

**FLORA OF  
ETHIOPIA AND ERITREA**

**VOLUME 2, PART 2**

# FLORA OF ETHIOPIA AND ERITREA

VOLUME 2, PART 2

CANELLACEAE TO EUPHORBIACEAE

*Editors*

*Sue Edwards*

*Mesfin Tadesse*

*and*

*Inga Hedberg*

**Addis Ababa, Ethiopia**

**Uppsala, Sweden**

**1995**

Published by  
The National Herbarium, Biology Department,  
Science Faculty, Addis Ababa University, Ethiopia,  
and  
The Department of Systematic Botany,  
Uppsala University, Sweden.

Prepared by the Ethiopian Flora Project, funded by Addis Ababa University and the Swedish Agency for Research Cooperation with Developing Countries (SAREC) through the Ethiopian Science and Technology Commission. Project Leader — Dr Tewolde Berhan Gebre Egziabher and European Coordinator — Professor Olov Hedberg.

All pages prepared in The National Herbarium using Personal Computers and an HP LaserJet Series II Printer. Main text formatted with MicroSoft Word, Version 5.5, final pages made with Ventura Publisher 4.0 for Windows, section on Vernacular names made with Word for Windows 6 with Compose Ge'ez fonts. Printed in Times New Roman point sizes 9, 10, 11 and 12.

Printed by the Educational Materials Production and Distribution Agency (EMPDA), Textbook Production Department, Ministry of Education, Addis Ababa, Ethiopia.

© The National Herbarium, June 1995

ISBN: 91-971285-1-1

Distributed by:

The National Herbarium,  
Addis Ababa University,  
P.O.Box 3434,  
ADDIS ABABA,  
ETHIOPIA

Department of Systematic Botany,  
Uppsala University,  
Box 541,  
S-751 21 UPPSALA,  
SWEDEN

#### Cover Illustrations

Front — *Euphorbia dumalis*, endemic herb of the Ethiopian highlands, drawn by Damtew Teferra

Back — *Terminalia schimperiana*, important tree in Combretaceous woodland,  
drawn by Eleanor Catherine

Spine — calyx of *Hibiscus surattensis*, striking herb from clearings in lowland rainforest,  
drawn by Eleanor Catherine

**FLORA OF ETHIOPIA AND ERITREA**  
**VOLUME 2, PART 2**

**CONTENTS**

<b>Editorial Board</b>	vii
<b>Contributors</b>	ix
<b>Foreword</b>	xi
<b>Acknowledgements</b>	xiii
<b>Map of the floristic regions of Ethiopia and Eritrea</b>	xiv
<b>Map of Ethiopia and Eritrea showing major physiographic features</b>	xv
<b>Abbreviations</b>	xvii
<b>Flora</b>	
60. Canellaceae by I. Friis	1
61. Cistaceae by Mesfin Tadesse	2
62. Frankeniaceae by Mesfin Tadesse	2
63. Tamaricaceae by Mesfin Tadesse	3
64. Passifloraceae by W.J.J.O. de Wilde & M.G. Gilbert	6
65. Cucurbitaceae by C. Jeffrey	17
66. Begoniaceae by Martin Sands, Sue Edwards & Mesfin Tadesse	60
67. Caricaceae by Mesfin Tadesse & Sue Edwards	64
68. Theaceae by Sue Edwards	65
69. Ochnaceae by K. Vollesen	66
70. Ancistrocladaceae by Mesfin Tadesse	70
71. Dipterocarpaceae by Mesfin Tadesse	70
72. Myrtaceae by I. Friis	71
73. Lecythidaceae by Mesfin Tadesse & Sue Edwards	107
74. Melastomataceae by M.G. Gilbert	108
75. Combretaceae by K. Vollesen	115
76. Rhizophoraceae by I. Friis	133
77. Guttiferae (Chusiaceae) by N.K.B. Robson	135
78. Scytopetalaceae by Mesfin Tadesse	144
79. Tiliaceae by K. Vollesen & Sebsebe Demissew	145
80. Sterculiaceae by K. Vollesen	165
81. Bombacaceae by K. Vollesen	186
82. Malvaceae by K. Vollesen	190
83. Malpighiaceae by E. Launert	257
84. Erythroxylaceae by B. Verdcourt	264
85. Euphorbiaceae by M.G. Gilbert	265
Amendments to Volume 3	
117. Balanophoraceae by B. Hansen	381
124. Meliaceae by F. White	382
A Glossary of Botanical Terms	383
Index to Scientific Names	401
Vernacular Names for Volume 2, Part 2	
Introduction	417
Arranged Alphabetically by Scientific Names	419
Ge'ez Names	430
Latin Names	437



# **FLORA OF ETHIOPIA AND ERITREA**

## **VOLUME 2, PART 2**

### ***Editorial Board***

**Dr Tewolde Berhan Gebre Egziabher,  
General Manager, National Environmental Protection Authority,  
and Keeper, The National Herbarium,  
Biology Department, Addis Ababa University, Ethiopia**

**Prof. Olov Hedberg,  
Department of Systematic Botany,  
Uppsala University, Sweden**

**Dr Mesfin Tadesse,  
The National Herbarium, Biology Department,  
Addis Ababa University, Ethiopia**

**Dr Sebsebe Demissew,  
The National Herbarium, Biology Department,  
Addis Ababa University, Ethiopia**

**Prof. Ib Friis,  
Head, Botanical Museum and Library,  
University of Copenhagen, Denmark**

**Dr Inga Hedberg,  
Conservation Unit, Department of Systematic Botany,  
Uppsala University, Sweden**

**Ms Sue Edwards,  
The National Herbarium, Biology Department,  
Addis Ababa University, Ethiopia**

**FLORA OF ETHIOPIA AND ERITREA  
VOLUME 2, PART 2**

**CONTRIBUTORS**

- Dr W.J.J.O. de Wilde, Rijksherbarium, P.O. Box 9514, 2300 RA Leiden, The Netherlands
- Prof. Ib Friis, Botanical Museum and Library, University of Copenhagen, Gothersgade 130, DK-1123 Copenhagen K, Denmark
- Mr M.G. Gilbert, Department of Systematic Botany, The Natural History Museum, Cromwell Road, London SW7 5BD, England
- Mr C. Jeffrey, The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK
- Dr E. Launert, formerly at the Department of Systematic Botany, The Natural History Museum, Cromwell Road, London SW7 5BD, England
- Mr N.K.B. Robson, Department of Systematic Botany, The Natural History Museum, Cromwell Road, London SW7 5BD, England
- Mr Martin Sands, The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK
- Dr Mesfin Tadesse, The National Herbarium, Addis Ababa University, P.O. Box 3434, Addis Ababa, Ethiopia
- Dr Sebsebe Demissew, The National Herbarium, Addis Ababa University, P.O. Box 3434, Addis Ababa, Ethiopia
- Ms Sue Edwards, The National Herbarium, Addis Ababa University, P.O. Box 3434, Addis Ababa, Ethiopia
- Dr B. Verdcourt, The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK
- Dr K. Vollesen, The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK

## FOREWORD

About fifty years after a clear manifestation of a surge foreword in the preparation and publication of floras around the world (the year 1939 according to *Guide to Standard Floras of the World* by D. G. Frodin, 1984), the first printed volume of a modern Flora of Ethiopia — Volume 3 — was published in 1989. Now, six years later, Volume 7 and Volume 2, Part 2 are published. Background information about the writing of a modern Flora, notes on plant collecting and identification, and information on the format of taxa (family, genus, species) appearing in the Flora volumes are provided in both the preface and the foreword to Volume 3. The reader is referred to that volume for information on these issues.

The Flora of Ethiopia and Eritrea Volume 2 is divided into two parts mainly due to the large number of species to be covered, estimated at over 1,100 in 85 families. Volume 2, Part 2, which comprises 26 families of flowering plant with 682 species and infraspecific taxa is published ahead of Volume 2, Part 1, for reasons of expediency. The present work starts with the *Canellaceae* and ends with the *Euphorbiaceae*. As in Volume 3, a number of families, such as *Dipterocarpaceae*, *Lecythidaceae* and *Scytotetalaceae*, which currently are not substantiated by voucher specimens, are included here for they could be propagated and grown in the country, or they may turn up in the future as some taxa within these families occur in one or more adjacent countries. In most cases the family description is brief and is accompanied by comments. Two of the editors (M.T. & S.E.) of this Volume took it as their responsibility to produce the descriptions of the five families in this category.

Members of three of the families in Volume 2, Part 2 (*Cucurbitaceae*, *Euphorbiaceae* and *Malvaceae*), which have large representations not only in the Flora area but also in the floras of North-East and East Africa, have been difficult to determine for anyone based in a regional herbarium. Now, with the acquisition of a thorough account for the taxa of the Flora area, it should be possible to identify with relative certainty any plant material belonging to these families. Further authentication can also be done in or obtained from the National Herbarium of Ethiopia. The accounts for *Cucurbitaceae* and *Malvaceae* also indicate clearly the need for further taxonomic work in a number of genera. The *Myrtaceae* contains the large genus, *Eucalyptus*, the species of which have been rather difficult to determine due to the paucity of voucher specimens, lack of clear records of taxa introduced into the country and the occurrence of natural hybridization within the genus. The account in this volume should enable foresters of both the Flora area and the East African region to have a better understanding of these important trees. The authors of these four families are highly credited for their timely and comprehensive contributions.

Without the active interest of the institutions which support and promote systematic botany, particularly the Herbarium and Library of the Royal Botanic Gardens at Kew, which provided a base and facilities to one of the co-editors (M.T.) during the first half of 1993, this part of Volume 2 would not have come to completion. The editors are also grateful for the support of all the specialists that have contributed accounts and the help from the Herbaria at Copenhagen, Florence, Kew, Nairobi, Paris, The Natural History Museum, Uppsala and Wageningen, all of whom have been extremely valuable in producing this and the other volumes of the Flora. We pay tribute to all these botanists and have no doubts in our minds that their contributions will be much appreciated by all those who deal with the plant life in this part of the world as well. In some of the accounts, the editors have supplied missing data or information derived from specimens and/or literature at the National Herbarium: circumstances dictated that this should be so.

Sometimes, the writing of a Flora is seen as an end in itself, but it is only a record of a certain state of knowledge for a particular area and time. A complete and perfect Flora would be paradoxical as it is dealing with living plants in a dynamic relationship with their environment. There are also many human activities involving plants which have dramatic effects on the floristic composition of all habitats, whether managed or wild. Fortunately the National Herbarium in Ethiopia, from which the Flora is being published, is now well enough staffed to make continuous studies of the flora a reality. For optimizing this human capacity, we look forward to the strengthening of the existing support and cooperation from both the Ethiopian authorities and our many friends and colleagues throughout the world, who are all concerned with biodiversity.

As editors we hope this work will remain available as reference material in its printed form for many years



to come. However, we also see a good Flora as a transient piece of work which should inspire others interested in the plants of a region to do more work to expand the frontiers of systematic botany and lead into new and economically or intellectually fruitful fields. The *Honeybee Flora of Ethiopia*, written by Reinhard Fichtl and Admassu Adi and published in 1994 is a testimony to such a belief. The principal author of this book wrote: 'All plant specimens have been identified in the National Herbarium and the descriptions for the book have been prepared in consultation with the staff of the National Herbarium as well as from data from the Herbarium collections and supporting literature, including that prepared for the Flora of Ethiopia.' The book is described as 'the first one on honey plants in Africa'.

M.T., S.E. & I.H.  
April 1995

## ACKNOWLEDGEMENTS

Production of the Flora of Ethiopia and Eritrea enjoys the support of many institutions and individuals both within and outside Ethiopia. The editors particularly acknowledge the contributions of the following which have made the publishing of the present volume possible:

The Ethiopian Government through the Ethiopian Science and Technology Commission, in particular the Commissioner – Dr Kebede Tadesse, and the Deputy Commissioner – Ato Asrat Bulbula, and the Swedish Government through the Swedish Agency for Research Cooperation with Developing Countries (SAREC) who have provided the financial support for the preparation and publishing of this volume. The past and present officers of Addis Ababa University, especially the office of President and its present incumbent – Dr Duri Mohammed, the past Research and Publications Officers and the present holder – Dr Endashaw Bekele, the past Dean of the Faculty of Science and the present office holder – Dr Zemedu Asfaw, and the past and present Heads of the Department of Biology with the present Head – Dr Yalemtehay Mekonnen, all of whom have given their administrative support to the Project; and

The Royal Botanic Gardens, Kew, in England, particularly the Director – Dr Gilleen Prance, and the Keeper of the Kew Herbarium – Professor Gren L. Lucas and his scientific and technical staff for their most valuable support and contributions to the present volume. The Botanical Museum and Library of the University of Copenhagen, especially its Head – Professor Ib Friis, for both his contributions and sound and practical advice on many editorial matters. The Department of Botany in the Natural History Museum, London, where the accounts for the present volume were prepared.

The editors also gratefully acknowledge the support of the editors of the *Flora of Tropical East Africa* and *Flora Zambesiaca* in allowing the use of illustrations published in these works to be reproduced in this Volume of the Flora of Ethiopia and Eritrea.

Last, but not least, the editors acknowledge the support of their colleagues and friends: Ms Eva Persson in Sweden, and in Ethiopia our fellow taxonomists and ecologists – Drs Ensermu Kelbessa, Getachew Aweke, Sileshi Nemomissa, Sebsebe Demissew, Tamrat Bekele, Zemedu Asfaw and Zerihun Woldu, editorial assistants – Ato Mirutse Giday and Ato Yilma Tesfaye, Herbarium secretary – W/o Asselefetch Ketsela, Herbarium administrator – Ato Tamrat Bekele, Herbarium librarian – W/t Eyerusalem Nebiyu, and the technical staff and drivers – W/o Emebet Getnet, Ato Melaku Wondafrash, Ato Shigultie Kebede and Ato Tamene Muluberhan. One of us (S.E.) is particularly grateful for the technical support and encouragement she received from her fellow editors, the Herbarium's illustrator and copy editor – Ato Damtew Teferra, and freelance editor – Ato Solomon Tilahun, for helping her keep going when problems in getting this volume to the press seemed almost insurmountable.

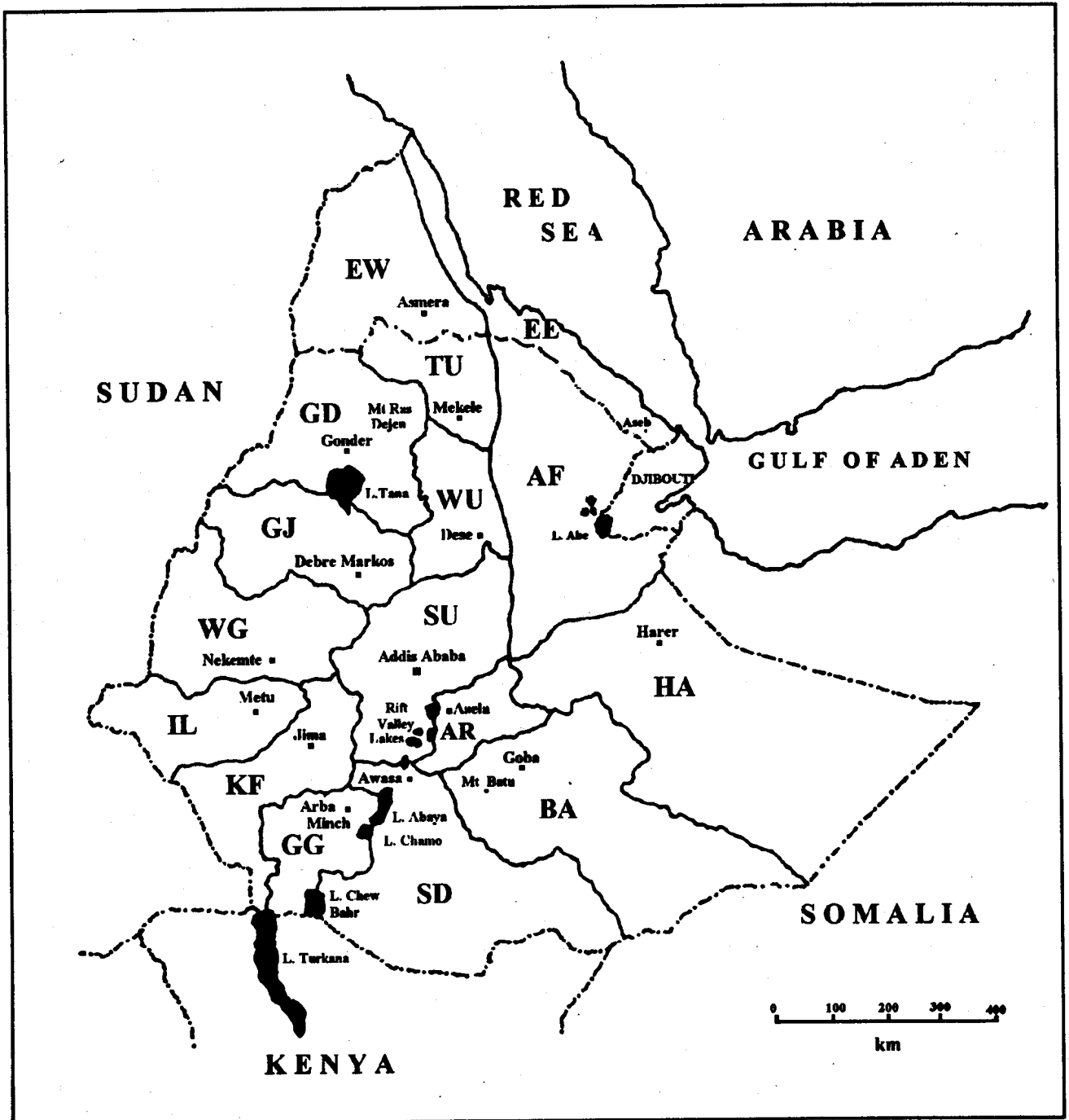
Finally, we thank our partners and families for their encouragement and understanding through the long period it has taken to finalize this volume.

S.E., M.T. & I.H.  
June 1995

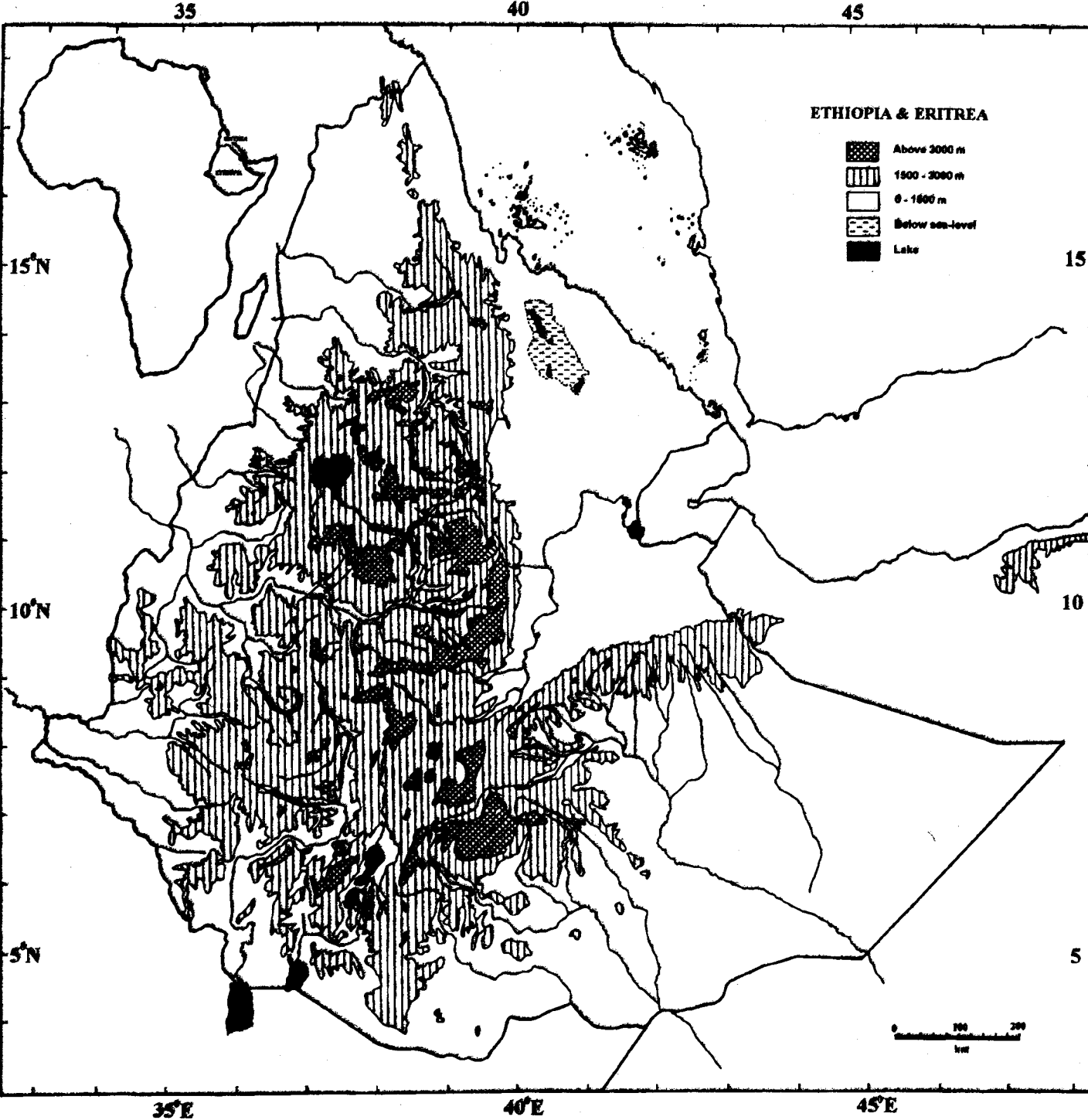
## MAP OF THE FLORISTIC REGIONS OF ETHIOPIA AND ERITREA

(These are the regions used in Volume 3 and kept in this Volume for continuity. They do not bear any relation to the present administrative structures.)

- |  |                       |
|--|-----------------------|
| EE – Eritrea East, below and to the east of the 1000 m contour   | AR – Arsi region      |
| EW – Eritrea West, above and to the west of the 1000 m contour   | WG – Welega region    |
| AF – Afar region, below and to the east of the 1000 m contour to the Eritrean border in the east and the Harerge border in the south | IL – Illubabor region |
| TU – Tigray region, above and to the west of the 1000 m contour  | KF – Kefa region      |
| GD – Gonder region   | GG – Gamo Gofa region |
| GJ – Gojam region  | SD – Sidamo region    |
| WU – Welo region, above and to the west of the 1000 m contour  | BA – Bale region      |
| SU – Shewa region, above and to the west of the 1000 m contour   | HA – Harerge region   |



# MAP OF ETHIOPIA AND ERITREA SHOWING MAJOR PHYSIOGRAPHIC FEATURES





**ABBREVIATIONS**  
(excluding authorities for names)

All units of measurement are given with SDI abbreviations.

Herbarium abbreviations are according to the 7th edition, 1981, of *Index Herbariorum*.

± - more or less

ACD - Herbarium, Alemaya University of Agriculture, Ethiopia, formerly Agricultural College of Haile Selassie 1st University, Diredawa, Ethiopia

ACT - Australian Capital Territory

Act. Bot. Nederland - *Acta botanica Neerlandica*

Adumb. Fl. Aeth. - *Adumbratio Florae Aethiopicae*

AF - Afar region, Ethiopia

Afr. - Africa

Agric. Colon. - *l'Agricoltura Coloniale*

ALF - Herbarium, Institut d'Élevage et de Médecine Vétérinaire des Pays Tropicaux, Maisons Alfort, France

alt. - altitude

Amer. - American

Ann. Cons. Bot. Geneve - *Annales Conservatoire et Jardin Botanique de la Ville de Genève*

Ann. di Bot. - *Annali di Botanica*, Roma

Ann. Miss. (Missouri) Bot. Gard. - *Annals of the Missouri Botanical Garden*

Ann. Naturh. Mus. Wien. - *Annalen des k.k. naturhistorischen (Hof)museums*, Wien

Ann. R. 1st. Bot. Roma - *Annali di Botanica*, Roma

Ann. Sc. Nat. - *Annales des Sciences naturelles*, Paris

Append. - Appendix

AR - Arsi region, Ethiopia

auct. - 'auctorum' Latin for 'of authors'; used to show that a name has been commonly misapplied to a different species from that to which it was originally given

B - Botanischer Garten und Botanisches Museum, Berlin, West Germany

BA - Bale region, Ethiopia

BM - Herbarium, The Natural History Museum, formerly The British Museum (Natural History), London, UK

Bol. Soc. Brot. - *Boletim da Sociedade Broteriana*

Boll. R. Orto. Bot. Palermo - *Bollettino del R. Orto Botanico, Palermo*

Bot. - botany

Bot. Jahrb. - *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie*, Leipzig

Bot. Not. - *Botaniska Notiser*, Lund

BR - Herbarium, Jardin Botanique National de Belgique, Meise, Belgium

Bull. - Bulletin

Bull. Br. Mus. Nat. Hist. (Bot.) - *Bulletin of the British Museum (Natural History)*, London

Bull. Misc. Inf. - *Bulletin of Miscellaneous Information*, Royal Kew Botanic Gardens, Kew, London

Bull. Herb. Boiss. - *Bulletin de l'Herbier Boissier*, Genève & Bâle

Bull. Jard. Bot. Etat. Brux. - *Bulletin du Jardin botanique de l'Etat à Bruxelles*, Bruxelles

Bull. Nat. Hist. Mus. Lond. (Bot.) - *Bulletin of the British Museum (Natural History)*, London

Bull. Soc. Bot. Fr. - *Bulletin de la Société botanique de France*

c - 'circa' Latin for 'about' or 'approximately'

C - (before a place name) central

C - Botanical Museum and Herbarium, Copenhagen, Denmark

CADU - Chilalo Agricultural Development Unit

CAL - Central National Herbarium, Botanical Survey of India

cf. - 'confer' Latin for 'compare'

CGE - Herbarium, Botany School, University of Cambridge, England

cons. - 'conservandus' Latin for 'to be kept'

Consp. Fl. Angol. - *Conspectus Florae Angolensis*.

consv. - 'conservandum' Latin for 'conserved'

Cufod. - Cufodontis

Curtis' Bot. Mag. - *Curtis's Botanical Magazine*, London

dbh - diameter at breast height

destr. - destroyed

diam. - diameter

E - east

e.g. - 'exempli gratia' Latin for 'for example'

EA (also sometimes mistakenly as EAH) - East African Herbarium, Nairobi, Kenya

ed. - edition, edited by, or editor(s)

EE - Eritrea east, below 1000 m contour to the Red Sea on the east

Encyc. - Encyclopaedia

Eng. - English

Enum. - *Enumeratio Plantarum Aethiopiae*

et al. - 'et alii' Latin for 'and others'

etc. - 'et cetera' Latin for 'and the rest'

ETH - The National Herbarium, Addis Ababa University, Ethiopia

EW - Eritrea west, above 1000 m contour to the Sudan on the west

ex - Latin for 'without'

excl. - 'exclusus' Latin for 'excluded'

f. - 'filius' Latin for 'son'

Fam. - family (of plants)

FHO - Forest Herbarium, Department of Forestry, University of Oxford, UK

FI - Herbarium Universitatis Florentinae, Museo Botanico, Firenze, Italy

fide - Latin for 'according to'

Field Mus. Nat. Hist. - *Field Museum of Natural History*, USA

fig. - figure

Fl. Afr. Cent. - *Flore d'Afrique Centrale*

Fl. Anal. d'Ital. - *Flore Annali d'Italiana*

Fl. Bras. - *Flora Brasiliensis*

Fl. Cap. - *Flora Capensis*

Fl. Congo - *Flore du Congo Belge*

Fl. du Congo du Rwanda et du Burundi - *Flora du Congo du Rwanda et du Burundi*

Fl. Eth. - *Flora of Ethiopia*

Fl. Males. - *Flora Malesiana*

Fl. Mascareignes - *Flora de Mascareignes*

- Fl. Maurit. & Seych. - *Flora of Mauritania and Seychelle*  
 Fl. Somalia - *Flora of Somalia*  
 Fl. Trop. Afr. - *Flora of Tropical Africa*  
 Fl. Trop. E. Afr. - *Flora of Tropical East Africa*  
 Fl. W. Trop. Afr. - *Flora of West Tropical Africa*  
 Fl. Zam. - *Flora Zambesiaca*  
 Forest Fl. North. Rhodesia - *Forest Flora of Northern Rhodesia*  
 FR - Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt, Germany  
 fragm. - fragment  
 fructu minimo - Latin for 'small fruited'  
 FT - Erbario Tropicale di Firenze, Firenze, Italy  
 G - Herbarium, Conservatoire et Jardin botaniques, Genève, Switzerland  
 GD - Gondar region, Ethiopia  
 GE - Erbario dell' Instituto Botanico 'Hanbury' e Orto Botanico dell'Università di Genova, Genova, Italy  
 Genera of Fl. Plants - *Genera of Flowering Plants*  
 GG - Gamu Gofa region, Ethiopia  
 GJ - Gojam region, Ethiopia  
 GOET - Systematisch-Geobotanisches Institut, Göttingen, Germany  
 HA - Hararge region, Ethiopia  
 HBG - Herbarium, Institut für Allgemeine Botanik und Botanischer Garten, Hamburg, Germany  
 Herb. - herbarium  
 Herb. Thouin - Herbarium of Thouin  
 Herbar. Amboin. - *Herbarium Amboinense*  
 holo. - holotype  
 hort. - 'hortorum' Latin for 'of gardens'; a name used in horticulture  
 I.A.R. - Institute of Agricultural Research, Ethiopia  
 Ibid - 'Ibidem' Latin for 'in the same place'  
 ICBN - *International Code of Botanical Nomenclature*  
 IECAMA - (also sometimes IECA) - Imperial Ethiopian College of Agriculture and Mechanical Arts, now Alemaya University of Agriculture, Ethiopia  
 IL - Ilubabor region, Ethiopia  
 ILCA - International Livestock Centre for Africa, Addis Ababa, Ethiopia  
 in sched. - 'in schedula' Latin for 'on a herbarium label'  
 in syn. - Latin for 'in synonymy'  
 incl. - including  
 Indet - indeterminate  
 Indian J. Bot. - *Indian Journal of Botany*  
 ined. - 'ineditus' Latin for 'the item is being prepared for publication'  
 Inst. - *Institutiones Rei Herbariae*  
 Is. - Islands  
 iso. - isotype  
 isolecto. - isolectotype  
 isoneo. - isoneotype  
 isosyn. - isosynotype  
 J. Arn. Arb. - *Journal of the Arnold Arboretum*  
 J. Linn. Soc. Bot. - *Journal of Linnean Society of Botany*  
 J. S. Afr. Bot. - *Journal of South African Botany*  
 JE - Herbarium Haussknecht, Friedrich-Schiller-Universität, Jena, Germany  
 Jimma Agric. Tech. School - Jimma Agriculture and Technical School  
 K - The Herbarium, Royal Botanic Gardens, Kew, UK  
 Kew Bull. - *Kew Bulletin*  
 KF - Kefa region, Ethiopia  
 L - Rijksherbarium, Leiden, Netherlands  
 L. - lake  
 l.c. - 'loco citato' Latin for 'in the place cited'  
 LD - Botanical Museum, Lund, Sweden  
 LE - Herbarium of the Department of Higher Plants, V.L. Komarov Botanical Institute of the Academy of Sciences, St. Petersburg (Leningrad), Russia  
 lecto. - lectotype  
 leg. - 'legit' Latin for 'collected by'  
 LINN - Herbarium, The Linnean Society of London, London, England  
 LISU - Museu, Laboratório e Jardim Botânico, Lisboa, Portugal  
 loc. cit. - 'loco citato' Latin for 'at the place cited'  
 LUB - Herbarium, Naturhistorisches Museum zu Lübeck, Lübeck, Germany  
 LY - Herbiers de l'Université de Lyon, Villeurbanne, France  
 M - Herbarium, Botanische Staatssammlung, München, Germany  
 MA - Herbarium, Jardín Botánico, Madrid, Spain  
 Man. Cult. Plants - *Manual of Cultivated Plants*  
 Mem. Inst. Sc. Madag. - *Mémoires de l'Institut Scientifique de Madagascar*  
 Mem. N. Y. Bot. Gard. - *Memoirs of the New York Botanic Garden*  
 Miss. Biol. Borana - *Missione Biologica nel Paese dei Borana*  
 MO - Missouri Botanical Garden  
 Monogr. Afr. Pfl. -Fam. - *Monographien Afrikanischer Pflanzenfamilien*  
 Monogr. Afr. Pfl. -Fam. Und. -Gatt. - *Monographien Afrikanischer Pflanzenfamilien und Gattungen*  
 MPU - Institut de Botanique, Montpellier, France  
 Mt. - mountain  
 N - north  
 Nat. Herb. - National Herbarium (of Ethiopia)  
 NE - northeast  
 neo. - neotype  
 NNW - north-northwest  
 nom. - 'nomen' Latin for 'name'  
 nom. confus. - 'nomen confusum' Latin for 'confused name'  
 nom. cons. or nom. conserv. - 'nomen conservandum' Latin for 'conserved name'  
 nom. illegit. - 'nomen illegitimum' Latin for 'illegitimate name'  
 nom. nov. - 'nomen novum' Latin for 'new name'  
 nom. nud. - 'nomen nudum' Latin for 'naked name'; a name published without a description of the taxon  
 nom. superfl. - 'nomen superfluum' Latin for 'a superfluous name'; a name superfluous when published  
 non sens. str. - 'non sensu stricto' Latin for 'not in the strict sense'; not in the same sense as the original author of the group

- Nord. J. Bot. - *Nordic Journal of Botany*  
 NTM - Herbarium, Muséum d'Histoire Naturelle, Nantes, France  
 NW - northwest  
 Op. Bot. - *Opera Botanica*  
 op. cit. - 'opera citato' Latin for 'in the work already cited'  
 OXF - Herbarium, Department of Botany, University of Oxford, England  
 P - Muséum National d'Histoire Naturelle, Laboratoire de Phanérogamie, Paris, France  
 p. - page  
 p.p. - 'pro parte' Latin 'for in part'; used to show that only a part of the group as circumscribed by the original author is being used by the later author  
 PAL - Erbario Siculo and Erbario Generale, Palermo, Italy  
 PAT - Laboratoire d'Ethnobotanique, Muséum National d'Histoire Naturelle, Paris, France  
 Phyta Canar. - *Phyta Canariensis*  
 pp. - pages  
 PRE - National Herbarium, Botanical Research Institute, Pretoria, South Africa  
 pro maiore parte - Latin for 'for the major part'  
 prob. - probable or probably  
 Prodr. - 'prodromus' Latin for 'forerunner', a preliminary work which should be followed by a more complete one  
 R. - river  
 Result. Sci. Miss. Stef-paoli - *Resultati Scientifici della Missione Stefanini-Paoli nella Somalia Italiana*  
 RO - Erbario dell'Istituto Botanico dell'Università di Roma, Roma, Italy  
 S - Herbarium, Swedish Museum of Natural History (Naturhistoriska riksmuseet), Stockholm, Sweden  
 S - south  
 Sect. - Section of a genus  
 s. lat. - 'sensu lato' Latin for 'in a broad sense'  
 s.n. - 'sine numero' Latin for 'without a number'  
 SD - Sidamo region, Ethiopia  
 SE - southeast  
 Sect. - section  
 sensu - Latin for 'in the sense of'  
 sensu lato - Latin for 'in a broad sense'  
 Ser. - (also ser) - Series  
 sine relat. nom. - 'sine relatatum nomen' Latin for 'without a related name'  
 SINET: Eth. J. Sci. - *SINET: An Ethiopian Journal of Science*  
 sp. - species (singular)  
 spp. - species (plural)  
 STR - Institut de Botanique de l'Université Louis Pasteur, Strasbourg, France  
 SU - Shewa upland, above 1000 m contour to west, Ethiopia  
 Subgen. - Subgenus  
 subsp. - subspecies (singular)  
 subspp. - subspecies (plural)  
 Suppl. - supplement  
 Svensk. Bot. Tidsskr. - *Svensk Botanisk Tidskrift*  
 SW - southwest  
 syn. - synonym  
 t. - 'tabula' Latin for 'illustration'  
 tab. - 'tabula' Latin for 'illustration'  
 Tent. Fl. Abyss. - *Tentamen Florae Abyssinicae*  
 TO - Herbarium, Museum Botanicum Horti Taurinensis, c/o Istituto ed Orto Botanico dell'Università, Torino, Italy  
 Trop. - tropical  
 TU - Tigray region, Ethiopia  
 TUB - Herbarium, Institut für Biologie I, Tübingen, Germany  
 U. S. Nat. Herb. - *United States National Herbarium*  
 Univ. California Public. Bot. - *University of California Publications in Botany*  
 UPS - The Herbarium, University of Uppsala, Uppsala, Sweden  
 US - United States National Herbarium, Smithsonian Institution, Washington, U.S.A.  
 var. - variety  
 Verz. Vorl. Akad. Braunsberg S. -Sem - *Verzeichnis der Vorlesungen an den Königlichen Akademie zu Braunsberg*  
 vol. - volume of a published work which appears in more than one part  
 W - Naturhistorisches Museum, Wien, Austria  
 W - west  
 WAG - Herbarium Vadense, Laboratory for Plant Taxonomy and Plant Geography, Netherlands  
 WG - Welega region, Ethiopia  
 WIR - Herbarium, The All-Union Institute of Plant Industry, St Petersburg (Leningrad), Russia  
 WU - Welo region, Ethiopia  
 Z - Institut für systematische Botanik der Universität Zürich, Zürich, Switzerland





## 60. CANELLACEAE

by I. Friis\*

Verdcourt, *Canellaceae* in *Fl. Trop. E. Afr.*: 4 pp. (1956).

Glabrous aromatic trees. Leaves alternate, exstipulate, entire, penninerved, marked with pellucid dots. Flowers cymose, axillary or terminal, bisexual, regular; bracts 3, orbicular, much overlapping, persistent. Sepals 3–5, free, thick, deciduous, imbricate, the innermost narrower. Petals the same number as the sepals or more, thin, imbricate. Stamens above the ovary, 5–20, the filaments united into a tube produced above the anthers; anthers sometimes linear, opening length-wise. Ovary free from corolla tube, 1-locular, with 2–6 parietal placentas; style short, thick, or stigmas free, 2–5; ovules ascending or horizontal. Fruit a berry; seeds 2 to many; testa hard and brittle, shining.

A small family with 5 genera and about 10 species; pantropical. Only 1 genus with 1 species in the Flora area.

**WARBURGIA** Engl. (1895)

Trees. Leaves alternate, leathery, oblanceolate. Inflorescences of small axillary bracteate cymes. Flowers with 3 suborbicular sepals; outer 5 petals twice as long as the sepals, obovate-spathulate, the inner 5 slightly narrower than the outer, spatulate. Stamens 10, connate into a cylindrical column as long as the petals; anthers linear-oblong, with the connective prolonged beyond the thecae. Ovary elongated; placentas 5 with ovules in 1 row on each; styles connate almost to the top; stigmas 5. Fruit ellipsoid, fleshy with waxy covering.

Genus with 2 species in east tropical and S Africa, 1 in the Flora area.

The treatment here differs from that by Verdcourt in *Fl. Trop. E. Afr.* in that only two species are recognized, an upland taxon referred to as *W. ugandensis* Sprague and a coastal taxon referred to as *W. salutaris* (Bertol. f.) Chiov.

***W. ugandensis* Sprague (1906)**

– type: 'from Uganda'.

Tree to 30 m tall, commonly 10–20 m. Bole usually short and straight for 3–5 m. Bark brown to blackish, rough, with rectangular scales; inner bark dark pink-red; slash red with fine whitish streaks; sap scanty, sticky. Twigs glabrous. Leaves simple, entire, with translucent dots, ovate to oblanceolate, 3–9 x 1.5–3 cm, apex shortly acuminate; petiole narrowly winged, 0.3–0.5 cm long. Inflorescence of few-flowered, short, axillary cymes; flowers green, 4–6 mm long; sepals *c* 3 x 5 mm; petals *c* 4 x 2 mm; staminal tube *c* 4 x 2 mm; ovary *c* 3 mm long. Fruit green, turning purple, ovoid, *c* 25 x 15 mm. Seed compressed, yellowish-brown, *c* 3–5 mm long.

Transitional montane forest, adjacent woodland, often on termite mounds; 1400–1600 m. BA (only known from a small area at Dollo Menna); NE Zaire, Uganda, Kenya, Tanzania. *Chaffey* 307; *Friis et al.* 3446; *Mesfin T.* 5623.

A useful timber tree valued elsewhere in Africa, the wood has been used by the Wood Utilization & Research Center, Addis Ababa. Heartwood yellow or greenish, becoming brown on exposure, very fragrant when freshly cut,

the scent somewhat resembling that of sandalwood, *Santalum album* L., of India.

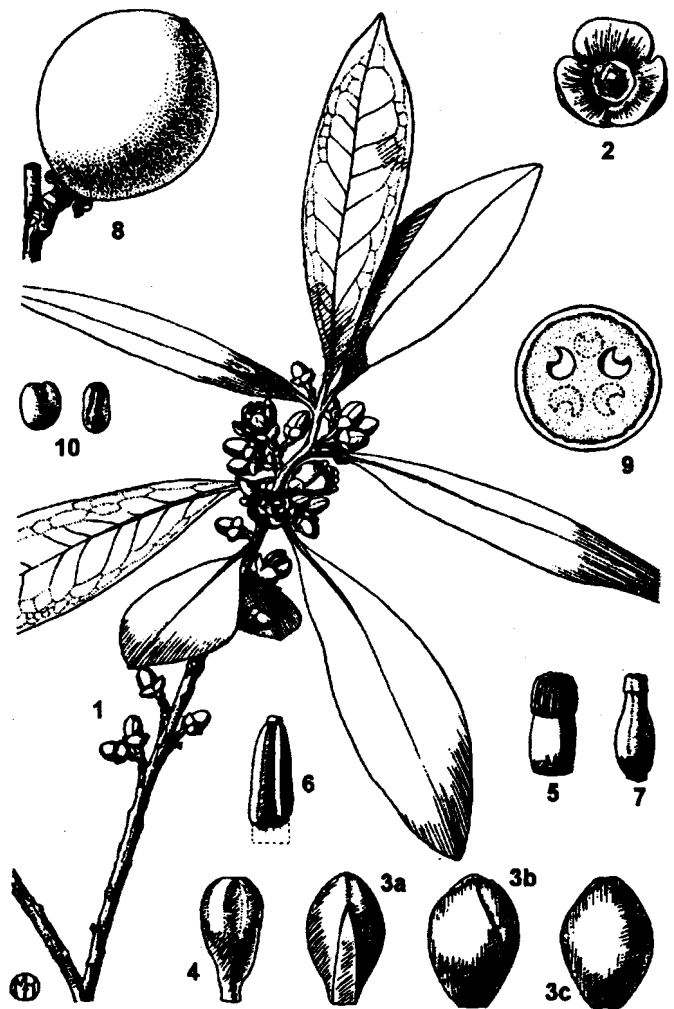


Figure 60.1 *WARBURGIA UGANDENSIS*: 1 – flowering branch x  $\frac{1}{2}$ ; 2 – bracts x  $1\frac{1}{2}$ ; 3 – sepals x  $3\frac{1}{2}$ ; 4 – petal x  $3\frac{1}{2}$ ; 5 – stamens x 5; 6 – anther x 8; 7 – pistil x  $3\frac{1}{2}$ ; 8 – fruit x  $\frac{1}{2}$ ; 9 – diagrammatic cross-section of fruit x  $\frac{1}{2}$ ; 10 – seeds x  $\frac{1}{2}$ . 1–7 from *G. R. Williams* 495; 8–10 from *Verdcourt* 1010 & 1010A. Drawn by *Olivia Milne-Redhead*. (Reproduced with permission from *Fl. Trop. E. Afr. Canellaceae*: fig. 1.)

\* Botanical Museum, University of Copenhagen, Gothersgade 130, DK-1123 Copenhagen K, Denmark.

## 61. CISTACEAE

by Mesfin Tadesse\*

*Cufodontis*, *Enum.*: 593 (1959); Verdcourt, *Bot. Soc. Brot.*, ser. 2, 40: 55-61 (1966); Burger, *Families of Flowering Plants in Ethiopia*: 103 (1967); Heywood (ed.), CXII. *Cistaceae* in *Flora Europaea*, 2: 282 (1968); Hutchinson, 75. *Cistaceae* in *The Families of Flowering Plants*: 245 (1973); Thulin, 54. *Cistaceae* in *Fl. Somalia*: 207-208 (1993).

Shrubs or herbs; indumentum often stellate. Leaves simple, opposite or rarely alternate; stipules present or fused to the petiole. Flowers perfect, regular, solitary to cymose, showy. Sepals 3 or 5, contorted or imbricate in bud, usually falling early. Stamens many; filaments free; anthers 2-locular, introrse, opening lengthwise. Ovary superior, 1-locular. Ovules 2 or more on each of the 3 or 5 (rarely 10) placentas; placentation parietal or placenta incompletely septate towards the base. Style simple, sometimes absent; stigmas 3-5, free or fused. Fruit a capsule, opening along locules.

A family of 7 genera and about 175 species with many of the species being found in the Mediterranean area and in North America. Some members of the genera *Cistus*, *Halimium* and *Helianthemum* are showy, shrubby ornamentals sometimes grown in gardens. Fragrant resin is also obtained from *Cistus*. *Helianthemum* Mill. which occurs in northern Somalia on gypsum/limestone may turn up in similar habitats in eastern Ethiopia.

## 62. FRANKENIACEAE

by Mesfin Tadesse\*

Chater, *Flora Europaea*, 2: 294 (1968); Obermeyer, *Frankeniaceae* in *Flora of Southern Africa*, 22: 32-36 (1976).

Herbs or dwarf shrubs with often prostrate branches, gregarious, rarely annual; stem densely covered with salt-secreting glands. Leaves often ericoid, decussate or verticillate (then usually 4), often in axillary fascicles through suppression of the branchlets. Flowers solitary or aggregated in terminal dichasia, sessile, regular, bisexual, rarely polygamous and dioecious (in *Niederleinia*). Calyx fused for more than half of its length, 4-6-lobed. Petals 4-6, free, imbricate, with a scale-like appendage attached to the claw on the inside (rarely absent), pink, mauve, red, white or yellow. Stamens (3-) 6(-24), in 2 whorls; filaments free or fused and expanded at base; anthers 2-locular, versatile, extrorse; staminodes present in *Niederleinia*. Ovary superior, 1-locular; ovules 1-many, placentation basal or parietal, attached to long funicles; style filiform, stigmatic branches (1-) 3(-4), rarely capitate. Fruit capsule, held in the calyx, dehiscing lengthwise along locules. Seeds small, ovoid-fusiform, smooth or rough.

A cosmopolitan family with 5 genera usually found along the sea coast; halophytic. *Frankenia* is the largest and most widespread genus recorded from the coastal parts of Africa and the associated islands. *F. pulverulenta* L. is known from Sudan (Erkowit, Aqiq, Red Sea Coast) and might also turn up in EE and/or AF.

\* The National Herbarium, Addis Ababa University, P.O. Box 3434, Addis Ababa, Ethiopia.

## 63. TAMARICACEAE

by Mesfin Tadesse\*

Oliver, *Fl. Trop. Afr.* 1: 151 (1868); Keay, *Tamaricaceae* in *Fl. W. Trop. Afr.* ed. 2. 1: 198 (1954); Cufodontis, *Enum.*: 591 (1959); Hunt, *Tamaricaceae* in *Fl. Trop. E. Afr.*: 3 pp. (1966); Mesfin Tadesse, 55. *Tamaricaceae* in *Fl. Somalia*, 1: 208–209 (1993).

Shrubs or small trees with slender branches and branchlets, halophytes, xerophytes or rheophytes. Leaves simple, scale-like or ericoid, alternate, exstipulate, with salt-secreting glands. Flowers small, bracteate, solitary, or in racemes or spikes, regular, hypogynous, monoecious or dioecious. Perianth 4–5-merous, imbricate, free. Stamens as many as the petals and alternating with them, or twice as many as petals in two alternating whorls; filaments free or united, inserted on a disc; anthers 2-theous, opening by longitudinal slits. Ovary superior, unilocular with 3–4 carpels; ovules with parietal placentation; styles as many as carpels, free or united below or stigmas sessile. Fruit a septicidal or loculicidal capsule, seeds numerous with long unicellular hairs.

Family with 5 genera and about 87 species; widespread in Eurasia and North Africa, especially common in the Mediterranean region and Central Asia. In the Flora area, 1 genus with 3 species.

## TAMARIX L. (1753)

Baum, *The genus Tamarix*: 1–209 (1978).

Shrubs or small trees, up to 10 m high. Stems pale brown, narrowly reticulately fissured. Leaves small, scale-like or ericoid, entire, alternate, glabrous to hairy, sessile with narrow bases, with numerous tiny salt-excreting glands. Inflorescence of simple or compound racemes or spikes. Flowers 4–5-merous, monoecious or dioecious, bracteate. Calyx 4–5, connate at base, entire or toothed, glabrous, papillose or hairy. Petals 4–5, white, pink or red, ovate or obovate, entire or emarginate. Stamens free, arising from a nectar-producing disc, in 2 whorls, the outermost whorl 4–5, opposite the sepals; the inner whorl 4–10, opposite the petals; anthers apiculate. Pistil with conical ovary and 3–4 stigmas; styles short and thick. Seeds small, glabrous except for an apical tuft of soft hairs.

A genus of about 54 species; chiefly in the Mediterranean region, Central Asia, and Europe but also occurring in Africa, Arabia, India, China and Japan. Only 3 species in Ethiopia.

Cufodontis (*op. cit.*) lists 5 other species but these occur outside the Flora area as has also been indicated by Baum (1978): *T. pentandra* Pallas (1788) in temperate Asia and Europe, *T. manifera* (Ehrenb.) Bunge in Egypt, Israel and Jordan, *T. passerinoides* Del. ex Desv. in Algeria, Egypt and Sinai, *T. arabica* Bunge in Egypt, Israel, Jordan, Saudi Arabia and Yemen, and *T. socotrana* Vierh. (1907) in Somalia and Socotra. Baum (1978: 50, Map 8) indicated *T. arabica* as occurring in southern Sidamo and eastern Harerge in Ethiopia as well as in southern Sudan, NE Kenya and in Socotra, but the species is not mentioned from these countries in the text. This is assumed to be an error made in preparing the map as there is also no indication of the presence of the species from Tanzania in the text although it is shown on the map.

1. Branchlets and young branches articulated; leaves minute, with only a tiny apiculate sheathing base; petals persistent or falling quickly. 1. *T. aphylla*

- Branchlets and young branches not articulated; leaves 1–3 mm long, closely imbricate, sessile with narrow base, sometimes auriculate; petals falling quickly. 2
2. Racemes up to 10 cm long, usually 3–4 mm wide at anthesis, flowers loosely arranged; ultimate branches slender with spreading leaves. 2. *T. nilotica*
- Racemes up to 5 cm long, usually 4–5 mm wide at anthesis, compact and cylindrical in fruit; ultimate branches wider with appressed leaves. 3. *T. arborea*

1. *T. aphylla* (L.) Karst. (1882);

*Thuja aphylla* L. – type: Egypt, LINN 1136.3 (holo.).

*Tamarix orientalis* Forssk. (1775); *T. articulata* Vahl (1791) – type: Egypt, *Forsskål* s.n. (C holo. not seen).

Tree or shrub, 8–10 m high, with spreading articulated branches. Leaves reduced to minutely apiculate sheathing bases at the apex of the articulated branchlets, or 1–3 mm long on major branches. Inflorescence racemose with all branches at the end of current season's growth, 60–80 mm long, 5–7 mm in diameter; bracts sheathing, concave, about 0.5 mm long. Flowers sessile to subsessile, 3–4 mm long, *c* 1.5 mm wide at base, white to pink or reddish-pink. Sepals 5, suborbicular, *c* 1 mm long, *c* 1 mm wide at base. Petals 5, oblong-lanceolate, 3 mm long, *c* 1 mm wide at base. Stamens 5, filaments equal to or longer than petals, slender, anthers minutely apiculate. Disk lobed at insertion of stamens. Seeds light brown, 0.5 mm long, glabrous except for the apical tuft of soft white hairs. Fig. 63.1.11–12.

Sandy-salty banks of wadis, river banks, dry deciduous woodland or scrubland, rarely in sugar-cane or cotton plantations (?cultivated); 15–900 m. EE WU SU SD HA; also in Morocco, Algeria, Libya, Egypt, Senegal, Sudan, Somalia, Kenya, Israel, Saudi Arabia, Yemen, Iraq, Kuwait, Iran, Pakistan, and Afghanistan. *Hemming* 1082; *Amare Getahun* F-36; *Burger* 2171.

\* The National Herbarium, Addis Ababa University, P.O. Box 3434, Addis Ababa, Ethiopia.

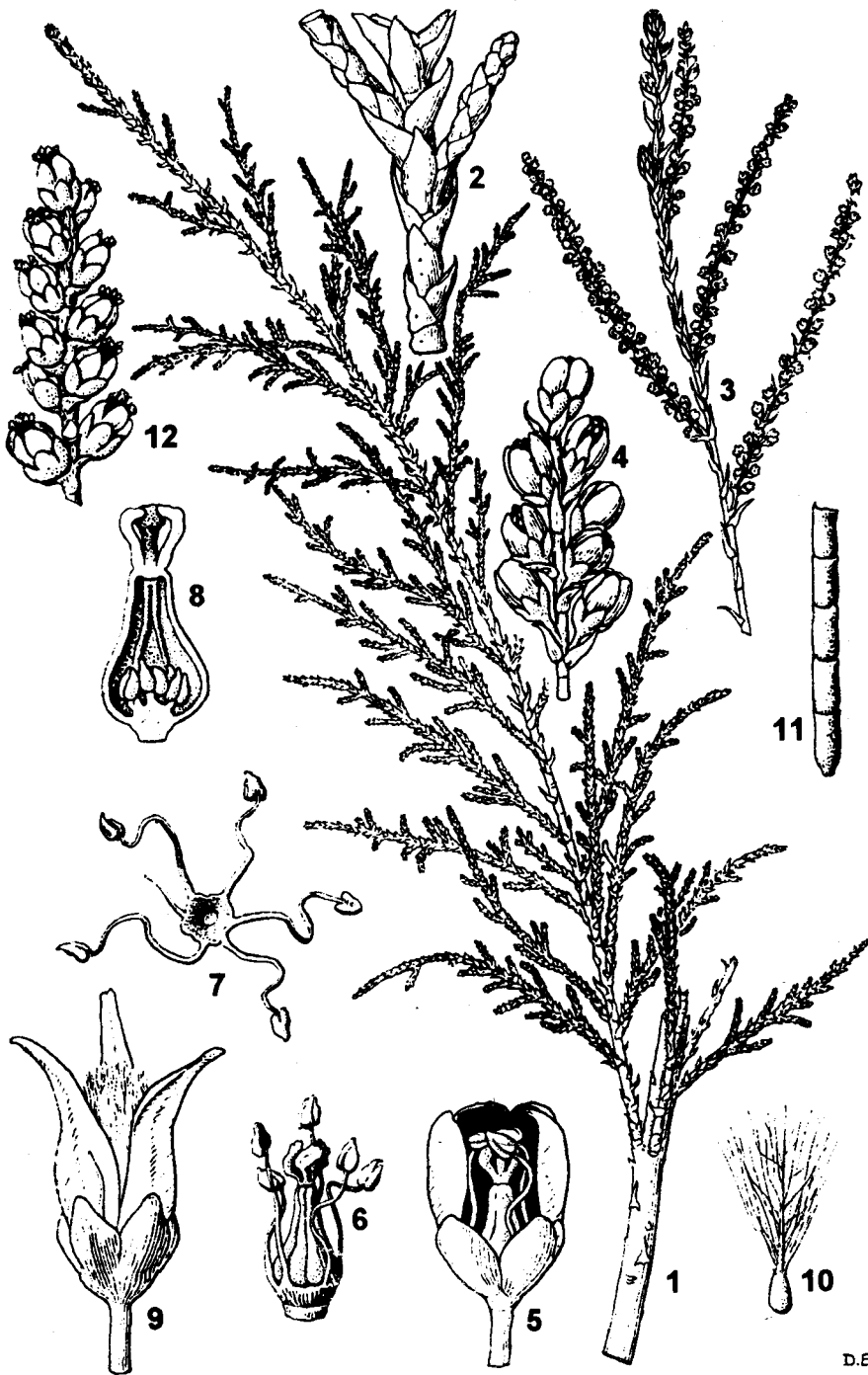


Figure 63.1 *TAMARIX NILOTICA*: 1 – leafy branch x 1; 2 – portion of branchlet x 5; 3 – flowering shoot x 1; 4 – detail of inflorescence x 4; 5 – side view of flower with one petal removed x 10; 6 – stamens and pistil x 10; 7 – stamens and disk (flattened) from above x 10; 8 – ovary with side removed to show placentation x 12; 9 – ripe fruit, side view x 10; 10 – seed x 10. *T. APHYLLA*: 11 – portion of branchlet x 4; 12 – detail of inflorescence x 4. 1–4 from Bogdan 2325; 5–8 from Battiscombe 38; 9 from Greenway 3943; 10 from Gillett 13301; 11 & 12 from J. Adamson 83. Drawn by Derek Erasmus. (Reproduced with permission from *Fl. Trop. E. Afr. Tamaricaceae*: fig. 1.)

2. *T. nilotica* (Ehrenb.) Bunge (1852);

*T. gallica* L. subsp. *nilotica* (Ehrenb.) Maire, in syn. (= *T. africana* Poir.); *T. gallica* L. var. *nilotica* Ehrenb. *Linnaea* 2: 269 (1827); *T. gallica* L. var. *nilotica* f. *glaucescens* (Ehrenb.) Bunge, *Tent. Gen. Tamar.* 54 (1852); – type: Egypt, Ehrenberg s.n. (K, syn.).

*T. nilotica* (Ehrenb.) Bunge var. *abyssinica* Hochst. ex Bunge, *op. cit.*: 55 (1852); *T. gallica* sensu Oliver in *Fl. Trop. Afr.* 1: 151 (1868), *pro parte* – type: TU, Tekeze below Dscheldschegane, 4. XI. 1839, Schimper 728 (P lecto.; K isolecto.).

*T. senegalensis* auct. non DC. (1828).

*T. nilotica* (Ehrenb.) Bunge var. *pallasii* (Desv.) Bunge, *op. cit.* (1852).

*T. pentandra* Pallas sensu Cufod. (1967), non Pallas

(1788), name only (= *T. ramosissima* Ledeb. (1829), fide Baum (1978) = *T. arborea*).

*T. passerinoides* auct. non Del. ex Desv. (1824): quoad *Licata* s.n. (collected at Assab).

*T. mannifera* auct. non (Ehrenb.) Bunge (1852).

Pirrota, in *Ann. R. Ist. Bot. Roma*, 8(2): 260 (1904).

Tree or shrub, up to 10 m high. Stem bark bright to pale brown, reticulately fissured. Leaves sessile, narrowly lanceolate, green, spreading, 1.3–2 mm long. Inflorescence an open raceme at the end of current season's growth, raceme 10–100 mm long, 3–4 mm in diameter at anthesis, 5–6 mm wide in fruit; bracts narrowly lanceolate, leaf-like, c 2 mm long, smaller than flowers. Flowers 1.5–2 mm long, on 1 mm long pedicels, white and/or pink. Sepals 5, ovate, 1–1.2 mm

long and wide, minutely toothed. Petals 5, oblong-lanceolate, 3(-4) mm long, 0.8-1 mm wide, falling quickly. Stamens 5; filaments slender, *c* 2 mm long; anthers apiculate. Disk lobed at insertion of stamens. Capsule 3-4 x 1-1.5 mm. Seeds light brown, (0.4-)-0.5(-0.6) mm long, oblong or pyriform, glabrous except for apical tuft of soft white hairs. Fig. 63.1.1-10.

Riverine woodland, on alluvial soil at bottom of river valleys, rarely planted; 300-1750 m. EW TU WU GJ SU HA; also in Yemen Arab Republic, Saudi Arabia, Jordan, Israel, Palestine, Egypt, Sudan, Somalia, Djibouti, Kenya, and Tanzania. *Brehme* in *Mooney* 9079; *Mesfin* *T.* 7079; *Mesfin* *T.* & *Tewolde* *B.G.E.* 8723.

3. *T. arborea* (*Sieb. ex Ehrenb.*) *Bunge* (1852)  
- type: Egypt, Cairo, *Sieber* s.n. (K isolecto.).

Trees or shrubs, 5-10 m high; stem with reddish to purplish-brown bark. Leaves slightly greyish to glaucous-green, densely punctate, 1-2 mm long, auriculate, closely imbricate and clasping the stem or pointed and shortly reflexed at apex. Inflorescence open paniculate racemes 20-50 mm long, 3-5 mm wide, pale brown or pinkish. Bracts longer than pedicels, *c* 1.5 mm long, narrowly triangular with long acuminate apices. Pedicels up to 1 mm long. Sepals 5, in two whorls of 2 and 3, 1-3 mm long, 5-6

mm wide, deltoid-ovate, the outer thickened in the middle, acute at apex, inner obtuse at apex, entire or irregularly toothed at margins. Petals 5 (rarely 4), falling quickly, ovate to elliptic, 1.7-2 mm long, 0.9-1.0 mm wide. Stamens 5, in one row with lobes between the stamens or lobes united. Ovary superior, unilocular. Fruit compact, cylindrical. Seeds with an apical tuft of soft white hairs.

Salt plains and steep river banks; 400-1650 m. SU HA; also in Tunisia, Libya, Egypt, Sudan, and Socotra. *W. de Wilde* 9757; *Hemming* 1235; *Friis* et al. 720.

*T. arborea* is vegetatively very similar to *T. arabica* but can be distinguished from it on staminal disc characteristics and the others given in the key.

When growing at high altitudes along river banks, *T. arborea* gets to be a tree of 10 m height with a trunk up to 1 m long; and the ultimate branches are rounded and appear much thicker than those from lower altitudes. The high altitude forms, e.g. *Friis* et al. 720, are vegetatively very similar to *T. nilotica* but they can be distinguished by the staminal disc having lobes between the stamens.

The value of the staminal disc characters, employed here as well as by *Baum* (1978), has been in doubt and may be too plastic to be of use in systematics but until a further version is done on the entire genus, nothing definite can be stated about it here.

## 64. PASSIFLORACEAE

W. J. J. O. de Wilde\* and M. G. Gilbert\*\*

Cufodontis, *Enum.*: 599–601 (1959); W.J. de Wilde, *Passifloraceae* in *Fl. Trop. E. Afr.* 68 pp. (1975); R. & A. Fernandes, *Fl. Zamb.* 4: 368–411 (1978); Thulin, 56. *Passifloraceae* in *Fl. Somalia* 1: 210–215 (1993).

Herbs, often climbing, to large woody climbers, mostly with axillary tendrils in tribe *Passifloreae* (erect shrubs or trees in tribe *Paropsieae*, not in Flora area), sometimes spiny, roots sometimes tuberous. Leaves mostly alternate, simple (compound outside Flora area), often lobed, often with glands on petiole and blade, particularly near junction between the two; stipules usually small, sometimes falling off quickly. Inflorescences axillary, cymose, often ending in 1–few tendrils in tribe *Passifloreae* (racemose outside Flora area). Flowers bisexual or dioecious, rarely monoecious; base forming a stipe which is articulated with the pedicel; hypanthium saucer-shaped to tubular. Sepals 4–5(–6) (or more outside Flora area), imbricate, free or joined into calyx-tube (some *Adenia*). Petals (0–)4–5(–6), imbricate. Corona extrastaminal, inserted at junction of hypanthium and calyx, composed of 1 or more whorls of hairs, thread-like processes or scales or tubular or cup-shaped, sometimes absent. Disc mostly extrastaminal, annular or with 5 usually strap-shaped lobes (*Adenia*) or absent. Stamens 4–6(–many outside Flora area), inserted on hypanthium or on an androgynophore, free or partially united; anthers basifixed or dorsifixed, sometimes apiculate. Ovary superior, sessile or on a gynophore or androgynophore, 1-locular with 3–5(–6) parietal placentas; styles (1–)3–5, free or partially joined, stigmas subglobose or divided (*Adenia*). Fruit a 3–5-valved capsule or berry. Seeds few to many, testa brittle, pitted, brown or black, surrounded by membranous or, usually, fleshy arils; funicles long.

A pantropical family of 18 genera and *c.* 500 species, extending into the subtropics. All the representatives in the Flora area belong to the tribe *Passifloreae* which includes *Passiflora*, with 350 species mostly in the New World, and *Adenia*, with nearly 100 species mostly in Africa and Madagascar. The other tribe, *Paropsieae*, is restricted to Africa south of the Flora area. For the Flora area, there are 3 genera with 11 indigenous species in *Adenia* and *Basananthe*, and 1 widely cultivated species in *Passiflora* with 2 others known from sight records.

Several members of the family, particularly within *Adenia*, contain highly toxic cyanogenic glucosides or toxalbumines and are used both in traditional medicine and as very effective poisons. Species of *Passiflora* are widely cultivated for their beautiful flowers and delicious fruits.

## Key to genera

1. Flowers bisexual; corona conspicuous, often double, usually consisting of thread-like appendages, often joined at base; disc annular; stigmas capitate or subglobose.
  - Flowers nearly always unisexual; corona at most a ring of hairs or a lacinate rim, sometimes absent; disc mostly consisting of 5 lobes; stigmas much divided or papillate.
    1. *Adenia*
2. Androgynophore absent; ovary sessile, stamens inserted in the inner corona; anthers basifixed.
  2. *Basananthe*
  - Androgynophore well-developed, as long as or longer than ovary; anthers dorsifixed, versatile.
    3. *Passiflora*

1. *ADENIA* Forssk. (1775)

W.J. de Wilde, *Meded. Landb. Wageningen* 71(18): 1–281 (1971), *Acta Bot. Neerl.* 21: 560–566 (1972), *Blumea* 22: 46 (1974).

Perennial herbaceous or woody climbers, or erect herbs or shrublets with or without tendrils, often with conspicuous tubers, or with swollen bases to main stems, glabrous or pubescent, sometimes thorny or spiny. Leaves either

simple, entire or lobed, or palmately divided; glands (absent or) 1 or 2(–4) at base of blade or near apex of petiole, with or without glands elsewhere on underside; margin entire or remotely dentate. Stipules minute. Inflorescences nearly always dioecious, with minute bracts and bracteoles, female with fewer flowers than male. Flowers nearly always unisexual; female flowers often smaller than male, bell-shaped to tubular, glabrous; hypanthium saucer-shaped to tubular. Sepals (4–)5(–6), free or partially joined into calyx-tube. Petals mostly ± lanceolate, free or sometimes joined to calyx-tube. Corona usually a ring of hair-like processes, or annular, of 5 cap-shaped parts or absent; disc-glands 5, alternating with petals, or absent. Male flowers: stamens free or partially united into tube; anthers basifixed. Female flowers: staminodes subulate; ovary glabrous, styles 3(–5), stigmas divided or papillate. Fruit a capsule or berry, pericarp usually leathery, often brightly coloured. Seeds few to many.

About 95 species in 6 sections in the Old World, most in Africa and Madagascar, a few in SE Asia and N Australia. In the Flora area 9, possibly 10, species belonging to four sections (see key).

*Adenia* species seem scarce in the Flora area and have usually been found as isolated individuals. They are also difficult to collect and are poorly represented in herbarium collections.

\* Rijksherbarium, P.O. Box 9514, 2300 RA Leiden, The Netherlands.

\*\* Department of Botany, Natural History Museum, Cromwell Road, London SW7 5BD, England.

## Synoptic key to sections

1. Sepals and petals free to the base. 2  
 - Sepals and petals united into tube.  
   Sect. *Blepharantes* (Wight & Arn.) Engl. (spp. 6-9)
2. Gland or glands at base of leaf-blade not on a spatulate appendage. 3  
 - Solitary gland at base of leaf-blade on median, spatulate appendage; disc-glands absent.  
   Sect. *Ophiocaulon* (Hook. f.) Harms (sp. 10)
3. Main stem conspicuously swollen; hypanthium tubular, much longer than wide; flowers tubular to funnel-shaped. Sect. *Adenia* (spp. 1 & 2)  
 - Main stem not swollen though subterranean tuber(s) normally present; hypanthium cup-shaped, as long as wide; flowers  $\pm$  bell-shaped.  
   Sect. *Microblepharis* (Wight & Arn.) Engl. (spp. 3-5)

## Key to species

1. Plants with numerous conspicuous prickles on thickened main stem or with spine-tipped axillary shoots. 2  
 - Plants without any prickles or spines (very rarely occasional axillary spines in *A. venenata*). 3
2. Base of plant developed into large globose trunk; trunk and branches smooth, green, branches with regularly-arranged specialized short spine-tipped branches; leaves minute, soon falling. 2. *A. globosa*  
 - Base of stem tapering gradually into upper stem, pale grey with longitudinal rows (often irregular) of sharp, black or dark brown, prickles; leaves well-developed during rains, often lobed. 4. *A. aculeata*
3. Plant glabrous throughout; corona present, often reduced to ring of hairs; stems always climbing with tendrils. 4  
 - Most parts of plant pubescent (very rarely glabrous outside Flora area); corona absent; stems often erect and without tendrils, arising from cluster of tuberous roots. 8. *A. ellenbeckii*
4. Base of stem not swollen though sometimes eventually quite thick in some large forest climbers; inflorescences axillary, usually with terminal tendril. 5  
 - Base of stem developed into conspicuous dull green conical or fusiform trunk; inflorescences on specialized short shoots, without tendrils; flowers with slender tubular hypanthium. 1. *A. venenata*
5. Stems uniformly coloured; base of leaf-blade with sessile gland(s); disc glands present. 6  
 - Old stem conspicuously marked with pale longitudinal streaks; base of leaf-blade with single median gland on short appendage; disc glands absent. 10. *A. gummifera*
6. Leaves entire to shallowly 3-lobed; flowers green, up to 20 mm long. 7  
 - Leaves very deeply (3-)5-lobed, almost compound, lobes  $\pm$  attenuate at base into petiolules; flowers 25-35 mm long, pendent, creamy white suffused with faint pink spots. 9. *A. pulchra*
7. Leaf-blade up to 6 cm long, apex rounded, basal gland 1; fruit subglobose, up to 15 mm in diameter,

- found in deciduous bush land, leafless for much of year. 8  
 - Leaf-blade 5-16 cm long, apex acuminate, basal glands 2(-4); fruit 35-50(-60) mm long (not known in *A. gedoensis*); found in forests and forest margins,  $\pm$  evergreen. 9
8. Leaves usually lobed; flowers densely clustered along short-shoot; fruit apiculate. 4. *A. aculeata*  
 - Leaves always entire, ovate-elliptic; flowers in axillary clusters along main stems; fruit subglobose. 5. *A. inermis*
  9. Midribs with 1-2 veins on each side; sepals joined into distinct calyx-tube; styles and placentas 3. 10  
 - Midrib with 2-8 veins on each side; sepals free; styles and placentas (3-)5. 3. *A. gedoensis*
  10. Anthers 3.5-5 mm, shorter than filaments; fruit subglobose to ellipsoidal. 6. *A. schweinfurthii*  
 - Anthers (5-)6-11 mm, longer than filaments; fruit pear-shaped. 7. *A. rumicifolia*

1. *A. venenata* Forssk. (1775)

- type: Yemen, *Forsskål* s.n. (C).

*Modecca abyssinica* A. Rich. (1847) - type: TU, near Djeladjeranne, *Schimper* III. 1672 (also as '242' and '207/4') (P holo.).

Climber to 8 m, with fleshy, fusiform to conical thickened main stem. Branches with smooth grey-green bark. Tendrils sometimes forming blunt thorns to 4 cm long. Leaves: petiole 1-8 cm; blade shallowly to deeply 3-5(-7)-lobed,  $\pm$  orbicular in outline, 1.5-12 cm across, glaucous beneath, often with some glands on the blade; base cordate, 5-nerved; margin entire; lobes lanceolate to suborbicular, blunt; basal gland 1 on narrowly peltate base. Inflorescences usually on short-shoots, (1-)3-5-flowered in male, mostly without tendril. Male flowers funnel-shaped; stipe (20-)30-55 mm, hypanthium tubular, 9-15 mm long; sepals free, 5-9 mm long; petals free; stamens inserted near base, free; corona absent. Female flowers 15-24 mm long with stipe; styles mostly united. Fruit ovate-ellipsoid, 2-4.5 cm long, apex  $\pm$  acute, leathery, almost white with conspicuous dark green veins. Seeds 15-35, 4.5-6 mm long. Fig. 64.1.

Dry deciduous woodland and bushland on a variety of soils; (500-)1000-1700 m. EW SU GG SD? BA HA; Somalia, west to Nigeria, south to Tanzania; Yemen. *Burger* 3218; *Gilbert & Lavranos* 2246; *W. de Wilde* 6326.

All parts very poisonous. Sometimes planted as a medicinal plant; once mentioned as a remedy for intestinal worms.

2. *A. globosa* Engl. (1891)

- type: Kenya, *Hildebrandt* 2858 (B destroyed.).

Shrub or climber up to 8 m; many erect, curved or scandent stems arising from a  $\pm$  subglobose trunk up to 2.5 m thick; bark and stems  $\pm$  smooth, green or grey-green; branches with regularly arranged specialized short spine-tipped shoots. Leaves soon falling; petiole 1-1.5 mm; blade entire or shallowly 3-lobed, up to 7 x 9 mm, grey-green, basal gland 1, on shortly peltate blade-base; each leaf subtending a





Figure 64.1

**ADENIA VENENATA:** 1 - habit; 2 - leafy branchlet  $\times \frac{2}{3}$ ; 3 - female flowering branchlet  $\times \frac{2}{3}$ ; 4 - longitudinal section of female flower  $\times 3$ ; 5 - part of hypanthium from same to show disk glands, staminodes and base of gynophore  $\times 6$ ; 6 - male flowering branchlet  $\times \frac{2}{3}$ ; 7 - longitudinal section of male flower  $\times 2$ ; 8 - part of hypanthium from same to show disk glands, bases of filaments and vestigial ovary  $\times 6$ ; 9 - fruits  $\times \frac{2}{3}$ ; 10 - seed  $\times 4$ . 2-5, from *Bally & Smith* 14715; 6-8, from *Gillett* 13936; 9 & 10, from *Gillett* 13390. Drawn by M. E. Church. (Reproduced with permission from *Fl. Trop. E. Afr., Passifloraceae*: fig. 6.)

woody thorn 0.5-8 cm long. Inflorescences on short-shoots 2-20(-50) mm long in axils of thorns or rarely on thorns themselves, peduncle up to 1.5 mm long, tendrils absent, up to 5-flowered. Male flowers cylindrical to funnel-shaped, 19-30(-35) mm long including 6-10(-14) mm stipe; hypanthium 5-12  $\times$  2-5 mm; sepals free, entire; petals obovate to oblong-lanceolate, 4-7.5 mm, minutely toothed; filaments 2-7 mm; corona absent. Female flowers  $\pm$  bell-shaped, (6-)8-12 mm long including 1-2 mm stipe; hypanthium (1-)1.5-4  $\times$  2.5-4 mm; petals (1.5-)2-3 mm, subserrulate; styles joined for 0.5-1.5 mm, free for 1-1.5 mm, stigmas papillate,  $c$  2 mm in diameter. Fruit leathery, subglobose to ovoid-ellipsoid, 12-28  $\times$  10-20 mm. Seeds 3-25 per capsule,  $c$  7 mm long.

#### subsp. *globosa*

Branches climbing, strongly curved or prostrate. Axillary thorns (1-)2-8 cm long, as long as or longer than internodes. Inflorescences scattered along branches. Filaments inserted up to 3 mm above base; anthers 6-8 mm. Fruit 12-18 mm long, containing 3-6 seeds.

On ridge of recent lava in *Acacia - Commiphora* woodland;  $c$  1000 m. SD; S Somalia, Kenya, N Tanzania. *Puff* et al. 870425-2/1.

Known in the Flora area from just one sterile collection very disjunct from the nearest area of occurrence in Central Kenya. This appears to match subsp. *globosa* but fertile

material with good information on the habit are needed to confirm this tentative determination.

Two further subspecies are recorded: subsp. *pseudoglobosa* with erect or slightly curved branches, thorns up to 2.5 cm long, shorter than the internodes, flowers from near tips of branches, anthers 4–6.5 mm and fruits 2–2.8 cm with 15–25 seeds, known from southern Kenya, and subsp. *curvata* with strongly curved or subscandent stems, short thorns (up to 2 cm long) and fruits 2–2.8 cm with 7–12 seeds per capsule, known from NE Tanzania.

### 3. *A. gedoensis* W.J. de Wilde (1971)

– type: ex SU, Gedo, cultivated in Wageningen, W. de Wilde 11725 (WAG, holo.).

Climber to 8 m high; stem not thickened at base, bark green, smooth. Tendrils simple, up to 1 cm long, those with inflorescences 2–4 cm long. Leaves: petiole 1–6 cm, with 2(–4) glands on small ± apical auricles; blade either simple, ovate to oblong, or palmately (2–)3-lobed, 3–16 cm long, base cordate to rounded, (3–)5-veined, apex acute to acuminate, margin entire or minutely toothed, midrib with 2–8 lateral veins on each side; blade-glands absent. Stipules minute, lacinate. Male flowers not known. Female inflorescence 2–6-flowered; peduncle 1–8 cm. Perianth bell-shaped, 11–20 mm long including 3.5–6 mm long stipe; hypanthium *c* 2 mm long; sepals free, lanceolate, (6–)7–11 mm long; petals free; staminodes joined *c* halfway; corona of fine hairs; disk-glands 1–2 mm; ovary ± fusiform, 5–10 mm long; styles (3–)5, very short; placentas 3–5; 15–20 ovules per placenta. Fruits not known.

Montane gallery forest; 1800–2000 m. SU; known only from a single plant.

This species is known only from cuttings taken from a sterile plant. Prolonged searching in the type area failed to find further material. It is noteworthy for the (3–)5-merous pistil, all other species of *Adenia* having 3-merous pistils.

### 4. *A. aculeata* (Hook. f.) Engl. (1891);

*Modecca aculeata* Hook. f. (1880) – type: Somalia, Kirk s.n. (K holo.).

Climber with stems to 20 m long, main stem up to 10 cm thick at base, without a tuber, old stems pale grey, nearly always with 4–5 often very irregular rows of brown to almost black prickles, the prickles 5–10 mm, simple or forked. Tendrils simple, 5–10 cm long. Leaves absent for much of year, petiole 0.5–5 cm long; blade suborbicular in outline, 3–7-lobed to half-way, 1–7.5(–11) cm diam, often scabrous, grey-glaucous beneath, lobes up to 3 cm long; base cordate, apex rounded to subacute, margin entire; 1 gland at base, partly on narrowly peltate base of blade and partly on petiole. Inflorescences usually sessile, normally grouped in clusters along short-shoots 1–10 cm long, without tendrils, male inflorescences 2–6(–40)-flowered; female 1–3-flowered. Male flowers narrowly bell-shaped, 11–18 mm long including 1.5–4 mm stipe; hypanthium cup-shaped, sepals free, lanceolate, 7–12 mm long; petals free, slightly shorter than sepals; stamens inserted at base of hypanthium; filaments joined for about half their length; corona membranous; disc glands 0.3 mm. Female flowers

8–12 mm long; styles shortly united, stigmas kidney-shaped, papillate. Fruit subglobose, apiculate, 10–15 mm long; pericarp thinly leathery. Seeds 10–15 per capsule, 3.5–4 x 3.5 mm.

### subsp. *aculeata*

Prickles 10–15 mm long, very wide at base. Leaves scabrous, not punctate below, with (0–)2–6 blade glands. Fig. 64.2.1–4.

Deciduous bushland, often over limestone; 350–1600 m. SD BA HA; Somalia, N Kenya. *Burger* 3314; *Friis* et al. 2956; *Gilbert* et al. 7515.

*Gilbert & Jones* 56, a sterile collection from near the type locality of *A. pulchra*, has slender herbaceous stems lacking prickles but otherwise matches subsp. *aculeata*.

Subsp. *manganiana* (Chiov.) W. de Wilde has longer, more slender prickles and smooth leaves that are punctate below and lack blade-glands. It is found in coastal scrub in S Somalia and NE Kenya.

### 5. *A. inermis* (W.J. de Wilde) W.J. de Wilde (1972);

*A. aculeata* subsp. *inermis* Wilde in *Meded. Landb. Wageningen* 71(18): 69 (1971) – type: BA, SE of Ginir, J. de Wilde 7321 (WAG holo.; K iso.).

Climber to 8 m, stem slender, not prickly, growing from an underground tuber. Leaves absent for much of the year; petiole 1–2 cm long; stipules minute; blade ovate-elliptic, 3–6 cm long, base subpeltate, apex rounded, margin entire, 3(–5)-veined from base; basal gland 1 at junction of blade and petiole, blade glands absent. Flowers in clusters along main shoots, male inflorescences (2–)5–20-flowered, female 1–8-flowered, both without tendrils. Male flowers similar to those of *A. aculeata*, 10–11 mm long including *c* 1.5 mm stipe, corona reduced to a low membranous rim. Female flowers 5–6 mm long, styles united towards base, stigmas kidney-shaped, papillate. Fruit subglobose, not apiculate, 10–15 mm long with short gynophore; pericarp thinly leathery. Seeds 8–10 per capsule, 4–5 x 4–5 mm wide. Fig. 64.2.5–8.

Deciduous bushland, often on limestone; 1000–1300 m. SD BA; N Kenya. J. de Wilde 7319; *Friis* et al. 905; *Gilbert* et al. 8076.

### 6. *A. schweinfurthii* Engl. (1891)

– type: Zaire, *Schweinfurth* 3485 (B destroyed.; K lecto. selected by W. de Wilde, loc. cit. 1972).

Woody climber to 20 m, all parts glabrous; stems not thickened at base, green, first rounded, later 3–5-winged or with rows of blunt fleshy tubercles. Tendrils 1–3-fid for 2/3rds their length. Leaves ± ever-green; petiole 2–6(–11) cm long; blade broadly ovate or orbicular or oblong, rarely shallowly 3-lobed, 5–15 x 3.5 cm, base usually cordate, apex acute-acuminate, basal glands 2, on lateral auricles at apex of petiole. Inflorescence on a peduncle up to 6 cm long; male inflorescences up to 20-flowered, with or without a tendril. Male flowers broadly tubular bell-shaped, base truncate or 5-saccate, 10–20 x 5–10 mm including short stipe; hypanthium saucer-shaped; calyx-tube 2–4(–6) mm long, lobes long-triangular 4–8(–12) mm; petals

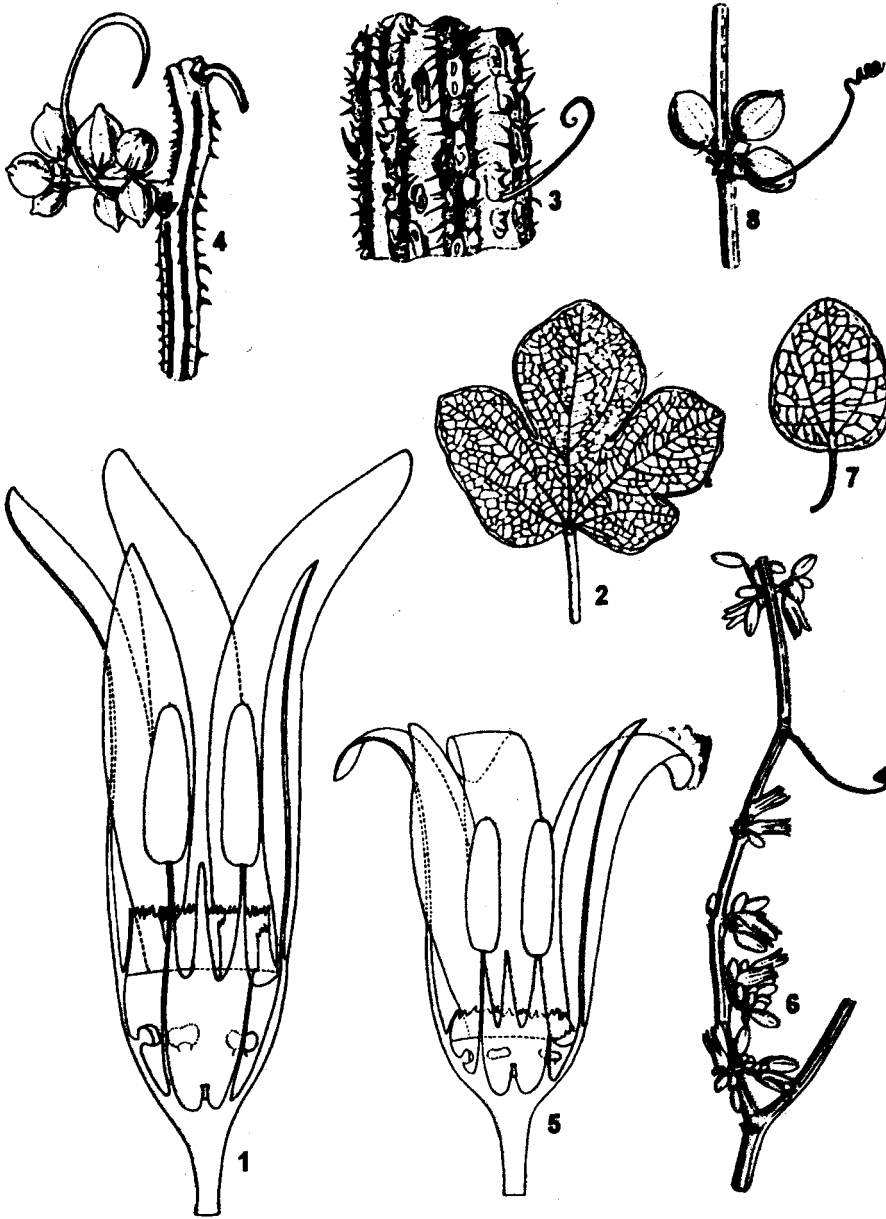


Figure 64.2 *ADENIA ACULEATA* subsp. *ACULEATA*: 1 – longitudinal section of male flower  $\times 5$ ; 2 – leaf seen from above  $\times \frac{1}{2}$ ; 3 – old stem  $\times \frac{1}{2}$ ; 4 – fruiting inflorescence  $\times \frac{1}{2}$ . *ADENIA INERMIS*: 5 – longitudinal section of male flower  $\times 5$ ; 6 – branch with male inflorescences  $\times \frac{1}{2}$ ; 7 – leaf seen from above  $\times \frac{1}{2}$  (from a cultivated specimen); 8 – fruiting inflorescence,  $\times \frac{1}{2}$ . All drawn from spirit material collected by J. J. F. E. de Wilde. 1 from *de Wilde* 7374; 2 & 3 from *de Wilde* 7192; 4 from *de Wilde* 7373; 5 & 6 from *de Wilde* 7321; 7 from a cultivated specimen; 8 from *de Wilde* 7319. Drawn by J. van Os and W.J. de Wilde. (Reproduced with permission from the author.)

broadly spatulate, 5–9 mm long, inserted by corona; stamens basally inserted; corona a ring of woolly hairs; disc glands 2–3 mm. Female flowers similar, 10–15 mm long; styles  $c$  2 mm long, free. Fruit on 5–10 mm gynophore, subglobose, 35–50 mm long, pericarp fleshy, leathery outside, smooth. Seeds 40–100 per capsule.

Forests and forest margins in higher rainfall areas, also in moister sites elsewhere; 1600–1700 m. SU; Central and East Africa from Cameroon to Tanzania. *Ash* 2976; *Gilbert* 2535.

7. *A. rumicifolia* Engl. (1921)

– type: Tanzania, *Engler* 3362 (B holo., EA iso.).

Woody climber up to 20 m, glabrous; older stems, 3–5-winged or with fleshy tubercles, up to 10 cm thick at the base; tendrils simple to 20 cm long. Leaf blade not punctate, usually entire, rarely shallowly 3(–5)-lobed or coarsely sinuate, 5–20(–30)  $\times$  5–10(–25) cm ovate to obovate; base acute to deeply cordate, or hastate, apex

acute to round, up to 2 cm long, basal glands 2, in 2  $\pm$  hollowed auricles at the apex of the petiole. Stipule triangular, withering. Inflorescence on a peduncle up to 12 cm long; male flower broadly tubular bell-shaped, 2.5–5  $\times$  10–18 mm long; hypanthium saucer-shaped 5-saccate; stipe 16–37 mm long; calyx-tube (5–)7–15 mm long, lobes long-triangular 7–14 mm; petals broadly spatulate, 4–13 mm long, inserted by corona; stamens basally inserted; corona a ring of woolly hairs; disc glands 2–3 mm. Female flowers similar, styles  $c$  2 mm long, free. Fruit on 1–5 mm gynophore, obovate, 30–80 mm long, pericarp fleshy, leathery outside, smooth. Seeds 40–150 per capsule.

In rather open, disturbed areas and forest margins. 1000–1650 m. Probably WG IL KF BA; Tropical & E Africa from Senegal to south to Angola and Mozambique. *Friis et al* 3909; *Mesfin T.* 4664 & 9040; *Tewolde & Mesfin* 2140.

There are now 4 sterile specimens in ETH which have leaf and tendril sizes in line with the description for *A.*

*rumicifolia*, i.e. they are larger than the dimensions for *A. schweinfurthii*. The authors suggest that this taxon could be found in Ethiopia and the editor feels a full description is now merited.

8. *A. ellenbeckii* Harms (1921)

– types: S Somalia, *Ellenbeck* 2133, 2291 (B syn. both destroyed).

*A. toxicaria* Harms (1936).

*A. vitifolia* Hutch. & Bruce (1941).

Suberect to prostrate herb with shoots 0.2–1(–1.5) m long from an erect fleshy stem up to 0.3(–0.6) m high arising from cluster of tuberous roots; all parts ± pubescent (rarely glabrous outside Flora area). Tendrils up to 10 cm long. Leaves more or less deciduous; petiole 1–7 cm long; blade varying from entire to deeply 3–5(–7)-lobed or pinnatifid, mostly ovate in outline, 2–17 cm long, lobes to 8 cm long, apex acute or obtuse; base acute to cordate, margin variously toothed or dissected, the teeth ending in a short black point; basal glands 2, ± sessile at either side of apex of petiole. Inflorescence sessile, 1–10-flowered in males, 1–3-flowered in females, sometimes with tendril. Flowers subglabrous, tubular, males 20–50 x 3–6 mm; hypanthium and calyx tube 14–45 mm long, lobes 3–6 mm long with fringed margin; petals linear, 5–8(–11) mm long, long-fringed, shorter than the calyx-tube; filaments on short androgynophore at base of hypanthium, largely free; corona of few hairs or absent; disc glands usually present. Female flowers similar but broader, 12–35 mm long; styles united for 0–4 mm, style arms 0.5–4 mm; stigmas much divided. Fruit globose, 20–45(–50) mm diameter; pericarp leathery outside, rather fleshy inside. Seeds 10–20 per capsule, 6.5–8 mm long.

Deciduous bushland and woodland, among rocks and on lateritic and clay soils overlying basement complex rocks; 400–1300 m. SD HA; Somalia, Kenya, Uganda, Tanzania. *Gilbert & Jones* 38; *Simmons* 139; *J. de Wilde & Gilbert* 421.

*A. ellenbeckii* is a polymorphic species: the leaves vary from subtire to deeply divided; the habit from stout, erect to climbing and the flowers from relatively narrow to quite broad and sometimes with a corona of only a few hairs. Juvenile leaves are sometimes narrowly peltate at the base. It is closely related to *A. volkensii* Harms (1895), widespread in Kenya, which has much broader flowers and never produces tendrils. The fruit is said to be toxic: all members of this group of species seem to contain dangerously poisonous toxalbumins.

9. *A. pulchra* M. Gilbert & W.J. de Wilde (1992)

– type: BA, 22 km N of Genale village along track to Bidre and Dollo Mena, *Gilbert & Jones* 76 (K holo.; ETH iso.; L fragment of holo.).

Herbaceous climber growing from a subglobose underground tuber at least 15 cm wide; all parts glabrous. Stems c 1 m long at time of flowering. Leaves: petiole up to 2.7 cm long; blade palmately (3–)5-foliolate or lobed, broadly ovate to suborbicular in outline, up to at least 6 x 7.5 cm, probably larger, lobes oblanceolate, up to 2 cm wide, basally attenuate into petiolule, apex acuminate, margin entire; basal glands 2, elliptic, submarginal at transition

between petiole and leaf-blade, smaller glands scattered between major veins of lobes. Inflorescence with peduncle 0.5–2 cm long plus tendril up to 9 cm long, male inflorescences with up to 9 flowers, branches to 1 cm long, female with 1–2 flowers; flowers pendent, produced with or before leaves, creamy white with pink mottling. Male flowers: pedicels 5–10 mm; perianth 29–34 mm long overall including stipe 6–7 mm long; hypanthium less than 1 mm deep; calyx ± urceolate, 8–11 mm wide when pressed, lobes 6.5–8 mm long, triangular, apex rounded, entire, slightly incurved; petals linear-lanceolate, 10 x 0.7–1.5 mm, margins sparsely fringed to ciliolate; corona reduced to a ring of hairs; androgynophore absent, filaments 6–7 mm, joined for c 1 mm, anthers 4.5–6 mm. Female flowers: pedicel 3–4 mm long; perianth 25–30 x c 12 mm overall including stipe c 6 mm long, similar in shape to male except that the calyx-lobes are recurved; lobes 7–15 mm long; petals c 7 x 0.7 mm; hypanthium c 1.5 mm deep; staminodes c 3.5 mm; styles c 4 mm long, stigmas lacinate, c 2 mm across overall. Fruit not known.

In shaded sites on raised earth banks in deciduous woodland dominated by *Acacia*, *Combretum* and *Terminalia*; 1520–1640 m. BA; not known elsewhere. *Gilbert & Jones* 51, 59.

Very conspicuous in flower but flowering very early in the rainy season and so usually missed by collectors.

10. *A. gummifera* (Harvey) Harms (1897);

*Modecca gummifera* Harvey (1862) – type: South Africa, *Drège* 5211 (P iso.).

Climber with stems to 30 m long, stout but not swollen at base, often glaucous or pruinose, with prominent white streaks, glabrous, possibly with tuberous roots. Tendrils simple or 3-fid, 5–20 cm long. Leaves: petiole 1.5–11 cm long; stipules minute, looking torn; blade ± evergreen, lower surface grey or glaucous, entire or deeply 3(–5)-lobed, orbicular to rhomboidal in outline, 2.5–11 cm long, base ± truncate, 3-nerved from the base and 1 pair of stronger side-nerves ending in minute marginal glands, apex rounded, basal gland solitary, on a median appendage at transition with petiole. Inflorescence on peduncle 1–12(–16) cm long, few to many-flowered in male, 2–6-flowered in female inflorescences, sometimes with tendril. Male flowers bell-shaped, 11–17 mm long including stipe; hypanthium narrowly cup-shaped; sepals and petals free, lanceolate, 6–11 mm long. Stamens inserted basally, filaments joined for half their length; corona and disc glands absent. Female flowers similar but smaller, 5.5–8 mm long; stigmas subsessile. Fruit ± fusiform, 25–40 mm long with leathery, usually finely granulate, pericarp. Seeds 30–50 per capsule, 3.5–5.5 mm.

Forest margins, damper sites in deciduous woodland; 600–1400 m. IL GG; widely distributed in tropical eastern Africa in areas with good but seasonal rainfall. *Gilbert & Friis* 8371; *Gilbert & Phillips* 9046; *Gilbert & Thulin* 276.

No fertile material has been collected in the Flora area.

The material seen for this account seems to belong to var. *gummifera*: var. *cerifera* Wilde is endemic to Zambia.

2. **BASANANTHE** Peyr. (1859)

*Tryphostemma* Harvey (1859)

*Carania* Chiov. (1929)

W.J. de Wilde, *Blumea* 21: 327 (1973).

Annual or perennial herbs or climbers, rarely shrubs, with or without tendrils, sometimes thorny. Leaves lobed or not, margin entire or glandular-toothed; stipules small, filiform. False stipules sometimes developed from supra-axillary buds. Tendrils axillary, replacing central flower of a cyme, or absent. Inflorescences 1–3-flowered; bracts and bractoles minute. Flowers usually bisexual; hypanthium shallowly cup-shaped. Sepals and petals (4–)5(–6), free (petals sometimes 0–2 outside Flora area) ± oblong, usually smaller than sepals. Inner and outer coronas present, usually separated by low annular disc; outer corona a barrel-shaped tube bearing a ring of threads and a ring of incurved teeth; inner corona membranous, usually cup-shaped. Stamens 5(–9), free, inserted on inside of inner corona; anthers basifixed. Ovary glabrous, styles 3(–4), stigmas small. Fruit a 3(–4)-valved capsule, ± ellipsoidal, ± leathery. Seeds 1–few, relatively large.

A genus of 27 species restricted to Central, Eastern and Southern Africa, many species local endemics. 3 species have been recorded from the Flora area.

1. Plant without thorns, usually with tendrils. 2  
– Plant with conspicuous thorns, tendrils absent. 3
2. Petiole 0.2–8 cm long; leaf-blade deeply 3–5-lobed; tendrils always present. 1. *B. hanningtoniana*  
– Petiole up to 0.5 cm long; leaf-blade elliptic to oblong, unlobed; tendrils present or not. 2. *B. scabrifolia*
3. Thorns up to 2 cm long; flowers on supra-axillary short-shoots, not on thorns. 4. *B. berberoides*  
– Thorns 2–5 cm long, bearing flowers. 3. *B. spinosa*

1. *B. hanningtoniana* (Mast.) W.J. de Wilde (1973);  
*Tryphostemma hanningtonianum* Mast. (1855) –  
types: Kenya, Johnson s.n.; Tanzania, Hannington s.n. (K syn.).

*T. volkensis* auct. non Harms.

Annual or perennial erect herb or, usually, climber to 3 m, much branched, glabrous or pubescent (rarely scabrous outside Flora area). Tendrils 1–15 cm long. Leaves: petiole 0.5–8 cm long; blade nearly always 3–5-lobed, ovate to orbicular in outline, 1–13 cm long; apex of lobes rounded or acute, margins entire or sparsely glandular-toothed. False stipules absent. Inflorescence (1–)2-flowered; peduncle 1–10 cm, ending in simple tendril. Sepals 3–8 mm and petals 2–6 mm long; outer corona tube *c* 2 mm with threads as long again; inner corona *c* 1(–1.5) mm high. Filaments 2–3 mm, anthers 1–1.5(–2.5) mm. Styles free, 1–3 mm long. Fruit 10–18 mm long, with 1–5 seeds; seeds 6–7 mm long. Fig. 64.3.

Forest margins, open bushland, etc., often in disturbed areas; 1300–1900 m. WG IL KF; Sudan, ? S Somalia, south

through eastern Africa to Zaire, Zambia, Zimbabwe and Mozambique. Gilbert & Rankin 4212; Mooney 7560; W. de Wilde 8888.

A very variable species. The Ethiopian collections are all of a robust, perennial climber which has at times been indicated as a 'sp. nov.' but this form merges gradually into the delicate ephemerals seen elsewhere.

2. *B. scabrifolia* (Dandy) W.J. de Wilde (1973);  
*Tryphostemma scabrifolium* Dandy (1927) – type:  
Uganda/Kenya border, van Someren s.n. (K holo.).

Perennial climber to 3 m or (in Flora area) a multi-stemmed herb to 75 cm high; stems ± scabrous. Tendrils absent or up to 7 cm. Leaves: petiole up to 5 mm long; blade elliptic to oblong, 1.5–4.5 x 0.5–1.5 cm, base and apex ± rounded to acute, margin serrate-dentate, teeth *c* 1 mm. False stipule usually absent. Inflorescence 1–2-flowered, peduncle to 4 cm long; bracts 0.2–0.3 cm. Flowers scabrous-hispid or (in Flora area only) glabrous, mostly greenish-white; stipe 8–12(–15) mm; hypanthium 2.5–3 mm wide. Sepals (6–)8–10 mm. Petals 4–6 mm. Outer corona-tube 2–2.5 mm, threads 2.5–3 mm, purple; inner corona cup- or funnel-shaped, ± 1.5 mm. Filaments 3–4 mm; anthers 2–3 mm. Styles free, 3–4 mm. Fruit 12–20 mm long plus 1–2 mm stipe. Seeds 1–5.

Area of alluvial soils with numerous dry water courses in very open *Acacia* bushland, water courses with *Ziziphus hamur*; *c* 325 m. SD; W Kenya, E Uganda and NW Tanzania. Gilbert et al. 8139.

The only Ethiopian collection is anomalous within the species by virtue of the low multi-stemmed habit and the glabrous flowers; it also occurs in an area of very much lower rainfall far from the main area of occurrence near Lake Victoria. It might be worthy of recognition as a distinct taxon.

3. *B. spinosa* W.J. de Wilde (1973);  
– type: Kenya, Bally 5478 (K holo., C EA iso.).

Thorny shrub to 1 m tall, scabrous. Tendrils absent; thorns 2–5 cm long. Leaves: petiole 0.5–2 mm long; blade entire, elliptic to obovate, 0.5–2 cm long, apex acuminate to mucronate, margin toothed. Stipules 4–7 mm. False stipules absent. Inflorescence 2-flowered, at or below the middle of a thorn. Flower stalk 3–8 mm; hypanthium 2–3 mm wide. Sepals 6–10 mm, obtuse. Petals 4.5–6 mm. Corona: outer tube 1.5–2 mm, threads 1.5–2 mm; inner 0.7–1 mm. Filaments (1–)2–4 mm, anthers 3–3.5 mm. Styles (1–)1.5 mm, united for 0.2 mm. Fruit (excluding the 1 mm gynophore) 10–15 mm long, containing 2–5 seeds; seeds 5–6 mm long.

Deciduous bushland, on lava or volcanic soils: 800–1500 m. No specimens seen from Ethiopia, but known from the Northern Frontier Province of Kenya, quite close to the Ethiopian border.

4. *B. berberoides* (Chiov.) W.J. de Wilde (1973);  
*Carania berberoides* Chiov. (1929) – type: Somalia, Puccioni & Stefanini 172. (FT holo.).



Figure 64.3 *BASANANTHE HANINGTONIANA*: 1 – flowering stem  $\times \frac{2}{3}$ ; 2 – lower surface of apex of middle lobe of leaf  $\times 4$ ; 3 – flower  $\times 4$ ; 4 – same, with sepals and petals removed  $\times 6$ ; 5 – longitudinal section of flower  $\times 10$ ; 6 – fruit  $\times 2$ ; 7 – seed  $\times 4$ . 1–5 from Drummond & Hemsley 2842; 6 & 7 from Verdcourt 3861. Drawn by M. E. Church. (Reproduced with permission from *Fl. Trop. E. Afr., Passifloraceae*: fig. 8.)

Thorny shrub to 5 m high, scabrous-hispidulous. Tendrils absent. Thorns axillary, 0.5–2 cm long. Leaves: petiole up to 1.5 mm; stipules 1–1.5 mm long; blade entire, ovate, obovate or oblong, 2–10 mm long, apex subacute, margin entire or minutely toothed. False stipules absent. Inflorescences sessile, 1(–2)-flowered, solitary or in small clusters on minute supra-axillary shoots. Sepals 6–9 mm long, sparingly hispid. Petals 4–6 mm. Corona: outer tube 0.7–2 mm with threads 1–2 mm; inner cup-shaped, 0.5–1 mm high, upper part forming 5 membranous cups around bases of filaments. Filaments 2–3 mm, anthers 1.5–2.5 mm. Styles 1.5–3.5 mm long, united for half their length. Fruit 12–18 mm long. Seeds 2–3 per capsule; seeds 8–10 mm.

Open deciduous bushland on sandy and stony soil; up to 750 m. HA; Somalia. *Hemming* 1559.

The thorns are the modified peduncles and terminal flower of the inflorescence and are equivalent to the tendrilled inflorescences of normal members of the genus. The inner corona is unique within the genus.

### 3. *PASSIFLORA* L. (1753)

Harms. *Nat. Pflanzenfam.*, ed. 2, 21: 495 (1925); Killip in *Field Mus. Nat. Hist. Chicago, Bot.* 19: 1–613 (1938).

Mostly perennial climbing herbs or large woody climbers with tendrils. Leaves lobed or not, margins often with gland-teeth, glands on petiole and blade present or not;

stipules sometimes well-developed. Inflorescence 1-many-flowered, usually inserted besides a simple tendril; bracts and bracteoles sometimes large. Flowers bisexual, 5-merous. Hypanthium saucer-shaped to cylindrical. Sepals free, sometimes horned, often bright-coloured; petals usually like sepals, sometimes absent. Corona outside stamens, simple or, more usually, complex with outer corona of threads and flat or plicate inner corona, sometimes with nectary ring. Androgynophore mostly distinct. Stamens 5(-8), mostly free, anther dorsifixed, versatile. Gynophore usually absent; styles 3(-4), reflexed at anthesis, stigmas capitate. Fruit usually indehiscent, leathery with many seeds surrounded by juicy arils.

About 350 species in the New World plus *c* 20 species in Australasia, none native in Africa but some species widely introduced and  $\pm$  naturalized. Some are widely cultivated for their delicious fruits, others for their very striking flowers. As with most cultivated plants, *Passiflora* is poorly represented in herbaria. The following key is to the species most commonly met with in East Africa and thus likely to occur in the Flora area. At present only 3 species are definitely recorded, only 1 of which is represented by herbarium collections.

The common name for many species, PASSION FLOWER and PASSION FRUIT, comes from the use of the flowers in allegoric Christian teaching: 3 stigmas = the crucifixion nails, 5 anthers = 5 wounds of Christ, corona = crown of thorns, 10 sepals and petals = apostles, and the lobed leaves and tendrils = hands and whips of Christ's persecutors.

1. Leaves palmately veined, lobed or divided. 2  
- Leaves pinnately veined, not lobed. 7
2. Stipules and involucre bracts not divided. 3  
- Stipules and involucre bracts very finely and deeply divided. 2. *P. foetida*
3. Hypanthium less than 1 cm long; flowers white or near white, sometimes with blue or purple markings on the corona. 4  
- Hypanthium tubular, 5-9 cm long; flowers pink to orange-pink. 3. *P. mollissima*
4. Bracts and bracteoles conspicuous, forming an involucre; flowers 3 cm or more in diameter with petals. 5  
- Bracts and bracteoles filiform or linear, not forming an involucre; flowers 1-1.5 cm in diameter, greenish-yellow, without petals. 1. *P. suberosa*
5. Stipules leafy; involucre bracts entire or nearly so. 6  
- Stipules lanceolate or filiform; involucre bracts minutely toothed. 6. *P. edulis*
6. Stipules 1-2 cm long, falcate, sometimes remotely dentate; corona threads blue. 7. *P. caerulea*  
- Stipules 1.5-4 cm long, straight, entire; corona threads white. 8. *P. subpeltata*
7. Stem 4-angular, distinctly winged. 4. *P. quadrangularis*  
- Stem not winged. 5. *P. ligularis*

1. *P. suberosa* L. (1753)

- type: a cultivated specimen originating from Hispaniola (LINN).

For synonyms, see Killip, *Field Mus. Nat. Hist. Chicago, Bot.* 19: 88 (1938).

Perennial climber to 6 m, glabrous or pubescent; stem corky when old. Leaves: petiole 0.5-4 cm, with 2 small wart-like glands at about the middle; blade entire or usually 3-lobed, suborbicular to oblong, 4-10 cm long, margin entire, glands usually absent. Stipules linear, 4-8 mm. Inflorescences sessile, 1 or 2-flowered, peduncle (pedicel) 1-2 cm, with a central simple tendril 3-12 cm long; bracts setaceous, falling quickly, *c* 1 mm. Flowers 1-2 cm in diameter, greenish-yellow. Hypanthium saucer-shaped; sepals  $\pm$  oblong, 5-10 mm. Petals absent. Corona threads in 2 series, 2-6 mm; inner corona plicate, fimbriate; disk annular. Androgynophore 2-4 mm. Ovary glabrous; styles 2-3 mm long. Fruit a purple-black subglobose berry 0.8-1.5 cm in diameter.

A polymorphic species, established in many tropical countries as a weed in disturbed places, often in sandy places near the coast, etc.; 0-2500 m in East Africa. No material seen from the Flora area.

2. *P. foetida* L. (1753)

- type: perhaps from Lesser Antilles, fide Killip (LINN).

For synonyms see Killip, *Field Mus. Nat. Hist. Chicago, Bot.* 19: 474 (1938).

Annual or biennial creeper or climber with some yellowish-brown hairs, and unpleasant smell. Leaves: petiole 1-6 cm, without glands but with gland-tipped stronger hairs; blade membranous usually 3(-5)-lobed to half-way, suborbicular to ovate, base cordate, 3-10 cm long, 3-5-nerved; margin entire, with coarser gland-tipped hairs. Stipules kidney-shaped, 0.5-1 cm, deeply divided into gland-tipped processes. Inflorescences sessile, 1(or 2)-flowered; bracts and bracteoles forming a conspicuous much divided gland-hairy involucre below and enveloping the flower. Flowers 3-5 cm in diameter, white to pale lilac. Hypanthium saucer-shaped. Sepals oblong to lanceolate, 1.5-2 cm, awned dorsally below the apex. Petals oblong to lanceolate, slightly shorter than the sepals. Corona of 2 outer rows of threads *c* 1 cm, and inner several rows of thinner threads 1-2 mm; operculum membranous,  $\pm$  erect, denticulate; disk annular. Androgynophore 4-6 mm long. Ovary usually glabrous; styles 4-5 mm long. Fruit a subglobose rather dry berry, 1.5-3 cm in diameter, usually glabrous, yellow to orange, enveloped by persistent involucre.

Widely established as a weed in many tropical countries; 0-2500 m in E Africa and Somalia. Fruits sometimes recorded as edible. No material seen from the Flora area but species common all over the tropics.

3. *P. mollissima* (Kunth) Baily (1916);

*Tacsonia mollissima* Kunth (1817)

- type: Colombia, Humboldt & Bonpland 1767 (P).

Strong perennial climber to 20 m, subglabrous to densely pubescent throughout. Leaves: petiole 0.5-2.5(-5) cm long, without or usually with 2-5 pairs of small sessile glands; blade 3-lobed to halfway or more, in outline sub-

orbicular, 5–13 cm diam, base  $\pm$  cordate,  $\pm$  glabrous above, pubescent beneath, lobes to 6 cm long, apex acute or acuminate; margin serrate-dentate, gland-tipped; glands absent or minute. Stipules subcircular or kidney-shaped, *c* 2–5 mm, or obliquely reniform. Inflorescences 1-flowered; bract and bracteoles largely united and forming a 2–4 cm long tubular involucre. Flowers 5–10 cm in diameter, pink to orange-pink. Hypanthium tubular, (5–)6–9 cm, sometimes pubescent; sepals oblong, 2–5.5 cm long, mucronate below apex. Petals oblong, 2–5 cm, obtuse. Corona a lobulate edge at throat of hypanthium, operculum a curved membrane at base of hypanthium. Androgynophore 6–10 cm. Ovary pubescent; styles 10–15 mm. Fruit  $\pm$  ellipsoid, (without gynophore) 6–12 cm long, rather dry, softly pubescent, yellow.

Cultivated as an ornamental and for the flavoured fruit (BANANA PASSION FRUIT); 1000–3000 m in East Africa. SU (sight record, Sue Edwards).

#### 4. *P. quadrangularis* L. (1759)

– type: Jamaica, *P. Browne* s. n (?S).

Vigorous subherbaceous or woody climber to 15 m, glabrous throughout; stem stout, 4-angled and winged. Leaves: petiole 2–5 cm, with 3 pairs of wart-like glands; blade entire, ovate to elliptic, 9–20 cm long, base  $\pm$  cordate, apex acute or acuminate-mucronate; margin entire, glands absent. Stipules ovate-oblong, 2–5 cm, acute, entire. Inflorescences with 1 flower; bract and bracteoles subovate, base cordate, apex acute-acuminate, 3–5.5 cm long, entire, forming a conspicuous involucre. Flowers 7.5–10 cm in diameter, white or pink, corona threads with purple and pink bands and mottled. Hypanthium cup-shaped. Sepals ovate-oblong, 3–4 cm long, horned. Petals (ovate-) oblong-lanceolate, 3–4.5 cm long. Corona of various rows of threads; operculum incurved, disk annular. Androgynophore 12–14 mm, thickened towards the base. Ovary glabrous; styles 10–12 mm long. Fruit ovoid-oblong, 20–30 cm, fleshy with thick rind.

Native of tropical America, cultivated as an ornamental and for the edible pleasantly-flavoured fruit (GRANADILLA); quite often escaped; 0–2500 m in East Africa. No herbarium material seen from the Flora area.

#### 5. *P. ligularis* Juss. (1805)

– type: 'from South America', *Dombey* 739 (P).

Stout subherbaceous climber, to 20 m, glabrous. Leaves: petiole 4–10 cm, with 2–3 pairs of elongated glands; blade mostly entire, broadly ovate, 8–17 cm long, apex acuminate, base cordate, margin entire, glands absent. Stipules ovate-lanceolate, acute-acuminate, 1–2.5 cm long, narrowed at base, entire or  $\pm$  dentate. Inflorescences of 1 or 2 flowers; bracts united towards base, forming an involucre, 2–3.5 cm. Flowers 6–9 cm in diameter, white or pale pink. Hypanthium short-campanulate. Sepals ovate-oblong, 2.5–3.5 cm. Petals oblong, *c* 3 cm. Corona of several ranks of filaments, the outer ones blue at apex, banded; operculum membranous; cup-shaped, surrounding base of androgynophore. Ovary glabrous. Fruit ovoid, 6–8 cm long, yellow or dull purple.

Native of Central and S. America, cultivated (SWEET GRANADILLA) in tropical countries; 1000–3000 m in East Africa. The sweet pulp of the fruit is tasty and used in drinks. No herbarium material seen from the Flora area.

#### 6. *P. edulis* Sims (1818)

– type: a specimen cultivated in Europe, probably originally from Brazil.

Fide Killip, *Field Mus. Nat. Hist. Chicago, Bot.* 19: 393 (1938).

Perennial climber to 15 m, glabrous throughout (except ovary); stem sometimes angular, but not winged. Leaves 3-lobed to over half-way, suborbicular in outline, 5–11 cm long, base acute to cordate, lobes up to 8 cm long, with 2 wart-like glands towards the apex; blade-glands absent. Stipules lanceolate-linear, *c* 1 cm long. Inflorescence 1-flowered; bract and bracteoles ovate, acute, glandular serrate, 1.5–2 cm long, forming an involucre. Flowers 4–7 cm in diameter, white. Hypanthium cup-shaped. Sepals oblong, 2–3 cm long, horned. Petals oblong, obtuse, 1–2.5 cm long. Corona composed of several rows of threads, the outer 0.5–2.5 cm long, white, purple towards base; operculum membranous, fimbriate, incurved; disk cup-shaped. Androgynophore 6–8 mm. Ovary glabrous or short-pubescent; styles 10–12 mm. Fruit berry-like with leathery pericarp, globose to ellipsoid, 4–5 cm in diameter, glabrous, yellow or purple.

Cultivated in many regions for the edible fruit (PASSION FRUIT) and often escaped in disturbed places; 0–2500 m. SU IL KF HA; native of Brazil and now pantropical. *Westphal* 2635; *Seeger* 3248; *Zemede A.* 2001.

#### 7. *P. caerulea* L. (1753)

– type: 'from Brazil' (LINN).

Perennial climber to 10 m, glabrous throughout, often glaucous. Stem somewhat angular, not winged. Leaves: petiole 1.5–4 cm long, with 2–4 stalked glands above the middle; blade subcircular in outline, 3–10 cm diam, deeply (3–)5(–7)-lobed, the lobes oblong, acute, margin entire; blade glands small, near the lobe-sinuses. Stipules subreniform falcate, entire or remotely dentate, 1–2 cm long. Inflorescence consisting of 1 flower, peduncle (pedicel) 3–7 cm long, beside a simple tendril *c* 10 cm long; bract and bracteoles not united, ovate(-oblong), entire, 1.5–2.5 cm long, forming an involucre. Flowers 6–10 cm in diameter, white or faint pink, the corona threads white and blue. Hypanthium cup-shaped. Sepals oblong, 2–2.5 cm, awned. Petals oblong, obtuse, 2.5–3 cm long. Corona consisting of various series of threads and incised rims, the outer threads to nearly half as long as the sepals, blue towards apex; operculum and nectar-ring rectangular, and limen present. Androgynophore *c* 1.5 cm. Ovary glabrous, pruinose. Fruit pendent, ellipsoid, *c* 6 cm, like a dry berry with orange leathery pericarp. Fig. 64.4.

Widely cultivated in many tropical and subtropical countries all over the world; occasionally escaped; 0–3000 m in East Africa. EW SU (sight records from gardens in Addis Ababa and Asmara, Sue Edwards).





Figure 64.4  
**PASSIFLORA CAERULEA:** 1  
 – flowering stem x 1; 2 – fruit x  
 1. Both from Robertson s.n.  
 Drawn by M.K. Scott. (Repro-  
 duced from *Flora of southern*  
*Africa* 22: 125, with permission  
 of the National Botanical Insti-  
 tute, South Africa.)

8. *P. subpeltata* Ortega (1798)

– type: 'from Mexico' (MA, fide Killip, loc. cit.).

Killip, *field Mus. Nat Hist. Chicago, Bot.* 19: 436 (1938)

Perennial climber to 5 m, slightly blue-green, glabrous throughout. Leaves: petiole 3–6 cm, with 2–5 scattered or paired slender glands at about the middle; blade subcircular in outline, 3-lobed to about half-way, 4–10 cm in diameter; base subcordate, sometimes subpeltate; lobes elliptic oblong, up to 5 cm, obtuse or acute; margin entire except for a few gland-teeth near the lobe sinuses, blade glands absent. Stipules ovate-oblong, straight, almost entire, 1.5–4 cm long. Inflorescences 1-flowered; bract and bracteoles ovate, acute, 1–1.5 cm long, entire or with a few minute gland-teeth, free, forming an involucre. Flowers 4–5.5 cm

in diameter, white. Hypanthium broadly cup-shaped. Sepals oblong, 2–2.5 cm, obtuse, awned. Petals oblong, acute, c 2 cm. Corona of various rows of threads, the outer row 1(–1.5) cm; operculum plicate, incised for about the half or less and with a fringe of filiform processes; disk annular. Androgynophore 10–12 mm. Ovary glabrous; styles 8–10 mm. Fruit subglobose, leathery, 3.5–4.5 cm, green turning yellow.

Well established as a weed in many parts of Africa, and likely to be encountered in the Flora area as well; 1000–2500 m in East Africa. No herbarium material seen from the Flora area.

This species has often been wrongly named as *P. eichleriana* Master.

## 65. CUCURBITACEAE

by C. Jeffrey\*

*Cufodontis*, *Enum.*: 1030–1052 (1965); Jeffrey, *Kew Bull.* 15(3): 337–371 (1962), **Cucurbitaceae** in *Fl. Trop. E. Afr.*: 156 pp. (1967), *Kew Bull.* 34(4): 789–809 (1980), *Kew Bull.* 40(1): 209–211 (1984); Jeffrey in Bates, Robinson & Jeffrey, *Biology and Utilization of the Cucurbitaceae*: 3–9 & 449–463 (1990); Thulin, *Nordic J. Bot.* 11: 535–542 (1991); Jeffrey & Thulin, 57. **Cucurbitaceae** in *Fl. Somalia* 1: 216–240 (1993).

Mostly monoecious or dioecious herbs, annual or perennial climbers or with trailing stems, usually with tendrils, often with a tuberous rootstock. Leaves alternate, with petioles but without stipules, simple and then usually palmately lobed, or compound. Tendrils inserted to the side of the leaf-base, simple or with 2–7 branches, rarely reduced or absent. Flowers usually regular, rarely bilaterally symmetrical, usually either male or female, inflorescence of various types. Hypanthium<sup>1</sup> present, usually extending above the ovary in female flowers. Sepals usually 5, free. Petals usually 5, united, often with free lobes, rarely free to the base. Stamens nearly always variously united, in origin 5 alternating with the corolla-lobes, nearly always with only one theca<sup>2</sup> each, but commonly appearing as two pairs of more or less united stamens and one free stamen, or the filaments partly or completely united into a central column; thecae often linear, curved or wavy. Ovary inferior, usually of 2–3 united carpels, or of 1 carpel; placentation usually parietal, the placentas large and intruding into the locule of the carpel; ovules 1 to many. Style 1 usually with 2–3 bilobed stigmas, or styles 2–3. Fruit various, usually a fleshy or hard-shelled berry. Seed 1 or many, usually large and compressed.

About 120 genera and 825 species falling into 2 well-defined subfamilies, mainly found in the tropics and subtropics of both the Old and New Worlds. At present 24 genera and about 71 species have been found in the Flora area, but the status of the species in some of the genera, particularly *Cucumis* and *Coccinia*, needs further study.

This family is poorly represented in collections and specimens are often difficult to identify because many species are dioecious. Mature fruits are diagnostic but these are not often collected because their fleshy nature makes them difficult to deal with in the field.

The family contains many genera of economic importance as sources of food (*Citrullus*, *Cucumis*, *Cucurbita* and *Coccinia*), medicine (*Cucumis*) and containers (*Lagenaria*).

The affinities of the family have long been debated. In many systems of classification, it has been placed in or near the Violales and a close relationship with the Passifloraceae and Caricaceae postulated. To the present author, the evidence for such a hypothesis has always seemed far from convincing, and the postulate that the Cucurbitaceae, Begoniaceae and Datisceae form a natural group much more strongly supported. Unfortunately, the wider affinities of this group remain obscure. Recent molecular data—see Chase et al. in *Ann. Missouri Bot. Gard.* 80: 528–580 (1993)—have shown, however, that there is some evidence that these three families plus the Coriariaceae form a group sister to the Fagales *sensu lato* (Fagaceae, Juglandaceae, Casuarinaceae, Betulaceae and Myricaceae), the whole together forming a clade characterized by a preponderance of unisexual apetalous flowers with inferior ovaries. In this light, the long-neglected hypothesis of Vuillemin in *Ann. Sc. Nat. ser. 10, 5*: 1–19 (1923), that the corolla of Cucurbitaceae is not homologous with that of typical petaloid families, but represents a calcine<sup>3</sup> outgrowth, may warrant re-examination.

In order to accommodate the considerable variation in leaf-shape and lobing exhibited by many species in the family, leaf-blade length is given as the length of the mid-rib from the apex of the petiole to the leaf-tip, and breadth as the overall distance between the outermost points of the farthest-spreading lobes on each side. Similarly, to allow for variation in depth of corolla lobing, the length of the corolla-lobes is given as the distance from the apex of the lobes to the base of the corolla-tube. Many species with tuberous rootstocks will flower on leafless, often short and crowded stems arising directly from the rootstock, as well as on typical leafy shoots. The key to genera is designed to take into account such leafless states.

**Key to subfamilies**

1. Styles 3, free; tendrils 2-branched towards the tip, spiralling below and above the point of branching; filaments inserted on or about the disc; pollen-grains striate. subfamily 1. **Zanonioidae**
- Style 1; tendrils unbranched or with 2–5 branches

from near the base, spiralling only above the point of branching; filaments inserted on the hypanthium; pollen grains not striate.

subfamily 2. **Cucurbitoidae**

- 
1. hypanthium: a more or less cup-shaped or tubular extension of the receptacle beneath the calyx, corolla and stamens.
  2. theca (pl. thecae): one anther lobe or pollen sac.
  3. calcine: growth from the calyx or the receptacle.

\* The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK.

## Subfamily 1. ZANONIOIDEAE

Jeffrey in *Kew Bull.* 15(3): 345 (1962)

Tendrils bifid, spiralling both below and above the point of branching, branching towards the end and the branches short. Filaments inserted on or about the disc. Pollen grains small, tricolporate, striate. Styles 2–3, free.

1. Stamens 4–5, with short straight thecae; ovary 3-sided, containing several ovules; fruit a capsule, several-seeded; seeds fusiform, winged.

1. *Gerrardanthus*

- Stamens apparently 1, central, with a horizontal ring-like theca; ovary compressed, containing 1 ovule; fruit winged, 1-seeded; seed compressed, not winged.

2. *Cyclantheropsis*1. *GERRARDANTHUS* Hook. f. (1867)

Climbing herbs with perennial tuberous rootstock, stems softly woody when old. Leaves simple. Flowers small, dioecious, zygomorphic. Male flowers in axillary panicle-like clusters; hypanthium broad, shallow; sepals 5, small; petals 5, free, unequal; stamens 4, each with one theca, in 2 pairs united by their anthers; fifth stamen a subulate staminode; connective extending apically; locules short, straight. Female flowers solitary or a few together; ovary 3-sided, with several pendulous ovules; perianth similar to that of the male flowers; styles 3. Fruit a dry, obconic-cylindric, 3-sided capsule, dehiscent by an apical triradiate slit. Seeds fusiform, with a distal membranous wing.

Genus with 5 species in tropical and southern Africa, 1 of which extends into the Flora area.

*G. lobatus* (Cogn.) C. Jeffrey (1962);

*G. grandiflorus* var. *lobatus* Cogn. in *Engl. & Prantl. IV*, 275(1): 23 (1916) – type: Kenya, *Scheffler* 473 (B holo. destroyed; K iso.).

Herb climbing to 6 m. Leaf-blade broadly ovate, subsucculent, almost glabrous, 3–14.5 x 4.5–12.5 cm, base cordate, usually palmately 5–7-lobed, lobes triangular or ovate-triangular; petiole 1.5–10 cm long. Male flowers 5–50 together; pedicels slender, 2–20 mm long; sepals ovate or triangular, acutely acuminate, 2.5–4 mm long; petals oblong, brownish-yellow, 10–18 mm long, unequal, 2 larger, erect, 3 smaller, spreading or reflexed. Female flowers in a lax group of (1–)2–3; ovary glabrous, 6–10 x 2–3 mm; sepals lanceolate, 2–2.8 mm long; petals (c 10 mm long) rather smaller than in male flowers, 3 erect, 2 narrower, spreading. Fruit brownish, 45–63 x 18–28 mm; seeds 25–44 mm long, with pale brown fusiform body 12–22 mm long and distal membranous wing 14–22 x 6–9 mm. Fig. 65.1.

*Acacia* – *Commiphora* woodland and *Olea*-dominated forest; 1200–1750 m. KF GG; tropical Africa westwards to Nigeria and south to Mozambique and Malawi. *Gilbert* et al. 364, 365; *Friis* et al. 2185.

2. *CYCLANTHEROPSIS* Harms (1896)

Climbing herbs with perennial tuberous rootstocks, stems softly woody when old. Leaves simple. Flowers small,

dioecious, regular. Male flowers in loose axillary panicle-like clusters; hypanthium very shallow; sepals 5, small; petals 5, free, small; stamens united into a single central column; thecae 2, semicircular, horizontal, at the top of the column, forming a split ring. Female flowers a few together; ovary compressed, unilocular, with 1 pendulous ovule; perianth similar to that of the male flowers; styles 3. Fruit compressed, 1-seeded with a surrounding wing, elliptic in outline, indehiscent. Seed rather large, elliptic in outline, compressed.

Genus with 2 species in Africa, 1 of which extends into the Flora area, and 1 in Madagascar.

*C. parviflora* (Cogn.) Harms (1896);

*Gerrardanthus parviflorus* Cogn. (1881) – type: Tanzania, Zanzibar island, *Hildebrandt* 1140 (W holo., L iso.).

*G. aethiopicus* Chiov. (1939) – type: GD, Galla-Sidamo, Malca Guba, *Cufodontis* 143 (FI holo.).

Herb climbing to 6 m. Leaf-blade ovate to reniform, subsucculent, minutely puberulous, 2–12 x 3–11.5 cm, base cordate, usually palmately 3–5(–7)-lobed, lobes ovate or triangular; petiole 1–4 cm long. Male flowers numerous; peduncles and pedicels slender; sepals oblong-lanceolate, 0.7–1 mm long; petals ovate, greenish-yellow, 1–1.5 mm long. Female flowers in 3–6-flowered racemes; pedicels 2–6 mm long; ovary compressed, 3–6 x 1–1.7 mm; styles very short. Fruits brownish, pendulous, 30–55 x 15–28 x 5 mm, surfaces reticulate. Seeds 11–21 x 8–16 x 3–5 mm, slightly rough. Fig. 65.2.

*Acacia* – *Commiphora*, etc., bushland; 800–1100 m. SD BA; east tropical Africa south to Mozambique, Zimbabwe and Angola. *Cufodontis* 143; *Friis* et al. 2966.

## Subfamily 2. CUCURBITOIDEAE

Plants with tendrils unbranched or with 2–5 branches, spiralling only above the point of branching, the branching point towards the base and the branches long. Filaments inserted on the hypanthium, free from the disc if the latter is present. Pollen grains various, not striate. Styles united into a single central column, with usually 2–3 bilobed stigmas.

About 100 genera and 750 species, mainly tropical and subtropical, with 22 genera and 69 species recorded for the Flora area.

1. Plant with flowers. 2
- Plant with mature fruits. 45

## Key for plants with flowers

2. Branches spiny, most spines paired, replacing or derived from the mostly paired tendrils.

13. *Momordica*

- Branches not spiny, or if weakly spiny then spines derived from the petiole bases; tendrils solitary, not paired at the nodes, very rarely several together, not spinescent. 3

3. Leaves compound, with distinct leaflets. 4

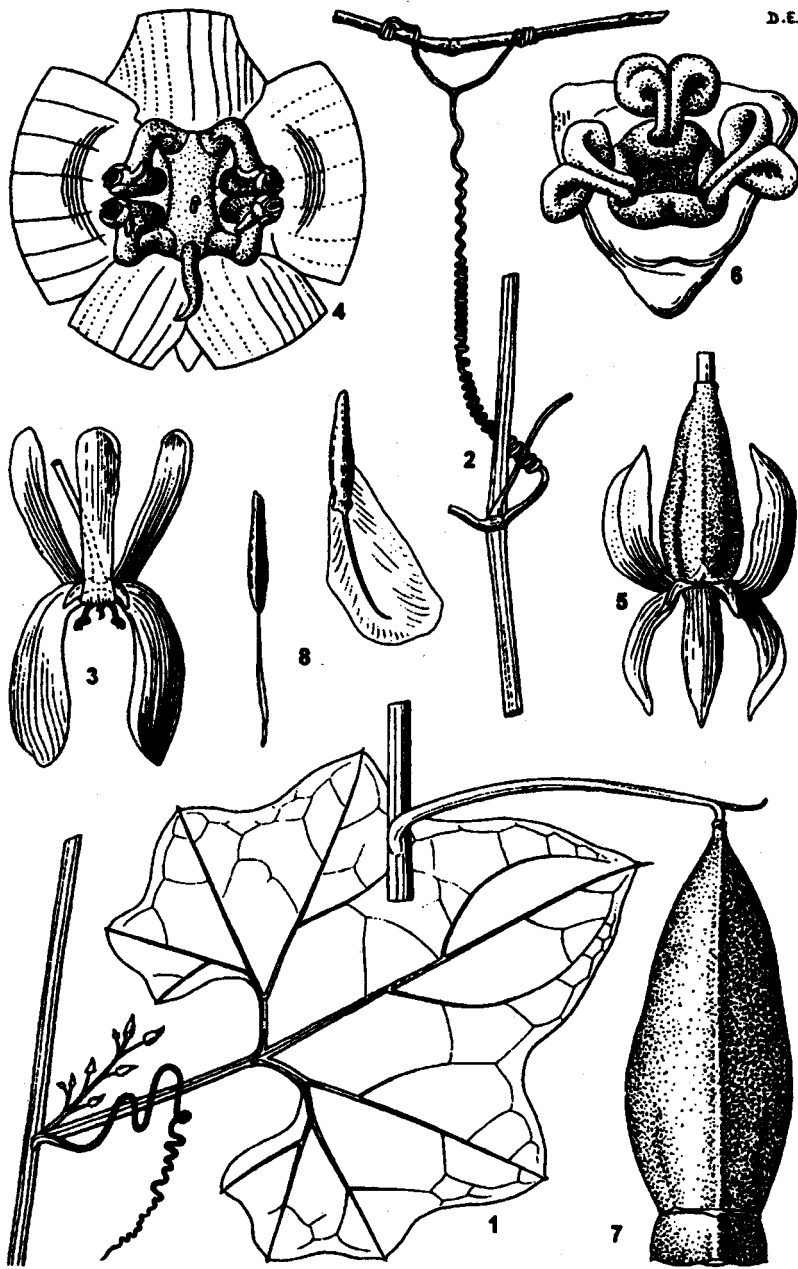


Figure 65.1

**GERRARDANTHUS LOBATUS:** 1 – stem portion with tendril, leaf and young inflorescence  $\times \frac{3}{8}$ ; 2 – apically bifid tendril  $\times \frac{3}{8}$ ; 3 – male flower  $\times 2$ ; 4 – stamens from above  $\times 6\frac{1}{2}$ ; 5 – female flower  $\times 3$ ; 6 – styles  $\times 10$ ; 7 – fruit  $\times 1\frac{1}{2}$ ; 8 – seed, side and face views  $\times 1\frac{1}{2}$ . 1 from Schlieben 2098; 2, 5 & 6 from Gillett 14136; 3 & 4 from Milne-Redhead & Taylor 7243; 7 from Drummond & Hemsley 4158; 8 from Gillett 14436. Drawn by Derek Erasmus. (Reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 25.)

- Leaves simple, though sometimes very deeply dissected, or absent. 6
- 4. Petals purplish, fringed with long fine filaments. 14. *Telfairia*
- Petals yellow or yellowish, not fringed with long fine filaments. 5
- 5. Petals 6 mm or more long. 13. *Momordica*
- Petals up to 4 mm long. 3. *Kedrostis*
- 6. Young stems spotted with darker green. 7
- Young stems uniform in colour or merely with pale dots. 8
- 7. Petals free, 1 or more with a recurved scale at the base on the upper surface. 13. *Momordica*
- Petals united, all without scales at the base. 21. *Diplocyclos*
- 8. Petiole with a pair of lateral glands just below or immediately adjacent to its insertion on to the blade. 18. *Lagenaria*
- Petiole without glands, or if glandular, then the glands not as above, or leaves absent. 9
- 9. Base of petiole with a ciliate stipuloid bract. 10
- Base of petiole without a ciliate bract. 12
- 10. Anther-thecae short, straight; ovules 2; petals 1.5–2 mm long. 12. *Ctenolepis*
- Anther-thecae forming a zigzag pattern; ovules more than 2; petals at least 3.5 mm long. 11
- 11. Petals 3.5–6 mm long; anthers protruding from the hypanthium. 11. *Dactyliandra*
- Petals 10–60 mm long; anthers included in the hypanthium. 10. *Trochomeria*

12. Leaves (except sometimes the lowermost) mostly subsessile, clasping the stem at the base. **13**  
 - Leaves distinctly petiolate, not clasping the stem at the base, or absent. **14**
13. Flowers subtended by a conspicuous circular bract; leaves unlobed or almost so. **13. Momordica**  
 - Flowers without a conspicuous circular bract; leaves shallowly to deeply lobed. **16. Cephalopentandra**
14. Corolla-lobes linear; corolla limbs usually spreading and star-shaped. **10. Trochomeria**  
 - Corolla-lobes much broader; corolla limb not spreading and star-shaped. **15**
15. Tendrils usually 3-5-branched, occasionally some only 2-branched. **16**  
 - Tendrils all unbranched or 2-branched. **19**
16. Male flowers in racemes, petals 1.5-5 mm long; ovary spiny, ovule solitary. **24. Sicyos**  
 - Male flowers solitary or paired, or if in racemes, then petals 20 mm long or more; ovary not spiny; ovules numerous. **17**
17. Petals 7-20 mm long; leaves usually deeply pinnately divided with pinnate lobes. **17. Citrullus**  
 - Petals more than 20 mm long; leaves palmately lobed. **18**
18. Petals united into a distinct tube; male flowers solitary. **23. Cucurbita**  
 - Petals almost or quite free; male flowers racemose. **22. Luffa**
19. Plant compact, with short thick stems, not trailing or climbing. **23. Cucurbita**  
 - Plant climbing or trailing, with comparatively slender, elongated stems. **20**
20. Incurved scales present near the base of the upper surface of 1-3 of the petals. **13. Momordica**  
 - Incurved scales absent from the petals. **21**
21. Tendrils 2-branched, occasionally also some simple. **22**  
 - Tendrils all simple, unbranched. **28**
22. Anther-thecae almost straight; stamens inserted on the mouth of the hypanthium; placentas and stigmas 2. **3. Kedrostis**  
 - Anther-thecae folded or contorted; stamens inserted on the throat of the hypanthium; placentas and stigmas 3. **23**
23. Male and female flowers in sessile axillary clusters, usually coxillary; ovary smooth. **21. Diplocyclos**  
 - Male flowers 1-3 or racemose, female solitary, not coxillary, or if so, then ovary densely spiny, otherwise ovary smooth or spiny. **24**
24. Leaves deeply divided, the lobes pinnately lobulate. **17. Citrullus**  
 - Leaves unlobed, palmately lobed, or absent. **25**
25. Ovary spiny; petals yellow; pedicels of female flowers 5-12 cm long. **9. Cucumis**  
 - Ovary smooth, or if spiny, then petals white and pedicels of female flowers only up to 1 cm long. **26**
26. Hypanthium cylindrical, 10-32 mm long in both male and female flowers; anthers narrow, with tightly folded thecae united into an oblong head. **15. Peponium**  
 - Hypanthium broadly obconic to campanulate, up to 8 mm long in male flowers, very shortly cylindrical, up to 4 mm long in female flowers; anthers broad, with laxly convoluted thecae, free or united into a globose head. **27**
27. Petals free, yellow, or if white, then ovary spiny. **22. Luffa**  
 - Petals united into a distinctly gamopetalous corolla, orange-yellow to white; ovary never spiny. **20. Coccinia**
28. Flowers with prominent basal disc, free laterally from the hypanthium, obconic or subglobose in male flowers, ring-like around the base of the style in female flowers. **29**  
 - Flowers without a basal disc or the glandular area, if present, not as above, not distinct laterally from the hypanthium. **38**
29. Stamens 3, all two-thealous; ovary more or less glabrous. **5. Zehneria**  
 - Stamens 3, 2 two-thealous, 1 one-thealous; ovary tomentose or hispid. **30**
30. Male and female flowers in separate clusters, subsessile. **6. Mukia**  
 - Male flowers solitary or few together, visibly pedicellate; female flowers solitary, pedicellate. **31**
31. Male and female flowers both present or only male flowers present. **32**  
 - Male flowers absent, only female flowers present. **34**
32. Anther-thecae with 2 folds, sinuous. **9. Cucumis**  
 - Anther-thecae straight or only apically incurved. **33**
33. Hypanthium with long brownish forward-pointing bristles; ovary tuberculate, densely bristly. **7. Oreosyce**  
 - Hypanthium with short hyaline spreading bristles; ovary not tuberculate. **8. Cucumella**
34. Tendrils several at each node; stalk of ovary rapidly elongating after fertilization, burying the developing fruit. **9. Cucumis**  
 - Tendrils solitary at each node; stalk of ovary not burying the young fruit. **35**
35. Ovary papillose, tuberculate or with short soft spines. **36**  
 - Ovary smooth or obscurely ribbed, pubescent. **37**
36. Tubercles, papillae or spines of ovary each with an apical seta, ovary otherwise glabrous. **9. Cucumis**  
 - Tubercles of ovary generally setulose, setae not confined solely to the apices. **7. Oreosyce**
37. Stems and petioles with coarse spreading setae. **9. Cucumis**  
 - Stems and petioles rather finely hispid or pubescent. **8. Cucumella**
38. Leaves deeply divided, the lobes pinnately lobulate. **17. Citrullus**  
 - Leaves unlobed, palmately lobed or absent. **39**
39. Corolla star-like, petals linear. **10. Trochomeria**  
 - Corolla not star-like, petals broader. **40**

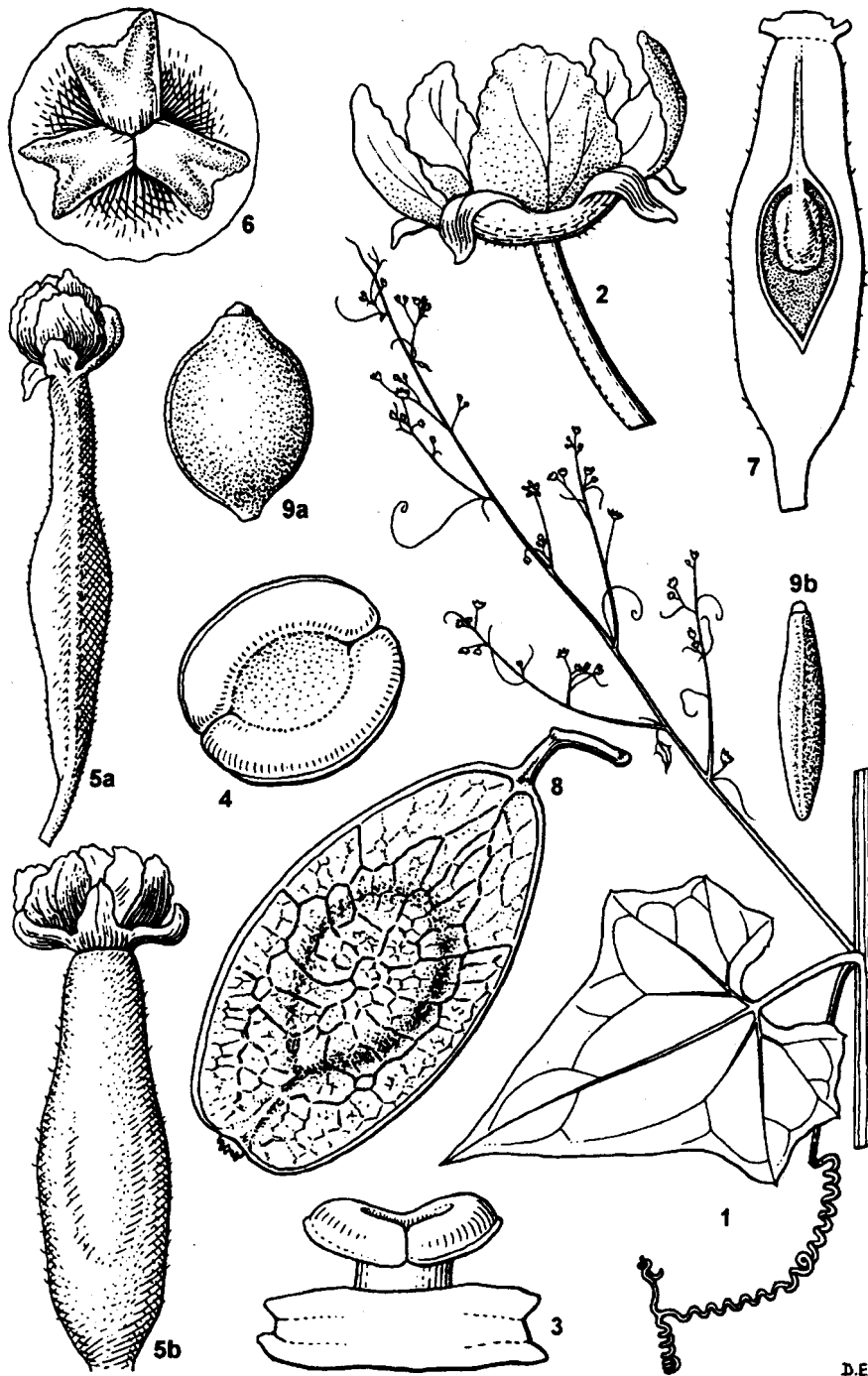


Figure 65.2 *CYCLANTHEROPSIS PARVIFLORA*: 1 – stem portion with tendril, leaf and inflorescence x 1; 2 – male flower x 20; 3 – staminal column and disk x 26; 4 – anther-thecae, in plan x 26; 5a & 5b – female flower, side and face views x 10; 6 – styles x 30; 7 – ovary, longitudinal median section x 10; 8 – fruit x 2½; 9a & 9b – seed, face and side views x 2½. 1 from Drummond & Hemsley 2024; 2–7 from Drummond & Hemsley 3515; 8 & 9 from Milne-Redhead & Taylor 7227. Drawn by Derek Erasmus. (Reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 26.)

40. Petals 12–20 mm long, free or almost so.

19. *Eureiandra*

– Petals 1–7.5 mm long, or if longer, then corolla markedly gamopetalous. 41

41. Anther-thecae variously folded; corolla markedly gamopetalous. 20. *Coccinia*

– Anther-thecae straight, short; petals united only at the base. 42

42. Stamens 3, all two-thealous. 5. *Zehneria*

– Stamens 3, 2 two-thealous, 1 one-thealous, or 5, all one-thealous. 43

43. Plant woody, developing thick stems with ridged brownish, pink or yellowish corky bark. 3. *Kedrostis*

– Plant herbaceous, aerial stems slender, not becoming thickly woody. 44

44. Ovary developing a cup-like base; male flowers racemose or subcapitate, without bracts or bracts not obvious. 4. *Corallocarpus*

– Ovary not developing a cup-like base; male flowers clustered or if racemose, the bracts obvious even if sometimes minute. 3. *Kedrostis*

#### Key for plants with fruits

45. Seeds large, about 30–36 x 32–40 x 10–15 mm; fruit large, longitudinally ribbed, many-seeded, dehiscent by longitudinal valves. 14. *Telfairia*

– Seeds much smaller; fruit not as above. 46

46. Fruit fusiform, sessile in the axil of a circular, deeply cordate, amplexicaul bract, basally 1-seeded. 13. *Momordica*  
 - Fruit not as above. 47
47. Mature fruit dry, brownish, fibrous, opening by an apical operculum. 22. *Luffa*  
 - Mature fruit fleshy or if dry then not opening by an apical operculum. 48
48. Surface of fruit with sparse to dense spines, tubercles or pustules or with undulate longitudinal wing-like ridges. 49  
 - Surface of fruit smooth or almost so, fruit in transverse section rounded, bluntly angular or ribbed. 52
49. Fruits 1-seeded, capitate at the apex of the peduncle. 24. *Sicyos*  
 - Fruits more than 1-seeded, solitary. 50
50. Spines, tubercles or pustules of fruit each ending in a solitary hyaline seta or its hardened basal remnant, the fruit otherwise glabrous. 9. *Cucumis*  
 - Spines, tubercles or pustules of fruit not each ending in a solitary seta, the fruit setulose or glabrous, or the fruit with fleshy wings. 51
51. Mature fruit setulose, greenish, tuberculate, expelling seeds forcibly on detachment from the stalk. 7. *Oreosyce*  
 - Mature fruit orange-red, glabrous, spiny, tuberculate or winged, dehiscent into 3 valves and exposing red-sheathed seeds hanging from the valve-faces, rarely indehiscent. 13. *Momordica*
52. Seeds with rugose appendages at one or both ends, fusiform or subglobose, the testa obscurely sculptured in very low relief, or, if without appendages then with distinctly sculptured faces. 13. *Momordica*  
 - Seeds smooth, fibrillose, verrucose or pitted, neither appendaged nor sculptured on the faces. 53
53. Mature fruit whitish, yellowish, brownish or green, or variegated in these colours, never red. 54  
 - Mature fruit red or orange-red, at least in part. 59
54. Fruit about 13 x 6 mm. 8. *Cucumella*  
 - Fruit at least 35 x 20 mm. 55
55. Fruit subterranean. 9. *Cucumis*  
 - Fruit not subterranean. 56
56. Seeds truncate or 2-horned at one end, ornamented on the faces with two raised ridges or a raised disc; fruit uniformly green or with paler transverse flecks and dashes. 18. *Lagenaria*  
 - Seeds tapered or rounded at the ends, without facial ridges or a raised disc; fruit green, yellow or brownish, sometimes with longitudinal stripes or mottling. 57
57. Seeds less than 7 mm long, or if longer, narrowly elliptic in outline, 1.8–2.5 or more times as long as broad, smooth, straw-coloured, not bordered. 9. *Cucumis*  
 - Seeds usually more than 7 mm long, ovate-elliptic in outline, up to 1.7 times as long as broad, smooth or not, bordered or not, white, straw-coloured, brown, reddish or black. 58
58. Seeds not bordered, at least distally, 6–11 x 3.5–7 x 2–2.7 mm, embedded in bland very watery pulp or in very bitter pulp. 17. *Citrullus*  
 - Seeds bordered all round, 8–21 x 4–13 x 1.5–4 mm, embedded in somewhat fibrous non-bitter pulp. 23. *Cucurbita*
59. Seeds 2, plano-convex, 7.5–11 x 5–6 x 2–3 mm; fruits subglobose, slightly oblate, 10–15 mm in diameter. 12. *Ctenolepis*  
 - Seeds and fruits not as in the above combination. 60
60. Seeds rather tumid, verrucose on the faces, bordered, 3–5 x 2–3 x 1.5–1.7 mm; fruits globose, 6–11 mm in diameter, subsessile. 6. *Mukia*  
 - Seeds and fruits not as in the above combination. 61
61. Seeds pitted or verrucose or with angular margins, dark-coloured. 62  
 - Seeds smooth or fibrillose, at most slightly rugose, white to reddish or brown, and much compressed. 63
62. Seeds pitted or with angular margins. 11. *Dactyliandra*  
 - Seeds verrucose, especially on the rather thick margins. 16. *Cephalopentandra*
63. Seeds compressed, with depressed, flat or only slightly convex faces, usually less than 2 mm thick. 64  
 - Seeds tumid, subglobose, ovoid or pear-shaped, usually at least 2.5 mm thick. 69
64. Testa fibrillose when dry; seeds rather thick at the edges, with 2-grooved margins and a flat disc, if with thin rounded margins, then broadly ovate in outline and rather tumid with convex faces. 20. *Coccinia*  
 - Testa smooth when dry; seeds lenticular with thin margins or if with thick edges, then with raised margins and depressed slightly convex disc. 65
65. Fruit cylindrical, strongly 10-ribbed. 20. *Coccinia*  
 - Fruit not as above. 66
66. Fruit subglobose or ellipsoid, without a beak, though sometimes slightly apiculate. 5. *Zehneria*  
 - Fruit fusiform or with a beak. 67
67. Fruit finely hairy. 8. *Cucumella*  
 - Fruit glabrous. 68
68. Fruit fusiform; seeds up to 5 x 2.5 x 1.6 mm. 5. *Zehneria*  
 - Fruit ellipsoid, more or less attenuate at the apex; seeds 4.5–6.5 x 3.5 x 1.5–2.5 mm. 20. *Coccinia*
69. Fruit a small ovoid often beaked berry, the upper part separating at maturity in a cap-like manner from the persistent green cup-like base. 4. *Corallocarpus*  
 - Fruit not dehiscent by a cap, but splitting longitudinally or irregularly or indehiscent. 70
70. Fruit globose, with longitudinal silvery-white stripes or lines of markings; seeds with thick prominent ridged and grooved margins and a small highly convex disc. 21. *Diplocyclos*  
 - Fruit ellipsoid or beaked, without such markings; seeds not as above. 71
71. Fruit with the seeds in 4 rows, dehiscent by a longitudinal slit. 3. *Kedrostis*  
 - Fruit with the seeds in 6 rows, not dehiscent by a longitudinal slit. 72

72. Fruit up to 20 x 10 mm; seeds asymmetrically ovate or pear-shaped, compressed at the apex, up to 6 x 4 x 2.5 mm. 3. **Kedrostis**  
 – Fruit 40–90 x 20–45 mm broad; seeds subglobose or ellipsoid, 8–14 x 5.5–8 x 4–5.5 mm. 73
73. Seeds white, with smooth hard testa; fruit not beaked. 10. **Trochomeria**  
 – Seeds with a golden-brown metallic luster, testa covered with thread-like fibres; fruit somewhat beaked. 19. **Eureiandra**

### 3. **KEDROSTIS** Medik. (1791)

*Cyrtonea* Schrad. ex Ecke & Zeyh. (1836);

A. Rich. (1847)

Climbing or trailing herbs with perennial tuberous rootstock, or softly woody climbers. Leaves simple or trifoliate. Tendrils simple or bifid. Flowers small, monoecious or dioecious. Male flowers in racemes or clustered; hypanthium campanulate; sepals 5, small, lanceolate to dentiform; petals 5, united at the base, greenish-yellow or yellow; stamens 5, all one-theous in 2 pairs with 1 single, or the paired stamens more or less united into 2 two-theous stamens, inserted on the mouth of the hypanthium; filaments short; thecae short, straight or curved. Female flowers solitary or few together; ovary smooth, glabrous or pubescent; ovules few to many, horizontal; perianth as in male flowers; stigmas usually 2. Fruits solitary or few together, fleshy, often beaked, red, indchiscent or dehiscent by a longitudinal slit. Seeds asymmetrically pear-shaped or subglobose, usually smooth.

Genus with 20 species, mostly in tropical and southern Africa and Madagascar, a few in south-west Asia and Indo-Malasia; 4 species in the Flora area.

1. Plant a tuberous-rooted herb with slender aerial stems. 2  
 – Plant a woody climber with thick basal stems and deeply fissured corky bark. 3
2. Male peduncles stout, distinct in appearance from the much more slender pedicels; fruit about 75 x 20 mm, glabrous; tendrils usually bifid. 1. **K. leloja**  
 – Male peduncles slender, similar in appearance to the pedicels; fruit 7–20 mm long, finely pilose; tendrils simple. 2. **K. foetidissima**
3. Leaves simple; bark red, pink or grey. 3. **K. gijef**  
 – Leaves trifoliate, with sessile leaflets; bark brownish. 4. **K. pseudogijef**

#### 1. **K. leloja** (Forssk.) C. Jeffrey (1962);

non sensu C. Jeffrey, *Fl. Trop. E. Afr. Cucurbitaceae*: 134 (1967); *Turia leloja* Forssk. ex J.F. Gmelin (1791) – type: Arabia, Yemen, *Forsskål* s.n. (C holo.).

*Rhynchocharpa hirtella* Naud. (1862); *K. hirtella* (Naud.) Cogn. (1881) sensu C. Jeffrey, *Fl. Trop. Afr. Cucurbitaceae*: 134 (1967) – type: Ethiopia, Dschinat-Mara (locality not identified), *Schimper* 330 (P holo. not seen; K iso.).

*Kedrostis cufodontii* Chiov. (1934) – type: SD, Galla-Sidamo, Moyale [Moiale], *Cufodontis* 720 (FI holo.).

Climbing herb with stems 1–2 m long from tuberous rootstock. Leaf-blade broadly ovate, hispid or pubescent, 2.5–10.5 x 3–13 cm, base cordate, margin sinuate-dentate, usually palmately 3–5-lobed, lobes obovate, triangular or elliptic, sometimes lobulate; petiole 2–11 cm long. Tendrils usually bifid. Male flowers up to 30 in pedunculate racemes; pedicels 2–11 mm long; hypanthium campanulate, 2.5–3 mm long; sepals lanceolate, attenuate, 4–5 mm long; petals pale green to yellow, 3.5–5 mm long. Female flowers solitary, with short pedicels; ovary fusiform, shortly hairy, 9–20 mm long. Fruits conical or fusiform, more or less truncate at the base, beaked, green or green with paler spots, orange to scarlet when ripe, about 75 x 20 mm, many-seeded, dehiscent by a longitudinal slit; stalk 5–20 mm long. Seeds subglobose, smooth, bordered, 3.5–5 mm long. Fig. 65.3.1–7.

Deciduous *Acacia* – *Commiphora* woodland and bushland; (250–)850–1650 m. SU AR GG SD HA; Somalia, Yemen, west to Senegal and south to South Africa (Transvaal). *Gilbert & Thulin* 156, *IECAMA* G-66, *Friis* et al. 2981.

#### 2. **K. foetidissima** (Jacq.) Cogn. (1881);

*Cyrtonea divergens* Hochst. ex A. Rich. (1847) – type: TU near Djeladjeranne, *Schimper* 1677 (P holo. not seen; K iso.).

*C. convolvulacea* Fenzl ex A. Rich. (1847) – type: EE, Madat, *Schimper* 1749 (P syn. not seen; K isosyn.).

*Kedrostis foetidissima* (Jacq.) Cogn. subsp. *obtusiloba* (Sond.) A. Meeuse in *Bothalia* 8: 27 (1962); *Cufod.*, *Enum.* 1033 (1965).

*Cyrtonea foetens* Hochst. nom. nud. based on *Schimper* 2174.

Climbing or trailing herb to 3 m, glandular-pubescent with an unpleasant smell when crushed. Leaf-blade ovate-oblong, ovate or broadly ovate, finely hispid, 1.6–9 x 1.3–10 cm, base cordate or subhastate, margin more or less sinuate-dentate, unlobed to moderately deeply palmately 3–5-lobed; petiole 0.5–5 cm long, pubescent. Tendrils simple. Flowers monoecious. Male flowers 3–15 in small clusters or racemes; peduncles and pedicels slender, pedicels 2–14 mm long; hypanthium campanulate, 2–2.5 mm long; sepals small, dentiform; petals pale yellow, 2.5–4 mm long. Female flowers solitary, shortly pedicellate; ovary ellipsoid, beaked, 2.5–4 mm long. Fruits subglobose to ovoid, shortly to prominently beaked, glandular-pubescent, green with darker longitudinal lines, red when ripe, 7–20 x 6–10 mm; stalk 1–6 mm long. Seeds asymmetrically ovate in outline, brownish, smooth, bordered, compressed at the apex, 4–6 x 2–4 x 2–2.2 mm. Fig. 65.3.11.

*Acacia* woodland, wooded grassland, evergreen bushland; 350–1900 m. EE EW TU TU-GD (Tekeze gorge) GJ SU GG HA; tropical Africa, Yemen, India, Burma. *Gilbert* et al. 325; *Carr* 858; *Gilbert* et al. 2457.

#### 3. **K. gijef** (Forssk.) C. Jeffrey (1962);

*Turia gijef* Forssk. ex J.F. Gmelin (1791) – type: Arabia, Yemen, *Forsskål* s.n. (C holo.).

Woody deciduous climber to 5 m. Stems up to 10 cm in



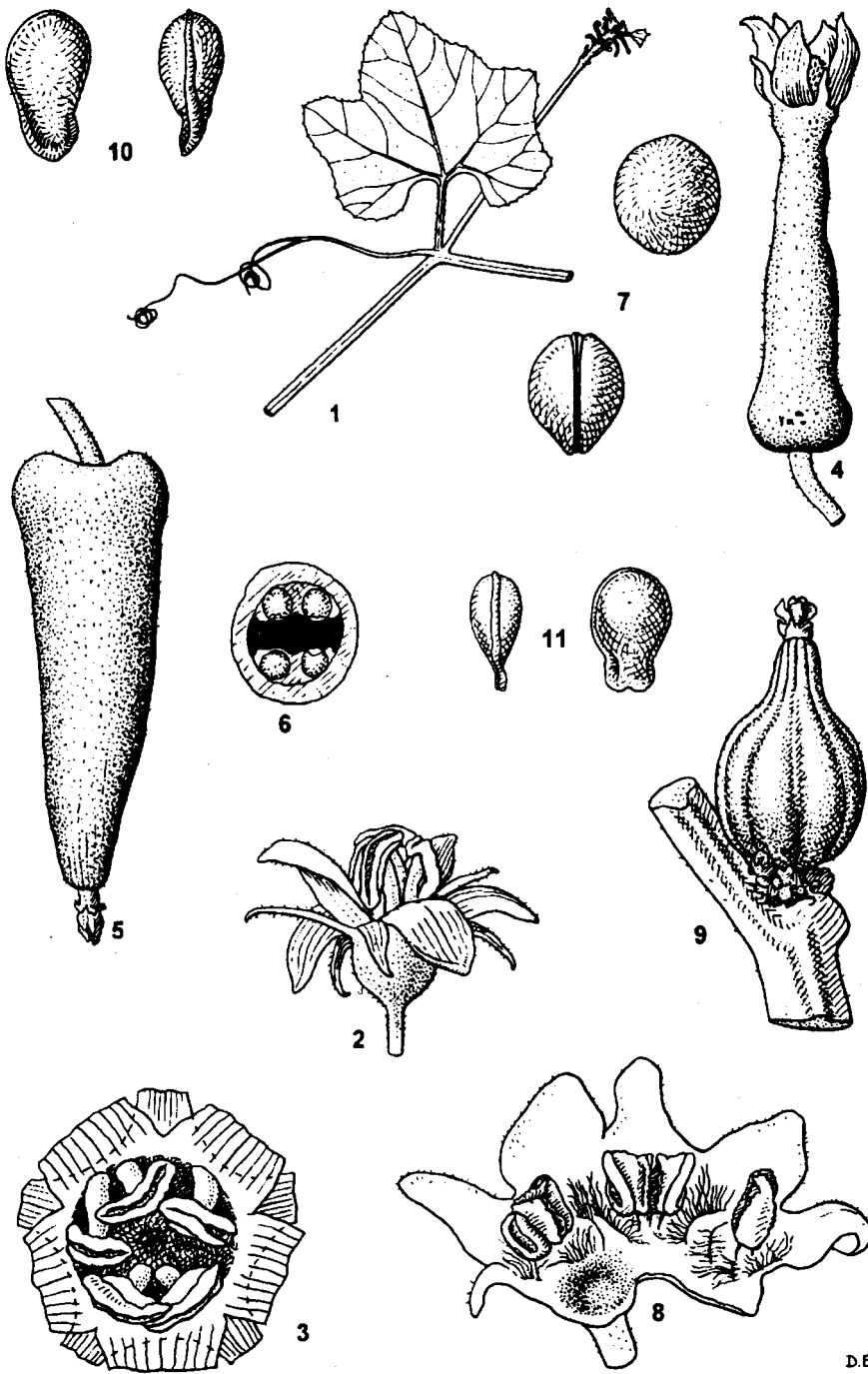


Figure 65.3

**KEDROSTIS LELOJA**: 1 – stem portion with tendril, leaf and male inflorescence  $\times \frac{2}{3}$ ; 2 – male flower  $\times 4$ ; 3 – male flower from above, showing stamens  $\times 4$ ; 4 – female flower  $\times 2$ ; 5 – fruit  $\times 1$ ; 6 – fruit in transverse section  $\times 1$ ; 7 – seed, side and face views  $\times 3$ . **K. PSEUDOGIJEF**: 8 – male flower, opened to show stamens  $\times 6$ ; 9 – fruit  $\times 2$ ; 10 – seed, side and face views  $\times 3$ . **K. FOETIDISSIMA**: 11 – seed, face and side views  $\times 3$ . 1–4 from Gillett 14027; 5 & 6 from Verdcourt; 7 from Drummond & Hemsley 4108; 8–10 from Drummond & Hemsley 4414; 11 from Scheffler 483. Drawn by Derek Erasmus. (Reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 23.)

diameter, with grey, pink or red ridged bark. Leaf-blade reniform in outline, more or less hispid or scabrid, somewhat dull green, 0.5–5.5  $\times$  1.5–8.5 cm, base cordate, palmately 3(–5)-lobed; petiole 0.5–2.5 cm long. Tendrils simple. Flowers dioecious, often appearing before the leaves. Male flowers up to 50 in sessile clusters or short racemes; pedicels slender, 2–9 mm long; hypanthium campanulate, 1.5–3 mm long; sepals triangular to lanceolate, 1–2 mm long; petals yellow with green veins, 1.5–2.5 mm long. Female flowers solitary or in small clusters; ovary ovoid to beaked, glabrous or shortly hispid, 2.5–6.5 mm long. Fruits ovoid, more or less beaked, faintly grooved, glabrous, green with paler stripes, red when ripe, 12–15  $\times$  6–9 mm; stalk 1–5 mm long. Seeds asymmetrically ovate

in outline, smooth or somewhat rugose, bordered, compressed at the apex, 6  $\times$  3.5–4  $\times$  2.5 mm.

Dry deciduous bushland with *Acacia*, *Commiphora*, *Cordia*, *Salvadora*, and others; 200–900 m. SU GG SD HA; Sudan, Kenya, N Tanzania, Somalia, Saudi Arabia, Yemen. Bally 10418; Gilbert & Gilbert 1511; Gilbert et al. 7529.

4. **K. pseudogijef** (Gilg.) C. Jeffrey (1962);

*Corallocarpus pseudogijef* Gilg. (1904) – types: Tanzania, Engler 1544, 1585, 1598 (B syn. destroyed).

Woody deciduous climber to 6 m. Stems up to 10 cm in diameter, with greyish-brown or grey rough-papillate ridged bark. Leaves trifoliolate, leaflets sessile; central

leaflet ovate or rhombic, bright green, finely hispid, 1.5–5 x 0.5–4 cm, base cuneate, margin sinuate, sinuate-dentate, unlobed or palmately 3-lobed; lateral leaflets rather small, bases more or less unequal; petiole 1–3.5 cm long. Flowers dioecious, developing with the leaves. Male flowers 6–50 in sessile clusters or short racemes; pedicels 3–5 mm long; hypanthium campanulate, 1.5–1.8 mm long; sepals triangular to lanceolate, 1–1.5 mm long; petals greenish-yellow, 2–3 mm long. Female flowers solitary or in small clusters; ovary inverted pear-shaped, grooved, hispid, 2.5–5 mm long. Fruit ovoid to inverted pear-shaped, shortly beaked, distinctly grooved, shortly hispid, green, red when ripe, 10–15 x 8–10 mm. Seeds asymmetrically ovate in outline, smooth, bordered, compressed at the apex, 6 x 3 x 2.5 mm. Fig. 65.3.8–10.

Deciduous woodland and bushland; 950–1800 m. WU SU GG SD BA; Kenya, N Tanzania. *De Wilde & De Wilde-Duyffes* 7327; *Gilbert & Gilbert* 1132; *Ash* 1903.

Leaves recorded as boiled and eaten at times of hunger in Gamo Gofa.

#### 4. CORALLOCARPUS *Welw. ex Hook.f.* (1867)

Climbing or trailing herbs with tuberous rootstocks. Leaves simple. Tendrils simple. Flowers small, monoecious. Male flowers few to many in subsessile or pedunculate, short to elongate, usually congested racemes; hypanthium campanulate; sepals 5, small; petals 5, greenish-yellow, united at the base; stamens 5, all one-theous, in two pairs with one single, or the paired stamens more or less united into 2 two-theous stamens, inserted on the mouth of the hypanthium; filaments short; thecae short, straight. Female flowers solitary or fasciculate, subsessile; ovary smooth, glabrous or puberulous; ovules few to several, horizontal; perianth as in male flowers; stigmas usually 2. Fruits solitary or clustered, small, fleshy, red, ovoid or ellipsoid, often beaked, beak breaking off as a cap above a persistent green cup-like base. Seeds asymmetrically ovoid or pear-shaped, rarely subglobose.

Genus with 17 species in tropical and southern Africa, Madagascar, south-west Asia and India; 2 species in the Flora area.

1. Fruits and young stems glabrous; seeds ovoid to pear-shaped. 1. *C. epigaeus*
- Fruits and young stems puberulous; seeds subglobose. 2. *C. schimperi*

##### 1. *C. epigaeus* (*Roettl.*) *C.B.Cl.* (1879);

*Bryonia epigaea* *Roettl.* (1803) – types: India, *Klein* 395 and 771 (B-W syn.), *Röttler* 3531 (HBG syn.), and *Röttler* s.n. (K syn.).

*Corallocarpus hildebrandtii* *Gilg.* (1904) – type: Eritrea, EW, Habab, Nakfa, *Hildebrandt* 617 (B, holo. destroyed).

Climbing herb to 4 m. Stems more or less glabrous, developing brownish papery bark. Leaf-blade ovate or reniform, finely hispid, 2.5–9 x 3.5–11.5 cm, base cordate, margin more or less sinuate-dentate, palmately deeply 3–5-lobed,

lobes obovate to lanceolate, often 3-lobulate; petioles more or less glabrous, 1–3.5 cm long. Male flowers 5–12(–40) in pedunculate clusters; peduncles 10–60(–110) mm long; pedicels 1–3 mm long; hypanthium campanulate, 1.5–2.5 mm long; sepals oblong-lanceolate, about 1 mm long; petals oblong, greenish-yellow, 1.5–2 mm long. Female flowers solitary or clustered; pedicels 1–4 mm long; ovary narrowly ovoid, beaked, glabrous, 5–6.5 mm long. Fruit ovoid or ellipsoid, beaked, glabrous, dark green dotted with paler green, when ripe bright red except for the green cup-like base and sometimes also the beak, 10–30 x 4–10 mm; stalk 1–12 mm long. Seeds asymmetrically ovoid, 4–4.5 x 2.5 x 2 mm. Fig. 65.4.

*Acacia* – *Dodonaea* – *Euclea* woodland and bushland; 650–1875 m. EW GG SD; Nigeria, Zaire, Sudan, Somalia, Rwanda, Kenya, N Tanzania, Oman, Pakistan, India. *Burger* 2864; *De Wilde* 7196; *Gilbert & Jones* 37.

##### 2. *C. schimperi* (*Naud.*) *Hook.f.* (1871);

*Rhynchocharpa schimperi* *Naud.* (1862) – type: TU, Sera-Walqua, *Schimper* 413 (P holo., K, iso.).

*R. pedunculosa* *Naud.* (1862); *Corallocarpus pedunculatus* (*Naud.*) *Cogn.* (1881) – type: GD, Baria-Dikeno, 6/8/1853, *Schimper* 1198 (P, holo.; photo. K).

*R. courbonii* *Naud.* (1863); *Corallocarpus courbonii* (*Naud.*) *Cogn.* (1881) – type: a plant grown from seed sent by Courbon from Ethiopia (P holo.; K iso.).

*R. ehrenbergii* *Schweinf.* (1868); *Corallocarpus ehrenbergii* (*Schweinf.*) *Hook.f.* (1871) – type: EE, Togodele, *Ehrenberg* 61 (B holo. destroyed).

*R. erostris* *Schweinf.* (1868); *Corallocarpus erostris* (*Schweinf.*) *Hook.f.* (1871) – type: Sudan, Mt. Soturba, *Schweinfurth* 120 (B holo.; K iso.).

*Corallocarpus longiracemosus* *Gilg.* (1904) – type: HA, Adjabo plateau, *Ellenbeck* 1113 (B holo. destroyed).

Climbing deciduous softly woody herb. Stems minutely velutinous, finely setulose, quickly developing reddish-brown or greyish papery bark. Leaf-blade broadly ovate, finely hispid, slightly succulent, 2.5–10 x 3.5–15 cm, base cordate, margin sinuate-dentate, usually palmately 3–5-lobed, lobes obovate to oblong, more or less rounded; petioles densely finely pubescent, 2–4 cm long. Male flowers 8–many in pedunculate racemes; peduncles 10–125 mm long; pedicels 2–12 mm long; hypanthium campanulate, 1.5–2 mm long; sepals triangular to oblong-lanceolate, about 1 mm long; petals greenish-yellow with green veins, 2 mm long. Female flowers solitary or in clusters, often on leafless contracted branches, more or less sessile; pedicels 1–3 mm long; ovary 3.5–4 mm long, shortly puberulous. Fruits ovoid or conical with short soft hairs, red when ripe, often shortly beaked, 10–17 x 7–10 mm; stalks 2–5 mm long. Seeds ellipsoid or subglobose, bordered, 3–3.5 x 2.2–2.5 x 2–2.5 mm.

*Acacia* – *Commiphora* woodland; 400–1600 m. EE GD TU SD BA; S Egypt, Sudan, Somalia, Kenya, Yemen, Saudi Arabia, Iran, Pakistan, India. *Ash* 2438; *Thulin* et al. 3739; *Friis* et al. 3227.

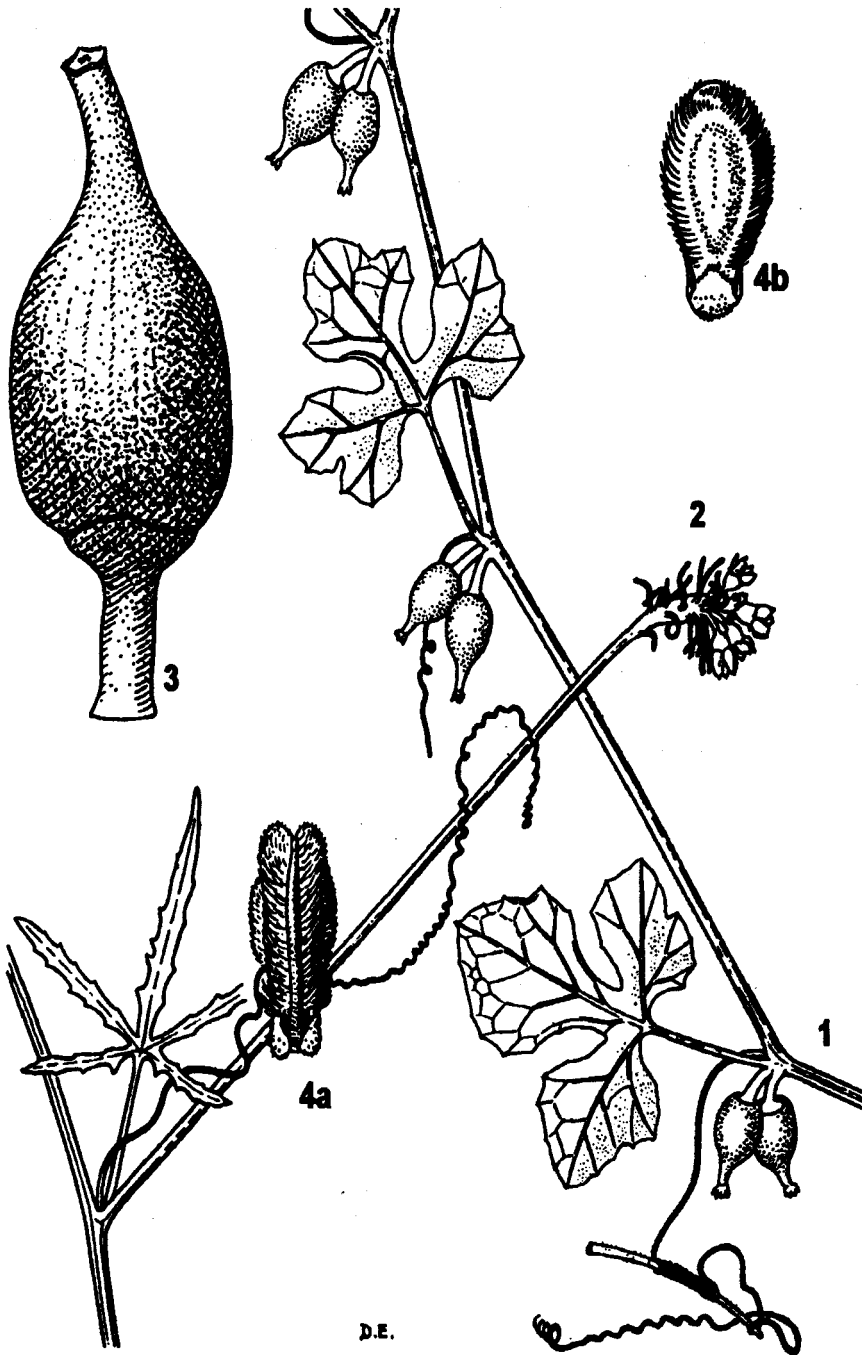


Figure 65.4  
**CORALLOCARPUS EPIGAEUS.** 1 – branch with female flowers x 1/2; 2 – male inflorescence x 1 1/2; 3 – fruit x 3; 4a & 4b – seed, side and face views x 6. 1 from Gillett 14093; 2 from Gillett 14035; 3 & 4 from Drummond & Hemsley 3576. Drawn by Derek Erasmus. (Modified and reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 24.)

**5. ZEHNERIA** Endl. (1833)

Climbing or trailing herbs or softly woody climbers, with more or less tuberous rootstocks. Leaves simple. Tendrils simple. Flowers small, monoecious or dioecious. Male flowers solitary or few to many in sessile or pedunculate subumbel-like or raceme-like clusters; hypanthium campanulate; sepals 5, small; petals 5, usually white, united below; stamens usually 3, all two-thecous, inserted on the middle or base of the hypanthium; filaments short or long; thecae short, straight or slightly curved; disc prominent, elevated, free from the hypanthium, rarely inconspicuous. Female flowers solitary or in sessile or pedunculate subumbelliform clusters; hypanthium and perianth similar to those of male flowers; disc annular, surrounding base of style, rarely inconspicuous; stigmas usually 3; ovary sub-

globose to fusiform, smooth, glabrous or shortly pubescent; ovules several, horizontal. Fruits solitary or in clusters, small, fleshy, globose to fusiform, red, indehiscent. Seeds ovate or elliptic in outline, compressed.

About 35 species in the palaeotropics; 4 in the Flora area.

1. Plant herbaceous, stems woody only at the base; disc prominent. 2
- Plant woody, stems quickly becoming woody, with smooth bark; disc obscure. 3. *Z. anomala*
2. Leaves distinctly succulent, variegated with white or paler green along the veins. 4. *Z. pallidinervia*
- Leaves thin to leathery, not variegated. 3
3. Fruit fusiform, pointed at each end, solitary; leaf-

blade narrowly triangular to broadly ovate, weakly cordate to sagittate.

2. *Z. minutiflora*  
 – Fruit globose or ellipsoid, rounded at base and apex, at most slightly apiculate, usually clustered; leaf-blade ovate to pentagonal, cordate. 1. *Z. scabra*

1. *Z. scabra* (Linn. f.) Sond. (1862);

*Bryonia scabra* L.f. (1781) – type: South Africa, Cape, Thunberg s.n. (UPS holo.).

*Zehneria longepedunculata* Hochst. ex A. Rich. (1847); *Melothria longepedunculata* (Hochst. ex A. Rich.) Cogn. (1881) – type: TU, near Djeladjeranne, 1.9. 1841, Schimper III:1625 (P holo.).

*Z. scrobiculata* Hochst. ex A. Rich. (1847); *M. scrobiculata* (Hochst. ex A. Rich.) Cogn. (1881) – types: TU, Adua, *Quartin Dillon & Petit* 35 (P syn. not seen; K isosyn.) & EW/TU, Mai-Fera, 5/6/1837, Schimper I:164 (P syn. not seen; K isosyn.).

*Melothria tomentosa* Cogn. (1881) – types: Ethiopia near Bouladeki, Schimper 927 (P syn. not seen; K isosyn.), Schimper 1242 (K isosyn.), TU, near Ouedger, *Quartin Dillon & Petit* s.n. (P syn.; K photo.).

*M. tomentosa* Cogn. var. *parvifolia* Cogn. in A. & L. DC., *Monogr. Phan.* 3: 615 (1881) – type: Ethiopia, Courbon s.n. (P holo.).

*M. pulchra* Busc. & Muschl. (Mar. 1913); *M. gilgiana* Cogn. (Nov. 1913) nom. illegit – type: EW, near Halai, 1600 m, April 1893, Schweinfurth 582 (B holo. destroyed; BR iso.).

*M. cipriani* Pichi-Serm. (1951) – type: GD, near Tucur Dinghia, 23/1/1937, Pichi-Sermolli 221 (FI holo. not seen; K iso.).

*Bryonia scrobiculata* Hochst., nom nud. quoad Schimper 164.

Climbing or trailing herb to 10 m, old stems becoming woody with corky ridged bark. Leaf ovate, broadly ovate, or pentagonal, more or less scabrid-punctate above, sparsely setulose to densely tomentose beneath, 1.5–11 x 1.5–11 cm, base cordate, margin sinuate-dentate, unlobed or usually palmately 3–5-lobed, lobes ovate to triangular, the central largest; petiole 0.5–7 cm long. Flowers dioecious. Male flowers 3–many in subsessile or pedunculate subumbel-like clusters; peduncles up to 70 mm long; pedicels 1.5–10 mm long; hypanthium campanulate, 2–5.5 mm long; sepals dentiform, up to 1.5 mm long; petals white, becoming cream then yellow with age, 1.5–3.5 mm long. Female flowers in usually sessile subumbel-like clusters; pedicels 1–5(–10) mm long; ovary ellipsoid, beaked, 2.5–5 mm long glabrous or shortly pubescent. Fruits globose to ellipsoid, sometimes apiculate, fleshy, green or green with darker longitudinal lines, sometimes with a waxy bloom, red when ripe, 8–13 x 7–8 mm, stalk 2–20 mm long. Seeds ovate in outline, 2–4 x 1–2.5 x 0.5–1 mm.

Upland forest and woodland, wooded grassland, river and lake margins, also in secondary vegetation, plantations, hedges and cultivated places; 1200–3580 m. EW TU GD GJ WU SU AR WG IL KF GG SD BA HA; tropical and southern Africa and tropical Asia. *Burger* 1199; *Mesfin & Kognew* 1807; *Taddesse Ebba* 518.

This is a widespread species showing a wide range in altitudinal and ecological tolerance and a corresponding

high degree of local, probably ecotypic, differentiation. It has been recorded as used medicinally against alopecia.

2. *Z. minutiflora* (Cogn.) C. Jeffrey (1962);

*Melothria minutiflora* Cogn. (1881) – type: Cameroon, Cameroon Mt., Mann 2010 (K holo.).

Climbing or trailing herb to 3 m. Leaf narrowly triangular to broadly ovate, scabrid-punctate above, sparsely to densely hispid or scabrid-setose on veins beneath, 1.5–7.5 x (0.5–)1.5–7 cm, base weakly cordate to sagittate, margin obscurely denticulate to sinuate-dentate, unlobed or palmately 3–5-angled or lobed, the central lobe largest; petiole 0.5–8.5 cm long. Flowers dioecious. Male flowers 5–28 in pedunculate subumbel-like clusters; peduncles 2–40 mm long; pedicels 2–13 mm long; hypanthium campanulate, 2–4 mm long; sepals dentiform, up to 1 mm long; petals white, becoming yellowish with age, 1.5–2.5 mm long. Female flowers solitary; pedicel slender, 10–35 mm long; ovary fusiform, 4–10 mm long, glabrous. Fruit fusiform, bright red, 9–24 x 5–8 mm; stalk 12–35 mm long. Seeds 3.5 x 1.7–2.5 x 1–1.6 mm.

In moist or wet places in *Aningeria* – *Syzygium* forest; 1600–3150 m. SU IL KF BA; Bioko (= Fernando Po), Cameroon, east tropical Africa south to Zimbabwe and Mozambique. *Friis* et al. 1860, 3566; *Jimma Agric. Tech. School* D17.

3. *Z. anomala* C. Jeffrey (1962)

– type: Kenya, Northern Frontier Province, Dandu, Gillett 13078 (K holo.).

Deciduous woody climber. Stems slender, soon woody and developing a grey or brownish papery bark. Leaf-blade broadly ovate in outline, minutely scabrid, subsucculent, 1–3.5 x 1.5–6.5 cm, base shallowly cordate, margin entire, palmately variously 3–5-lobed, the lobes very varied in shape, often lobulate; petiole 0.4–1.8 cm long, the base persistent, thickening and forming a short weak spine. Flowers monoecious or dioecious. Male flowers in small subsessile clusters; pedicels slender, 3–4 mm long; hypanthium campanulate, 2.5 mm long; sepals minute, dentiform; petals pale greenish-yellow, 1.8 mm long; disc obscure. Female flowers solitary, subsessile. Fruit ovoid or subglobose, pale green with dark green strips, red when ripe, 8–9.5 x 5.5–7 mm; stalk up to 4.5 mm long. Seeds ovate in outline, 3 x 2 x 0.5 mm. Fig. 65.5.

*Acacia* – *Commiphora* bushland or low woodland; 850–1240 m. GG SD HA; Niger, Chad, Sudan, S Egypt, N Kenya, Yemen, Saudi Arabia. *J. De Wilde* 7266; *Friis* et al. 2975; *Gilbert* et al. 7728.

4. *Z. pallidinervia* (Harms) C. Jeffrey (1962);

*Melothria pallidinervia* Harms (1923) – type: a plant grown from seeds sent by A. Zimmerman from Tanganyika, Tanzania (B holo. destroyed; UPS iso.).

Perennial creeper or climber, stems slender, glabrous, rooting and forming small tubers at the nodes. Leaf-blade triangular, glabrous, succulent, green with pale veins, 1.1–2.2 x 1.8–3.8 cm; base cordate, margin entire or sinuate-toothed, obscurely 5-lobed, petiole 0.6–1.7 cm long.

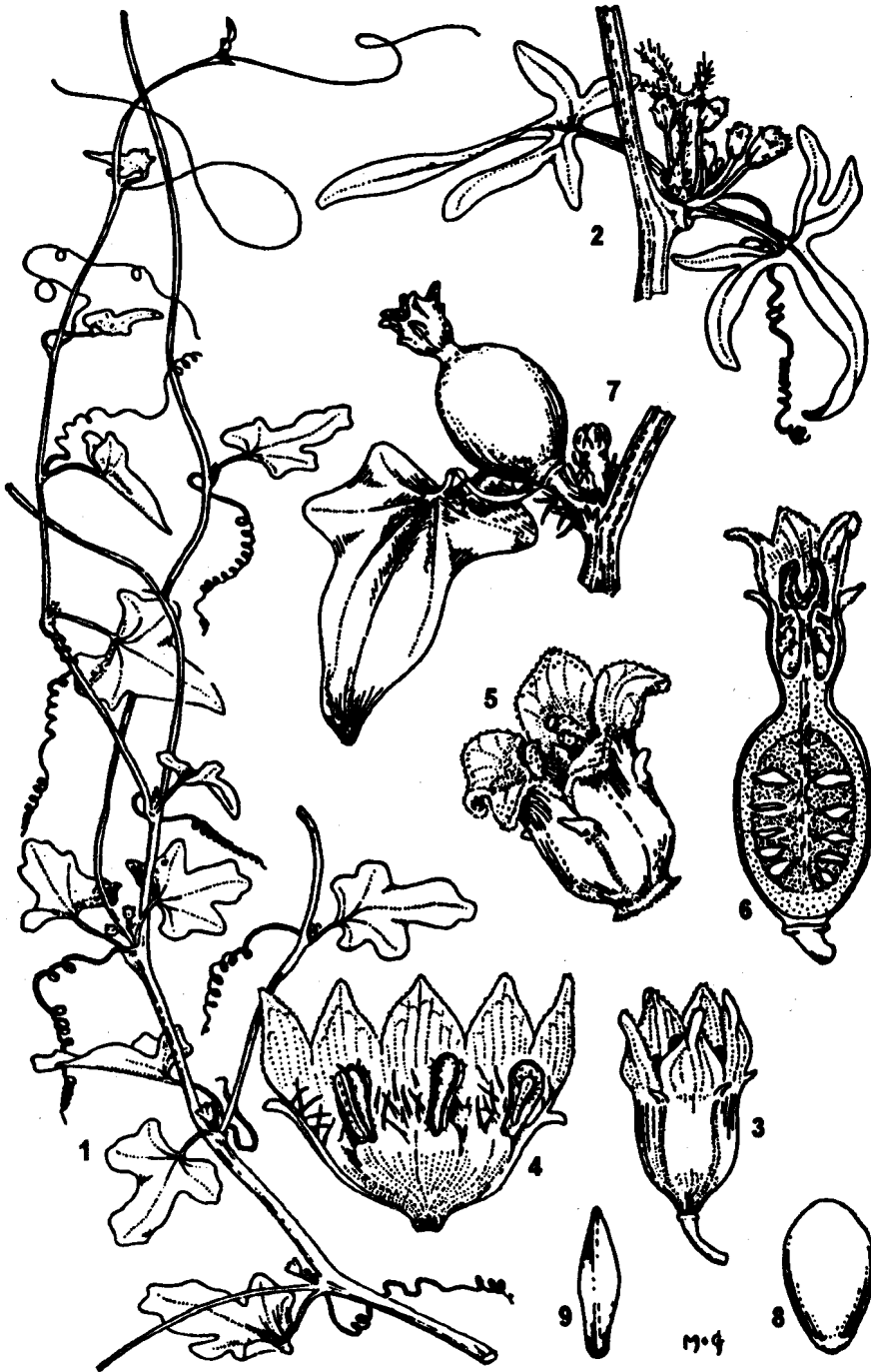


Figure 65. 5 *ZEHNERIA ANOMALA*: 1 - stems with axillary clusters of flowers x 1; 2 - male inflorescence x 3; 3 - male flower x 6; 4 - male flower opened to show stamens x 6; 5 - female flower detached from ovary x 9; 6 - female flower cut in half x 6; 7 - immature fruit x 3; 8 & 9 face and lateral views of seed x 6. 1 from Gillett 12575; 2-4 from Gillett 12738; 5 & 6 from Gillett 13864; 7 from Gillett 13078; 8 & 9 from Gillett 14006. Drawn by Mary Grierson. (Reproduced with permission from *Kew Bull.* 15(3): fig. 3, p. 365.)

Monoecious. Male flowers 7-21 together in contracted racemes; peduncles 7-14 mm long; pedicels 1-13 mm long; hypanthium 2.5-3.5 mm long, lobes filiform, up to 0.5 mm long; petals white or creamy, 2-4 x 1.5-2 mm. Female flowers solitary, often in the same axil with the male flowers; pedicels 8-12 mm long; ovary fusiform, beaked, 7-12 x 1-2.5 mm. Fruit stalked, fusiform, smooth, reddish with translucent wall, 10-13.5 x 6-7 mm; stalk c 6 mm long. Seeds pear-shaped in outline, compressed, with broad grooved edges, distinct raised margins and smooth convex depressed disk, 3.5 x 2 x 0.5 mm.

Dense *Acacia* - *Commiphora* - *Boscia* bushland with very dense ground cover, and growing in deepest shade; 1160 m. GG; Uganda, Kenya, Tanzania and Mozambique. Gilbert et al. 9108.

#### 6. *MUKIA* Arn. (1840)

Climbing or trailing herbs with tuberous rootstock. Leaves simple. Flowers small, monoecious. Male flowers in sessile clusters; hypanthium campanulate; sepals 5, small; petals 5, yellow, united below; stamens 3, 2 two-thealous, 1 one-thealous, inserted on the middle of the hypanthium; filaments short; thecae straight; disc prominent, elevated, free from the hypanthium. Female flowers in sessile clusters, rarely solitary; ovary smooth, hairy; ovules several, horizontal; hypanthium and perianth as in male flowers; disc annular, surrounding base of style; stigmas 3. Fruit small, fleshy, ellipsoid or globose, red, indehiscent. Seeds elliptic in outline, rather swollen, with prominent margins and smooth or verrucose faces.

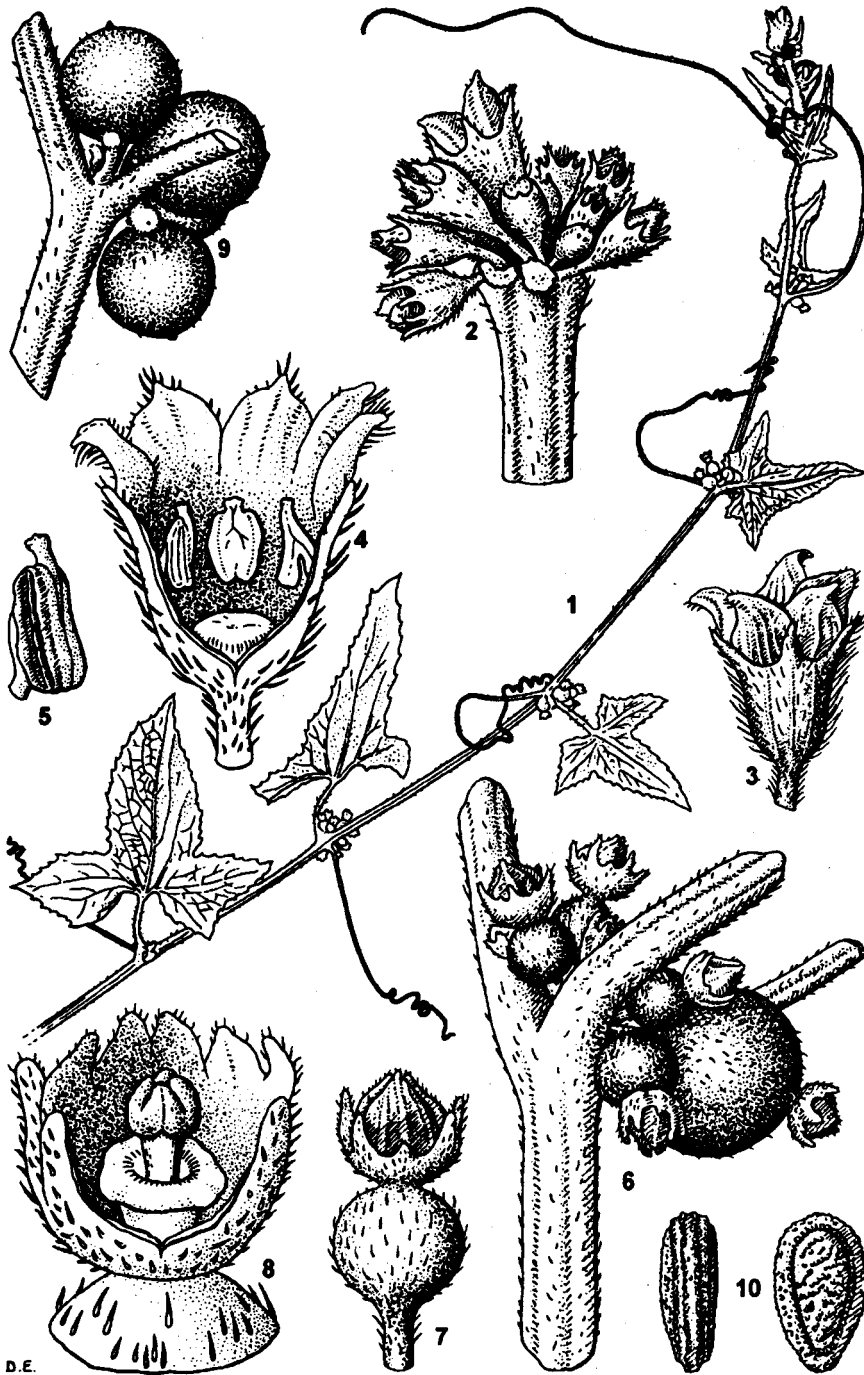


Figure 65. 6

**MUKIA MADERASPATANA:** 1 – stem with clusters of flowers in the leaf axils  $\times \frac{1}{2}$ ; 2 – male inflorescence  $\times 4$ ; 3 – male flower  $\times 6\frac{2}{3}$ ; 4 – male flower opened to show stamens  $\times 10$ ; 5 – double stamen  $\times 20$ ; 6 – female inflorescence  $\times 4$ ; 7 – female flower  $\times 6\frac{2}{3}$ ; 8 – female flower opened to show disk  $\times 13\frac{1}{4}$ ; 9 – fruit cluster  $\times 2$ ; 10 – seed, side and face views  $\times 4$ . 1 from *Purseglove* 570; 2–5 from *Drummond & Hemsley* 3041; 6–9 from *Milne-Redhead & Taylor* 9856; 10 from *Purseglove* 1314. Drawn by Derek Erasmus. (Reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 19.)

About 4 species in tropical Africa, Asia and Australia; 1 species in the Flora area.

**M. maderaspatana** (L.) M.J. Roem. (1846);

*Cucumis maderaspatanus* L. (1753); *Melothria maderaspatana* (L.) Cogn. (1881) – type: illustration of *Cucumis maderaspatensis* fructu minimo in Pluk., *Phytogr.* 3, t 170/2 (1692).

*Bryonia micrantha* Hochst. ex A. Rich. (1847) – type: TU, Taccaze, 8/1840, *Dillon* s.n. (K isosyn.).

Climbing or trailing herb to 4 m. Stems hispid or scabrid. Leaf-blade broadly to narrowly ovate or triangular, hispid or setulose especially on veins beneath, 1–11  $\times$  1–11 cm, base cordate, hastate or sagittate, margin minutely to coarsely sinuate-denticulate, scabrid above, unlobed or

palmately 3(–5)-lobed, lobes triangular, the central largest; petiole 0.5–11.5 cm long, antrorsely hispid or scabrid. Male flowers on 1–3 mm long pedicels; hypanthium obconic-campanulate, 0.7–1.5 mm long, densely setulose; sepals lanceolate, 0.5–1 mm long; petals 1.2–1.5 mm long, yellow or orange-yellow. Female flowers sessile; ovary subglobose, 1.5–2 mm long, setulose. Fruits 1–8 in axillary clusters, globose, green with paler longitudinal stripes orange-red and glabrous when ripe, 6–11 mm in diameter, stalk 1–4 mm long. Seeds 3–5  $\times$  2–3  $\times$  1.5–1.7 mm, bordered, verrucose. Fig. 65.6.

In moist or wet spots in *Terminalia* – *Combretum* – *Ptilostigma* woodedgrassland, and in grassland, also in plantations and cultivated places; 500–2300 m. EW TU GD GJ

SU WG IL KF; Old-World tropics, except Madagascar. *Getachew Aweke & Gilbert* 729; *De Wilde & Gilbert* 278; *Friis et al.* 1702.

Recorded as used medicinally for eyes and throat.

### 7. *OREOSYCE* Hook.f. (1871)

Climbing herbs. Leaves simple. Tendrils simple. Flowers small, monoecious. Male flowers in small clusters, rarely solitary; hypanthium narrowly campanulate; sepals 5, small, filiform; petals 5, yellow, united above the base; stamens 3, 2 two-theous, 1 one-theous, inserted on the middle of the hypanthium; filaments short; thecae straight; disc prominent, elevated, free from hypanthium. Female flowers solitary, pedicellate; ovary tuberculate, setose; ovules several, horizontal; hypanthium and perianth as in male flowers; disc annular, surrounding base of style; stigmas 3. Fruit ovoid, fleshy, tuberculate, setose, dehiscent by expulsion of seeds from the stalk-scar. Seeds ovate in outline, compressed, with broad margins and depressed faces.

A probably monotypic genus found in tropical Africa and Madagascar.

#### *O. africana* Hook.f. (1871)

– types: Bioko (= Fernando Po), *Mann* s.n. (K syn.); Cameroon, Cameroon, Mt., *Mann* 1285 and 2025 (K syn.).

*Cucumis membranifolius* Hook.f (1871); *Hymenosicyos membranifolius* (Hook.f) Chiov. (1911) – type: TU, *Schimper* 1457 (K holo.).

Slender climber or trailer to 3 m. Leaf-blade ovate or broadly ovate, 2–10 x 2–9.5 cm, base cordate, margin more or less sinuate-denticulate, palmately 3–5-lobed, lobes triangular, the central largest; petioles 2.5–11.5 cm long, retrorsely setulose. Male flowers 3–6 together, rarely solitary; pedicels 3–15 mm long; hypanthium 2–6.5 mm long, hispid; sepals 1–6 mm long, linear-filiform; petals bright yellow, 2.5–11 mm long; stamens as for genus. Female flowers solitary; pedicels 3–10 mm long; ovary ovoid, densely setulose, 4–8 mm long. Fruit ovoid to ellipsoid, usually shortly beaked, tuberculate, green or greenish-white, 15–27 x 13–21 mm; stalk rather stout, 10–25 mm long. Seeds 5–6.5 x 3–3.5 x 0.6–1 mm, obscurely pitted. Fig. 65.7.

In wet or moist *Aningeria* – *Syzygium* forest margins, grassland and in plantations; 1650–2000 m. TU GD GJ KF BA; mountains of tropical Africa and Madagascar. *Friis et al.* 136; *Gilbert & Getachew* 3029; *Mesfin & Kagnew* 1742.

### 8. *CUCUMELLA* Chiov. (1929)

Slender softly woody climbers or climbing or trailing herbs with tuberous rootstock. Leaves simple. Flowers small, monoecious or dioecious. Male flowers solitary or in small clusters; hypanthium campanulate; sepals 5, small, subulate or filiform; petals 5, yellow, united below; stamens 3, 2 two-theous, 1 one-theous, inserted on the middle of the hypanthium; filaments short; thecae straight or apically hooked; disc elevated, free from the hypanthium. Female flowers solitary, pedicellate; ovary smooth, hairy; ovules several, horizontal; hypanthium and perianth as in male

flowers; disc annular, surrounding base of style; stigmas 3. Fruit ellipsoid or fusiform, fleshy, smooth, hairy. Seeds small, ovate or elliptic in outline, lenticular, compressed.

About 7 species in tropical Africa, Madagascar and India; 2 species in Ethiopia.

1. Leaf-blade broadly ovate or pentagonal, base distinctly cordate; seeds elliptic, about 1.7 times as long as broad; stems herbaceous. 1. *C. jeffreyana* – Leaf-blade ovate-elliptic to broadly ovate, base subcuneate to truncate or weakly cordate; seeds broadly ovate, about 1.3 times as long as broad; stems quickly becoming softly woody. 2. *C. kelleri*

#### 1. *C. jeffreyana* Kirkbride (1994)

– type: Uganda, *Liebenberg* 954 (K holo.).

*C. engleri* sensu *C. Jeffrey*, *Fl. Trop. E. Afr. Cucurbitaceae*: 134, fig. 18.9 pro maiore parte, excl. type.

Climbing or trailing herb, stems 1–2 m long. Leaf broadly ovate or slightly 5-angled, shortly hispid or scabrid above, sparsely to densely finely setulose especially on veins beneath, 2.5–8 x 2–7 cm, base cordate, margin more or less sinuate-denticulate, unlobed; petiole 1–6.7 cm long, setulose or scabrid. Flowers monoecious. Male flowers 2–12 in sessile or shortly pedunculate clusters; pedicels slender, 5–18 mm long; hypanthium 2.5–5 mm long, densely hispid; sepals filiform, 1–2 mm long; petals yellow, 3–8 mm long. Female flowers solitary; pedicels 5–30 mm long; ovary ovoid-cylindrical or fusiform, densely hairy, 12–16 mm long; sepals rather longer than in male flowers, perianth otherwise similar. Fruit ellipsoid-cylindrical or fusiform, sometimes beaked, more or less longitudinally ribbed, densely hispid, orange-red, 10–40 x 7–15 mm; stalk 5–30 mm long. Seeds 3.5–7 x 2–4 x 0.5–1 mm, smooth. Fig. 65.8.8.

*Acacia* – *Terminalia* and *Acacia* – *Commiphora* bushland; 1240–1600 m. SD; Central African Republic, Sudan, east tropical Africa south to Malawi. *Friis et al.* 883; *Gilbert & Jones* 114.

#### 2. *C. kelleri* (Cogn.) *C. Jeffrey* (1962);

*Oreosyce kelleri* Cogn. (1896) – type: Ethiopia or Somalia, between Web River and Abdallah, *Keller* 111 (Z holo.).

Deciduous softly woody climber. Stems slender, quickly woody and developing smooth greyish bark. Leaf-blade ovate-elliptic to broadly ovate, shortly hispid or scabrid, 1.8–5 x 1–5.5 cm, base subcordate-emarginate, subtruncate or subcuneate, margin subentire or sinuate-denticulate, unlobed or palmately 3-lobed, the central lobe largest; petiole 0.3–1 cm long, the base persistent, thickening and forming a short weak spine. Flowers dioecious. Male flowers in subsessile 3–15-flowered clusters; pedicels 2–5 mm long; hypanthium 2.5–7 mm long; sepals subulate-filiform, 1–1.5 mm long; petals yellow, ovate, 2.5–7 mm long. Female flowers solitary; pedicels 3–5 mm long; ovary ovoid, beaked, pubescent, faintly 5-ribbed longitudinally, 4–8 mm long. Fruit ovoid, beaked, about 13 x 6 mm, shortly stalked. Seeds about 4.5 x 3.5 x 1 mm. Fig. 65.8.1–7.

Deciduous semi-desert bushland; 400–760 m. HA; Somalia, N Kenya. *Simmons* S.85; *Ellis* 270.

D.E

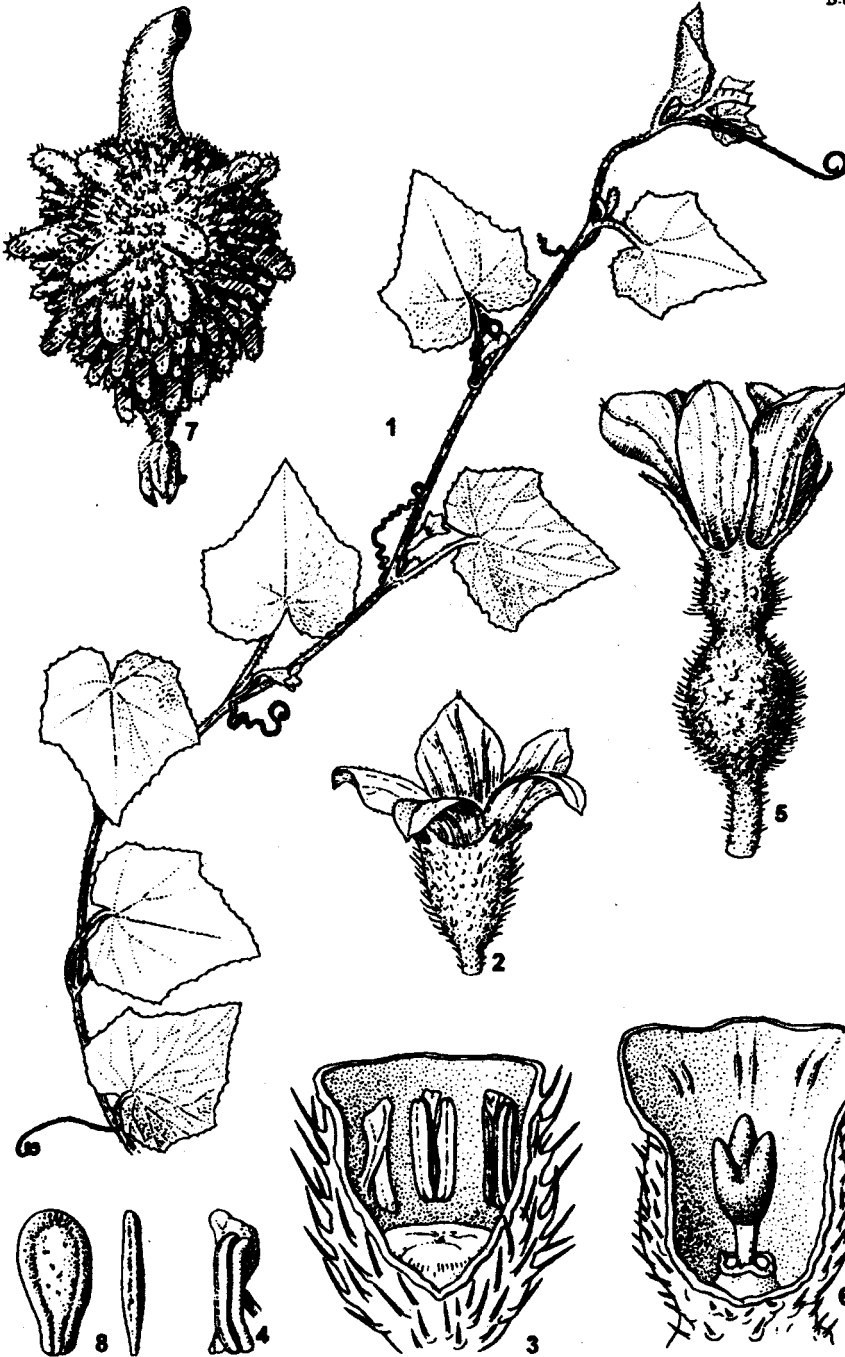


Figure 65.7 *OREOSYCE AFRICANA*: 1 – stem with flowers in leaf axils  $\times \frac{1}{2}$ ; 2 – male flower  $\times 3$ ; 3 – male flower opened to show stamens  $\times 6$ ; 4 – double stamen  $\times 8$ ; 5 – female flower  $\times 3$ ; 6 – female flower opened to show disk  $\times 6$ ; 7 – fruit  $\times 1\frac{1}{2}$ ; 8 – seed, face and side views  $\times 3$ . 1 from *Fries* 439; 2–7 from *Milne-Redhead & Taylor* 11302; 8 from *Chandler* 1582. Drawn by Derek Erasmus. (Reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 17.)

### 9. CUCUMIS L. (1753)

Climbing or trailing perennial or annual herbs. Leaves simple. Tendrils simple (or bifid, but abnormal). Flowers small to medium-sized (rarely large), monoecious or dioecious. Male flowers solitary or in small clusters; hypanthium campanulate, more or less setulose; sepals 5, usually small, narrow; petals 5, yellow, united near the base; stamens 3, 2 two-theous, 1 one-theous, inserted on the middle of the hypanthium; filaments short; theca with 3 folds; disc elevated, free from the hypanthium. Female flowers solitary; ovary usually with soft apically setiferous spines or pustules, less often smooth and densely pubescent; ovules numerous, horizontal; perianth similar to that of male flowers; disc annular, surrounding base of style; stigmas 3. Fruit subglobose to cylindrical, firmly fleshy,

smooth or with sparse to dense apically setiferous spines, tubercles or pustules<sup>1</sup>. Seeds ovate or shortly 3–5-lobed elliptic in outline, smooth, compressed.

About 30 species in the palaeotropics, mostly in tropical and southern Africa; 12 species in Ethiopia.

1. Tendrils several at each node; stalk of ovary rapidly elongating and burying the young fruit after flowering; fruit subterranean; seeds about 15 mm long.

#### 2. *C. humifructus*

– Tendrils solitary at each node; stalk of ovary not burying the young fruit; fruit not subterranean; seeds up to 12 mm long.

2. Ovary and fruit with sparse to dense, slender to stout,

1. pustule: a small bump or blister-like projection.



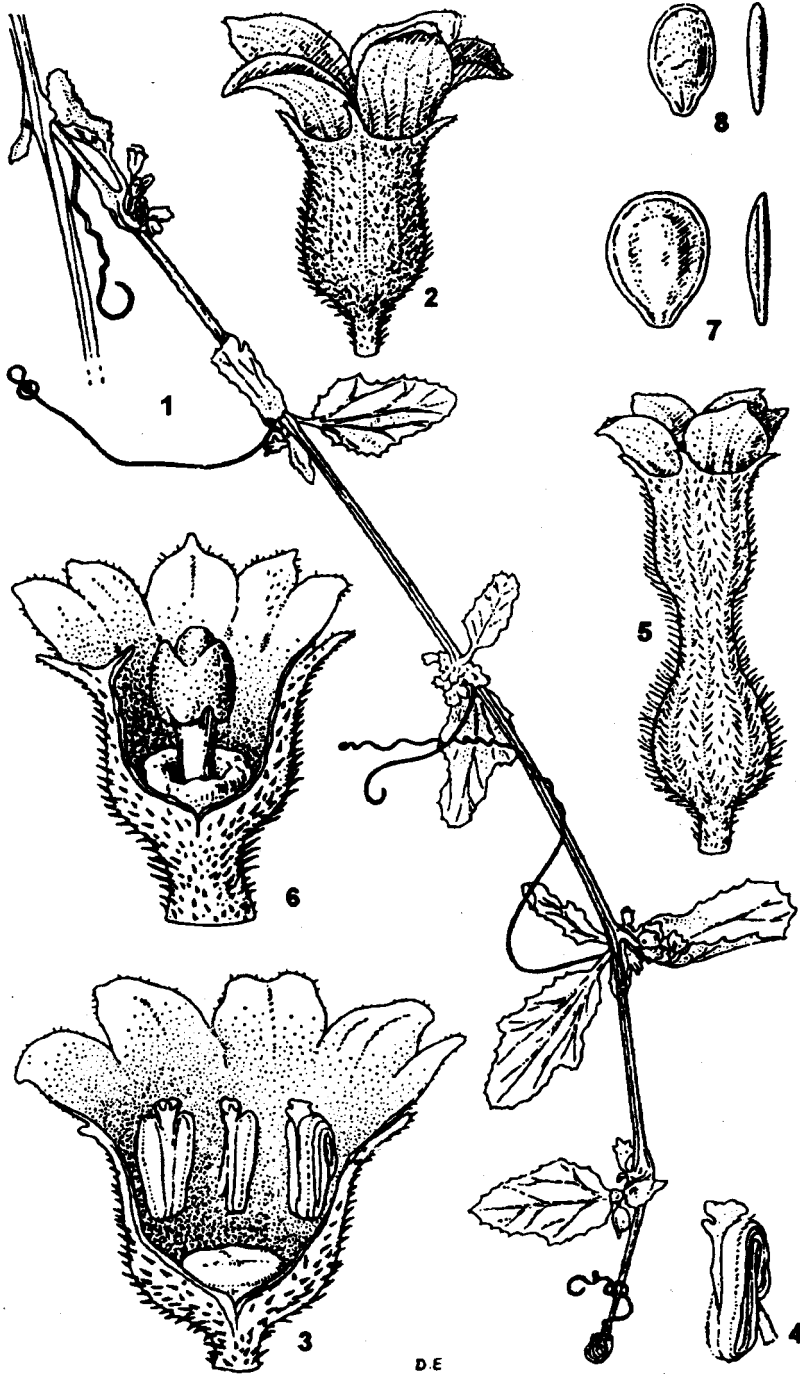


Figure 65.8 *CUCUMELLA KELLERI*: 1 - stem with clusters of flowers in the leaf axils x 1; 2 - male flower x 6; 3 - male flower opened to show stamens x 6; 4 - double stamen x 10; 5 - female flower x 6; 6 - female flower opened to show disk x 8; 7 - seed, face and side views x 4. *C. JEFFREYANA*: 8 - seed, face and side views x 4. 1-4 from Gillett 14071; 5 & 6 from Gillett 13774; 7 from Puccioni & Stefanini 568; 8 from Gillett 14094. Drawn by Derek Erasmus. (Reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 18.)

- elongated to low and obscure apically setose spines, tubercles or pustules. 3
- Ovary and fruit more or less densely pubescent or the fruit glabrescent, without apically setose spines, tubercles or pustules. 1. *C. melo*
- 3. Fruit red when ripe, with stout conical spines. 3. *C. metuliferus*
- Fruit greenish, yellowish or orange when ripe, of one colour or longitudinally striped; spines or tubercles not more than 5 mm long, or if longer, then slender. 4
- 4. Fruit with stiff or fleshy spines up to 16 mm long. 5
- Fruit tuberculate or pustulate. 10
- 5. Flowers large, petals 23-33 mm long. 10. *C. carolinus*
- Flowers small, petals up to 15 mm long. 6
- 6. Spines of fruit dense, hiding the body of the fruit. 11. *C. dipsaceus*
- Spines of fruit more scattered, the body of the fruit visible. 7
- 7. Fruit spines stout, widely scattered. 9. *C. jeffreyanus*
- Fruit spines slender, moderately dense. 8
- 8. Fruit on long stalk of up to 150 mm, spines soft, 10-16 mm long. 8. *C. insignis*
- Fruit on stalk up to 6 cm long, spines 0.5-6(-12) mm long. 9
- 9. Leaf unlobed, blade c 12-13 x 12-13 cm; fruit 73 x 27 mm with erect stiff spines.

*C. dipsaceus x pustulatus*

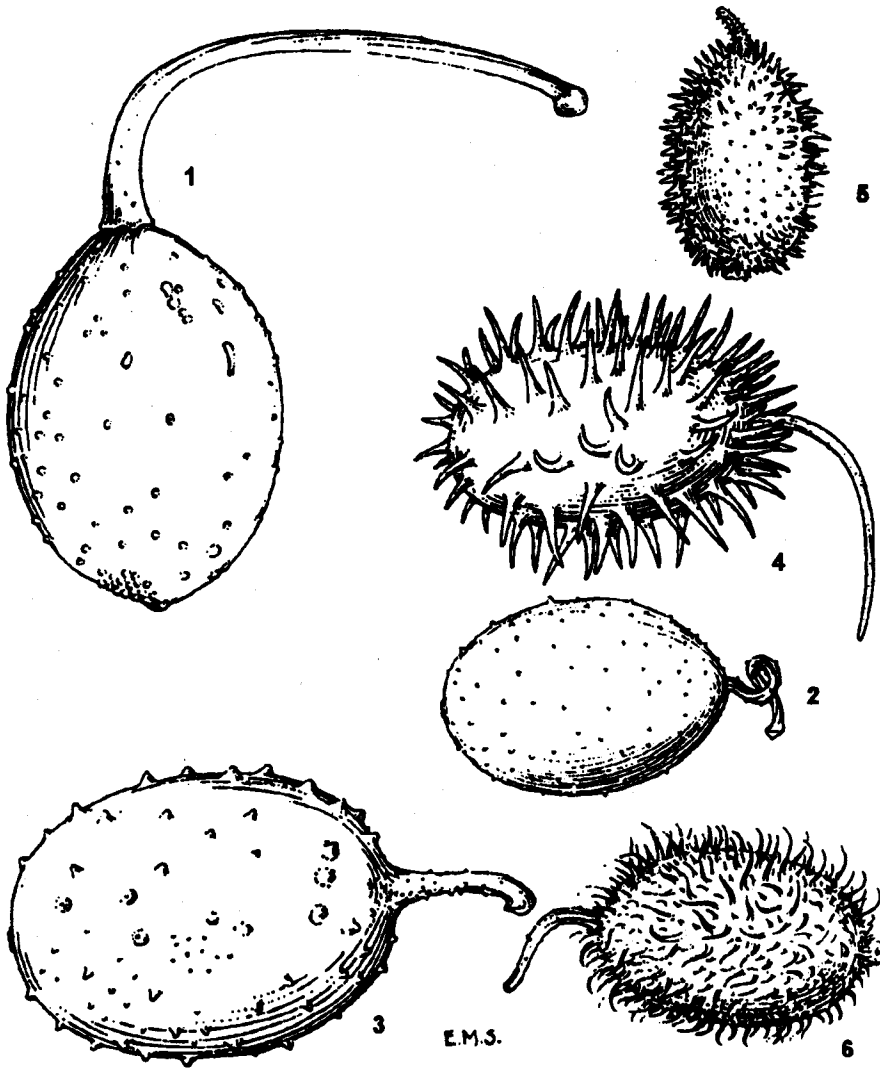


Figure 65.9

*CUCUMIS* fruits and fruit-stalks, all  $\times \frac{3}{8}$ . 1 - *C. PUSTULATUS*, 2 - *C. FICIFOLIUS*, 3 - *C. ACULEATUS*, 4-6 - variants of *C. PROPHETARUM* subsp. *DISSECTUS*. Notes: 2 & 4-6 are more or less striped when immature, 1 & 3 always more or less uniformly green. 1 from Drummond & Hemsley 4159; 2 from Drummond & Hemsley 1212A; 3 from Verdcourt 1792; 4 from Drummond & Hemsley 2359; 5 from Milne-Redhead & Taylor 11416; 6 from Milne-Redhead & Taylor 11278. Drawn by Margaret Stoner. (Modified and reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 15.)

- Leaf moderately to deeply 3-5-lobed, 1-9.5 x 1-8 cm; fruit 25-40(-60) x 15-30 mm, spines slender.

7. *C. prophetarum*

10. Stems, petioles and undersides of leaves prickly with thorn-like setae strongly distinct from the rest of the indumentum; fruit 50-70 x 35-50 mm.

9. *C. aculeatus*

- Stems, petioles and undersides of leaves more or less hispid, without thorn-like setae, or if such setae present, then fruit smaller, 20-50 x 10-30 mm.

11

11. Plant annual, cultivated; leaves with triangular lobes.

12. *C. sativus*

- Plant perennial, wild; leaf-lobes rhombic, ovate, elliptic or obovate, rounded.

12

12. Fruit-stalk 30-70 mm long, stout, enlarged upwards to a broad insertion on the fruit.

4. *C. pustulatus*

- Fruit-stalk 7-15 mm long, slender, not enlarged upwards.

5. *C. ficifolius*

Species 4-11 are genetically compatible with one another to varying degrees, and hybrids between any of them may therefore be occasionally found, e.g. Friis et al. 3225 (= *Cucumis dipsaceus* x *pustulatus*).

1. *C. melo* L. (1753)

- type: a plant cultivated at Uppsala, Sweden (LINN lecto.).

*Cucumis bardana* Fenzl ex Naud. (1859).

Trailing or sometimes climbing annual herb to 1.5 m. Stems hispid. Leaf-blade ovate or broadly ovate, scabrid-setulose or scabrid-punctate, 1.5-6.5 x 1.5-8 cm, base cordate, margin more or less sinuate-dentate, unlobed or usually palmately 3-5-lobed, lobes broadly triangular to obovate, obtuse or rounded; petiole hispid-setose, 1-9 cm long. Flowers monoecious. Male flowers solitary or in small clusters; pedicels 2.5-7 mm long; hypanthium 3-4 mm long, hispid or villous; sepals linear, 3-7 mm long; petals yellow, 3-7 mm long. Female flowers solitary; pedicels 4-10 mm long; ovary ellipsoid, 4-10 mm long, densely finely puberulous and usually also with some longer forward-pointing hairs. Fruit ellipsoid or oblong-ellipsoid, 40-60 x 20-40 mm, smooth, green to white with darker green longitudinal stripes, yellow when ripe, shortly pubescent; flesh bitter or non-bitter. Seeds elliptic in outline, about 4.2 x 2.2 x 1 mm. Fig. 65.10.8 & 9.

Open woodland, especially on river margins, also cultivated; 200-1100 m. EE AF SU KF GG HA; palaeo-

tropics. *De Wilde* 4674; *Gilbert & Gilbert* 1264; *Tadesse Ebba* 628

This is the MELON or MUSK-MELON of commerce.

The above description is based on wild plants collected from the Flora area which are referable to subsp. *agrestis* (Naud.) Grebensc., distinguished by shortly puberulous ovaries. Plants of subsp. *melo*, with densely long-villous ovaries, are widely cultivated for their edible fruits. They are usually also much larger in all parts, especially flowers, fruits and seeds, and the fruits vary greatly in size, shape, colour and surface ornamentation. Fruits of cultivated varieties are grown commercially on farms in the Awash and other river valleys.

### 2. *C. humifructus* Stent (1927)

—type: South Africa, a cultivated plant, *Stent in Nat. Herb.* 2866 (PRE holo.).

Trailing annual herb to 7 m. Leaf-blade broadly ovate to reniform, shortly hispid-setulose above and more densely so on veins beneath, 3–17 x 3–22 cm, base subcordate-subtruncate, margin somewhat sinuate-dentate, palmately 3-lobed, lobes short, rounded; petioles 1.5–11.5 cm long, setulose. Tendrils weak, 2–8 at each node. Flowers monoecious. Male flowers 2–12 in small clusters; pedicels 5–11 mm long; hypanthium 1.5–3.5 mm long; sepals filiform, up to 3 mm long; petals bright yellow, 4.5–7 mm long. Female flowers solitary; perianth quickly deciduous; pedicel stout, 3.5–11 mm long, rapidly elongating after flowering and burying the young fruit; ovary ovate, acute, 3–3.5 mm long, densely retrorsely hairy. Fruit subterranean, subglobose, about 40 x 35–50 mm, pale brownish, with rough markings; stalk very long, 10–25 cm long. Seeds elliptic in outline, 15–20 x 7–9 x 2–3 mm.

Woodland and wooded grassland; 1700 m. SU SD; eastern and southern tropical Africa. *Gilbert & Gelahun* 3122; *Gilbert & Jefford* 4548.

### 3. *C. metuliferus* E. Mey. ex Naud. (1859)

—type: from a cultivated plant, *Naudin* (P lecto.).

Trailing or climbing annual herb to 5 m. Stems densely setose. Leaf-blade ovate to broadly ovate, hispid-setulose becoming scabrid-punctate, 3.5–12 x 3.5–13.5 cm, base deeply cordate, margin sinuate-denticulate, palmately (3–) 5-lobed, lobes usually short, broadly triangular to ovate or elliptic; petiole 2–11.5 cm long, densely patent-setose. Flowers monoecious. Male flowers solitary or in 2–10-flowered clusters; pedicels 3–16 mm long; hypanthium 3.5–6 mm long; sepals filiform, 1.5–5 mm long. Female flowers solitary; pedicels 0.5–3.5 cm long; ovary ellipsoid, 9.5–25 mm long, covered with large soft spines. Fruit oblong-cylindrical, rounded at the ends, 65–130 x 35–65 mm, covered with stout fleshy spines, mottled green, bright red when ripe; stalk 20–70 mm long, little or not expanded towards the apex. Seeds narrowly ovate in outline, 5–9 x 3–4 x 1–1.5 mm, fibrillose.

Habitat not recorded. GD; tropical Africa, Yemen, sometimes cultivated. *Schimper* (1863) 838.

### 4. *C. pustulatus* Naud. ex Hook.f. (1871)

—type: EW, June 1863, *Schimper* 835 (K lecto.).

*Cucumis figarei* var. *ficifolius* Naud. in *Ann. Sc. Not. sér. 4*, 11: 17 (1859) —type: TU, Daroe, 1 Sept. 1853, *Schimper* 1423 (P lecto.).

*C. figarei* sensu Jeffrey, *Fl. Trop. E. Afr. Cucurbitaceae*: 99, non Del ex Naud.

*C. ficifolius* sensu Cufod., *Enum.* 1042 (1965) p.p., non A. Rich.

Trailing or climbing perennial herb to 2 m. Leaf-blade ovate to broadly ovate, harshly hispid or scabrid, 3–10 x 2.5–8 cm, base subcordate, margin sinuate-dentate, palmately (3–) 5-lobed, lobes ovate-triangular to ovate-oblong, rounded, the central largest, petiole 1.3–6 cm long. Flower monoecious. Male flowers solitary or in small clusters; pedicels 4–15(–22) mm long; hypanthium (3–) 5 mm long; sepals linear, 2–3 mm long; petals yellow, 5–8 mm long. Female flowers solitary; pedicels 3.8–6.5 cm long; ovary ellipsoid, 6–13 mm long, pustulate. Fruit obtusely ellipsoid to cylindrical, 50–65(–100) x 30–50 mm, tuberculate, green, ripening yellow, the tubercles obscure to prominent, 1–7 mm long; stalk 30–70 mm long, expanded towards the apex. Seeds elliptic in outline, 6–6.5 x 3 x 1–1.5 mm. Fig. 65.9.1.

Deciduous *Acacia* woodland, *Acacia* – *Commiphora* bushland, abandoned cultivated fields, sometimes as a weed in fields; 1000–2200 m. EW TU SU SD GG; west to Nigeria, south to S Tanzania, east to Arabia. *Gilbert* 1654; *Thulin et al.* 3607; *Friis et al.* 3223.

### 5. *C. ficifolius* A. Rich. (1847)

—type: TU, Adua, *Quartin-Dillon & Petit* s.n. (P lecto.).

*Cucumis abyssinicus* A. Rich. (1847) —type: TU, Shire [Chire], *Quartin-Dillon & Petit* s.n. (P lecto.).

*C. figarei* Del. ex Naud. var. *cyrtopodus* Naud. in *Ann. Sc. Not. sér. 4*, 11: 17 (1859) —type: TU, *Quartin-Dillon & Petit* s.n. (P lecto.).

*C. figarei* var. *microphyllus* Naud. loc.cit. (1859) —type: Ethiopia, *d'Hericourt* s.n. (P holo.).

Trailing perennial herb to 4 m. Stems hispid or more or less coarsely setose. Leaf-blade ovate, hispid or scabrid above, hispid-setose beneath with longer setae on veins, 1.5–8 x 1.5–7.5 cm, base weakly cordate, margin sinuate-dentate, palmately 3–5-lobed, the lobes oblong to elliptic or obovate-oblong, rounded, the central largest, often 3-lobulate; petiole 1–7 cm long; setose. Flowers monoecious. Male flowers solitary or few-fasciculate; pedicels 3–12 mm long; hypanthium (2.5–) 4–6 mm long; sepals filiform, 1.5–3 mm long; petals yellow, (4–) 6–10 mm long. Female flowers solitary or paired; pedicels 6–12 mm long; ovary ellipsoid, 5–12 mm long, minutely pustulate. Fruit obtusely shortly ellipsoid, (25–) 30–40(–60) x 15–30 mm, dark green with 10 paler longitudinal stripes, deep yellow when ripe, sparsely to densely tuberculate, the tubercles obscure, up to 1 mm long; stalk (7–) 15–20(–35) mm long, rather slender, not or little expanded towards the apex. Seeds elliptic in outline, 5–6 x 2–3 x 1–1.3 cm. Fig. 65.9.2. & 65.10.1–7.

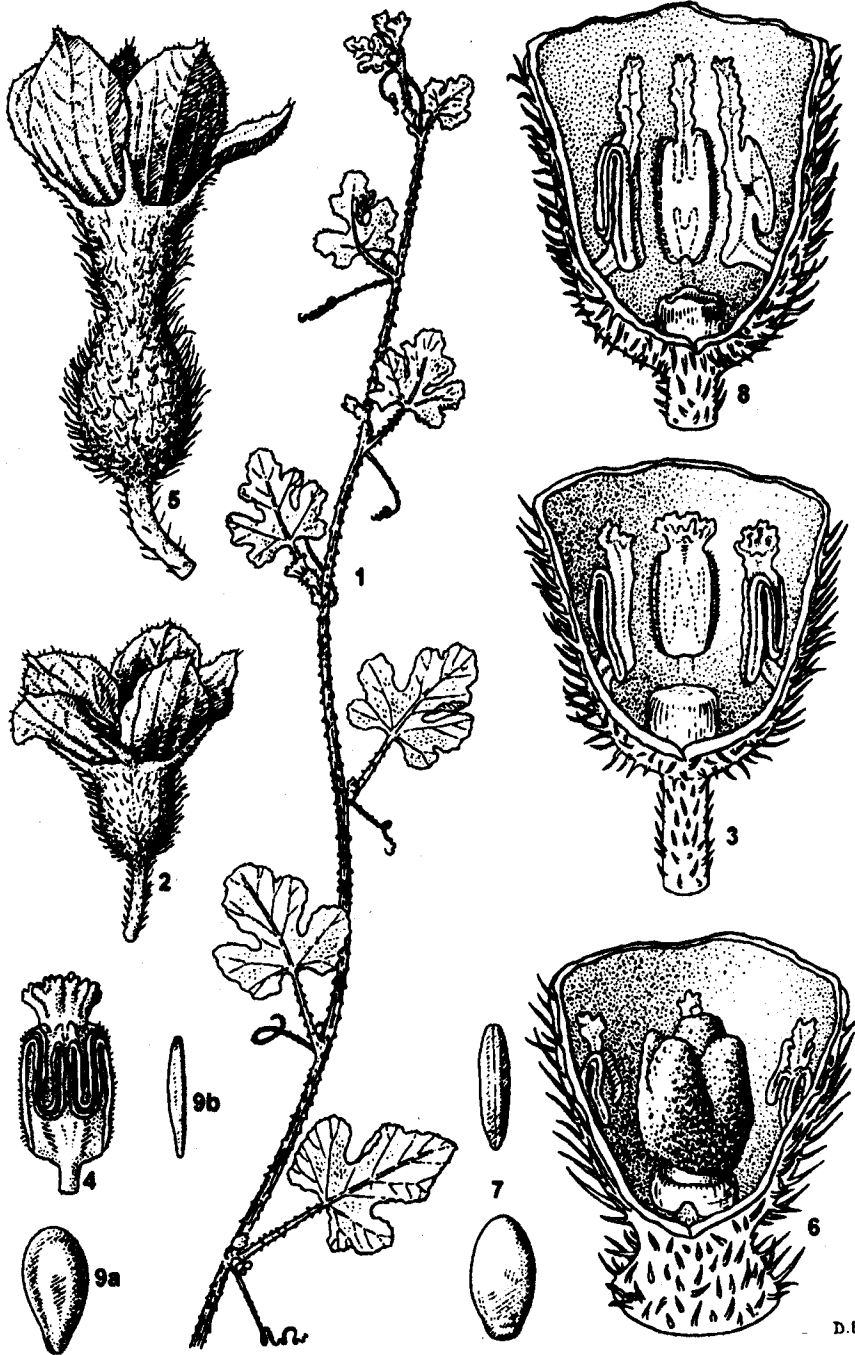


Figure 65.10

**CUCUMIS FICIFOLIUS:** 1 – stem with flowers in leaf axils  $\times \frac{1}{3}$ ; 2 – male flower  $\times 3$ ; 3 – male flower opened to show stamens  $\times 6$ ; 4 – stamen dorsal view  $\times 6$ ; 5 – female flower  $\times 3$ ; 6 – female flower opened to show pistil and staminodes  $\times 6$ ; 7 – seed, side and face views  $\times 3$ . **C. MELO:** 8 – male flower opened to show stamens  $\times 6$ ; 9a & 9b – seed, face and side views  $\times 3$ . 1 from Drummond & Hemsley 1238; 2–7 from Tweedie 1555; 8 from Drummond & Hemsley 1790; 9 from Bullock. Drawn by Derek Erasmus. (Reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 16.)

Grassland and wooded grassland, *Acacia* woodland, rocky slopes, also in secondary vegetation and cultivated places; 1300–2400 m. EW TU GJ SU WG GG HA; E Uganda, Kenya, Rwanda, N Tanzania. Burger 3498; De Wild 7058; Gilbert & Getachew 2865.

Root extract recorded as used in local honey-wine TEJ to make beverage more intoxicating.

6. *C. aculeatus* Cogn. (1895)

– type: Tanzania, Kilimanjaro, Volkens 1972 (B holo. destroyed; BR lecto.).

Trailing or climbing perennial herb to 3 m. Stems prickly-setose. Leaf-blade ovate-oblong, scabrid above, prickly-setose on veins beneath, 2–9  $\times$  2–7.5 cm, base weakly cordate or subtruncate, margin sinuate-dentate, unlobed or

palmately 3–5-lobed, lobes ovate to broadly elliptic, rounded, the central largest; petiole 1–3 cm long, prickly-setose. Flowers monoecious. Male flowers solitary; pedicel 1.5–6 mm long; hypanthium 3–4.5 mm long; sepals filiform, 2–5 mm long; petals pale yellow with green veins, 5.5–13 mm long. Female flowers solitary; pedicel 6–17 mm long; ovary fusiform, 10–12 mm long, pustulate. Fruit ovoid-ellipsoid, bluntly trigonous, 50–70  $\times$  35–50 mm, pale green, yellow when ripe, tuberculate, the tubercles low, conical; stalk 15–25 mm long, stout not or little expanded upwards. Seeds elliptic in outline, 6.5  $\times$  3  $\times$  1.5 mm. Fig. 65.9.3.

Grassland, wooded grassland, disturbed *Juniperus* forest; 1700–1850 m. SD; Tanzania, Rwanda, E Zaire. Gilbert & Jefford 4522; Gillett 14426.

7. *C. prophetarum* L. (1757)

– type: Israel, *Hasselquist* s.n. (LINN 1152/4 holo.; UPS lecto.).

Trailing perennial herb to 2.5 m from a thick woody taproot or rootstock. Stems hispid or scabrid with spreading or adpressed hairs. Leaf-blade ovate to almost circular in outline, hispid or scabrid, 1–9.5 x 1–8 cm, base obtuse to attenuate, margin sinuate-dentate, moderately to deeply palmately 3–5-lobed, the lobes varied, usually narrowed towards the base, sometimes narrow and deeply lobulate; petioles 0.5–8.5 cm long, hispid or scabrid. Flowers monoecious. Male flowers solitary or in small clusters; pedicels slender, 3–25 mm long; hypanthium 2.5–5 mm long; sepals filiform, 1–3(–4) mm long; petals yellow, (3–)5–8(–10) mm long. Female flowers solitary; pedicel 1–5 cm long; ovary ellipsoid, 4.5–8 mm long, densely softly spiny. Fruits subglobose to ellipsoid, 25–40(–60) x 15–30 mm, pale green with obscure to distinct darker green longitudinal stripes, yellow when ripe, shortly spiny, the spines rather slender, 0.5–6(–12) mm long; stalk 20–60 mm long, rather slender. Seeds elliptic in outline, 3–5 x 2–2.5 x 1 mm.

1. Plant bright green; fruit spines 4–6 mm long.

subsp. *dissectus*

– Plant grey-green; fruit spines up to 3 mm long.

subsp. *prophetarum*

subsp. *prophetarum*.

*Cucumis pustulatus* Hook.f. var. *echinophorus* A. Terr. in *Ann. Ist. Bot. Roma* 5: 108 (1894) – types: EE, Anfilo Bay, *Terracciano* 77 & 186 (RO syn.).

Dry *Acacia* bushland, grassland and semi-desert scrub, also in cultivated places; 0–550 (–1000) m. EE AF TU HA; desert regions, west to Senegal, N Kenya, Somalia, Socotra, north to Syria, east to Pakistan and W India. *Bally* 6955; *Beals & Prosser* 72; *Gilbert & Gilbert* 1870.

subsp. *dissectus* (Naud.) C. Jeffrey in *Kew Bull.* 15: 351 (1962) – type: TU, Golleb, *Schimper* 1201 (P lecto.).

Fig. 65.9.4–6.

Open *Acacia* grassland, *Acacia* – *Commiphora* bushland and grassland, also in cultivated places; 200–1950 m. EE AF EW TU WU SU SD; west to Senegal, south to N Tanzania, Somalia, Socotra, Yemen, Saudi Arabia. *Burger* 3518; *Mesfin & Vollesen* 4124; *Friis* et al. 3159.

8. *C. insignis* C. Jeffrey (1984)

– type: SD, 39 km on Yavello-Ageremariam road, 22 May 1976, *Gilbert & Jefford* 4656 (K holo.).

*Cucumis prolator* Kirkbride (1993) – type: Kenya, Kitui Distr., *Gillett & Gachathi* 20478 (K holo.).

Perennial herb, stems up to 2.5 m long, numerous from the thickened rootstock, prostrate, purplish, densely setulose. Leaf-blade broadly ovate in outline, purplish, densely appressed hairy, 2.5–8 x 1.5–7.5 cm, base broadly cordate, deeply palmately (3–)5-lobed; lobes narrowly elliptic or narrowly oblong-lanceolate, shortly 3-lobulate with obtuse or subacute-apiculate teeth; petiole densely white hairy, 0.7–3.8 cm long. Tendrils simple or abnormally bifid.

Flowers monoecious. Male flowers few, in axillary clusters; pedicels slender or filiform, c 30 mm long; hypanthium campanulate, 4 mm long, hairy; sepals subulate, hairy, 2 mm long; petals yellow, ovate-oblong, 6 mm long. Female flowers solitary; pedicels thicker than in the male flowers, 75–100 mm long; ovary elliptic, shortly beaked, densely spiny, 15 mm long; hypanthium obconic, 3.5 mm long. Fruits elliptic, 40–45 x 32 mm, dark-green with pale longitudinal stripes, covered with slender spines 10–16 mm long; stalk 10.4–12 mm long, expanded towards the apex. Seeds elliptic, compressed, pale white, 5–5.5 x 2.3–2.5 x 1 mm.

Deciduous *Combretum* – *Terminalia* woodland; 1550–1600 m. SD; Kenya. *Gilbert* et al. 8061; *Friis* et al. 3224.

9. *C. jeffreyanus* Thulin (1991)

– type: HA, Erer Gota, 31 Aug. 1963, *Burger* 3214 (K holo.).

Trailing perennial herb. Leaf-blade ovate or broadly ovate, shortly scabrid, densely so beneath, 1.5–5.5 x 1.8–3.6 cm, base weakly cordate, margin obscurely sinuate-serrate, rather deeply palmately 3–5-lobed, the lobes obovate or oblanceolate, rounded, the central largest; petiole 0.8–3.5 cm long, hispid-setose. Tendrils simple. Flowers monoecious. Male flowers solitary or paired; pedicels 10–20 mm long; hypanthium 5.5–6 mm long; sepals filiform, 1–2 mm long; petals yellow, 10 mm long. Female flowers solitary; pedicel 5–12 mm long; ovary ellipsoid, densely spiny; hypanthium 3.5–4 mm long, hispid; sepals c 1.5–2.5 mm long, hispid; petals, c 4–5.5 mm long, hirsute outside; staminodes 3; style less than 0.5 mm long. Fruit subglobose to ellipsoid, 35–40 x 25–35 mm, glabrous, green with scattered stout yellow-tipped spines, spines 3–5 mm long; stalk rather slender, 10–15 mm long. Seeds ovate-elliptic in outline 3.2–4.5 x 1.6–2 x 1 mm.

Grassland and wooded grassland; 650–1200 m. HA; Somalia. *Ash* 2505.

Fruit recorded as edible.

10. *C. carolinus* Kirkbride (1993)

– type: Kenya, Wajir Distr., *Gilbert & Thulin* 1116 (K holo., UPS iso.).

Trailing herb, probably perennial. Leaf-blade ovate, 3–7 x 2–6 cm, base weakly cordate, margin scabrid, obscurely sinuate-dentate, shortly to moderately deeply palmately 3(–)5-lobed, lobes ovate-triangular to obovate, obtuse or rounded; petioles 2–6 cm long, shortly setulose. Flowers monoecious. Male flowers solitary or paired; pedicels 6–11 cm long; hypanthium 10–12 mm long; sepals linear-lanceolate, 3–6 mm long; petals yellow, broadly obovate, 23–33 mm long. Female flowers solitary; pedicel stout, 30 mm long; ovary ellipsoid, 25 mm long, densely spiny. Fruits 50–55 x 30–35 mm, ellipsoid, glabrous with scattered stout spines, spines 3.5–6.5 mm long. Seeds elliptic in outline, 4–4.2 x 1.6 x 0.9 mm.

Flood plain; 240–915 m. HA; Somali, Kenya. *Ashall* CA4.

11. *C. dipsaceus* Ehrenb. ex Spach (1838)

– type: Saudi Arabia, Wadi Kamme, Ehrenberg & Hemprich s.n. (B holo. destroyed; MPU lecto.).

*Momordica dasycarpa* Hochst. ex A. Rich. (1847)

– type: EE, Agau [Aguar] valley, near Modat, 4 April 1839, Schimper II: 1419 (P holo.; K iso.).

Trailing annual herb to 2 m. Stems harshly hispid. Leaf-blade ovate to reniform, bright green, scabrid or hispid especially on veins beneath, 2–9.5 x 2.5–10 cm, base deeply cordate, margin rounded sinuate-dentate, unlobed or shallowly and broadly palmately 3-lobed, lobes rounded; petiole 1.7–14 cm long, roughly hispid. Flowers monoecious. Male flowers solitary or in 2–4-flowered clusters; pedicels 7–13 mm long; hypanthium pale green, 3–5 mm long; sepals linear, spreading, 1.5–5 mm long; petals bright yellow with pellucid green veins, 5–15 mm long. Female flowers solitary; pedicel 5–10 mm long; ovary ellipsoid, 9–17 mm long, densely spiny. Fruit ellipsoid, 45–80 x 30–40 mm, densely softly spiny, pale green, yellow when ripe; stalk stout, about 10 mm long. Seeds elliptic in outline, rather acute at each end, 4.5–5.0 x 2–2.5 x 1 mm.

Deciduous *Acacia* woodland, wooded grassland and *Acacia-Commiphora* bushland, also in cultivated places; 670–2000 m. EE EW TU WU SU SD HA; Sudan, N Uganda, Kenya, Tanzania, Somalia, Socotra, Saudi Arabia; adventive in the dry neotropics. *Amare Getahun* F-49; *Gilbert* 196; *De Wilde* 4829.

12. *C. sativus* L. (1753)

– type: ‘from cultivated plants’, *J. Burser* vol. 17 no. 97 (UPS lecto.).

Annual climbing or trailing hispid herb to 3 m. Leaf-blade ovate, 4–20 x 5–20 cm, base cordate, palmately 3–5-lobed or angled, lobes triangular; petiole 2.5–20 cm long. Flowers usually monoecious. Male flowers 2–7 in small clusters; pedicels 3–11 mm long, hypanthium 5–10 mm long; sepals linear, 3–5 mm long; petals yellow, 8–20 mm long. Female flowers solitary, pedicellate; ovary more or less ellipsoid, tuberculate, 10–15 mm long. Fruit variable, commonly ellipsoid to cylindrical, 8–30 cm long, bluntly 3-angled, obscurely pustulate, green, yellow or mottled when ripe, pedicellate. Seeds 8–12 x 3–4 x 1 mm.

Cultivated for its edible fruits around Addis Ababa (SU), Asmara (EW) and probably in other places. Native of the Sino-Himalaya region. *Sue Edwards* et al. 5224

Recorded as cultivated for its edible fruits by Richard (1847) in *Tent. Fl. Abyss.*

## 10. TROCHOMERIA Hook.f. (1867)

Climbing trailing or erect perennial herbs with tuberous rootstock. Leaves simple, often with a ciliate stipuloid bract at the petiole base. Tendrils simple. Flowers dioecious, often appearing before the leaves. Male flowers in sessile or pedunculate clusters, rarely solitary; hypanthium cylindrical; sepals 5, minute, dentiform; petals 5, greenish, ovate to lanceolate-attenuate, spreading or deflexed, united at the base; stamens 3, 2 two-thecous, 1

one-thecous; filaments free, inserted near the middle of the hypanthium, anthers united, included in the hypanthium; thecae tightly folded; connective apically pubescent. Female flowers solitary; ovary ovoid to ellipsoid, smooth; ovules several to many, horizontal; perianth like that of male flowers; stigmas 3. Fruit fleshy, rounded, indehiscent, red when ripe. Seeds subglobose to ellipsoid, smooth, white.

About 7 species in tropical and southern Africa; 1 species in the Flora area.

*T. macrocarpa* (Sond.) Hook.f. (1871);

*Zehneria macrocarpa* Sond. (1862) – types: S. Africa, Transvaal, *Burke* 290 and *Zeyher* 579 (K isosyn.).

Climbing or trailing herb to 6 m. Leaf-blade broadly ovate in outline, base cordate, margin more or less asperulous or scabrid, entire or sinuate-dentate, unlobed to very deeply palmately 5-lobed, lobes ovate or triangular to linear, often lobulate; petioles 0.5–3 cm long, pilose. Stipuloid bracts absent. Male flowers solitary or in lax 2–13-flowered clusters or racemes; pedicels 0.6–11 cm long; hypanthium narrowly obconic-cylindric, 13–25 mm long; sepals dentiform, 1–3 mm long; petals olive green to greenish-yellow, sometimes tinged reddish, linear-lanceolate, reflexed, 1–6 cm long. Female flowers solitary; pedicels 3–18 mm long; ovary ovoid, beaked, 7–13 mm long. Fruit ellipsoid, rounded or shortly beaked at the apex, orange-red or bright red when ripe, (30–)40–65 x 20–30 mm. Seeds ovoid, 8–11 x 5.5–6 x 4–5.5 mm. Fig. 65.11.

Wooded grassland; 1650–1900 m. EW SD; north, east and southern tropical Africa. *Gillett* 14847; *Sahle G/Kristos* in *Sue Edwards* 3835.

## 11. DACTYLIANDRA (Hook.f.) Hook.f. (1871)

Slender trailing or climbing perennial herbs. Leaves simple, usually with a ciliate stipuloid bract at the petiole base. Tendrils simple. Flowers small, monoecious or dioecious. Male flowers in pedunculate subumbelliform or irregular racemes; hypanthium campanulate; sepals 5, small, dentiform; petals 5, yellow or greenish, shortly united; stamens 3, 2 two-thecous, 1 one-thecous, inserted on the lower part of hypanthium; filaments free; anthers protruding; thecae inverted U-shaped; connectives apically pubescent. Female flowers usually solitary; stigmas 3; ovary ovoid; ovules several, horizontal; perianth like that of male flowers. Fruit fleshy, red when ripe, indehiscent. Seeds somewhat compressed, asymmetrically oblong or pyriform, somewhat angular, smooth or pitted.

Genus with 2 species in the dry regions of Namibia, Angola, NE tropical Africa and India; 1 species in the Flora area.

*D. stefaninii* (Chiov.) C. Jeffrey (1984);

*Coccinia stefaninii* Chiov. (1910); *Trochomeria stefaninii* (Chiov.) C. Jeffrey (1962) – types: Somalia, Jubaland, *Paoli* 1069 and 1179 (FI syn.).

*Dactyliandra nigrescens* C. Jeffrey (1965) – type: Kenya, Kitui, *Bogdan* 5124 (K holo.).

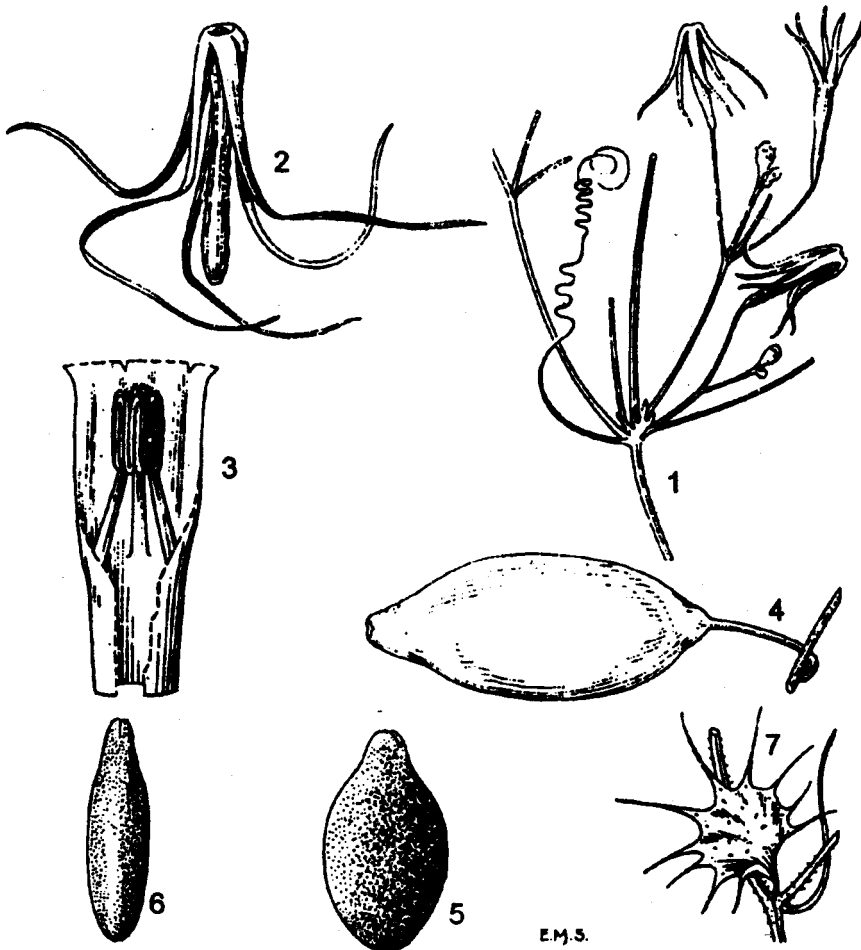


Figure 65.11

**TROCHOMERIA MACROCARPA:**  
 1 – stem showing flowers without supporting leaves  $\times \frac{3}{4}$ ; 2 – male flower  $\times 1$ ; 3 – staminal column  $\times 6$ ; 4 – fruit  $\times 1$ ; 5 & 6 – seed, face and side views  $\times 3$ ; 7 – stipuliform bract  $\times 2$ . 1 & 4 from Richards 6941; 2 & 3 from Milne-Redhead & Taylor 7667; 5 & 6 from Cook 55; 7 from Napier 1982. Drawn by Margaret Stoner. (Modified and reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 12.)

Slender climbing or trailing herb; stems many from large rootstock. Leaf-blade ovate to broadly reniform in outline, scabrid or strigose, 1.6–8 x 1.4–10 cm, base broadly cordate, margin subentire to sinuate-dentate, unlobed to deeply and narrowly palmately 3–5-lobed, lobes narrowly elliptic or lanceolate to rhombic, more or less lobulate, the central largest; petiole 0.2–4 cm long. Stipuloid bracts when present lanceolate to almost circular, sinuate-ciliate, 2–15 x 1.2–13 mm. Flowers dioecious. Male flower(s) solitary or in loose 2–15-flowered racemes; pedicels 3–27 mm long; hypanthium campanulate, up to 14 mm long; sepals lanceolate, 0.5–1.5 mm long; petals greenish or dull yellow, sometimes crimson at the base, ovate-triangular to ovate-lanceolate, 3.5–9 mm long, spreading or somewhat deflexed; stamens as for the genus. Female flowers solitary; pedicels about 4 mm long; ovary subglobose, 2.5 mm long. Fruits subglobose, red, 10–25 mm in diameter, stalk 4–8 mm long. Seeds broadly pear-shaped in outline, somewhat compressed, with flat faces and somewhat angular margins, 6–6.5 x 4–5 x 2–3.5 mm, dark-coloured, smooth or obscurely to distinctly pitted. Fig. 65.12.

*Acacia* – *Commiphora* woodland and bushland; open grassland; 300–1700 m. SD BA; N Kenya, Somalia. *Riva*, s.n.; *Gilbert & Jefford* 4586; *Gilbert et al.* 8160.

## 12. CTENOLEPIS Hook.f. (1867)

Slender climbing herbs. Leaves simple, with a ciliate stipuloid bract at the petiole base. Flowers very small, monoecious. Male flowers in short pedunculate racemes; hypanthium shortly obconic; sepals 5, small, dentiform; petals 5, yellowish, spreading, united at the base; stamens 3, 2 two-theous inserted on the lower part of the hypanthium; anthers free, protruding; theca short, curved. Female flowers solitary, in the same axil with male; ovary subglobose, smooth; ovules few, horizontal; perianth as in male flowers; stigmas usually 2. Fruit fleshy, smooth, red. Seeds usually 2, ovate in outline, more or less plano-convex, smooth.

Genus with 2 species in tropical Africa, SW Asia and S India; 1 species in the Flora area.

### *C. cerasiformis* (Stocks) Hook.f. (1871);

*Zehneria cerasiformis* Stocks (1852) – types: Sudan, Blue Nile Province, Jebel Arsch-Cool, *Kotschy* 205 (K syn.); W Pakistan, *Stocks* 29 (K syn.).

*Blastania cerasiformis* (Stocks) A. Meeuse (1962).

Slender climbing herb. Leaf-blade broadly ovate in outline, asperulous or scabrid, 2.5–9 x 2.5–13 cm, base cordate, deeply palmately 3–5-lobed, lobes elliptic to broadly

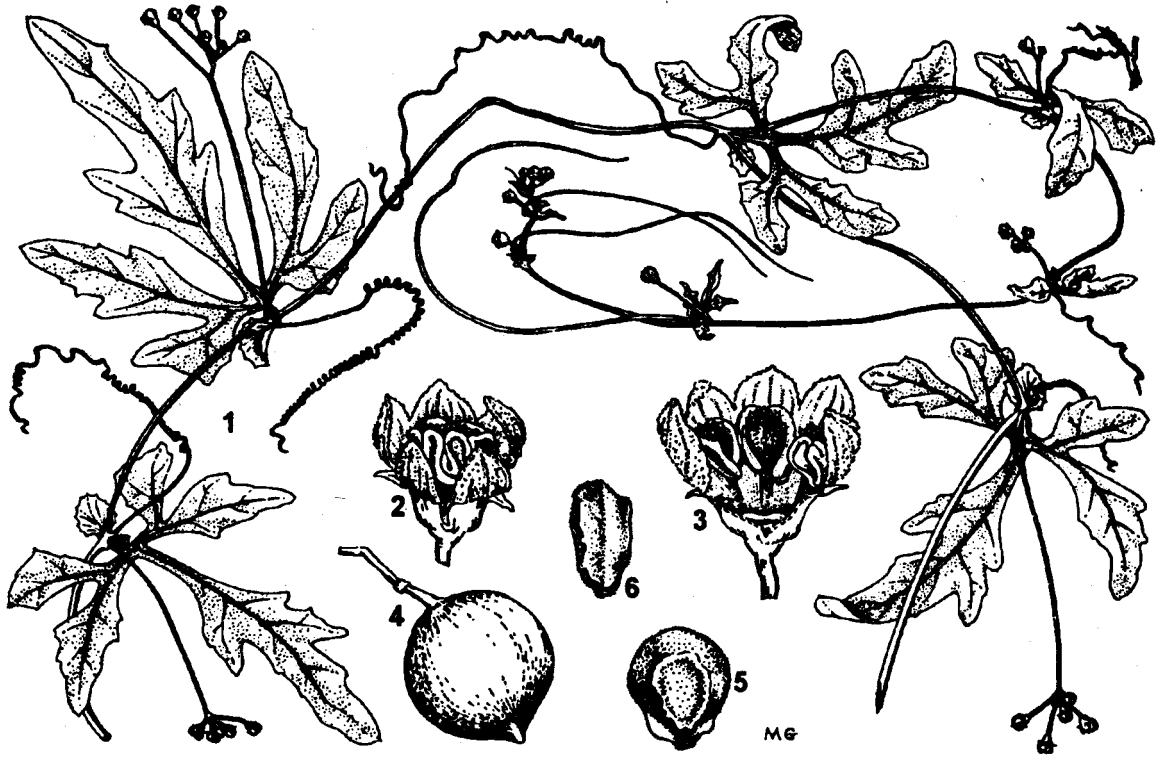


Figure 65.12 *DACTYLIANDRA STEFANINII*: 1 – stem with flowers and fruits x 1; 2 – male flower x 6; 3 – male flower opened to show stamens x 6; 4 – fruit x 1; 5 & 6 – seed, face and side views x 3. 1–3 from Bogdan 5124; 4–6 from Kirrika 34. Drawn by Mary Grierson. (Reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 13.)

elliptic, sinuate-serrate, sometimes lobulate, the central largest; petiole 0.5–5.5 cm long, strigose or scabrid. Stipuloid bract almost circular, 6–20 mm in diameter, finely ciliate. Male flowers 3–20 in pedunculate racemes; peduncles 5–33 mm long; pedicels slender, 1.5–2.5 mm long; hypanthium obconic, about 1 mm long; sepals 0.5–1 mm long, dentiform, spreading; petals ovate, spreading, yellowish, 1.5–2 mm long. Female flowers solitary; pedicel 2–7 mm long; ovary subglobose, about 2 mm long. Fruit subglobose, slightly oblate, 10–15 mm in diameter, smooth, red, usually 2-seeded; stalk 2.5–7 mm long. Seeds 7.5–11 x 5–6 x 2–3 mm, not or scarcely bordered. Fig. 65.13.

Deciduous bushland and thickets; 0–1000 m. EE GD; E to Mauritania, S to south Africa (Transvaal), W to Yemen, Saudi Arabia, Pakistan and W India. Ehrenberg 188; Schweinfurth 100; Greathead 160.

### 13. *MOMORDICA* L. (1753)

Trailing or climbing annual herbs, perennial tuberous-rooted herbs or softly woody climbing shrubs. Leaves simple or pedately compound. Tendrils simple or bifid. Flowers monoecious or dioecious. Male flowers in pedunculate clusters or racemes, often with conspicuous bracts at the base, sometimes reduced to a single flower; hypanthium broad, short; sepals 5, entire; petals 5, orange-yellow to white, free, entire, 1–3 bearing a basal ventral incurved scale; stamens usually 3, 2 two-theous, 1 one-theous; anthers usually free; thecae curved, wavy or with 3 folds. Female flowers solitary; ovary smooth or with fleshy

wings, tubercles or spines; ovules 1-many, usually horizontal; hypanthium very shortly cylindrical; sepals often narrower than in male flowers; petals similar to those of male flowers; stigmas 3. Fruits ellipsoid to fusiform, smooth, winged, tuberculate or spiny, usually many-seeded, fleshy and red or orange-red when ripe and dehiscent into 3 valves exposing red-sheathed seeds or indehiscent, sometimes few-seeded and pod-like. Seeds usually compressed, with sculptured faces and grooved margins.

About 45 species, palaeotropical; 13 species in the Flora area.

1. Leaves sessile or subsessile, more or less hastate and amplexicaul at the base, simple. 13. *M. sessilifolia* – Leaves distinctly petiolate, not hastate nor amplexicaul at the base, simple or compound. 2
2. Plant a spiny shrub, the spines replacing or derived from the tendrils and usually paired at the nodes. 3 – Plant not spiny, the tendrils solitary at the nodes. 4
3. Seeds compressed, 12–21 x 10–14 x 3–4 mm; fruit with rows of fleshy spines. 1. *M. spinosa* – Seeds swollen, about 25 x 23–25 x 13 mm; fruit with undulate fleshy wings. 2. *M. macrosperma*
4. Young stems and petioles flecked with darker green spots; ovary and fruit spiny. 5. *M. foetida* – Young stems and petioles not flecked with darker green spots; ovary and fruit winged, tuberculate, ridged or smooth. 5
5. Leaves ternately or biternately deeply dissected into deeply toothed or lobulate segments or leaflets. 10. *M. dissecta*



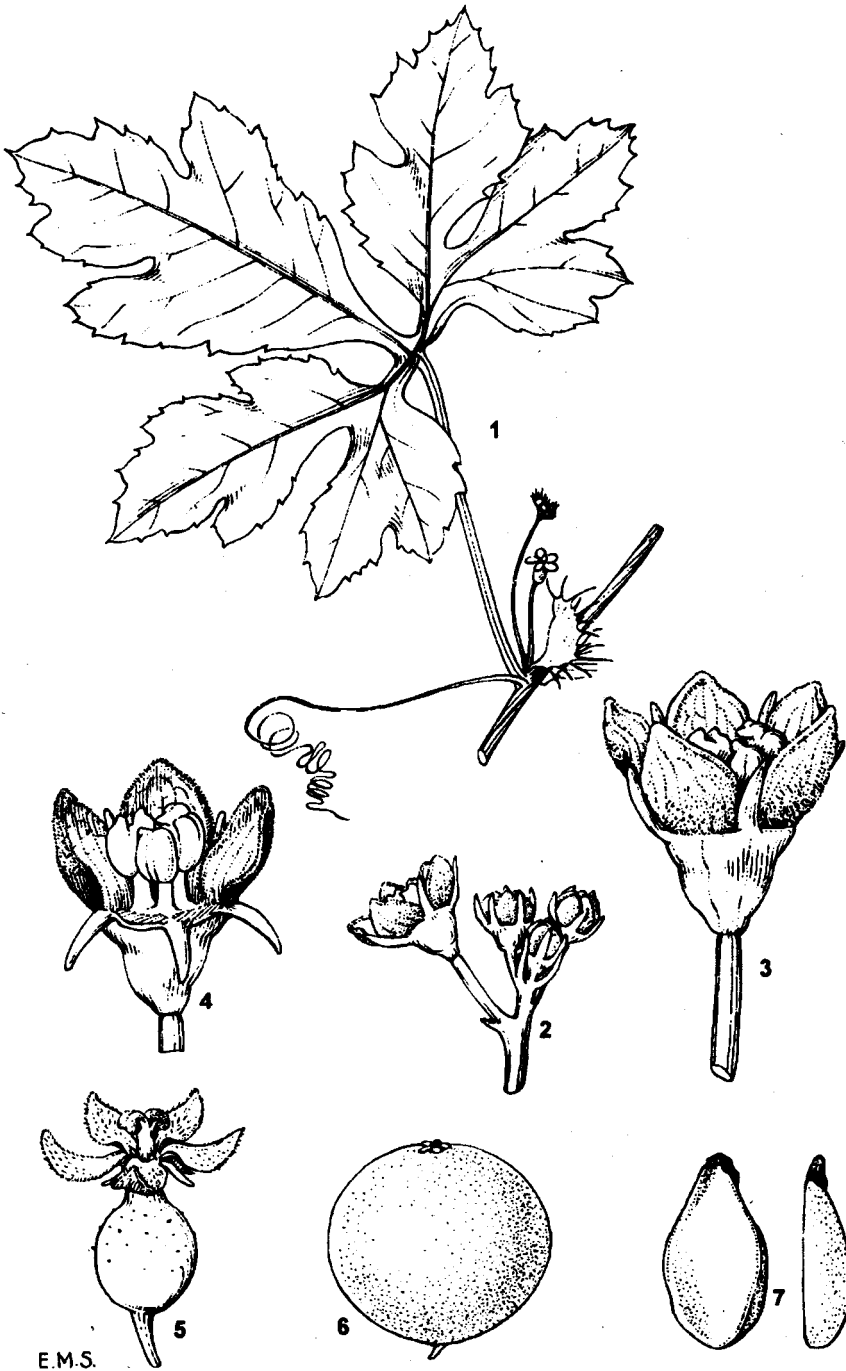


Figure 65.13  
**CTENOLEPIS CERASIFORMIS**: 1 – stem portion with leaf, female flower, bract and tendril x 1; 2 – male inflorescence x 8; 3 – male flower x 16; 4 – male flower opened to show stamens x 16; 5 – female flower x 8; 6 – fruit x 3; 7 – seed, face and side views x 3. 1–5 from cult. Kew 597/1950; 6 from *Milne-Redhead & Taylor* 11240; 7 from *Hornby & Hornby* 550. Drawn by Margaret Stoner. (Reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 14.)

E.M.S.

- Leaves simple, palmately lobed or angled, or compound with clearly distinct, more or less sinuate-denticulate leaflets. 6
- 6. Leaves compound. 7
- Leaves simple. 10
- 7. Stalk of central leaflet or group of leaflets shorter than the petiole; fruit with longitudinal fleshy wings. 8
- Stalk of central leaflet or group of leaflets longer than the petiole; fruit unwinged. 9
- 8. Hypanthium of male flowers broadly campanulate, 4.5–7 mm long; seeds oblong, more or less compressed. 3. *M. pterocarpa*
- Hypanthium of male flowers cylindrical in lower part, expanded in upper part, 9–11 mm long; seeds more or less pea-shaped. 4. *M. friesiorum*
- 9. Plant woody, with partially exposed tuberous rootstock; male racemes 1–14-flowered; fruit-stalk 2–15 mm long. 9. *M. rostrata*
- Plant herbaceous, with underground tuberous rootstock; male flowers always solitary; fruit-stalk 20–60 mm long. 8. *M. trifoliolata*
- 10. Leaf-blade deeply palmately 5–7-lobed to the middle or beyond; lobes narrowed towards the base; fruits many-seeded, dehiscent by 3 valves; seeds compressed, unappendaged, enveloped in red pulp; plants annual. 11
- Leaf-blade moderately palmately 3–5-lobed or angled; lobes broadest at the base; fruit few-seeded, pod-like; seeds somewhat rounded, appendaged, not enveloped in red pulp; plants perennial, with tuberous rootstocks. 12
- 11. Pedicel of male flowers 2–5 mm long, the subtend-

ing bract thus close to the flower, pallid with green veins and margins.

6. *M. balsamina*

– Pedicel of male flower 20–95 mm long, the subtending bract thus remote from the flower, uniformly green.

7. *M. charantia*

12. Petals pale yellow; leaves pentagonal, lobes subequal; seeds subglobose, 6–7 mm long.

11. *M. cymbalaria*

– Petals bright orange-yellow to orange-red; leaves ovate, central lobe larger than the laterals; seeds ellipsoid or fusiform, 11–17 mm long.

12. *M. boivinii*

1. *M. spinosa* (Gilg) Chiov. (1916);

*Kedrostis spinosa* Gilg. (1904) – type: Tanzania, Engler 1567 (B holo. destroyed).

*K. brevispinosa* Cogn. (1916); *Momordica brevispinosa* (Cogn.) Chiov. (1929) – type: HA, Ogaden, Riva 893 (B holo. destroyed).

Climbing or decumbent softly woody deciduous spiny shrub to 3 m high. Leaf-blade sub-pentagonal or circular in outline, narrowly decurrent on to the petiole, shortly pubescent, 1.7–7.2 x 2.3–5.8 cm, base deeply cordate, shallowly palmately 5-lobed; petiole 0.8–3 cm long. Tendrils simple, usually paired, spine-like or the basal part spinescent and persistent. Flowers dioecious. Male flowers fasciculate; pedicels up to 10 mm long; hypanthium broadly campanulate, 2–3 mm long; sepals oblong or spatulate, rounded, 2.5–4 mm long; petals yellow with green lines or 3 with dark spots towards the base, oblong, 10–11 mm long. Female flowers solitary or paired; pedicel up to 5 mm long; ovary ovoid, beaked, softly spiny, about 12 mm long hypanthium short; sepals obovate-spatulate, with prominent shortly projecting midrib. Fruit ovoid, 70–100 x 35–50 mm, fleshy, orange-red when ripe, with 10 longitudinal rows of large fleshy spines; stalk 5–9 mm long. Seeds elliptic in outline, compressed, slightly rough, 12–21 x 10–14 x 3–4 mm. Fig. 65.15.4.

Open deciduous *Acacia* – *Commiphora* bushland, woodland, grassland and semi-desert scrub; 100–900 m. SD HA; Somalia, N Kenya. Ellis 321; Hemming 1450; Gilbert et al. 7518.

2. *M. macrosperma* (Cogn.) Chiov. (1929);

*Kedrostis macrosperma* Cogn. (1916); ?*Momordica brichetti* Chiov. (1916) – type: Somalia, Kehera, July–August 1891, *Brichetti* 229 (FI holo.; K photo.).

Climbing or decumbent softly woody deciduous spiny shrub. Leaf-blade circular-obovate in outline, narrowly decurrent on to the petiole, entire, densely shortly pubescent, 2–4 x 2–4 cm, base cordate; petiole 1–1.5 cm long. Tendrils simple, solitary or paired, spine-like or the basal part spinescent and persistent. Flowers dioecious. Male flowers fasciculate; pedicels 2–3 mm long; hypanthium hemispherical, 2 mm long; sepals spatulate, 3 mm long; petals ovate-elliptic, deep yellow, 10–12 mm long. Female flowers unknown. Fruit subglobose, shortly beaked, 45 x 50 mm, with narrow undulate longitudinal fleshy wings. Seeds 2–3, almost circular in outline, planoconvex, slightly rough, about 25 x 23–25 x 13 mm.

Habitat not recorded, probably semi-desert scrub below 1000 m. Somalia (Kehera).

Although *M. macrosperma* has not yet been found in the Flora area, it may occur in southeast Ethiopia, the Ogaden.

3. *M. pterocarpa* Hochst. ex A. Rich. (1847)

– types: TU, near Adua, Dillon 3 (P syn. not seen); below Mt Scholoda, Schimper 187 (P syn. not seen; K isosyn.).

Trailing or climbing perennial herb to 2 m. Rootstock tuberous. Leaves pedately 3–5(–7)-foliolate; central leaflet narrowly to broadly ovate or elliptic, more or less pubescent, 4.2–13 x 1.8–8 cm; base cuneate to subcordate, margin remotely denticulate, apex acute to obtuse, apiculate, lateral leaflets smaller, with unequal bases; central petiole 0.7–3.7 cm long; petiole 0.6–5.5 cm long. Tendrils bifid. Flowers dioecious. Male flowers 4–18 in pedunculate bracteate clusters or short racemes; peduncle 48–170 mm long, apically bracteate; bract ovate to almost circular, pedicellate or subsessile, 6–20(–35) mm long; pedicels 3–20 mm long; hypanthium campanulate, 4.5–5.5(–7) mm long, black; sepals ovate-triangular, 6–9(–11) mm long, black with green tips; petals pale yellow to almost white, obovate, 15–25(–32) mm long, 3 with black markings at the base. Female flowers solitary; pedicels 4–30 mm long; ovary fusiform, with toothed longitudinal ridges, 13–32 mm long; hypanthium short, broad, 1–2 mm long; sepals lanceolate, 5–11 mm long. Fruit ellipsoid, beaked, with 8–10 longitudinal undulate wings or ridges, fleshy, bright orange, 50–70 x 20–25 mm, dehiscent into 3 valves; stalk 30–85 mm long. Seeds sheathed in red or orange-red pulp, oblong or ovate-oblong, about 10 x 7 x 3 mm, faces sculptured.

Forest margins, scrub and grassland, also in cultivated places; 1350–2650 m. EW TU SU; Cameroon, E tropical Africa south to Malawi. Ryding 1385; Gilbert & Getachew 2734; Getachew Aweke & Gilbert 807.

4. *M. friesiorum* (Harms) C. Jeffrey (1962);

*Calpidosicyos friesiorum* Harms (1923) – types: Kenya, Fries 1523, 1523a, 1523b (B syn. destroyed) and 2214 (B syn. destroyed; K isosyn.).

Climbing herb to 3 m; rootstock tuberous. Leaves pedately 3–5(–7)-foliolate; central leaflet lanceolate to ovate or elliptic, shortly pubescent, 2.5–13 x 1–5 cm; base rounded to subtruncate, margin remotely denticulate, apex acutely acuminate, apiculate, lateral leaflets smaller, unequal-based; central petiole 0.4–2.7 cm long; petiole 0.7–5.5 cm long. Tendrils bifid. Flowers dioecious. Male flowers 5–15 in pedunculate bracteate clusters or short racemes; peduncles 3–13 cm long, apically bracteate; bract ovate to almost circular, shortly pedicellate, 10–30 mm long; pedicel 4–11 mm long; hypanthium tubular in lower part, expanded above, 9–11 mm long, dark purplish; sepals triangular or triangular-attenuate, 3.5–8(–12) mm long, dark purplish; petals pale yellow, 10–15 mm long, some with dark markings at the base. Female flowers solitary; sepals lanceolate, 6–11 mm long; pedicels 10–35 mm long;

ovary fusiform, longitudinally ridged, 20–35 mm long; hypanthium short and broad, about 1 mm long. Fruit fusiform, beaked, with about 10 toothed longitudinal wings or ridges, fleshy, bright orange, about 60 x 20 mm, dehiscent into 3 valves; stalk 23–60 mm long. Seeds sheathed in red or orange pulp, swollen, more or less pea-shaped, about 8 x 3 x 4 mm, rugose. Fig. 65.15.5.

Moist *Podocarpus*–*Juniperus* forest margins, thickets beside highland rivers; 1180–2800 m. SU AR GG BA HA; E tropical Africa south to Malawi. *IECAMA* H-74; *W. de Wilde & de Wilde-Duyffes* 6555, 6519.

5. *M. foetida* Schumach. (1827)

– type: Ghana, *Thonning* 85 (C holo.).

*Momordica mokorra* A. Rich. (1847) – type: Ethiopia, *Quartin Dillon & Petit* s.n. (P syn. not seen; K isosyn.).

*M. schimperiana* Naud. (1866) – type: GD, Woina, *Schimper* 326 (P holo. not seen; K iso.).

*M. cucullata* Hook.f. (1871) – types: GD, Woina, *Schimper* 327 (K syn.). Angola, *Welwitsch* 809 (BM syn.; K isosyn.), Angola, *Welwitsch* 809 (BM syn., K isosyn.).

*M. foetida* var. *villosa* Cogn. in Engl., *Bot. Jahrb.* 21: 208 (1895) – type: Tanzania, Mlalo, *Holst* 2453 (B holo. destroyed; K iso.)

Trailing or climbing unpleasant-smelling herb to 3 m or more. Sometimes several to many flowering stalks arising from the rootstock before the leaves are produced. Stems spotted with darker green. Leaf-blade ovate to broadly ovate, subglabrous to densely tomentose beneath, 1.5–19 x 1.5–18 cm; base cordate, margin obscurely to coarsely sinuate-denticulate, apex acuminate, apiculate, petiole 1.5–17 cm long. Tendrils simple or bifid. Flowers dioecious. Male flowers 1–9, opening one at a time, in pedunculate bracteate or ebracteate clusters, arising from the leaf axils or sometimes directly from the rootstock; peduncle 20–370 mm long; bract 3–30 mm long, elliptic to broadly rounded, closely subtending the flowers, rarely absent; pedicels 2–70 mm long, hypanthium broadly obconic, 3–8 mm long, dark-coloured; sepals ovate, obtuse or rounded, 5–9 mm long, dark-coloured, bearing a few small emergences on the back; petals pale yellow to almost white, darker toward the base, obovate, 1.7–3.5 cm long, 3 with dark markings at the base. Female flowers solitary; pedicel 1.5–13 cm long; ovary ovoid, beaked, densely shortly spiny, 10–25 mm long; hypanthium shallow, 2 mm long; sepals oblong-lanceolate to triangular, acute to obtuse, 2–11 mm long; petals like those of male flowers. Fruit ellipsoid, densely softly spiny, orange, 35–75 x 25–50 mm, dehiscent into 3 valves. Seeds sheathed in red pulp, oblong, 7–12 x 5–7.5 x 2–4.5 mm, faces sculptured. Fig. 65.14.

Forest and thicket margins, wooded grassland, grassland, also in disturbed and cultivated places; 530–3450 m. EW TU GD GJ WU SU WG IL KF SD HA; tropical Africa. *Burger* 575; *Friis* et al. 2483; *Mooney* 6727.

Richard in *Tent. Fl. Abyss.* comments that children suck the pulpy covering of the seeds because it is soft and sweet.

6. *M. balsamina* L. (1753)

– type: specimen from a plant grown at Uppsala, Sweden (LINN lecto.)

Annual climbing or trailing herb to 1.5 m. Leaf-blade broadly ovate to circular in outline, usually somewhat pubescent, 1–9 x 1.2–12 cm, base cordate, palmately 3–5-lobed to about the middle or beyond, lobes sharply sinuate-dentate or sinuate-lobulate with apiculate teeth; petiole 0.5–6 cm long. Tendrils simple. Flowers monoecious. Male flowers solitary; peduncle 17–35 mm long, apically bracteate; bract broadly ovate-cordate, apiculate, pallid with green veins and margins, 4–18 x 9–34 mm; pedicels 4–5 mm long; hypanthium broadly obconic, 2–3 mm long; sepals ovate-acuminate, acute, green, 5–7 mm long; petals pale yellow, broadly obovate, 10–15 mm long, 3 with darker yellow markings at the base. Female flower solitary; hypanthium shallow, about 0.5 mm long; sepals lanceolate, 2.5–5 mm long; petals obovate, 8–11 mm long; bract basal, like a much-reduced leaf; pedicel 4–15 mm long; ovary ovate, beaked, longitudinally ridged, 6.5–7 mm long. Fruit ovoid-ellipsoid, with undulate wings or rows of small tubercles or almost smooth, bright orange, 25–45 x 20–30 mm, dehiscent into 3 valves. Seed sheathed in bright red pulp, ovate-oblong, 9–11.5 x 5–6 x 2.5–3 mm, faces sculptured.

On banks and in dry beds of rivers in deciduous bushland, on sandy soils; 0–1200 m. EE EW HA; drier parts of tropical and southern Africa, tropical Asia and Australia. *Ash* 1123; *Tadesse Ebba* 733; *Schweinfurth & Riva* 440.

Fruits recorded as possibly edible on herbarium labels.

7. *M. charantia* L. (1753)

– type: specimen of a plant cultivated at Harte Kamp, Holland (BM lecto.).

Herbaceous climber to 2 m high; similar to *M. balsamina*, but with the leaf-lobes less sharply toothed, the male bract wholly green and remote from the flower, corolla of male flowers uniformly pale yellow, stamens a deeper yellow, the male pedicels 20–95 mm long, and the fruit often large and prominently tuberculate.

Riverine forest; 1000 m; IL/KF; native of the palaeotropics, widely adventive in the neotropics, often cultivated elsewhere as a vegetable. *Friis* et al. 4084.

8. *M. trifoliolata* Hook. f. (1871)

– type: Tanzania, Morogoro distr., Ngomero, *Grant* s.n. (K holo.).

Climbing or trailing perennial herb to 6 m; rootstock tuberos, subterranean. Leaves pedately (3–)9–15-foliolate; terminal leaflet of central group largest, glabrous, 1–4.2 (–9) x 0.8–4.2 (–6.4) cm; base oblong-circular, broadly cuneate, margin sinuate-denticulate, apex slightly apiculate, petiolule of central group of leaflets 1.2–4.5 (–5) cm long; petioles 0.4–1.7 cm long. Tendrils simple. Flowers dioecious. Male flowers solitary; peduncle 2–6.5 (–8) cm long, apically bracteate; bract circular, apiculate, (1.5–)10–16 x (2–)12–26 mm; pedicels 1–7 mm long; hypanthium broadly campanulate, 2–4 mm long; sepals triangular to

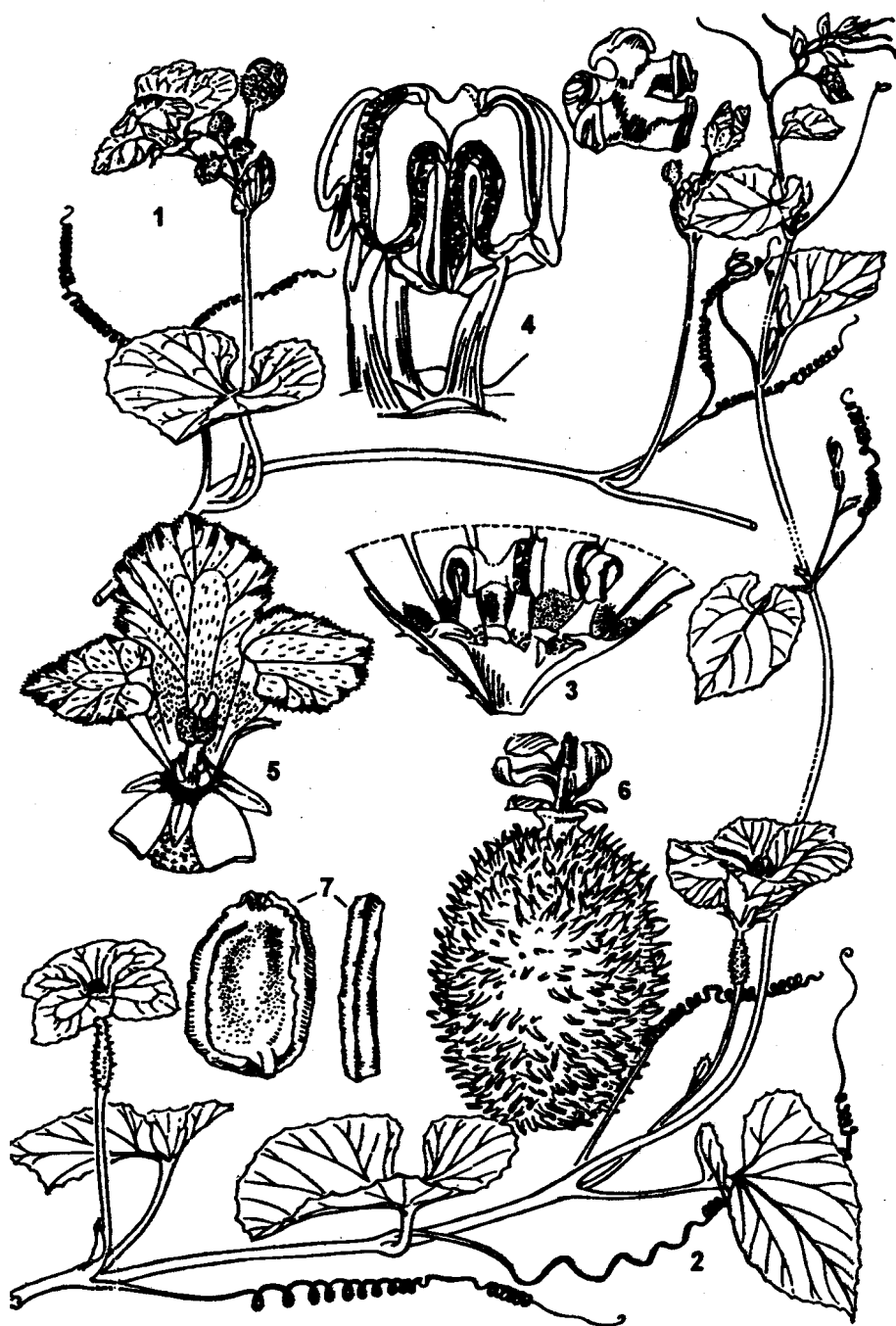


Figure 65.14

*MOMORDICA FOETIDA*: 1 - part of shoot from a male plant x 1/2; 2 - part of shoot from a female plant x 1/2; 3 - male flower, basal part, dissected out x 1 1/2; 4 - anthers, side view x 6; 5 - female flower partly dissected x 1; 6 - fruit x 1; 7 - seed, face and lateral views x 3. 1 from Wild 3900 & Swynnerton 94; 2 from Wild 3703 & Eyles 7951; 3-7 from Robson 248. Artist not known. (Reproduced with permission from *Fl. Zamb. Cucurbitaceae*: Tab. 101, 1978.)

broadly ovate, obtuse to rounded, black with pale margins, 3-7.5 mm long; petals yellow, obovate, rounded, 11-12 mm long, some with dark markings at the base. Female flowers solitary; pedicel 1.4-2.8 cm long, bracteate in lower half; ovary cylindrical, shortly beaked, 5-8 mm long; hypanthium very short; sepals ovate or triangular, 3-4 mm long; petals like those of male flowers. Fruit ovoid, somewhat acute, rounded or obscurely ribbed, bright red with paler spots, 40-63 x 28-35 mm; immature fruits green with raised white blotches; stalk 20-30 mm long. Seeds sheathed in white pulp, ovate-oblong, about 13 x 7 x 3.5 mm, faces sculptured.

River banks, river beds and other seasonally inundated places, in deciduous *Acacia* - *Commiphora* woodland and bushland; 250-300 m. SD HA; E tropical Africa south to

Mozambique and Madagascar. Ash 1926; *IECAMA* J3; Gilbert et al. 7615.

9. *M. rostrata* A. Zimm. (1922)

-type: Tanzania, Lushoto district., Buiko, Zimmerman s.n. (EA lecto.).

*Momordica microphylla* Chiov. (1929) -type: SD, Galla- Sidamo, Malca Guba, *Cufodontis* 72 (FI holo.).

Softly woody deciduous climber to 7 m; rootstock tuberous, partially above ground, dark green, tapered, furrowed, 15-20 cm across. Stems quickly woody, with pale bark. Leaves pedately (5-9)-(12)-foliolate; central leaflet elliptic to almost circular, 1.1-4.7 x 1-2.8 cm; base cuneate, margin sinuate-denticulate, lateral leaflets smaller; petiolule of central group of leaflets 0.6-3.1 cm long;

petiole 2.5–25 mm long. Tendrils simple. Flowers dioecious. Male flowers 1–14 in pedunculate bracteate subumbelliform clusters; peduncles 0.4–10 cm long, axillary or more or less crowded on contracted leafless stems; bract 1–3 mm long, pale green, immediately subtending the flowers; pedicels pubescent, 2–13 mm long; hypanthium broadly campanulate, brownish green, 2–2.5 mm long; sepals triangular, apiculate, green at the apex, 2–4 mm long; petals orange-yellow, oblong, rounded, 7–13 mm long, 3 with a dark basal marking. Female flowers solitary, subsessile; ovary narrowly ovoid, 12–14 mm long, slightly 8-ridged; sepals triangular-lanceolate, 1.5–2 mm long. Fruit ovoid, beaked, rounded or slightly 8-angled, 30–70 x 15–30 mm, bright red, flesh yellowish. Seeds sheathed in yellowish pulp, broadly ovate, about 14 x 10 x 2.5 mm, faces sculptured.

*Acacia* – *Commiphora* bushland; 1160 m. SD; NE Uganda, Kenya, N & C Tanzania. Gillett 14167, 14168.

10. *M. dissecta* Bak. (1895)

– types: Somalia, Golis range, Djedainio, *Edith Cole* s.n. (K syn.) and *Phillips* s.n. (K syn.).

Trailing perennial herb, much-branched from the base. Leaf-blade ovate or triangular in outline, 1.6–8 x 2.2–8.5 cm, deeply to very deeply ternately to biternately and pedately lobulate or 3–9-foliolate with sessile or subsessile leaflets, the central lobe or leaflet largest, lanceolate, angular-ovate or obdeltoid in outline, the lateral smaller, all deeply few-dentate or lobulate, sparsely setulose above and on veins beneath; petioles 0.2–0.5 cm long. Tendrils simple, weak. Flowers dioecious. Male flowers solitary; peduncle 1–5 cm long, apically bracteate; bract lanceolate and inconspicuous to large and almost circular and concealing the flower-bud, green, 1–16 x 1–20 mm; pedicel 4–9 mm long; hypanthium broadly campanulate, black, 2–2.5 mm long; sepals ovate-lanceolate or triangular-lanceolate, black with green apices, 5–6 mm long; petals obovate, bright yellow, 20–25 mm long, the 3 inner each with 2 dark basal markings. Female flowers, fruits and seeds unknown.

Open grassland with scattered trees on sandy or silty red soil; 450–650 m. HA; Somalia. *Ellis* 360A; *Simmons* S256; *Keller* 108.

11. *M. cymbalaria* Fenzl ex Hook. f. (1871)

– type: Sudan, Blue Nile Prov., *Kotschy* 147 (K lecto.).

*Kedrostis malvifolia* Chiov. (1932) – type: EW, Tessenei, *De Benedittis* 202 (FI, holo.)

*M. tuberosa* (Roxb.) Cogn. (1881) non Dennst. (1818) nom. illegit.

Trailing herb to 1 m. Rootstock a small subglobose tuber. Leaf-blade circular to reniform or pentagonal, glabrous or sparsely hairy, 0.7–4.5 x 1.2–6 cm, base cordate, margin sinuate-denticulate, palmately 5-angled or obscurely 5-lobed; petiole 0.5–5.5 cm long. Tendrils simple. Flowers monoecious. Male flowers solitary or few in pedunculate clusters; peduncle 1–20 mm long, apically minutely bracteate; pedicels 3–8 mm long; hypanthium obconic, green or black, 1.5–3 mm long; sepals lanceolate, green or black,

3–6 mm long; petals yellow, 7.5–12 mm long. Female flowers solitary; ovary fusiform, ribbed, 5–12 mm long; hypanthium very short; pedicel about 5 mm long; sepals linear, 2.5–3 mm long. Fruits fusiform, fleshy, longitudinally ribbed, 16–35 x 7–15 mm, few-seeded. Seeds subglobose, 6–7 x 4.5 x 3.5 mm, rugose-appendaged, obscurely sculptured.

Bushland and grassland; below 1000 m. AF EW; Sudan, Uganda, Kenya, N Tanzania, India. *Burger* 2919.

12. *M. boivinii* Baill. (1886);

*Raphanistocarpus boivinii* (Baill.) Cogn. (1895); *R. boivinii* (Baill.) Chiov. (1929) – type: Kenya, Mom-basa, *Boivin* s.n. (P holo.).

Trailing or climbing herb to 2 m; rootstock tuberous. Leaf-blade ovate, shortly hairy or asperulous, 1.4–7.5 x 0.8–6.7 cm, base cordate, margin more or less sinuate-dentate, unlobed or shortly palmately 3–5-lobed, lobes triangular, the central largest; petiole 0.4–5 cm long. Tendrils simple. Flowers monoecious. Male flowers 1–8 in pedunculate bracteate subumbelliform clusters; peduncle 1–10 cm long; bract linear or lanceolate, 3–5 mm long; pedicels 5–20 mm long; hypanthium broad, shallow, dark-coloured, 2–5 mm long, sepals lanceolate or narrowly ovate, dark-coloured, 6–17 mm long; petals orange-yellow or bright orange, some with dark markings at the base, obovate, 1.3–2.8 cm long. Female flowers solitary; peduncles slender, 1.7–6.4 cm long, apically bracteate; bract narrow, 4–7 mm long; pedicel slender, 4–7 mm long; ovary fusiform, ribbed, 4.5–12 mm long; hypanthium shortly cylindrical, 0.5 mm long; sepals narrowly lanceolate, green, 2–5 mm long; petals rather smaller than in male flowers. Fruit fusiform, ribbed or angled, 23–100 x 4–9 mm, green becoming yellow and irregularly splitting when ripe, 3–4-seeded; stalk 15–110 mm long. Seeds ellipsoid, with terminal verrucose appendages, 9–17 x 3–5 x 2–5 mm, obscurely sculptured. Fig. 65.15.1–3.

Deciduous *Acacia* – *Commiphora* bushland; 1190 m. SD; E tropical Africa south to Transvaal and Namibia. *Gillett* 14166.

13. *M. sessilifolia* Cogn. (1896)

– type: HA, Abdallah, *Keller* 104 (Z holo.; K iso.).

Climbing or decumbent softly woody shrub up to 50 m high; rootstock tuberous. Main stem up to 30 cm thick, rough-barked, branches slender, numerous, prostrate. Leaves simple, dull green, fleshy, subsessile; blade ovate or ovate-lanceolate, hastate, amplexicaul, entire or angled, 3.8–7.3 x 1–1.9 cm; petiole up to 2 mm long. Tendrils simple. Flowers monoecious. Male flowers solitary or paired; peduncle 20–37 mm long, apically bracteate; bract circular, sessile, amplexicaul, 3.5–8 x 9–13 mm; pedicels 9–23 mm long; hypanthium broadly campanulate, dark greenish-purple, 3–5 mm long; sepals ovate, acute, 5–12 mm long; petals orange-yellow, obovate-oblong, 8–11 mm long. Female flowers solitary; peduncle 8–26 mm long, apically bracteate; bract like that of male flower, rather larger, 6–15 x 15–30 mm; ovary subsessile, 6–10 mm long, slightly constricted about 1/3 of its length from the base;

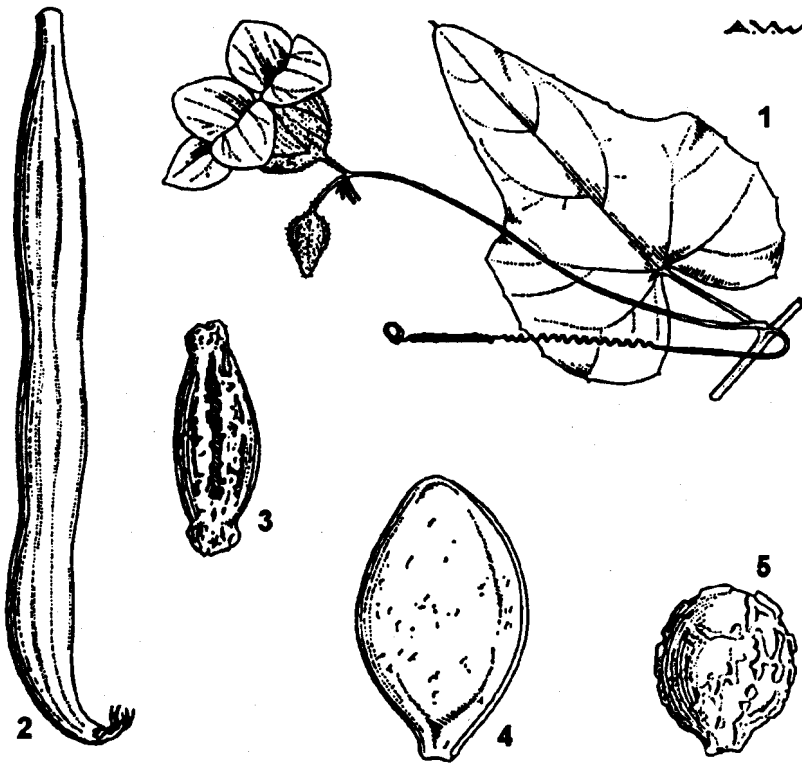


Figure 65.15

**MOMORDICA BOIVINII**: 1 - stem portion with leaf, inflorescence and tendril x 1; 2 - fruit x 2; 3 - seed x 3. **M. SPINOSA**: 4 - seed x 2. **M. FRIESIORUM**: 5 - seed x 3. 1 & 2 from Drummond & Hemsley 2998; 3 from Drummond & Hemsley 1259; 4 from Gillett 12736; 5 from Pierce 2686. Drawn by Anne Webster. (Modified and reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 3.)

hypanthium short, about 0.5 mm long; sepals lanceolate, acute, about 4 mm long; petals unknown. Fruit 17–22 x 1.5–3.5 mm, dry, slightly ribbed, slightly constricted about  $\frac{1}{3}$  of its length from the base, the upper part slender, deciduous, the lower part persistent, 1-seeded. Seed about 10 x 2 x 2 mm, smooth.

Semi-desert bushland, *Commiphora*–*Acacia* bushland and woodland; 400–1180 m. SD HA; Somalia, N. Kenya. Simmons S108; Gilbert 2142; Gilbert & Sebsebe 8723.

The rootstock is reported as being used as soap on some herbarium labels.

#### 14. TELFAIRIA Hook. (1827)

Large climbers. Leaves pedately 3–7-foliolate. Tendrils bifid. Flowers large, dioecious. Male flowers racemose; hypanthium short, broad; sepals 5, dentate; petals 5, free, fringed with filaments; stamens 5, all two-theous, or 3, 2 four-theous, 1 two-theous, inserted on the hypanthium, free; thecae straight. Female flowers solitary; perianth similar to that of male flowers; stigmas 3; ovary ribbed; ovules numerous, horizontal. Fruit very large, fleshy, ribbed, many-seeded, tardily dehiscent into 10 longitudinal valves. Seeds large, broadly ovate to circular in outline, compressed, enveloped in a fibrous endocarpic sheath.

A genus with 3 species in tropical Africa; 1 species introduced for possible cultivation in the Flora area.

#### **T. pedata** (Sm. ex Sims) Hook. (1827)

–type: specimen of a cultivated plant from seed sent by Telfair from Mauritius (K holo.).

Plant climbing to 30 m. Leaves 5–7-foliolate; central leaflet 5.5–14 x 2–7.5 cm, elliptic, pinnately veined; petiole 0.5–5 cm long. Male flower: hypanthium campanulate, about 5 mm long; sepals ovate to lanceolate, 12–18 mm long; petals 2–3.5 cm long, purplish. Female flowers on 6.5–14 cm long pedicels; rather larger than the male. Fruit ellipsoid, with expanded base, obtusely 10-ribbed, green, 30–90 x 15–25 cm. Seeds 33–35 x 32–40 x 10–13 mm; endocarpic sheath persistent, reticulate. Fig. 65.16.

This species has been grown experimentally at Jimma Agricultural Research Centre, Melko, (KF) and could be met with in cultivation elsewhere in the southwest. It is a native of East Tropical Africa cultivated for its edible oily seeds called OYSTER NUT.

#### 15. PEPONIUM Engl. (1895)

Climbing or trailing perennial herbs. Leaves simple. Tendrils bifid. Flowers dioecious, rather large. Male flowers usually racemose, conspicuously bracteate; bracts more or less hooded, glandular; hypanthium cylindrical; sepals 5, lanceolate, narrow, entire; petals 5, white to pale yellow, free or almost so, entire; stamens 3, all two-theous, inserted on the hypanthium below the middle; filaments free; anthers connate; connective narrow; thecae with 3 folds. Female flowers solitary; ovary smooth, hairy; ovules nu-



Figure 65.16 *TELFAIRIA PEDATA*: 1 – flowering stem portion with male inflorescence  $\times \frac{1}{2}$ ; 2 – female flower  $\times \frac{1}{2}$ ; 3 – stamens from male flower  $\times 3$ ; 4 – fruit  $\times \frac{1}{4}$ ; 5 – fruit in longitudinal section  $\times \frac{1}{4}$ ; 6 – seed with endocarpic fibrous sheath  $\times 1$ . 1 from *Greenway* 5922; 2 from a drawing by *Bojer*; 3 from *Greenway* 5079; 4 & 5 from a photograph by *Bally*; 6 from seed in *Kew* collection, sent by *Crump*. Drawn by *Anne Webster*. (Modified and reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 1.)

merous, horizontal; hypanthium and perianth like those of male flowers. Fruit ellipsoid, rounded, fleshy, red when ripe, many-seeded. Seeds elliptic in outline, compressed, black.

About 20 species in tropical and southern Africa, Madagascar, Aldabra and Seychelles; 2 species in the Flora area.

1. Hypanthium of male flowers 19–26 mm long; sepals 8–11 mm long; leaf-lobes triangular, stalk of fruit 30–55 mm long. 1. *P. vogelii*  
 – Hypanthium of male flowers 10–13 mm long; sepals 4–5 mm long; leaf-lobes broadly ovate or rounded; stalk of fruit up to 10 mm long. 2. *P. cienkowskii*

1. *P. vogelii* (*Hook.f.*) *Engl.* (1897);

*Peponia vogelii* *Hook.f.* (1871) – types: Bioko (Fernando Po), *Vogel* 8 (K syn.) and Nigeria, *Barter* 20169 (K syn.).

Climbing or trailing herb to 12 m. Stems more or less crispate-pubescent. Leaf-blade broadly ovate, hispid becoming scabrid above, pubescent on veins beneath, (5–) 11–16(–18)  $\times$  (7–) 12–19(–19) cm, base cordate, margin conspicuously sinuate-dentate, palmately 5-lobed, lobes ovate-triangular or triangular, petiole 2–13 cm long, pubescent. Flowers sweet-scented, opening at night. Male flowers mostly racemose, racemes 80–360 mm long; peduncle 30–210 mm long; bracts obovate, pale green, hooded, 8–35 mm long; pedicels 3–25 mm long; hypanthium cylindrical, yellowish-green, (15–) 19–26(–32) mm long; sepals linear-

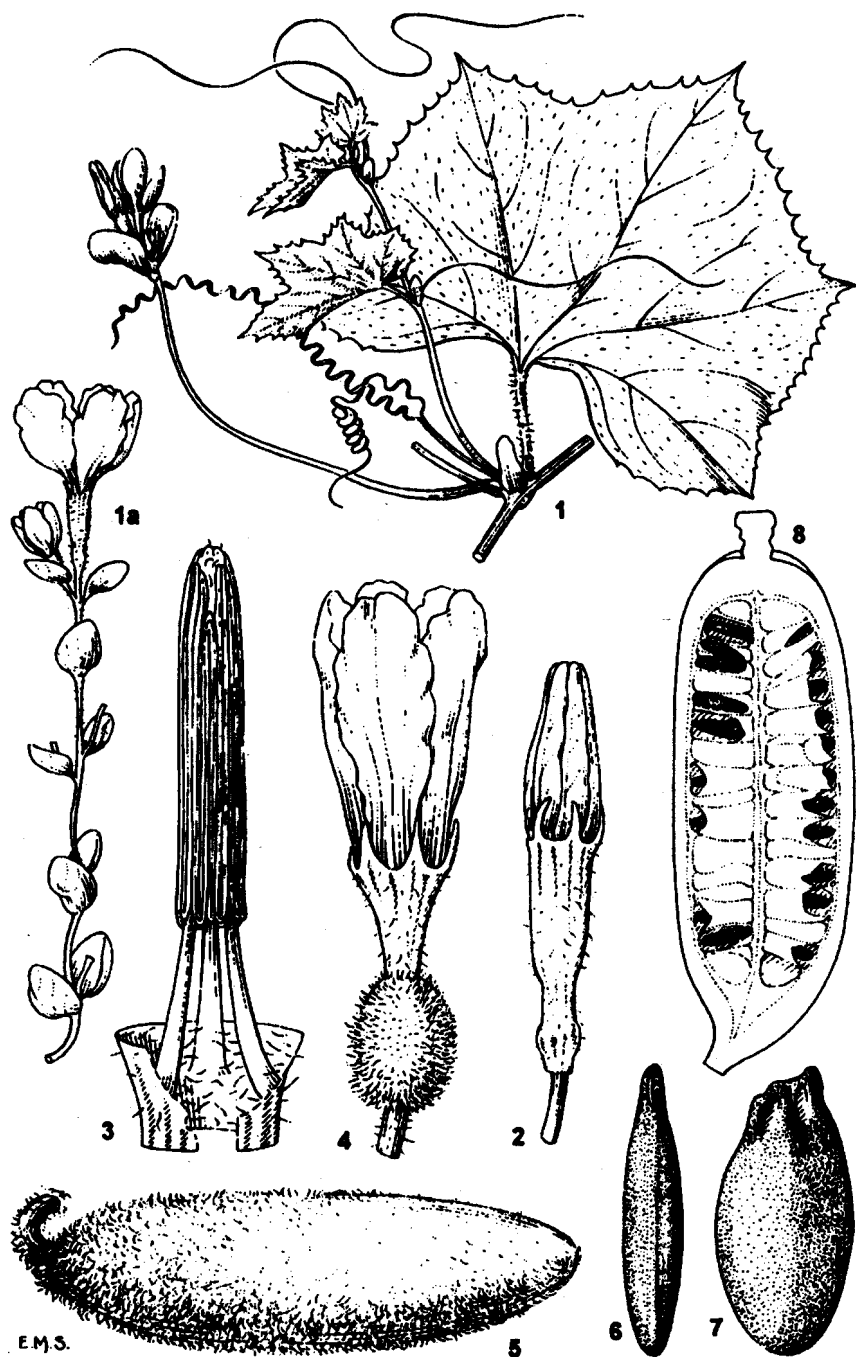


Figure 65.17 *PEPONIUM VOGELII*: 1 - stem portion with leaf, vegetative shoot, inflorescence and tendril  $\times \frac{1}{2}$ ; 1a - male inflorescence  $\times \frac{1}{2}$ ; 2 male flower  $\times 1$ ; 3 - staminal column  $\times 4$ ; 4 - female flower  $\times 1$ ; 5 - fruit  $\times \frac{1}{2}$ ; 6 & 7 - seed, side and face views  $\times 4$ . *P. CIENKOWSKII*: 8 - fruit in longitudinal section  $\times 1$ . 1 from Drummond & Hemsley 3440; 1a from Braun 688; 2-4 from Drummond & Hemsley 1100; 5 from Drummond & Hemsley 1343; 6 & 7 from Verdcourt 2259; 8 from Chancellor 240. Drawn by Margaret Stoner. (Reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 11.)

lanceolate, (6-)8-11(-13) mm long. Female flowers solitary; pedicel 1-5.5 cm long; ovary ellipsoid densely villos, 15-26 mm long; hypanthium obconic-cylindrical, 11-16(-22) mm long. Fruit ellipsoid, (40-)60-110(-140)  $\times$  30-45(-50) mm, glabrescent; stalk 20-70 mm long. Seeds (6-) 8.5-10  $\times$  (3-)4.5-5  $\times$  1-1.5 mm. Fig. 65.17.1-7.

Margins of montane forests; 1500-2100 m. SU IL KF SD BA; tropical Africa west to Ghana and south to Malawi. *Perdue* 6405; *Tadesse Ebba* 589; *Friis et al.* 1838.

Fruits reported to be edible and good for stomach-ache from herbarium labels.

2. *P. cienkowskii* (Schweinf.) Engl. (1897);

*Adenopus cienkowskii* Schweinf. (1868) - type: Ethiopia/Sudan border area, *Cienkowski* 131 (LE, holo.).

Trailing or climbing perennial herb. Stems more or less crispate-pubescent. Leaf-blade reniform in outline, hispid becoming scabrid above, hispid on veins beneath, 6-9  $\times$  8-12 cm, base cordate, margin sinuate-dentate, unlobed or palmately 3-5-lobed, lobes broadly ovate; petiole 1.5-5.5 cm long. Male flowers mostly racemose, racemes 70-120 mm long; peduncles 30-60 mm long; bracts obovate-spathulate, hooded, 3-9 mm long; pedicels 5-10 mm long; hypanthium obconic-cylindrical, 10-13 mm long; sepals linear, 4-5 mm long; petals pale greenishyel-



low, obovate, 2–2.3 cm long. Female flowers solitary, subsessile; ovary shortly hairy, 14 x 2 mm. Fruit ellipsoid, orange when ripe, shortly and sparsely hairy, 65–85 x 23–35 mm. Seeds lenticular, 7.5 x 4 x 2 mm. Fig. 65.17.8.

Exposed rocky outcrops; 1000–1200 m. WG; S Sudan, N Uganda. *Cienkowski* 131.

#### 16. CEPHALOPENTANDRA *Chiov.* (1929)

Climbing herbs with tuberous rootstocks. Leaves simple. Tendrils simple. Flowers dioecious, medium-sized. Male flowers solitary or paired; hypanthium cylindrical below, expanded at the apex; sepals 5, small; petals 5, united below; stamens 3, all two-thecous, inserted on the lower part of the hypanthium, free; connectives rather narrow; thecae with 3 folds. Female flowers solitary; ovary smooth, hairy; ovules many, horizontal; hypanthium cylindrical; perianth like that of male flowers. Fruit fleshy, smooth. Seeds pear-shaped in outline, compressed, rough.

A monotypic genus.

*C. ecirrhosa* (*Cogn.*) *C. Jeffrey* (1962);

*Coccinia ecirrhosa* *Cogn.* (1896) – type: HA, Abdallah, 1891, *Keller* 116 (Z hol.).

*C. quercifolia* *Hutch. & Bruce* (1941) – type: Ethiopia/Somalia border, 6 Oct. 1932, *Gillett* 4194 (K hol.).

*C. obbiadensis* (*Chiov.*) *Cufod.* (1965) – type: Somalia, *Stefanini & Puccioni* 458 (FT hol.).

Trailing or climbing herb to 1 m; rootstock tuberous, subterranean or partly exposed and hemispherical, with pallid papery bark. Leaves mostly subsessile, amplexicaul; blade elliptic in outline, glabrous, dull green, 3–11 x 4–7(–12) cm, base emarginate-cordate, shallowly to deeply broadly to finely pinnately or palmate-pinnately (3–)5–7-lobed; petioles 2–15 mm long, rarely longer in lowermost leaves. Male flowers solitary or paired; pedicels 17–25 mm long; hypanthium 7–10 mm long; sepals triangular-lanceolate, 2–3 mm long; petals pale or greenish yellow, 12–28 mm long, united in lower quarter. Female flowers solitary; pedicel 5–20 mm long; ovary ellipsoid, 10–19 mm long; hypanthium cylindrical, 5–7 mm long. Fruit ellipsoid, green with paler stripes or markings, red when ripe, glabrescent, about 80 x 40 mm; stalk 7–25 mm long. Seeds about 6 x 5 x 2 mm, black, rough with small warts.

Deciduous *Acacia* – *Commiphora* woodland and bushland; 400–1500 m. SD HA; Somalia, N Kenya, NE Uganda. *Thulin* et al. 3588; *Friis* et al. 3165, 995.

#### 17. CITRULLUS *Schrad. ex Eckl. & Zeyh.* (1836) *nom. cons.*

Trailing or climbing annual or perennial herbs. Leaves simple, usually deeply lobed. Tendrils simple or 2–4-fid or absent. Flowers monoecious. Male flowers solitary; hypanthium shortly obconic; sepals 5, small, distant from one another; petals 5, yellow, shortly united; stamens 3, 2 two-thecous, 1 one-thecous, inserted on the lower part of the hypanthium, free; connective broad; thecae forming a zigzag pattern. Female flowers solitary; ovary smooth, hairy; ovules many, horizontal; hypanthium very shortly

cylindrical; perianth like that of male flowers; stigmas 3. Fruit subglobose to ellipsoid, firm-walled, fleshy, indehiscent, green or yellowish, often mottled, many-seeded. Seeds compressed.

A genus with 3 species in the tropics and subtropics of the Old World; 2 species in the Flora area.

1. Plant perennial; tendrils simple. 1. *C. colocynthis*  
– Plant annual; tendrils usually bifid. 2. *C. lanatus*

1. *C. colocynthis* (*L.*) *Schrad.* (1838)

– type: specimen from a plant grown at Uppsala, Sweden (LINN lecto.).

Trailing perennial herb to 3 m or more; rootstock tuberous. Leaf-blade elongate-ovate in outline, stiff, scabrid, 2.5–11 x 2.5–6.5 cm, palmately deeply 3–5-lobed, the lobes deeply pinnately lobulate; petiole 1–7 cm long, retrorsely hispid or scabrid. Tendrils usually simple. Male flowers solitary; pedicel 8–20 mm long; hypanthium broadly obconic, 1.5–2.5 mm long; sepals lanceolate, 2–4 mm long; petals greenish-yellow, obovate, 8–15 mm long. Female flowers solitary; pedicel 10–45 mm long; ovary subglobose; hypanthium very short. Fruit subglobose, smooth, green longitudinally mottled with darker green, ripening yellow, 5–12 cm in diameter, flesh white, very bitter, stalk up to 5.5 cm long. Seeds ovate in outline, dark brown, smooth, 6–10 x 3.5–5 x 2–2.5 mm. Fig. 65.18.6 & 7.

Semi-desert bushland and grassland; 0–1500 m. EE AF TU HA; semi-desert areas of northern Africa, tropical Asia and Australia. *De Wilde* 4714; *Gilbert* 2544; *Bally* 6957.

2. *C. lanatus* (*Thunb.*) *Matsum. & Nakai* (1916);

*Momordica lanata* *Thunb.* (1800) – type: South Africa, Cape Province, *Thunberg* s.n. (UPS hol.).

*Citrullus vulgaris* *Schrad. ex Eckl. & Zeyh.* (1836);  
*A. Rich.* (1847).

Annual usually trailing herb. Leaf-blade ovate or narrowly ovate in outline, rather villous especially on veins beneath, scabrid-punctate when old, 5–20 x 3.5–19 cm, usually deeply palmately 3–5-lobed, the lobes usually deeply pinnately lobulate; petioles 2–18.5 cm long, more or less villous. Tendrils usually bifid. Male flowers solitary; pedicel 14–45 mm long; hypanthium broadly obconic, 2.5–5 mm long; sepals lanceolate, 2.5–5.5 mm long; petals yellow, obovate, 7–19 mm long. Female flowers solitary; pedicel 3–45 mm long; ovary ellipsoid to subglobose, villous, 6–15 mm long; hypanthium 1.5–2 mm long. Fruit subglobose to ellipsoid, green or yellowish, often mottled or striped, up to 60 x 30 cm; flesh white or red, watery, usually not bitter; stalk 2–5 cm long. Seeds ovate in outline, variously coloured, sometimes mottled, smooth or slightly rough, 9–11 x 5–6 x 2.5–2.7 mm. Fig. 65.18.1–5.

By rivers and in cultivated places, on sandy soils; 0–550(–1000) m. EE IL HA also cultivated in many places; native of the Kalahari region, widely cultivated for its edible fruits and often naturalized. *Taddesse Ebba* 819; *Mesfin Tadesse* 5947; *Ryding & Sileshi* 1984.

This is the cultivated water melon now grown on a commercial scale on farms in the rift valley.

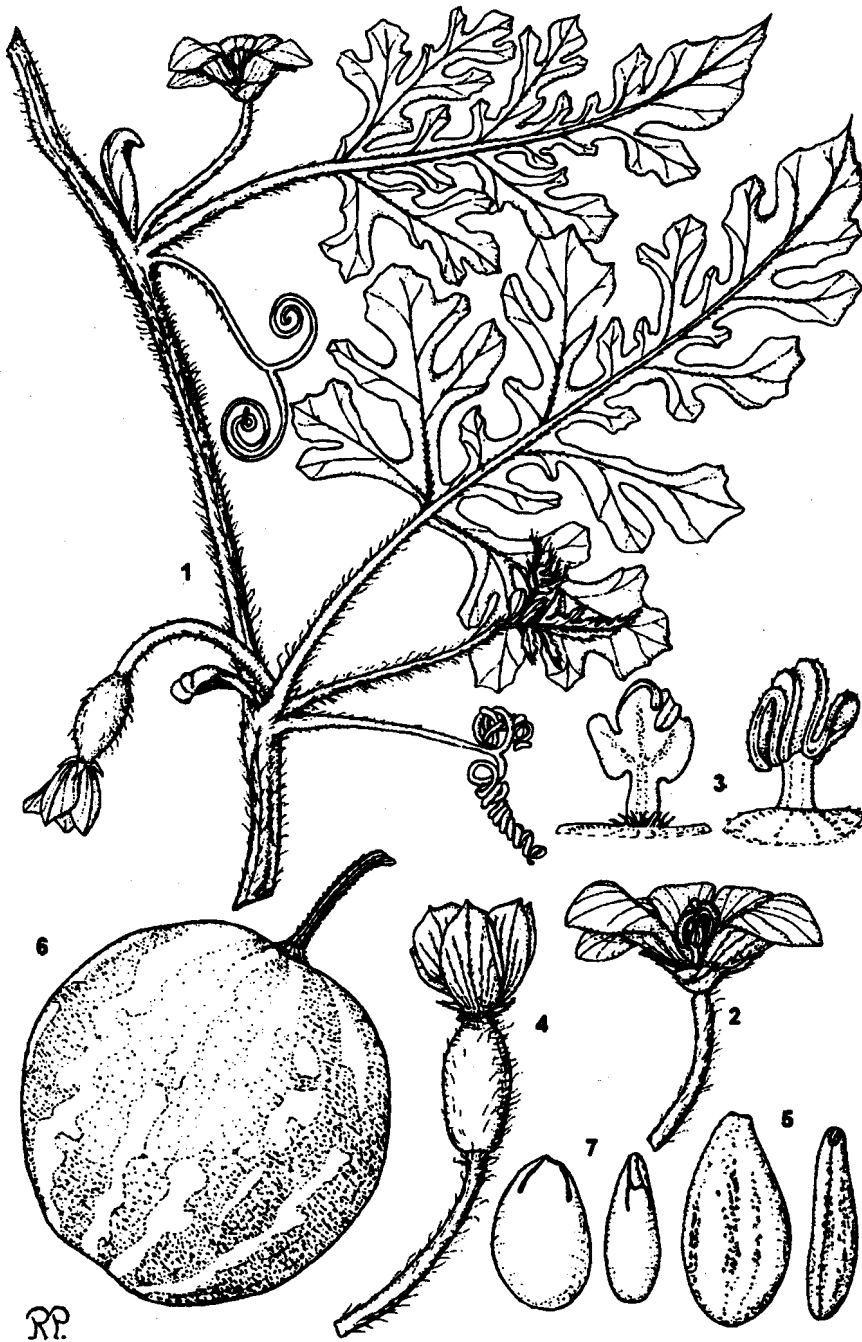


Figure 65.18

**CITRULLUS LANATUS:** 1 – stem with flowers, leaves and tendrils  $\times \frac{2}{3}$ ; 2 – male flower  $\times 1\frac{1}{2}$ ; 3 – stamen back and front views  $\times 3\frac{1}{2}$ ; 4 – female flower  $\times 1\frac{1}{2}$ ; 5 – seed, face and side view  $\times 3\frac{1}{2}$ . **C. COLOCYNTHIS:** 6 – fruit  $\times 1$ ; 7 – seed, face and side view  $\times 3\frac{1}{2}$ . 1–4 from Polhill & Paulo 1298; 5 from Verdcourt 2340A; 6 from Hepper 3021; 7 from Chipp 90. Drawn by Roger Polhill. (Reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 5.)

### 18. LAGENARIA Ser. (1825)

Vigorous climbing or trailing perennial or annual herbs. Leaves simple, the petiole with 2 lateral glands at the apex. Tendrils 2-fid. Flowers monoecious or dioecious, opening in the evenings. Male flowers solitary or racemose; hypanthium obconic to cylindrical; sepals 5, narrow, widely separated from one another, usually glandular; petals 5, free or almost so; stamens 3, 2 two-theous, 1 one-theous, free, inserted on the lower part of the hypanthium; connective broad; thecae forming a zigzag pattern. Female flowers solitary; ovary rounded; ovules numerous, horizontal; hypanthium very short; perianth like that of male flowers; stigmas 3. Fruit hard-shelled, fleshy, indehiscent, many-seeded. Seeds oblong or ovate in outline, compressed, the faces with two flat ridges or a raised disc.

A genus with 6 species in tropical Africa and Madagascar, 1 extending throughout the tropics; 2 in the Flora area.

1. Hypanthium of male flowers 23–36 mm long; leaf-lobes prominent, often narrowed towards the base; leaves tomentose beneath; flowers dioecious; plant perennial. 1. *L. abyssinica*
- Hypanthium of male flowers 11–16 mm long; leaf-lobes shallow, broadest at the base; leaves puberulous or pubescent beneath; flowers monoecious; plant annual. 2. *L. siceraria*

1. *L. abyssinica* (Hook.f.) C. Jeffrey (1962);  
*Adenopus abyssinicus* Hook.f. (1871) – type: GD (Begemdir), Rep valley, Schimper 11950 (K holo.).

Vigorous climbing or trailing perennial herb to 7 m. Leaf-

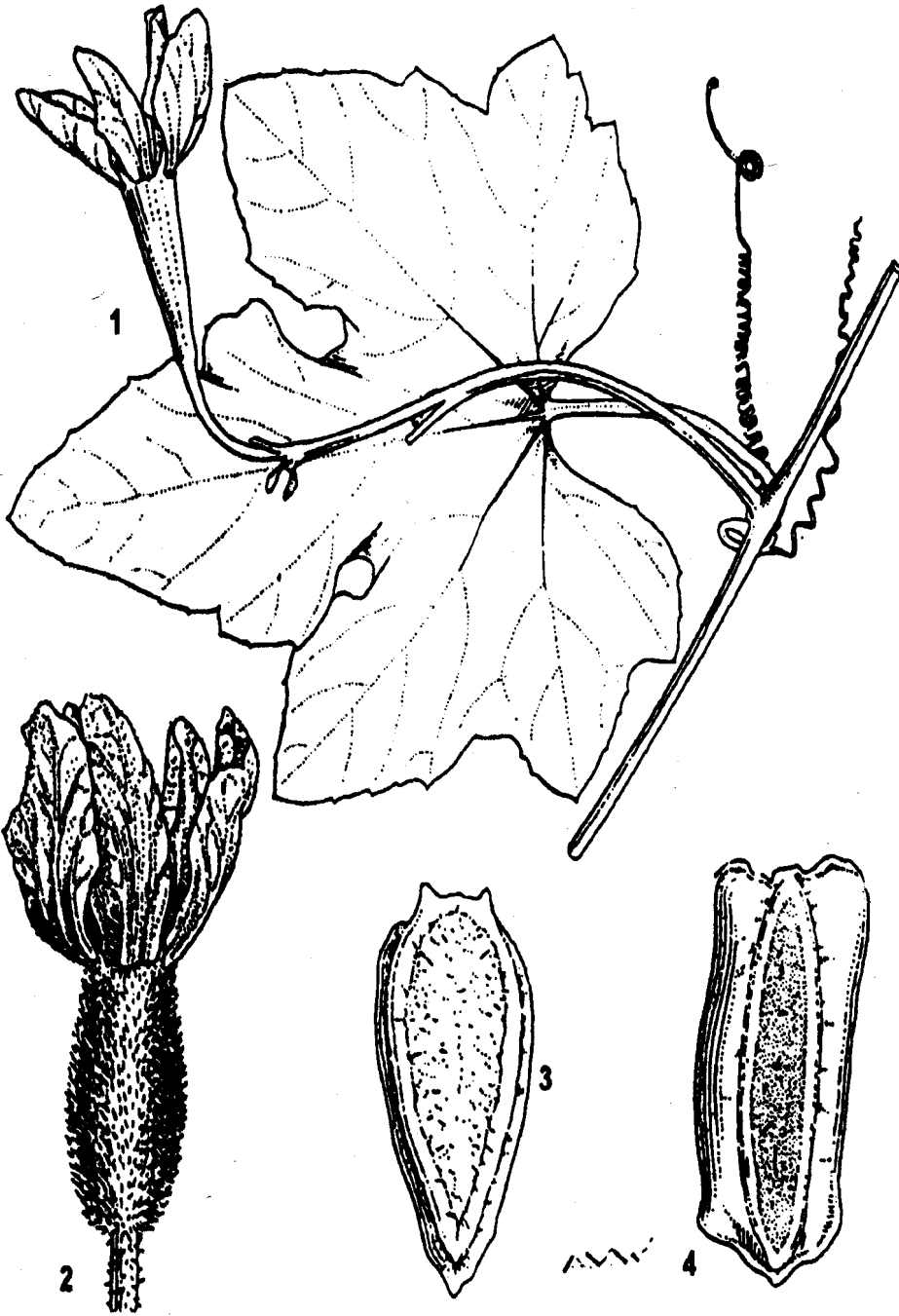


Figure 65.19

**LAGENARIA ABYSSINICA:** 1 – stem portion with leaf, flower and tendril  $\times \frac{2}{3}$ ; 2 – female flower  $\times 3$ ; 3 – seed  $\times 3$ . **L. SICERARIA:** 4 – seed  $\times 3$ . 1 from Drummond & Hemsley 1491; 2 from Norman 201; 3 from C.G. Rogers 505; 4 from Raymond H48/45. Drawn by Anne Webster. (Reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 6.)

blade ovate or broadly ovate, scabrid above, pallid-tomentose beneath, 4–17 x 5–17 cm, base weakly cordate, margin sinuate-dentate, usually palmately 5-lobed, lobes usually ovate to triangular, petiole 1.8–15 cm long, obscurely biglandular at the apex. Flowers dioecious, sweetly scented. Male flowers solitary or in 2–5-flowered racemes; peduncles 55–400 mm long; pedicels 6–55 mm long; hypanthium funnel-shaped or cylindrical, 23–36 mm long; sepals triangular-subulate, rather fleshy, 1.5–12 mm long, sometimes toothed; petals white or cream with green veins, obovate, rounded, 23–45 mm long. Female flowers solitary; pedicels 35–80 mm long; ovary ellipsoid, densely hairy, 15–30 mm long; hypanthium 5-angled, flared, 1–3 mm long. Fruit oblong-ellipsoid to subglobose, 7–23 x 4.5–18 cm, green with light green or yellow flecks; stalk 6–12 cm long. Seeds

ovate in outline, somewhat compressed, pale buff, 13–17 x 6–9 x 2.5–6 mm, the faces margined. Fig. 65.19.1–3.

Forest and scrub; 1600–2750 m. GD GJ SU AR KF GG SD; east tropical Africa south to S Tanzania. *Perdue* 6445, *Friis* et al. 494.

2. *L. siceraria* (Molina) Standl. (1930);

*Cucurbita siceraria* Molina (1782) – type: Chile, Molina s.n. (not located).

*Lagenaria vulgaris* Ser. (1825); *L. leucantha* Rusby (1896) nom. illegit.

*L. idolatrica* Ser. ex Hochst., nom. nud. based on Schimper III:1571.

Vigorous prostrate or climbing annual herb to 4.5 m. Leaf-blade broadly ovate or reniform, softly shortly pubescent

or puberulous, 3–40 x 4.5–40 cm, base cordate, unlobed or incipiently palmately 5–7-lobed, lobes rounded; petiole 2–30 cm long, obscurely 2-glandular at the apex. Flowers monoecious, sweet-scented. Male flowers solitary; pedicel 7–31 cm long; hypanthium obconic-cylindrical, 11–16 mm long; sepals triangular-lanceolate or lanceolate, 2.5–11 mm long; petals white with green veins, obovate, 2.5–4.7 cm long. Female flowers solitary; pedicel 2–10 cm long; ovary ellipsoid to cylindrical, villous, 1–3.5 cm long; hypanthium 1.5–2.5 mm long. Fruit subglobose to cylindrical, commonly bottle-shaped or swollen at both ends, 7–100 x 10–20 cm, green, one colour or mottled, yellow-brown when dry. Seeds oblong in outline, 7–20 mm long, variable, smooth or with longitudinal facial ridges. Fig. 65.19.4.

Bushland and grassland, also in cultivated places; 300–2300(–2800) m. GD GJ TU SU AR IL KF GG BA HA; widely cultivated and probably found in all regions; pan-tropical. *Friis & Lawesson* 5376; *Taddesse Ebba* 818; *Ash* 881.

This is the widely cultivated gourd. In the Flora area, young fruits are sometimes eaten, mature fruits are widely used as containers, particularly for milk, and are often beautifully decorated. The leaves are boiled and the steam inhaled by patients suffering from malarial fever.

#### 19. EUREIANDRA *Hook.f.* (1867)

Herbaceous or softly woody perennial climbers with tuberous rootstock. Leaves simple. Flowers dioecious. Male flowers solitary or few to many in sessile or pedunculate clusters, often appearing before the leaves, the young flowering branches then often looking like racemes; hypanthium obconic-cylindrical in lower part, usually expanded at the apex; sepals 5, ovate or lanceolate; petals 5, free, white or yellow; stamens 5, in two pairs with 1 single, all one-theous, or the paired stamens more or less united, free, inserted on the middle of the hypanthium; connective broad; thecae forming a zigzag pattern. Female flowers solitary; ovary smooth; ovules numerous, horizontal; hypanthium shorter than in male flowers; perianth similar; stigmas 3. Fruit ellipsoid, beaked, rounded, fleshy, orange-red, indehiscent, many-seeded. Seeds inflated, smooth or covered in fibres.

Genus with 8 species in tropical Africa and Socotra; 3 species, one imperfectly known, in the Flora area.

1. Stems glabrous except at the nodes; hypanthium villous with rather sparse long white hairs.
  2. *E. sp.* = *De Wilde* 6662
  - Stems finely densely crispate-pubescent; hypanthium shortly and densely pubescent. 2
2. Hypanthium of male flowers obconic in lower part, broadly expanded at the apex, 10–11 mm long.
  1. *E. somalensis*
  - Hypanthium of male flowers turbinate-cylindrical, 13–26 mm long. 3. *E. cogniauxii*

1. *E. somalensis* (*Chiov.*) *C. Jeffrey* (1962); *Momordica somalensis* *Chiov.* (1929) – type: Somalia, *Stefanini & Paoli* 166 (FT, holo.).

Slender deciduous climbing or trailing shrub. Stems at first herbaceous, shortly crispate-pubescent, becoming softly woody with pale corky bark. Leaf-blade 1.5–4.5 x 1.5–4 cm palmately 5-lobed, densely tomentose when young, when mature scabrid above and densely tomentose beneath. Flowers appearing before or just with the young leaves. Male flowers in small clusters; pedicels 4–12 mm long; hypanthium obconic-cylindrical in lower part, broadly expanded at the apex, 10–11 mm long, densely pubescent; sepals ovate, 3–3.5 mm long; petals yellow, obovate, 12–17 mm long. Female flowers unknown. Fruit pear-shaped, pale green with ten dark green obtuse longitudinal ridges, about 18 x 9 cm. Seeds elliptic in outline, about 25 x 18–19 x 10 mm, smooth, margined, straw-coloured.

Open deciduous *Acacia* – *Commiphora* bushland; 750–1240 m. SD HA; Somalia. *Simmons* S.7; *Ellis* 117; *Gilbert & Jones* 106.

#### 2. *E. sp.* = *De Wilde* 6662

Climbing or trailing herb to 2–3 m. Rootstock tuberous, rounded, about 22 cm high and wide. Stems dull green, subglabrous except at the nodes. Leaves unknown. Flowers appearing before the leaves. Male flowers solitary or paired; pedicels 6–7 mm long; hypanthium cylindrical, slightly expanded above the middle, thinly villous, 18–20 mm long; sepals lanceolate, 5.5 mm long; petals yellow, obovate, about 20 mm long. Female flowers, fruits and seeds unknown.

Deciduous *Acacia* – *Commiphora* bushland, 1150 m. SD; only the one specimen collected.

#### 3. *E. cogniauxii* (*Gilg*) *C. Jeffrey* (1962);

*Peponia cogniauxii* *Gilg* (1904) – type: AR, *Webi Mara*, *Ellenbeck* 1988 (B holo. destroyed, BR iso.).

Climbing softly woody shrub to 12 m. Rootstock massive, tuberous, woody. Stems at first herbaceous, shortly crispate-pubescent, becoming softly woody with pale ridged corky bark. Leaf blade ovate or reniform in outline, minutely scabrid above, more or less tomentose beneath, 7–8 x 8.5–11 cm, base cordate, palmately rather deeply 5-lobed, lobes elliptic, lobulate. Flowers mostly appearing before the leaves. Male flowers solitary; pedicel 12–30 mm long; hypanthium obconical-cylindrical, finely pubescent, 13–26 mm long; sepals ovate, 4.5–9 mm long; petals yellow, 12–20 mm long. Female flowers solitary; pedicels 15–22 mm long; hypanthium 6–10 mm long; ovary ellipsoid; sepals narrowly oblong-lanceolate, acute, 4–6 mm long; petals as in male flowers. Fruit ellipsoid, yellow-green becoming dull orange with 10 darker longitudinal bands, 6.6–9 x 2.8–4.5 cm, glabrescent. Seeds asymmetrically ovate in outline, 11–14 x 8–9 x 4–4.5 mm, covered in fibres, with a golden-brown lustre.

*Acacia* – *Commiphora* woodland and bushland; 500–1250 m. SD BA; Somalia, N Kenya. *Ash* 1922; *Vollesen* 86/16; *Gilbert & Jones* 142.

20. *COCCINIA* *Wight & Arn.* (1834)

Perennial climbing or trailing herbs or softly woody climbers with tuberous rootstock. Leaves simple. Tendrils simple or 2-fid. Flowers dioecious. Male flowers solitary or clustered; hypanthium obconic to campanulate; sepals 5, entire, usually small and widely spaced; petals 5, united in the lower half; stamens usually 3, usually all two-theous, inserted on the hypanthium; filaments coherent or connate into a central column; anthers coherent or connate into a globose head; connectives broad; thecae forming a zigzag pattern. Female flowers solitary; ovary smooth; ovules numerous, horizontal; hypanthium shortly cylindrical; perianth like that of male flower; stigmas 3. Fruit globose to cylindrical, rounded or slightly angled, thin-walled, fleshy, bright red when ripe, many-seeded. Seeds ovate or elliptic in outline, more or less compressed, often covered in fibres.

A genus with about 30 species in the palaeotropics, all but 1 confined to Africa; 8 species in the Flora area.

1. Tendrils, or at least some of them, bifid; sepals of male flowers ovate, 11–25 mm long; corolla 40–60 mm long; fruit 10-ribbed. 1. *C. schliebenii*
  - Tendrils all simple; sepals of male flowers narrowly oblong or triangular-lanceolate, 1–6.5 mm long; corolla 6–35 mm long; fruit more or less circular in cross section. 2
2. Leaves palmately lobed to the base into entire, linear segments 1–4 mm broad. 3. *C. sp.* = *Bally* 12989
  - Leaves not so deeply lobed, lobes broader, usually more or less dentate. 3
3. Hairs on inside of hypanthium around bases of filaments (in male flowers) and staminodes (in female flowers) eglandular, with tapering apices; seeds with convex disc and thin edges. 2. *C. adoensis*
  - Hairs on inside of hypanthium around bases of filaments (in male flowers) and staminodes (in female flowers) glandular, with slightly enlarged apices; seeds with flat or depressed disc and rather thick edges. 4
4. Fruit globose, up to 2.5 cm in diameter; male pedicels 1.5–5 mm long; female pedicels 1.5–3 mm long. 7. *C. sp.* = *Gilbert & Jones* 129
  - Fruit ellipsoid or if globose then 3 cm or more in diameter; male pedicels 5–20 mm long; female pedicels 4–25 mm long. 5
5. Plant more or less glabrous except at the nodes; ripe fruit more or less uniformly red. 8. *C. grandis*
  - Plant villous, pubescent or setulose; ripe fruit with paler longitudinal lines or spots or blotches. 6
6. Male flowers in pedunculate clusters, peduncles 0.5–16 cm long; seeds over 3.5 mm broad. 4. *C. abyssinica*
  - Male flowers solitary or in sessile or subsessile clusters, peduncles not more than 0.5 cm long; seeds up to 3 mm broad. 7
7. Fruit longitudinally mottled with pale green or white patches; stems becoming softly woody. 5. *C. sp.* = *Burger* 2947A
  - Fruit longitudinally striped with pale green or white; stems herbaceous. 6. *C. megarrhiza*

1. *C. schliebenii* *Harms* (1932)

– type: Tanzania, Ulanga distr. near Mahenge, *Schlieben* 1620 (B hol., BM iso.).

Robust climbing herb to 15 m. Leaf-blade broadly ovate, scabrid-punctate above, densely asperulous on veins beneath, 8–24 x 8–28 cm, base cordate, margin sinuate-dentate, palmately 5-lobed, lobes usually broadly triangular; petioles 3.5–12 cm long, pubescent. Tendrils bifid or simple. Male flowers solitary or 4–5 in pedunculate clusters; peduncles 2–7 cm long; pedicels up to 20 mm long, usually with short bracts; bracts small, rounded; hypanthium broad and shallow, 2–5 mm long; sepals ovate, acuminate, pale brownish-green, 11–25 mm long; corolla orange-yellow with green veins, urceolate, the petals 40–60 mm long, united to the middle or above. Female flowers solitary; pedicel 5–35 mm long; ovary cylindrical, ribbed, 13–24 mm long; hypanthium obconic-cylindrical, 3–4 mm long; sepals lanceolate, 6.5–19 mm long. Fruit ellipsoid-cylindrical, 10-ribbed, green or cream with the ribs darker green, red when ripe, 6–10 x 2–3 cm; stalk 3.5–6.5 cm long. Seeds ovate in outline, lenticular, compressed, 5 x 3.5 x 1 mm.

Riverine gallery forest, evergreen woodland and grassland; 1220–2000 m. WG IL KF; S Sudan, S Tanzania, N Mozambique. *De Wilde & De Wilde-Duyffes* 7184; *Ash* 3111; *Gilbert & Thulin* 630.

2. *C. adoensis* (*Hochst. ex A. Rich.*) *Cogn.* (1881);

*Momordica adoensis* A. Rich. (1847) – types: TU, Adua, *Quartin-Dillon & Petit* s.n. (P syn. not seen), *Schimper* 166 (P syn. not seen, K isosyn.).

*Bryonia jatrophiifolia* A. Rich. (1847); *C. jatrophiifolia* (A. Rich.) *Cogn.* (1881) – type: TU, Adua, *Quartin-Dillon & Petit* s.n. (P hol.).

? *C. aostae* *Busc. & Muschl.* (1913) – type: EW, near Keren, *Schweinfurth* 578 (B hol.).

Climbing or trailing herb to 3 m; rootstock woody, tuberous. Leaf-blade very variable, ovate or broadly ovate in outline, glabrous or usually more or less pubescent especially on veins, often becoming scabrid-punctate above, 3.5–13.5 x 2.5–13.5 cm, base cordate, margin variously sinuate-dentate to subentire, unlobed or shallowly to very deeply palmately 3–5-lobed, lobes triangular to oblong-lanceolate sometimes lobulate; petiole 0.4–2(–5) cm long, usually short, pubescent with rather fine forward-curving hairs. Tendrils simple. Flowers sometimes appearing before the leaves. Male flowers mostly in 4–20-flowered racemes; peduncles 5–75 mm long; pedicels 3–10(–20) mm long; hypanthium obconic, shortly pubescent or subglabrous, 3–4.5 mm long; sepals oblong, acute, 1.5–4 mm long; corolla yellow or orange-yellow, the petals 13–30 mm long, united to the middle or above. Female flowers solitary; pedicel 2–20 mm long; ovary ellipsoid-fusiform, 6–20 mm long; hypanthium narrowly campanulate, 1.5–3 mm long. Fruit ellipsoid or ellipsoid-cylindrical, smooth, green with darker longitudinal markings, bright red when ripe, 3.5–8 x 1.5–3 cm; stalk 0.5–2 cm long. Seeds broadly ovate in outline, subcompressed, lenticular, 4.5–6.5 x 3–5 x 1.5–2.5 mm. Fig. 65.20.1–7.

*Combretum* – *Terminalia* woodland, wooded grassland

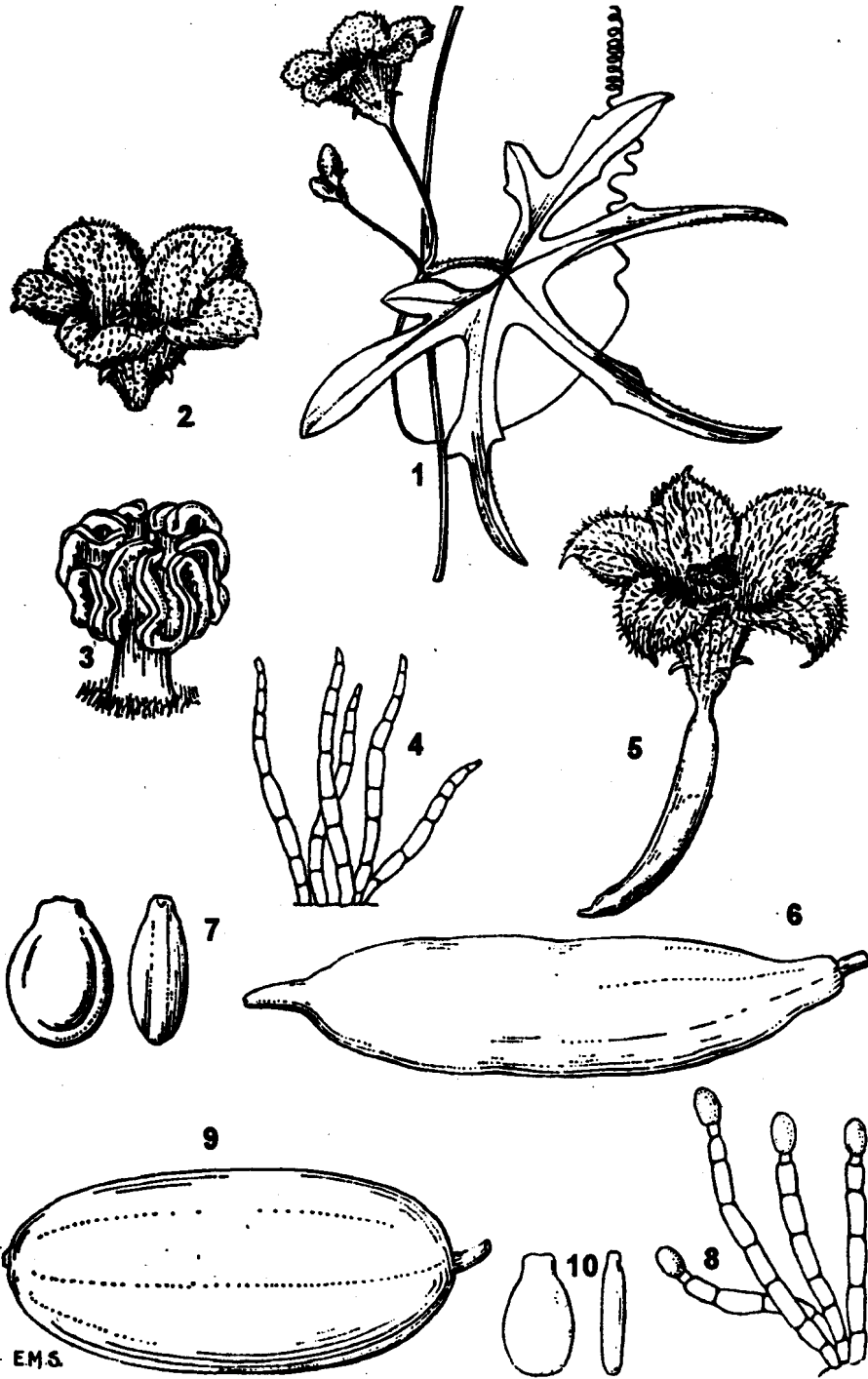


Figure 65.20 *COCCINIA ADOENSIS*: 1 - stem portion with leaf, flowers and tendril x 1; 2 - male flower x 1½; 3 - staminal column x 4; 4 - simple hairs from filament bases x 40; 5 - female flower x 1½; 6 - fruit x 1; 7 - seed, face and side views x 3. *C. GRANDIS*: 8 - glandular hairs from filament bases x 40; 9 - fruit x 1; 10 - seed, face and side views x 3. 1 from Milne-Redhead & Taylor 7432; 2-4 from Milne-Redhead & Taylor 7950; 5 from Milne-Redhead & Taylor 7876; 6 & 7 from Milne-Redhead & Taylor 7876A; 8 from Milne-Redhead & Taylor 7295; 9 from Verdcourt 1083; 10 from Drummond & Hemsley 3522. Drawn by Margaret Stoner. (Reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 8.)

and grassland; 400-2200 m. TU GJ SU WG IL KF GG; north and east tropical Africa west to Ghana and south to South Africa (Transvaal). *Thulin & Hunde* 4002; *Mooney* 6898; *Friis et al.*, 2435.

Leaves reported to be eaten boiled.

3. *C. sp.* = *Bally* 12989

Very slender climbing or trailing herb. Leaves palmately divided to the base into (3-)5 linear lobes, glabrous, scabrid-punctate above, entire, the central lobe 2-7.5 cm long, 1-4 mm broad, obtuse, lateral lobes shorter; petiole

slender, almost glabrous, 4-12 mm long. Tendrils slender, simple. Male flowers solitary or in small clusters; pedicel 5 mm long; hypanthium obconic, glabrous, 3-3.5 mm long; sepals narrowly triangular or triangular-lanceolate, 2-4 mm long; corolla yellow or white, the petals 18-25 mm long, united in lower half. Female flowers unknown. Fruit fusiform, green with long white spots, becoming red when ripe, about 5 x 1.5 cm. Seeds asymmetrically ovate in outline, compressed, about 4 mm long and 2 mm broad.

Semi-desert bushland; 350-800 m. HA; *Bally* 12989; *Ellis* 163; *Simmons* S.63.

4. *C. abyssinica* (Lam.) Cogn. (1881)

– type: specimen from a plant cultivated in Paris from seeds sent by Bruce from Ethiopia (P holo.).

*Cephalandra diversifolia* Naud. (1866); *Coccinia diversifolia* (Naud.) Cogn. (1881) – type: specimen of a plant cultivated in Paris from seeds sent by Schimper (P holo., K iso.).

*Coccinia diversifolia* (Naud.) Cogn. var. *glabrescens* Cogn. in A. & C. DC., *Monogr. Phan.* 3: 537 (1881) – type: TU, Schimper 250 (P syn., G, K syn.).

Amare Getahun in *Bot. Not.* 26: 437–449 (1973).

Climbing or trailing herb to 3.5 m. Rootstock tuberous, fleshy. Leaves ovate or broadly ovate in outline, scabrid-punctate above, crispate-setulose on veins beneath, 7.5–15 x 7.5–17 cm, margin sinuate-denticulate, shallowly to deeply palmately 5-lobed, lobes triangular to ovate, sometimes lacinate; petiole 1.5–16 cm long, spreading-setulose. Tendrils simple. Male flowers usually in pedunculate 5–7-flowered raceme-like clusters; peduncles 0.5–16 cm long; pedicels villous, 7–30 mm long; hypanthium obconic-campanulate, villous, 6–7 mm long; sepals lanceolate or linear, 2–6 mm long; corolla pale yellow with green veins, petals 12–22 mm long, united in the lower half. Female flowers solitary; pedicel 10–25 mm long; ovary ellipsoid, beaked, laxly setulose, 17–20 mm long; hypanthium obconic-cylindrical, villous, 2–5 mm long. Fruits ellipsoid, dark green with longitudinal lines of white spots, red with lines of paler spots when ripe, 5.5–7 x 3.5–4 cm. Seeds broadly asymmetrically ovate in outline, compressed, 6–7.5 x 3.7–3.8 x 2–2.5 mm, covered in fibres.

*Juniper* – *Podocarpus* forest and evergreen woodland or scrub, in cultivated places especially in backyard gardens; 1300–2400 m. TU GD GJ WG IL KF SD; not known outside Ethiopia. *Burger* 569; *De Wilde* 7059; *Tadesse Ebba* 540.

Cultivated for its edible young shoots and tubers; fruits of wild plants also eaten.

5. *C. sp.* = *Burger* 2947A

Climbing or trailing herb or softly woody shrub to 2.5 m. Leaves ovate or broadly ovate in outline, hispid becoming scabrid-punctate above, glabrous beneath, 5.5–6.5 x 6.5–8 cm, base cordate, margin sinuate-dentate with brownish-red glandular teeth, deeply palmately 5-lobed, the lobes pinnately lobulate, rounded, apiculate; petiole 3–6.5 cm long, ascending-hispid. Male flowers in small shortly pedunculate clusters; pedicel 7 mm long; hypanthium obconic, 3.5 mm long, villous; sepals lanceolate, 4 mm long; corolla yellow with green veins, further details unknown. Female flowers unknown. Fruit ellipsoid, green with longitudinal lines of white spots, becoming brilliant red, 5.5–6 x 3–4 cm; stalk 2 cm long. Seeds asymmetrically ovate in outline, compressed, about 7 x 3 x 1.5 mm, covered in fibres.

Deciduous bushland; 1220–1350 m. HA. *De Wilde* 4793; *Burger* 2947A; *Tadesse Ebba* 622.

Fruits reported to be edible and of good flavour.

6. *C. megarrhiza* C. Jeffrey (1962)

– type: Kenya, Moyale, *Gillett* 12967 (K holo.).

Climbing perennial herb; rootstock tuberous, woody. Leaf-blade variable, ovate in outline, scabrid or punctate above, scabrid-setulose on veins beneath, 3–12 x 4–16.5 cm, base cordate, margin sinuate-dentate, palmately 3–5-lobed, lobes often rounded, sometimes lobulate; petiole 2–7.5 cm long, crispate-pubescent. Tendrils simple. Male flowers in small sessile or shortly pedunculate clusters; pedicels 5–55 mm long; hypanthium broadly obconic, villous, 4–8 mm long; sepals lanceolate, 3–8 mm long; corolla yellow with green veins, petals 10–22 mm long, united in lower half. Female flowers solitary; pedicel 5–18 mm long; ovary fusiform, 15–20 mm long; hypanthium broadly campanulate, 2.5–4 mm long. Fruit ellipsoid, green with longitudinal pale green or cream stripes, 3.8–5.5 x 1.9–3 cm; stalk 0.7–4 cm long. Seeds unknown. Fig. 65.21.

Deciduous *Acacia* – *Commiphora* bushland and woodland, *Euclea* – *Euphorbia candelabrum* woodland, open Juniper forest; 1240–2000 m. SD BA; N Kenya. *Ash* 814; *Gilbert & Jefford* 4412; *Friis* et al. 2664.

7. *C. sp.* = *Gilbert & Jones* 129

*C. sp.* C of *Fl. Trop. E. Afr. Cucurbitaceae*: 69 (1967).

Slender softly woody climber to 3 cm. Leaves ovate or reniform in outline, shortly hispid or scabrid-punctate, 1–7 x 1.5–9 cm, base cordate, palmately usually more or less deeply 3–5-lobed, lobes usually elliptic or obovate, rounded, sometimes lobulate; petioles to 0.25 cm long. Tendrils simple. Male flowers solitary or in small clusters; pedicels 1.5–5 mm long; hypanthium broadly obconic, 2 mm long; sepals linear, acute, 1–3 mm long; corolla pale yellow with green veins, petals 8–18 mm long, united in lower half. Female flowers solitary; pedicel 1.5–3 mm long; ovary ellipsoid, 4–5.5 mm long; hypanthium campanulate, 1.5–2 mm long. Fruits globose, red with paler longitudinal markings, 1–2.5 cm in diameter, stalk 0.3–0.7 cm long. Seeds asymmetrically narrowly ovate in outline, compressed, 4.5–6 x 2–3 x 1 mm, covered in fibres.

Semi-desert grassland with *Acacia* and *Commiphora*; 1000–1380 m. SD; N Kenya. *Friis* et al. 3228; *Ash* 804.

8. *C. grandis* (L.) Voigt (1845);

*Bryonia grandis* L. (1767); *Coccinia indica* Wight & Arn. (1834); A. Rich. (1847), nom. illegit. – type: India (LINN lecto.).

*C. moghadd* (J.F. Gmelin) Schweinf. & Aschers. (1867), based on *Stuedner* 828 and *Schweinfurth & Riva* 1007.

Climbing or trailing perennial herb or softly woody deciduous climber to 20 m; rootstock tuberous. Leaf-blade broadly ovate in outline, punctate above, glabrous, 3.5–11.5 x 3.5–15.5 cm, base cordate, margin sinuate-dentate with glandular usually reddish teeth, obscurely pentagonal to deeply palmately 3–5-lobed, lobes deltoid to elliptic or rhombic in outline, often lobulate, sometimes deeply so; petioles 1–5 cm long, glabrous. Tendrils simple. Male flowers solitary or 2–4 in shortly pedunculate clusters;

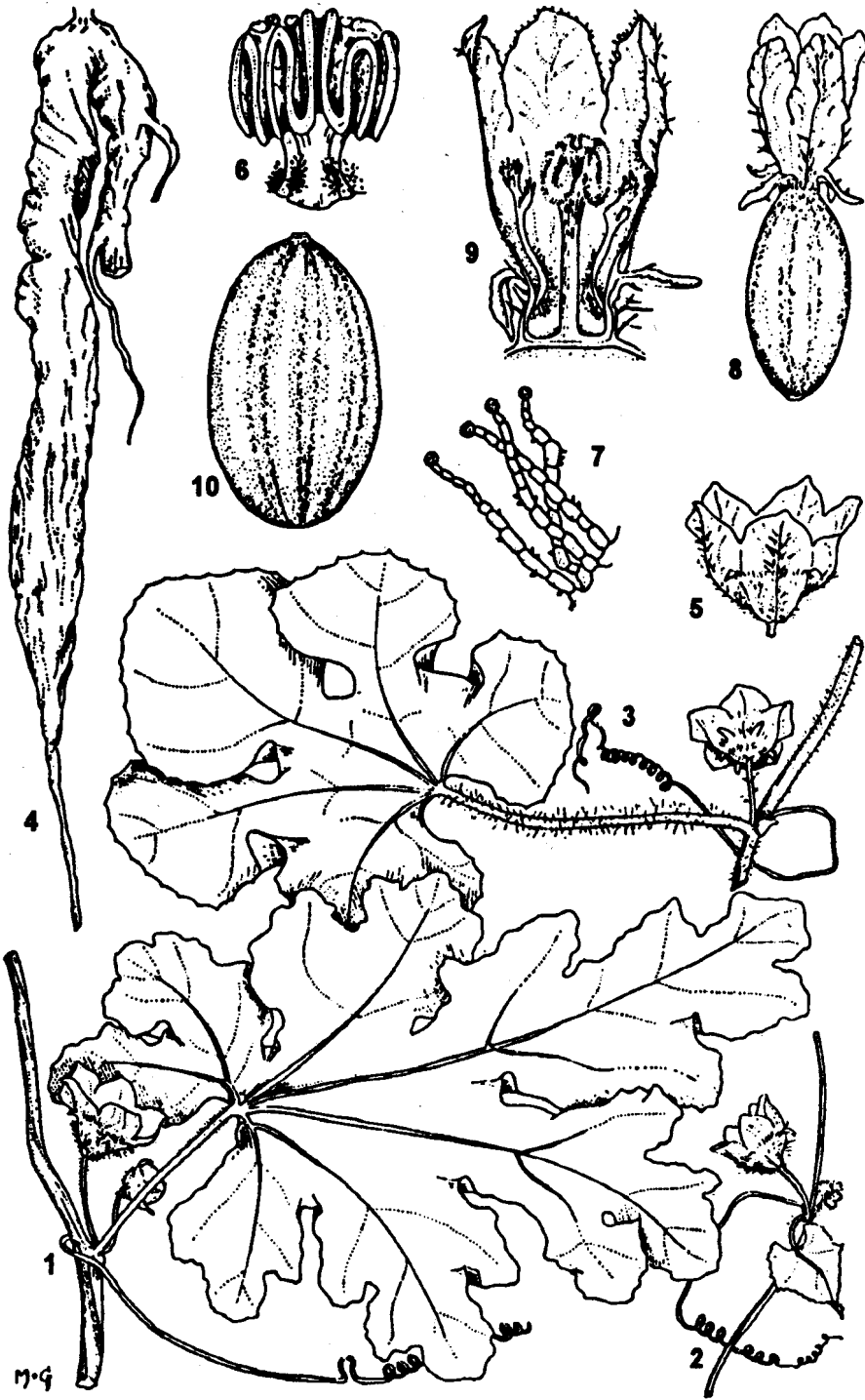


Figure 65.21

*COCCINIA MEGARRHIZA*: 1, 2 & 3 – stem portions showing variation in size and shape of leaves at time of flowering  $\times \frac{2}{3}$ ; 4 – root  $\times \frac{2}{3}$ ; 5 – male flower  $\times 1$ ; 6 – staminal column  $\times 3$ ; 7 – glandular hairs at base of filament  $\times 14$ ; 8 – female flower  $\times 1$ ; 9 – half a female flower  $\times 2$ ; 10 – fruit (immature)  $\times 1$ . 1 from Gillett 12759; 2, 5–7 from Gillett 14038; 3 from Gillett 12967; 4, 8–9 from Gillett 14037; 10 from Gillett 13112. Drawn by Mary Grierson. (Reproduced with permission from *Kew Bull.* 15(3): fig. 1, p. 348.)

pedicels 7–70 mm long; hypanthium obconic, expanded above, glabrous, 3–7 mm long; sepals lanceolate, 2.5–6.5 mm long, often red at the apex; corolla pale yellow with green veins, campanulate, petals 14–25 mm long, united in lower half. Female flowers solitary; pedicels 4–25 mm long; ovary ellipsoid, 3–14 mm long; hypanthium cylindrical, 2–7 mm long; sepals oblong-lanceolate, 2–4 mm long, red-tipped; petals similar to those of male flowers, 20–35 mm long. Fruit globose to ellipsoid, green with paler green stripes, red or reddish-orange when ripe, 3–7  $\times$  1.5–3.5 cm; stalk 0.4–4 cm long. Seeds asymmetrically ovate in outline,

compressed, about 6  $\times$  2.5–3  $\times$  1.5 mm, covered in fibres. Fig. 65.20.8–10.

Deciduous bushland, woodland and wooded grassland, also in cultivated places; 300–2350 m. EE AF EW TU GD WU SU AR WG IL KF GG SD HA; tropical Africa west to Senegal and south to S Tanzania, tropical Asia and Australasia east to Fiji. *Burger* 3253; *Ash* 1069; *Gilbert & Gilbert* 1567.

It is reported on herbarium labels that the Mursi people boil and eat the leaves of this species.



21. *DIPLOCYCLOS* (Endl.) Post & O. Kuntze (1903)

Perennial climbing herbs. Young stems spotted with darker green. Tendrils 2-fid. Flowers monoecious, in axillary clusters. Male flowers pedicellate; hypanthium short, broad; sepals 5, small, spaced out; petals 5, pale yellow, united in lower half; stamens, 2 two-theous, 1 one-theous, inserted on the lower part of the hypanthium, free; connective broad; thecae forming a zigzag pattern. Female flowers subsessile; ovary rounded; ovules horizontal; hypanthium smaller and narrower than in male flowers; perianth similar to that of male flowers; stigmas 3. Fruit fleshy, red with longitudinal silvery-white markings, indehiscent. Seeds pear-shaped, with highly convex faces and thick 2-grooved margins.

A genus with c 5 species in tropical Africa, Asia and Australasia, 1 species in Ethiopia.

**D. palmatus** (L.) C. Jeffrey (1962);

*Bryonia palmata* L. (1753) – type: Sri Lanka (Ceylon), Hermann s.n. (BM lecto.).

Vigorous climbing herb to 6 m. Leaf-blade broadly ovate in outline, setulose on veins beneath, 4–14 x 4–15 cm, base cordate, margin more or less sinuate-dentate, deeply palmately 5(–7)-lobed, lobes elliptic or narrowly elliptic, apiculate; petioles 2–10 cm long, coarsely spiculate. Male and female flowers usually coaxillary. Male pedicels slender, 5–15 mm long; hypanthium 2.5–4 mm long; sepals subulate or filiform, 0.5–2 mm long, petals whitish with green veins, 6–9 mm long, united in lower half. Female pedicels 1–5 mm long; ovary ovoid-ellipsoid, 4–5 mm long, green with longitudinal whitish markings; hypanthium 1.5–2.5 mm long. Fruits solitary or in small clusters, subglobose, red with white longitudinal markings, 15–25 mm in diameter; stalk 1–5 mm long. Seeds 5–6 x 2.5–3 x 4–4.5 mm.

*Acacia* – *Balanites* woodland; 1200 m. GG; palaeotropics from West Africa and Zimbabwe to Australia. Gilbert et al. 335.

22. *LUFFA* Mill. (1754)

Annual climbing or trailing herbs. Leaves simple. Tendrils 2–6-fid. Flowers monoecious or dioecious. Male flowers racemose; hypanthium broadly campanulate, sepals 5, large, enclosing the petals in bud; petals 5, free, yellow or white; stamens 5, all one-theous, or 3, 2 two-theous, 1 one-theous, inserted on the hypanthium, free; connectives broad; thecae convoluted. Female flowers solitary; ovary smooth, ribbed or spiny; ovules numerous, horizontal. Fruit dry, brownish smooth, ribbed or spiny, dehiscent by an apical operculum. Seeds compressed, black.

A genus with 6 species of which 5 are palaeotropical and 1 is neotropical; 2 species in Ethiopia.

1. Petals yellow; flowers monoecious; ovary and fruit not spiny. 1. *L. cylindrica*
- Petals white; flowers dioecious; ovary and fruit spiny. 2. *L. echinata*

1. *L. cylindrica* (L.) M. J. Roem. (1846)

– type: illust. *Pepo indicus reticulatus seminibus nigris* Herm., *Hort. Acad. Lugd.-Bat. Cat.*: 482 (1687); lectotype selected by Jeffrey in 1980 (*Kew Bull.*, 34(4): 791).

*Momordica cylindrica* L. (1753) – type: presumed to be a cultivated plant or plants (not located).

*Luffa aegyptiaca* Mill. (1786) – type: presumably a cultivated plant or plants (not located).

Vigorous climber or trailer to 15 cm. Leaf-blade broadly ovate, asperulous or scabrid, 6–18 x 6–22 cm, base cordate, margin sinuate-dentate, palmately 5–7-lobed, lobes triangular to narrowly oblong-lanceolate, the central largest; petioles 1–15 cm long. Tendrils usually 2–4-fid. Flowers monoecious. Male flowers racemose; peduncle 70–320 mm long, finely pubescent; pedicels 3–13 mm long, bracteate, bracts glandular, 2–6 mm long; hypanthium obconic below, expanded above, finely pubescent, 3–8 mm long; sepals ovate, acuminate, 8–14 mm long; petals deep yellow, broadly obovate, rounded, 20–45 mm long. Female flowers solitary; pedicel 15–145 mm long; hypanthium 2.5–6 mm long; ovary cylindrical, 20–40 mm long; sepals ovate-lanceolate or lanceolate, 8–16 mm long. Fruit ellipsoid to cylindrical, more or less circular in cross section, slightly sulcate, 6–25 x 2.5–6 cm; stalk 1.5–15 cm long, stout. Seeds broadly elliptic in outline, 10–15 x 6–11 x 2–3 mm, smooth, dull, with a narrow thin wing-like margin. Fig. 65.22.

River banks, cultivated places; 550–1500 m. EW HA IL also cultivated; the palaeotropics, widely cultivated and naturalized in both hemispheres. *Ash* 141; *IECAMA* BH57; *Tewolde Berhan* G.E. 1608.

The dried, fibrous skeleton of the fruit is the LUFFA of commerce which is used as a wash cloth and for cleaning china and glass as the fibres are soft and non-scratching.

2. *L. echinata* Roxb. (1832)

– type: Roxb., drawing no. 1694 (K lecto.), as designated by Jeffrey, *loc. cit.* 1980: 791.

Trailing or climbing herb. Leaf-blade broadly ovate, asperulous or scabrid, 1.5–10(–20) x 2–13.5(–20) cm, base cordate, margin sinuate-dentate, palmately 3–5-lobed, the lobes broadly ovate to elliptic, obtuse to rounded, apiculate; petiole 1–8.5 cm long. Tendrils 2-fid. Flowers dioecious. Male flowers racemose; peduncles 10–140 mm long, pubescent; pedicels 3–12 mm long, slender, bracteate; bracts small; hypanthium 1.5–2 mm long, pubescent; sepals ovate or broadly ovate, 3.5–5 mm long; petals white, obovate, 10–16 mm long. Female flowers solitary; pedicel 2.5–4(–10) mm long; perianth similar to that of male flowers, rather smaller; ovary subglobose, shortly beaked, densely spiny, densely hairy, about 10 mm long; style prominent, persistent and enlarging in fruit. Fruit subglobose, densely spiny, 2.5–3.5 cm in diameter; stalk 0.4–2 cm long. Seeds 5–5.5 x 3–4 x 2–3 mm, black, slightly rough, not margined.

River banks, along irrigation ditches; 400–520 m. AF GG; Sahel region, west to Mauritania, Pakistan, India, Bangladesh. *Carr* 702.

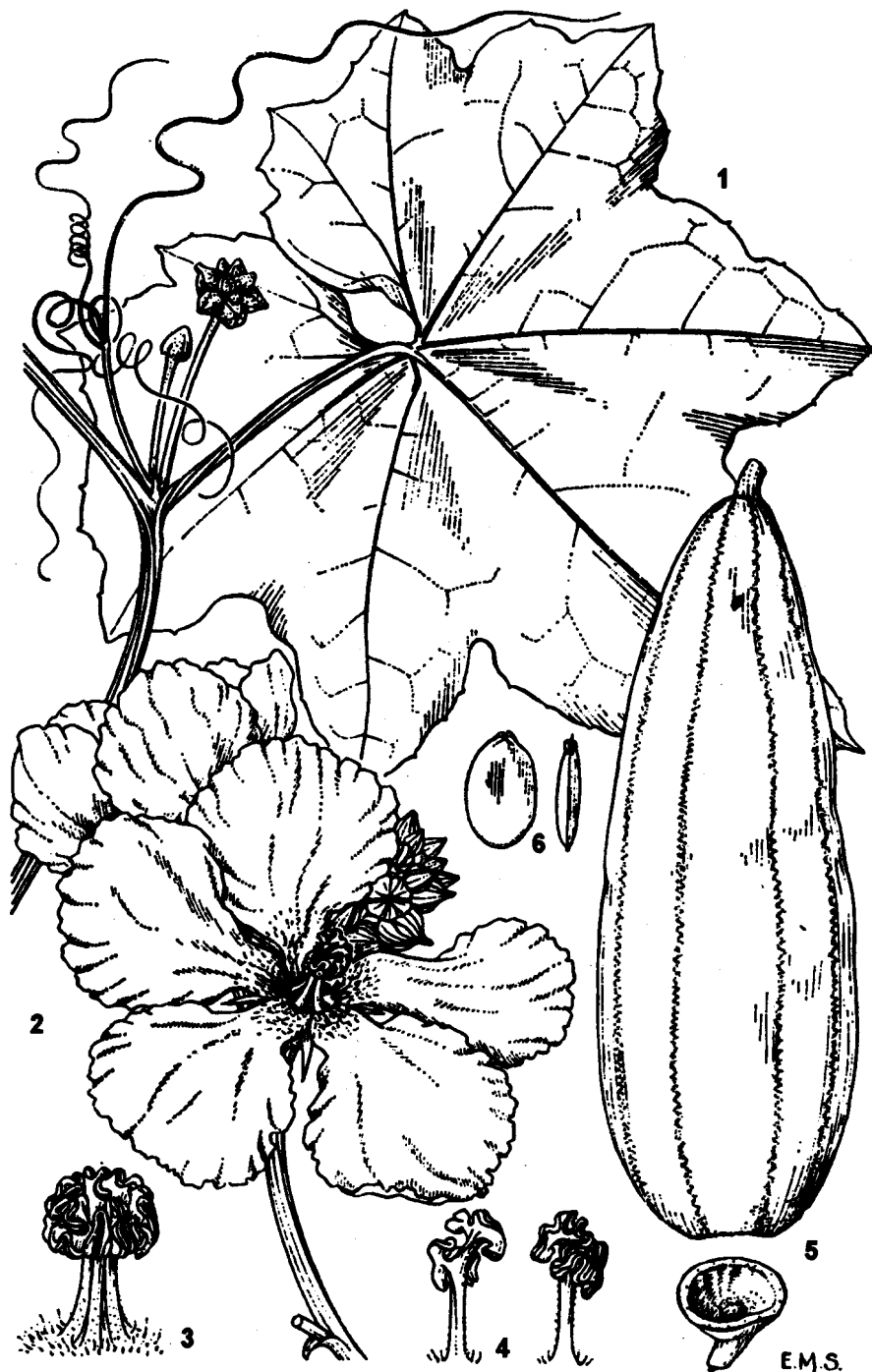


Figure 65.22 *LUFFA CYLINDRICA*: 1 – stem portion with leaf, young inflorescences and tendril  $\times \frac{3}{8}$ ; 2 – male flower and flower buds  $\times \frac{3}{8}$ ; 3 – staminal column  $\times 2$ ; 4 – stamen, ventral and dorsal views  $\times 2$ ; 5 – fruit with cap shown separately  $\times \frac{3}{8}$ ; 6 – seed, face and side views  $\times 1\frac{1}{2}$ . 1 from Tanner 1474; 2–4 from Jeffrey, 5 & 6 from a specimen in Kew carpological collection sent in by Sutton's. Drawn by Margaret Stoner. (Reproduced with permission from *Fl. Trop. E. Afr. Cucurbitaceae*: fig. 10.)

### 23. CUCURBITA L. (1753)

Rather coarse usually trailing annual or perennial herbs, short-stemmed and compact in some cultivars. Leaves simple. Tendrils 3–7-fid, reduced or absent in short-stemmed cultivars. Flowers large, monoecious. Male flowers solitary; hypanthium shortly campanulate; sepals 5, narrow, sometimes expanded towards the apex; corolla distinctly gamopetalous, with prominent tube; petals 5, yellow; stamens 3, inserted on the hypanthium; filaments free; anthers connate, connectives narrow; thecae with 3 tight folds. Female flowers solitary; ovary rounded, hairy; ovules numerous, horizontal; hypanthium very short; perianth as in male flowers; stigmas 3. Fruit medium to very large, firm-walled, fleshy, indehiscent, very variable in

shape, colour and pattern, many-seeded. Seeds ovate in outline, compressed, smooth, bordered.

A genus with *c* 20 species, 5 known only in cultivation, the rest neotropical, mostly in Mexico and Central America; probably 4 species in Ethiopia.

- |   |                        |
|---|------------------------|
| 1. Seeds dark brown or black.   | 1. <i>C. ficifolia</i> |
| – Seeds white to pale yellowish-brown.  | 2                      |
| 2. Fruit-stalk rather soft, rounded, inflated and corky; stems rounded; flowers faintly fragrant. |                        |
|   | 4. <i>C. maxima</i>    |
| – Fruit-stalk hard, angled, not inflated nor corky; stems angled; flowers not fragrant.           | 3                      |
| 3. Plant softly hairy; fruit-stalk markedly expanded at   |                        |

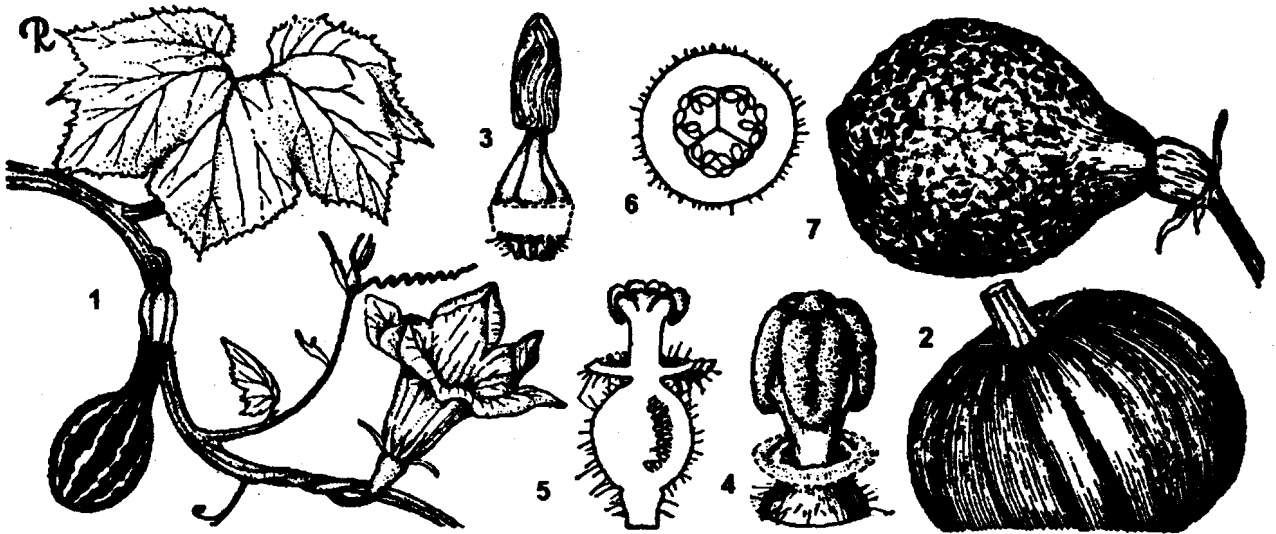


Figure 65.23 *CUCURBITA PEPO*: 1 – stem with leaf, flower and young fruit of an ornamental variety  $\times \frac{1}{4}$ ; 2 – fruit of edible variety, much reduced. *C. MAXIMA*: 3 – staminal column from male flower  $\times \frac{1}{2}$ ; 4 – style and stigmatic surface  $\times 1$ ; 5 – female flower, longitudinal section with the perianth removed  $\times \frac{1}{2}$ ; 6 – ovary cross-section  $\times 1$ ; 7 – fruit, much reduced. (Reproduced with permission from Bailey, *Man. Cult. Plants*: fig. 191, p. 951, 1.)

the apex; seeds often with a thin, wavy or ragged margin; sepals usually strap-shaped, parallel-sided, often expanded and foliaceous in the upper part.

### 2. *C. moschata*

– Plant with rough hairs; fruit-stalk usually little expanded at the apex; seeds with well-defined rounded margins; sepals linear-lanceolate, usually not foliaceous.

### 3. *C. pepo*

#### 1. *C. ficifolia* Bouche (1837)

– type: not known.

Vigorous annual climber or trailer. Leaf-blade broadly ovate in outline, 12.5–25 cm long and broad, base cordate, palmately 5-lobed, lobes rather rounded, often 3-lobulate; petioles 6–26 cm long. Male flowers with long pedicels; hypanthium about 10 mm long; sepals linear-lanceolate, 5–15 mm long; corolla 6–12.5 cm long, lobes acute. Female pedicels stout, 30–50 mm long. Fruit oblong to subglobose, green with white or cream mottling, 12–20 cm in diameter; stalk somewhat expanded at attachment. Seeds dark brown to black, about 18  $\times$  11  $\times$  2 mm.

Cultivated, e.g. near Asbe Teferi, 1960 m. (HA); native of South America, not known in the wild. *Westphal & Westphal-Stevens* 1974.

Cultivated for its edible fruits.

#### 2. *C. moschata* (Duchesne ex Lam.) Duchesne ex Poir. (1818);

*Cucurbita pepo* L. var. *moschata* Duchesne ex Lam. *Encyc.* 2: 152 (1786) – type: from a cultivated plant, possibly grown from seeds from Martinique (not found). No type indicated in Jeffrey 1980: 799.

Vigorous usually trailing annual herb. Leaf-blade broadly ovate, not coarsely setose, 20–28 cm long and broad, long-petiolate, often marbled with white between the veins, base cordate, palmately 5-lobed, lobes ovate-triangular, rather flaccid. Male flowers on 60–180 mm long pedicels; hypanthium very shallow to shortly campanulate, 3–10 mm long;

sepals linear or strap-shaped, often slightly to distinctly expanded in upper part, 10–37(–75) mm long; corolla 5–13.5 cm long, lobes spreading, tube not or only slightly bulging below. Female flowers on 30–150 mm long pedicels. Fruit very variable in size, shape and colour, depressed-spherical to cylindrical; stalk 3–15 cm or more long, 5-angled, broadly expanded at the apex. Seeds whitish, often covered with thin fibres or with wavy margin, 12–21  $\times$  5–13  $\times$  1.5–3.5 mm.

Recorded as cultivated by Cufodontis (1965); native of Central or South America, cultivated for its edible fruits, not known in the wild.

No material has been collected of this plant. But as there is very little collected material of all the cultivated species, it is quite possible that it could be found in future collections.

#### 3. *C. pepo* L. (1753)

– type: illust. *Zuccha major rotunda* in Cordus, *Hist. Pl.*: 117 (1561), selected by C. Jeffrey 1980: 798.

Vigorous usually trailing annual herb, compact in some varieties. Leaf-blade ovate or broadly triangular, prickly-setose especially on veins beneath, up to 30 cm long and broad, long-petiolate, base cordate, palmately 5-lobed, lobes triangular to rhombic-elliptic, often lobulate, rather rigid, erect or ascending. Male flowers on 45–150 mm long pedicels; hypanthium campanulate, 9–12 mm long; sepals usually lanceolate-subulate, 12–20 mm long, rarely with a few small apical lobes; corolla 55–110 mm long, lobes spreading or erect. Female flowers on 5–50 mm long pedicels. Fruit extraordinarily variable in size, shape and colour; stalk 0.5–7 cm long, strongly 5-angled, little expanded at the apex. Seeds dirty white, 8–20  $\times$  4–12  $\times$  1.5–2.5 mm, bordered. Fig. 65.23.1 & 2.

Cultivated; c 800–1350(–2500) m. EW; probably native of N Mexico and S USA. Cultivated for its edible fruits. *Students of Asmara University* 2; *Sue Edwards et al.* 5224.

Compact forms of this species are grown for their long, dark green fruits sold as ZUCCHINI.

4. *C. maxima* Duchesne ex Lam. (1786)

— type: from a cultivated plant (not found); neotype: illustr. labelled *melopepo fructu maximo albo* in Tournefort, *Inst.* 1: 106, t. 34 (1700), selected by C. Jeffrey 1980: 799.

Usually a trailing annual herb. Leaf-blade reniform or circular in outline, hispid, up to 36 x 44 cm, long-petiolate, base cordate, palmately 5-lobed, lobes usually shallow and broadly rounded. Male flowers with long pedicels; hypanthium obconic-campanulate, 8–12 mm long; sepals lanceolate-subulate, 10–12 mm long; corolla 4.5–7.5 cm long, the lobes rather flaccidly revolute, tube parallel-sided or somewhat bulging below. Female flowers more shortly pedicellate. Fruit variable in size, shape and colour, stalk thick, inflated, spongy, rounded, not expanded at the apex. Seeds white, 13–22 x 8–12 x 3–4 mm, bordered. Fig. 65.23.3–7.

Cultivated; KF and probably throughout; probably native to South America. Cultivated for its edible fruits. *Turton* 50.

24. *SICYOS* L. (1753)

Climbing or trailing herbs. Leaves simple. Tendrils 2–5-fid. Flowers small, greenish, monoecious. Male flowers in simple or compound pedunculate racemes; hypanthium shallowly campanulate; sepals (3–)5, small, tooth-like; petals (3–)5, united at the base; stamens (2–)3(–5), inserted at the base of the hypanthium; filaments united into a central column; anthers usually united; thecae forming a zigzag pattern. Female flowers solitary or capitate, smaller than the male; ovary ovoid, unilocular; ovule solitary, pendulous; sepals and petals usually 5; stigmas 3. Fruit small, dry, often spiny, 1-seeded.

A genus with c 50 species in the New World and the Hawaiian Islands, 1 species in Australasia, 1 (probably introduced) also in tropical Africa.

*S. polyacanthus* Cogn. (1898)

— type: Brazil, *Mueller* 181 (K holo.).

*Sicyos angulatus* sensu A. Rich. (1847); *Fl. Trop. Afr.* 2: 508 (1871), non L.

*S. australis* sensu Cufod., *Enum.*: 1051 (1965), non Endl.

Vigorous climbing herb to 7 m. Leaf-blade broadly ovate or reinform in outline, finely hairy, becoming scabrid-punctate above, 3–15 x 5–20 cm, base cordate, margin sinuate-dentate, apex acuminate, apiculate, palmately 5-lobed, lobes usually triangular, petiole 1.5–15 cm long, finely pubescent. Tendrils 2–5-fid. Male flowers usually numerous in elongated compound racemes; peduncle 15–300 mm long; pedicels 2–18 mm long, in whorls or subumbelliform clusters along the rachis; hypanthium 1–1.5 mm long; sepals 5, triangular to lanceolate, 0.5–3 mm long; petals 5, greenish, 1.5–5 mm long; stamens 3. Female flowers in pedunculate clusters, subsessile, coaxillary with but smaller than and opening before the male; peduncle 3–30 mm long; ovary ovoid, beaked, 2–3 mm long, antrorsely spiny; sepals 5, 0.5–1 mm long; petals 5, 1.5–2 mm long. Fruits 3–20 in 1–7 cm pedunculate clusters, ovoid, compressed, 5–14 x 4–9 x 1.5–5 cm, dry, leathery, covered with pale slender spines, eventually splitting. Seed 5–10 x 4–8 x 1.25 mm smooth, brown.

Forest margins, river banks; 1050–2000 m. GD GJ SU WG IL KF SD HA; tropical Africa (probably adventive) and South America. *Burger* 820; *Taddesse Ebba* 594; *Gilbert & Getachew* 3028.

The fruit is recorded by some collectors as being edible.

## 66. BEGONIACEAE

by Martin Sands\*, Sue Edwards\*\* and Mesfin Tadesse\*\*

*Cufodontis*, *Enum.*: 602 (1959); Bailey, *Manual of Cultivated Plants*: 693–700 (1964); Wilczek, *Fl. du Congo, du Rwanda et du Burundi*: **Begoniaceae**: 53 pp. (1969); Sands, *Fl. Mascareignes*: 102 **Bégoniacées**: 11 pp. (1990).

Perennial herbs or shrubs, rarely annual, usually somewhat succulent or woody; stems erect, scrambling or climbing, or plants acaulescent, sometimes with underground tubers or rhizomes. Leaves alternate, rarely subverticillate, usually petiolate, blade simple, or sometimes palmately or pinnately lobed, occasionally peltate, usually asymmetrical with an oblique base; stipules 2, often membranous, usually persistent. Inflorescence usually cymose, sometimes racemose or flowers solitary; bracts and bracteoles generally opposite and persistent; flowers unisexual, usually with both sexes in the same inflorescence. Male flowers with 2–4(–8) tepals, free or united; stamens generally many; filaments free or somewhat united; anthers basifixed, opening by lateral slits or apical pores, often with the connective extended into a globose structure. Female flowers with 2–5(–10) tepals, free or rarely united just at the base; ovary inferior, rarely half-inferior, with (1–)3(–4) locules, with or without wings; placentas axile or parietal, entire or divided; ovules very numerous; styles 2–3(–6), free or united at the base, generally bifid and often with a spirally twisted stigmatic surface. Fruit usually a capsule, 3-sided with or without wings, rarely a fleshy berry; capsule 3-sided, with 3 locules. Seeds very small with a reticulate testa.

Family found in most tropical and sub-tropical regions except Polynesia and Australia, made up of 3 genera and more than 1000 species. Only the genus *Begonia* is found in the Flora area.

**BEGONIA** L. (1753)

MEZIEREA Gaud. (1841)

Reader's Digest Association, *Reader's Digest Encyclopaedia of Garden Plants and Flowers*: 74–78 (1987); Brickell (ed.), *The Royal Horticultural Society Gardeners' Encyclopaedia of Plants and Flowers*: 251, 417–419 (1989).

Plants herbaceous or suffrutescent, glabrous or covered with soft scales or hairs; leaves often asymmetrical at the base, with one basal lobe larger than the other, or peltate; tepals free, less than 10; styles 3, often divided almost to the base to appear as 6; ovary inferior.

A pantropical genus of 900 to 1000 species and over 10,000 cultivated varieties and hybrids. For the Flora area, 1 indigenous and 7 widely cultivated species and hybrids, mainly native to tropical S America, have been recorded.

The beautiful leaves and flowers as well as the relative ease of cultivation have made *Begonia* a popular horticultural genus. It is likely that more cultivated species than are recorded here are grown as pot plants and in gardens in the Flora area. In the horticultural literature, plants which have creeping stolons are often referred to as "rhizomatous".

Elsewhere in Africa, the leaves of some species are eaten as a vegetable. In South America, people use the rhizomes against a variety of ailments.

1. Plants with erect stems and fibrous or tuberous roots. 2  
– Plants with creeping stolons or rhizomes either on the surface or under the soil. 7

2. Leaves small, up to 3 x 2 cm.

2. *B. foliosa* var. *miniata*

– Leaves larger, mostly over 5 cm long and wide. 3

3. Leaves membranous, margin finely and unevenly toothed; plants found growing wild in forests.

1. *B. wollastonii*

– Leaves not membranous, often somewhat thick and succulent, margin entire, lobed or coarsely toothed; plants usually found in cultivation. 4

4. Leaves obliquely elliptic-oblong, often hanging, blade flat or wavy, only folded when young; basal lobes very unequal. 5

– Leaves ovate to round, erect, blade often somewhat folded; basal lobes more or less equal. 6

5. Leaves glossy, dark green, often with red entire margins. 3. *B. coccinea*

– Leaves covered with white spots, margin shallowly lobed or toothed. 4. *B. x argenteo-guttata*

6. Plant covered with long somewhat stiff white hairs; upper leaf-surface dark metallic green, apex acute. 5. *B. metallica*

– Plant glabrous; upper leaf surface shiny green to dark red, apex rounded or obtuse. 6. *B. cucullata* var. *cucullata*

7. Leaf surface raised in blisters, bright green with a dark brown palmate design in the centre. *B. masoniana*

– Leaf surface smooth, one colour, or if patterned, not as above. 8

8. Leaves deeply lobed, the margins and ends of the lobes with long teeth, leaves variously coloured. 7. *B. heracleifolia*

– Leaves not lobed, margin entire, leaves dark green to dark reddish green. 8. *B. manicata*

*B. masoniana* Irmsch. ex Ziesen. (1959), the IRON CROSS BEGONIA, has creeping stolons and oval, toothed leaves with the surface raised in bubbles and a distinct central palm-shaped pattern. Popular elsewhere, this distinctive species is highly likely to be found as a pot plant in private houses.

1. *B. wollastonii* Bak. (1908)

– type: Uganda, *Wollaston* s.n. (BM holo.).  
*B. lebrunii* Robyns & Lawal (1947).

\* The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK.

\*\*The National Herbarium, Science Faculty, Addis Ababa University, P. O. Box 3434, Addis Ababa, Ethiopia.

*B. abyssinica* Cufod. (1960) – type: GG, Mt Dita, in forest on rocky slope (3000 m), 22 Aug. 1955, male plant only, *Kuls* 718 (FR, not seen).

Fleshy-stemmed herb growing from a small tuber, stems ascending to erect up to 1.5(–2.4) m tall, unbranched and glabrous. Leaves: stipules 0.4–1 cm long, ovate-oblong, membranous and persistent; petiole 5–15(–20) cm long with a ring of soft teeth at the junction with the blade; blade membranous, 6–20 x 4–13 cm, asymmetrically oval with an oblique cordate base, sparsely hairy on both surfaces, margin finely unevenly toothed. Inflorescence axillary, bracts thinly membranous, peduncles slender, up to 5 cm long, usually dichotomous, flowers light to dark pink. Male flowers: tepals 4, outer large, oval to round, up to 2–3.5 x 1.5–3.5 cm, inner much smaller, obovate, 1–2 x 0.6–1 cm; stamens usually numerous, anthers and connective globose. Female flowers smaller than the males, tepals 4 or 5, outer pair obovate to round, 0.9–1.3 cm long and wide, inner oblong-linear, up to 0.8 x 0.4 cm; ovary 3-winged, styles 3, with twisted stigmatic surface. Fruit a dry 3-winged capsule 2.5–3 cm long, largest wing up to 1.5 cm wide at the top.

On steep wet banks or in rock crevices often in the spray zone of waterfalls, sometimes as an epiphyte; 1500–2500 (–3000) m. IL KF GG BA; Uganda, Congo. *Mooney* 8806; *Mesfin* T. 4971; *Haugen* 1290.

Although the type (*Kuls* 718) of *B. abyssinica* has not been seen, there is a photograph of the specimen with the original publication. This photograph and the description fit with the original circumscription of this species. This taxon normally occurs in moist cool to warm forest and the reference to 3000 m altitude is doubtful.

This species has been cultivated in temperate countries (*Wilczek*, loc. cit.).

2. *B. foliosa* Kunth var. *miniata* (Planchon) L.B. Smith & Schubert, *Caldasia* 4: 196 (1946);

*B. fuchsoides* var. *miniata* (Planchon) A. DC in DC., *Prodr.* 15: 291 (1864); *B. miniata* Planchon (1853) – type: *Fl. Serres* 8: 105, t. 787 (1853)

*B. fuchsoides* Hook. (1847).  
non *B. foliosa* HBK.

Shrub up to 0.5(–1) m, stems much-branched and drooping. Leaves many, distichous, elliptic to obovate-oblong, not markedly asymmetrical 1.2–3(–4) x 1–2 cm; apex obtuse; margin with a few small teeth; base rounded or cuneiform; stipules up to 1 cm long, membranous and persistent. Inflorescence axillary, with 2–8 hanging flowers. Flowers pale pink to red. Male flowers: tepals 4, outer ovate and obtuse, 4.5–6 x 2–4 mm, inner very small; stamens 20–40. Female flowers: tepals 5 sub-equal; elliptic to obovate, 6–10 x 2.5–4; ovary with 3 unequal wings. Fruiting material not seen from the Flora area.

Cultivated pot plant in hotels and other public buildings; c 2400 m. SU (Addis Ababa) and probably in other major towns; originally from Mexico, now widely cultivated and sometimes escaped. *Sue Edwards* 5372.

This plant is known in horticulture as the FUCHSIA BEGONIA.

3. *B. coccinea* Hook (1843)

–type: Illustration of a plant from Brazil, *Hook. Bot. Mag.* t. 3990.

non *B. coccinea* Ruiz ex Klotzch (1854).  
*B. corallina* Carr. (1875).

Erect glabrous plant with branching stems up to 1.5(–3) m tall. Leaves thick, obliquely oblong to oblong-ovate, 10–15 x 3–4.5 cm, usually held vertically, petiole inserted in a sinus ¼ to ½ along one side, glabrous, green above and reddish beneath; apex pointed, margins entire, undulated or obscurely toothed, often red; base very asymmetrical with the outer/basal lobe much larger than the other; petiole short, stiff. Inflorescence of axillary panicles, flowers often drooping, dark pink to red. Flowers: male up to 2.5 cm in diameter, female with conspicuous usually red-winged ovary. Mature fruits not seen in the Flora area.

Cultivated in gardens and as a pot plant in public buildings and hotels; c 2400 m. SU (Addis Ababa) and probably in other large towns; originally from Brazil, now widely grown as an ornamental. *Sue Edwards* 5374.

Known as the ANGEL-WING BEGONIA, this is a popular ornamental plant. There are many derivatives from this species including some which have white-spotted leaves and bright red flowers.

4. *B. x argenteo-guttata* Lemoine (1888)

– type: plate no. 109, *Nursery Catalogue* (not seen).

Erect freely branched, glabrous plant with stems up to 1 m tall. Leaves numerous, elliptic-lanceolate, 5–12 x 3–5 cm, usually vertical, bright to olive green covered with silvery-white spots; apex pointed; margins wavy; base cordate with one lobe much larger than the other. Inflorescence not much exceeding the leaves, flowers small, greenish-white, male tepals c 1.5 cm long. Mature fruits not seen in the Flora area.

Cultivated in gardens and as a pot plant in public buildings and hotels; c 2400 m. SU (Addis Ababa) and probably in other large towns; originally from Brazil, now widely grown as an ornamental. *Sue Edwards & Melaku W.* 5375.

5. *B. metallica* L. Smith (1876)

– type: *Floral Magazine*, t. 197.

Erect plant covered in soft white hairs, stems branching, c 0.5 m tall in Flora area (over 1 m tall elsewhere). Leaves held horizontal, 7–10(–17) x 5–8(–12) cm, obliquely ovate with 2 or 3 angled lobes, upper surface bronze green with a metallic shine and somewhat stiff erect white hairs, lower surface red, particularly hairy on the veins; base asymmetrically cordate; margins toothed; apex acute. Inflorescence an axillary panicle with pale to dark pink flowers covered with red hairs. Male flowers with 2 outer almost round tepals up to 2 cm across. Fruiting material not seen in the Flora area.

Cultivated as a pot plant in public buildings and hotels; *c* 2400 m. SU (Addis Ababa) and probably in other large towns; originally from Brazil, now widely grown as an ornamental. *Sue Edwards* 5373.

6. *B. cucullata* Willd. (1805) var. *cucullata*,

Golding, *Phytologia* 50: 350 (1982) – type: Brazil (B-W 17567, holo.)

*B. semperflorens* Link et Otto (1828).

Golding, *Phytologia* 50(5): 330–356 (1982)

Succulent herb with underground rhizome and erect, mostly unbranched stems 0.1–0.5(–1) m tall, glabrous, shiny green or flushed red. Leaves fleshy, ovate to somewhat rhomboid, 3.5–10(–12) x 3–8(–10) cm, glossy green to dark red, sometimes pleated; apex obtuse; margin crenulate to broadly toothed; base truncate to cordate, sometimes flat and other times rolled inwards. Inflorescence of few-flowered axillary cymes, flowers white, pink or red. Male flowers: tepals 4, outer ovate to round, 5–12 x 5–13 mm, inner very small; stamens numerous, free. Female flowers: tepals 4 or 5, oblong to obovate, 4–8 x 3.5–7 mm; styles bifid; ovary with 3 unequal wings. Capsule as long as the wings, *c* 10 mm long, opening through basal pores. Seeds numerous and minute, *c* 0.4 mm long.

Cultivated in public and private gardens as a bedding plant to form a coloured mass, also as a pot plant, and growing spontaneously in cracks between stones: *c* 2400 m. EW (Asmara site record) SU (Addis Ababa) and undoubtedly in other towns of the country; originally from Brazil but now cultivated throughout temperate and tropical areas. *Ensermu K.* 2429; *Sue Edwards & Melaku W.* 5324, 5325.

Referred to as BEGONIA SEMPERFLORENS in the horticultural literature, this is the most widely cultivated *Begonia*. Many cultivated varieties have been developed including ones with double "pom-pom" flowers.

7. *B. heracleifolia* Cham. et Schlecht. (1830)

– type: 'from Mexico'.

*B. x ricinifolia* A. Dietr. (1847).

Stoloniferous herb, the creeping stem covered with the persistent withered stipules and scars from leaves. Leaves with shaggy hairs; petioles erect up to 20 cm long; blade

usually held vertically, oval to round in outline, 15–30 x 10–19 cm, with 5–9 large angular and toothed lobes, upper surface dark green to bronze, paler beneath; margins ciliate and toothed. Inflorescence an erect many-flowered panicle, peduncle usually 30 cm or more tall, with shaggy hairs and large spreading bracts; flowers white or pale pink. Male and female flowers each with only 2 tepals, round to obovate, up to 1 cm long. Fruits not seen in the Flora area.

Cultivated in gardens and as a pot plant in public buildings and hotels; *c* 2400 m. SU (Addis Ababa) and probably in other large towns; originally from Central America, now widely grown as an ornamental. *Ensermu K.* 2430; *Sue Edwards & Melaku W.* 5376.

A number of hybrids and cultivars have been developed from this species. These vary in the deepness of the lobes and the coloration of the leaves. Plants of this species grown in gardens in Addis Ababa develop quite tough succulent leaves while those of well-watered pot plants remain more or less membranous.

8. *B. manicata* Cels ex Vis. (1842)

– type: 'from Mexico'.

Stoloniferous herb, stem creeping, thick, succulent, internodes very short, with persistent withered stipules and oval leaf scars. Leaves fleshy; petiole 1–20 cm long, covered with shaggy hairs, white when fresh drying to red-brown; blade held vertically, heart-shaped to round, 7–12(–20) x 4.5–9.5 cm, upper surface glabrous, dark green to bronze, lower surface red with pale veins; base cordate, lobes unequal, sometimes overlapping to give a peltate appearance; margin with widely spaced small teeth, with long white hairs which wither to red brown; apex acute. Inflorescence an erect panicle, peduncle 15–20 cm tall, flowers pale pink, pendant. Male flowers not seen on plants in Flora area. Female flowers: tepals 2, small, round or obovate; ovary with conspicuous pink wings. Mature fruit not seen on material in the Flora area.

Cultivated mostly as a pot plant in public buildings, hotels and private houses; *c* 2400 m. SU (Addis Ababa) and probably in other large towns; originally from Central America, now widely grown as an ornamental. *Ensermu K.* 2429; *Sue Edwards & Melaku W.* 5350.



Figure 66.1 *BEGONIA WOLLASTONII*: 1 - portion of stem with male flowers and a pair of fruits  $\times \frac{1}{3}$ . *B. CUCULLATA* var. *CUCULLATA*: 2 - part of leafy stem with male and female flowers  $\times 1$ . *B. ARGENTEO-GUTTATA*: 3 - leaf  $\times \frac{1}{3}$ . *B. HERACLEIFOLIA*: 4 - leaf  $\times \frac{1}{3}$ . *B. MANICATA*: 5 - stem showing persistent stipules, hairs and leaf scars; 6 - leaf; 7 - female flower  $\times \frac{1}{2}$ . 1 from Mooney 8806; 2 from Sue Edwards & Melaku W. 5325; 3 from Sue Edwards & Melaku W. 5375; 4 from Sue Edwards & Melaku W. 5376; 5-7 from Sue Edwards & Melaku W. 5350. Drawn by Damtew Teferra.



## 67. CARICACEAE

by Mesfin Tadesse\* and Sue Edwards\*

Cufodontis, *Enum.*: 601 (1959); Burger, 'Families of Flowering Plants in Ethiopia', *Oklahoma Ag. Exp. Station, Exp. Station Bull.* No. 45 : 105 (1967); Thulin, 58. *Caricaceae* in *Fl. Somalia* 1: 240 (1993).

Small trees or shrubs, rarely herbs with smooth or spiny stems and milky latex. Leaves simple, alternate, long-petiolate, deeply palmately lobed, spirally arranged on stem and usually clustered at branch tips, exstipulate. Inflorescence axillary or sometimes cauliflorous. Flowers unisexual or sometimes bisexual (in *Carica*), regular, 5-merous; sepals fused for most part, 5-lobed. Male flowers gamopetalous, corolla tube long; stamens 10, epipetalous, filaments short, anthers 2-theous; a pistillode may be present. Female flowers polypetalous; pistil solitary with 5 united carpels, ovary superior with 1 or 5 locules, style short with 5 large stigmas or absent, ovules numerous with parietal placentation. Fruit a large fleshy berry with numerous seeds; seeds with mucilaginous outer cover and hard inner coat.

A family with 5 genera, 4 of which are distributed in the tropical and subtropical regions of America and 1 genus, *Cylicomorpha* Urban, is native to Tropical Africa. Only 1 widely cultivated species in the Flora area.

**CARICA L.**

Hutchinson, *Genera of Fl. Plants*, Vol. II: 425 (1967).

Trees or shrubs with usually simple, thick spongy stems and milky latex. Leaves large, spreading, subpeltate, with palmate or digitate lobes, forming a rosette at the top of the stem; stipules none. Inflorescence long or short axillary racemes of usually unisexual flowers. Male flowers: calyx small, 5-lobed; corolla-tube long, slender with oblong or linear lobes; stamens 10, inserted in the throat; rudimentary ovary usually present. Female flowers: calyx as in males; petals 5, linear-oblong, deciduous; staminodes none; ovary sessile 1- or 5-locular; stigmas 5, usually sessile; ovules numerous. Fruit a fleshy berry, many-seeded; seeds ovoid, with an aril, testa various.

Genus with over 20 species found in tropical and subtropical America.

***C. papaya* L. (1753)**

Purseglove, *Tropical Crops, Dicotyledons* 1: 45-51 (1968).

Trees, 3-8 m high; stem smooth, often with large conspicuous leaf-scars. Leaves deeply lobed, (5-)10-30(-45) cm long; petiole usually over 20 cm long, flat on upper side. Plants usually either male or female, but hermaphrodite varieties also occur. Flowers sweetly-scented, unisexual or bisexual, male in large panicles 25-75 cm long; female solitary or in few-flowered axillary cymes. Male flowers: calyx 1 mm long, 5-toothed; corolla  $\pm$  2.5 cm long, with 5 spreading lobes, creamy-white or yellow; filaments and anthers woolly. Female flowers similar to male 3.5-5 cm long; petals lanceolate, twisted, fleshy; yellow or creamy-yellow; ovary large, 2-3 cm long. Fruit a fleshy berry, up to 30 x 20 x 15 cm.

Cultivated in both home gardens and small and large plantations wherever there is sufficient water and no frost throughout the Flora area: sea level-1800 m. Originally from Mexico and Costa Rica, now grown throughout the tropics and sub-tropics. Mesfin T. et al. 3496; Demel Teketay 1079; Yohannes Petros 31.

\* The National Herbarium, Addis Ababa University, P.O. Box 3434, Addis Ababa, Ethiopia.

A very popular fruit eaten fresh and also made into a refreshing drink either alone or mixed with other fruit juices. The proteolytic enzyme, papain, is prepared from the dried latex of immature fruits. This has a wide number of uses: manufacture of chewing gum and some cosmetics, a drug for digestive disorders, in the tanning industry, and others. The seeds are used elsewhere as a vermifuge and abortifacient.

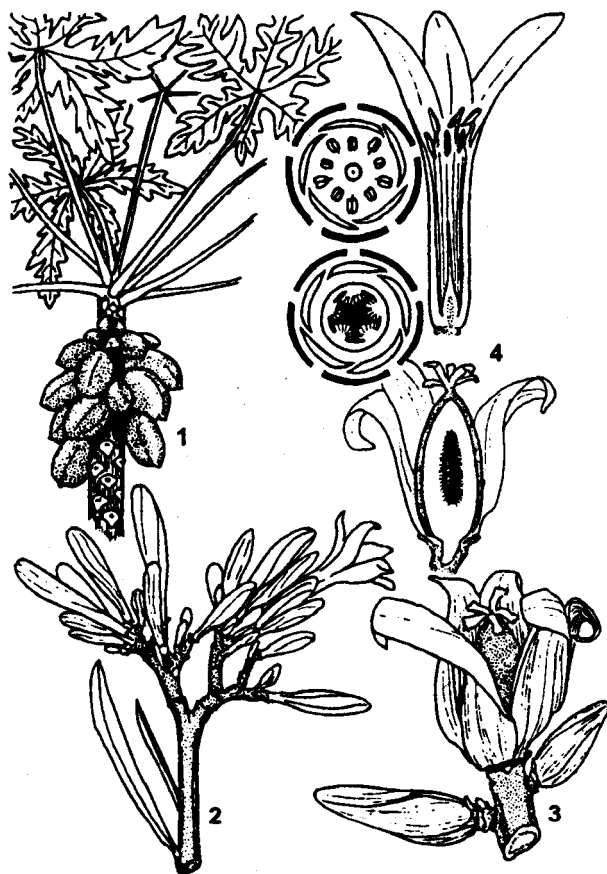


Fig. 67.1 *CARICA PAPAYA*: 1- apical portion of plant showing crown of leaves and mature fruits, much reduced, 2 - part of male inflorescence  $\times \frac{1}{2}$ ; 3 - female inflorescence  $\times \frac{1}{2}$ ; 4 - floral diagrams and longitudinal sections of male flower (top)  $\times \frac{1}{2}$  and female flower (bottom)  $\times \frac{1}{2}$ . Drawn by W.C. Burger. (Reproduced with the permission of Oklahoma Ag. Exp. Station from *Exp. Station Bull.* No. 45, *op. cit.*: fig. 45, in part.)

## 68. THEACEAE

## TERNSTROEMIACEAE

by Sue Edwards\*

Verdcourt, *Theaceae* in *Fl. Trop. E. Afr.*: 8 pp. (1962); Burger, *Families of Flowering Plants in Ethiopia*: 82 (1967); Purseglove, *Tropical Crops: Dicot. 2*: 599–612 (1968).

Trees or shrubs, usually evergreen. Leaves simple, usually with some small teeth along the margin; stipules absent. Flowers unisexual or bisexual, regular, usually solitary and somewhat showy. Sepals (4–)5(–7), free or united near the base. Petals 5(–10), free or united near the base. Stamens 15 to many, filaments free or united near the base; anthers opening by slits or pores. Ovary superior with (1–)2–5(–10) locules and several ovules in each locule; styles free or united. Fruit a capsule, or not opening and dry or fleshy.

A tropical and subtropical family with between 20 genera and 200 species (*Fl. Trop. E. Afr.*) and 40 genera with 600 species (*World Conservation Monitoring Centre*), mostly occurring in east Asia and America. Only represented by the crop plant, TEA, and one or more ornamental species of *Camellia* in the Flora area.

In Tanzania and Uganda, this family is represented by 3 genera: *Ternstroemia*, *Melchiora* and *Ficalhoa*.

**THEA** L. (1753)

Shrubs or small trees. Leaves with short petioles and serrate margins. Flowers solitary or 2–4 together, nodding. Sepals remain after flowering. Petals and outer ring of stamens united at the base. Ovary with 3–5 locules and 4–6 ovules in each. Fruit a woody capsule.

About 16 species in tropical and subtropical Asia.

*Camellia* is often united with *Thea* from which it differs in having sessile erect flowers and deciduous sepals.

**T. sinensis** L. (1753).

*Camellia thea* Link. (1822).

*Camellia sinensis* (L.) O. Kuntze (1887).

Naturally a small evergreen tree to 15 m tall, but under cultivation generally pruned to a low spreading bush 0.5–1.5 m tall; all parts glabrous except for the lower surface of young leaves. Leaves leathery, glossy on the upper surface, elliptic to obovate or lanceolate, 3–12.5(–30) cm long, margin serrate, apex acute to acuminate. Flowers sweet smelling, solitary or 2–4 together in leaf axils, 2.5–4 cm in diameter. Sepals 5–7, persistent. Petals 5–7, white or pink, obovate. Stamens numerous, 0.8–1.2 cm long. Capsule thick-walled, 3-lobed, 1.5–2 cm in diameter. Fig. 68.1.

Cultivated in plantations in areas of high rainfall; 1750–1900 m. IL KF; originating from China, now widely cultivated in many countries including the highlands of Southern and East Africa where it was introduced at the end of the last century. *Burger* 3671.

This is the commercial TEA. Black tea is made from leaves which are withered, rolled, fermented and dried, while for green tea the leaves are steamed and dried without withering and fermenting.

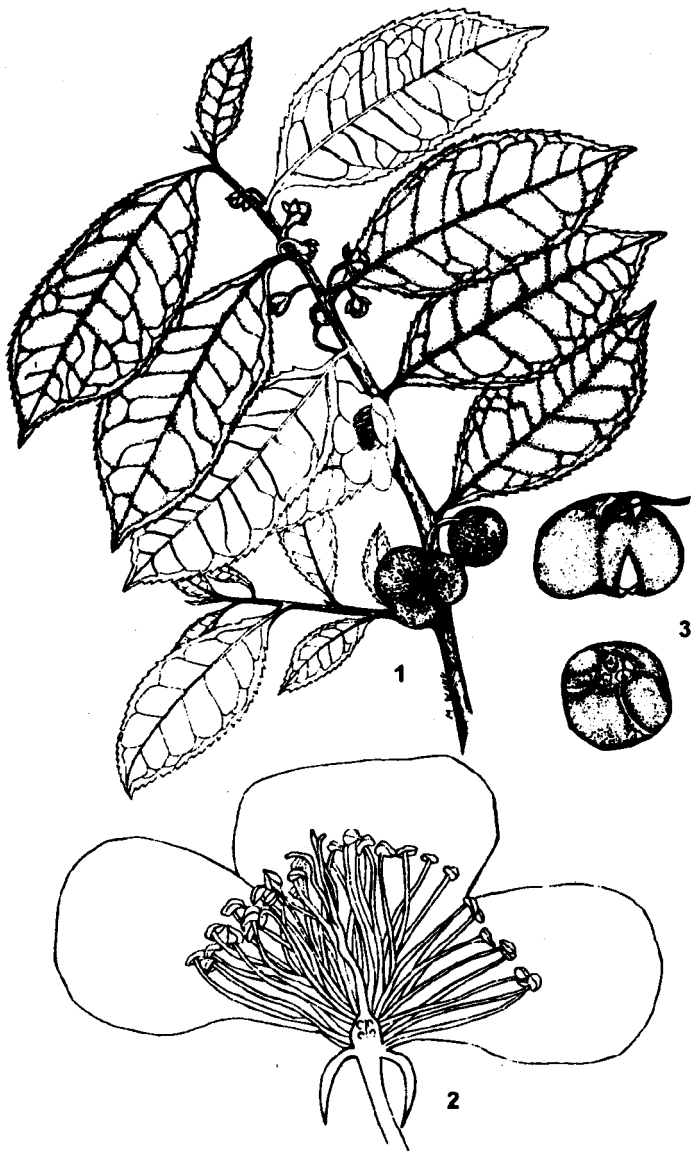


Fig. 68.1 *THEA SINENSIS*: 1 – Branch with flower buds, an open flower and fruits; 2 – flower cut in half; 3 – fruits. (Reproduced with permission from Purseglove: *Tropical Crops: Dicotyledons 2*: fig. 91.)

\* The National Herbarium, Addis Ababa University, P.O. Box 3434, Addis Ababa, Ethiopia.

## 69. OCHNACEAE

by K. Vollesen\*

Cufodontis, *Enum.*: 586–587 (1959); Robson, *Ochnaceae in Fl. Zamb.* 2: 224–262 (1963); Bamps, *Ochnaceae in Fl. Congo*: 1–66 (1967); Kanis in *Blumea* 16: 1–83 (1968); Cucuini, 59. *Ochnaceae in Fl. Somalia* 1: 241–243 (1993).

Trees, shrubs or shrublets, rarely perennial or annual herbs. Leaves alternate, simple, penninerved; stipules present, entire to ± dissected, free or united intrapetiolarly. Flowers bisexual, regular, in axillary or terminal paniculate to umbellate or fasciculate cymes or racemes or solitary. Sepals (3–)5(–10), free or shortly united, sometimes enlarged and brightly coloured in fruit. Petals (4–)5(–12), free. Stamens 5-many, free, inserted on a receptacle; anthers opening by longitudinal slits or apical pores; petaloid or subulate staminodes sometimes present. Ovary sessile, either entire to shallowly lobed with apical style and 2–5 parietal placentas with 1-many ovules or with (3–)5–15 one-ovulate lobes and gynobasic style; styles as many as placentas or ovary-lobes, united or free towards apex. Fruit a 2–5-valved capsule or of 3–12 one-seeded drupelets on a swollen receptacle (rarely a nut).

Family with 30–40 genera and about 600 species in all tropical regions. In the Flora area 2 genera and 7 species.

## Key to genera

1. Perennial herb; flowers with petaloid and subulate staminodes; style apical; fruit a capsule. *Sauvagesia*  
– Shrubs or trees; flowers without staminodes; fruit of free drupelets or a nut. 2
2. Sepals unequally enlarged in fruit, one large and wing-like; fruit dry and nut-like; style apical.  
*Lophira*  
– Sepals equally enlarged and reddish in fruit; fruit of free fleshy drupelets on a fleshy receptacle; style gynobasic. 3
3. Stamens 14 or more, with filaments at least half as long as anthers. 1. *Ochna*  
– Stamens 10, filaments very short to almost absent. 2. *Gomphia*

Both *Sauvagesia erecta* L. – a perennial herb with creeping and ascending stems in swampy places, and *Lophira lanceolata* van Tiegh. ex Keay – a small tree in *Combretum* – *Terminalia* woodland, occur in S Sudan and could possibly turn up in W Ethiopia. I have, therefore, included the genera in the key.

1. *OCHNA* L. (1753)

Trees, shrubs or shrublets, usually glabrous. Leaves petiole, serrulate to serrate or ciliate; stipules entire or ± deeply bifid, free. Inflorescence paniculate to racemose or umbellate or reduced to a single flower, terminal or on short axillary branches; pedicels articulated. Sepals (4–)5, green in flower, persistent, enlarged, ± leathery and reddish in fruit. Petals 5, yellow to orange or white, often unguiculate, deciduous. Stamens 14-many, free, filaments persistent, anthers dehiscing by longitudinal slits or apical pores. Carpels 3–15, free, one-ovulate; styles gynobasic, united or free at apex. Fruit of 3–12 black, one-seeded, fleshy drupelets inserted on the enlarged reddish receptacle.

About 85 species, mostly in tropical Africa, Madagascar and the Mascarenes but with about 10 species in tropical Asia.

\* The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK.

1. Anthers dehiscing by longitudinal slits along their whole length. 2  
– Anthers dehiscing by apical pores or by slits at most along 1/3 of their length. 3
2. Pedicels articulated 2–5(–7) mm above base; leaves acute to acuminate; branchlets brown to purplish, not becoming corky; inflorescence-axis 0.7–2(–2.5) cm long; found in forest. 1. *O. holstii*  
– Pedicels articulated 0–1 mm above base; leaves subacute to retuse; branchlets pale yellow, soon with corky bark; inflorescence-axis 0–0.5(–1) cm; found in woodland. 2. *O. schweinfurthiana*
3. Some or all inflorescences with 3 or more flowers. 4  
– Flowers all solitary or some paired. 5
4. Sepals 12–22 mm long in flower; petals 15–25 mm long; leaves with spreading teeth; pedicels articulated 1–7 mm above base. 3. *O. insculpta*  
– Sepals 4–6 mm long in flower; petals 5–7 mm long; leaves with incurved teeth; pedicels articulated (5–)7–17 mm above base. 4. *O. leucophloeos*
5. Bud-scales persistent on stems for several years, conspicuous; leaves acute to acuminate; ovary with 3–4 carpels; found in rainforest. 6. *O. bracteosa*  
– Bud-scales falling off soon, inconspicuous; leaves subacute to rounded; ovary with 5 carpels; found in dry bushland. 5. *O. inermis*

1. *O. holstii* Engl. (1894).

Tree to 12 m; bark grey or greyish brown, smooth; branchlets brown to purplish, not becoming corky. Leaves often drying bluish-green; petiole 1–5 mm; blade narrowly elliptic or narrowly obovate to obovate, 4–14.5 x 1–5 cm; margin serrulate with incurved reddish teeth; apex acuminate to acute; base cuneate. Inflorescence racemose, 5–15-flowered; rachis 0.7–2(–2.5) cm; pedicels 1.5–3.5 cm, articulated 2–5(–7) mm above base. Sepals 6–9(10–15 in fruit) mm long. Petals 10–12 mm long, pale to bright yellow. Anthers 2–2.5 mm long, same length or shorter than filaments, dehiscing along their whole length. Carpels 5; styles 5–8 mm. Drupelets 9–12 mm long, cylindrical-ellipsoid. Fig. 69.1.4.

(Wondo Genet) AR SD; from S Sudan and S Ethiopia through eastern Africa to S Africa. *Chaffey* 134; *Tesfaye Haile* 696.

2. *O. schweinfurthiana* F. Hoffm. (1889).

Shrub or tree to 6 m; bark dark grey, reticulately fissured; branchlets pale yellow, longitudinally ribbed, soon with corky bark. Leaves: petiole 2–10 mm, narrowly winged from the decurrent leaf-base; blade elliptic to obovate or narrowly so, 5–15 x 2.5–6.5 cm; margin serrulate with incurved reddish teeth; apex subacute to retuse; base attenuate. Inflorescence subumbellate or a short raceme or flowers solitary, 1–8-flowered; rachis 0–5(–10) mm; pedicels 0.8–4 cm, articulated within 1 mm of base. Sepals 4–7 (10–15 in fruit) mm long. Petals 6–10 mm long, bright yellow. Anthers 2–2.5 mm long, shorter than filaments, dehiscing along their whole length. Carpels 5; styles 4–8 mm. Drupelets 7–10 mm long, subglobose-ellipsoid. Fig. 69.1.1–3.

*Combretum* – *Terminalia* woodland on stony granitic soil; 1100–1700 m. SD; widespread in the drier parts of tropical Africa, but almost absent from the NE, not in Kenya and Somalia. *Tesfaye Haile* 840; *Haugen* 873.

3. *O. insculpta* Sleumer (1934);

*O. boranensis* Cufod. (1939) – types: SD, Arero, *Cufodontis* 291 and 353 (both FT syn.).

*O. macrocalyx* sensu Cufod. (1959) for *Mooney* 5591, not Oliv. (1868).

Shrub or small tree to 4 m; bark rough, greyish; branchlets greyish to brownish or purple, soon rugose. Leaves: petiole 1–3 mm; blade elliptic to obovate or narrowly so, 4–11.5 x 1.3–4.5 cm; margin closely serrulate with spreading teeth; apex acute to rounded; base cuneate to rounded. Inflorescence subumbellate, a condensed raceme or flowers solitary, 1–6-flowered; rachis 0–4(–7) mm; pedicels 1–4 cm, articulated 1–7 mm above base. Sepals 12–22 mm long in flower, hardly enlarging in fruit. Petals 15–25 mm long, bright yellow. Anthers 4–5.5 mm long, same length or longer than filaments, dehiscing by apical pores. Carpels 5–7; styles 10–17 mm. Drupelets 9–12 mm long, ellipsoid. Fig. 69.2.1 & 2.

Dry *Juniperus* forest; 1650–2000 m. SD; Uganda, Kenya, N Tanzania. *Mooney* 5591.

Closely related to *O. macrocalyx* which is a suffrutex in woodland habitats found in southern tropical Africa (north to N Tanzania).

4. *O. leucophloeos* Hochst. ex A. Rich. (1847)

– types: EW/TU, Mareb Valley, *Quartin-Dillon & Petit* s.n. (P syn.); TU, Tacazze Valley, *Schimper* II: 1408 (P syn.).

*O. micropetala* Hochst. ex Martelli (1886) – type: TU, Djeladjeranne, *Schimper* III: 1738 (FI–Webb holo., FT K P iso.).

*O. ardisioides* Webb (1854).

Tree to 8 m; bark grey to yellowish, powdery or scaly; branchlets greenish to brownish, soon pale greyish to yellowish and ± powdery. Leaves: petiole 2–4 mm, winged from decurrent leaf-base; blade elliptic to slightly obovate,

largest (6.5–)8.5–21 x (2.7–)3–8 cm; margin serrulate with incurved teeth; apex subacute with broad obtuse acumen to broadly rounded; base attenuate to cuneate. Inflorescence subumbellate (rarely a few solitary flowers), (1–)2–6-flowered (always some with 3 or more flowers); rachis up to 1 mm long; pedicels 1.5–4 cm, articulated (5–)7–17 mm above base. Sepals 4–6(–11 in fruit) mm long. Petals 5–7 mm long, bright yellow. Anthers 1.5–2 mm long, shorter than filaments, dehiscing by apical pores. Carpels 5; style c 5 mm. Drupelets 8–13 mm long, ellipsoid. Fig. 69.2.3 & 4.

*Combretum* – *Terminalia* and *Pterocarpus* – *Terminalia* woodland on rocky slopes; 400–1500 m. EE EW TU GD GJ WG IL; E Sudan. *Friis* et al. 2517, *Mooney* 6928, *Thulin* et al. 4032.

5. *O. inermis* (Forssk.) Schweinf. ex Penzig (1893);

*O. rivae* Engl. (1897) – type: SD, Otallo, *Ruspoli & Riva* 1790(1733) (FT holo.).

*Diporidium schimperi* van Tiegh. (1902) – type: GD, Bellegas and Amsala to Netch, *Schimper* 485 (P holo., K iso.).

*Heteroporidium abyssinicum* van Tiegh. (1902) – types: EW, Damas, Chagali, *Schweinfurth & Riva* 664 (P syn., FT K isosyn.); EW, Acrur, *Schweinfurth & Riva* 1726 (P syn., FT K isosyn.).

*O. leucophloeos* A. Rich. var. *micropetala* Fiori in *Boschi e Piante Legnose dell'Eritrea*: 266 (1912) – types: EW, Keren, Mt. Deban, *O. Beccari* 16 (FT syn., BM K isosyn.) and 259 (FT syn.), not *O. micropetala* Hochst. ex Martelli (1886).

Shrub to 2(?–4) m; branchlets brownish to purplish, becoming greyish to purplish, bark not becoming powdery. Leaves: petiole 1–4 mm, narrowly winged apically; blade elliptic to slightly obovate, largest 1.5–8(–15) x 0.8–4.5 (–7.5) cm; margin serrulate with incurved teeth; apex subacute to rounded, sometimes apiculate; base shortly cuneate to truncate. Flowers all solitary or some paired; pedicels 0.5–2.5(–3) cm, articulated 0.5–2(–6) mm above base. Sepals 5–6 (8–13 in fruit) mm long. Petals 7–10 mm long, bright yellow. Anthers c 1.5 mm long, shorter than filaments, dehiscing by apical pores. Carpels 5; style c 4 mm. Drupelets 7–9 mm long, ellipsoid-subglobose. Fig. 69.1.5 & 6.

*Acacia* and *Acacia* – *Commiphora* woodland and bushland on a wide variety of soils; 500–1900 m. EE EW GD SU (Awash Valley & Abbay Gorge) WU GG SD BA HA; Blue Nile from Ethiopia through eastern Africa to Transvaal. *Ash* 1894; *Friis* et al. 1032; *M.G. & S.B. Gilbert* 1276.

The material from northern Ethiopia generally has larger leaves and more paired flowers (and thus approaches *O. leucophloeos*), but this combination also occurs further south in Africa (see *Fl. Zamb.*) and is most likely not worth taxonomic recognition.

6. *O. bracteosa* Robyns & Lawalrée (1947).

Shrub to 2 m; branchlets brownish to purplish, soon covered with persistent bud-scales. Leaves: petiole 1–2 mm; blade elliptic or narrowly so or slightly obovate, 3.5–11 x 1–3.5 cm; margin serrulate with straight teeth; apex acuminate to acute; base attenuate to cuneate, decurrent on the petiole.



Figure 69.1 *OCHNA* spp. and *GOMPHIA* sp. *O. SCHWEINFURTHIANA*: 1 – fruiting branch  $\times \frac{1}{2}$ ; 2 – flower  $\times 2$ ; 3 – anther  $\times 12$ . *O. HOLSTII*: 4 – fruiting branch  $\times \frac{1}{2}$ . *O. INERMIS*: 5 & 6 fruiting branches  $\times \frac{1}{2}$ . *O. BRACTEOSA*: 7 – fruiting branch  $\times \frac{1}{2}$ . *GOMPHIA* sp. = Mooney 9249: 8 – flowering branch  $\times \frac{1}{2}$ ; 9 – flower  $\times 2$ . 1 from Tesfaye Haile 840; 2 & 3 from Wickens 3125; 4 from Tesfaye Haile 696; 5 from Friis et al. 2725; 6 from de Wilde 7347; 7 from Meyer 9014; 8 & 9 from Mooney 9249. Drawn by Eleanor Catherine.

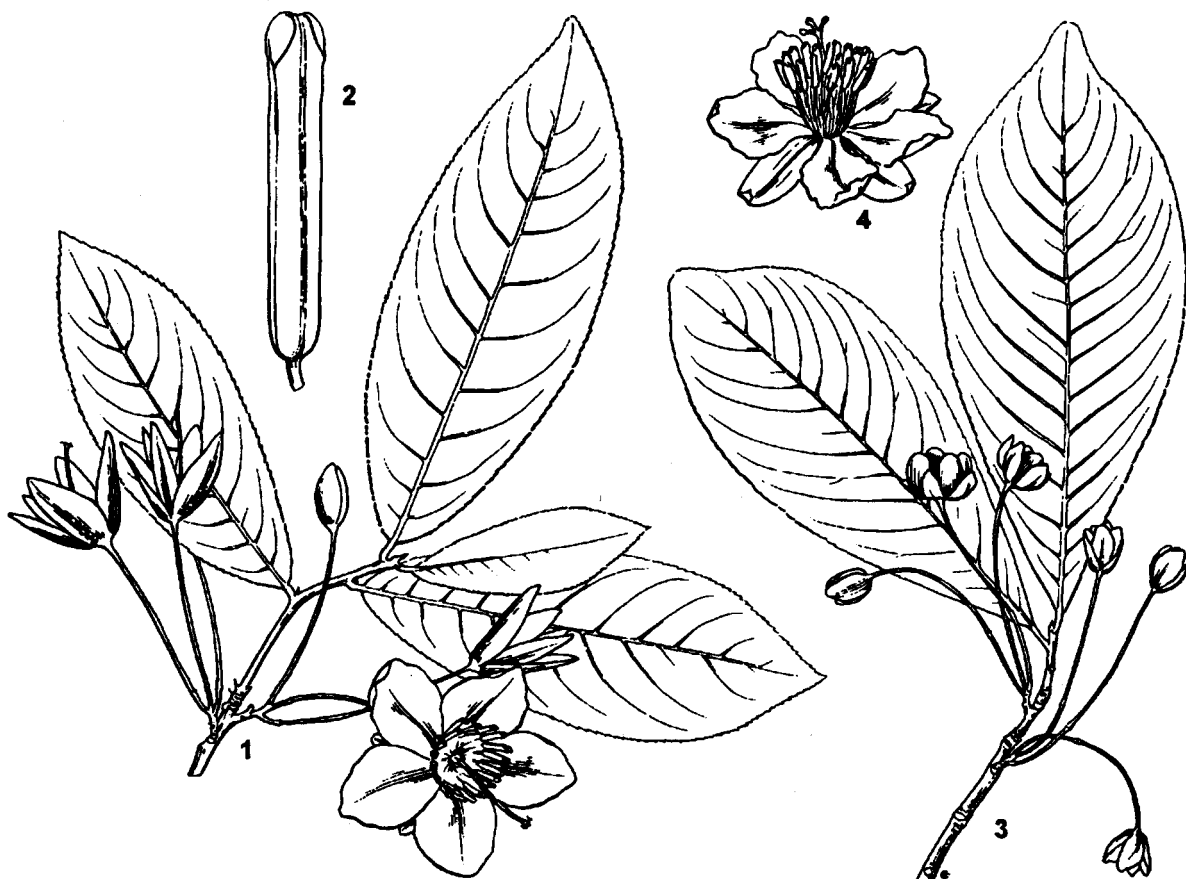


Figure 69.2 *OCHNA* spp. *O. INSCULPTA*: 1 – flowering branch  $\times \frac{2}{3}$ ; 2 – anther  $\times 8$ . *O. LEUCOPHLOEOS*: 3 – fruiting branch  $\times \frac{2}{3}$ ; 4 – flower  $\times 2$ . 1 & 2 from Mooney 5591; 3 from de Wilde 10743; 4 from Mooney 6928. Drawn by Eleanor Catherine.

Flowers all solitary; pedicels 0.5–1(–1.5) cm, articulated 2.5–4 mm above base. Sepals 6–9 (10–13 in fruit) mm long. Petals 10–13 mm long, yellow. Anthers  $c$  4 mm long, longer than filaments, dehiscing by apical pores. Carpels 3–4; styles 5–7 mm. Drupelets 7–8 mm long, ellipsoid. Fig. 69.1.7.

Shrub layer in lowland rainforest;  $c$  925 m. KF; Cameroon, S Sudan, NE Zaire, Uganda. Meyer 9014.

2. **GOMPHIA** Schreb. (1789)  
*Campylospermum* van Tiegh. (1902)  
*Ouratea* Aubl. (1775)

Trees or shrubs, usually glabrous. Leaves petiolate to sessile and amplexicaul, margins serrate to ciliate or entire; stipules entire, free or united intrapetiolarly. Inflorescence paniculate to racemose or umbellate, terminal or axillary; pedicels articulated. Sepals 5, green in flower, persistent, usually enlarged,  $\pm$  leathery and reddish in fruit. Petals 5, yellow (rarely white), not unguiculate, deciduous. Stamens 10, free, anthers dehiscing by apical pores, filaments absent or very short, persistent. Carpels 5–10, free, one-ovulate; styles gynobasic, completely united. Fruit of 1–several free brown to blackish one-seeded fleshy or leathery drupelets inserted on the enlarged reddish receptacle.

About 50 species, mainly in tropical Africa and Madagascar. One species from India east to Hainan (SE China) and south to Indonesia.

It seems totally reasonable to follow the view of Kanis (l.c.) and accept the Old World species as being generically distinct from the American species (*Ouratea*, sens. str.). However, most newer African authors take a wider circumscription of this genus.

G. sp. = Mooney 9249.

*Ouratea floribunda* De Wild. (1920), not (St. Hill) Engl. (1876).

Shrub or tree to 5 m; branchlets greenish, longitudinally striate and ribbed, becoming straw-coloured and slightly fissured. Leaves: petiole 1–3 mm, grooved above; blade narrowly elliptic to slightly obovate, largest 10–22  $\times$  2.7–5 cm; margin serrulate with straight to slightly spreading teeth; apex acuminate; base attenuate. Flowers in clusters of 2–4 (or some solitary) along the branches of a terminal (rarely axillary) condensed to open 3–15 cm long panicle; pedicels 5–15 mm, articulated 2–4 mm above base. Sepals 5–8 mm long, lanceolate, acute. Petals 7–10 mm long, obovate, bright yellow. Anthers 4–5 mm long, filaments less than 1 mm. Carpels 5; style 4–6 mm. Drupelets 6–7 mm long, ellipsoid. Fig. 69.1.8–9.

Understorey in rainforest, swamp forest; 1250–1350 m. IL KF; S Sudan, Uganda, W Kenya. Mooney 9249; Friis 4509.

## 70. ANCISTROCLADACEAE

by Mesfin Tadesse\*

Burger, *Families of Flowering Plants in Ethiopia*: 83 (1967); Leonard, *Ancistrocladaceae in Fl. Trop. E. Afr.*: 4 pp. (1986).

Scandent shrubs or woody climbers; ultimate branches with a series of woody hooks in one plane. Leaves alternate, simple, glabrous, leathery, penninerved, variable in size with those on main shoots being larger, cuneiform, minutely punctate on both surfaces, each puncta with a peltate hair and glandular secretion; petiole articulated; stipules small, falling early. Inflorescence axillary or pseudo-terminal, spikate or dichotomously branched, some branches with hooks; pedicels articulated. Flowers perfect, actinomorphic, 5-merous, falling early. Calyx-tube short, fused to the base of the ovary; sepals imbricate, unequal. Petals free, contorted or imbricate. Stamens (5–)10(–15), 1–2-seriate, alternately unequal, perigynous; filaments short, fused at the base; anthers basifixed, 2-theous, dehiscent longitudinally. Ovary inferior, 3-carpellate, 1-locular; style 3, free or united; stigmas 3; ovule 1, basal. Fruit an indehiscent nut, 1-seeded, crowned by the wing-like enlarged sepals. Seeds with thin testa and endosperm.

A small monogeneric family with 20 species, 10 in tropical Asia, 9 in the Guineo-Congolian forests in Africa and 1 species, *Ancistrocladus robertsoniorum* Leonard, in the coastal forests of Kenya.

## 71. DIPTEROCARPACEAE

by Mesfin Tadesse\*

Andrews, *The flowering Plants of the Anglo-Egyptian Sudan*, Vol. I: 189 (1956); Burger, *Families of Flowering Plants in Ethiopia*: 82 (1967); Hutchinson, *The families of Flowering Plants*, ed. 3: 350 (1973); Verdcourt, *Dipterocarpaceae in Fl. Trop. E. Afr.*: 11 pp. (1989).

Trees or shrubs with aromatic resins; stem usually buttressed. Indumentum often of fasciculate or stellate hairs, frequently glandular. Leaves alternate, penninerved, simple with entire or sinuate margins and nectary at the base of the mid-rib on the upper side of the blade, petiolate and stipulate; stipules paired, persistent or falling early. Flowers bisexual, regular, several to many in axillary or terminal branched panicles, racemes or less often cymes, with paired persistent or soon falling bracts or bracteoles, often hairy. Calyx persistent, free or fused at the base, 2–5 lobes usually developing into very distinct wings in fruit, lobes imbricate or valvate in bud. Corolla-lobes 5, contorted, fused at the base or free. Stamens 5 to over 100; filaments free or united; anthers two-theous, introrse, or laterally dehiscent. Ovary superior or semi-inferior, partly unilocular or (2–) 3–5-locular; ovules 2(–4) per locule, placentation axile or parietal; style 1 with 3 stigmas. Fruit with woody pericarp and 2–5 persistent wing-like sepals, indehiscent. Seeds usually 1.

A family with many of its members found in Asia. It is divided into three subfamilies: *Dipterocarpoideae* with 13 genera and 470 species is confined to Seychelles, Asia and Malaysia; *Monotoideae* Gilg (1899) with 2 genera, i.e. *Marquesia* Gilg (1908) and *Monotes* A. DC. (1868) and about 35 species occurs in Africa and Madagascar; and *Pakaraimoideae* Maguire, Ashton & de Zeeuw (1977) with a single species is found in Guyana and Venezuela.

*Marquesia* with 3–4 species is found in Tanzania, Zaire, Zambia and Angola. *Monotes* with about 26–32 species is known from Sudan, Tanzania, Zaire, Angola, Mozambique, Zambia, Malawi, Mali, Guinea, Cote d'Ivoire, Togo, Ghana.

Verdcourt (1989) wrote 'although *Dipterocarpoideae* do not occur within Africa today there are undoubtedly records from the late tertiary near Mt. Elgon; Bancroft has described *Dipterocarpoxyllum africanum* (Føren. Forhandl. 55: 59 (1933)) and Weyland collected fossil woods in volcanic tuffs which are probably congeneric (Lehrbuch der Paläobotanik, ed. 2: 455 (1964)). The significance of these is discussed by Ashton in *Fl. Males.*, Ser. 1, 9(2): 242 (1982).' Verdcourt (1989:4) also wrote that *Monotes* is 'reported from the Tertiary of Europe'. *Monotes kerstingii* Gilg occurs in Sudan (Juba district, near Nargata; east of Madebe) and thus might turn up in SW Ethiopia (Gambella).

The subfamily *Dipterocarpoideae* includes many good timber trees, some of which have been planted in Tanzania.

\* The National Herbarium, Addis Ababa University, P.O. Box 3434, Addis Ababa, Ethiopia.

## 72. MYRTACEAE

by Ib Friis\*

Cufodontis, *Enum*: 625 (1959); White, 74. *Myrtaceae* in *Fl. Zamb.* 4: 183–212 (1978); Thulin and Moggi, 60. *Myrtaceae* in *Fl. Somalia* 1: 243–245 (1993).

Trees or shrubs (in the Flora area). Leaves usually opposite, less often alternate or in whorls of threes or fours, simple, entire, usually leathery, punctate from dot-shaped oil glands embedded in the blade, usually with a submarginal (rarely marginal) nerve running along the entire length. Stipules absent. Inflorescences axillary or terminal, paniculate or umbellate, rarely fasciculate, composed of small cymose umbels in *Eucalyptus*; flowers sometimes solitary in leaf-axils. Flowers bisexual, rarely unisexual by abortion, regular. Sepals 4–5, often persistent, often with punctate glands, sometimes (most notably in *Eucalyptus*) completely fused to form a conical structure called an operculum or cap which is shed at the beginning of flowering to expose the stamens and style. Petals 4–5, free or (in *Eucalyptus*) fused with the sepals in the operculum. Stamens usually numerous, free or basally united, sometimes fused into bundles; filaments often coiled or bent in bud; anthers often with an apical gland. Ovary inferior or half inferior, enclosed in a usually obconical or bell-shaped structure (hypanthium) thought to have been formed by the pedicel, the hypanthium may continue as a short tube above the ovary, carrying the stamens; free top part of ovary often forms a nectar-producing disc; ovary 2–5(–10)-locular, septa sometimes incomplete; ovules usually numerous per locule or placenta; style 1, stigma punctiform, capitate or 2–3-lobed at apex. Fruit a berry, drupe or capsule dehiscent only at apex. Seeds usually many per locule.

More than 100 genera and over 3000 species names have been published in this largely tropical family. It is very well represented in tropical America, Asia and Australia, but more poorly represented by indigenous species in tropical Africa. However, a large number of species, particularly of *Eucalyptus*, have been introduced and a few of these are now extensively used in forestry plantations and in village woodlots. The account covers 9 genera and 64 species, the majority of which are introductions.

This account contains original taxonomic observations where the two indigenous genera (*Eugenia* and *Syzygium*) are concerned; the remaining part of the treatment relies on already established taxonomic opinions in horticultural literature and in the *Flora of Australia*.

## Key to genera

- |   |                    |  |                       |
|---|--------------------|--|-----------------------|
| 1. Fruit a berry.   | 2                  | – Flowers in axillary or terminal cymes or panicles; perianth with free sepals and petals or these united into an operculum. | 8                     |
| – Fruit a capsule.  | 6                  |  |                       |
| 2. Ovary 4–5-locular; fruit many-seeded.  | 3                  | 7. Filaments free.   | 6. <i>Callistemon</i> |
| – Ovary 1–2(–3)-locular; fruit few-seeded.  | 4                  | – Filaments united into bundles opposite the petals.   | 7. <i>Melaleuca</i>   |
| 3. Leaves not white-tomentose beneath; stamens about as long as petals.   | 2. <i>Psidium</i>  | 8. Perianth with free sepals and petals; filaments united into bundles opposite the petals.                                  | 8. <i>Lophostemon</i> |
| – Leaves white-tomentose beneath; stamens much longer than petals.  | 3. <i>Feijoa</i>   | – Perianth with sepals and petals united into an operculum which falls off when the stamens expand.                          | 9. <i>Eucalyptus</i>  |
| 4. Placentation (at least in upper part of ovary) appearing parietal; fruit crowned with the persistent calyx lobes.  | 1. <i>Myrtus</i>   |  |                       |
| – Placentation axile; fruit without persistent calyx lobes.   | 5                  |  |                       |
| 5. Flowers axillary in 1–5-flowered fascicles; bracteoles persistent; petals free, usually persistent during anthesis; filaments and style scarcely longer than petals.   | 4. <i>Eugenia</i>  |  |                       |
| – Flowers in terminal cymes or panicles; bracteoles soon falling; sepals and petals usually falling together as an operculum early during anthesis; filaments and style almost twice as long as petals or longer. | 5. <i>Syzygium</i> |  |                       |
| 6. Flowers sessile and solitary in axils of normal leaves, forming alternately flowering and non-flowering parts of the shoot; perianth with free sepals and petals.  | 7                  |  |                       |

## 1. MYRTUS L. (1753)

Shrubs or small trees. Leaves gland-dotted, often aromatic. Flowers solitary or occasionally in racemes. Hypanthium ellipsoid or subglobose. Sepals 5 (rarely 4), soon opening. Petals 5 (rarely 4), spreading and persistent during anthesis. Stamens numerous, in several whorls. Ovary 2–3-locular, at least in lower part; ovules numerous. Fruit a berry, crowned with the persisting calyx.

A genus of about 100 species, mostly in tropical regions, especially in the warm parts of Australia. Only one species recorded in the Flora area.

*M. communis* L. (1753)

– type: ‘In southern Europe, Asia, Africa’ in *Herb. Linnaeus* (LINN).

Shrub to c 3 m high. Young branches usually quadrangular

\* Botanical Museum, University of Copenhagen, Gothersgade 130, DK-1123 Copenhagen K, Denmark.



or even winged. Leaves ovate to lanceolate, 1.5–4(–6) x 0.5–1.5(–3) cm, apex obtuse, acute or acuminate, base rounded or cuneate, dark shining green above, paler below, conspicuously gland-dotted, margin usually incurved; petiole up to 2 mm long. Flowers axillary, solitary, pedicel slender, *c* 1.5 cm long; bracteoles *c* 1.5 mm long, falling quickly. Hypanthium ellipsoid, *c* 4 x 3 mm. Sepals broadly deltoid, 1.5 x 2 mm. Petals obovate, white, 7–10 x 5–7 mm. Stamens 6–8 mm long. Style slightly longer than stamens; stigma truncate. Fruit a subglobose black berry, *c* 8 mm in diameter, crowned by the persisting perianth. Fig. 72.1.

Grown in gardens and parks of Addis Ababa and the larger towns, and also found in many villages; 1800–2500 m. EW GD SU HA; indigenous in the Mediterranean region, as far east as Afghanistan. *Tadesse Ebba* 500; *Amare Getahun* D-98; *Westphal & Westphal-Stevens* 1301.

This plant is much more widespread than herbarium collections indicate. Ethiopia has had cultural contacts with Egypt and the eastern Mediterranean from pre-historic times and it is likely this species, like *Punica granatum* (Lythraceae) and *Vitis vinifera* (Vitaceae), was introduced a long time ago.

This species is used in flavouring butter. It is also used to extract a perfume which women mix with butter to make a fragrant ointment for their hair.

## 2. PSIDIUM L. (1753)

Trees or shrubs. Inflorescences axillary, 1–3-flowered. Calyx entire, almost completely concealing the corolla before anthesis, irregularly splitting into 4–5 lobes, persistent. Petals 4–5. Stamens numerous, free. Ovary imperfectly 4–5-locular, with 4–5 intrusive, parietal placentas. Ovules numerous. Fruit a berry with numerous angular seeds.

Over 100 species, mostly in tropical America; a few in the Pacific Islands. Two species, *P. guajava* L., with a quadrangular cross-section of the young branches, and *P. cattleianum* Sabine with a rounded cross-section, are widely planted in tropical Africa for their edible fruits. In the Flora area only *P. guajava* has so far been recorded with certainty, but one incompletely identified specimen, *Berhanu Lemma* 38, from the park at the Addis Ababa Hilton Hotel, may represent *P. cattleianum*. Hence, only the following species has been given full treatment for the Flora area.

### *P. guajava* L. (1753)

– type: 'In India' in *Herb. Linnaeus* (LINN).

Small tree to 10 m tall, but usually much smaller. Bark smooth, pale brown, peeling; branchlets quadrangular. Leaves: blade up to 13 x 7 cm, elliptic to oblong-elliptic, leathery, apex rounded or acute, base rounded; lower surface densely puberulous; lateral nerves numerous, parallel, prominent beneath. Flowers solitary in leaf-axils. Calyx completely covering the young buds, lobes *c* 9 x 5 mm, in open flowers reflexed, persisting and becoming more or less erect in fruit, strap-shaped, white puberulent inside. Corolla white, petals *c* 13 x 8 mm, elliptic-oblong. Stamens *c* 1 cm long. Style of about same length as stamens, with

slightly capitate stigma. Berry up to *c* 5 cm in diameter, globose or ovoid, sometimes pear-shaped, usually yellow-green, with pinkish edible flesh inside. Fig. 72.2.

Very commonly planted in town gardens and parks, frequently also in village gardens, sometimes naturalised in secondary scrub or along forest margins (see below); 1200–2400 m. EW SU BA KF IL HA; indigenous in tropical America. Presumably cultivated specimens: *Chaffey* 305; *Jansen & Aweke* 4891; *Tadesse E.* 506.

*P. guajava*, GUAVA, is now cultivated throughout the tropics for its edible fruits which are reported to be rich in vitamin C. In many places this species is becoming naturalised, for example at the edge of the riverine forest in Bole Gorge (*Ash* 439). In other countries, particularly South Africa, it has become a highly aggressive and damaging weed.

## 3. FEJJOA O. Berg (1858)

Shrubs or small trees with opposite, pinnate-veined leaves white tomentose beneath. Flowers solitary, axillary, long-pedicelled; receptacle prolonged above the ovary into a tube, carrying 4 calyx lobes. Petals 4, spreading. Stamens many, long exserted; anthers fixed to filament on the back, versatile. Ovary 4-loculed with several ovules in each locule; style as long as the stamens. Fruit a berry, crowned by the persisting calyx-lobes.

2 species in S America, 1 of these (the one recorded below) widely cultivated in the tropics and recorded from the Flora area.

### *F. sellowiana* (O. Berg) O. Berg (1858);

*Orthostemon sellowianus* O. Berg (1856) – types: Brazil, Rio Grande del Sul & Uruguay, Montevideo, *Sello* s.n. (prob. B. syn. destroyed.).

Tree to *c* 5 m tall. Leaves ovate-oblong to elliptic, 4–6 cm long, apex acute or obtuse, glossy green above, densely white tomentose beneath. Flowers 2–3.5 cm across when fully open. Petals white-tomentose on outside, purplish and almost glabrous on inside. Stamens and style dark red. Fruit ovate to oblong, 2.5–7.5 cm long, dull greenish, sometimes tinged with red and with whitish bloom when mature; flesh whitish, surrounding pulp in which the seeds are embedded.

Planted as an ornamental or for its fruits in parks and gardens; 1700–2000 m. SD HA; indigenous in S Brazil, Paraguay, Uruguay, and Argentina. *Amare Getahun* s.n. (*Digg's Farm*, 1960); *Yemanie Tekie* s.n. (Awasa, 1981).

Widely introduced to warm parts of the world and known in the horticultural trade as PINEAPPLE GUAVA.

## 4. EUGENIA L. (1753)

Trees, shrubs or subshrubs. Flowers axillary, solitary or in small, sessile fascicles; flower-buds globose or subglobose; flowers often functionally unisexual or the plants with male and bisexual flowers. Bracteoles conspicuous and persistent at base of receptacle; pedicels usually long and slender. Lower part of receptacle completely fused



Figure 72.1 *MYRTUS COMMUNIS*: 1 – branch with flowers and young fruits; 2 – branch with mature fruits. 1 drawn by Mrs Katty Torn and 2 drawn by Mrs Ester Huber. (Reproduced with permission from *Flora of Palestine: Two plates*, page 542 (1972). Neither scales nor specimens are given in the original.)



Figure 72.2 *PSIDIUM GUAJAVA*: 1 – flowering branch x  $7\frac{1}{2}$ ; 2 – leaf underside x  $7\frac{1}{2}$ ; 3 – transverse section through the main vein of the leaf x 130; 4 – flower bud x 3; 5 – flower x 3; 6 – petal x 3; 7 – stamen x 6; 8 – style and stigma x 6; 9–10 – transverse sections through the ovary x 6; 11 – fruit x 1. 1–2, 4–7 & 11 from *de Burkart* 6809; 3 from *de Burkart* 14345; 8 from *de Alboft* s.n., 9-XI-1896; 9 & 10 from *de Jörgensen* 3643. Drawn by Alicia Rotman. (Reproduced with permission from *Revision Del Genero Psidium En La Argentina, (Myrtaceae). De Darwiniana*, tomo 20: 118–444, fig. 9, 1976.)

with the ovary; free receptacle tube usually short or undeveloped; in male flowers the hypanthium is deeply concave. Calyx of 4–5 well developed, free sepals. Petals 4–5, free, persistent during anthesis. Stamens numerous, inserted on the rim of the receptacle, about the same length as the petals. Ovary 2-locular, placentation axile; ovules numerous. Style about same length as stamens; ovary and style very rudimentary in male flowers. Fruit a 1–3-seeded berry.

A genus with several hundred species, mostly in tropical and subtropical America. In Africa and Asia largely replaced by *Syzygium*.

This genus includes *Eugenia caryophyllus*, the CLOVE tree. Cloves are the dried unopened flower-buds which have been used to control toothache, tooth decay and halitosis since ancient times. Originating from the Molucca Islands, cloves have been a major item of world trade for more than a millennium. Zanzibar is now the leading producer.

1. Sepals much longer than broad; exotic. 1. *E. uniflora*  
– Sepals almost orbicular; indigenous species.

2. *E. bukobensis*

1. *E. uniflora* L. (1753)

– type: 'In India' in *Herb. Linnaeus*.

Shrub or small tree up to 5 m. Leaves leathery, blade up to 6 x 3 cm, ovate or ovate-elliptic, usually broadest below middle, apex long and bluntly acute or subacuminate, base rounded to subcordate; leathery, glabrous; lateral veins rather indistinct, submarginal vein indistinct; petiole 2–4 mm long. Flowers axillary, solitary or few together, 1.5–2.5 cm long; pedicel up to 2 cm long, slender. Sepals 4, c 4 x 3 mm, ovate-dentate, strongly reflexed, persisting in fruit. Petals 6 x 3 mm, obovate to elliptic, reflexed. Stamens c 5 mm long. Style slightly longer, stigma punctiform. Fruit a dark red or purple berry, depressed globose, sometimes more or less ribbed, 1.5–2.0 cm in diameter. Fig. 72.3.6 & 7.

Planted as a hedge-forming shrub and cultivated in research stations (Jimma, Melko, Amaressa, Digg's Farm); 1000–2000 m. KF HA; indigenous in Brazil. Friis et al. 3958; Sue Edwards & Tewolde B. G/E 4142; Berhanu s.n. (1960).

This species is widely cultivated in the tropics, both as a hedge plant and for its edible fruits.

2. *E. bukobensis* Engl. (1899)

– type: Tanzania, Bukoba, *Stuhlmann* (B, 5 syntypes).

Small tree to c 10 m high. Leaves lanceolate to elliptic-ovate, 3–14(–16.5) x 1.3–5.5(–8.0) cm, apex acute to shortly acuminate, base cuneate to rounded or slightly subcordate, leathery, glabrous, submarginal nerve 1–2 mm from edge; petiole thick, 1–1.5 mm in diameter, 2–5 mm long. Flowers fasciculate, axillary, but also formed on older wood in the axils from which leaves have fallen, 3–5(–8) in each fascicle; pedicel 2–13 mm long, flower-bud 3–6 mm in diameter; bracteoles 0.5–1 mm long, 'pseudopeduncle' above the

bracteole c 1 mm long, receptacle (including pseudopeduncle) 2–3 mm long. Sepals 4, almost orbicular, 2.5–3.5 mm in diameter. Petals 4, 4–6 x 2–3 mm, white. Stamens 5–8 mm long. Style slightly shorter than stamens, stigma slightly expanded. Fruit a subglobose berry, c 8–15 x 7–11 mm, purplish. Fig. 72.3.1–5.

Riverine forest and upland rain forest; 1000–2000 m. WG KF IL SD; Zaire, Uganda, Tanzania, Zambia, Zimbabwe. Mooney 8708; Friis et al. 4076; J.J. de Wilde 6366.

The identity of this taxon is not altogether certain, and the genus needs revision on a continental scale before the question can be settled. Boutique in *Flore d'Afrique Centrale, Myrtaceae*: 25 (1968) has given an account of *E. bukobensis* without including material from Ethiopia. The general size of the leaves and the flowers of the Ethiopian material assigned to *E. bukobensis* seems to be larger than in the material from NW Tanzania and Uganda, but matches material seen for this account from Zaire. I have, therefore, with some reservation, maintained the determination of the Ethiopian material as *E. bukobensis*. This material is also very similar to material named as *E. capensis* (Eckl. & Zeyh.) Sond. subsp. *nyassensis* (Engl.) F. White, in the synonymy of which F. White in *Flora Zambesiaca* 4: 189 (1978) placed *E. bukobensis* with an indication of doubt.

5. *SYZYGIUM* Gaertn. (1788)

Trees, shrubs or subshrubs. Inflorescences usually terminal cymose panicles. Flowers pear-shaped in bud; receptacle narrowing into a thin lower part (a 'pseudopedicel') which is difficult to distinguish from the pedicel itself except for an articulation; the upper, tube-like receptacle bears stamens on the margin; the perianth forms (in African species) an indistinct, irregularly lobed extension of the receptacle tube. Petals 4, usually obovate, usually (in African species) falling together as an operculum. Stamens numerous, much longer than the petals, usually white or cream. Ovary 2-locular, placentation axile; ovules numerous. Style slightly longer than stamens; stigma punctiform. Fruit a berry, usually 1-seeded.

A genus which has often been confused with *Eugenia*, for which reason the exact number of species is not clear, but it has lately been estimated at more than 500, which are distributed in tropical Africa and Asia. For the Flora area, there is only 1 very variable indigenous species which is here divided into 3 subspecies.

One widely introduced species in the tropics, *S. cumini* (L.) Skeels, jambolan or jambolan-plum, is of Indonesian origin and has edible, 2–3 cm long, purple-black, oblong, curved fruits. It is much planted for shade, producing fuelwood, and for its edible fruits, of which a juice can be made. Two specimens, both from Digg's Farm, Amaressa (HA), *Amare Getahun* s.n. (1960), and *C. Basham* s.n. (1960), are claimed on the label to represent this species, but the material is not adequate to confirm identity.

There are several other species in this genus which also have edible fruits.

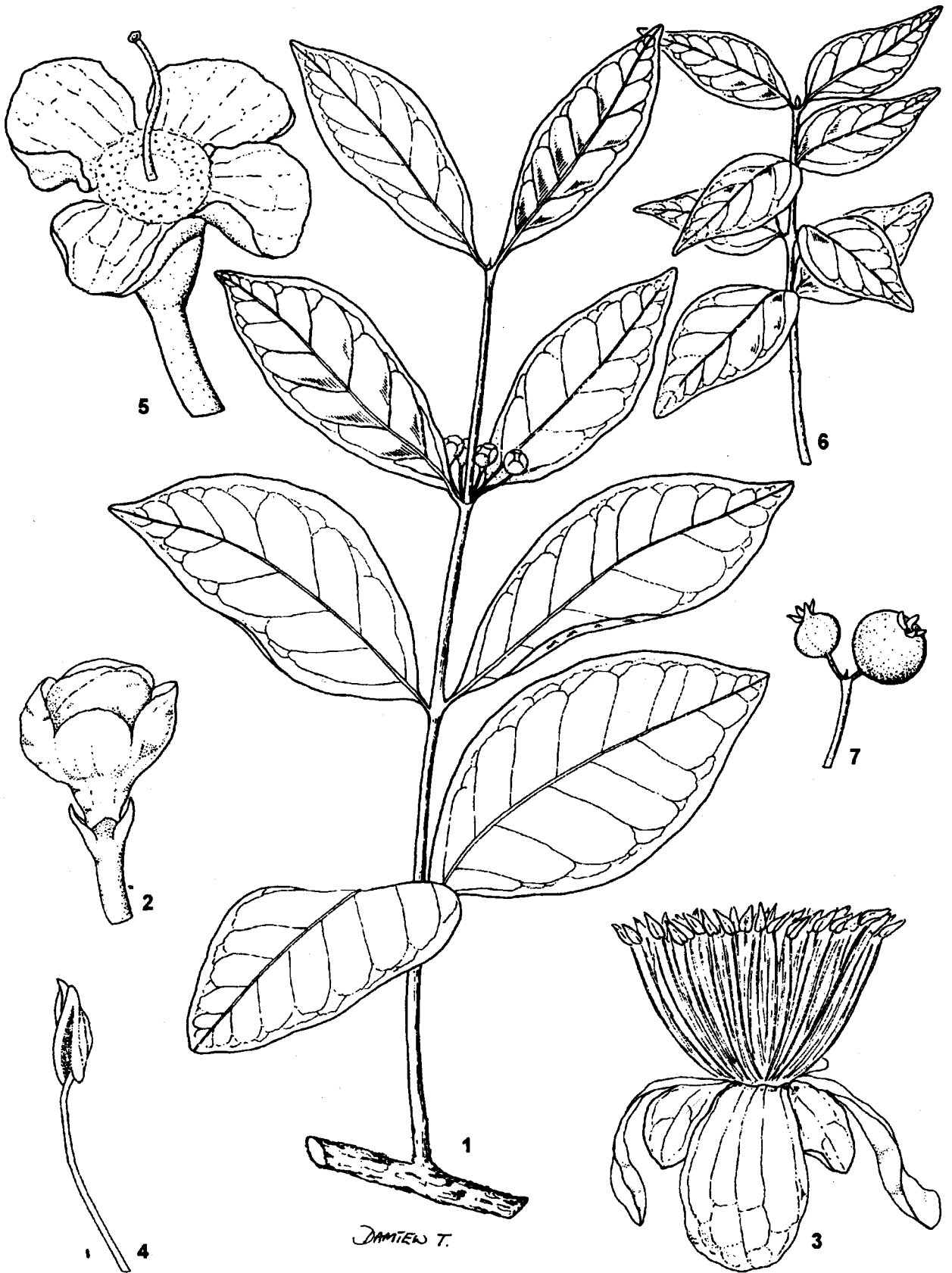


Figure 72.3 *EUGENIA BUKOBENSIS*: 1 – leafy branch with flowers x 1; 2 – flower bud x 5; 3 – open flower with petals turned back to show stamens x 5; 4 – detail of stamen x 15; 5 – older flower/young fruit to show persistent calyx lobes and disc x 5. *E. UNIFLORA*: 6 – leafy branch x 1; 7 – mature fruits x 1. 1–4 from Mooney 8078; 5 from Torstein Haugen 40; 6 & 7 from Sue Edwards et al. 4142. Drawn by Damtew Teferra.

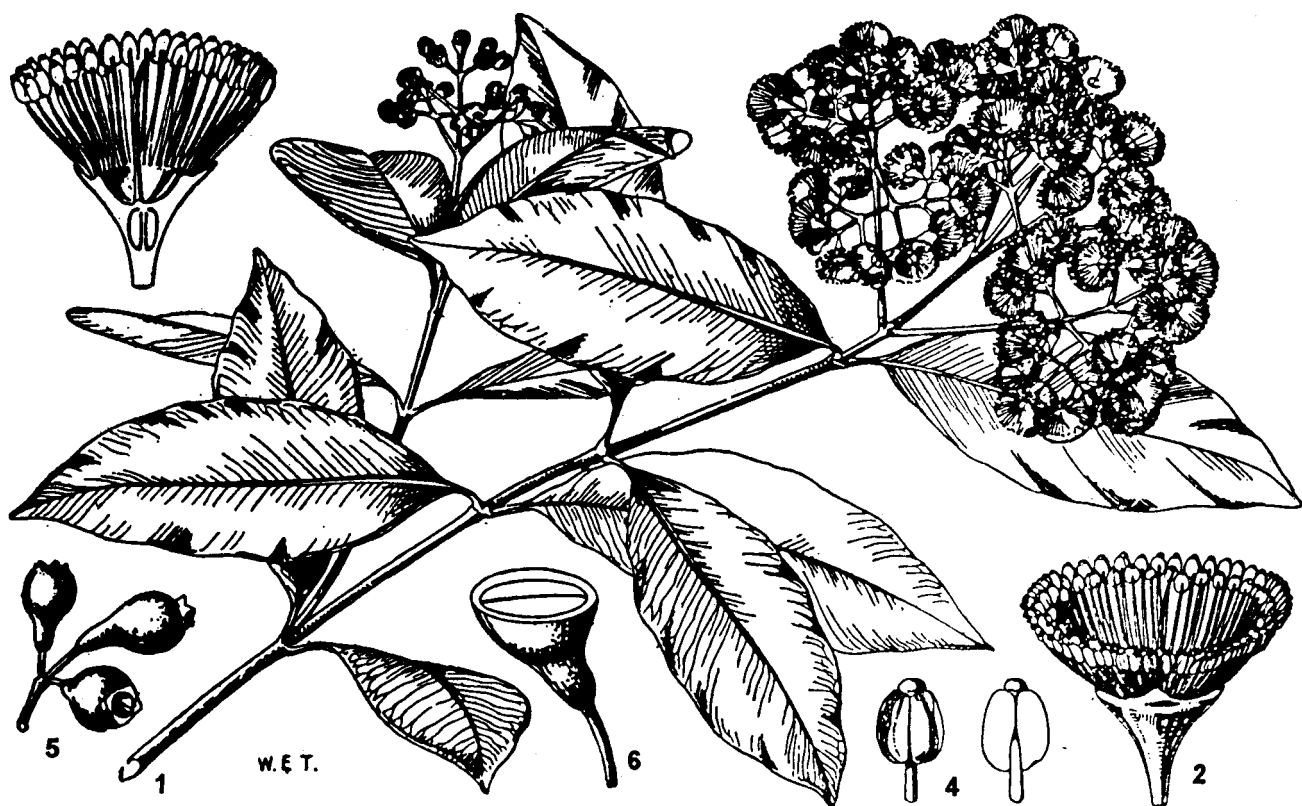


Figure 72.4 *SYZYGium GUINEENSE*: 1 – flowering branch; 2 – flower with corolla removed; 3 – vertical section through flower; 4 – anther, front and back views to show gland at tip of connective; 5 – cluster of fruits; 6 – cross section of a fruit. Drawn by W. E. Trevithick. (Reproduced with permission from *Fl. W. Trop. Afr.* Vol. 1/1: fig 96. Neither scales nor specimens are given in the original.)

*S. guineense* (Willd.) DC. (1828)

– type: Ghana, *Isert* s.n. in *Herb. Willdenow* (B-WILLDENOW).

Shrub, or small to large tree, 8–35 m high. Leaves variable in shape, lanceolate, oblanceolate, elliptic or narrowly ovate, but usually broadest near the middle, 4–12 x 2–7 cm, apex obtuse, acute or acuminate, base cuneate; petiole 2–20 mm long. Receptacle (including pseudopedicel) 3–6 mm long. Stamens 4–8 mm long. Fruit globose or ellipsoid, c 1 x 2–3.5 cm. Fig. 72.4.

Three subspecies are recognised in the Flora area. Intermediate specimens do occur, but the majority of the material can be identified to subspecies without difficulty. In all three subspecies, galled, much branched inflorescences may occur. In these, the diameter of the inflorescence and number of flowers is greatly increased, while the size of the individual flower is much reduced.

The fruits of this species are edible but do not have much flavour. However, they are much-liked by birds and monkeys so that a tree in full fruit will attract large numbers of animals.

1. Leaf-apex markedly acuminate, with a narrow, slender acumen; a large tree of the afromontane rain forest. subsp. *afromontanum*
- Leaf-apex not markedly acuminate, either rounded, emarginate, acute, acuminate, or with a very broad-based, wide acumen. 2

2. Fruit up to 2.0 cm wide; ultimate venation not prominent beneath; a medium sized tree of riverine forest, secondary scrub and moist woodland.

subsp. *guineense*

- Fruit usually 2.5–3.0 cm in diameter; ultimate venation very prominent beneath; a large shrub or a small tree of deciduous woodland.

subsp. *macrocarpa*

subsp. *guineense*

Medium sized tree to about 20 m high. Young branches cylindrical or tetragonal. Leaves elliptic to oblong-elliptic, 3.5–12(–15) x 1–5(–6.5) cm, mature crown leaves often 8–11 x 3–5 cm, apex rounded or acute to broad acuminate, base cuneate, texture leathery, ultimate venation often not clearly visible; petiole 8–13(–20) mm long. Inflorescences 5–10 cm in diameter, often larger than in subsp. *afromontanum*. Flower-buds 2.5–3.5 mm in diameter. Petals 2–3 mm in diameter. Stamens 4–6 mm long; style slightly longer. Fruits globular to ellipsoid, 7–12(–20) mm in diameter.

Riverine forest, riparian woodland and lake shores; occasionally also transgressing into humid secondary evergreen bushland and woodland; 1200–2500 m, but probably this subspecies descends much lower. EW TU WU GD GJ SU WG KF AR GG SD HA; from Senegal to Eritrea, Ethiopia and S Somalia, through most of tropical Africa, south to South Africa (Transvaal, Natal). *Burger* 3392; *Gilbert & Gilbert* 1973; *Ash* 2393.

subsp. *afromontanum* F. White, *Forest Fl. North Rhodesia*: 455 (1962)

– type: Zambia, F. White 3058 (FHO).

Large forest tree to 35 m high. Young branches cylindrical or bluntly triangular. Leaves narrowly elliptic to narrowly obovate or oblanceolate, 4–11 x 2–5 cm, mature crown leaves usually fairly small and typically 4–7 x 2–3 cm, apex markedly and narrowly acuminate, base cuneate; petiole 4–15 mm long. Inflorescences up to 15 cm in diameter, but often rather few-flowered. Flower-buds 2–3 mm in diameter. Petals 1.5–2.5 mm in diameter. Stamens 5–7 mm long. Fruit ellipsoid to globular, up to 17 x 14 mm wide.

Upland rain forest, forest edges or secondary growth, occasionally left as a single tree in farmland recently cleared from forest; 1400–2600 m. GD SU WG KF IL AR GG SD BA: from S Sudan and Ethiopia through East Africa, incl. E Zaire and Rwanda, south to Angola, Zambia, Malawi and Zimbabwe. *Friis* et al. 458; *Ash* 394; *Mooney* 7711.

subsp. *macrocarpum* (Engl.) F. White, *Forest Fl.*

*North Rhodesia*: 455 (1962)

– type: not indicated.

Shrub or small tree to c 8 m high. Young branches cylindrical, rarely angled. Leaves obovate or broadly elliptic, 7–15 x 3.5–9.0 cm, apex broadly acute, rounded, or emarginate, base cuneate, ultimate venation very distinct below; petiole 10–45 mm long. Inflorescences up to 18 cm in diameter. Flower-buds 4–5 mm in diameter. Petals 3.5–5 mm in diameter. Stamens 5–7 mm long. Fruits globular to ellipsoid, 15–30 x 11–16 mm.

Restricted to woodlands; 1400–2500 m. SU WG KF SD BA; widespread in tropical Africa. *Friis* et al. 3441; *Ash* 390; *Lemma G. Selassie* 744.

In the latest account of *S. guineense* for *Flora Zambesiaca*, F. White (1978) has reduced this taxon to an informally named form. In the Flora area, it seems nearly as distinct from subsp. *guineense* as does subsp. *afromontanum*, and the name subsp. *macrocarpum* has, therefore, been retained here for the typical woodland form.

## 6. CALLISTEMON R. Br. (1814)

Shrubs or small trees. Leaves alternate, without clearly defined petiole, gland-dotted. Flowers solitary, sessile in the axils of normal leaves, forming a spike. The axes of the inflorescences continue growing beyond the flowers and continue to produce leaves. Hypanthium large, continued in a tube above the ovary, ovoid or bell-shaped. Sepals 5, free, membranous, deciduous. Petals 5, almost orbicular, free, longer than sepals, deciduous. Stamens numerous on a disk, usually much longer than sepals and petals, usually free, strongly coloured with red or orange, usually in two whorls. Ovary 3–4-celled; ovules numerous. Style long, usually coloured as stamens. Capsule woody, loculicidal, enclosed in the receptacle/hypanthium, often persistent for several years, so older stems contain segments with old fruits alternating with bare segments.

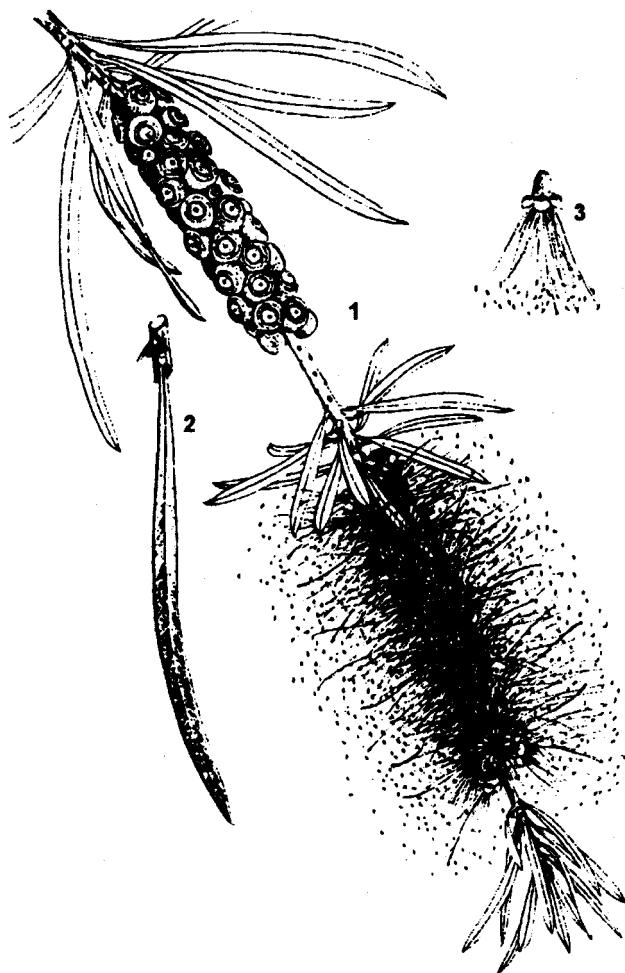


Figure 72.5 *CALLISTEMON*: A member of the *CALLISTEMON CITRINUS* complex (*C. rigidus* R. Br.) 1 – fertile branch showing terminal inflorescence at the top and mature fruits below x 1; 2 – leaf x 1; 3 – detail of flower x 8. Drawn by Anna Maria Kunkel. (Reproduced with permission from Kunkel, *Arboles Exoticos Los Arboles Cultivados en Gran Canaria*. 1: 61, 1969.)

A genus of about 20 species, indigenous in Australia and New Caledonia.

At least one species of *Callistemon*, the BOTTLE BRUSH TREE, is commonly grown in gardens and parks in Addis Ababa, Harare, and other towns. According to F. White in *Flora Zambesiaca* 4, *Myrtaceae*, the taxonomy of the cultivated species in Africa is very difficult, and their nomenclature is uncertain. Hence the name *C. citrinus* (previously known as *C. lanceolatus*) for the commonly grown plant of this genus must be accepted with caution.

*C. citrinus* (Curtis) Skeels (1913)

– type: Tab. 260 in Curtis' *Bot. Mag.* (1794).

*C. lanceolatus* DC. (1828).

Medium sized shrub or small tree, with numerous branches which arch and then hang down, young shoots pink or red, silky. Leaves without clearly marked petiole, lanceolate to narrowly elliptic, 5–10 x 1–2 cm long, tapering at both base and apex, pointed, but not pungent, glabrescent and with indistinct veins on both sides, submarginal vein very near leaf-margin. Flower-bearing part of branch up to 12 cm long, with many long-lasting flowers. Petals to 0.6 cm long,

greenish or reddish, rarely white. Stamens bright crimson, rarely white, anthers dark. Fruit a woody capsule, about 0.7 cm wide. Fig. 72.5.

Cultivated as an ornamental in parks and town gardens; 1200–2500 m. EW SU KF? SD HA, and certainly elsewhere; indigenous in New South Wales and Victoria in Australia, now very well established as an ornamental in the tropics and the warm temperate countries throughout the world. *Demel T.* 329; *Abiy Eshetu* 29; *Samuel T. & Mesfin T.* s.n.

This ornamental tree is very tolerant of both frost and prolonged drought, and grows excellently in full sun. Known under the English name of CRIMSON BOTTLEBRUSH; it often has the trade name of *Metrosideros floribunda*. Live plants of this species have been observed in many gardens in Addis Ababa, and in municipal parks along the main roads. The species is very polymorphic and hybridises freely with other species and forms; the progeny is also very variable. Plants for cultivation are propagated both from seeds and cuttings.

### 7. MELALEUCA L. (1767)

Shrubs or trees. Leaves lanceolate, leathery. Rather similar in appearance to *Callistemon*, but the stamens are fused in 5 bundles opposite the petals, and the flowers are generally whitish.

A genus of about 100 species in Australia and on the Pacific islands. The following species almost certainly occurs in the Flora area.

#### *M. leucadendron* (L.) L. (1767)

— type: Tab. 16 & 17 in Rumphius, *Herbar. Amboin.*, 2 (1741).

*Myrtus leucadendra* L. (1759).

Tree to c 10 m high, with pale, thick, spongy bark. Branches often pendulous. Leaves without clearly marked petiole, 5–9 x 1–2 cm, lanceolate, tapering at both ends, clearly nerved, with many cross-nerves connecting the longitudinal nerves, silvery sericeous when young, later glaucous. Flowers cream to white, in terminal spikes, the axes of which continue growing after flowering; staminal bundles c 1 cm long, with 5–8 filaments at end. Fruits nearly hemispherical, 0.5–0.8 cm in diameter.

An ornamental in parks and gardens of towns; altitude not known. SU? HA?; indigenous in Australia and widely cultivated in the warm regions of the world under names such as CAJEPUT-TREE or PUNK-TREE; widely grown in East Africa.

No herbarium specimens seen from the Flora area, but it almost certainly must have been introduced.

### 8. LOPHOSTEMON Schott (1831)

*Tristania* sect. *Lophostemon* (Schott) Benth. (1865)

Trees; young stems with a thick milky juicy. Leaves alternate and crowded at end of the new growth in false whorls around the bract-covered terminal bud; with reduced or scale-like leaves on the new growth. Inflorescences

pedunculate, axillary panicle-like cymes. Hypanthium obconical to bell-shaped, hardly coming above the top of the ovary. Sepals 5, usually persistent (but falling quickly in *L. confertus*). Petals 5, white to cream. Stamens in several whorls on the hypanthium, united into vaguely defined bundles opposite petals. Ovary semi-inferior to inferior, 3-locular. Placentation axillary; ovules numerous. Fruit a capsule, apically loculicidal.

A genus of 4 species in northern Australia. Only the following species has been recorded from the Flora area.

The species of this genus, especially *L. confertus*, have a striking superficial similarity with *Eucalyptus*, especially when in fruit, but differ markedly in the detailed morphology of leaves and flowers.

#### *L. confertus* (R. Br.) Wilson & Waterhouse (1982);

*Tristania conferta* R. Br. (1812) — type: Australia, R. Brown s.n. (BM).

Trees to 10 m high or more, with bark peeling off in irregular-shaped flakes. Leaves in false whorls of 4–6, blade lanceolate, 7–15 x 2.5–4.5 cm, apex acute to acuminate, base long cuneate, leathery, dark green, lower surface paler than upper, glabrous on both sides; petiole up to c 2 cm long. Inflorescences 3–7-flowered, usually subtended by scale-like bracts. Flower-buds 3–5 mm in diameter. Sepals 4–5 mm long, falling quickly. Petals 6–9 mm long, orbicular. Stamens very numerous, 10–15 mm long. Ovary shorter than hypanthium; style shorter than stamens. Fruit thick-walled, broadly obconical, 10–15 mm in diameter, resembling the fruits of some species of *Eucalyptus*.

Planted as an ornamental and in trial plots; 1700–2100 m. KF HA; indigenous in Australia, but widely planted in many parts of the tropics under the name of BRISBANE BOX. *Demel T.* 112; *Friis et al.* 6008, 6161.

### 9. EUCALYPTUS L'Hérit. (1788)

Breitenbach, E. von: Exotic trees in Ethiopia. *Ethiopian Forestry Review* 2: 19–39 (1961).

*Eucalyptus* in White, F., *Forest Flora of Northern Rhodesia*, Oxford: 293–301 (1962).

Adugna Zerihun: Adaptability trial of several *Eucalyptus* species in Hararge Administrative Region. *Ethiopian Journal of Agricultural Science* 3: 31–48 (1981).

Husnia Ibrahim: Australian species in African Plantations: Australian species in Ethiopia. In: *Proceedings of a Workshop on Seed Handling and Eucalypt Taxonomy Held at the Regional Seed Centre, Harare, Zimbabwe, 8–12 July 1985*: 199–207. Published by the Forestry Commission of Zimbabwe (1986).

Chippendale, G. M., *Myrtaceae — Eucalyptus*, Angophora. In: George, A. S. et al. (eds.), *Flora of Australia* 19: 1–494 (1988).

Michelsen, A.: Mycorrhiza and root nodulation in tree seedlings from five nurseries in Ethiopia and Somalia. *Forest Ecology and Management* 48: 335–344 (1992).

Another Ethiopian source of information used in the compilation of this account is the unpublished records of the CADU project at Asella which were consulted during visits to the project area.



Trees or shrubs. A number of species form a swollen mass of woody tissue at the base of the trunk (a 'lignotuber') which forms a reservoir of dormant buds approximately at ground level from which the plant can regenerate if the trunk is cut, broken by wind, burnt by bush-fire or otherwise destroyed. Bark of trunk and main branches smooth, fibrous, stringy, flaky or in thick, regular scales; often different in different parts of the trunk and the main branches – see below for a more detailed description. Strikingly different juvenile, intermediate and adult leaves occur in most species, the differences may be in morphology, colour or indumentum, or in combinations of these characters, but the difference between juvenile leaves and adult ones varies from species to species; adult leaves always glabrous, mostly alternate, usually petiolate, lanceolate, often falcate, hanging, rarely erect, with a distinct midvein, penninerved. The inflorescences of the genus is very variable; very few species have single, axillary flowers (only found in *E. globulus* subsp. *globulus* in the Flora area). Many species have apparently simple, sessile or pedunculate, umbel-like inflorescences in the leaf-axils, others have clearly compound inflorescences, these are usually pedunculate, single or paired in leaf axils, or in terminal, sometimes corymbose panicles. Flowers (1–)3 or more per umbel, sessile or pedicellate. Calyx and corolla each or together forming a cap or operculum which is shed at anthesis, the sepals sometimes free, falling separately or together. Stamens numerous; filaments curved inwards in bud, bending outwards at anthesis; anthers opening by lateral slits or by terminal pores. Ovary 2–7 locular, inferior or nearly so, enclosed in the hypanthium; ovules many. Fruit a capsule enclosed in a woody hypanthium, loculicidal at top within the rim of circular scars from operculum and stamens; remaining disc on fruits convex, flat or descending into the tubular prolongation of the hypanthium; capsule valves exerted, level with the rim of the hypanthium, or included in it. Seeds several to many, variously shaped and coloured.

A genus of over 500 species, mostly in Australia, but extending to the Malaysian region and the Philippines. Many species are widely planted in other parts of the tropics and in the warm temperate regions for shelter, timber, fuelwood, production of eucalyptus oil, ornamental purposes, or as a source of nectar in honey production. In East Africa over 100 species have been recorded from cultivation and a little over 50 from the Flora area. Of these there are between 5 and 10 widely grown species.

#### Notes on some features of *Eucalyptus*

**Bark:** Various groups of species, sometimes closely related, sometimes not, are each characterised by a particular combination of characters of the bark:

**BLOODWOODS** have rough, short-fibred, persistent bark on the trunk and on the larger branches. This bark becomes cracked in an irregular pattern of roughly rectangular, scaly pieces. The height to which this type of bark extends differs between the species, and in, for example, *E. citriodora* this feature occurs only at the very base (for which reason the tree is mostly classified as a GUM), while the major part of the trunk is comparatively

smooth and mottled in blue, grey and white; **IRONBARKS** have hard, deeply furrowed bark which, however, may be restricted to the base of the trunk as, for example, in *E. leucoxylon*;

**STRINGYBARK** members are a loosely defined group of species with fibrous, persistent bark;

**PEPPERMINT BARKS** are species with less fibrous bark; **BOX** refers to the group of species which has closely adhering, finely fibrous, grey bark over all parts of trunks and larger branches;

**ASH:** The group of species have rough, more or less fibrous bark on the trunk, and usually smooth bark on the branches;

**GUMS** are the largest and most loosely defined group. The species have smooth bark all over the large branches and the trunk, perhaps with the exception of the extreme base of the plant. The GUMS shed their bark in various patterns; many lose the whole of their outer layer each year, leaving a rather smooth and clean trunk; others shed their bark in patches of various shapes over periods of several years, during which the surface of the bark changes colour so that the surface looks like an irregular mosaic.

**Inflorescences:** All inflorescence-types in *Eucalyptus* are assumed to be compound in origin, made up of simple, umbel-like cymose basal inflorescences; the single axillary flower in *E. globulus* subsp. *globulus* represents a reduction from this, as confirmed by the few-flowered axillary umbels of the others subspecies.

**Operculum:** The nature of the operculum in *Eucalyptus* has been much debated. It is often a double structure; in some species the outer operculum is retained until shortly before anthesis, and both inner and outer operculum are shed almost at the same time; in other species the outer operculum is shed early in the development of the bud. In other species the outer and the inner operculum are separable only with care or by anatomical investigation and fall together at anthesis. In still other species only one operculum is found, and there is no trace of a second operculum. When both an outer and an inner operculum are found, the two are interpreted as representing respectively the sepals and the petals of the flowers found in other genera of the family. Recent studies have shown that when there is no trace of a second operculum the surviving one represents the calyx, and the one representing the corolla has been lost.

**Introductions into Ethiopia:** In the Flora area the genus *Eucalyptus* was first introduced during the time of Menelik II when a French philologist, Mondon-Vidallet, in 1895 introduced a number of species from Australia: *E. amygdalina*, *E. bicolor* (now *E. largiflorens*), *E. camaldulensis*, *E. cladocalyx*, *E. cornuta*, *E. diversicolor*, *E. globulus*, *E. incrassata*, *E. leucoxylon*, *E. melliodora*, *E. patens*, *E. resinifera*, *E. rudis* (probably used in a sense now considered identical with *E. tereticornis*), *E. salubris*, and *E. tereticornis* are listed by Breitenbach in *Ethiopian Forestry Review* 2 (1961). Most of these species did not perform well under the local conditions, and at first only *E. globulus* was really successful in the cool highlands. Other early introductions were made by the Italians to the area of Asmara.

Today the most widespread species are probably *E.*

*camaldulensis*, *E. citriodora*, *E. globulus* subsp. *globulus*, *E. regnans*, *E. saligna*, and *E. tereticornis*. These are chiefly grown for building-timber and fuelwood, both in large-scale plantation and in small woodlots, but also as shelter belts in farmland and to form shady groves in and around villages, churches and other dwellings. These eucalypts occur nearly everywhere in the country where the rainfall is above c 400 mm. Many other species have been planted as ornamentals, in arboreta (tree-collections), in trial plots, or in pilot plantations on a comparatively small scale. These species are included here because they may occasionally be met with. All species in cultivation in Eritrea and Ethiopia are ultimately of Australian origin, but may well have been introduced from seed suppliers elsewhere which makes the genealogical link between the wild populations in Australia and the cultivated plants in Africa sometimes rather tenuous.

It is worth mentioning that the species of *Eucalyptus* occurring in the Flora area do not seem to naturalise or to regenerate very well without human intervention. As far as can be judged from the field work for this account, all specimens observed in plantations and woodlots could be traced back to planted individuals.

**Identifying *Eucalyptus*:** In order to name *Eucalyptus* specimens with a reasonable degree of reliability one should have as complete material as possible, know about the habit of the plant, have samples of bark from both lower and upper parts of the trunk and from larger and smaller branches, and also both juvenile and adult leaves. Above all, buds and fruits are absolutely necessary for the identification of the more critical species. The arrangement of the flowers is also very important.

Material of *Eucalyptus* should, if at all possible, always be compared with one of the National Herbarium collections (ETH) in Addis Ababa, or the Herbarium of the Agricultural University of Alemaya (ACD), and, if feasible, also with foreign collections of indigenous Australian *Eucalyptus* species collected in nature. The occurrence in Ethiopia of a number of species has only so far been recorded in the literature; their identity has not been documented by adequate herbarium specimens. Such material should be gathered and compared with authentically named material.

It should be borne in mind that other species than those accounted for here may have been introduced, and that these may easily 'key out' as one of the included species. Even with good material, identification of cultivated *Eucalyptus* species from the Flora area may be unsuccessful, as the material may not fit the descriptions. It is believed that cultivation or possible hybridisation may modify the characters found in natural populations. B. Verdcourt (in a mimeographed key to the material of *Eucalyptus* present at the East African Herbarium, Nairobi) has written: 'The genus *Eucalyptus* is a nightmare to most tropical botanists. Numerous species have been introduced into the rest of the tropics from Australia. Hybridisation is a very common phenomenon in the genus and hybrids have appeared in cultivation, which by virtue of their natural habitats, are quite unknown in the wild in Australia. Numerous specimens are therefore to be found which are difficult if not impossible to identify.' For a survey of the problems of

specific delimitation in natural populations of *Eucalyptus*, see L.A.S. Johnson, 'Problems of species and genera in *Eucalyptus* (Myrtaceae).' *Pl. Syst. Evolution* 125: 155-167 (1976).

The material available for the writing of this account has very frequently been incomplete and the descriptions and keys included here have, therefore, with permission been adapted from the latest authoritative account of the genus in Australia written by G. M. Chippendale for the *Flora of Australia* (1988), in some cases supplemented by S. Kelly, G. M. Chippendale & R. D. Johnston, *Eucalypts, Volume One* (new edition, 1983). Therefore, the descriptions largely give a picture of the species as they appear in nature in Australia, although the described range of variation has been somewhat adapted to show the situation in the Flora area. Illustrations of the buds and fruits of nearly every species mentioned are also included to assist in identification. The key is based on the appearance of the species as reported to occur in nature in the *Flora of Australia*.

The following names refer to plants of uncertain identity: *E. decisneana* (authority not stated or traced) has been recorded planted at the CADU project near Asella (AR). Material named *E. glabratus* (authority not stated or traced), and a sheet tentatively named *E. cf. studleyensis* (authority uncertain) are represented in the collections at ETH, but it has not been possible to identify these specimens, and the names are therefore not accounted for in this account.

- |  |                            |
|--|----------------------------|
| 1. Bark smooth throughout.                                 | 2                          |
| - Bark rough, at least at base, not smooth throughout.     | 46                         |
| 2. Operculum shorter than hypanthium.                      | 3                          |
| - Operculum almost equal to or longer than hypanthium.     | 18                         |
| 3. Buds 1-3 per umbel.                                     | 14                         |
| - Buds more than 3 per umbel.                              | 7                          |
| 4. Buds and fruits glaucous.                               | 5                          |
| - Buds and fruits not glaucous.                            | 6                          |
| 5. Buds 8 mm wide or more.                                 | 40. <i>E. globulus</i>     |
| - Buds less than 8 mm wide.                                | 45. <i>E. gunnii</i>       |
| 6. All parts of plant (esp. leaves) lemon-scented.         | 3. <i>E. citriodora</i>    |
| - Plant not lemon-scented.                                 | 4. <i>E. maculata</i>      |
| 7. Leaves with different colour-shade on the two surfaces. | 8                          |
| - Leaves uniform in colour.                                | 10                         |
| 8. Buds urn-shaped to cylindrical.                         | 28. <i>E. cladocalyx</i>   |
| - Buds not urn-shaped or cylindrical.                      | 9                          |
| 9. Fruit 8-12 mm long.                                     | 14. <i>E. diversicolor</i> |
| - Fruit 4-6 mm long.                                       | 15. <i>E. deanei</i>       |
| 10. Capsule-valves exserted.                               | 11                         |
| - Capsule-valves more or less level or included.           | 15                         |
| 11. Buds glaucous.   | 12                         |
| - Buds not glaucous.                                       | 13                         |
| 12. Petiole 8-15 mm long.                                  | 26. <i>E. salubris</i>     |
| - Petiole 20 mm or more long.                              | 40. <i>E. globulus</i>     |
| 13. Fruit cylindrical.                                     | 39. <i>E. nitens</i>       |
| - Fruit not cylindrical.                                   | 14                         |
| 14. Buds pedicellate.                                      | 26. <i>E. salubris</i>     |

- Buds usually sessile. 39. *E. nitens*
- 15. Buds sessile. 39. *E. nitens*
- Buds pedicellate. 16
- 16. Fruits globular or almost globular. 27. *E. brockwayi*
- Fruits not globular or almost globular. 17
- 17. Petiole 2-7 mm long. 36. *E. parvifolia*
- Petiole 8-22 mm long. 39. *E. nitens*
- 18. Buds 3 per umbel. 19
- Buds more than 3 per umbel. 24
- 19. Fruits striate. 31. *E. incrassata*
- Fruits smooth. 20
- 20. Leaves lanceolate to broadly lanceolate, margin finely crenate. 41. *E. johnstonii*
- Leaves narrowly lanceolate to lanceolate, margin not finely crenate. 21
- 21. Peduncle rounded. 42. *E. viminalis*
- Peduncle slightly flattened, angular, or quadrangular. 22
- 22. Fruits ovoid to globular; juvenile leaves lanceolate, green, with slightly different colour-shade on the two surfaces. 42. *E. viminalis*
- Fruits more or less hemispherical; juvenile leaves orbicular, to ovate, glaucous, uniform in colour. 23
- 23. Buds, fresh fruits and leaves green; juvenile leaves light green to glaucous. 43. *E. dalrympleana*
- Buds and fresh fruits often glaucous; leaves dull green or glaucous; juvenile leaves glaucous. 44. *E. rubida*
- 24. Leaves with different colour-shade on the two surfaces. 25
- Leaves uniform in colour. 26
- 25. Capsule-valves incurved; buds 3-4 mm wide.
- Capsule-valves usually spreading outwards or erect; buds 3-4 mm wide. 16. *E. grandis*  
17. *E. saligna*
- 26. Capsule-valves included. 27
- Capsule-valves exerted or level. 28
- 27. Fruits 9-25 mm long. 31. *E. incrassata*
- Fruits 3-8 mm long. 49. *E. bosistoana*
- 28. Peduncle distinctly or slightly flattened. 29
- Peduncle rounded, angular or quadrangular, or absent. 34
- 29. Buds sessile or almost so. 30
- Buds distinctly pedicellate. 31
- 30. Operculum slightly longer than hypanthium; juvenile leaves lanceolate, green. 42. *E. viminalis*
- Operculum more or less equal in length to hypanthium; juvenile leaves orbicular to ovate, light green to glaucous. 43. *E. dalrympleana*
- 31. Buds ovoid or clavate to globular.
- Buds conical, fusiform, cylindrical, beaked or horn-shaped. 43. *E. dalrympleana* 32
- 32. Buds 7-12 mm long. 25. *E. wandoo*
- Buds more than 12 mm long. 33
- 33. Fruits bell-shaped. 24. *E. astringens*
- Fruits not bell-shaped. 25. *E. wandoo*
- 34. Buds glaucous or with waxy, powdery secretion on surface. 35
- Buds not glaucous and with no such secretion on surface. 36
- 35. Fruits globular or urn-shaped.
- 29. *E. transcidentalis*
- Fruits hemispherical, obconical or ovoid. 47. *E. microtheca*
- 36. Operculum distinctly longer than hypanthium. 37
- Operculum more or less equal in length or shorter than hypanthium. 42
- 37. Leaves grey-green or yellow-green.
- 34. *E. camaldulensis*
- Leaves green. 38
- 38. Disc on capsule descending. 30. *E. salmonophloia*
- Disc on capsule ascending or level. 39
- 39. Fruits usually hemispherical, sometimes cylindrical or bell-shaped. 34. *E. camaldulensis*
- Fruits globular to ovoid. 40
- 40. Operculum hemispherical or beaked.
- 34. *E. camaldulensis*
- Operculum conical. 41
- 41. Operculum acutely conical. 33. *E. tereticornis*
- Operculum beaked or obtusely conical. 34. *E. camaldulensis*
- 42. Inflorescence compound, terminal. 43
- Inflorescence simple, axillary. 44
- 43. Buds 3-4 mm long; disc on capsule ascending.
- 47. *E. microtheca*
- Buds 7-9 mm long; disc on capsule descending. 49. *E. bosistoana*
- 44. Leaves broadly lanceolate, ovate, orbicular or rhomboid. 35. *E. ovata*
- Leaves linear or narrowly lanceolate to lanceolate. 45
- 45. Capsule-valves 3-4, exerted to level.
- 43. *E. dalrympleana*
- Capsule-valves 5-6, included to level. 49. *E. bosistoana*
- 46. Inflorescences compound. 47
- Inflorescences simple. 58
- 47. Fruits 12 mm or more long. 1. *E. ficifolia*
- Fruits less than 12 mm long. 48
- 48. Leaves with different colour-shade on the two surfaces. 49
- Leaves uniform in colour. 52
- 49. Fruits 1-5 mm long. 5. *E. cloeziana*
- Fruits 5-12 mm long. 50
- 50. Fruits urn-shaped or globular to urn-shaped to ovoid.
- 2. *E. torelliana*
- Fruits not urn-shaped. 51
- 51. Buds 4-7 mm long; bark rough on trunk and larger branches, then smooth above. 5. *E. cloeziana*
- Buds 7-11 mm long; bark rough throughout. 51. *E. paniculata*
- 52. Buds and/or fruits glaucous or with waxy, powdery secretion on surface; leaves usually glaucous, with similar secretion on surface, grey or grey-green. 47. *E. microtheca*

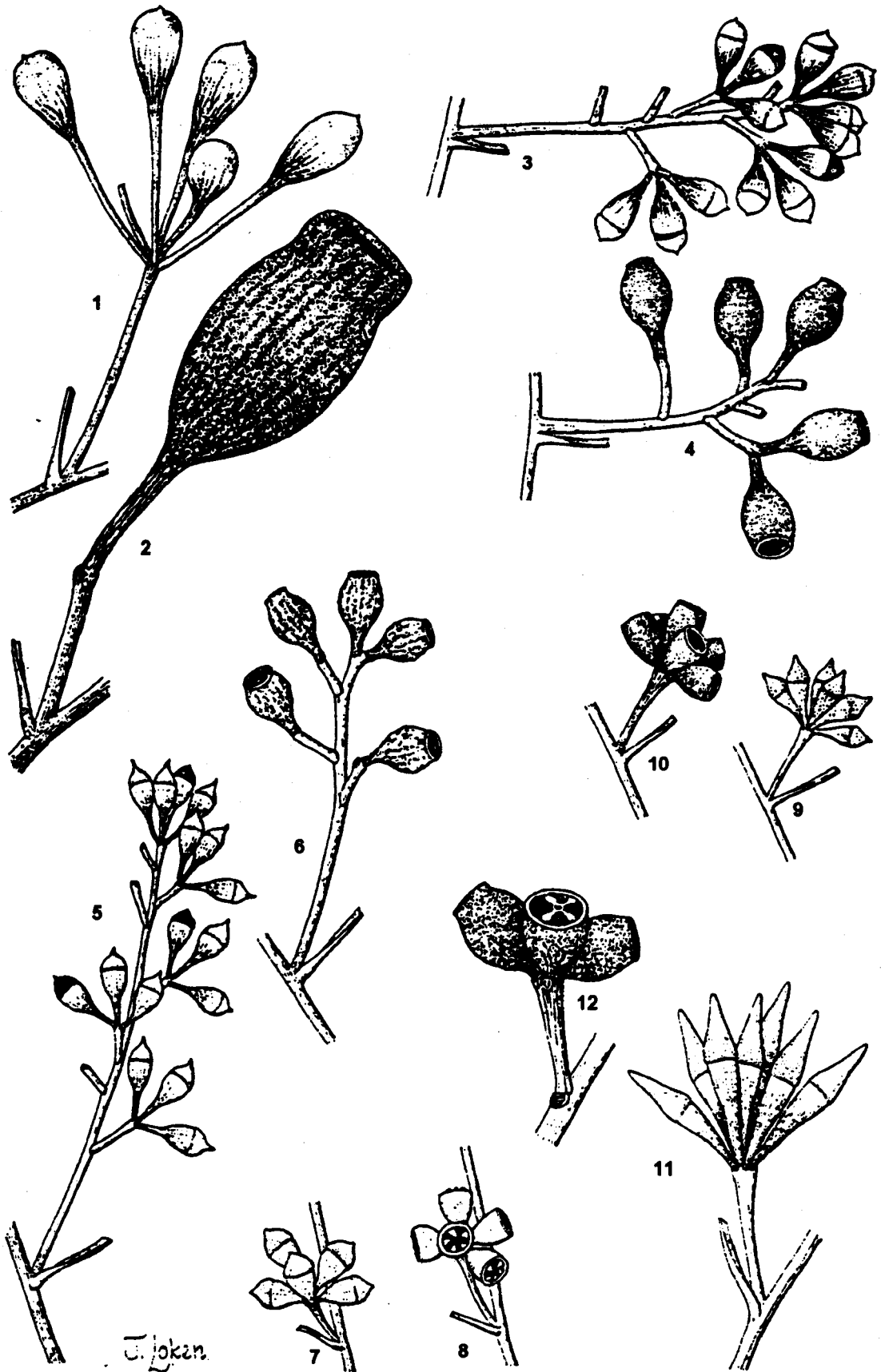


Figure 72.6 *EUCALYPTUS FICIFOLIA*: 1 – flower-buds x 1; 2 – fruit x 1. *E. CITRIODORA*: 3 – flower-buds x 1; 4 – fruits x 1. *E. MACULATA*: 5 – flower-buds x 1; 6 – fruits x 1. *E. GRANDIS*: 7 – flower-buds x 1; 8 – fruits x 1. *E. BOTRYOIDES*: 9 – flower-buds x 1; 10 – fruits x 1. *E. ROBUSTA*: 11 – flower-buds x 1; 12 – fruits x 1. 1 from Mitchell s. n.; 2 from S. Afr. For. Dept. 7029; 3 from Cooling 89; 4 from White 2095; 5 from Cooling 88; 6 from Dillon 9 MS; 7 & 8 from FHO 93058; 9 & 10 from Wigg FH 1743; 11 & 12 from Savory 184. Drawn by J. Loken. (Reproduced with permission from *Fl. Zamb.* 4: Tab. 46.)



Figure 72.7 *EUCALYPTUS TERETICORNIS*: 1 – flower-buds x 1; 2 – fruits x 1. *E. CAMALDULENSIS*: 3 – flowering branchlets x  $\frac{1}{2}$ ; 4 – fruits x 1. *E. PANICULATA*: 5 – flower-buds x 1; 6 – fruits x 1. 1 from Savory 145; 2 from FHO 18537; 3 from Cooling 86; 4 from White 3488; 5 from C. T. White 6088; 6 from Dillon 8 MS. Drawn by J. Loken. (Reproduced with permission from *Fl. Zamb.* 4: Tab. 47.)

- Buds and fruits not glaucous or with waxy, powdery secretion on surface. 53
- 53. Buds fusiform. 54
- Buds not fusiform. 55
- 54. Rough bark fibrous or somewhat flaky, grey, grey-white, yellow-grey to grey-brown or grey black. 47. *E. microtheca*
- Rough bark hard, furrowed, dark grey to black (IRONBARK). 50. *E. crebra*
- 55. Rough bark hard, furrowed, dark grey to black (IRONBARK). 50. *E. crebra*
- Bark fibrous or flaky, dark brown, brown-black, grey, grey-black or black. 56
- 56. Bark rough on all parts of trunk, then smooth above. 49. *E. bosistoana*
- Bark rough on trunks and larger branches, or throughout. 57
- 57. Capsule-valves exserted. 47. *E. microtheca*
- Capsule-valves level or included. 48. *E. largiflorens*
- 58. Bark hard, usually furrowed, grey to black (IRONBARK). 54. *E. sideroxyton*
- Bark fibrous or flaky (not IRONBARK). 59
- 59. Operculum distinctly longer than hypanthium. 60
- Operculum about equal in length to or shorter than hypanthium. 72
- 60. Capsule-valves included or about level. 19. *E. robusta*
- Capsule-valves exserted. 61
- 61. Leaves with different colour-shade on the two surfaces. 62
- Leaves uniform in colour. 64
- 62. Bark rough, flaky at base of trunk or up to 6 m, but smooth above. 17. *E. saligna*
- Bark rough throughout, or to larger branches. 63
- 63. Fruits cylindrical. 19. *E. robusta*
- Fruits hemispherical or obconical. 20. *E. resinifera*
- 64. Bark rough throughout. 21. *E. gomphocephala*
- Bark rough at base of trunk only, or on trunk, or up to larger branches, then smooth above. 65
- 65. Fruits 9-24 mm long. 23. *E. occidentalis*
- Fruits 3-8 mm long. 66
- 66. Buds 14-38 mm long. 67
- Buds 3-13 mm long. 68
- 67. Buds and fruits sessile. 22. *E. cornuta*
- Buds and fruits pedicellate. 23. *E. occidentalis*
- 68. Leaves 0.7-1 cm wide. 42. *E. viminalis*
- Leaves 1-3 cm wide. 69
- 69. Umbels often 3-flowered, occasionally up to 7-flowered. 42. *E. viminalis*
- Umbels 7-flowered. 70
- 70. Peduncle not flattened. 42. *E. viminalis*
- Peduncle flattened. 71
- 71. Buds pedicellate. 37. *E. dunnii*
- Buds sessile. 42. *E. viminalis*
- 72. Buds and fruits sessile. 73
- Buds and fruits pedicellate. 85
- 73. Buds, and usually also fruits, glaucous. 45. *E. gunnii*
- Fruits not glaucous; buds not glaucous (except in *E. cinerea*). 74
- 74. Bark rough throughout. 75
- Bark rough on lower trunk or extending to larger branches, but smooth above. 76
- 75. Leaves and buds not glaucous. 38. *E. goniocalyx*
- Leaves and buds glaucous. 46. *E. cinerea*
- 76. Fruits more than 10 mm long. 18. *E. botryoides*
- Fruits 3-10 mm long. 77
- 77. Leaves with different colour-shade on the two surfaces. 78
- Leaves uniform in colour. 80
- 78. Bark rough at least on all the trunk. 18. *E. botryoides*
- Bark rough or scaly at base of trunk or up to 4 m. 79
- 79. Capsule-valves incurved. 16. *E. grandis*
- Capsule-valves erect or curved outwards. 17. *E. saligna*
- 80. Bark rough mostly on lower trunk, sometimes on whole trunk but smooth on branches. 81
- Bark rough on trunk and larger branches. 84
- 81. Buds beaked. 32. *E. dundasii*
- Buds not beaked. 82
- 82. Umbels 3-flowered. 42. *E. viminalis*
- Umbels 7-flowered or more. 83
- 83. Operculum distinctly shorter than hypanthium. 39. *E. nitens*
- Operculum just longer than or equal in length to hypanthium. 42. *E. viminalis*
- 84. Disc on capsule ascending. 42. *E. viminalis*
- Disc on capsule level or descending. 46. *E. cinerea*
- 85. Buds and fruits glaucous. 86
- Buds and fruits not glaucous. 87
- 86. Leaves apiculate or uncinatate; buds club-shaped to cylindrical. 45. *E. gunnii*
- Leaves acuminate; buds ovoid or barrel-shaped. 53. *E. leucoxylon*
- 87. Leaves with different colour-shade on each surface. 88
- Leaves uniform in colour. 93
- 88. Bark rough usually at base of trunk, up to 6 m. 89
- Bark rough throughout, or to larger branches. 91
- 89. Operculum hemispherical, apiculate. 15. *E. deanei*
- Operculum conical, sometimes beaked. 90
- 90. Capsule-valves incurved. 16. *E. grandis*
- Capsule-valves erect or curved outwards. 17. *E. saligna*
- 91. Fruits 4-5 mm long. 55. *E. microcorys*
- Fruits 6-14 mm long. 92
- 92. Leaves not crenate; operculum without sutures. 18. *E. botryoides*
- Leaves finely crenate; operculum hemispherical, usually with cross sutures. 55. *E. microcorys*
- 93. Bark rough throughout. 94
- Bark rough at base or on all trunk, or extending to larger branches, then smooth above. 99
- 94. Peduncle 1-6 mm long. 11. *E. obliqua*
- Peduncle 7 mm or more long. 95

95. Fruits 13–26 mm long. 96  
 – Fruits less than 13 mm long. 98
96. Buds 8–13 mm long. 6. *E. patens*  
 – Buds 15–28 mm long. 97
97. Buds cylindrical. 10. *E. planchoniana*  
 – Buds clavate. 21. *E. gomphocephala*
98. Leaves not usually oblique at base. 6. *E. patens*  
 – Leaves oblique at base. 11. *E. obliqua*
99. Umbels 3-flowered. 53. *E. leucoxylo*  
 – Umbels more than 3-flowered. 100
100. Umbels mostly in pairs. 101  
 – Umbels not in pairs. 102
101. Bark rough on trunk to 15 m, then smooth above.  
 8. *E. regnans*  
 – Bark rough on trunks and larger branches, then  
 smooth above. 9. *E. fastigiata*
102. Fruits ribbed. 32. *E. dundasii*  
 – Fruits not ribbed. 103
103. Bark rough on trunk and larger branches. 104  
 – Bark rough on lower trunk or on all trunk, but not  
 on branches. 105
104. Leaves with peppermint scent; buds 3–5 mm long.  
 13. *E. amygdalina*  
 – Leaves without peppermint scent; buds 5–7 mm  
 long. 52. *E. melliodora*
105. Leaves oblique at base. 12. *E. delegatensis*  
 – Leaves not oblique at base. 106
106. Operculum distinctly shorter than hypanthium.  
 52. *E. melliodora*  
 – Operculum and hypanthium about equal in length.  
 107
107. Capsule-valves exserted. 37. *E. dunnii*  
 – Capsule-valves included or level. 108
108. Peduncle flattened. 7. *E. pilularis*  
 – Peduncle rounded, angular or quadrangular. 109
109. Petiole 15–25 mm long. 49. *E. bosistoana*  
 – Petiole 5–15 mm long. 110
110. Buds 5–7 mm long; dark staminal ring shedding  
 from fruits. 52. *E. melliodora*  
 – Buds 7–9 mm long; fruits without dark staminal  
 ring. 49. *E. bosistoana*

1. *E. ficifolia* F. Muell. (1860)

– type: Australia, G. Maxwell s.n.

Straggling tree to 10 m high. Bark rough. Juvenile leaves usually alternate, petiolate, ovate to orbicular, sometimes peltate, bristly. Adult leaves alternate, sometimes opposite, broadly lanceolate or ovate, acuminate, thick; blade 7.5–15 x 3–5 cm, glossy, dark green above, paler below, with strong difference between the colours of the two sides; lateral veins fine, submarginal veins very close to or confluent with margin; petiole flattened or channelled, 10–20 mm long. Compound inflorescence a terminal corymbose panicle; umbels 3–11-flowered. Buds club-shaped or pear-shaped; operculum depressed hemispherical-conical, 2–3 x 6–7 mm; hypanthium truncate to pear-shaped, 8–10 x 6–7 mm. Hypanthium and stamens usually crimson, but the colour may vary from red to almost white. Fruits ovoid,

globular or urn-shaped, often contracted at orifice, 20–35 x 20–30 mm. Seeds with terminal wing, yellow-brown. Fig. 72.6.1 & 2 (p. 83).

Cultivated as an ornamental in parks and town-gardens and as a road tree; 1800–2500 m. SU IL AR SD; planted at the CADU project area at Asella and elsewhere in central Ethiopia; widely planted in Eastern and Southern Africa, and indeed throughout the tropics. Indigenous in a restricted part of Western Australia where it is known as RED-FLOWERING GUM. *Mesfin T.* 6865, 9208; *Friis et al.* 6083.

2. *E. torelliana* F. Muell. (1877)

– type: Australia, E. Fitzalan s.n.

Tree to 30 m high. Bark rough, grey or black on lower trunk, smooth green above. Juvenile leaves alternate, petiolate, broadly ovate, more or less peltate; petioles and veins hairy. Adult leaves not commonly seen, as juvenile and intermediate leaves often form crown of mature trees; alternate, petiolate, blade with strong difference in colour between the two sides, narrowly to broadly lanceolate, acuminate, 10–14 x 1–3.5 cm, green; lateral veins distinct; submarginal vein up to 1 mm from margin; petiole 5–20 mm long. Compound inflorescences terminal corymbose panicles; umbels 3–7-flowered. Peduncle rounded, 5–20 mm long; pedicels absent or up to 3 mm long. Buds ovoid. Operculum hemispherical, apiculate, 1–3 x 3–6 mm; hypanthium cupular, 6–8 x 4–8 mm. Fruits globular or urn-shaped or ovoid, 8–10 x 8–10 mm; disc broad, descending; valves 3, deeply included. Seeds elliptic, keeled on one side. Fig. 72.8.

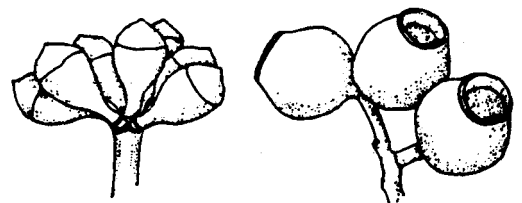


Figure 72.8 *EUCALYPTUS TORELLIANA*: buds (from I. Brooker 4127) and fruits (from D. Kleinig DK 266) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 48.)

In trial plots and pilot plantations; c 2000–2350 m. AR; widely planted in Africa, but apparently so far not in any large quantity. Indigenous in a small area of Queensland, Australia, where it is known as CADAGA.

Reported as planted at the CADU project near Asella, but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

3. *E. citriodora* Hook. (1848)

– type: Australia, T.L. Mitchell 153.

Tree, 25–40 m high. Bark mostly smooth throughout, often mottled, pale grey, powdery, sometimes blue-grey and somewhat thinly flaky on older trunks. Juvenile leaves alternate, petiolate, with strong difference in colour between the two sides, ovate to broadly lanceolate, sometimes

peltate, sometimes setose on petiole and blade. Adult leaves alternate, petiolate, lanceolate to narrowly lanceolate, acuminate, strongly lemon-scented when crushed, uniform in colour, blade 8–16 x 0.5–2 cm; lateral veins just visible; submarginal vein up to 1 mm from margin; petiole flattened, 13–20 mm long. Compound inflorescences terminal or axillary, corymbose panicles; umbels 3-flowered; peduncle rounded, 3–7 mm long; pedicels 1–6 mm long. Buds club-shaped; operculum hemispherical, apiculate, 3–4 x 4–5 mm; hypanthium hemispherical, 5–6 x 4–5 mm. Fruit ovoid or urn-shaped, 7–15 x 7–11 mm, often warty; disc broad, descending; valves 3 or 4, deeply included. Seeds elliptic, keeled on dorsal side, red-black. Fig. 72.6.3–4 (p. 83).

In trial plots and pilot plantations; c 1800–2000 m. SU HA; widely planted in tropical and South Africa; indigenous to Queensland, Australia, where it is known as LEMON-SCENTED GUM, now widely cultivated in the tropics. *Demel T.* 606; *Sebsebe D. & Negist A.* 2406; *Friis et al.* 6283.

Tried successfully at Alemaya (Adugna Zerihun, 1981; Ibrahim, 1986) and at Wondo Genet (Michelsen, 1992); widely planted, but only successful in places with deep soil and rainfall over 1000 mm.

This species is supposed to produce a better quality of saw timber than most other eucalypts. Closely related to *E. maculata*, but with a very characteristic lemon-scent which can usually be detected in fresh material and sometimes also in herbarium specimens.

#### 4. *E. maculata* Hook. (1844)

– type: Australia (4 syntypes).

Tree to 45 m high. Bark smooth throughout, cream or blue-grey, usually mottled in several colours. Juvenile leaves alternate, petiolate, with strong difference in colour between the two sides, ovate, sometimes peltate, setose or glabrous. Adult leaves alternate, petiolate, lanceolate to narrowly lanceolate, uniform in colour, blade 12–21 x 1.2–3 cm; lateral veins just visible; submarginal vein up to 1 mm from margin; petiole angular, 15–25 mm long. Compound inflorescences terminal or axillary corymbose panicles; umbels 3-flowered; peduncle rounded, 3–8 mm long; pedicels angular, 3–7 mm long. Buds ovoid; operculum hemispherical, apiculate, 4–5 x 5–8 mm; hypanthium hemispherical, 5–8 x 5–8 mm. Fruits ovoid or almost urn-shaped; 10–14 x 9–11 mm; disc broad, descending; valves 3 or 4, deeply included. Seeds elliptic, keeled on dorsal side, red-black. Fig. 72.6.5 & 6 (p. 83).

In trial plots and pilot plantations; c 1800–2800 m. SU AR KF; widely planted in Africa, indigenous to Queensland, Australia, where it is known as SPOTTED GUM.

Planted at the CADU project near Asella, and reported to have been tried successfully at Menagesha and Beleta (Ibrahim, 1986); also planted at Debre Berhan and Wondo Genet (Michelsen, 1992). However, no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

This species is regarded as one of the most useful

timbers among the eucalypts. Closely related to *E. citriodora*, but without the characteristic fragrance of that species.

#### 5. *E. cloeziana* F. Muell. (1878)

– type: Australia, *J. Dallachy* s.n.

Tree to 55 m high. Bark flaky, fibrous, longitudinally fissured or in thick, irregular scales, brown, grey or grey-yellow on trunk and large branches; smaller branches smooth, grey-white or yellow. Juvenile leaves alternate, petiolate, green, but with strong difference in colour between the two sides, ovate or broadly lanceolate. Adult leaves alternate, petiolate, green, but with strong difference in colour between the two sides, narrowly lanceolate to lanceolate, acuminate; blade 8–13 x 1–3 cm; lateral veins just visible; submarginal vein up to 1 mm from margin; petiole flattened, 10–15 mm long. Compound inflorescences axillary, paniculate; umbels 7-flowered. Peduncle rounded or angular, 5–10 mm long; pedicels 1–4 mm long. Buds ovoid to club-shaped. Sepals 4, free; inner operculum of fused petals hemispherical or conical, 2–3 x 3–4 mm; hypanthium hemispherical, 2–4 mm x 3–4 mm. Fruits hemispherical or globular, 5–10 x 6–12 mm; disc usually broad, level or convex; valves 3 or 4, level or exerted. Seeds cube-shaped or elongated, yellow-brown. Fig. 72.9.

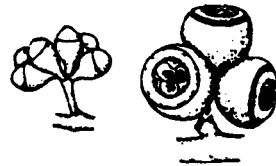


Figure 72.9 *EUCALYPTUS CLOEZIANA*: buds and fruits (both from *J. Turnbull* 64) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 51.)

In trial plots and pilot plantations; c 2000–2350 m. AR; tried in Zambia; indigenous in Queensland, Australia, where it is known as GYMPIE MESSMATE.

Planted at the CADU project near Asella, but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

The species is supposed to produce very good poles because of the strength and growth form of the bole.

#### 6. *E. patens* Benth. (1866)

– type: Australia (6 syntypes).

Tree to 45 m high. Bark fibrous, longitudinally furrowed, usually persistent throughout, grey to grey-brown. Juvenile leaves opposite, becoming alternate, petiolate, ovate, acuminate, with strong difference in colour between the two sides. Adult leaves alternate, petiolate, narrowly lanceolate to lanceolate, sometimes falcate, acuminate, uniform in colour, blade 10–16 x 1.2–3 cm, dull green; lateral veins just visible; submarginal vein up to 1 mm from margin; petiole flat or channelled, 10–20 mm long. Inflorescences simple, axillary; umbels 3–11-flowered; peduncle angular, 10–20 mm long; pedicels 1–4 mm long. Buds club-shaped; operculum hemispherical-conical, 5–6 x 6–7 mm; hypanthium bell-shaped, 5–7 x 6–7 mm. Fruits globular to



ovoid, 9–14 x 9–12 mm; disc broad, descending; valves 3–5, included. Seeds usually D-shaped, red-brown. Fig. 72.10.

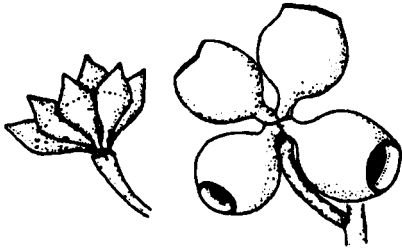


Figure 72.10 *EUCALYPTUS PATENS*: buds (from *FRI* 11831) and fruits (from *A. Hill* U9M-B3) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 53.)

In gardens, presumably cultivated as an ornamental, and in trial plots; c 2000–2400 m. EW HA; use in Africa not known; indigenous in Western Australia, where it, like the following species, is known as BLACKBUTT. *Baldrati* 4492; *Demel* T. 613.

One of the early introduced species of *Eucalyptus*, cultivated in Asmara in the Italian colonial period and tried with moderate success at Alemaya (Adugna Zerihun, 1981).

#### 7. *E. pilularis* Smith (1797)

– type: Australia, *J. White* s.n.

Tree to 70 m high. Bark rough, fibrous, grey-brown on most of trunk, then smooth, white or yellow-grey above. Juvenile leaves opposite, sessile, broadly lanceolate to lanceolate, with strong difference in colour between the two sides, green above, often purple below, glabrous. Adult leaves alternate, petiolate, green, uniform in colour, lanceolate; blade 9–16 x 1.6–3 cm; lateral veins clearly visible; submarginal vein up to 2 mm from margin; petiole flattened or channelled, 10–20 mm long. Inflorescences simple, axillary; umbels 7–15-flowered; peduncle flattened, 10–17 mm long; pedicels angular, 3–6 mm long. Buds fusiform or club-shaped. Operculum conical or beaked, 4–5 x 3–5 mm; hypanthium obconical, 3–4 x 3–5 mm. Fruits hemispherical or globular, 6–11 x 7–11 mm wide; disc narrow to wide, ascending, level or descending; valves 4, at rim level or included. Seeds pyramidal or D-shaped, red-brown. Fig. 72.11.

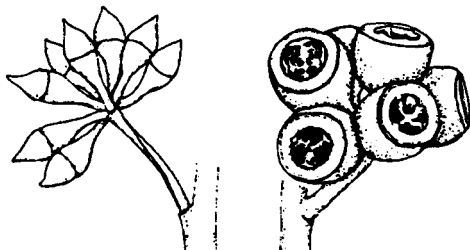


Figure 72.11 *EUCALYPTUS PILULARIS*: buds (from *G. Chippendale* 1033) and fruits (from *G. Chippendale* 875) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 57.)

In trial plots and pilot plantations; c 2000–2350 m. AR; grown in Zambia and South Africa, and probably else-

where; indigenous in Queensland and New South Wales, Australia, where it, like the previous species, is known as BLACKBUTT.

Planted at the CADU project near Asella, but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

#### 8. *E. regnans* F. Muell. (1870–71)

– type: Australia, *D. Boyle* s.n.

Tree usually to 75 m high, but recorded occasionally to reach a height of 100 m (in Australia). Bark rough up to 15 m on trunk, fibrous brown on lower part of trunk, smooth, white or grey-green above, often shed in strips. Juvenile leaves alternate, petiolate, ovate to broadly lanceolate, oblique, green, but with strong difference in colour between the two sides. Adult leaves alternate, petiolate, lanceolate to broadly lanceolate, falcate, acuminate, often oblique, green, uniform in colour; blade 9–14 x 1.6–2.7 cm; lateral veins conspicuous; submarginal vein up to 4 mm from margin; petiole channelled, 12–22 mm long. Inflorescences axillary, appearing simple; umbels paired, 9–15-flowered; peduncle angular, 5–13 mm long; pedicels 2–4 mm long. Buds club-shaped. Operculum conical, 2–3 x 3–4 mm; hypanthium obconical, c 3 x 3–4 mm. Fruits obconical to pear-shaped; 5–9 x 4–7 mm; disc broad, level or ascending; valves 3, at rim level or slightly exerted. Seeds pyramidal, brown. Fig 72.12.

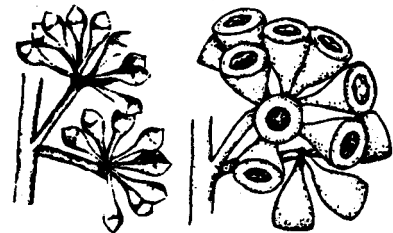


Figure 72.12 *EUCALYPTUS REGNANS*: buds and fruits (both from *K. Eldridge*) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 58.)

In trial plots and pilot plantations; 1800–2450 m. SU AR KF; reported grown in East Africa; indigenous in Victoria, Australia, and Tasmania where it is known as MOUNTAIN ASH. *Friis* et al. 6061, 6069, 6288.

Planted in trials at the CADU project near Asella, and at Wondo Genet; tried with moderate success at Alemaya (Adugna Zerihun, 1981), and with success at Menagesha and Beleta (Ibrahim, 1986).

Closely related to the following species, *E. fastigiata*.

#### 9. *E. fastigiata* Deane & Maiden (1897)

– type: Australia, *H. Deane* & *J. H. Maiden* s.n.

Tree to 45 m high. Bark rough, persistent, fibrous, furrowed on trunk and larger branches, shedding in long strips above, leaving smooth white upper branches. Juvenile leaves alternate, petiolate, ovate to broadly lanceolate, oblique, green, but with strong difference in colour between the two sides. Adult leaves alternate, petiolate, lanceolate, falcate, acuminate, often oblique, green uniform in colour; blade

8–15 x 1.5–2.7 cm; lateral veins conspicuous; submarginal vein up to 4 mm from margin; petiole flattened or channelled, 10–15 mm long. Inflorescences axillary, appearing simple; umbels paired, 11–15-flowered; peduncle rounded or angular, 4–14 mm long, pedicels 1–2 mm long. Operculum conical or beaked,  $c$  2 x 3 mm; hypanthium obconical,  $c$  2 x 3 mm. Fruit 5–8 x 4–7 mm; disc broad, level or ascending; valves 3, at rim level or slightly exserted. Seeds pyramidal, brown. Fig. 72.13.

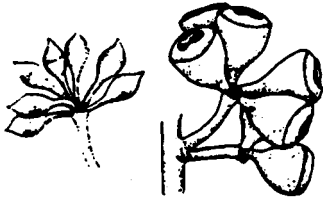


Figure 72.13 *EUCALYPTUS FASTIGIATA*: buds (from R. Johnson & A. Nicholls) and fruits (from I. Brooker 6039) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 58.)

In trial plots and pilot plantations;  $c$  2000–2350 m. AR; cultivated distribution elsewhere in Africa not known; indigenous in New South Wales and Victoria, Australia, where it is known as BROWN BARRELL.

Planted at the CADU project near Asella, but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

This is reported to be the tallest hardwood in the world. It is closely related to *E. regnans*, but differs in having rough bark up to the larger branches.

10. *E. planchoniana* F. Muell. (1878)

– type: Australia, F. M. Bailey s.n.

Tree to 20 m high. Bark rough, fibrous, red-brown, yellow-brown to grey-brown throughout. Ultimate branches often angular. Juvenile leaves alternate, petiolate, ovate to broadly lanceolate, blue-green, but with strong difference in colour between the two sides. Adult leaves thick, alternate, petiolate, ovate to lanceolate, often falcate, oblique, uniform in colour; blade 12–16 x 2–3.3 cm, blue-green, lateral veins just visible; submarginal vein up to 1 mm from margin; petiole flattened, 15–25(–30) mm long. Inflorescences

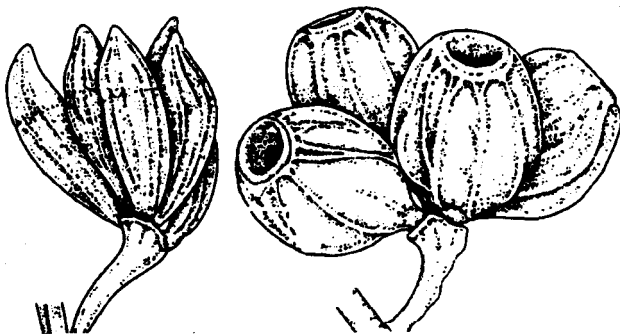


Figure 72.14 *EUCALYPTUS PLANCHONIANA*: buds and fruits (both from E. Larsen) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 58.)

axillary, simple; umbels 7-flowered; peduncle flattened, 13–30 mm long, up to 10 mm wide, pedicels angular, 2–10 mm long. Buds cylindrical, ribbed; operculum conical, 9–13 x 7–9 mm; hypanthium cylindrical to conical, 11–15 x 7–9 mm. Fruits globular or ovoid, clearly ribbed, 17–30 x 15–30 mm; disc broad, descending; valves 4, included. Seeds pyramidal, black. Fig. 72.14.

In park and arboretum;  $c$  2000 m. HA; cultivated distribution elsewhere in Africa not known; indigenous in Queensland and New South Wales, Australia, where it is known as NEEDLEWORK STRINGYBARK. *Demel T.* 44, 1092.

Not reported in the literature, but found among material from the arboretum of Alemaya University of Agriculture. Although the fruits of the specimens seem larger than in wild Australian material of *E. planchoniana* there seems little doubt that the material cited belongs to this very characteristic species.

11. *E. obliqua* L'Hérit. (1792)

– type: Australia, D. Nelson s.n.

Tree to 90 m high. Bark fibrous, stringy, furrowed throughout, grey to red brown. Juvenile leaves ovate, oblique, often shortly acuminate; shining. Juvenile leaves alternate, petiolate, often with strong difference in colour between the two sides at first, becoming uniform in colour later. Adult leaves alternate, petiolate, oblique, broadly lanceolate, acuminate; blade 10–15 x 1.5–3.3 cm, dark green, shining; lateral veins just visible; submarginal vein  $c$  1 mm from margin; petiole channelled, 7–17 mm long. Inflorescences axillary, simple; umbels with 11 or more flowers; peduncle angular or flattened, 4–15 mm long; pedicels 1–6 mm long. Buds club-shaped; operculum hemispherical, apiculate, 1–2 x 2–3 mm; hypanthium obconical, 2–4 x 2–3 mm. Fruits obovoid, globular, barrel-shaped or urn-shaped, 6–11 x 5–9 mm; disc level or steeply descending; valves 3 or 4, level to included. Seeds pyramidal, brown. Fig. 72.15.

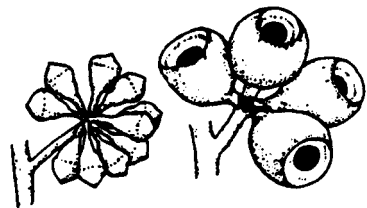


Figure 72.15 *EUCALYPTUS OBLIQUA*: buds (from H. Williamson) and fruits (from G. Chippendale 1308) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 58.)

In trial plots and pilot plantations;  $c$  1800–2350 m. AR KF; cultivated distribution elsewhere in Africa not known; indigenous in Queensland, New South Wales, Victoria, Tasmania and South Australia, where it is known as MESSMATE STRINGYBARK.

Planted at the CADU project near Asella; tried with only moderate success at Alemaya (Adugna Zerihun, 1981), and successfully at Menagesha and Beleta (Ibrahim, 1986), but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

Closely related to the following species, *E. delegatensis*.

12. *E. delegatensis* R. Baker (1900)

- type: Australia, W. Bduerlen s.n.

Tree to 40 m high, sometimes reaching 90 m. Bark fibrous, grey to brown on lower half of trunk, smooth and white above. Juvenile leaves alternate, petiolate, often with strong difference in colour between the two sides at first, later uniform in colour, dull green or glaucous. Adult leaves alternate, petiolate, narrowly to broadly lanceolate, falcate, acuminate, oblique, green, uniform in colour, shining; lateral veins conspicuous; submarginal vein up to 2 mm from margin; petiole flattened or channelled. Inflorescences axillary, simple; umbels 5–27-flowered, but usually *c* 11-flowered; peduncle rounded or angular, 9–20 mm long; pedicels 2–7 mm long. Buds club-shaped; operculum hemispherical, apiculate, *c* 2 x 3 mm; hypanthium obconical, 3–4 x 3 mm. Fruits ovoid to pear-shaped, sometimes hemispherical, 8–19 x 6–11 mm; disc broad, descending, sometimes level; valves 3–5, included. Seeds pyramidal, brown. Fig. 72.16.



Figure 72.16 *EUCALYPTUS DELEGATENSIS*: buds (from P. Martensz 115) and fruits (from C. Beauglehole 35736) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 58.)

In trial plots and pilot plantations; *c* 2000–2350 m. AR; cultivated distribution elsewhere in Africa not known; indigenous in New South Wales, ACT, Victoria, Australia, and in Tasmania, where it is known as ALPINE ASH.

Planted at the CADU project near Asella (Ibrahim, 1986), but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

In Australia two subspecies are distinguished based on seedling morphology but the subspecific identity of the cultivated material was not reported.

13. *E. amygdalina* Labill. (1806)

- type: Australia, J. de Labillardière s.n.

Tree to 30 m high. Bark finely fibrous, grey brown on trunk and larger branches, smooth and white to grey above. Juvenile leaves opposite, sessile or shortly petiolate, lanceolate, green to glaucous, with slight difference in colour between the two sides. Adult leaves alternate, petiolate, uniform in colour, with peppermint scent, narrowly lanceolate to linear, falcate, acuminate to uncinat, thin; blade 7–12 x 0.5–1.3 cm, dull, green; lateral veins faint; submarginal vein up to 1 mm from margin; petiole flattened or angular, 7–10 mm long. Inflorescences axillary, simple; umbel with 11–15 or more flowers; peduncle rounded or angular, 4–10 mm long; pedicels 1–3 mm long. Buds club-shaped. Operculum hemispherical, sometimes apicu-

late, 1–2 x 2–3 mm; hypanthium pear-shaped, 2–3 x 2–3 mm. Fruits hemispherical or obconical, 4–7 x 5–7 mm; disc broad, level, sometimes ascending; valves 4, level. Seeds pyramidal, red brown. Fig. 72.17.

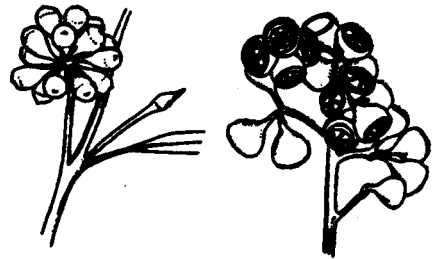


Figure 72.17 *EUCALYPTUS AMYGDALINA*: buds (from C. Dunlop) and fruits (FRI s.n.) x 1. Drawn by M. Risby. (Reproduced with permission from the *Flora of Australia*: fig. 58.)

In trial plots; *c* 1000–1500 m. EE/EW; widely planted in the Mediterranean and in South Africa; indigenous in Tasmania where it is known as BLACK PEPPERMINT. Baldrati 4574.

One of the early introduced species of *Eucalyptus* which was tried successfully in experimental plots at Ghinda (Eritrea) in the Italian colonial period.

14. *E. diversicolor* F. Muell. (1863)

- type: Australia, A. Oldfield s.n.

Tree to 90 m high. Bark smooth throughout, orange-yellow, bronze or white, often in varying patterns. Juvenile leaves alternate, petiolate, broadly ovate or orbicular, green, but with strong difference in colour between the two sides. Adult leaves alternate, petiolate, green, with strong difference in colour between the two sides, broadly lanceolate, acuminate; blade 9–12 x 2–3.2 cm; lateral veins conspicuous; submarginal vein up to 1 mm from margin; petiole channelled, 10–20 mm long. Inflorescences axillary, simple; umbels 7-flowered; peduncle flattened or angular, 18–28 mm long; pedicels 3–6 mm long. Buds club-shaped. Operculum conical, 5–7 x 5–7 mm; hypanthium cylindrical to obconical, 7–8 x 5–7 mm. Fruits ovoid or globular, 8–12 x 7–10 mm; disc broad, descending; valves 3, prominent, included or level. Seeds round or elliptic, flat, grey-brown. Fig. 72.18.

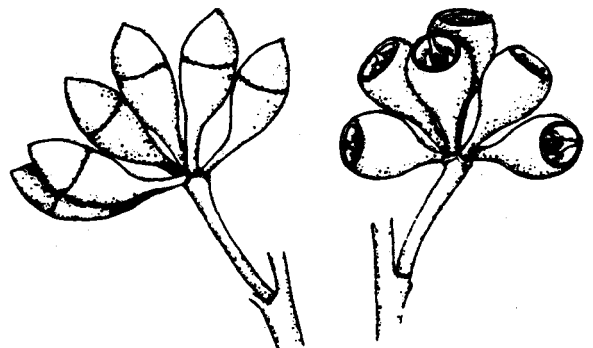


Figure 72.18 *EUCALYPTUS DIVERSICOLOR*: buds (from C. Hamilton) and fruits (from B. Rockel W.A.2) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 64.)

Planted, probably as an ornamental; *c* 2400 m. EW; cultivated distribution elsewhere in Africa not known; indigenous in Western Australia where it is known as KARRI. *Baldrati* 4578, 4584.

One of the early introduced *Eucalyptus* species, cultivated in Asmara (at 'Cornocalis') in the Italian colonial period.

15. *E. deanei* Maiden (1904)

—type: Australia, *H. Deane* s.n.

Tree to 65 m high. Bark smooth, white or blue-grey throughout, sometimes with a small amount of flaky bark at base. Juvenile leaves alternate, petiolate, ovate to orbicular, green, but with strong difference in colour between the two sides. Adult leaves alternate, petiolate, lanceolate to broadly lanceolate, long acuminate, green, but with strong difference in colour between the two sides; blade 8–12.5 x 1.7–3.5 cm; lateral veins faint; submarginal vein up to 1 mm from margin; petiole channelled, 15–20 mm long. Inflorescences simple, axillary; umbels 7–11-flowered; peduncle angular or flattened, 7–14 mm long; pedicels angular, 1–5 mm long. Buds club-shaped. Operculum hemispherical, apiculate, 1–3 x 3–4 mm; hypanthium obconical or bell-shaped, 3–4 x 3–4 mm. Fruits cylindrical or bell-shaped, 4–6 x 4–6 mm; disc level or descending; valves 3 or 4, level or exserted, often curved outwards. Seeds cube-shaped or flat, brown. The species is reported to form lignotubers. Fig. 72.19.

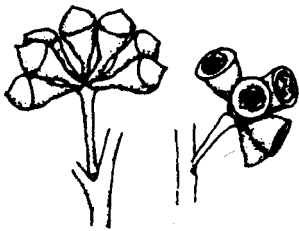


Figure 72.19 *EUCALYPTUS DEANEI*: buds (from *I. Brooker* 3949) and fruits (from *L. Langley*) x 1. Drawn by *M. May*. (Reproduced with permission from the *Flora of Australia*: fig. 64.)

In trial plots and pilot plantations; *c* 2000–2350 m. AR; cultivated distribution elsewhere in Africa not known; indigenous in Queensland and New South Wales, Australia, where it is known as DEANE'S GUM.

Planted at the CADU project near Asella (*Ibrahim*, 1986), but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

Closely related to the following sequence of species, *E. grandis*, *E. saligna*, *E. botryoides*, and *E. robusta*.

16. *E. grandis* Maiden (1862)

—type: Australia, *W. Hill* 74.

Tree to 55 m high; not forming lignotubers. Bark smooth, white, grey-white or blue-grey, with some rough flaky bark at base. Juvenile leaves alternate, petiolate, green, but with strong difference in colour between the two sides, ovate. Adult leaves alternate, petiolate, lanceolate, long

acuminate, green, but with strong difference in colour between the two sides; blade 10–16 x 2–3 cm; lateral veins conspicuous; submarginal vein up to 1 mm from margin; petiole channelled, 15–20 mm long. Inflorescences axillary, simple; umbels 7–11-flowered; peduncle flattened, 8–18 mm long; pedicels angular, absent or to 3 mm long. Buds ovoid or broadly fusiform; operculum conical or slightly beaked, 3–4 x 4–5 mm; hypanthium obconical or bell-shaped, 3–4 x 4–5 mm. Fruits inverted pear-shaped, 5–8 x 4–7 mm; disc narrow, level or descending; valves (3) 4 or 5, exserted, more or less incurved. Seed cube-shaped or flat, brown. Fig. 72.6.7 & 8 (p. 83).

Commonly planted throughout Ethiopia, in trial plots, woodlots, pilot and large scale plantations; 1700–2500 m. SU AR HA KF; widely planted in tropical Africa; indigenous in Queensland and New South Wales, Australia, where it is known as FLOODED GUM or ROSE GUM. *Demel* T. 604; *Friis* et al. 6066, 6084.

Planted at the CADU project near Asella, and at Wondo Genet (*Michelsen*, 1992); reported as planted at Ambo and Holleta by *Breitenbach* (1961, p. 23 & 25), and tried successfully at Alemaya (*Adugna Zerihun*, 1981), at Munessa, Menagesha, and Beleta (*Ibrahim*, 1986). Recorded by *Breitenbach* (1961, p. 25) as frequently planted in Ethiopia, but precise locations not specified.

*E. grandis* and *E. saligna* occur in adjacent areas of eastern Australia; there is a considerable area where the two species overlap, and here populations are reported to be variable and intermediate, though the extremes are somewhat different. It seems that the African stands are largely of hybrid origin, and hybrids with *E. tereticornis*, *E. saligna*, and *E. camaldulensis* have been reported. Many of the hybrids grown in Zambia are known to be of South African origin. Foresters in East Africa tend to refer also to these hybrids with the name 'saligna'. *E. grandis* is reported not to form lignotubers whereas *E. saligna* does form these, and is, therefore, a better producer of coppice. No information has been found about the behaviour of the 'saligna'-hybrids with regard to the formation of lignotubers.

17. *E. saligna* Smith (1797)

—type: Australia, *J. White* s.n.

Tree to 55 m high, forming well developed lignotubers. Bark smooth, white or blue grey, with rough brown-grey, flaky bark at base up to 4 m. Juvenile leaves alternate, petiolate, ovate to broadly lanceolate, green, but with strong difference in colour between the two sides. Adult leaves alternate, petiolate, long acuminate, lanceolate, green, but with strong difference in colour between the two sides; blade 9–17 x 2–3 cm; lateral veins visible; submarginal vein up to 1 mm from margin; petiole channelled, 15–25 mm long. Inflorescences axillary, simple; umbels 7–11 flowered; peduncle flattened, 4–18 mm long; pedicels absent or angular, to 3 mm long. Buds fusiform or ovoid; operculum conical, 3–4 x 3–4 mm. Fruits cylindrical, bell-shaped or almost pear-shaped, 5–8 x 4–7 mm; disc narrow, descending; valves 3 or 4, rarely 5, exserted, curved outwards. Seeds cube-shaped or flat, brown. Fig. 72.20.



Figure 72.20 *EUCALYPTUS SALIGNA*: buds and fruits (both from I. Brooker 6065) x 1. Drawn by M. Risby. (Reproduced with permission from the *Flora of Australia*: fig. 64.)

Commonly planted throughout Eritrea and Ethiopia, in trial plots, woodlots, pilot and large scale plantations; 1700–2300 m. EW AR SU SD HA KF; probably widely grown in tropical Africa (but see below); indigenous in Queensland, Australia, where it is known as SYDNEY BLUE GUM. *Baldrati* 916; *Friis* et al. 6164, 6168, 6281.

Recorded by Breitenbach (1961, p. 25) as planted at Ambo and Holeta; tried successfully at Alemaya (Adugna Zerihun, 1981), and at Menagesha and Beleta (Ibrahim, 1986); planted at Wondo Genet (Michelsen, 1992).

It is probable that pure *E. saligna* is only grown from seeds of Australian origin. Most seeds of African origin represents hybrids with *E. grandis* and *E. tereticornis*. See note about taxonomy under *E. grandis*.

#### 18. *E. botryoides* Smith (1795)

– type: Australia, *J. White* s.n.

Tree to 40 m high. Bark fibrous or flaky-fibrous, brown to grey-brown on trunk and larger branches, above smooth, white or grey-white on smaller branches. Juvenile leaves alternate, petiolate, ovate, green, but with strong difference in colour between the two sides. Adult leaves alternate, petiolate, broadly lanceolate, long acuminate, green, but with strong difference in colour between the two sides; blade 10–16 x 2.5–4 cm; lateral veins usually visible; submarginal vein up to 2 mm from margin; petiole channelled, 20–30 mm long. Inflorescences axillary, simple; umbels 7–11-flowered; peduncle broadly flattened, 7–15 mm long; pedicels usually absent, sometimes up to 3 mm long. Buds almost cylindrical, club-shaped or ovoid; operculum conical or hemispherical, 3–5 x 4–5 mm; hypanthium cylindrical or obconical, often ribbed, 4–6 x 4–5 mm. Fruits cylindrical, 7–12 x 5–9 mm; disc moderately broad, descending; valves 3 or 4, level or included. Seeds cube-shaped or flat, brown. Fig. 72.6.9–10 (p. 83).

In trial plots and pilot plantations; (1800–)2000–2350 m. EW? AR HA; reported grown in Zambia; indigenous in Queensland and New South Wales, Australia, where it is known as BANGALAY or SOUTHERN MAHOGANY.

Planted at the CADU project near Asella; tried successfully at Alemaya, HA (Adugna Zerihun, 1981), but no herbarium material of this species from the Flora area has

as yet been verified against authentically named cultivated or wild Australian material. A sterile specimen (*Demel* T. 620) named as this species cannot be verified. Two specimens from EW, Asmara (*Ryding* 1215) and Nefasit (*Sue Edwards & Tewolde* B. G/E 3503), respectively, are very likely this species, but cannot be verified under present conditions.

Differs from *E. saligna* in having fibrous bark to the lower branches, and usually sessile, robust buds and fruits.

#### 19. *E. robusta* Smith (1795)

– type: Australia, *J. White* s.n.

Tree to 30 m high. Bark rough throughout, soft, spongy, fibrous, red-brown. Juvenile leaves alternate, petiolate, ovate, green, but with strong difference in colour between the two sides. Adult leaves alternate, petiolate, broadly lanceolate, long acuminate, green, but with strong difference in colour between the two sides; blade 10–16 x 2.7–4.5 cm; lateral veins fine; submarginal vein up to 2 mm from margin; petiole channelled, 20–35 mm long. Inflorescences axillary, simple; umbels 9–15-flowered; peduncle broadly flattened, 13–30 mm long; pedicels angular, 1–9 mm long, sometimes absent. Buds beaked or fusiform; operculum conical, beaked, 10–12 x 6–8 mm; hypanthium obconical, 6–7 x 6–8 mm. Fruits cylindrical, sometimes slightly constricted in the middle, 10–18 x 6–11 mm; disc broad, descending; valves 3 or 4, included or joined across the orifice, sometimes level or slightly exerted. Seeds cube-shaped or flat, brown. Fig. 72.6.11–12 (p. 83).

In trial plots; c 2000 m. HA; grown in tropical Africa, e.g. Zambia, in places with deep soil and high rainfall; indigenous in Queensland and New South Wales, Australia, where it is known as SWAMP MAHOGANY. *Demel* T. 190, 193, 608.

Tried successfully at Alemaya (Adugna Zerihun, 1981; Ibrahim, 1986), this species has been widely planted in eastern Africa, and is reported to be excellent on deep, alluvial soil where it has been used as an anti-malaria measure, but it is often considered to be too slow-growing for productive purpose.

#### 20. *E. resinifera* Smith (1790)

– type: Australia, *J. White* s.n.

Tree to 45 m high. Bark fibrous throughout, red-brown, brown or grey. Juvenile leaves alternate, petiolate, ovate to broadly lanceolate, green, but with strong difference in colour between the two sides. Adult leaves alternate, petiolate, broadly lanceolate, long acuminate, green, but with strong difference in colour between the two sides; blade 10–17 x 1.8–3.5 cm; lateral veins faint to distinct; submarginal vein up to 1 mm from margin; petiole channelled, 15–30 mm long. Inflorescences axillary, simple; umbels 7–11-flowered; peduncle flattened, 10–22 mm long; pedicels angular, 3–10 mm long. Buds beaked, fusiform; operculum conical or beaked, 10–12 x 5–7 mm; hypanthium hemispherical, 4–5 x 5–7 mm. Fruits hemispherical or obconical, 6–11 x 7–10 mm; disc broad, level or convex; valves 3 or 4, exerted. Seeds cubical or flattened, brown. Fig. 72.21.

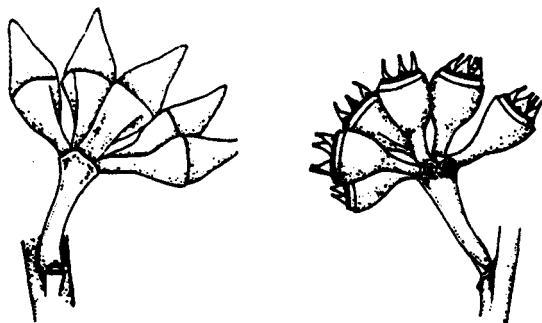


Figure 72.21 *EUCALYPTUS RESINIFERA*: buds (from I. Brooker 4123) and fruits (from I. Brooker 4838) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 65.)

In trial plots and pilot plantations, in parks, and as a road tree; c 2000-2400 m. EW SU AR HA; known to be grown in Zambia. Indigenous in Queensland and New South Wales, Australia, where it is known as RED MAHOGANY. *Baldrati* 4498, 4503.

One of the early introductions of *Eucalyptus*, cultivated at Asmara (e.g. at the 'Catholic Mission' and along 'Via della Regina') during the Italian colonial period; planted at Shola (Michelsen, 1992); at the CADU project near Asella; and tried successfully at Alemaya (Adugna Zerihun, 1981).

21. *E. gomphocephala* DC. (1828)

— type: Australia, J. Leschenault s.n.

Tree to 40 m high. Bark fibrous throughout, finely fissured, grey. Juvenile leaves alternate, petiolate, ovate, often cordate, green, but with strong difference in colour between the two sides. Adult leaves alternate, petiolate, lanceolate, acuminate, usually green, uniform in colour, blade 9–16 x 1.6–2.5 cm; lateral veins faint; submarginal vein up to 1 mm from margin; petiole flattened or channelled, 15–20 mm long. Inflorescences axillary, simple; umbels 7-flowered; peduncle flattened or angular, 13–27 mm long; pedicel absent or up to 4 mm long. Buds club-shaped; operculum hemispherical, 8–10 x 9–13 mm; hypanthium obconical or bell-shaped, often ribbed, 7–9 x 7–8 mm. Fruits bell-shaped or cylindrical, often faintly ribbed, 13–22 x 13–17 mm; disc broad, level, convex or ascending; valves 4, level or slightly exserted. Seeds flat, grey-brown. Fig. 72.22.

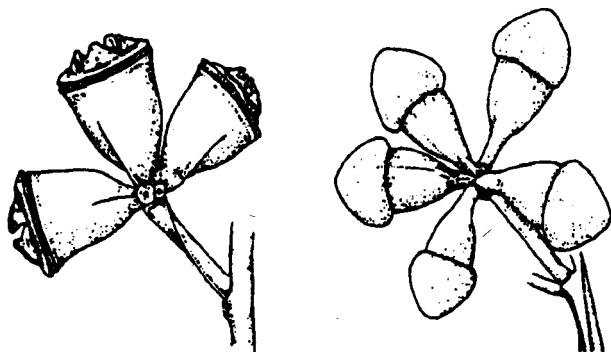


Figure 72.22 *EUCALYPTUS GOMPHOCEPHALA*: fruits (from C. Cossalter 1571) and buds (from M. Phillips) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 66.)

In trial plots; c 2000 m. HA; cultivated distribution elsewhere in Africa not known; indigenous in a small area of Western Australia where it is known as TUART.

Tried successfully at Alemaya (Adugna Zerihun, 1981), but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material. *Demel* T. 621 is said to represent this species, but the material is sterile.

The operculum clearly wider than the hypanthium is a very distinctive feature of this species. Fruits are larger than in most other species grown in Eritrea and Ethiopia, with the exception of *E. planchoniana*.

22. *E. cornuta* Labill. (1800)

— type: Australia, J. de Labillardière s.n.

Tree to 25 m high. Bark rough, hard, deep furrowed, dark grey or black on trunk and larger branches, then smooth, grey or grey-brown above. Juvenile leaves alternate, petiolate, orbicular to ovate, green, but with strong difference in colour between the two sides. Adult leaves alternate, petiolate, lanceolate to broadly lanceolate, acuminate, shining, green, uniform in colour; blade 8–14 x 1–2.7 cm; lateral veins conspicuous; submarginal vein up to 2 mm from margin; petiole flattened or channelled, 5–15 mm long.

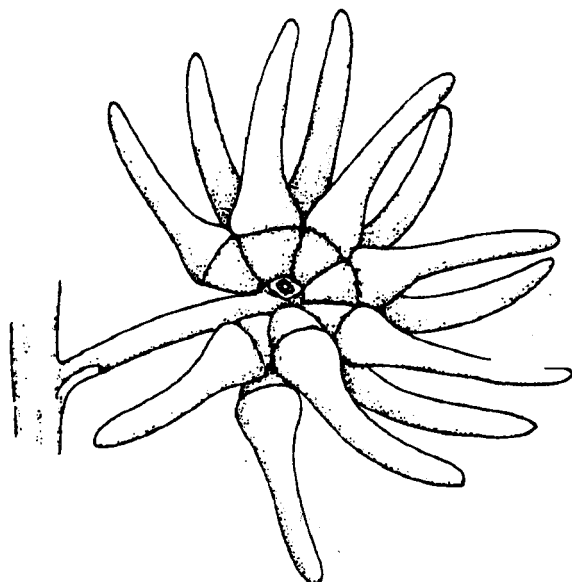
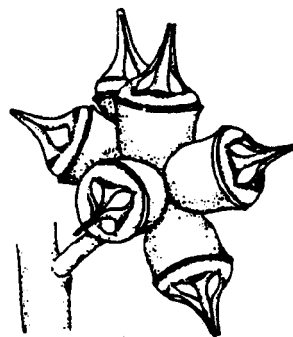


Figure 72.23 *EUCALYPTUS CORNUTA*: buds below (from I. Brooker 5652) and fruits above (from B. Rockel W.A.3) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 66.)

Inflorescences axillary, simple; umbels usually 11–15-flowered; peduncle flattened or angular, 17–30 mm long. Buds horn-shaped or narrowly cylindrical, often short pedicellate; operculum horn-shaped, 17–30 x 5–10 mm; hypanthium hemispherical, faintly ribbed, 4–8 x 5–10 mm. Fruits hemispherical or bell-shaped, crowded, 7–14 x 6–13 mm; disc obscure; valves 3, exserted. Seeds flat, grey-brown. Fig. 72.23.

In parks and gardens, probably chiefly as an ornamental grown for the notable flowers; c 2400 m. EW; known to be cultivated in Zambia; indigenous in Western Australia where it is known as YATE. *Baldrati* 4560, 4562.

One of the early introduced *Eucalyptus* species, cultivated at Asmara during the Italian colonial period.

23. *E. occidentalis* Endl. (1837)

– type: Australia, *K. Hügel* s.n.

Tree to 20 m high. Bark rough, flaky, fibrous on trunk and lower part of main branches, smooth grey above. Juvenile leaves alternate, petiolate, ovate, green, but with strong difference in colour between the two sides. Adult leaves alternate, lanceolate, uncinuate, usually shining, green, uniform in colour; blade 7–16 x 1.2–2.5 cm; lateral veins conspicuous; submarginal vein up to 1 mm from margin; petiole rounded, channelled or flattened, 8–15 mm long. Inflorescences axillary, simple; umbels usually 7-flowered; peduncle flattened, usually recurved, up to 2.5 cm long; pedicels thick, 3–6 long. Buds cylindrical or horn-shaped; operculum cylindrical-conical or horn-shaped, much longer than the hypanthium, expanded at base, 10–15 x 5–6 mm; hypanthium bell-shaped, 5–10 x 5–6 mm. Fruits bell-shaped, faintly striated, 8–15 x 7–11 mm; disc narrow, obscured by a prominent staminal ring, descending; valves 4, curved outwards. Seeds irregularly crescent-shaped, reticulate, grey-brown or black. Fig. 72.24.

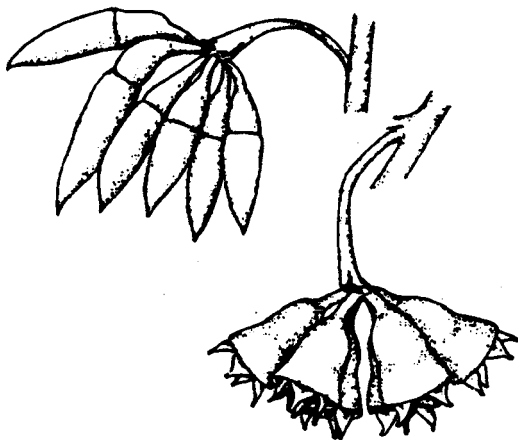


Figure 72.24 *EUCALYPTUS OCCIDENTALIS*: buds above (from *P. Wilson* 5665) and fruits below (from *D. Boland* 220) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 69.)

In trial plots; 2000–2400 m. SU HA; cultivated distribution elsewhere in Africa not known; indigenous in West-

ern Australia where it is known as FLAT-TOPPED YATE or SWAMP YATE. *Demel* T. 605, 622; *Friis* et al. 6175.

Tried at Alemaya (Adugna Zerihun, 1981) and planted at Shola (Michelsen, 1992).

Closely related to the following species, *E. astringens*.

24. *E. astringens* (Maiden) Maiden (1924)

– type: Australia, *J. H. Maiden* s.n.

Tree to 24 m high. Bark smooth throughout, light brown to grey, usually with small flakes of curly flaking bark. Juvenile leaves alternate, petiolate, ovate, green or grey-green, uniform in colour. Adult leaves alternate, lanceolate, acuminate, usually shining, green, uniform in colour; blade 7–11 x 1.2–2 cm; lateral veins just visible; submarginal vein up to 1 mm from margin; petiole rounded, 10–20 mm long. Inflorescences axillary, simple; umbels usually 7-flowered; peduncle flattened, becoming recurved, 15–30 mm long; pedicels 5–8 mm long. Buds cylindrical or horn-shaped. Operculum cylindrical, longer than the hypanthium, constricted in the middle, expanded slightly at base, 8–18 x 5–7 mm; hypanthium bell-shaped or hemispherical, 6–8 x 5–7 mm. Fruits bell-shaped, faintly striated, 8–12 x 6–10 mm; disc narrow, almost level; valves usually 4, curved outwards. Seeds irregularly crescent-shaped, reticulate, grey-brown or black. Fig. 72.25.

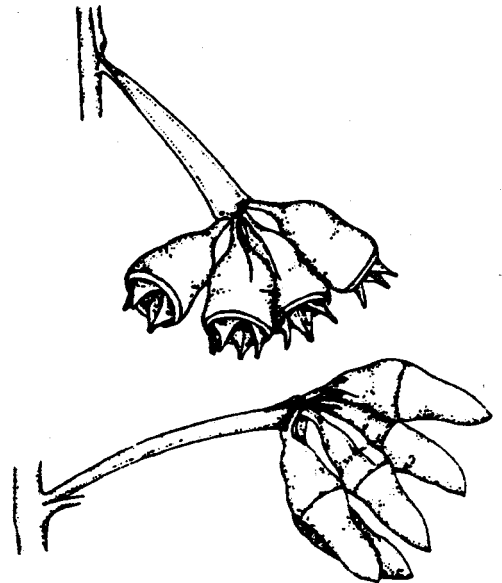


Figure 72.25 *EUCALYPTUS ASTRINGENS*: buds below (from *G. Chippendale* 417) and fruits above (from *C. Gardner* 1223) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 69.)

In trial plots; c 2000 m. HA; known to be cultivated in Zambia; indigenous to western Australia where it is known as BROWN MALLETT.

Tried with only moderate success at Alemaya (Adugna Zerihun, 1981), but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

Similar to *E. occidentalis* but has smooth bark with small curly flakes.

25. *E. wandoo* *Blakely* (1934)- type: Australia, *A. Oldfield* s.n.

Tree to 25 m high. Bark smooth throughout, white or cream, often with yellow-brown flakes. Juvenile leaves alternate, petiolate, ovate to broadly lanceolate, uniform in colour. Adult leaves alternate, petiolate, lanceolate to narrowly lanceolate, acuminate, uniform in colour, blade 8–12 x 1–2 cm, dull, green to grey-green; lateral veins faint; submarginal vein up to 3 mm from margin; petiole rounded or angular, 12–16 mm long. Inflorescences axillary, simple; umbels 11–15-flowered; peduncle flattened, 10–20 mm long; pedicels 1–5 mm long. Buds horn-shaped; operculum 6–10 x 3–5 mm; hypanthium cylindrical to bell-shaped, 4–5 x 3–5 mm. Fruits cylindrical to pear-shaped, 6–10 x 3–8 mm; disc descending vertically; valves level or slightly exserted. Seeds spherical, almost smooth, white-grey-brown. Fig. 72.26.

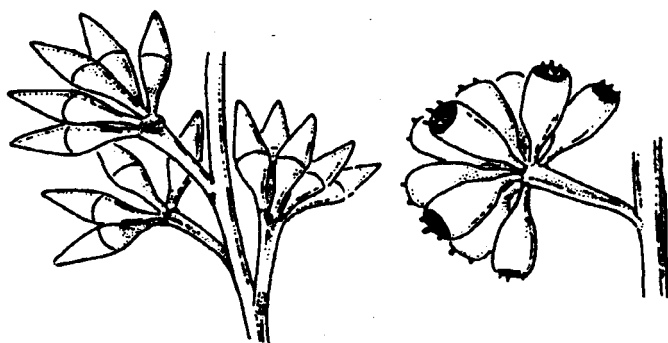


Figure 72.26 *EUCALYPTUS WANDOO*: buds (from *I. Brooker* 2429) and fruits (from *G. Chippendale* 209) x 1. Drawn by *M. Risby*. (Reproduced with permission from the *Flora of Australia*: fig. 72.)

In trial plots; c 2000 m. HA; cultivated distribution elsewhere in Africa not known; indigenous to Western Australia where it is known as WANDOO. *Demel* T. 609.

Tried with reasonable success at Alemaya (Adugna Zerihun, 1981).

26. *E. salubris* *F. Muell.* (1876)- type: Australia, *J. Young* s.n.

Tree to 15 m high; trunk strongly spirally fluted. Bark smooth throughout, shining, red brown or copper-coloured. Juvenile leaves alternate, petiolate, lanceolate, green, uniform in colour. Adult leaves alternate, petiolate, narrowly lanceolate, acute to acuminate, uniform in colour, blade 4.5–10.5 x 0.5–1.3 cm; lateral veins faint; submarginal vein up to 1 mm from margin; petiole rounded, 8–15 mm long. Inflorescences axillary, simple; umbels usually 7-flowered; peduncle flattened, 4–13 mm long; pedicels absent or up to 5 mm long. Buds ovoid; operculum conical, rounded at apex, 4–6 x 4–5 mm; hypanthium hemispherical, 6–8 x 4–5 mm. Fruits hemispherical, 3–6 x 5–8 mm; disc usually convex, narrow, descending; valves 3 or 4, exserted. Seeds irregularly D-shaped, cubical or orbicular, red- to yellow-brown. Fig. 72.27.



Figure 72.27 *EUCALYPTUS SALUBRIS*: buds (from *R. Kuchel* 1757) and fruits (from *J. Baker* 8) x 1. Drawn by *M. Risby*. (Reproduced with permission from the *Flora of Australia*: fig. 74.)

In parks and gardens; c 2400 m. EW; cultivated distribution elsewhere in Africa not known; indigenous to Western Australia where it is known as GIMLET. *Baldrati* 4582, 4592, 4593.

Cultivated in Asmara in the Italian colonial times; the specimens seen all come from the garden of a certain 'Ing. Bonetti in Asmara'.

27. *E. brockwayi* *C. Gardner* (1942)- type: Australia, *G. E. Brockway* & *C. A. Gardner* 5598.

Tree to 25 m high. Bark smooth throughout, white or grey to red-brown or pink; shedding in flakes. Juvenile leaves crowded, alternate to almost opposite, sessile, elliptic, pale green, uniform in colour. Adult leaves alternate, petiolate, narrowly lanceolate, uncinata, shining, bright green, uniform in colour, blade 8–12.5 x 0.7–1.5 cm; lateral veins faint; submarginal vein up to 1 mm from margin; petiole 15–20 mm long. Inflorescence axillary, simple; umbels 7–15-flowered; peduncles angular, 4–12 mm; pedicels 1–2 mm long. Buds ovoid or cylindrical; operculum hemispherical, 3–4 x c 3 mm; hypanthium urn-shaped to cylindrical, wider than operculum, 4–6 x 3–4 mm. Fruits globular, narrowing to a short neck, 5–6 x 4–5 mm; disc broad, descending vertically; valves 3, included. Seeds elliptic, faintly reticulate, brown or grey-brown. Fig. 72.28.



Figure 72.28 *EUCALYPTUS BROCKWAYI*: buds and fruits (both from *P. Barrett*) x 1. Drawn by *M. May*. (Reproduced with permission from the *Flora of Australia*: fig. 76.)

In trial plots; c 2000 m. HA; widely grown in northern Africa; indigenous to western Australia where it is known as DUNDAS MAHOGANY.

Tried with only moderate success at Alemaya (Adugna Zerihun, 1981), but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.



28. *E. cladocalyx* F. Muell. (1852)

— type: Australia, *C. Wilhelmi* s.n.

Tree to 35 m high. Bark smooth throughout, grey-white, yellow or blue-grey. Juvenile leaves alternate, petiolate, orbicular, dark green, with strong difference in colour between the two sides. Adult leaves alternate, petiolate, lanceolate, acuminate, shining, dark green, with strong difference in colour between the two sides; blade 11–15 x 2–2.5 cm; lateral veins clearly visible; submarginal vein 1–2 mm from margin; petiole quadrangular, 12–21 mm long. Inflorescences axillary, simple; umbels 7–11-flowered; peduncle rounded, 10–17 mm long; pedicels 2–7 mm long. Buds cylindrical or urn-shaped; operculum hemispherical, apiculate, usually wider than hypanthium, 3–4 x c 5 mm; hypanthium cylindrical, faintly ribbed, 7–8 x 4–5 mm. Fruits ovoid or urn-shaped, ribbed, 9–16 x 6–10 mm; disc broad, descending; valves 3 or 4, included. Seeds elliptic, faintly reticulate, grey-brown. Fig. 72.29.



Figure 72.29 *EUCALYPTUS CLADOCALYX*: buds (from *D. Kleinig* 48) and fruits (from *G. Chippendale* 1374) x 1. Drawn by M. Risby. (Reproduced with permission from the *Flora of Australia*: fig. 76.)

In trial plots; c 2000–2800 m. EW SU HA; not successful in Zambia; indigenous to south Australia where it is known as SUGAR GUM. *Baldrati* 4553; *Demel* T. 176, 603.

One of the early introduced species of *Eucalyptus*, cultivated in Asmara in the Italian colonial period; recently tried successfully at Alemaya (Adugna Zerihun, 1981); Ibrahim, 1986); planted at Debre Berhan (Michelsen, 1992).

29. *E. transcontinentalis* Maiden (1919)

— type: Australia, *J. H. Maiden* s.n.

Tree to 25 m high. Bark smooth throughout, white or grey to grey-red, with an accumulation of peeling, fibrous bark sometimes at base of older trees. Juvenile leaves alternate, petiolate or opposite, sessile, decurrent, ovate, blue-green. Adult leaves alternate, petiolate, lanceolate to narrowly lanceolate, acuminate, uniform in colour; blade 7–15 x 1–2.2 cm, blue-grey or grey-green, dull, glandular; lateral veins faint; submarginal vein up to 2 mm from margin; petiole rounded, 15–25 mm long. Inflorescences simple, axillary; umbels 7-flowered; peduncle rounded or angled, 7–13 mm long; pedicels 4–7 mm long. Buds ovoid or cylindrical, glaucous; operculum hemispherical at base, narrowly beaked, 8–13 x 4–6 mm; hypanthium almost urn-shaped, 4–5 x 5–6 mm. Fruits globular to urn-shaped,

6–11 x 6–11 mm, usually glaucous; valves usually 3, sometimes up to 5, subulate, usually exserted. Seeds elliptic, shallowly reticulate, grey-brown. Fig. 72.30.



Figure 72.30 *EUCALYPTUS TRANSCONTINENTALIS*: buds and fruits (both from *J. Maiden*) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 78.)

In trial plots; 2000 m. HA; cultivated distribution elsewhere in Africa not known; indigenous to western Australia where it is known as REDWOOD. *Demel* T. 612.

Tried with reasonable success at Alemaya (Adugna Zerihun, 1981).

30. *E. salmonophloia* F. Muell. (1878)

— type: Australia (numerous syntypes).

Tree to 24 m high. Bark smooth throughout, salmon-coloured or pink-brown to grey or grey-brown. Juvenile leaves alternate, petiolate, elliptic to lanceolate, uniform in colour. Adult leaves alternate, petiolate, lanceolate, falcate, uncinata; blade 6–12 x 0.6–1.5 cm, shining, green; lateral veins faint; submarginal vein up to 1 mm from margin; petiole rounded, 10–15 mm long. Inflorescences simple, axillary; umbels 7–11-flowered; peduncle slender, rounded or angled, 5–10 mm long; pedicels slender, 2–5 mm long. Buds ovoid or club-shaped. Operculum hemispherical, apiculate or conical, 3–4 x 3–4 mm; hypanthium hemispherical or obconical, 2–3 x 3–4 mm. Fruits hemispherical, 3–5 x 4–5 mm; disc narrow, descending vertically; valves 3 or 4, exserted, slender. Seeds usually elliptic, reticulate, grey-brown. Fig. 72.31.



Figure 72.31 *EUCALYPTUS SALMONOPHLOIA*: buds (from *G. Chippendale* 277) and fruits (from *J. Baker* 5) x 1. Drawn by M. Risby. (Reproduced with permission from the *Flora of Australia*: fig. 78.)

In trial plots; *c* 2000 m. HA; cultivated distribution elsewhere in Africa not known; indigenous to eastern Australia where it is known as SALMON GUM.

Tried with only moderate success at Alemaya (Adugna Zerihun, 1981), and no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

31. *E. incrassata* Labill. (1806)

– type: Australia, *J. de Labillardière* s.n.  
*E. costata* F. Muell. (1855).

Several, usually dense woody stems up to 4 m high developing from lignotuber. Bark smooth, grey to light brown throughout, sometimes rough at base. Juvenile leaves alternate, petiolate, ovate, green, uniform in colour. Adult leaves alternate, petiolate, thick, lanceolate, acuminate to uncinately, uniform in colour; blade 6–9 x 1.4–2.5 cm, shining, green; lateral veins faint; submarginal vein faint, up to 2 mm from margin; petiole rounded, 10–20 mm long. Inflorescences axillary, simple; umbels 3–7-flowered; peduncle flattened, dilating upwards, 13–20 mm long; pedicels 3–5 mm long. Buds cylindrical, smooth or striate; operculum hemispherical, beaked, smooth, 7–10 x 6–8 mm; hypanthium bell-shaped, slightly striate, 8–10 x 6–8 mm. Fruits cylindrical, urn-shaped, bell-shaped or ovoid, smooth or striate, 10–15 x 10–15 mm; valves 3 or 4, included. Seeds pyramidal or sometimes elliptic or crescent-shaped, reticulate, narrowly winged, brown to black. Fig. 72.32.

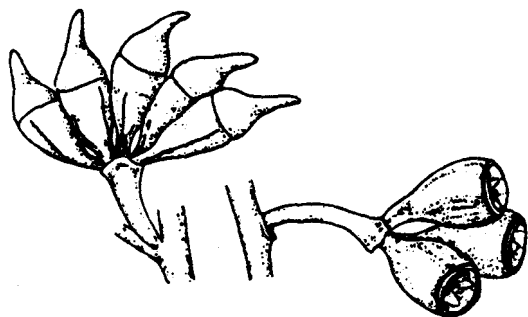


Figure 72.32 *EUCALYPTUS INCRASSATA*: buds and fruits (both from *J. Baker* 72) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 87.)

In gardens (?) and trial plots; *c* 2400 m. EW; distribution elsewhere in Africa not known; indigenous in Western Australia, South Australia and New South Wales, where it is known as LERP MALLEE. *Baldrati* 4579.

One of the early introduced species of *Eucalyptus*, cultivated in Asmara (at 'Cornocalis') in the Italian colonial period.

32. *E. dundasii* Maiden (1916)

– type: Australia, *L. Diels* 5454.

Tree to 21 m high. Bark rough, grey or black, forming thick, to *c* 6 m, above smooth, red-brown to grey. Juvenile leaves alternate, petiolate, ovate, uniform in colour. Adult leaves alternate, petiolate, lanceolate, sometimes falcate, unci-

nate, shining, green, uniform in colour; blade 8–12 x 1–1.5 cm; lateral veins faint; submarginal vein almost confluent with margin; petiole rounded, 12–15 mm long. Inflorescence axillary, simple; umbels 7-flowered; peduncle angular, 5–20 mm; pedicels absent or to 2 mm long. Buds cylindrical; operculum hemispherical, shortly beaked, 3–4 x 2–3 mm; hypanthium cylindrical, sometimes slightly constricted in the middle, 5–6 x 2–3 mm. Fruits cylindrical, 2-ribbed, sometimes further striate, 6–10 x 4–5 mm; disc broad, descending vertically; valves 3, deeply included. Seeds elliptic to crescent-shaped, reticulate, brown. Fig. 72.33.



Figure 72.33 *EUCALYPTUS DUNDASII*: buds (from *C. Gardner* 2230) and fruits (from *J. Baker* 54) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 89.)

In trial plots; *c* 2000 m. HA; cultivated distribution elsewhere in Africa not known; indigenous in Western Australia where it is known as DUNDAS BLACKBUTT. *Demel* T. 614.

Tried with moderate success at Alemaya (Adugna Zerihun, 1981).

33. *E. tereticornis* Smith (1795)

– type: Australia, *J. White* s.n.

*E. rudis* auct., non Endl.: *Cufodontis*, *Enum.*: 629 (1959).

Tree to 50 m high. Bark smooth throughout, white, grey or grey-blue. Juvenile leaves alternate, petiolate, ovate, dull, green to blue-green, with slight difference in colour between the two sides. Adult leaves narrowly lanceolate to ovate-acuminate, thick; blade 10–20 x 1–2.7(–5) cm, shining, green; lateral veins visible; submarginal vein up to 2 (–4) mm from margin; petiole rounded or channelled, 13–24 mm long. Inflorescences axillary, simple; umbels 7–11-flowered; peduncle rounded or angular, 7–25 mm long; pedicels 3–10 mm long. Buds conical; operculum conical, 8–13 x 4–6 mm; hypanthium hemispherical, 2–3 x 4–6 mm. Fruits globular or ovoid, 5–7 x 4–8 mm; disc broad, steeply ascending; valves (2–)3–4(–5), strongly exerted. Seeds brown-black. Seeds cuneate, toothed around the edge, reticulate. Fig. 72.7.1 & 2 (p. 84).

In parks, trial plots and pilot plantations, woodlots, shelter belts, large scale plantations, and as single trees on farmland; 1450–2350 m. EW GD SU AR KF SD HA; widely cultivated in tropical East Africa; indigenous in Queensland, New South Wales and Victoria, Australia, where it is known as FOREST RED GUM. *Friis* et al. 6002, 6085; *Pichi-Sermolli* 805.

This is one of the very widely planted species in Eritrea and Ethiopia. It has been tried successfully at Alemaya (Adugna Zerihun, 1981; Ibrahim, 1986); planted at Wondo Genet (Michelsen, 1992); and is one of the early introduced species of *Eucalyptus*. Elsewhere in eastern Africa it is considered a potentially very important species.

It is closely related to *E. camaldulensis*; see note about the taxonomic distinction between *E. Salmonploia* and *E. camaldulensis* under the latter species. Some cultivated material from the Flora area previously referred to *E. rudis* (e.g. Saccardo 74) is considered indistinguishable from *E. tereticornis* and therefore placed here. Some material (e.g. Baldrati 4588) from Asmara (EW) previously called *E. resinifera* also seems to belong here. It has been reported to hybridize with *E. grandis*, and probably also with *E. camaldulensis*.

34. *E. camaldulensis* Dehnh. (1832)

– type: Tree cultivated at Camalduli, Naples, Italy, F. Dehnhardt s.n.

Tree usually to 20 m high, sometimes reaching 40 m. Bark smooth throughout, white, grey, brown or red. Juvenile leaves alternate, petiolate, ovate to broadly lanceolate, green, grey-green or blue-green, with slight difference in colour between the two sides. Adult leaves alternate, petiolate, lanceolate to narrow lanceolate, acuminate, moderately thick; blade 8–30 x 0.7–2 cm, green or grey-green, uniform in colour; lateral veins visible; submarginal vein up to 2 mm from margin; petiole rounded or channelled, 12–15 mm long. Inflorescences axillary, simple; umbels 7–11-flowered; peduncle slender, rounded or quadrangular, 6–15 mm long; pedicels slender, 5–12 mm long. Buds globular-beaked or ovoid-conical; operculum hemispherical, beaked or conical, obtuse, 4–6 x 3–6 mm; hypanthium hemispherical, 2–3 x 3–6 mm. Fruits hemispherical or ovoid, 5–8 x 5–8 mm; disc broad, ascending; valves (3–)4(–)5. Seeds cuneate, yellow. Fig. 72.7.3 & 4 (p. 84).

In parks, trial plots and pilot plantations, woodlots, shelter belts, large scale plantations, and as single trees on farmland; 1250–2800 m. EW TU GD SU HA KF; widely grown throughout the low rainfall areas of tropical Africa; indigenous in extensive parts of the Australian mainland, where it is known as RED RIVER GUM (except southern Western Australia and the eastern coast). Friis et al. 6097, 6163; Mesfin T. & Kagnew G. 1901.

Tried successfully at Alemaya (Adugna Zerihun, 1981), Menagesha and Beleta (Ibrahim, 1986); planted at Mojo (Michelsen, 1992). One of the early introduced species of *Eucalyptus* and recorded by Breitenbach (1961, p. 22) as widely cultivated throughout Eritrea and Ethiopia, also in Eritrea in the Italian colonial period (Cufodontis).

*E. camaldulensis* is reported to be one of the most widely planted species in the *Flora Zambesiaca* area, and indeed in large parts of Africa where it is probably the most common tree planted in woodlots, shelter belts, and fuel-wood plots; it is considered less important in large scale plantations.

Cultivated material of this species may be very difficult to distinguish from *E. tereticornis* as all intermediates may be found in characters such as the narrowly conical or

mucronate operculum and the long pedicels supposed to be characteristic of *E. camaldulensis*. It is reported to hybridize with *E. tereticornis*, *E. grandis*, and *E. saligna*.

The name '*E. rostratus*' (*E. rostrata* Schldl. non Cav., an illegitimate earlier name for *E. camaldulensis*) has been used for material of this species, e.g. Pichi-Sermolli 807 and Baldrati 4510, Asmara.

35. *E. ovata* Labill. (1806)

– type: Australia, J. Labillardière s.n.

*E. mucronata* auct., non Link: Breitenbach (1961, p. 24).

Tree to 30 m high. Bark smooth throughout, white, grey or grey pink, often with accumulated, partly peeling bark forming a rough trunk base. Juvenile leaves elliptic to ovate, dull, green, but with strong difference in colour between the two sides. Adult leaves broadly lanceolate, undulate, apex acuminate; blade 8–15 cm long, 1.7–3 cm wide, shining, green; lateral veins distinct; submarginal vein up to 2 mm from margin; petiole rounded, 17–25 mm long. Umbels 7-flowered; peduncle rounded or angular, 3–14 mm long; pedicels 1–4 mm long, sometimes absent. Buds fusiform; operculum conical to slightly beaked, 3–5 mm long, 4–5 mm wide; hypanthium obconical, 3–4 mm long, 4–5 mm wide. Fruit obconical, 5–7 mm long, 4–7 mm wide; disc broad, more or less level; valves 3 or 4, level or slightly exserted. Fig. 72.34.

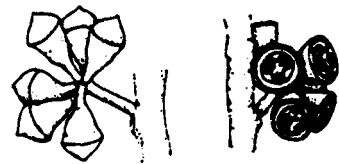


Figure 72.34 *EUCALYPTUS OVATA*: buds (from J. Turner 193) and fruits (from R. Eakin 13) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 92.)

In trial plots; altitude not known. SU; reported as planted in Zambia. Indigenous in New South Wales, Victoria and South Australia, and in Tasmania, where it is known as SWAMP GUM.

Reported by Breitenbach (1961, p. 24) as planted at Suba, but no herbarium material of this species from the Flora area has as yet been seen or verified against authentically named cultivated or wild Australian material.

36. *E. parvifolia* Cambage (1909)

– type: Australia, R. H. Cambage 1924 & 2019.

Tree to 9 m high. Bark smooth throughout, dull, grey, grey-green or sometimes pink. Juvenile leaves opposite, sessile, elliptic, green, with slight difference in colour between the two sides or uniform in colour, often persisting on mature trees. Adult leaves opposite, lanceolate, acute; blade 5–7 x 0.6–1 cm; green; lateral veins faint; submarginal vein up to 1 mm from margin; petiole more or less flattened, 2–6 mm long. Inflorescences axillary, simple;

umbels 7-flowered; peduncle rounded, thick, 4–7 mm long; pedicels absent. Buds ovoid; operculum conical, 1–2 x 2–3 mm; hypanthium hemispherical, 2–3 x 2–3 mm. Fruits hemispherical to obconical, 3–4 x 3–4 mm; disc slightly ascending; valves 3 or 4, level. Seeds irregularly shaped, flattened, shallowly reticulate, brown-grey. Fig. 72.35.

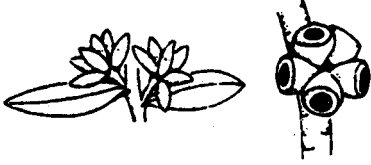


Figure 72.35 *EUCALYPTUS PARVIFOLIA*: buds and fruits (both from *J. Briggs* 18) x 1. Drawn by *M. May*. (Reproduced with permission from the *Flora of Australia*: fig. 93.)

In trial plots; c 2000 m. HA; cultivated distribution elsewhere in Africa not known. Indigenous in New South Wales, Australia, where it is known as KYBEAN GUM.

Tried with only moderate success at Alemaya (Adugna Zerihun, 1981), but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

37. *E. dunnii* Maiden (1905)

– type: Australia, *W. Dunn* 88.

Tree to 50 m high. Bark rough, flaky or fibrous, grey to c 4 m, then smooth or white to grey above. Juvenile leaves opposite to subopposite, sessile to shortly petiolate, ovate to orbicular, cordate, finely crenate, with strong difference in colour between the two sides. Adult leaves alternate, lanceolate to narrowly lanceolate, acuminate; blade 13–20 x 1.3–2.5 cm, green, uniform in colour; lateral veins clearly visible; submarginal vein up to 1 mm from margin; petiole rounded or channelled, 22–40 mm long. Inflorescences axillary, simple; umbels 7-flowered; peduncle flattened, 7–16 mm long; pedicels angular, 1–5 mm long. Buds ovoid; operculum conical or hemispherical, apiculate, 3–4 x 3–4 mm; hypanthium hemispherical, 2–3 x 3–4 mm. Fruits obconical or hemispherical, 4–5 x 5–8 mm; disc broad, level or ascending; valves 3 or 4, exserted. Seeds irregular, reticulate, grey to black. Fig. 72.36.



Figure 72.36 *EUCALYPTUS DUNNII*: buds (from *J. Doran* 29) and fruits (from *J. Doran* 24) x 1. Drawn by *M. May*. (Reproduced with permission from the *Flora of Australia*: fig. 94.)

In trial plots and pilot plantations; c 2000–2350 m. AR; indigenous in New South Wales, Australia, where it is known as DUNN'S WHITE GUM.

Planted at the CADU project near Asella, but no herbarium material of this species from the Flora area has as

yet been verified against authentically named cultivated or wild Australian material.

38. *E. goniocalyx* Miq. (1856)

– type: Australia, *F. Mueller* s.n.

Tree to 15 m high, often straggly. Bark rough, fibrous throughout, grey-brown. Juvenile leaves opposite, sessile, orbicular, light green, with slight difference in colour between the two sides. Adult leaves alternate, lanceolate, acuminate; blade 10–22 x 1.3–3 cm, slightly shining, green, uniform in colour; lateral veins faint; submarginal vein up to 2 mm from margin; petiole rounded, 20–30 mm long. Inflorescences axillary, simple; umbels 7-flowered; peduncle flattened, 5–15 mm long; pedicels absent. Buds ovoid, angular; operculum conical, 3–5 x 3–6 mm; hypanthium obconical, often angular, 4–6 x 3–6 mm. Fruits cylindrical, 6–10 x 6–8 mm; disc narrow, descending; valves 3 or 4, level or included. Seeds irregular, reticulate, grey to black. Fig. 72.37.

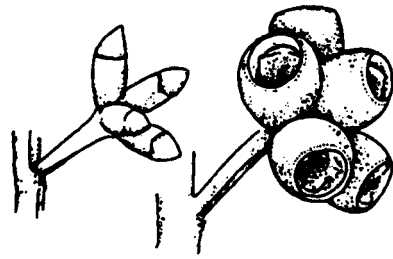


Figure 72.37 *EUCALYPTUS GONIOCALYX*: buds and fruits (both from *I. Brooker* 4369) x 1. Drawn by *M. May*. (Reproduced with permission from the *Flora of Australia*: fig. 94.)

In trial plots; c 2000 m. HA; cultivated distribution elsewhere in Africa not known; indigenous to New South Wales and South Australia where it is known as LONG-LEAVED BOX.

Tried with only moderate success at Alemaya (Adugna Zerihun, 1981), but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

39. *E. nitens* (Deane & Maiden) Maiden (1913)

– type: Australia, *W. B. Buerlen* s.n.

Tree to 70 m high, occasionally reaching 90 m. Bark smooth throughout, yellow-white or grey, or sometimes rough, flaky, grey to black at base of trunk. Juvenile leaves opposite, sessile, broadly lanceolate to ovate, cordate, base clasping the stem, glaucous, with strong difference in colour between the two sides. Adult leaves alternate, lanceolate to narrowly lanceolate, acuminate; blade 13–24 x 1.5–2.5 cm, shining, green, uniform in colour; lateral veins distinct; submarginal vein up to 3 mm from margin; petiole rounded or channelled, 15–22 mm long. Inflorescences axillary, simple; umbels 7-flowered; peduncle slightly flattened, 6–15 mm long; pedicels absent. Buds ovoid to cylindrical, angular or ribbed; operculum conical, 2–3 x 3–4 mm; hypanthium cylindrical or angular, 3–4 x 3–4 mm. Fruits cylindrical or ovoid, often slightly ribbed, shining,

4–7 x 4–6 mm; disc narrow, descending; valves 3 or 4, level or slightly exserted. Seeds irregular, reticulate, grey to black. Fig. 72.38.

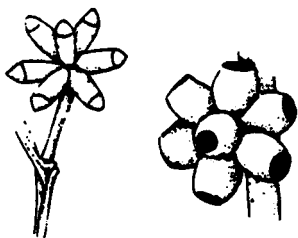


Figure 72.38 *EUCALYPTUS NITENS*: buds (from *A. Johnson*) and fruits (from *D. Kleinig* 81) x 1. Drawn by *M. May*. (Reproduced with permission from the *Flora of Australia*: fig. 95.)

In trial plots and pilot plantations; c 2000–2800 m. SU AR; cultivated distribution elsewhere in Africa not known; indigenous in New South Wales and Victoria, Australia, where it is known as SHINING GUM. *Tewolde B. G/E* 1701; *Friis et al.* 6070.

Planted at Debre Berhan (Michelsen, 1992) and at the CADU project near Asella.

#### 40. *E. globulus* Labill. (1799)

– type: Australia, *J. de Labillardière* s.n.

Tree, usually to 45 m high, sometimes reaching 70 m. Bark usually smooth, white to cream, yellow, bluish-grey or grey, peeling from the trunk throughout, but with accumulated grey-brown, not-peeling bark for up to one meter from the trunk base. Juvenile leaves numerous and prominent, opposite, sessile, cordate, base clasping the stem, ovate, grey-green to glaucous, with strong difference in colour between the two sides, 7–16 x 4–9 cm. Adult leaves lanceolate to narrowly lanceolate, sometimes falcate, acuminate, green, uniform in colour. Inflorescences variable between the subspecies; umbels 1-, 3- or 7-flowered (see under subspecies); peduncle flattened or rounded; pedicels present or absent. Buds barrel-shaped to obconical, warty, glaucous; operculum flattened hemispherical, shortly protruding and navel-shaped; hypanthium obconical, ribbed or smooth. Fruits sessile, obconical to hemispherical or globular, glaucous or not, usually with prominent longitudinal, warted ribs; disc broad, level to ascending; valves 3–5, level or exserted. Seeds irregular, reticulate, grey to black.

- |                           |                         |
|---------------------------|-------------------------|
| 1. Umbels 1-flowered      | subsp. <i>globulus</i>  |
| – Umbels 3- or 7-flowered | 2                       |
| 2. Umbels 3-flowered      | subsp. <i>bicostata</i> |
| – Umbels 7-flowered       | subsp. <i>maidenii</i>  |

#### subsp. *globulus*

Tree to 50 (–70) m high. Adult leaves: blade (10–)12–25 (–30) x 1.7–3 (–4) cm, acuminate, thick; lateral veins conspicuous; submarginal vein up to 2 mm from margin; petiole channelled or flattened, 20–30 mm long. Flowers axillary, single (1-flowered umbels); peduncle absent or

upto 4 mm long; pedicels absent or very short. Operculum 7–15 x 14–17 mm; hypanthium 10–12 x 14–17 mm. Fruits 10–21 x 14–24 mm, valves 4 or 5. Fig. 72.39.

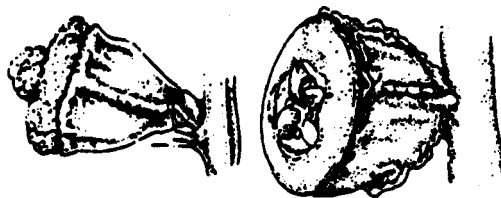


Figure 72.39 *EUCALYPTUS GLOBULUS* subsp. *GLOBULUS*: bud (from *C. Dunlop*) and fruit (from *J. Turner* 218 & *D. Kleinig*) x 1. Drawn by *M. May*. (Reproduced with permission from the *Flora of Australia*: fig. 95.)

In trial plots, pilot plantations, woodlots, shelter belts, large scale plantations, and also frequently as an isolated tree in farmland; 1700–2800 m. EW SU GD HA KF; reported grown in mountain habitats of East Africa; indigenous in Victoria, Australia, and in Tasmania, where it is known as TASMANIAN BLUE GUM. *Albers* 6109; *Pichi-Ser-molli* 806; *Friis et al.* 6174.

This is among the earliest of the introduced species of *Eucalyptus*, recorded already in 1895. It has been tried successfully at Alemaya (Adugna Zerihun, 1981), Holeta, Menagesha and Beleta (Ibrahim, 1986), and planted at Debre Berhan, Wondo Genet and Mojo (Michelsen, 1992). It is widely cultivated throughout the Ethiopian and Eritrean Highlands (Breitenbach 1961, p. 20).

This tree does best above 1800 m on red, loamy soils; performance not quite so good on black cotton soils. Seedlings sensitive to frost. It is an important tree both in woodlots with regular cutting and coppicing and in large-scale plantations.

subsp. *bicostata* (*Maiden, Blakely & J. Simm.*) *Kirkpatr.* in *Bot. J. Linn. Soc.* 69: 101 (1975);

*E. bicostata* *Maiden, Blakely & J. Simm.* (1931) – type: Australia, *W. de Beuzeville* s.n.

Tree to 45 m high. Adult leaves: blade 14–25 x 2–3 cm, acuminate, thick; lateral veins conspicuous; submarginal vein up to 2 mm from margin; petiole rounded or channelled, 30–50 mm long. Umbels 3-flowered; peduncle 1–3 mm long; pedicels absent or central bud shortly pedicellate. Operculum 6–8 x 12–14 mm; hypanthium 7–9 x 12–14 mm. Fruits 2-ribbed, glaucous, 8–17 x 10–20 mm; valves 3 or 4. Fig. 72.40.

In trial plots and pilot plantations; c 2000–2800 m. SU AR HA; cultivated distribution elsewhere in Africa not known; indigenous in New South Wales, Australia, where it is known as SOUTHERN BLUE GUM.

Planted at various places within the CADU project area near Asella; tried with moderate success at Alemaya (Adugna Zerihun, 1981); planted at Debre Berhan (Michelsen, 1992), but no herbarium material of this subspecies has as yet been verified against authentically named cultivated or wild Australian material.

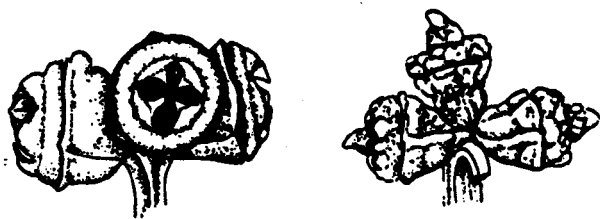


Figure 72.40 *EUCALYPTUS GLOBULUS* subsp. *BICOSTATA*: buds (from *D. Young* 373) and fruit (from *D. McGilivray* & *R. Coveny* 404) x 1. Drawn by *M. May*. (Reproduced with permission from the *Flora of Australia*: fig. 95.)

subsp. *maidenii* (*F. Muell.*) *Kirkpatr.* (1974)  
– type: Australia, *W. Bäuerlen* s.n.

Tree to 45 m high. Adult leaves: blade 12–28 x 1.2–2.5 cm, acuminate, thick; lateral veins visible; submarginal vein up to 2 mm from margin; petiole channelled or rounded, 15–35 mm long. Umbels 7-flowered; peduncle 8–25 mm long; pedicels absent or upto 8 mm long. Operculum 3–4 x 5–7 mm; hypanthium 5–7 x 5–7 mm. Fruits 5–11 x 6–10 mm; valves 3 or 4.

In trial plots and pilot plantations; c 2000–2350 m. AR; reported grown in East Africa and Zambia; indigenous in New South Wales and Victoria, Australia, where it is known as MAIDEN'S GUM.

Planted at the CADU project near Asella, but no herbarium material of this subspecies has as yet been verified against authentically named cultivated or wild Australian material.

Differs markedly from the two other subspecies by the long peduncle and the 7-flowered umbels.

41. *E. johnstonii* *Maiden* (1922)

– type: Australia, *collector unknown* s.n.

Tree to 40 m high. Bark smooth throughout, orange-red or yellow-green to grey or yellow-bronze. Juvenile leaves opposite, elliptic, sessile, becoming alternate, petiolate, orbicular, shining, dark green, with slight difference in colour between the two sides or uniform in colour. Adult leaves alternate, lanceolate to broadly lanceolate, finely crenate, apex acuminate; blade 8–12 x 2–3 cm, shining, dark green, uniform in colour; lateral veins visible; submarginal vein up to 4 mm from margin; petiole rounded, 15–30 mm long. Inflorescence simple, axillary; umbels 3-flowered; peduncle flattened or angular, 3–9 mm long; pedicels absent or to 2 mm long. Buds ovoid, slightly wrinkled; operculum low-hemispherical, shortly protruding and navel-shaped, 4–6 x 6–9 mm; hypanthium obconical, angular or 2-ribbed, 5–6 x 6–9 mm. Fruits obconical to hemispherical, wrinkled, 2- or 3-ribbed, 7–8 x 9–13 mm; disc broad, level or slightly ascending; valves 3 or 4, exserted. Seeds irregular, reticulate, grey to black. Fig. 72.41.

In trial plots and pilot plantations; c 2000–2350 m. AR HA; cultivated distribution elsewhere in Africa not known. Indigenous in Tasmania where it is known as TASMANIAN YELLOW GUM.

Planted at the CADU project near Asella; tried with only moderate success at Alemaya (Adugna Zerihun, 1981), but no herbarium material of this species from the

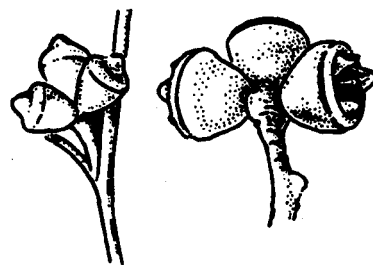


Figure 72.41 *EUCALYPTUS JOHNSTONII*: buds and fruits (both from *G. Chippendale* 1191 & *A. Grey*) x 1. Drawn by *M. Risby*. (Reproduced with permission from the *Flora of Australia*: fig. 96.)

Flora area has as yet been verified against authentically named cultivated or wild Australian material.

42. *E. viminalis* *Labill.* (1806)

– type: Australia, *J. de Labillardière* s.n.

Tree to 50 m high. Bark smooth throughout, grey, white or yellow-white, or rough, fibrous on lower or the whole trunk, or rough to the larger branches, sometimes with not-peeling bark at base or most of trunk. Juvenile leaves opposite, sessile, lanceolate, cordate and sometimes base clasping the stem, green, with slight difference in colour between the two sides. Adult leaves alternate, blade: 12–20 x 0.8–2.5 cm, lanceolate or narrowly lanceolate, acuminate, green, uniform in colour. Lateral veins distinct; submarginal vein up to 2 mm from margin; petiole rounded or slightly flattened, 10–25 mm long. Inflorescences axillary, simple; umbels 3- or 7-flowered; peduncle angular or flattened, 4–13 mm long; pedicels absent or very short. Bud ovoid; operculum conical or hemispherical, apiculate, 3–5 x 3–5 mm; hypanthium hemispherical or bell-shaped, 2–3 x 3–5 mm. Fruits hemispherical to globular, 5–8 x 5–9 mm; disc broad, ascending; valves 3 or 4, exserted. Seeds irregular, reticulate, grey to black. Fig. 72.42.

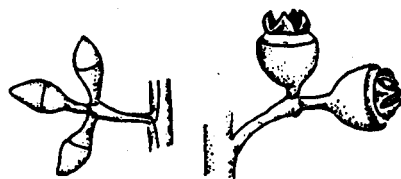


Figure 72.42 *EUCALYPTUS VIMINALIS* var. *VIMINALIS*: buds and fruits (both from *N. Brown* 426) x 1. Drawn by *M. May*. (Reproduced with permission from the *Flora of Australia*: fig. 96.)

In trial plots and pilot plantations; c 2000–2350 m. SU AR HA KF; reported planted in Zambia; indigenous in Queensland, New South Wales and Victoria, Australia, where it is known as MANNA GUM. *Friis* et al. 6068.

Planted at the CADU project near Asella; recorded as planted at Suba by Breitenbach (1961, pp. 23–24); tried with only moderate success at Alemaya (Adugna Zerihun,

1981), and with success at Menagesha, SU, and Beleta, KF (Ibrahim, 1986).

In Australia two subspecies, subsp. *viminalis* and subsp. *cygnetensis* Boosma, are recognised; the subspecific identity of the material from the Flora area has not been established.

43. *E. dalrympleana* Maiden (1920)

— type: Australia, *W. de Beuzeville* 1, 2 & 3.

Tree to 40 m high. Bark smooth throughout, blotched white or grey to yellow-white, and sometimes pink, green to olive, and often with c 1 m of accumulated not-peeling bark at trunk base. Juvenile leaves opposite, sessile, base cordate and clasping the stem, orbicular to ovate, light green to glaucous, uniform in colour. Adult leaves alternate, blade: 10–22 x 1.5–3 cm, narrowly lanceolate to lanceolate, acuminate, sometimes undulate, green, often shining, uniform in colour, lateral veins conspicuous; submarginal vein up to 1 mm from margin; petiole rounded, 15–27 mm long. Inflorescences axillary, simple; umbels 3- or 7-flowered; peduncle angular or slightly flattened, 3–8 mm; pedicels absent or 1–4 mm long. Buds ovoid; operculum conical or sometimes almost hemispherical, 2–4 x 3–5 mm; hypanthium hemispherical to obconical, 2–4 x 3–5 mm. Fruits hemispherical, ovoid or bell-shaped, 5–8 x 5–9 mm; disc moderately broad, ascending, convex or sometimes nearly level; valves 3 or 4, exserted. Seeds irregular, reticulate, grey to black. Fig. 72.43.

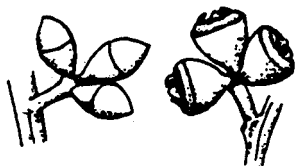


Figure 72.43 *EUCALYPTUS DALRYMPLEANA*: buds (from *I. Brooker* 2982) and fruits (from *J. Doran* 535) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 97.)

In trial plots and pilot plantations; c 2000–2350 m. AR; cultivated distribution elsewhere in Africa not known; indigenous in New South Wales and Victoria, Australia, and in Tasmania, where it is known as MOUNTAIN GUM.

Planted at the CADU project near Asella (Ibrahim, 1986), but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

In Australia, two subspecies are recognised: subsp. *dalrympleana* with 3-flowered umbels, and subsp. *heptantha* L. Johnson, with 7-flowered umbels. No subspecies has been indicated for the Ethiopian material.

44. *E. rubida* Deane & Maiden (1899)

— type: Australia, *J. H. Maiden* s.n.

Tree to 40 m high. Bark smooth throughout, white or red to red brown. Juvenile leaves opposite, sessile, orbicular, with base clasping the stem, glaucous, uniform in colour. Adult leaves alternate, lanceolate to narrowly lanceolate,

acuminate; blade 9–15 x 0.8–2.4 cm, glaucous or dull, green, uniform in colour; lateral veins distinct; submarginal vein to 2 mm from margin; petiole rounded, 13–25 mm long. Inflorescences axillary, simple; umbels 3-flowered; peduncle slightly angular or flattened, 3–8 x 4–5 mm. Buds club-shaped; operculum conical, 2–3 x 3–4 mm; hypanthium hemispherical, 2–4 x 4–5 mm. Fruit hemispherical to globular, often glaucous, 4–6 x 5–7 mm; disc broad, ascending; valves 3 or 4, exserted. Fig. 72.44.



Figure 72.44 *EUCALYPTUS RUBIDA*: buds (from *M. Connell* 23) and fruits (from *M. Connell* 180) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 97.)

In trial plots and pilot plantations; above 2000 m, exact altitude not known. SU; reported planted in Zambia; indigenous in New South Wales, Victoria, South Australia and in Tasmania where it is known as CANDLEBARK.

Reported by Breitenbach (1961, p. 24) as planted at Suba, but no herbarium material of this species from the Flora area has as yet been seen or verified against authentically named cultivated or wild Australian material.

45. *E. gunnii* J. D. Hook. (1844)

— type: Australia, *R. Gunn* (several syntypes).

Tree to 25 m high. Bark smooth throughout, white-grey or grey-green, or sometimes c 1 m of persistent or not completely peeling bark at trunk base. Juvenile leaves opposite, sessile, ovate to orbicular, with cordate base clasping the stem, finely crenate, emarginate, grey-green, with slight difference in colour between the two sides. Adult leaves alternate, elliptic or ovate to broadly lanceolate, acuminate or apiculate; blade 5–8 x 1.2–3 cm, grey-green, uniform in colour, lateral veins faint; submarginal vein up to 1 mm from margin; petiole rounded; 11–20 mm long. Inflorescences axillary, simple; umbels 3-flowered; peduncle slightly angular, 5–9 mm long; pedicels absent or 1–2 mm long. Buds club-shaped to cylindrical, usually glaucous; operculum hemispherical, slightly protruding and navel-shaped, 2–3 x 3–5 mm; hypanthium obconical, 4–5 x 3–5 mm. Fruits cylindrical or almost urn-shaped, usually glaucous, 6–9 x 4–7 mm; disc broad, level or slightly descending; valves 3 or 4, included. Seeds irregular, reticulate, grey to black. Fig. 72.45.

In trial plots and pilot plantations; c 2000–2350 m. AR; cultivated distribution elsewhere in Africa not known; indigenous in Tasmania where it is known as CIDER GUM.

Planted at the CADU project near Asella, but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

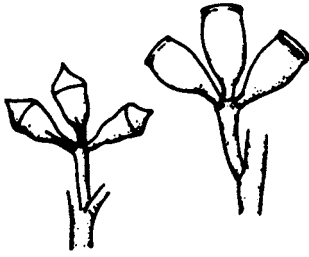


Figure 72.45 *EUCALYPTUS GUNNII*: buds (from G. Chippendale 1161) and fruits (from A. Grey 29) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 97.)

46. *E. cinerea* Benth. (1867)

— types: Australia, A. Cunningham 39 & ?Wolls s.n.

Tree to 16 m high. Bark rough, fibrous, red-brown on trunk and larger branches, then smooth and brown-red or grey above, or sometimes rough throughout. Juvenile leaves opposite, sessile or shortly petiolate, with cordate base clasping the stem, orbicular to cordate, glaucous, with slight difference in colour between the two sides. Intermediate leaves opposite, sessile or shortly petiolate, sometimes with cordate base clasping the stem, more or less cordate or broadly ovate, glaucous or almost green. Juvenile or intermediate leaves usually persist on old trees. Adult leaves alternate, broadly lanceolate, acuminate, thick; blade 7.5–11.5 x 1.5–2.5 cm, glaucous, uniform in colour; lateral veins faint; submarginal vein up to 2 mm from margin; petiole flattened, 5–11 mm long. Inflorescences axillary, simple; umbels 3-flowered; peduncle rounded, 2–6 mm long; pedicels absent. Buds fusiform, glaucous; operculum conical, 2–3 x 4–5 mm; hypanthium obconical, 3–4 x 4–5 mm. Fruits obconical to hemispherical, 5–8 x 5–9 mm; disc broad, level or ascending; valves 3–5, slightly exserted. Seeds irregular, reticulate, grey to black. Fig. 72.46.

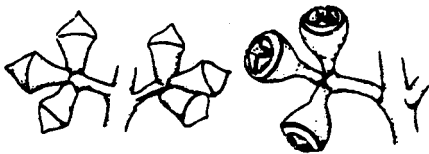


Figure 72.46 *EUCALYPTUS CINEREA*: buds (from J. Briggs 38) and fruits (from C. Moore 1273) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 98.)

In trial plots; c 2000 m. HA; general cultivated distribution elsewhere in Africa not known; indigenous in New South Wales, ACT, and Victoria, Australia, where it is known as ARGYLE APPLE.

Tried with only moderate success at Alemaya (Adugna Zerihun, 1981), but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

47. *E. microtheca* F. Muell. (1859)

— type: Australia, F. Mueller s.n.

Tree to 20 m high, sometimes with an irregular, not upright growing trunk. Bark varies from smooth and white to grey throughout to rough, fibrous, grey to grey-black on trunk and often on larger branches. Juvenile leaves alternate, lanceolate to broadly lanceolate, green to grey-green or glaucous, with slight difference in colour between the two sides. Adult leaves alternate, petiolate, lanceolate or narrowly lanceolate, acute; blade 8–17 x 0.8–2.5 cm, dull, green or grey-green; lateral veins clearly visible; submarginal vein up to 1 mm from margin; petiole rounded, 8–17 mm long. Compound inflorescences terminal, sometimes also axillary, paniculate; umbels 7-flowered; peduncle rounded, 3–9 mm long; pedicels 1–4 mm long. Buds usually ovoid, occasionally fusiform, often glaucous; operculum hemispherical, apiculate or conical, 1–2 x 2–3 mm; hypanthium obconical, c 2 x 2–3 mm. Fruits hemispherical or obconical, 1–5 x 3–7 mm; disc very narrow, ascending or absent; valves 3 or 4, broad, clearly exserted. Seeds orbicular to elliptic, shallowly reticulate, yellow brown. Fig. 72.47.



Figure 72.47 *EUCALYPTUS MICROTHECA*: buds (from D. Nelson 2178) and fruits (from J. Must 647) x 1. Drawn by M. Risby. (Reproduced with permission from the *Flora of Australia*: fig. 100.)

In trial plots; 2000–2400 m. SU HA; reported planted in Zambia and South Africa; indigenous in large parts of Australia, absent from Victoria; it is known as COOLIBAH. Demel T. 617.

Tried at Alemaya (Adugna Zerihun, 1981) and planted at Shola (Michelsen, 1992).

48. *E. largiflorens* F. Muell. (1855)

— type: Australia, F. Mueller s.n.

*E. bicolor* Cunn. ex Hook. (1848).

Tree to 20 m high. Bark rough, fibrous, dark grey on trunk and larger branches, then smooth and white above. Juvenile leaves petiolate, linear to narrowly lanceolate, blue-green, with slight difference in colour between the two sides. Adult leaves alternate, petiolate, narrowly lanceolate to lanceolate, apex acute; blade 9–18 x 0.9–1.8 cm, dull green or grey-green, uniform in colour; lateral veins faint; submarginal vein up to 1 mm from margin; petiole 8–15 mm long. Compound inflorescences usually terminal, panicu-



late; umbels 7–11-flowered; peduncle rounded or angular, 1–3 mm long; pedicels 1–5 mm long. Buds ovoid; operculum hemispherical, apiculate to conical,  $c 2 \times c 3$  mm; hypanthium ovoid to obconical,  $2-3 \times c 3$  mm. Fruit hemispherical or ovoid,  $3-6 \times 3-5$  mm; valves 3 or 4, level or included. Seeds orbicular to elliptic, shallowly reticulate, grey or black. Fig. 72.48.



Figure 72.48 *EUCALYPTUS LARGIFLORENS*: buds (from D. Kleinig 148) and fruits (from P. Martensz 1122)  $\times 1$ . Drawn by M. Risby. (Reproduced with permission from the *Flora of Australia*: fig. 100.)

In parks, trial plots and pilot plantations;  $c 2000-2350$  m. EW AR HA; cultivated distribution elsewhere in Africa not known; indigenous in Queensland, New South Wales, Victoria and South Australia where it is known as BLACK BOX. *Baldrati* 4568, 4571.

One of the early introduced species of *Eucalyptus*, cultivated in Asmara in the Italian colonial period; planted at the CADU project near Asella; tried (under the name of *E. bicolor*) with moderate success at Alemaya (Adugna Zerihun, 1981) and recorded under the name of *E. bicolor* by Breitenbach (1961, p. 25) as cultivated in Ethiopia (locality not indicated).

#### 49. *E. bosistoana* F. Muell. (1895)

– type: Australia, C. L. *Schlipaulis* s.n.

Tree to 60 m high. Bark rough, finely fibrous, grey on lower trunk or sometimes higher, or sometimes more or less smooth, grey-white throughout. Juvenile leaves alternate, petiolate, ovate to orbicular, green, but with strong difference in colour between the two sides. Adult leaves alternate, petiolate, lanceolate to narrowly lanceolate, sometimes falcate, acuminate; blade  $20-20 \times 0.7-2$  cm, green; lateral veins clearly visible; submarginal vein up to 3 mm from margin; petiole rounded, 10–17 mm long. Inflorescence usually axillary, simple, but sometimes terminal, paniculate; umbels 7-flowered; peduncle rounded to quadrangular, 7–10 mm long; pedicels 3–10 mm long. Buds ovoid or club-shaped; operculum conical to hemispherical,  $3-5 \times 3-5$  mm; hypanthium hemispherical,  $c 4 \times 3-5$  mm. Fruits hemispherical to ovoid,  $4-7 \times 4-7$  mm; disc moderately broad, descending; valves 5–7, level or included. Seeds ovate to elliptic, shallowly reticulate, grey-brown-black. Fig. 72.49.

In trial plots;  $c 2000$  m. HA; cultivated distribution elsewhere in Africa not known; indigenous to New South

Wales and Victoria, Australia, where it is known as BOSISTO'S BOX or COAST GREY BOX. *Demel T.* 619.

Tried successfully at Alemaya (Adugna Zerihun, 1981).



Figure 72.49 *EUCALYPTUS BOSISTOANA*: buds and fruits (both from M. Crisp 6441)  $\times 1$ . Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 103.)

#### 50. *E. crebra* F. Muell. (1859)

– type: Australia, F. *Mueller* s.n.

Tree to 30 m high. Bark very hard, rough throughout, dark grey to black. Juvenile leaves alternate, petiolate, linear to narrowly lanceolate, green or grey green, with slight difference in colour between the two sides. Adult leaves alternate, petiolate, narrowly lanceolate to lanceolate, apex acuminate; blade  $6.5-15 \times 1-1.7$  cm, dull, green or grey-green; lateral veins faint; submarginal vein up to 1 mm from margin; petiole 10–15 mm long. Compound inflorescence terminal, paniculate; umbels 7–11-flowered; peduncle rounded to quadrangular, 4–12 mm long; pedicels 1–6 mm long, with angles sometimes continuing as ribs on hypanthium. Buds club-shaped or fusiform; operculum conical to hemispherical,  $2-3 \times c 3$  mm. Fruits hemispherical or ovoid,  $4-7 \times 4-6$  mm; disc narrow, level or descending; valves 3 or 4, more or less level or included. Seeds orbicular to elliptic, shallowly reticulate, grey-brown. Fig. 72.50.



Figure 72.50 *EUCALYPTUS CREBRA*: buds (from N. Hall & D. Symon) and fruits (from G. Smith 15)  $\times 1$ . Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 105.)

In trial plots;  $c 2000$  m. HA; reported planted in Zambia; indigenous to Queensland and New South Wales, Australia, where it is known as NARROW-LEAVED IRON-BARK. *Demel T.* 611.

Tried successfully at Alemaya (Adugna Zerihun, 1981).

51. *E. paniculata* Smith (1797)- type: Australia, *D. Burton* s.n.

Tree to 50 m high. Bark hard, rough throughout, light grey. Juvenile leaves alternate, petiolate, ovate to broadly lanceolate, green, but with strong difference in colour between the two sides. Adult leaves alternate, petiolate, lanceolate, acuminate; blade 9.5–15 x 1.2–2.4 cm, green, but with strong difference in colour between the two sides; lateral veins clearly visible; submarginal nerve up to 1 mm from margin; petiole 13–22 mm long. Compound inflorescence terminal, paniculate, but also axillary umbels; umbels 7-flowered. Peduncle rounded, quadrangular or flattened, 6–16 mm long; pedicels 4-angled, 2–10 mm long. Buds obovoid to fusiform; operculum conical, usually narrower than hypanthium, 3–4 x 3–4 mm; hypanthium obovoid to obconical, 4–5 mm long and wide. Fruits hemispherical, obconical, obovoid or pear-shaped, 6–8 x 5–8 mm; disc obscure; valves 4 or 5, level or included. Seeds ovoid, shallowly reticulate, grey-brown. Fig. 72.75 & 6 (p. 84).

In parks, trial plots and pilot plantations; c 2000–2350 m. SU AR HA; often planted elsewhere in Eastern and Southern Africa; indigenous to New South Wales, Australia, where it is known as GREY IRONBARK. *Giordano* 990.

Cultivated in Addis Ababa, and also planted at the CADU project near Asella, tried with moderate success at Alemaya (Adugna Zerihun, 1981).

52. *E. melliodora* Schauer (1843)- type: Australia, *A. Cunningham* 57.

Tree to 30 m high. Bark fibrous on lower trunk only up to larger branches, grey, yellow or red-brown, then smooth, white-yellow above. Juvenile leaves alternate, petiolate, ovate or elliptic, grey-green, uniform in colour. Adult leaves alternate, petiolate, narrowly lanceolate to lanceolate, apex acuminate; blade 6.5–14 x 0.8–1.8 cm, green or grey-green; lateral veins clearly visible; submarginal veins up to 2 mm from margin; petiole rounded or slightly flattened, 10–15 mm long. Inflorescences axillary, simple; umbels 7-flowered; peduncle rounded or quadrangular, 3–11 mm long; pedicels 2–9 mm long. Buds club-shaped to fusiform; operculum conical to beaked, usually narrower than hypanthium, 2–3 x 3 mm; hypanthium hemispherical, 3–4 x 3–4 mm. Fruit hemispherical, ovoid to globular, 4–7 x 4–7 mm; disc narrow, descending, usually obscured by staminal ring; valves usually 5, level or included. Seeds elliptic, smooth or shallowly reticulate, grey-brown. Fig. 72.51.

In trial plots; c 2000 m. HA; reported planted in Zambia; indigenous to Queensland, New South Wales and Victoria, Australia, where it is known as YELLOW BOX.

One of the early introduced species of *Eucalyptus*, but with very few traces in the collections and the literature; tried with moderate success at Alemaya (Adugna Zerihun, 1981), but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

Closely related to the following species, *E. leucoxylon*.

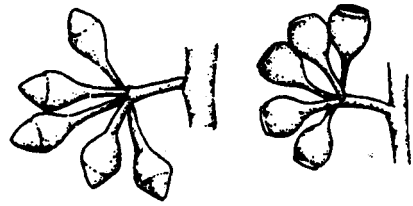


Figure 72.51 *EUCALYPTUS MELLIODORA*: buds (from *I. Brooker* 5167) and fruits (from *G. Chippendale* 1236) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 108.)

53. *E. leucoxylon* F. Muell. (1855)- type: Australia, *F. Mueller* s.n.

Tree to c 15 m high. Bark rough, fibrous to c 2 m, grey to dark grey, then smooth, white, grey yellow and/or blue above. Juvenile leaves opposite, broadly lanceolate to ovate or orbicular, cordate, sometimes the two of a pair united at base, green or glaucous, with slight difference in colour between the two sides. Adult leaves alternate, petiolate, narrowly lanceolate to lanceolate, acuminate; blade: 9–14 x 1.3–2.5 cm, green to glaucous; lateral veins visible; submarginal vein up to 3 mm from margin; petiole rounded, 10–17 mm. Inflorescences axillary, simple; umbels 3-flowered; peduncle rounded, 8–18 mm. Buds ovoid, sometimes fusiform; operculum conical to beaked, 2–8 x 4–7 mm, usually narrower than hypanthium; hypanthium hemispherical, 4–8 x 4–8 mm. Fruits hemispherical, globular, ovoid or bell-shaped, sometimes ribbed, 5–15 x 8–15 mm; disc narrow, descending, usually obscured by staminal ring; valves 4–6, included. Seeds elliptic, smooth or shallowly reticulate, grey-brown. Fig. 72.52.

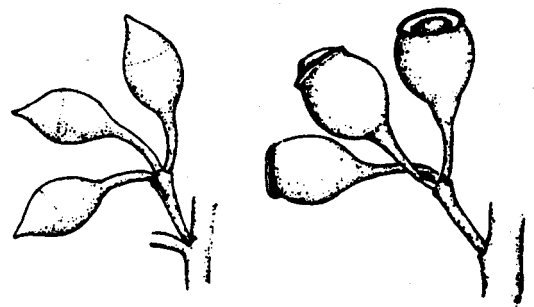


Figure 72.52 *EUCALYPTUS LEUCOXYLON*: buds (from *N. Donner* 114) and fruits (from *D. Boland* 34) x 1. Drawn by M. May. (Reproduced with permission from the *Flora of Australia*: fig. 108.)

In gardens and parks, presumably grown as an ornamental; c 2400 m. EW; cultivated distribution elsewhere in Africa not known; indigenous to New South Wales, Victoria and South Australia. *Baldrati* 914, 2148, 4490.

One of the early introduced species of *Eucalyptus*, cultivated in Asmara in the Italian colonial times; all specimens seen seem to originate from the garden of a certain 'Ing. Bonetti in Asmara'.

In Australia, where it is known as YELLOW GUM or BLUE GUM, 4 subspecies are recognised; the subspecific identity of the material from the Flora area has not been established.

54. *E. sideroxylon* Wolls (1887)

– type: Australia, C. Stuart s.n.

Tree to 35 m high. Bark hard, black, deeply furrowed throughout or on trunk and larger branches, smooth, white on upper branches. Juvenile leaves alternate, petiolate, linear to lanceolate or ovate, green or grey-green, with slight difference in colour between the two sides. Adult leaves lanceolate to narrowly lanceolate, apex acuminate or uncinata; blade green, grey-green or blue-green; lateral veins just visible; submarginal vein up to 2 mm from margin; petiole rounded, 10–20 mm long. Inflorescences axillary, simple; umbels (2–)5-flowered; peduncle quadrangular to rounded; pedicels quadrangular. Buds ovoid, beaked; operculum conical or beaked; hypanthium ovoid to hemispherical. Fruits hemispherical, ovoid, globular or urn-shaped; valves 5 or 6, included. Fig. 72.53.



Figure 72.53 *EUCALYPTUS SIDEROXYLON* subsp. *SIDEROXYLON*: buds (from I. Brooker 6191) and fruits (from D. Walker 1325) x 1. Drawn by M. Risby. (Reproduced with permission from the *Flora of Australia*: fig. 109.)

In trial plots and pilot plantations; above 2000 m, exact altitude not known. SU; reported grown in East Africa and Zambia; indigenous in Queensland, New South Wales and Victoria, Australia, where it is known as RED IRONBARK or BLACK IRONBARK.

Reported by Breitenbach (1961, p. 24) as planted at Suba, but no herbarium material of this species from the Flora area has as yet been seen or verified against authentically named cultivated or wild Australian material.

Several subspecies are recognised in Australia; the

subspecific identity of the material from the Flora area has not been established.

55. *E. microcorys* F. Muell. (1860)

– type: Australia (several collectors and syntypes).

Tree to 60 m high. Bark rough, softly fibrous throughout, brown to red brown. Juvenile leaves alternate, petiolate, ovate, often finely crenate, green, but with strong difference in colour between the two sides. Adult leaves alternate, petiolate, lanceolate, usually finely crenate, acuminate, blade thin, green, but with strong difference in colour between the two sides, 8–13 x 1.5–2.5 cm; lateral veins just visible to clearly visible; submarginal vein up to 1 mm from margin; petiole rounded to channelled, 8–15 mm long. Inflorescences axillary, simple, 7–9-flowered umbels. Peduncle flattened, 6–8 mm long; pedicels 2–7 mm long. Buds club-shaped. Operculum hemispherical, often with crossed sutures, 1–2 x 2–3 mm; hypanthium club-shaped, 3–5 x 2–3. Fruits obconical, 4–10 x 3–6 mm; disc moderately broad, steeply descending; valves 3 or 4, included to slightly exerted. Seeds elliptic, more or less flat, finely reticulate to smooth, yellow-brown. Fig. 72.54.



Figure 72.54 *EUCALYPTUS MICROCORYS*: buds (from I. Brooker 6601) and fruits (from I. Brooker 6094) x 1. Drawn by M. Risby. (Reproduced with permission from the *Flora of Australia*: fig. 109.)

In trial plots and pilot plantations; c 2000–2350 m. AR HA; reported planted in Zambia; indigenous in Queensland and New South Wales, Australia, where it is known as TALLOW-WOOD.

Planted at the CADU project near Asella and tried with moderate success at Alemaya (Adugna Zerihun, 1981), but no herbarium material of this species from the Flora area has as yet been verified against authentically named cultivated or wild Australian material.

**73. LECYTHIDACEAE**  
incl. *BARRINGTONIACEAE*

by Mesfin Tadesse & Sue Edwards\*

Cufodontis, *Enum.*: 613 (1959); Burger, *Families of Flowering Plants in Ethiopia*: 108 (1967); Sangai, *Lecythidaceae in Fl. Trop. E. Afr.*: 6 pp (1971); Purseglove, *Tropical Crops: Dicot. 2*: 637 (1968).

Trees or shrubs. Leaves simple, alternate, entire or sometimes with glands along the margins, with or without small stipules. Flowers usually large and showy, regular or irregular. Calyx 2–6-lobed or coming off as a cap, if the lobes free then valvate or slightly imbricate in bud. Petals 4–6 or absent, free or united at the base to the staminal column (in *Barringtonia*). Stamens many, free, or some often sterile and forming a ribbed, many-lobed bell-shaped tube called a corona (in *Napoleana*), or a 1-sided tongue-like structure that curves over the centre of the flower (in *Couroupita*). A disc often present between the stamens and the style. Ovary inferior or half-inferior, with 1–6(-many) locules; ovules 1-many in each locule; style simple or shortly branched at the apex. Fruit woody, fibrous or fleshy, indehiscent or opening through a cap.

A family of 22 genera: *Barringtonia* and *Foetidia* occur naturally in Eastern Africa and *Couroupita guianensis* Aubl., the CANNON-BALL TREE, has been cultivated in Entebbe Botanical Garden, Uganda.

Burger states that *Barringtonia racemosa* (L.) Spreng. is found in Ethiopia. No material from the Flora area has been seen. This is probably a mis-intepretation of the distribution given in Cufodontis. The habitat given by Sangai for this species is 'In forest by rivers and streams in coastal belt and some short way inland, also often between the mangroves and bordering grassland or bush with roots often in the water; 0–450(-750) m.'

---

\* The National Herbarium, Addis Ababa University, P.O. Box 3434,  
Addis Ababa, Ethiopia.

## 74. MELASTOMATACEAE

by M. G. Gilbert\*

Cufodontis, *Enum.*: 629–630 (1959); Wickens, *Melastomataceae* in *Fl. Trop. E. Afr.*: 96 pp. (1975); Thulin, 62. *Melastomataceae* in *Fl. Somalia* 1: 246–247 (1993).

Herbs and shrubs (trees and climbers outside Flora Area). Leaves opposite, decussate, rarely whorled, simple, usually entire, with 2 or more strong longitudinal veins parallel to midrib from base. Stipules absent. Inflorescence terminal in Ethiopian taxa. Flowers 4–5(–6)-merous, regular except for stamens. Calyx tubular, free or partially joined to ovary; lobes valvate, often with appendages alternating with them. Petals free, often pink or purple. Stamens usually twice as many as petals, inserted on or around ovary, filaments often bent, anthers 2-locular, basifixed, usually dehiscent by terminal pores, anther connectives often elongated and spurred at junction with filament. Ovary (1 or) 3–5-locular with numerous axile ovules, style solitary with capitate stigma. Fruit a loculicidal capsule or berry. Seeds small to minute.

A pantropical family with c 200 genera and 4000 species which are usually found in high rainfall areas, most in S America, fewer in Africa and rarely in the subtropics. There are 5 genera and 9 species in the Flora area.

The generic delimitation followed here is that used by Wickens in *Fl. Trop. E. Afr.* and is not necessarily that used in other areas.

## Key to genera

1. Flowers in heads or panicles, occasionally solitary; ovary with convex top, sometimes with rim or crown of scales around the style-base but this does not enlarge in fruit. 2
  - Flowers in lax 1-sided scorpioid cymes; ovary with concave top surrounded by a crown of 3–5 scales which are persistent becoming enlarged and woody in fruit, exerted beyond the subtruncate calyx. 5. *Calvoa*
2. Perennial herb or subshrub, sometimes decumbent; petals 10 mm or more long, anthers 6 times or more longer than broad. 3
  - Erect ephemeral herb; petals up to 4 mm long, anthers 1.5–4 times longer than broad. 2. *Antherotoma*
3. Hairs on upper surface of leaves simple, adpressed and partly fused to surface; flowers in dense heads surrounded by involucre of persistent bracts. 4
  - Hairs on upper surface of leaf simple or stellate, never adpressed nor partly fused to surface; flowers solitary or in open panicles, bracts soon falling off. 5
4. Leaf-margin entire; calyx glabrous except for a few basal hairs; stamens unequal. 3. *Melastomastrum*
  - Leaf-margin minutely serrate; calyx with 1–3 rings of bristles; stamens ± equal. 4. *Tristemma*
5. Calyx with hairs clustered or stellate and/or with bristle-tipped appendages; petals 1–2(–3) cm long; filaments glabrous. 1. *Dissotis*
  - Calyx silky pilose; petals 2.5–4 cm long; filaments glandular hairy (cultivated). *Tibouchina*

A species of *Tibouchina* is cultivated at least in Addis Ababa. It is a slender shrub or small tree with large purple flowers. It is probably *T. viminea* (D. Don) Cogn., a native of Brazil widely cultivated in East Africa; but it has also been named as *T. semi-decandra* Cogn. (*Emebet* G. 41) in Ethiopia.

1. DISSOTIS Benth. (1849) *nom. conserv.*

*OSBECKIA* L. sens. lat., non sens. str.

Herbs or shrubs, less often small trees. Flowers in terminal panicles or solitary, 4–5(–6)-merous. Bracts ovate, soon falling off. Calyx-tube bell-shaped to ovoid, often with setose scales or appendages; lobes persistent or soon falling off, usually alternating with intersepalal appendages. Petals usually glabrous. Stamens usually very unequal, sometimes ± equal in 'Osbeckioid' forms, connective with double appendage at junction with filament, longer in larger stamens only. Ovary 4–5-locular, adhering to calyx by 8–10 septa or partially free, convex, tip with a tuft of stiff hairs. Capsule leathery, enclosed by calyx. Seeds curved or cochleate<sup>1</sup>.

Perhaps 140 species in tropical and southern Africa; 5 in the Flora area.

Taxonomically difficult, both at species level and with regards to delimitation from allied genera such as *Antherotoma*.

1. Erect subshrub; flowers in large terminal panicles. 2
  - Scandent or prostrate herb; flowers solitary or in 2–4-flowered cymes. 5. *D. decumbens*
2. Stem hairs simple. 3
  - Stem hairs tufted or stellate. 4
3. Stems with erect bristles, longer at nodes; calyx-tube with uniformly distributed persistent conspicuous bristle-tipped appendages. 1. *D. senegambiensis*
  - Stems with adpressed hairs; calyx-tube with a few bristle-tipped appendages near rim only, and these fall off soon. 2. *D. brazzae*
4. Leaves ovate, up to (1.4–)2.4–5 cm wide, yellowish adpressed-pilose below; both calyx-lobes and short intersepalal appendages fall off soon. 3. *D. princeps*
  - Leaves oblong, up to 0.3–1.6(–2.2) cm wide, whitish stellate-tomentose below; calyx-lobes persistent, without intersepalal-appendages. 4. *D. canescens*

\* formerly: Ethiopian Flora Project, c/o The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK.

now: Department of Botany, The Natural History Museum, Cromwell Road, London, SW7 5BD, UK.

1. cochleate: shape of a human ear or coiled as in a snail shell.

1. *D. senegambiensis* (Guill. & Perr.) Triana (1872)  
*Osbeckia senegambiensis* Guill. & Perr. (1833) –  
 type: Senegal, Leprieur s.n.

Erect shrubby herb, 0.3–1.5(–2) m high, woody at base; stems with solitary erect yellow bristles. Leaves: petiole up to 5 mm long; leaf-blade linear-lanceolate to oblong-ovate, 1.5–8(–11.5) x 0.5–2.5(–3) cm, base subcuneate, tip acute, margin sometimes obscurely serrate, with 3(–5) longitudinal veins. Flowers in dense panicles; bracts c 5 mm long, glabrous except for margins. Calyx-tube ovoid, c 6 x 4 mm, covered with bristle-tipped appendages; lobes 5 mm long, glabrous except for margins and apical setose scales, intersepal appendages resembling those on tube. Petals 10–15 x 8–13 mm, rounded, pink to purple. Stamens unequal or subequal, anthers 3–8 mm long, filaments 6–8 mm long, connective up to 8.5 mm long or 1 mm long; ovary with apical tuft of bristles. Fruiting calyx 7–10 x 4.5 mm, hiding capsule. Seeds 0.5 mm long, pale buff, almost smooth.

1. Sepal-lobes and petals 5; stamens 10.

var. *senegambiensis*

– Sepal-lobes and petals 4; stamens 8. var. *alpestris*

var. *senegambiensis*

*Dissotis irvingiana* Hook.f. (1859).

*Osbeckia abyssinica* Gilg (1898); *D. irvingiana* var. *irvingiana* forma *abyssinica* (Gilg) A. & R. Fernandes, *Garcia de Orta* 2: 179 (1954) – type: GD, Carrula, *Schimper* (1863) 1437 (B holo. destr.; BM K iso.).

Fig. 74.1.

Forest margins, disturbed evergreen bushland or grassland; 1400–2750 m. GD SU WG IL KF GG SD; west to Senegal, south to Mozambique. *Ash* 1349; *Gilbert* 4123; *Mooney* 5890.

All the material seen has subequal stamens which makes it forma *senegambiensis*: forma *irvingiana* (Hook.) A. & R. Fernandes, with unequal stamens, has not been found in the Flora area.

var. *alpestris* (Taub.) A. & R. Fernandes

*Bol. Soc. Brot. ser. 2*, 46: 69 (1972); *Dissotis alpestris* Taub. (1895) – type: Tanzania, *Volkens* 631.

Fig. 74.2.

Habitat similar to that of var. *senegambiensis*; in East Africa particularly frequent around volcanic fumaroles; c 1850 m. GD KF (SD); East Africa south to Malawi & Mozambique. *E. Gilbert* 10; *Brehme* in *Mooney* 9040; *Massey* 61.

The 3 cited collections have unequal stamens and belong to forma *alpestris*. The only collection with ± equal stamens which could be assigned to forma *osbeckioides*, *Gillett* 15049 from Mt Delo, c 2400 m, SD, has more distinctly ovate leaves than other Ethiopian material of this species and may represent a distinct taxon.

2. *D. brazzae* Cogn. (1891)

– type: Gabon, *Brazza* s.n.

Erect shrubby herb 0.6–1.75 m high; stems sharply 4-angled and often also winged, adpressed hairy. Leaves:

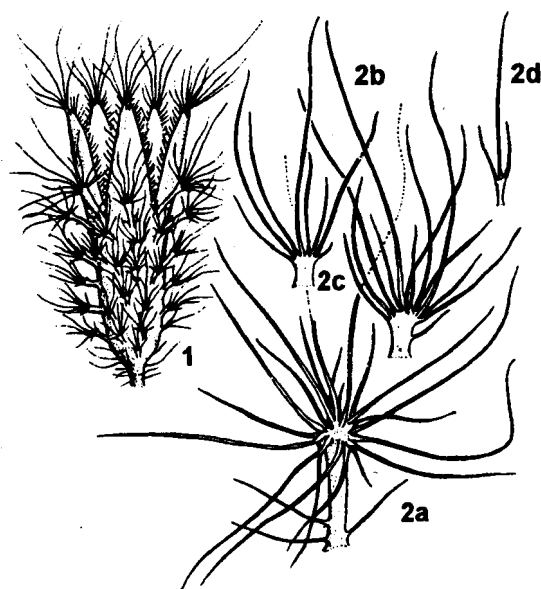


Figure 74.1 *DISSOTIS SENEGAMBIENSIS* var. *SENEGAMBIENSIS*: 1 – calyx x 3; 2a – intersepal appendage x 6; 2b–d – other appendages from calyx x 6. All from *Renvoize & Abdallah* 1915. Drawn by Mrs M. E. Church. (Reproduced with permission from *Fl. Trop. E. Afr. Melastomataceae*: fig. 10.2.)

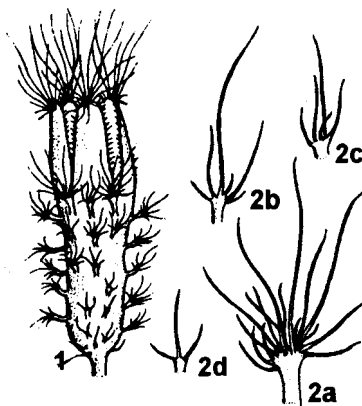


Figure 74.2 *DISSOTIS SENEGAMBIENSIS* var. *ALPESTRIS*: 1 – calyx x 3; 2a – intersepal appendage x 6; 2b–d – other appendages from calyx x 6. All from *Drummond & Hemsley* 1501. Drawn by Mrs M. E. Church. (Reproduced with permission from *Fl. Trop. E. Afr. Melastomataceae*: fig. 10.1.)

petioles 1.5–6(–10) mm long; leaf-blade broadly lanceolate, 2–10 x 0.7–4.5 cm, base truncate to subcordate, tip acute to subacuminate, margin minutely serrate, with c 7 longitudinal veins. Flowers 5-merous, in lax, elongated, terminal panicles, lower bracts leaf-like. Calyx-tube cylindrical and urn-shaped, c 4.5 x 3 mm, setose and with bristle-tipped appendages which soon fall off; lobes triangular, soon falling off, c 3 mm long, margins conspicuously white ciliate; intersepal appendages present. Petals c 17 x 12 mm, obovate, bright-pink to reddish-purple. Stamens unequal: 5 longer with filaments 6 mm, anthers 8 mm, purplish with 3 mm connective; 5 shorter with anthers 7 mm long, yellow, with 1.5 mm connective. Fruiting calyx hiding capsule, to 8 mm long with short hairs only, conspicuously cross-veined. Seeds pale buff, smooth. Fig. 74.3.

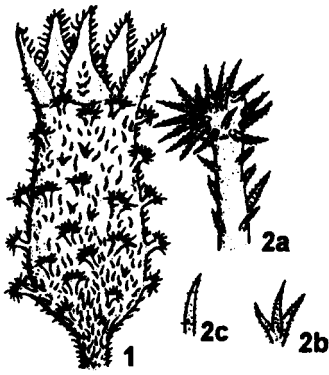


Figure 74.3 *DISSOTIS BRAZZAE*: 1 – calyx x 4; 2a–c – appendages from calyx-tube x 16. All from Drummond & Hemsley 4780. Drawn by Mrs M. E. Church. (Reproduced with permission from *Fl. Trop. E. Afr. Melastomataceae*: fig. 9.1.)

Wooded *Terminalia* – *Hyparrhenia* grassland; 1200–1550 m. WG KF GG; west to Sierra Leone, south to Zambia & Angola. Friis et al. 3937; Gereau 1404; Mesfin & Kagnew 2369.

3. *D. princeps* (Kunth) Triana (1872)  
– type: Mozambique, da Silva s.n.

Shrubby herb 0.6–3 m high; stems rather cottony with tufts of short yellowish hairs. Leaves often in whorls of 3, lanceolate (to oblong-ovate), (4–)6.5–16 x (1.5–)2.4–5 cm, base subcordate, tip acute, with 5(–7) longitudinal veins, adpressed pilose above and below, veins on underside with hairs in tufts. Flowers 5-merous, in large panicles; bracts 9–15 mm long, pubescent. Calyx-tube bell-shaped, 7–13 x 4–6 mm, covered with tufts of bristles and some short broad appendages; lobes oblong-lanceolate, 6–9 x 2–3 mm, pubescent with ciliate margins; intersepal appendages short but tipped with long bristles. Petals obovate, 22–30 x 18–23 mm, purple, margins minutely ciliate. Stamens unequal: 5 larger with filaments *c* 15 mm, anthers 9–13 mm with connective 16–23 mm long; 5 shorter with connectives 2–4 mm long. Fruiting calyx only slightly enlarged and persistent; capsule with apical bristles, not exserted. Seeds 0.5 mm, pale brown, almost smooth. Fig. 74.4.

'In a muddy stream' and 'dry clay bank' in the open (elsewhere a forest associate); 1650–2100 m. WG (KF) SD; ?Sudan, Cameroon, Zaire, Tanzania, south to Angola and Natal. Mooney 5409, 7782.

The 2 Ethiopian collections seen come closest to var. *princeps*, separated from var. *candolleana* (Cogn.) A. & R. Fernandes by the more compact inflorescences and the denser, longer calyx hairs.

4. *D. canescens* (Graham) Hook.f. (1871)  
*Osbeckia canescens* Graham (1840) – type: cultivated from seed of unknown origin.  
*Dissotis incana* (Walp.) Triana (1872) nom. illegit.

Woody-based herb, 0.5–1.5(–1.8) m high; stems usually erect, little branched, stellate-pubescent. Leaves: petioles up to 3 mm long; leaf-blade oblong-lanceolate, 1.7–8.5 x 0.3–2.2 cm, base rounded, tip obtuse to acute, with 3–5 longitudinal veins, stellate pubescent above, whitish to yellowish stellate tomentose below. Flowers 5-merous, in

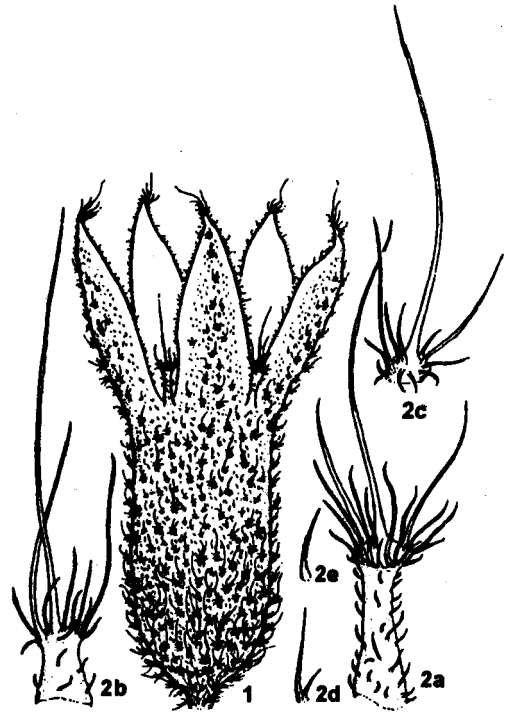


Figure 74.4 *DISSOTIS PRINCEPS*: 1 – calyx x 3; 2a – inter-sepal appendage x 6; 2b–e – other appendages from calyx x 24. All from Milne-Redhead & Taylor 9009. (Reproduced with permission from *Fl. Trop. E. Afr. Melastomataceae*: fig. 10.5.)

elongated leafy panicles; bracts ovate, longer than calyx-tube, falling off soon. Calyx-tube campanulate, 4–6 x 2.5–3 mm, shortly stellate pubescent, often also with simple or gland-tipped hairs; lobes triangular-lanceolate, 4–5 mm long, intersepal appendages absent or very reduced. Petals obovate, 15 x 11 mm, purple, margin glabrous or ciliate. Stamens unequal, filaments 5.5–6 mm, anthers 5–5.5 mm long; larger with connective *c* 8 mm long. Fruiting calyx *c* 7 x 5 mm, slightly glabrescent; capsule pubescent. Seeds 0.5 mm, yellowish brown, ridged. Fig. 74.5.

Seasonally water-logged grasslands or wet flushes; 1600–1950 m. WG KF; west to Nigeria, south to the Cape. Ash 1466; W. de Wilde 8836; Mooney 8660.

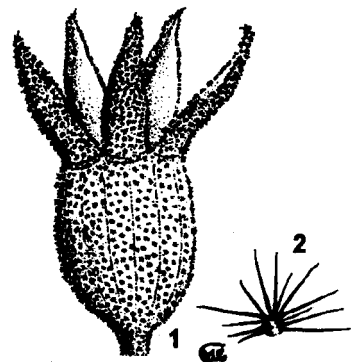


Figure 74.5 *DISSOTIS CANESCENS*: 1 – calyx x 4; 2 – appendage from calyx-tube x 8. All from Drummond & Hemsley 4511. Drawn by Mrs M. E. Church. (Reproduced with permission from *Fl. Trop. E. Afr. Melastomataceae*: fig. 8.7.)

Varieties based on the types of hairs on the calyx have been proposed; the type has stellate hairs only while var. *sudanica* Jacques-Félix from W Africa has simple hairs only. The Ethiopian material, with a mixture of hairs, has been placed in 'var. *zambesiensis*' nom. invalid.

5. *D. decumbens* (P. Beauv.) Triana (1872);  
*Melastoma decumbens* P. Beauv. (1806) – type:  
 Nigeria, Palsiot de Beauvoir s.n.  
*Dissotis rotundifolia* (Sm.) Triana (1872); *Osbeckia*  
*rotundifolia* Sm. (1822).

Herb with prostrate or scandent stems, rooting at nodes, branches to 16 cm long; stem pilose, nodes with bristles. Leaves: petiole up to 0.5–2.5 cm long; leaf-blade usually ovate, 1.5–7 x 0.8–4 cm, base cuneate, tip acute, with 3 longitudinal veins, sparsely to densely pubescent above and below. Flowers 5-merous, terminal, solitary or less often in 2–4-flowered cymes; bracts ovate, 5 mm long, glabrous with ciliate margin. Calyx-tube campanulate, 5–7 x 3–4 mm, pilose, hairs arising from bulbous bases or short appendages; lobes lanceolate, 6 mm long, margins ciliate, tip with bristles, intersepalal appendages up to 2.5 mm long, bristle-tipped. Petals 20 x 16 mm, pink purple. Stamens unequal, filaments 5–6 mm, anthers 6–8.5 mm, larger with connective 6–7 mm long, bent. Fruiting calyx globose, 8 mm long, capsule pilose at tip. Seeds 0.5 mm, yellowish brown, ridged. Fig. 74.6.

Stream margins in riverine forest; c 1300 m. WG KF GG; west to Sierra Leone, south to Angola, Zimbabwe and Mozambique; introduced to Malesia and West Indies. *Gilbert & Thulin* 719; *Gilbert & Phillips* 9064; *Smeds* 1272.

The distinction between *D. decumbens* and the more widespread and variable *D. rotundifolia* has been found too difficult to maintain.

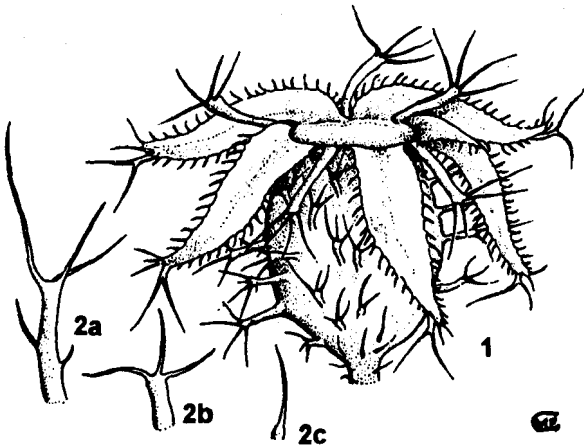


Figure 74.6 *DISSOTIS DECUMBENS*: 1 – calyx x 4; 2a – appendages from opposite and below calyx-lobe x 8; 2b – appendages from upper and lower part of calyx-tube x 8; 2c – appendages from base of calyx-tube x 8. All from *Lye* 254. Drawn by Mrs M. E. Church. (Reproduced with permission from *Fl. Trop. E. Afr. Melastomataceae*: fig. 8.6.)

## 2. ANTHEROTOMA (Naud.) Hook.f. (1867)

Ephemeral herbs. Flowers congested, 4–5-merous. Calyx-tube ovoid; lobes persistent, alternating with slender appendages. Petals with apical tuft of hairs. Stamens equal, anthers oblong-elliptic with a large terminal pore, connec-

tive curved with 2 tubercles at junction with filament. Ovary stuck to calyx at base, convex with small setose crown around style-base, 4-locular. Capsule enclosed in dry calyx-tube, valvate. Seeds cochleate.

This genus is closely related to *Dissotis*. There are 2 species, one widespread in tropical Africa and Madagascar, the other in Cameroon.

### *A. naudinii* Hook.f. (1867)

*Osbeckia antherotoma* Naud. (1850) – types: Madagascar, Bojer s.n. and Comoros, Boivin 3418.

Ephemeral (2.5–)4–35 cm high, simple or branched; stem 4-angled with adpressed hairs. Leaves widely spaced, larger towards inflorescence; petiole 1–5 mm long, pilose; leaf-blade ovate, up to 38 x 14 mm, base cuneate to subtruncate, tip acute, with 3 or 5 subequal veins, sparsely strigose above and on veins below. Flower heads terminal occasionally also axillary, subtended by 1–2 pairs of leaves, up to 12-flowered. Pedicels up to 3 mm. Calyx-tube 2.5 x 2 mm, sparsely setose; lobes triangular, 1 mm long, with apical tuft of bristles, intersepalal appendages with prominent bristly tips. Petals suborbicular, c 4 x 3.5 mm, pale mauve to pink. Stamens: filaments c 3.5 mm long, anthers 0.7 mm long, free part of connective c 0.5 mm. Capsule subglobose, 2.5–3 mm long. Seeds 0.4–0.5 mm long, papillose. Fig. 74.7.

Moist short grass, often at forest margins, usually in somewhat disturbed ground; 1200–2300 m. GD GJ SU WG IL KF SD BL; west to Guinea, south to Angola & Transvaal; Madagascar & Comoros (? introduced). *Friis* et al. 1051; *Gilbert & Thulin* 625; *Mooney* 8465.

## 3. MELASTOMASTRUM Naud. (1850)

Closely related to *Dissotis*, separable from it by the involucre of bracts surrounding the flowers and the characteristic hairs on upper leaf surface which have the lower part fused to the surface. Also similar to *Tristemma*, and separable from it only by the glabrous or uniformly hairy calyx and dry dehiscent capsule.

Six species in tropical Africa.

### *M. capitatum* (Vahl) A. & R. Fernandes (1954)

*Melastoma capitata* Vahl (1797) – type: 'from Sierra Leone'.

Woody herb or shrub up to 2 m high; stem sparsely (to densely) scabrid. Leaves: petiole up to 23 mm long; leaf-blade ovate-elliptic, 11–14 x 5–7 cm, base cuneate-subattenuate, tip acuminate, margin entire, with 5 longitudinal veins, uniformly adpressed pilose above, only veins hairy below. Inflorescence a small head of flowers concealed partly by involucre of bracts, outer bracts leafy, inner bracts oblong, acute, with long bristles at base. Calyx-tube c 11 x 5 mm, glabrous except for ciliate margins of lobes; lobes acuminate, c 7 mm long. Petals obovate, 20 x 15 mm, mauve. Larger stamens: filaments c 9 mm long, connective c 4 mm, anthers c 9 mm long, mauve; smaller stamens with anthers yellow, c 6–7 mm long. Capsule two thirds as long as calyx, with a crown of bristles at tip. Seeds 0.8 mm long, glossy brown, very minutely papillate.



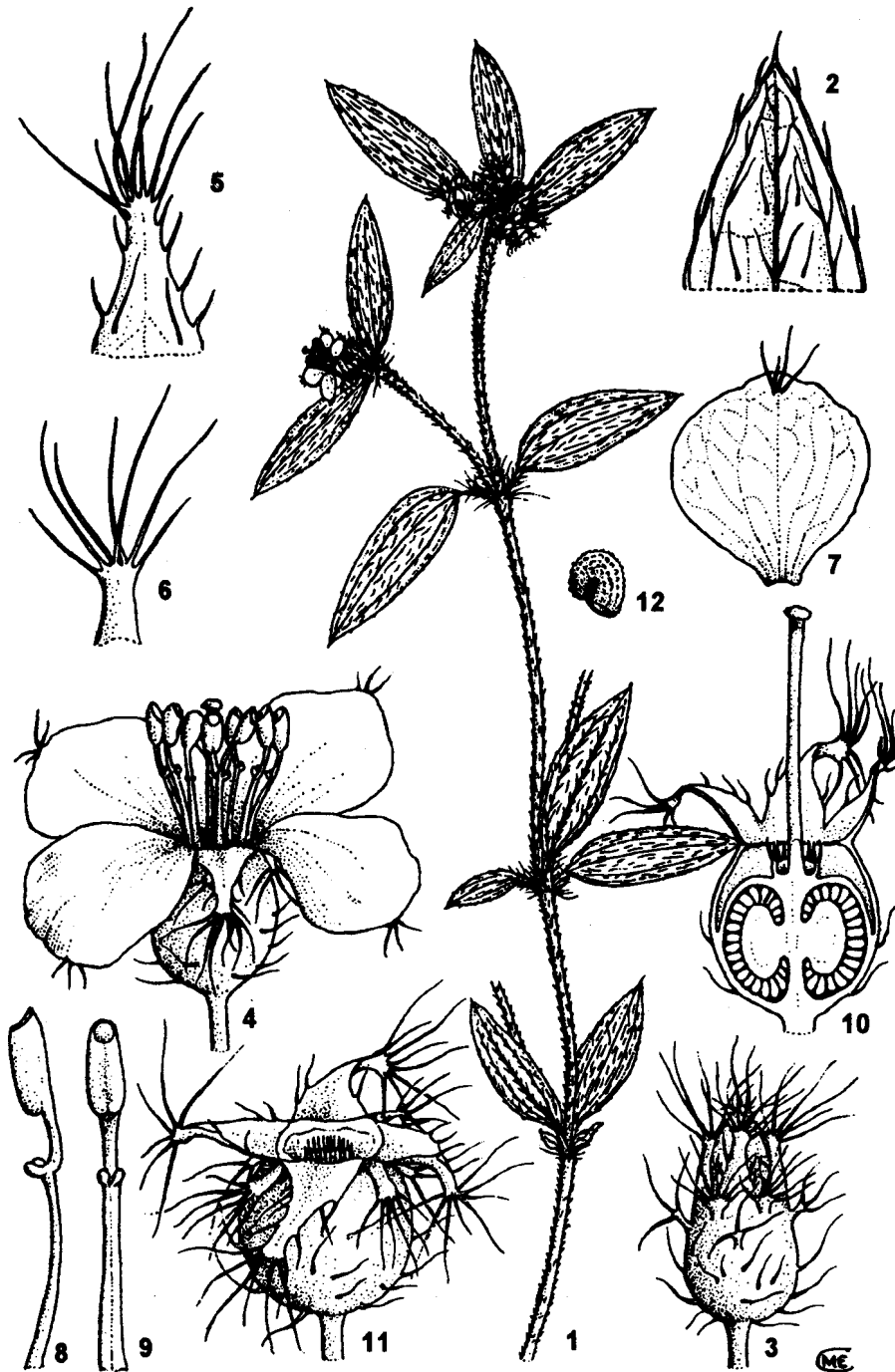


Figure 74.7 *ANTHEROTOMA NAUDINII*: 1 – flowering stem x 1; 2 – part of leaf lower surface x 6; 3 – flower bud x 8; 4 – flower x 6; 5 – calyx-lobe x 10; 6 – intersepal appendage x 10; 7 – petal x 6; 8 & 9 – stamen, side and front views respectively x 12; 10 – longitudinal section of flower x 8; 11 – fruiting calyx with included capsule x 8; 12 – seed x 20. All from *Milne-Redhead & Taylor* 9493. Drawn by Mrs M. E. Church. (Reproduced with permission from *Fl. Trop. E. Afr. Melastomataceae*: fig. 3.)

Growing beside stream running through riverine forest; c 1300 m. WG (Didessa Valley); west to Senegal, Uganda, W Tanzania, south to Angola & Zambia. *Gilbert & Thulin* 705.

The collection cited is the only one seen from Ethiopia. Earlier records of this species in the Flora area were based on mis-identifications of *Tristemma mauritianum*, which is much more common.

#### 4. TRISTEMMA Juss. (1789)

Shrubs or woody herbs with erect or prostrate stems. Leaves entire, petiolate, with 5–7 nerves. Inflorescence terminal of 1–3 or many flowers usually enclosed by several large persistent bracts. Calyx-tube tubular or campanulate, usually with 1 or more rings of bristles, rarely glabrous; lobes persistent and reflexed; intersepal ap-

pendages absent. Stamens equal or subequal, anthers narrowly oblong to linear, with or without the connective extended below the anther. Ovary mostly united with the calyx-tube, tip with a tuft of bristles. Fruit indehiscent. Seeds cochleate.

About 16 species in tropical Africa, 1 in the Flora area.

#### *T. mauritianum* J.F. Gmelin (1791)

– type: Mauritius, *Commerson* s.n.

*T. incompletum* R.Br. (1818).

*Melastomastrum capitatum* sensu Cufod., non (Vahl) A. & R. Fernandes.

Shrubby herb (0.3–)0.6–1.5(–2) m high; stem sharply 4-angled and sometimes also winged, hispid. Leaves: petiole 1–4 cm; leaf-blade elliptic-ovate, up to 10–20 x 5–8.5 cm, base cuneate, tip acute or acuminate, margin minutely

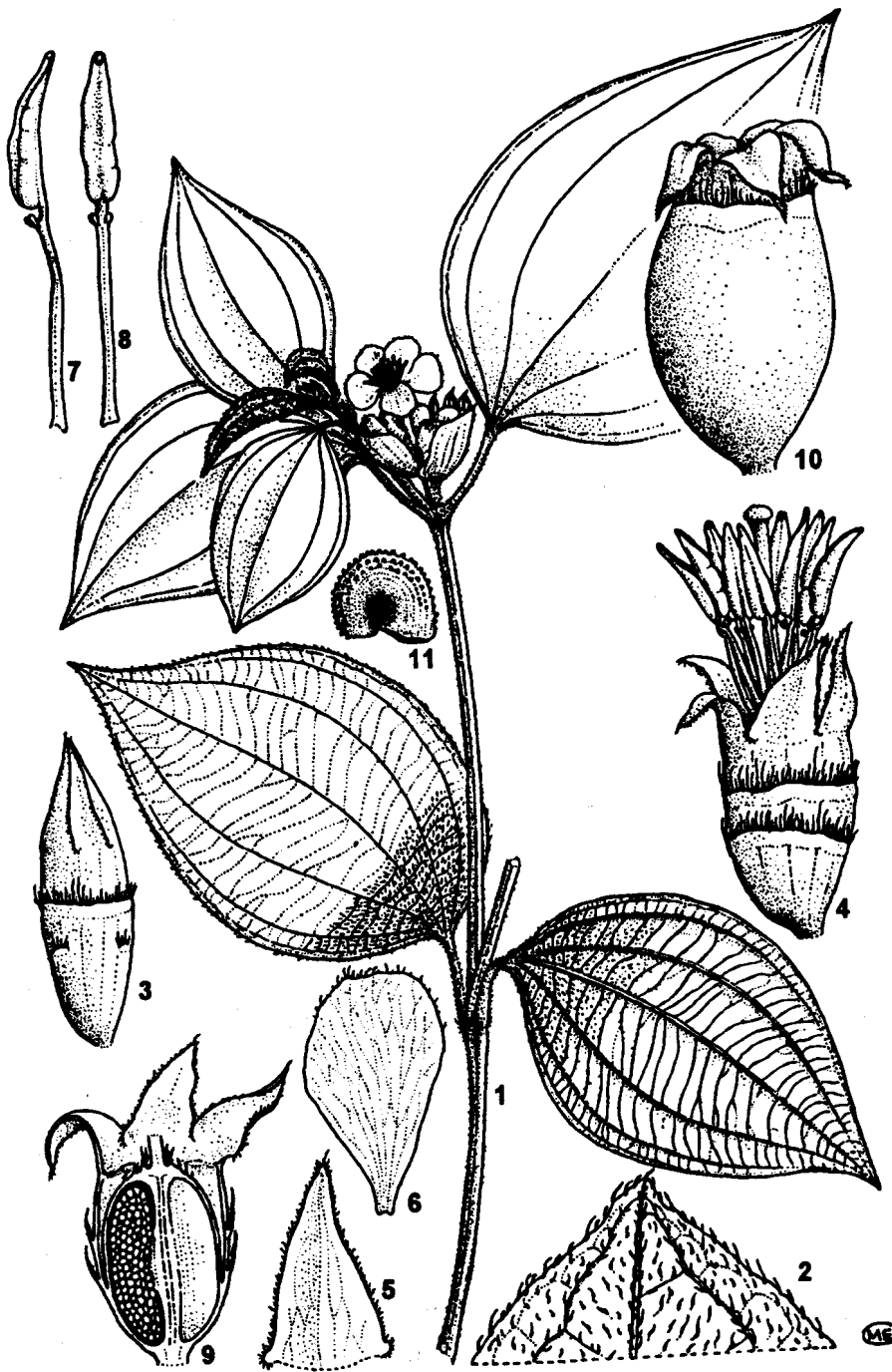


Figure 74.8  
**TRISTEMMA MAURITIANUM:**  
 1 – flowering branch x  $\frac{2}{3}$ ; 2 – part  
 of leaf lower surface x 4; 3 – flower  
 bud x 4; 4 – flower with petals re-  
 moved x 4; 5 – calyx-lobe x 6; 6 –  
 petal x 3; 7 & 8 – stamen, side and  
 front view respectively x 6; 9 – lon-  
 gitudinal section of flower x 4; 10 –  
 fruiting calyx x 3; 11 – seed x 20.  
 1–9 from Symes 418; 10 & 11 from  
*Osmaston 2777*. Drawn by Mrs M.  
 E. Church. (Reproduced with per-  
 mission from *Fl. Trop. E. Afr.*  
*Melastomataceae*: fig. 6.)

Shrubby herb (0.3–)0.6–1.5(–2) m high; stem sharply 4-angled and sometimes also winged, hispid. Leaves: petiole 1–4 cm; leaf-blade elliptic-ovate, up to 10–20 x 5–8.5 cm, base cuneate, tip acute or acuminate, margin minutely serrate, with 5–7 longitudinal veins, hairs as in *Melastomastrum capitatum* but more variable in size. Inflorescence as in *Melastomastrum capitatum* except that inner bracts have ciliate margins. Calyx-tube campanulate, 10–11 x 5–6 mm with 1–2(–5) transverse bands of bristles; lobes triangular, 5–8 mm long, margins ciliate. Petals obovate, 15 x 12 mm, pink. Stamens: filaments 3.5 mm, connective very short, anther 3 mm long. Capsule as long as calyx-tube, tip with bristles. Seeds 0.6 mm, glossy brown, minutely papillate. Fig. 74.8.

Margins and openings in montane forest in damp situations; 1350–2000 m. WG IL KF; west to Senegal, south to Angola, Zimbabwe & Mozambique; Madagascar & Mascarenes. *Ash 1484*; *Mooney 6772, 8663*.

Most of the earlier collections were mis-identified as *Melastomastrum capitatum*.

#### 5. CALVOA Hook.f. (1867)

Succulent or semi-woody herbs. Flowers 5-merous, in strictly secund scorpioid cymes. calyx-tube 5 or 10 ribbed; lobes small, deciduous. Petals glabrous. Stamens equal or unequal, anthers linear-oblong, connective small with scale-like anterior appendage, dorsal appendage small or absent. Ovary adherent to calyx-tube, 3–5-locular, concave

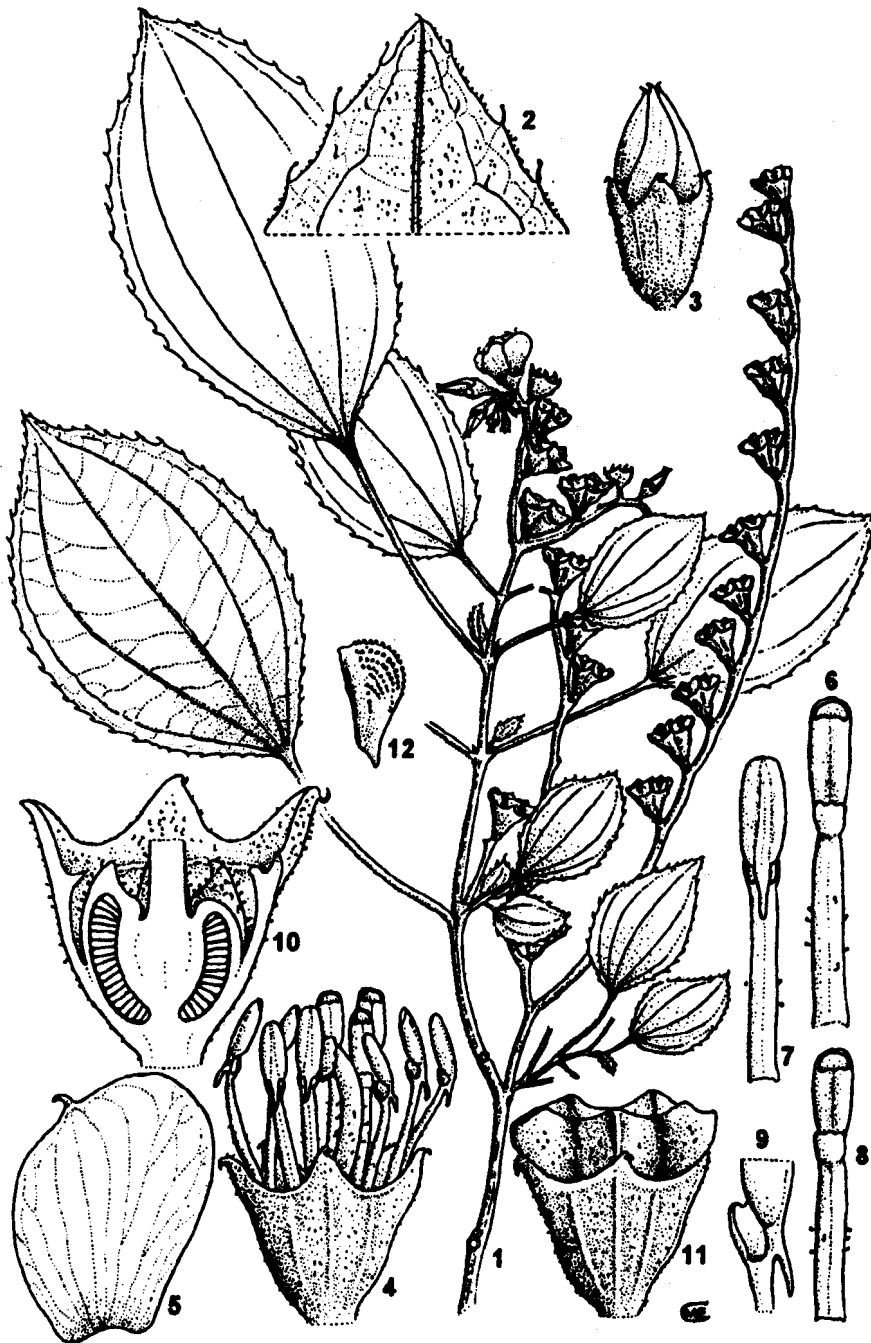


Figure 74.9 *CALVOA ORIENTALIS*: 1 – flowering branch x 1; 2 – part of leaf lower surface x 6; 3 – flower bud x 4; 4 – flowers with petals removed x 6; 5 – petal x 6; 6 & 7 – outer stamen, front and back views respectively x 10; 8 – inner stamen, front view x 10; 9 – detail of same, side view, to show appendages x 20; 10 – longitudinal section of flower x 8; 11 – fruit, x 4; 12 – seed x 20. 1 & 2 from *Faulkner* 1492; 3–11 from *Dawkins* 398; 12 from *Remvoize & Abdallah* 1596. Drawn by Mrs M. E. Church. (Reproduced with permission from *Fl. Trop. E. Afr. Melastomataceae*: fig. 15.)

above with a crown of 3–5 firm scales. Capsule crowned by persistent woody scales exserted beyond calyx, circumscissile just inside these. Seeds oblong or obovoid.

About 15 species in tropical Africa, mostly in the west; only 1 species from the Flora area.

*C. orientalis* Taub. (1895)

– types: Tanzania, *Stuhlmann* 994 & *Holst* 4278.

Herb, erect or semiproscumbent, sometimes epiphytic with stems up to 1 m long; all parts minutely glandular-puberulent-glabrescent. Leaves: petioles 1–5 cm long; leaf-blade 2–7 x 1.5–4.5 cm, base rounded-attenuate to cuneate, tip acute, margins entire (to serrate or dentate), with 3 longitudinal veins, with scattered short stout hairs. Cyme to 11 cm long, 1–12-flowered; pedicels stout, 0.5 mm long.

Calyx-tube campanulate, 3 x 4 mm, 10-ribbed; lobes small, triangular-acuminate. Petals obliquely obovate, 10–15 x 8 mm, pinkish-mauve. Stamens subequal, filaments c 4 mm long, anthers 1.5–2 mm long. Fruiting calyx enlarged and persistent to 4–4.5 x 5–5.5 mm with conspicuous crown of scales exserted by 2.5 mm. Seeds 0.7 mm long, glossy buff, blunt end minutely papillate. Fig. 74.9.

Clearings and margins of moist forest; c 1500 m. KF (NW of Mizan Teferi); Uganda, Tanzania, Zaire, Central African Republic and Cameroon. *M.G. Gilbert* 4229.

The only Ethiopian collection seen, a single plant in fruit growing on a moss-covered tree-stump, differs from material elsewhere by the entire leaves but otherwise seems best included within this rather variable species.

## 75. COMBRETACEAE

by K. Vollesen\*

Keay in *Fl. W. Trop. Afr.*, ed. 2, 1: 264–281 (1954); Cufodontis, *Enum.*: 615–625 (1959); Exell & Stace in *Bol. Soc. Brot.*, ser. 2, 40: 5–25 (1966); Wickens, *Combretaceae* in *Fl. Trop. E. Afr.*: 100 pp. (1973); Thulin, 63. *Combretaceae* in *Fl. Somalia*: 247–254 (1993).

Trees, shrubs, shrublets or woody climbers. Leaves opposite, whorled or alternate, simple; stipules absent. Flowers bisexual or andromonoecious, in axillary spikes, racemes or heads or in terminal or axillary panicles. Receptacle of two parts, lower surrounding the ovary, upper extended beyond ovary to form a usually campanulate tube terminating in 4–5(–8) sepals, these sometimes almost absent or accrescent. Petals 4–5 or 0, inserted near mouth of receptacle. Stamens 8–10, exerted or included in receptacle. Disc intrastaminal, glabrous or hairy, sometimes absent. Ovary inferior, 1-locular with 2(–6) pendulous ovules from apex. Style usually free. Fruit 1-seeded, indehiscent, dry or fleshy, often winged or ridged.

Family with 20 genera and 400–500 species in all tropical and subtropical regions. In the Flora area 5 genera and 27 species.

## Key to Genera

1. Fruit 4–5-winged or -angled; petals present; leaves opposite or whorled (or alternate on long shoots). 2
  - Fruit 2-winged or -angled; petals absent; leaves alternate, often on spur shoots or crowded towards branch ends. 3
2. Petals more than 10 mm long; stamens included in the 40–80 mm long receptacle; style adnate to side of receptacle. 2. *Quisqualis*
  - Petals up to 8 mm long; stamens exerted; receptacle up to 6 mm long; style not adnate to receptacle. 1. *Combretum*
3. Flowers and fruits in spikes or racemes with bisexual flowers in basal and male flowers in apical part. 3. *Terminalia*
  - Flowers and fruits in dense globose heads; all flowers bisexual. 4
4. Inflorescences solitary in leaf-axils; single fruits 6–10 x 7–11 mm, beaked; stamens 10. 4. *Anogeissus*
  - Inflorescences aggregated into large panicles; fruits c 2 x 2 mm, not beaked; stamens 5. 5. *Conocarpus*
- Petals white to yellow. 2
2. Flowers 5-merous; fruit 5-winged; petals 4–8 mm long; scandent shrub. 11. *C. aculeatum*
  - Flowers 4-merous; fruit 4-winged or -angled; petals up to 3 mm long. 3
3. Climber or scrambler; wings on fruit narrower than body. 9. *C. capituliflorum*
  - Erect trees or shrubs; wings on fruit wider than body. 4
4. Inflorescence axes 0.5–3(–4) cm long; mature leaves up to 4(–5) cm long. 5
  - Some or all inflorescence axes longer; some or all mature leaves longer. 6
5. Scales on branches and inflorescences reddish, contiguous; upper receptacle infundibuliform (disk not visible in dried flowers), 2–3 mm long; petals spatulate or broadly obovate. 8. *C. hereroense*
  - Scales on branches and inflorescence axes yellowish, scattered; upper receptacle flat, saucer-shaped (disk easily visible in dried flowers); petals narrowly oblanceolate. 1. *C. contractum*
6. Scales on lower leaf surface inconspicuous or apparently absent, not visible with a x10 lens. 7
  - Scales conspicuous, sometimes completely covering lower leaf surface, whitish to yellow, easily visible with a x10 lens. 10
7. Leaves glabrous, drooping, with distinctly crenate-sinuate margin and very long drawn out tip; petals ciliate. 4. *C. hartmannianum*
  - Leaves rounded to cuspidate (if cuspidate then hairy and/or petals glabrous), not drooping, entire (rarely indistinctly crenate). 8
8. Leaves drying reddish brown, strongly glutinous when young; petals hairy on back and ciliate; fruit reddish; inflorescence axis glabrous. 6. *C. nigricans*
  - Leaves not drying reddish brown; petals glabrous on back, sometimes with a few ciliae; fruit straw-coloured; inflorescence axes hairy. 9
9. Leaves tomentose, not glutinous when young; branchlets lanate; upper receptacle tomentose; fruit pubescent to hirsute. 5. *C. rochetianum*
  - Leaves glabrous to densely pubescent, glutinous

1. *COMBRETUM* Loefl. (1758), *nom. conserv.*

Trees, shrubs or woody climbers (rarely suffrutices); indumentum of simple hairs and/or peltate scales. Leaves opposite or whorled (often alternate or subopposite on vigorous stems), usually entire. Flowers bisexual, in axillary spikes which sometimes merge into panicles. Upper receptacle varying from flat (saucer-shaped) to infundibuliform<sup>1</sup>, sometimes constricted at or below middle, terminating in 4–5 usually triangular sepals. Petals 4–5, usually rounded to retuse. Stamens 8–10. Disc glabrous or hairy. Style not adnate to receptacle. Fruit 4–5-winged or -angled.

About 250 species. Widespread in all tropical and subtropical regions.

1. Petals bright red or scarlet; flowers 5-merous; fruit 5-winged; rainforest climber or scrambler. 10. *C. paniculatum*

\* The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK.

1. infundibuliform: funnel-shaped.

when young; branchlets glabrous to densely pubescent; upper receptacle puberulous to densely pubescent; fruit glabrous and glutinous.

3. *C. adenogonium*

10. Upper receptacle flat, saucer-shaped (disk easily visible in dried flowers); petals glabrous, narrowly oblanceolate.

1. *C. contractum*

– Upper receptacle cupuliform to infundibuliform (disk not easily visible in dried flowers); petals hairy or glabrous, obovate to transversely elliptic.

11

11. Fruit greyish to reddish brown or dark purple, with appressed curled hairs; petals glabrous at apex.

2. *C. collinum*

– Fruit straw-coloured to yellowish or pale brown, glabrous or with spreading hairs; petals very distinctly pilose at apex.

7. *C. molle*

1. *C. contractum* Engl. & Diels (1907).

Shrub to 3 m tall; branchlets puberulous and with scattered yellow peltate scales, in second year with stringy bark. Leaves opposite or subopposite, with scattered yellowish scales; petiole 2–5 mm; blade elliptic to slightly obovate, up to 4.5 x 2.5 cm; apex broadly rounded or with a short blunt acumen. Flowers 4-merous, sparsely (rarely densely) covered in scales, in sparsely puberulous and sparsely scaly up to 5 cm long spikes which are axillary or congested into terminal panicles. Lower receptacle 1–2 mm long, upper flat, saucer-shaped (disk easily visible in dried flowers). Petals 1.5–2 mm long, creamy white, narrowly oblanceolate, glabrous. Filaments 2–3 mm long. Style glabrous. Fruit 4-winged, 1.5–2 cm long, oblong, brown or dark brown, scaly, otherwise glabrous; wings c 0.5 cm wide. Fig. 75.2.8–10.

*Acacia* – *Commiphora* woodland on red sandy soil; 1050 m. SD; N & E Kenya, S Somalia, NE Tanzania. Puff et al. 870430–1/10.

2. *C. collinum* Fresen. (1837)

– type: *Rüppell* s.n. (FR holo.).

Tree to 10(–15) m; bark greyish to dark brown, rough or fissured; all parts glabrous to tomentose. Leaves opposite or whorled, usually densely covered with silvery scales; petiole 0.5–3 cm; blade ovate to elliptic or narrowly so or obovate, up to 23 x 10 cm; apex acuminate to rounded. Flowers 4-merous, fragrant, covered in scales, in (1–)3–13 cm long spikes, these either axillary or on lateral leafless branches, forming panicles up to 10 cm long. Lower receptacle 2.5–4 mm long, upper 2–4 mm long. Petals 1.5–2.5 mm long, yellow or yellowish green, obovate to circular or transversely elliptic, glabrous. Filaments 4–5 mm long. Fruit 4-winged, 2–3.7 cm long, ovoid to ellipsoid, reddish or greyish brown to dark purple, puberulous to pubescent from appressed curled hairs, densely scaly on body; wings thick and leathery, 0.5–1.1 cm wide. Fig. 75.2.1, 1–8.

1. Leaves and branchlets puberulous to tomentellous from fine curled appressed greyish hairs (sometimes only on midrib and petiole of mature leaves); leaves usually narrowly elliptic or narrowly ovate, acuminate. subsp. *collinum*

– Leaves and branchlets glabrous or from sparsely pubescent to tomentose or lanate, hairs usually yellowish to brownish; leaves usually ovate or elliptic, acute. 2

2. Leaves and branchlets yellowish to brownish lanate, hairs short crisped appressed; reticulation usually prominent on mature leaves. subsp. *hypopilinum*

– Leaves and branchlets glabrous or from sparsely pubescent to tomentose, hairs spreading, usually brownish. 3

3. Lower leaf-surface glabrous to sparsely pubescent (rarely pubescent), reticulation not or only slightly raised; flowers puberulous to pubescent; fruit puberulous, with conspicuous reddish scales.

subsp. *binderianum*

– Lower leaf-surface densely pubescent to tomentose on the conspicuously raised reticulation; flowers tomentellous; fruit densely pubescent, with inconspicuous whitish scales. subsp. *elgonense*

subsp. *collinum*

Fig. 75.1.1–3.

*Combretum* – *Terminalia* and *Anogeissus* – *Combretum* woodland and wooded grassland; (500–)1100–1950 m. EW TU GD GJ IL; E Sudan. Chaffey 622; Gilbert & Getachew Aweke 2976; Mercier 1592.

Collections intermediate between subsp. *collinum* and subsp. *binderianum* occur in GJ and IL. They mostly have the narrow acuminate leaves of subsp. *collinum* but are usually completely glabrous. Friis et al. 2535 and Thomson 612 are examples.

Thulin et al. 4013 has the relatively broader leaves of subsp. *binderianum* but the fine appressed indumentum of subsp. *collinum* on the branchlets.

subsp. *binderianum* (Kotschy) Okafor in *Bol. Soc.*

*Brot.*, ser. 2, 41: 141 (1967).

*C. cyclocarpum* Chiov. (1940) – type: *Massa* 250 (FT holo., K photo.).

*C. marchettii* Chiov. (1940) – type: *Marchetti* 72 (FT holo., K photo.).

Fig. 75.1.4–6.

*Combretum*, *Combretum* – *Terminalia*, *Combretum* – *Terminalia* – *Stereospermum* woodland and wooded grassland, usually with tall grass cover and subject to burning, on grey to black alluvial soils and rocky slopes, often a dominant; 450–1950 m. GJ SU (Gibe Gorge) WG IL KF GG SD BA HA; W Africa to Ethiopia, Uganda, Kenya, Tanzania. Friis et al. 2272; Gilbert 3195a; Mooney 6903.

*Mesfin Tadesse* 2254 is intermediate between subsp. *binderianum* and subsp. *elgonense*. It has distinctly raised reticulation on the leaves but a rather sparser indumentum than the rest of the subsp. *elgonense*-material.

subsp. *elgonense* (Engl.) Okafor in *Bol. Soc. Brot.*, ser. 2: 41: 142 (1967).

Fig. 75.1.7 & 8.

*Combretum* – *Terminalia* – *Stereospermum* wooded grassland and woodland with tall grass cover and subject to regular burning; 1325–2200 m. WG SU (Bako-area);

Sudan, E Zaire, Uganda, Kenya, Tanzania, Zambia. *Gilbert & Thulin* 822; *Mooney* 7770; *W. de Wilde* et al. 6358.

*W. de Wilde* et al. 6250 has the youngest leaves brownish lanate and thus approaches subsp. *hypopilinum*.

subsp. *hypopilinum* (*Diels*) *Okafor* in *Bol. Soc. Brot.*, ser. 2, 41: 142 (1967).

*Combretum* – *Terminalia* wooded grassland; c 1800 m. WG; W Africa to W Ethiopia, N Uganda. *Benedetto* 387.

The species as a whole is widespread in tropical and subtropical Africa. *Okafor* (*l.c.*) divides it into 11 reasonably distinct subspecies. But as several of these have largely overlapping distributions, it is quite possible that further studies, involving detailed field-work in areas where more than one taxon occurs, will eventually provide a more satisfactory method of dealing with this complex species.

3. *C. adenogonium* *Steud. ex A. Rich.* (1848)

– type: *Schimper* II:1289 (K iso.).

*C. reticulatum* *Fresen.* (1837), not *Presl* (1831–35)

– type: *Rüppell* s.n. (FR holo.).

*C. fragrans* *F. Hoffm.* (1889).

*C. ghasalense* *Engl. & Diels* (1899).

Tree to 12 m; bark pale to dark brown, smooth or flaky to rough or reticulate; branchlets and leaves glabrous to densely pubescent, glutinous when young. Leaves in 3's (rarely opposite), glossy, scales inconspicuous, impressed; petiole 1–10 mm; blade ovate to elliptic or obovate or broadly so, (rarely narrowly elliptic), up to 20(–28) x 9(–12) cm; apex cuspidate to retuse; reticulation inconspicuous to strongly raised. Flowers 4-merous, fragrant, in 1.5–7(–13) cm long pubescent to tomentose spikes, these either single or forming panicles on axillary leafless branches. Lower receptacle pubescent to lanate, 1.5–3 mm long, upper puberulous to densely pubescent, 1.5–3 mm long. Petals 1.5–3 mm long, yellow or yellowish green, obovate to spatulate, glabrous (rarely with a few ciliae). Filaments 4–7 mm. Fruit 4-winged, 2.5–3.8 cm long, elliptic or broadly so, yellowish to brownish, glabrous, glutinous, not scaly; wings papery, 0.7–1.5 cm wide. Fig. 75.1.9–12.

*Combretum* – *Terminalia* woodland and wooded grassland, on alluvial clay soils or on rocky slopes; 500–2000 (–2300) m. EE EW TU GD GJ SU WG IL GG SD; widespread in tropical Africa. *Chaffey* 964; *Friis* et al. 1936; *W. de Wilde* et al. 10120.

Some collections in the Flora area from higher altitudes (above 1700 m) have larger leaves with more prominent reticulation and denser indumentum than normal. The extreme is *Rüppell* s.n., the type of *C. reticulatum* *Fresen.* But they seem to merge gradually into more typical material and are probably not worthy of any taxonomic rank.

Some collections from Eritrea and N Ethiopia (Tigray and Gonder) have rather long drawn out leaf-tips and thus tend towards *C. hartmannianum*. This could indicate that hybridization occasionally occurs. Some of these (*Fiori* 310, *Pappi* 7727) are quite glabrous while others (*Pichi-Sermolli* 739, *Schweinfurth* & *Riva* s.n., near Dongollo) are hairy. This latest collection has tomentellous branches which seems to indicate that *C. rochetianum* might also be involved.

Reported as being used against hepatites in Metekel.

4. *C. hartmannianum* *Schweinf.* (1867).

Tree to 25 m; bark pale grey, smooth; branchlets and leaves glabrous, glutinous when young. Leaves drooping, opposite or in 3's, with inconspicuous immersed scales; petiole 1–3 cm; blade ovate to elliptic or broadly so, up to 20 x 7 cm, about  $\frac{1}{3}$ – $\frac{1}{2}$  the length being the extremely long drawn out tip; base often unequal; margin slightly to distinctly crenate to sinuate. Flowers 4-merous, puberulous, not scaly, in 2–6 cm long, puberulous to pubescent axillary spikes or these aggregated into panicles (sometimes appearing before the leaves). Lower receptacle 1–2 mm long, upper 2–3 mm long. Petals 1–2 mm long, yellow, obovate or broadly so, sparsely to densely ciliate. Filaments 3–4 mm. Fruit 4-winged, 2.5–3.5 cm long, oblong or elliptic, straw-coloured or light brown, glabrous and glutinous; wings papery, 0.7–1 cm wide. Fig. 75.3.1–4.

*Combretum* – *Terminalia* woodland and wooded grassland on alluvial soil, often reported to be a dominant; 500–1200 m. EW TU GD; E Sudan. *Greathead* 104, *Schweinfurth* 2124.

The remarkable drooping extremely long drawn out leaves makes this an easily recognizable species. It has a very restricted total distribution almost identical to that of the following species.

5. *C. rochetianum* *A. Rich. ex A. Juss.* (1851)

– type: *Rochet d'Hericourt* s.n. (P holo., BM iso.).

*C. gallabatense* *Schweinf.* (1868) – types: *Schweinfurth* 2128 (BM K iso.); *Steudner* 202 (not seen).

Tree to 5 m; branchlets whitish to brownish lanate. Leaves in 3's, beneath tomentose to lanate on the strongly raised veins, above pubescent (tomentose on midrib), scales inconspicuous; petiole 0.3–1.5 cm; blade narrowly to broadly elliptic, up to 21 x 8 cm; apex subacuminate to rounded. Flowers 4-merous, tomentose, in up to 5 cm long lanate axillary spikes, or these clustered on short side branches. Lower receptacle c 1 mm long, upper c 1 mm long. Petals 1–1.5 mm long, yellow, obovate, glabrous. Filaments c 3 mm long. Fruit 4-winged, 3–3.7 cm long, broadly ovoid to elliptic, yellowish or light brown, pubescent to hirsute; wings papery, 1–1.3 cm wide. Fig. 75.3.5 & 6.

*Combretum* – *Terminalia* woodland and bushland on alluvial plains, often dominant; 1000–1900 m. EW TU GD GJ; E Sudan. *Kuls* 280, 282; *Mercier* 1829.

A species of very restricted distribution in Eritrea and NW Ethiopia and adjacent areas of the Sudan. But—as in the preceding species—reportedly often common or dominant where it occurs.

6. *C. nigricans* *Lepr. ex Guill. & Perr.* (1833).

Tree to 5 m; branchlets and leaves glabrous to sparsely pubescent, glutinous when young. Leaves drying reddish brown (blackish above) when mature, opposite (rarely in 3's), scales small, reddish, immersed or apparently absent; petiole 3–10 mm; blade ovate to elliptic, up to 11 x 4.5 cm; apex acuminate to rounded. Flowers 4-merous glabrous to pubescent, in 1–5 cm long glabrous to puberulous and

glutinous axillary spikes, or these on short axillary branches, sometimes appearing before the leaves; bracts ciliate, rather persistent. Lower receptacle *c* 1 mm long, upper *c* 1 mm long. Petals *c* 1 mm long, yellow, spatulate, pilose on back and strongly ciliate. Filaments 3–5 mm. Fruit 4-winged, 2–2.8 cm long, ovate to elliptic, reddish brown, glabrous and glossy, densely scaly on body; wings 0.5–0.8 cm wide. Fig. 75.3.7–10.

*Combretum* – *Terminalia* woodland on recent lava flows; *c* 1900 m. GJ; Senegal to W Ethiopia. *Kuls* 298, 302.

In W Africa this species is usually divided into var. *nigricans* with densely hairy stems and leaves, and var. *elliottii* (Engl. & Diels) Aubrev. with glabrous stems and leaves or almost so. Much of the Sudanian and Ethiopian material seems to be rather intermediate between these two states.

7. *C. molle* R. Br. ex G. Don (1827)

– type: Salt s.n. (BM holo.).

*C. trichanthum* Fresen. (1837) – type: *Rüppell* s.n. (FR holo.).

*C. ferrugineum* A. Rich. (1848) – type: *Schimper* II:767 (K iso.).

*C. lepidotum* A. Rich. (1848), non Presl (1846) – type: *Schimper* II:1358 (BM K iso.).

*C. petitianum* A. Rich. (1848) – type: Choa, *Petit* s.n. (not seen).

*C. punctatum* A. Rich. (1848), not Blume (1825) – type: Aderbati, *Quartin-Dillon* s.n. (not seen).

*C. quartinianum* A. Rich. (1848) – type: Tchelatckehanne, *Quartin-Dillon* s.n. (not seen).

*C. ruppellianum* A. Rich. (1848) – type: *Schimper* II:622 (BM K iso.).

*C. schimperianum* A. Rich. (1848) – type: *Schimper* II:582 (K iso.).

*C. richardianum* van Heurck & Mull. Arg. (1870) – type: *Schimper* II:1358 (BM K iso.).

*C. bricchettii* Engl. & Diels (1899) – type: *Robecchi-Bricchetti* 71 (FT holo., K photo).

*C. insculptum* Engl. & Diels (1899) – types: *Ruspoli & Riva* 325(72), 327(100) (both FT holo.).

*C. sublancofolium* Chiov. (1929) – type: *Basile* 309 (TO holo.).

*C. trichanthum* var. *angustifolium* Fiori in *Boschi e Piante Legnose dell'Eritrea*: 278 (1912) – type: *Fiori* 308 (FT holo.).

*C. trichanthum* var. *petitianum* (A. Rich.) Fiori, *l.c.*: 278 (1912).

Tree to 15(–20) m; dbh to 50 cm; bark grey to brownish or blackish, smooth or flaky or deeply fissured; all parts glabrous to tomentose, branchlets sometimes glutinous. Leaves opposite (rarely in 3's), sparsely to densely covered with silvery or yellowish scales; petiole up to 5(–8) mm; blade narrowly ovate or elliptic to broadly so or obovate, up to 21 x 12.5 cm; apex acute to rounded. Flowers scaly, in 3–10 cm long scale-covered spikes, these usually axillary, more rarely forming short leafless panicles. Lower receptacle 1–3 mm long, upper 1.5–2.5 mm long. Petals 0.5–1.5 mm long, yellow or yellowish green, obovate to spatulate, distinctly 3-lobed, strongly ciliate. Filaments 4–5 mm. Fruit 4-winged, 0.8–2.8 cm long, elliptic or

broadly so; straw-coloured to yellowish brown, glabrous to pubescent, densely scaly on body; wings papery, 0.3–1.2 cm wide. Fig. 75.2.1–7.

A wide variety of *Combretum* and *Combretum* – *Terminalia* woodland and wooded grassland, often on rocky slopes, usually with tall grass cover and subject to regular burning, often a dominant element, penetrating into riverine forest, dry *Juniperus*-forest, ground-water forest or even into lowland rain forest; 500–2200(–2500) m. EE EW TU GD GJ WU SU AR WG IL KF GG SD BA HA; widespread in tropical and S Africa, the Yemen. *Ash* 1937, *Burger* 1599, *Mooney* 6695, (flowering specimens); *Burger* 1444, *Friis* et al. 1149 (small leaves and fruits); *Friis* et al. 426, *Gilbert* 2321A (large leaves and fruits); *Mooney* 5592 (forest form).

This is an extremely variable species the variation of which has been commented upon extensively in other floras (*Fl. Trop. E. Afr.*). The treatment as presented here follows the trend of these but is extremely unsatisfactory. What is needed is extensive field work to study the constancy of populations, whether more than one form occurs in any one place and if so how constant are they and do they occupy different habitats.

Following is an outline to show some patterns of the variation of the species in the Flora area.

In the southwestern part of the country the leaves are large and leathery (largest 10.5–)12–21 cm long) and the fruits large (largest 2–2.8 cm long, smallest 1.7–2.3 cm). The plants vary from glabrous to densely rufous pubescent. In Harerge this form co-exists with and is completely distinct from a small-leaved (largest 6.5–11 cm long) and small-fruited (largest 1.2–1.8(–2) cm long, smallest 0.8–1.5(–1.7) cm) glabrous or subglabrous form (*C. insculptum* s.str.). On the central plateau the large-leaved form persists while the small-leaved gets more densely white-haired. There is also here a large-leaved form with white indumentum but this merges completely into the other large-leaved form. In northern Ethiopia and Eritrea one finds small-fruited but relatively large-leaved forms, this is *C. molle* s.str. This form usually has a rufous indumentum but it merges completely into the southern small-fruited glabrous form. A number of collections from the north completely demolishes the differences between the reasonably distinct southern forms. In the south and southwest there is also an occasional forest form with rather large, thin, broad leaves and small fruits. It is very variable in indumentum.

As far as can be judged from the available material, there are also two very different bark-types. One type is smooth to slightly flaky, pale to golden brown. All plants belonging here are small-fruited. The other type is grey to blackish and deeply fissured. All plants belonging here are large-fruited. There is no information available on the bark from N Ethiopian and Eritrean material.

8. *C. hereroense* Schinz (1888).

Shrub or tree to 6 m; all parts glabrous to densely pubescent, branchlets with contiguous reddish scales. Leaves opposite, with scattered to contiguous scales; petiole 1–5 mm; blade elliptic to subcircular or obovate to broadly so, up to 4(–5) x 3.5(–4) cm; apex subacute to emarginate.

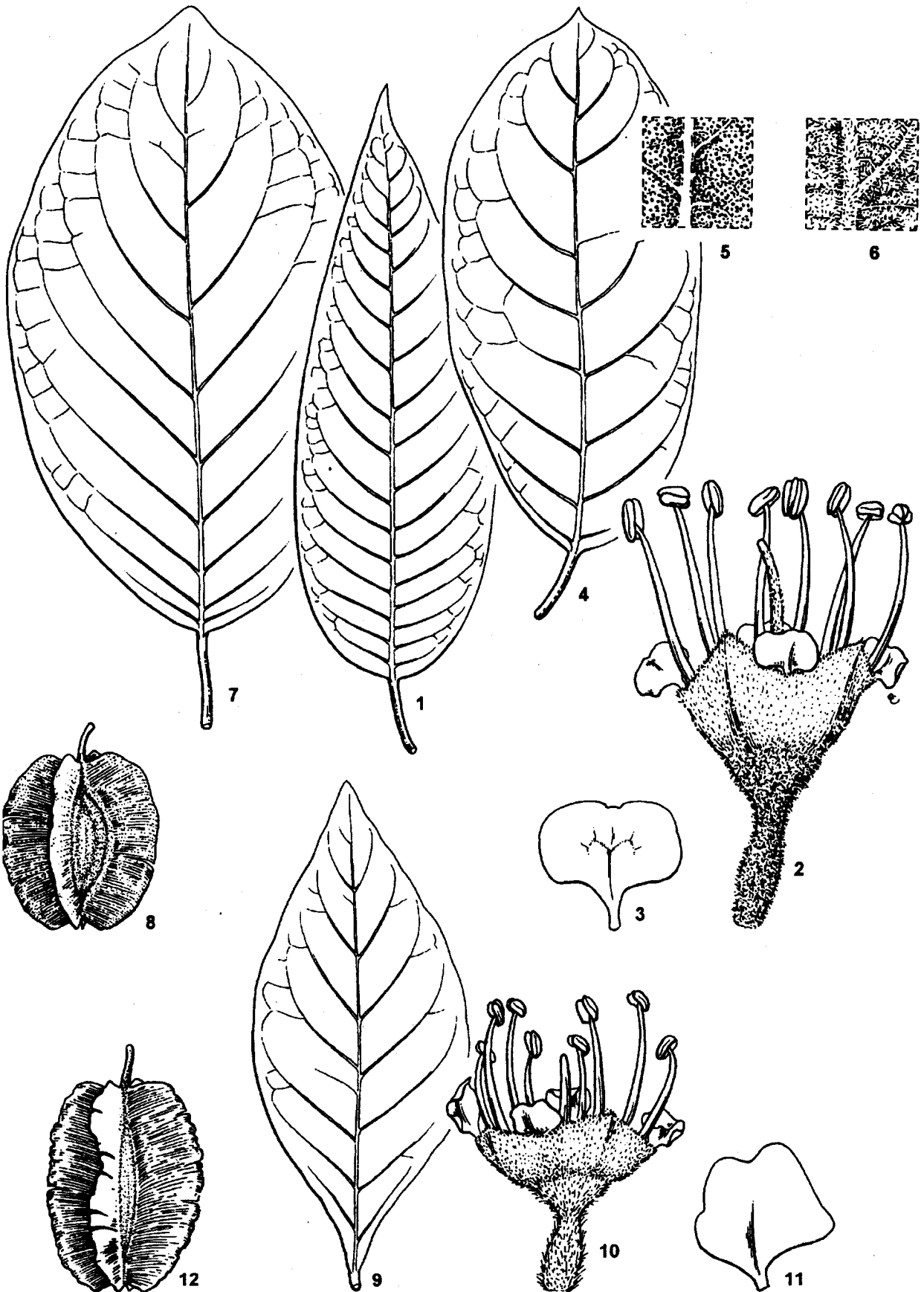


Figure 75.1 *COMBRETUM COLLINUM* subsp. *COLLINUM*: 1 - leaf  $\times \frac{2}{3}$ ; 2 - flower  $\times 6$ ; 3 - petal  $\times 12$ . subsp. *BINDERIANUM*: 4 - leaf  $\times \frac{2}{3}$ ; 5 - detail of lower leaf-surface  $\times 2$ ; 6 - detail of upper leaf-surface  $\times 2$ . subsp. *ELGONENSE*: 7 - leaf  $\times \frac{2}{3}$ ; 8 - fruit  $\times 1$ . *C. ADENOGONIUM*: 9 - leaf  $\times \frac{2}{3}$ ; 10 - flower  $\times 6$ ; 11 - petal  $\times 12$ ; 12 - fruit  $\times 1$ . 1 from Gilbert & Getachew 2976; 2 & 3 from Chaffey 622; 4 & 5 from Beals 915; 6 from Mogk 409; 7 & 8 from Gilbert & Thulin 822; 9 from de Wilde 10120; 10 & 11 from Gillett 14864; 12 from Purdy 130. Drawn by Eleanor Catherine.



Flowers 4-merous, densely scaly, fragrant, in glabrous to densely pubescent and densely reddish scaly 0.5–3(–4) cm long spikes, axillary or congested towards branch-ends, sometimes appearing before the leaves. Lower receptacle 1–2 mm long, upper 2–3 mm long. Petals 1.5–2.5 mm long, yellow or cream, spatulate or broadly obovate. Filaments 2–4 mm; style pilose. Fruit 4-winged, 1.5–2.8 cm long, ovoid to subcircular, straw-coloured to dark brown, glabrous to pubescent, usually densely scaly; wings papery, 0.4–0.7 cm wide. Fig. 75.3.11–14.

subsp. *volkensii* (Engl.) Wickens in *Kew Bull.* 25: 415 (1971);

*C. volkensii* Engl. (1895).

Scales not contiguous on lower leaf-surface.

var. *parvifolium* (Engl.) Wickens in *Kew Bull.* 25: 416 (1971).

*C. erlangerianum* Engl. & Diels (1907) – types: *Ellenbeck* 1921, 1996, 2030 (all B, destroyed).

*C. cufodontii* Chiov. (1939) – type: *Cufodontis* 725 (FT holo., K photo).

Leaves pubescent, at least on midrib (glabrous in var. *volkensii*); fruit pubescent and densely scaly (only scaly in var. *volkensii*).

*Acacia* – *Commiphora* and *Acacia* woodland and bushland on red sandy to silty soil or on rocky slopes; 650–1500 m. GG SD BA; S Somalia, Kenya, Tanzania. *Friis* et al. 2828, 3011; *Thulin* et al. 3544.

There is an unnumbered fragment of one of the types of *C. erlangerianum* at BM, and it clearly belongs to this variety.

Two other subspecies and several varieties are widespread through eastern Africa to S Africa and west to Angola. Of these subsp. *volkensii* var. *volkensii* and subsp. *grotei* (Exell) Wickens occur in NE Uganda and N Kenya and could well occur in Ethiopia. Subsp. *grotei* has contiguous scales on lower leaf surface and leaves usually less than 2 cm long.

### 9. *C. capituliflorum* Fenzl ex Schweinf. (1868).

Scrambler or woody climber to 10 m, forming large hanging clumps sometimes completely covering "host"; branchlets rufous puberulous to pubescent and with reddish scales. Leaves opposite or in 3's or 4's, glabrous or midrib puberulous to pubescent, with yellowish to reddish scales; petiole 2–7(–10) mm; blade oblong to obovate or narrowly so, up to 18 x 5.5 cm; apex acute to acuminate; margin undulate. Flowers 4-merous, fragrant, in rufous pubescent to tomentose 0.5–2 cm long spikes, these axillary or merging into terminal or axillary panicles; bracts persistent, 2–7 mm long. Lower receptacle 2–3 mm long, tomentose, upper 3–5 mm long, pubescent and scaly. Petals 1–2 mm long, white, oblanceolate to obovate, ciliate. Filaments 5–7 mm. Fruit narrowly 4-winged, 2–4 cm long, ovoid to ellipsoid, brown or dark brown, glabrous, scaly; wings 0.1–0.3 cm wide (up to 8 mm in Sudanian material), thick and triangular in section. Fig. 75.3.15–18.

Riverine forest, riverbanks; 550–850 m. IL; S Sudan,

NE Zaire, N Uganda, NW Kenya. *Friis* et al. 1924, 2557; *Mooney* 6834.

### 10. *C. paniculatum* Vent. (1808).

Vigorous scrambling or scandent shrub or woody climber to 15 m or more; branchlets subglabrous to rufous pubescent or sericeous. Leaves opposite (rarely in 3's), glabrescent when mature; petiole 1–3.5 cm, base often persisting as a spine; blade elliptic to broadly so or obovate, up to 17 x 9 cm; apex rounded to acuminate with obtuse tip. Inflorescence rufous pubescent to sericeous, of spikes merging into large terminal panicles and supported by reduced leaves (leafless in fruit). Flowers 5-merous; lower receptacle 4–6 mm long, densely rufous sericeous, upper 3.5–6 mm long, puberulous or sparsely so (or glabrous apically). Petals 2–3 mm long, bright red or scarlet, broadly ovate, often ciliate. Filaments dark red, 7–12 mm. Fruit 5-winged, 2–3.5 cm long, broadly elliptic, pale yellow or pale brown, glabrous; wings 0.7–1 cm wide, thin and papery. Fig. 75.4.1–4.

Montane forest, often on edges and in clearings, riverine forest, secondary forest and scrub, coffee plantations, secondary *Acacia* woodland and scrub, persisting in hedges and bush clumps in cleared areas; 1500–2600 m. SU(Bako area) WG IL KF SD(NW part only); widespread in tropical Africa. *Friis* et al. 1551; *Mooney* 6760, 7720.

### 11. *C. aculeatum* Vent. (1808).

*C. ovale* R. Br. ex G. Don (1827) – type: *Salt* s.n. (BM holo.).

*C. aculeatum* forma *kotschyana* Almagia in *Pirotta*, *Fl. Col. Eritrea* 1: 110 (1903).

*C. aculeatum* forma *nudiflorum* Almagia, *l.c.*: 110 (1903) – type: *Schweinfurth* & *Riva* 2236 (FT holo., K iso.).

*C. aculeatum* forma *schimperii* Almagia, *l.c.*: 110 (1903) – type: *Schimper* II: 881 (FT holo., BM K iso.).

*C. aculeatum* forma *stenophyllum* Almagia, *l.c.*: 110 (1903).

Scrambling or scandent shrub or woody climber to 4 m, often with long sarmentose branches, if grazed sometimes suberect; branchlets pubescent. Leaves opposite, subglabrous to pubescent along veins; petiole 0.2–1.5 cm, basal part persisting as a spine; blade elliptic or obovate to orbicular, up to 6.5(–8.5) x 4(–4.5) cm; apex acute to emarginate. Flowers 5-merous, fragrant, in pubescent to tomentose axillary or terminal spikes; bracts sometimes leafy. Lower receptacle 4–7 mm long, tomentose, upper 4–5 mm long, pubescent. Sepals greenish to dark red; petals 4–8 mm long, white, oblanceolate to obovate, pubescent on back. Filaments 5–10 mm. Fruit 5-winged, 1.2–2.7 cm long, ovoid to ellipsoid, yellowish brown, glabrous to puberulous or pubescent; wings papery, 0.4–0.6 cm wide. Fig. 75.4.5–8.

*Acacia* – *Commiphora* and *Combretum* woodland and bushland on red sandy to silty soil or rocky slopes, *Acacia* and *Acacia* – *Hyphaene* woodland and wooded grassland on alluvial soils, riverine forest and ground-water forest; 325–1600 m. EE EW TU GD WU KF GG SD BA HA;



Figure 75.2 *COMBRETUM MOLLE*: 1 – flowering branch  $\times \frac{2}{3}$ ; 2 – fruiting branch  $\times \frac{2}{3}$ ; 3 & 4 – leaves  $\times \frac{2}{3}$ ; 5 – flower  $\times 6$ ; 6 – petal  $\times 6$ ; 7 – fruit  $\times 1$ . *C. CONTRACTUM*: 8 – flower  $\times 6$ ; 9 – petal  $\times 6$ ; 10 – fruit  $\times 1$ . 1, 5 & 6 from Burger 3454; 2 from Jackson 727; 3 from Perdue 6429; 4 & 7 from Burger 829; 8 & 9 from Bally 8162; 10 from Gillett et al. 19089. Drawn by Eleanor Catherine.

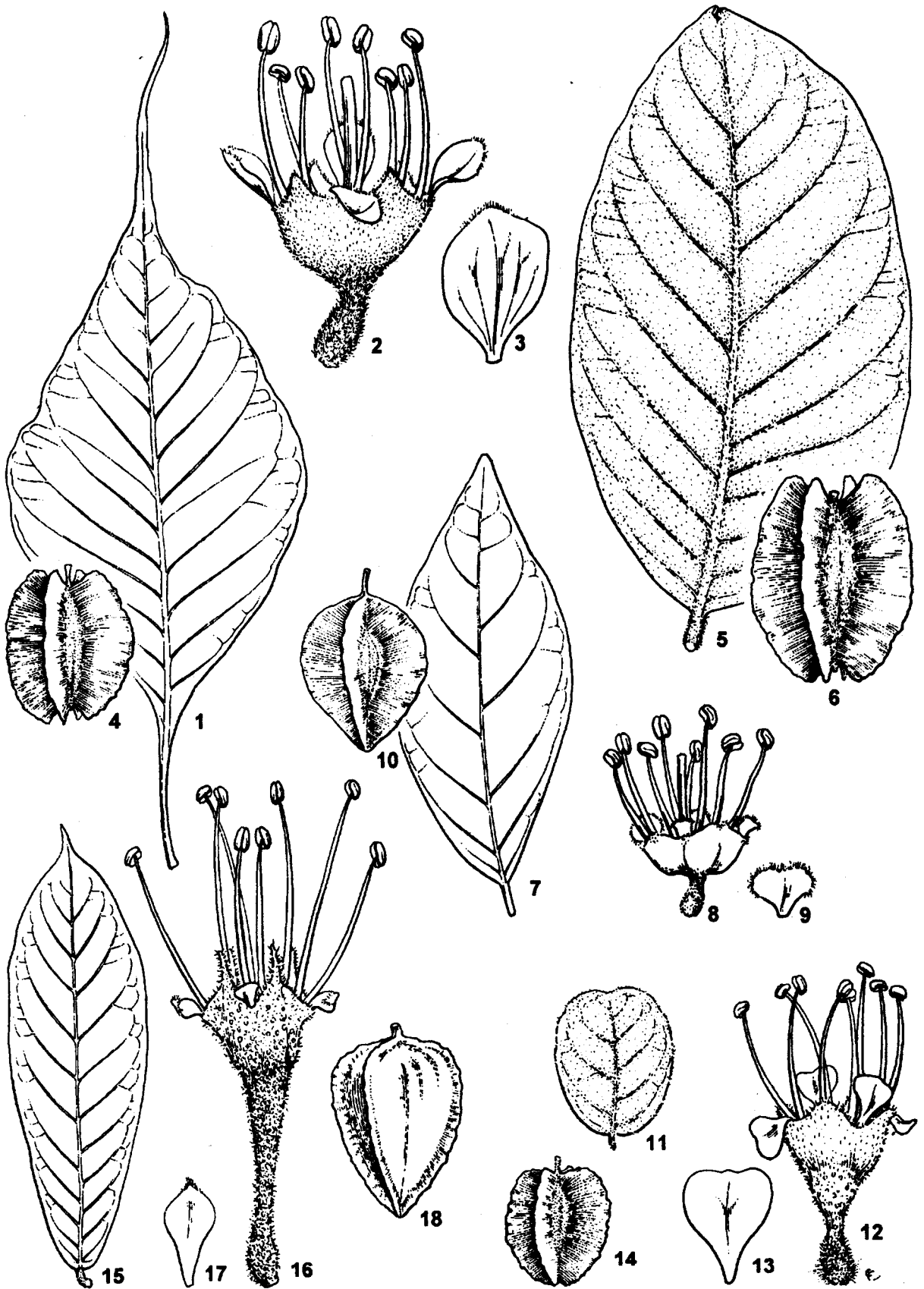


Figure 75.3 *COMBRETUM HARTMANNIANUM*: 1 - leaf  $\times \frac{1}{2}$ ; 2 - flower  $\times 6$ ; 3 - petal  $\times 12$ ; 4 - fruit  $\times 1$ . *C. ROCHETIANUM*: 5 - leaf  $\times \frac{1}{2}$ ; 6 - fruit  $\times 1$ . *C. NIGRICANS*: 7 - leaf  $\times \frac{1}{2}$ ; 8 - flower  $\times 6$ ; 9 - petal  $\times 12$ ; 10 - fruit  $\times 1$ . *C. HEREROENSE*: 11 - leaf  $\times \frac{1}{2}$ ; 12 - flower  $\times 6$ ; 13 - petal  $\times 12$ ; 14 - fruit  $\times 1$ . *C. CAPITULIFLORUM*: 15 - leaf  $\times \frac{1}{2}$ ; 16 - flower  $\times 6$ ; 17 - petal  $\times 12$ ; 18 - fruit  $\times 1$ . 1 from Unknown collector LJ60; 2 & 3 from Schweinfurth 1014; 4 from Wickens 3082; 5 & 6 from Mercier 1829; 7 & 10 from Myers 14145; 8 & 9 from Wickens 2123B; 11 & 14 from Thulin et al. 3544; 12 & 13 from Ash 1920; 15 & 18 from Friis et al. 2557; 16 & 17 from Mooney 6834. Drawn by Eleanor Catherine.



Figure 75.A *COMBRETUM PANICULATUM*: 1 - flowering branch  $\times \frac{1}{2}$ ; 2 - leafy branch  $\times \frac{1}{2}$ ; 3 - flower  $\times 4$ ; 4 - fruit  $\times \frac{1}{2}$ . *C. ACULEATUM*: 5 & 6 - leaves  $\times \frac{1}{2}$ ; 7 - flower  $\times 4$ ; 8 - fruit  $\times \frac{1}{2}$ . 1 & 3 from Mooney 6663; 2 from Mooney 6743; 4 from Ash 3444; 5 from Mooney 8581; 6 from Gilbert et al. 275; 7 from Turton 91; 8 from Ash 1613. Drawn by Eleanor Catherine.

from Senegal to Somalia, Uganda, Kenya, NE Tanzania. Ash 1613; Friis et al. 1033; Mooney 8581.

## 2. QUISQUALIS L. (1762)

### *Q. indica* L. (1762).

Woody scrambler or climber; branchlets pubescent. Leaves opposite, entire, subglabrous to densely pubescent, elliptic or oblong, up to 14 x 9 cm; basal part of petiole persisting as a spine. Flowers 5-merous, fragrant, in terminal and axillary 5–10 cm long spikes. Upper receptacle 4–8 cm long, narrowly tubular, expanding slightly at apex. Petals white at first, turning through pink to dark red, up to 2 cm long. Stamens 10, inserted near mouth of receptacle. Style adnate to receptacle. Fruit 2.5–4 cm long, with 5 narrow thick wings.

Native of tropical Asia and coastal E Africa, widely cultivated as an ornamental elsewhere. In the Flora area as a hedge plant. Gilbert et al. 7365; IECA E-38.

## 3. TERMINALIA L. (1767), *nom. conserv.*

Griffiths in *Journ. Linn. Soc. Bot.* 55: 818–907 (1959).

Trees or shrubs; indumentum of simple hairs. Leaves spirally arranged, often crowded towards end of branches or on short spur shoots, entire. Flowers andro-monoecious (bisexual in basal and male in apical part of inflorescence), in axillary spikes. Male flowers with pedicel-like stalk corresponding to lower receptacle. Bisexual flowers sessile. Upper receptacle a shallow cup terminating in 5 triangular sepals, densely hairy on the inside as is the conspicuous disk. Petals absent. Stamens 10, exerted. Fruit usually 2-winged (outside the Flora area often un-winged or 3–5-winged).

Genus with 100–150 species in all tropical and subtropical regions.

1. Fruit fleshy when mature, with lateral ridges, but not winged; leaves obovate, up to 30 x 20 cm, subcordate. 12. *T. catappa*  
– Fruit not fleshy, with two lateral wings; leaves if obovate usually less than 10 cm long. 2
2. Leaves in fascicles terminating spur shoots; spines often present. 3  
– Leaves scattered or crowded towards end of lateral branches, not in fascicles on spur shoots; spines absent. 9
3. Fruit 5–8.5 x 4.5–8.5 cm; leaves broadly elliptic to subcircular; inflorescences appearing before the leaves; sepals red, reflexed. 1. *T. orbicularis*  
– Fruit 1.3–4 x 0.8–2 cm; leaves obovate or broadly so; inflorescences with the leaves; sepals white to cream, erect. 4
4. Spines present. 5  
– Spines absent. 7
5. Lateral branches terminating in spines; fruit subcircular. 2. *T. brevipes*  
– Spines always on long shoots; fruit oblong to elliptic. 6

6. Spines usually numerous, in 2–3's at base of spur shoot, long shoots distinctly zig-zag. 3. *T. spinosa*  
– Spines few and irregularly scattered, long shoots straight. 4. *T. prunioides*
  7. Lower receptacle (pedicel in male flower) glabrous to pilose; bark longitudinally fissured; leaf-reticulation impressed above; fruit glabrous or with scattered appressed straight hairs. 4. *T. prunioides*  
– Lower receptacle tomentose. 8
  8. Leaves up to 5.5 x 3.5 cm, reticulation impressed above; petiole 5–20 mm long; bark longitudinally fissured; inflorescences 3.5–11 cm long; fruit puberulous. 5. *T. polycarpa*  
– Leaves up to 3.5 x 2.5 cm (usually less than 2 x 1.2 cm), glossy, distinctly greyish beneath, reticulation raised above; petiole 1–5 mm long; bark smooth; inflorescences 1–4(–5) cm long; fruit sericeous. 6. *T. basilei*
  9. Flowers and fruits glabrous. 10  
– Flowers and fruits hairy. 12
  10. Leaves glabrous, sessile or petiole up to 2 cm, base decurrent on petiole; spikes 10–20 cm long, glabrous, bisexual flowers in basal 5 cm. 7. *T. macroptera*  
– Leaves glabrous or hairy, always clearly petiolate, base not decurrent; spikes glabrous or hairy, bisexual flowers in basal 1–3 cm. 11
  11. Leaves up to 14.5 x 10.5 cm (usually less than 10 x 7 cm); spikes 5–12(–14) cm long; fruit 2.5–6 cm long, less than twice as long as wide. 8. *T. brownii*  
– Leaves 10–28 x 5.5–15.5 cm; spikes 12–15 cm long; fruit 6.5–10.5 cm long, 2–3.5 times as long as wide. 9. *T. laxiflora*
  12. Mature leaves glabrous, 3 or more times as long as wide; filaments 2–4 mm long; fruit 2.5–4.2 cm long. 10. *T. schimperiana*  
– Mature leaves hairy, usually less than 3 times as long as wide; filaments 4–7 mm long; fruit 4–10.5 cm long. 13
  13. Reticulation raised above; spikes 12–15 cm long; pedicels of male flowers 3–6 mm; fruit 6.5–10.5 cm long. 9. *T. laxiflora*  
– Reticulation not raised above; spikes 3–11 cm long; pedicels of male flowers 1–2(–3) mm; fruit 4–7 cm long. 14
  14. Branchlets becoming corky in second year; 15–20 m tall tree with large rounded crown; leaves very dark green and glossy, with whitish indumentum. 11. *T. sp.* = Friis et al. 3443  
– Branchlets remaining fibrous; tree to 8 m, usually with a rather irregular crown; leaves dull green or olive-green, usually with rufous indumentum. 10. *T. schimperiana*
1. *T. orbicularis* Engl. & Diels (1900).  
*T. ruspolii* Engl. & Diels (1900) – type: *Ruspoli* & Riva 912(332) (FT holo., K photo).  
*T. orbicularis* var. *macrocarpa* Engl. & Diels *Monogr. Afr. Pfl.-Fam.* 4: 26 (1900) – type: *Robecchi-Bricchetti* 232 (FT holo., K photo).

Shrub or tree to 7 m, crown large spreading, branched from

near base; bark dark grey, smooth, exfoliating in irregular patches leaving a pale yellowish underbark; long shoots zigzag; lateral branches glabrous to finely sericeous, ending in spur shoots. Leaves glabrous; petiole 1–2 cm; blade broadly elliptic to suborbicular, up to 6 x 5 cm; apex rounded to retuse; base cuneate to truncate, often oblique. Spikes appearing before the leaves, 1–3 cm long, sericeous to tomentose. Lower receptacle lanate; upper red, sericeous at base. Sepals red outside, cream inside, reflexed when mature, glabrous. Fruit 5–8.5 x 4.5–8.5 cm, suborbicular to orbicular, red, finely puberulous; wings developed beyond apical peg and beyond insertion of stipe, projections often overlapping. Fig. 75.5.6.

*Acacia - Commiphora*, *Acacia - Commiphora - Delonix* and *Acacia - Commiphora - Terminalia* woodland and bushland on red to grey sandy to loamy soil, often in places with impeded drainage; 400–1500 m. SD BA HA; Somalia, NE & E Kenya. Friis et al. 2885, 3010; Hemming 1550.

#### 2. *T. brevipes* Pampan. (1915).

Shrub or tree to 10 m; long shoots straight; lateral branches ending in spines, usually also with lateral spines, with short lateral spur shoots, soon fibrous, puberulous to tomentellous. Leaves densely sericeous; petiole 2–7 mm; blade elliptic or narrowly to broadly obovate, up to 4.5 x 3 cm; apex broadly rounded to retuse; base attenuate to cuneate. Spikes appearing with the leaves, 3–8 cm long, glabrous to pilose. Flowers white to yellow, glabrous, heavily scented. Fruit 1.3–2 x 1.2–1.6 cm, broadly oblong to suborbicular, yellowish brown, glabrous. Fig. 75.5.1–4.

Flood plains, *Acacia* woodland on alluvial, sandy to silty often salty soil, usually in places liable to seasonal flooding; 250–450 m. AF GG SD BA HA; E Kenya, S Somalia, N Tanzania. Ash 1151; Gilbert et al. 8146; Hemming 1230.

#### 3. *T. spinosa* Engl. (1895).

*T. bispinosa* Schweinf. & Volkens (1897) – type: Burka, Ghika-Comanesti s.n. (not seen).

*T. robecchii* Chiov. (1917) – type: Robecchi-Bricchetti 345 (FT holo., K photo).

Tree to 10(–15) m, usually flat-topped with conspicuously layered horizontal branches; bark dark grey, longitudinally fissured; long shoots zigzag; lateral branches also zigzag, ending in spur shoots and with lateral spurs, fibrous, puberulous to pubescent (rarely tomentellous); spines 1–3 at base of spurs. Leaves glabrous to pubescent or pilose, densest along veins; petiole 1–5 mm; blade obovate or broadly so, up to 3.5 x 2.3 cm; apex rounded to retuse; base cuneate. Spikes appearing with the leaves, 2–4.5 cm long, pubescent. Flowers white, sweetly scented, glabrous. Fruit 1.5–3 x 1–2 cm, elliptic to oblong, yellowish brown to reddish purple, glabrous. Fig. 75.5.5.

*Acacia - Commiphora* bushland on grey alkaline sandy soil, *Acacia - Terminalia* wooded grassland on volcanic hills, alkaline flood plains; 500–1000 m. KF GG HA; SE Sudan, NE Uganda, S Somalia, N & E Kenya, E Tanzania. Burger 2295, 2303; Gilbert 4153.

The differences between *T. spinosa* and *T. bispinosa* given by Engl. & Diels (who examined the type of *T. bispinosa*) are insignificant when compared with the now available material.

The author considers *T. robecchii* to be no more than a juvenile rather hairy form of *T. spinosa*. The copious material collected by Corradi in S Gamo Gofa shows very hairy juvenile and glabrous adult plants from the same localities, and similar recent collections have also been seen from Somalia.

#### 4. *T. prunioides* Laws. (1871).

*T. somalensis* Engl. & Diels (1900) – type: Robecchi-Bricchetti 366 (FT holo., K photo).

Tree to 8 m with short horizontal branches; bark dark grey, longitudinally fissured; long shoots straight; lateral branches ending in spur shoots, not with lateral spurs, soon fibrous, sericeous to tomentose; spines occasionally present, scattered on long shoots. Leaves pubescent beneath, above subglabrous or with scattered long straight hairs; petiole 0.5–1.5 cm; blade elliptic to obovate or broadly so, up to 5 x 3.5 cm; apex subacute to emarginate; base attenuate to cuneate; secondary veins not raised beneath, reticulation impressed above. Spikes appearing with the leaves, 3–6(–8) cm long, pubescent to pilose. Flowers white or cream, glabrous to sparsely pilose (or pilose on lower receptacle). Fruit (1.5–)2–4 x 1–2.5 cm, elliptic to oblong, yellowish to purplish, glabrous or with scattered appressed long hairs. Fig. 75.6.1–2

*Acacia - Commiphora* bushland on coarse grey granitic sand or on rocky limestone slopes; 800–1000 m. SD BA HA; S Somalia, E Kenya, NE Tanzania, Mozambique, Zambia, Zimbabwe, Botswana, Angola, Namibia, Transvaal. Friis et al. 2884; Gilbert et al. 8293; Mooney 9908.

Some of the Ethiopian collections have more hairy flowers and smaller more hairy fruits than typical material from further south in Africa, but the very sparse material does not really allow any judgment as to whether a distinct taxon could possibly be involved. Matching collections have been made in N Kenya.

#### 5. *T. polycarpa* Engl. & Diels (1900)

– types: Ruspoli & Riva 1189(281) (FT syn., K photo), 1620(838) (FT lecto., K photo, selected by Griffiths (1959)).

*T. kelleri* Engl. & Diels (1900) – types: Keller 222, 225 (both Z syn., K photo).

Tree to 8 m, branched near base; bark dark grey longitudinally fissured; long shoots zigzag; lateral branches ending in spur shoots and with occasional lateral spurs, soon fibrous, sericeous; spines absent. Leaves sericeous on both sides or sparsely so, hairs crisped; petiole 0.5–2 cm; blade obovate or broadly so, up to 5.5 x 3.5 cm; apex rounded to broadly emarginate; base attenuate to cuneate; secondary veins raised beneath, reticulation impressed above. Spikes appearing with the leaves, 3.5–11 cm long, tomentose. Flowers white or cream, sweetly scented, lower receptacle tomentose, upper pubescent. Fruit 1.5–3 x 1–1.5 cm, oblong to elliptic, yellowish to purplish, uniformly crisped puberulous to densely so. Fig. 75.6.3–5.

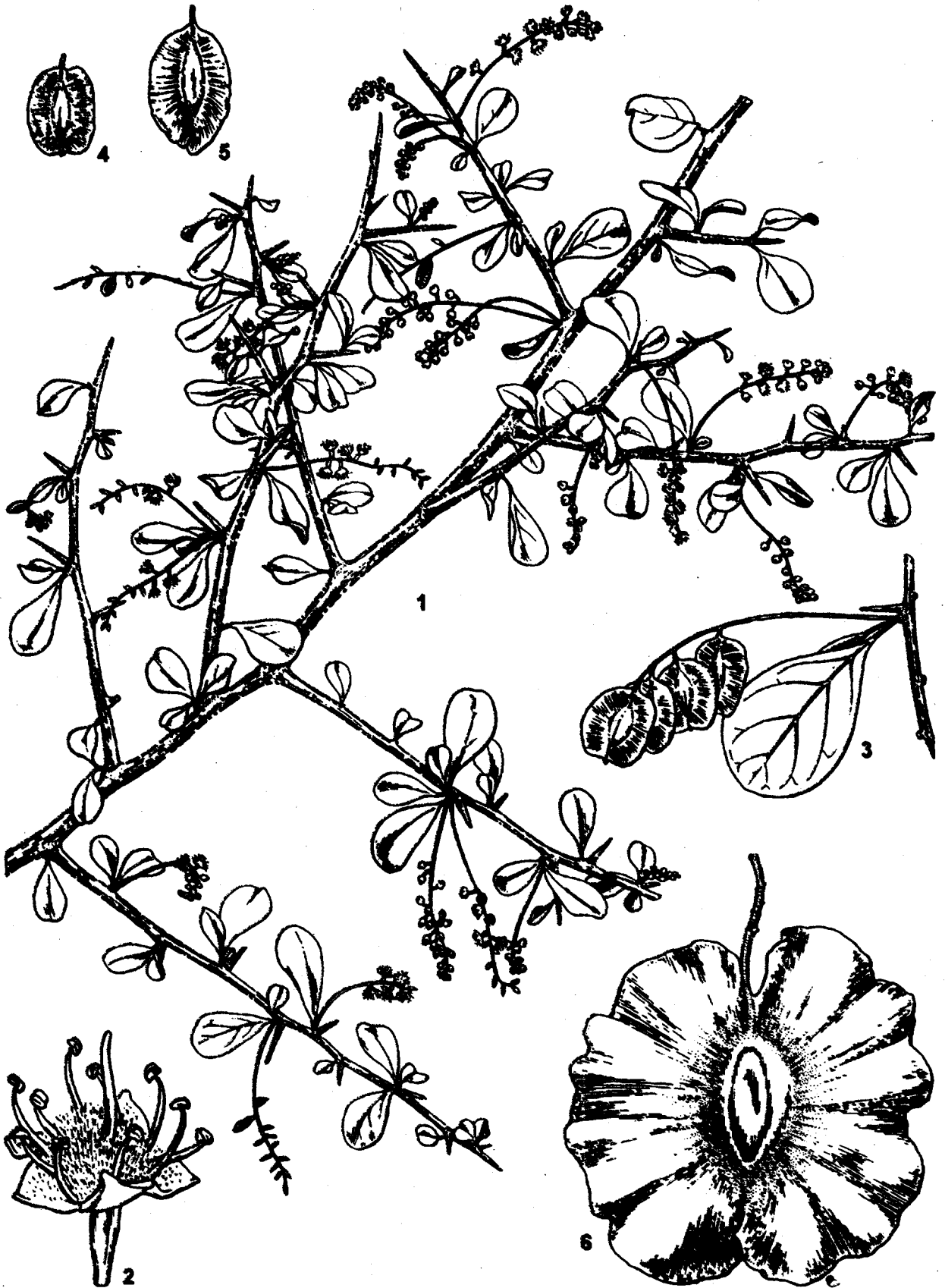


Figure 75.5 *TERMINALIA BREVIPES*: 1 - flowering branch  $\times \frac{1}{2}$ ; 2 - flower  $\times 6$ ; 3 - fruiting branch  $\times \frac{1}{2}$ ; 4 - fruit  $\times \frac{1}{2}$ . *T. SPINOSA*: 5 - fruit  $\times \frac{1}{2}$ . *T. ORBICULARIS*: 6 - fruit  $\times \frac{1}{2}$ . 1 from Ash 1151; 2 from Carr 741; 3 & 4 from Greenway 8863; 5 from Myers 13465; 6 from Henning 1550. Drawn by Eleanor Catherine.

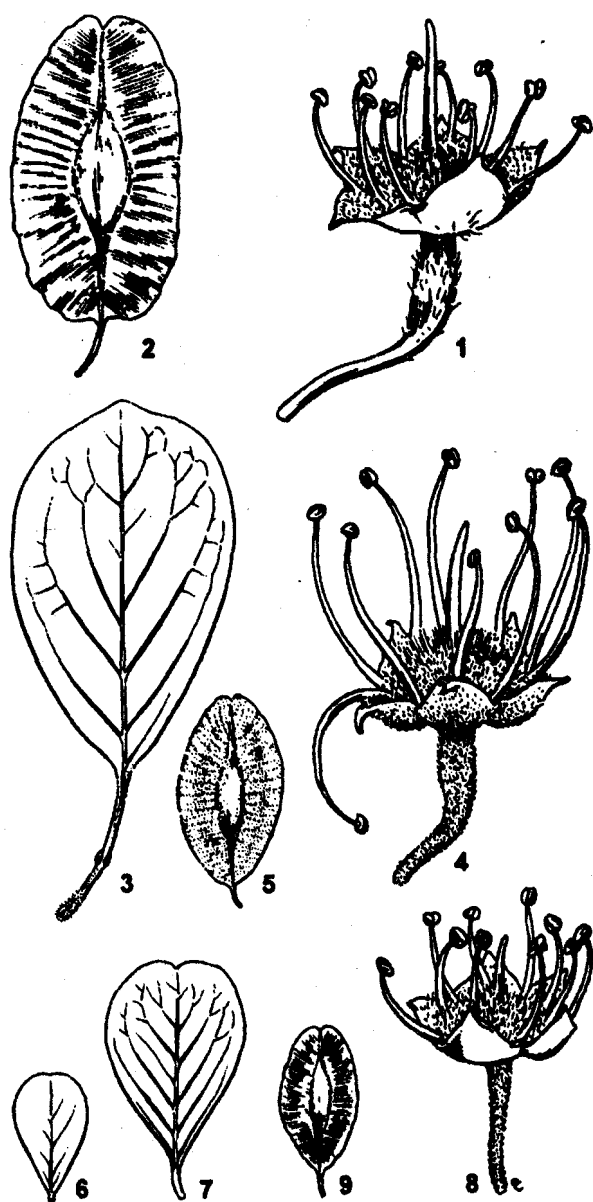


Figure 75.6 *TERMINALIA* spp. *T. PRUNOIDES*: 1 - flower x 6; 2 - fruit x 1. *T. POLYCARPA*: 3 - leaf x 1; 4 - flower x 6; 5 - fruit x 1. *T. BASILEI*: 6 & 7 - leaves x 1; 8 - flower x 6; 9 - fruit x 1. 1 from Peck 353; 2 from Kasmi 627; 3 from Gilbert et al. 8188; 4 from Rippstein 1214; 5 from Glover & Gilliland 1191; 6 & 9 from Gilbert 2098; 7 & 8 from Ellis 382. Drawn by Eleanor Catherine.

Open *Acacia - Commiphora* bushland on sandy soil or rocky slopes; 300-1400 m. SD BA HA; NE Kenya, Somalia. Burger 2953, 3083; Gilbert et al. 8188.

#### 6. *T. basilei* Chiov. (1929)

- type: Basile 336 (TO holo., K photo).

Tree to 10(-15) m, with rather irregular flat-topped crown; bark grey, smooth; long shoots zigzag or arching; lateral branches ending in spur shoots and with lateral spurs, becoming slightly fibrous or not, sericeous or sparsely so; spines absent. Leaves glossy, greyish beneath, subglabrous to sericeous beneath, sparser above; petiole 1-5 mm; blade elliptic to obovate or broadly so, up to 3.5 x 2.5 cm (usually less than 2 x 1.2 cm); apex rounded to broadly emarginate; base attenuate to cuneate; secondary veins not raised

beneath, reticulation raised above. Spikes appearing with the leaves, 1-4(-5) cm long, pubescent to tomentose. Flowers white, strongly scented; lower receptacle tomentose, upper sparsely pilose near base, otherwise glabrous. Fruit 1.7-2.5 x 0.8-1.3 cm, oblong to elliptic, yellowish to reddish purple, sparsely sericeous. Fig. 75.6.6-9.

*Acacia - Commiphora* woodland and bushland on red sandy soil, often in places with impeded drainage, often a dominant; 400-800 m. HA; Somalia. Ellis 382; Gilbert 2098; Hemming 1459.

This is one of the true Ogaden endemics. Quite common in a rather restricted area where it is often reported as the dominant tree. Normally easily recognized by the small shiny leaves with conspicuously raised reticulation above.

#### 7. *T. macroptera* Guill. & Perr. (1832).

Tree to 12 m; bark dark grey to blackish, longitudinally fissured; branchlets glabrous, in second year developing a thick corky bark. Leaves glabrous; petiole 0-2 cm; blade elliptic to obovate, up to 30 x 15 cm; apex subacute to obtuse; base attenuate, decurrent on petiole; midrib 3-5 mm wide near base; secondary veins and reticulation prominent on both sides. Spikes 10-20 cm long, glabrous, bisexual flowers in basal 5 cm. Flowers white, heavily scented, glabrous; pedicels of males 3-6 mm. Sepals c 3 mm long. Filaments c 5 mm. Fruit 8-11 x 3-4.5 cm (l/w-ratio 2-3), oblong to elliptic, pale to reddish brown or purplish over seed, glabrous. Fig. 75.7.1-2.

*Combretum - Terminalia* wooded grassland with tall grass cover on black cotton soil or on rocky slopes; 1300-1400 m. WG; Gambia to W Ethiopia and N Uganda. Mooney 7778; W. de Wilde et al. 10720.

#### 8. *T. brownii* Fresen. (1837)

- type: Rüppell s.n. (FR holo.).

*T. hemignosta* Steud. ex Del. (1847) - type: Schimper II:879 (BM FT K iso.).

*T. confertifolia* Steud. ex A. Rich. (1848) - type: Schimper II:817 (not seen).

*T. brownii* var. *gallaensis* Engl. ex Diels in Bot. Jahrb. Syst. 39: 513 (1907) - types: Ellenbeck 1214, 1978 (both B destr.).

*T. brownii* var. *stenocarpa* Fiori in Boschi e Piante Legnose dell'Eritrea: 274 (1912) - type: Fiori 291 (FT holo.).

*T. cycloptera* R. Br. in Salt (1814), *nom. nud.*

Tree to 10(-15) m, often branching near base and with a large spreading crown; bark greyish, longitudinally fissured; branchlets glabrous to tomentellous, bark fibrous to slightly fissured in second year. Leaves sericeous-tomentose when young, becoming glabrous to densely puberulous; petiole 0.7-3.5(-4) cm; blade elliptic to obovate or broadly so, up to 14.5 x 10.5 cm (usually less than 10 x 7 cm); apex acute to obtuse (rarely subacuminate); base attenuate to truncate; median vein c 1 mm wide near base; secondary veins slightly raised below, reticulation impressed above. Spikes 5-12(-14) cm long, sparsely puberulous to tomentellous; bisexual flowers in basal 2-4 cm. Flowers white or cream, strongly scented, glabrous out-



side; pedicels of males 1–4 mm. Sepals 2–3 mm long. Filaments 2–5 mm. Fruit 2.5–6 x 1.7–3.5 cm (l/w-ratio less than 2), ellipsoid or broadly so, reddish purple to crimson, glabrous. Fig. 75.7.5–6.

*Acacia*, *Acacia* – *Commiphora*, *Acacia* – *Combretum*, *Combretum* – *Terminalia*, *Terminalia* and *Anogeissus* woodland, wooded grassland and bushland on a wide variety of soils but usually in rocky places, relic tree in cultivated areas, river banks, dry riverine forest, often a dominant element; 300–2000 m. EE EW TU & GD (Tazze Valley) WU SU (Awash Valley) AR GG SD BA HA; Nigeria, SE Sudan, Somalia, Uganda, Kenya, NE Tanzania, NE Zaire. *Burger* 678; *Mooney* 8020; *Thulin* 1308.

9. *T. laxiflora* Engl. & Diels (1900).

*T. schweinfurthii* Engl. & Diels (1900) – types (p.p.): *Schweinfurth* 2120 (BM K isosyn.), 2121 (not seen), *Steudner* 195, 205 (both K isosyn.).

Tree to 15 m with a large spreading crown; bark dark to blackish grey, reticulately fissured; branchlets glabrous and glaucous to tomentellous. Leaves glabrous and glaucous to crisped rufous pubescent beneath, glabrous above or with hairy midrib; petiole 1.5–4(–5.5) cm; blade elliptic to obovate or broadly so, 10–28 x 5.5–15.5 cm; apex subacuminate to obtuse; base cuneate to truncate; midrib 2–4 mm wide near base; reticulation raised above and pustulate (resembling strings of tiny beads) beneath with raised secondary veins and reticulation. Spikes 12–15 cm long, glabrous to tomentose; bisexual flowers in basal 1–2 cm. Flowers white, glabrous or with scattered long hairs; pedicels of males 3–6 mm; calyx 3–4 mm long. Filaments 5–7 mm. Fruit 6.5–10.5 x 2.2–4 cm (l/w-ratio 2:3.5), oblong to elliptic, yellowish to purplish, glabrous (rarely finely puberulous). Fig. 75.7.3–4.

*Combretum* – *Terminalia*, *Anogeissus* – *Pterocarpus* woodland and wooded grassland on grey sandy or alluvial soils or on rocky slopes; 450–1500 m. GD GJ IL; W Africa to W Ethiopia, NE Zaire, N Uganda. *Chaffey* 972; *Friis* et al. 2512; *Kuls* 237.

Some of the Ethiopian collections (e.g. *Friis* et al. 2512 and to a lesser degree *Chaffey* 972) are somewhat intermediate with *T. mollis* Laws. They have rather densely hairy leaves with raised reticulation beneath and large puberulous fruits. Typical *T. mollis* has brownish tomentose leaves with impressed reticulation above and smaller densely hairy flowers. None of these characters are shown by any of the Ethiopian collections. *T. mollis* occurs in S Sudan and N Uganda and could well turn up in SW Ethiopia.

10. *T. schimperiana* Hochst. (1844)

– type: *Schimper* III.1638 (FT K iso.).

*T. glaucescens* Planch. ex Benth. (1849).

*T. salicifolia* Schweinf. (1868) – type: *Schweinfurth* 2127 (BM K iso.).

*T. avicennioides* sensu Cufod. (1959), quoad distrib. Aethiop., non Guill. & Perr. (1832).

Tree to 10 m; bark dark to blackish grey, fissured; branchlets glabrous to rufous (rarely whitish) tomentellous, remaining fibrous in second year. Leaves dull green

or olive green, rufous (rarely whitish) tomentose when young, becoming pubescent to densely so (rarely glabrous even when young); petiole 1–5.5 cm; blade elliptic to obovate, (6–)10–28 x (1.5–)4–10(–11.5) cm; apex acuminate to acute (rarely rounded); base attenuate to rounded; midrib c 1(–2) mm wide near base; tertiary veins raised or not above, reticulation impressed, beneath with conspicuous but not raised veins and reticulation. Spikes 3–13 cm long, tomentose; bisexual flowers in basal 1–2 cm. Flowers white or cream, heavily scented, pubescent to tomentose (calyx often glabrous on lobes); pedicels of male 1–2(–3) mm; calyx 2–3 mm long. Filaments (2–)4–5 mm. Fruit (2.5–)4–7 x 1.5–3.5 cm (l/w-ratio 2–3), oblong to elliptic or narrowly so, yellowish to yellowish brown, densely puberulous. Fig. 75.8.

*Combretum* – *Terminalia* – *Stereospermum* – *Piliostigma* woodland and wooded grassland, on rocky slopes, black clay or sandy soil, often a dominant element, often persisting in cultivated areas; (1000–)1300–2200 m. TU GD GJ SU WG IL KF GG SD BA; W Africa to Ethiopia, E Zaire, Uganda, NW Tanzania. *Ash* 2397; *Friis* et al. 2298; *Gilbert* 3222.

Mostly an easily recognized species with its rusty indumentum, and densely hairy flowers and fruits. But some collections (e.g. *Ash* 2397 and *Thulin* et al. 4075) show a bewildering mixture of characters. For example glabrous and tomentose branchlets and/or glabrous and hairy leaves on the same branch. This would seem to suggest some introgression, possibly with *T. laxiflora* in the case of *Thulin* et al. 4075. But *Ash* 2397 is from an area (Gibe Gorge) where no other species of *Terminalia* occur.

The type of *T. salicifolia* has small narrow glabrous leaves, small flowers and small fruits and was at first thought to be a distinct species. But recent collections from the Abay Gorge links it with *T. schimperiana*.

11. *T. sp.* = *Friis* et al. 3443.

Tree, 15–20 m tall, with a large rounded crown; bark greyish, reticulately fissured; branchlets whitish tomentellous, becoming corky in second year. Leaves dark green, glossy, whitish pubescent or densely so when young; petiole 1–4 cm; blade elliptic to slightly obovate, 9–31 x 3.5–10 cm; apex acuminate to acute; base cuneate; midrib c 1.5 mm wide near base; tertiary veins (but not reticulation) slightly raised above, secondary veins slightly raised beneath, reticulation conspicuous but not raised. Spikes densely pubescent; bisexual flowers in basal 1–2 cm. Flowers not known. Fruit 4.5–6.5 x 2–3 cm (l/w-ratio 1.7–2.5), oblong to elliptic, yellowish brown, puberulous.

*Combretum* – *Terminalia* wooded grassland on brown loam; 1350–1500 m. BA; not known elsewhere. *Friis* et al. 3443.

Only known from this collection. Grows together with *T. schimperiana* and is immediately recognized by its huge size and very dark green glossy leaves. It also differs in developing a corky bark on the branches in the second year, in its finer whitish indumentum and its relatively broader fruit.

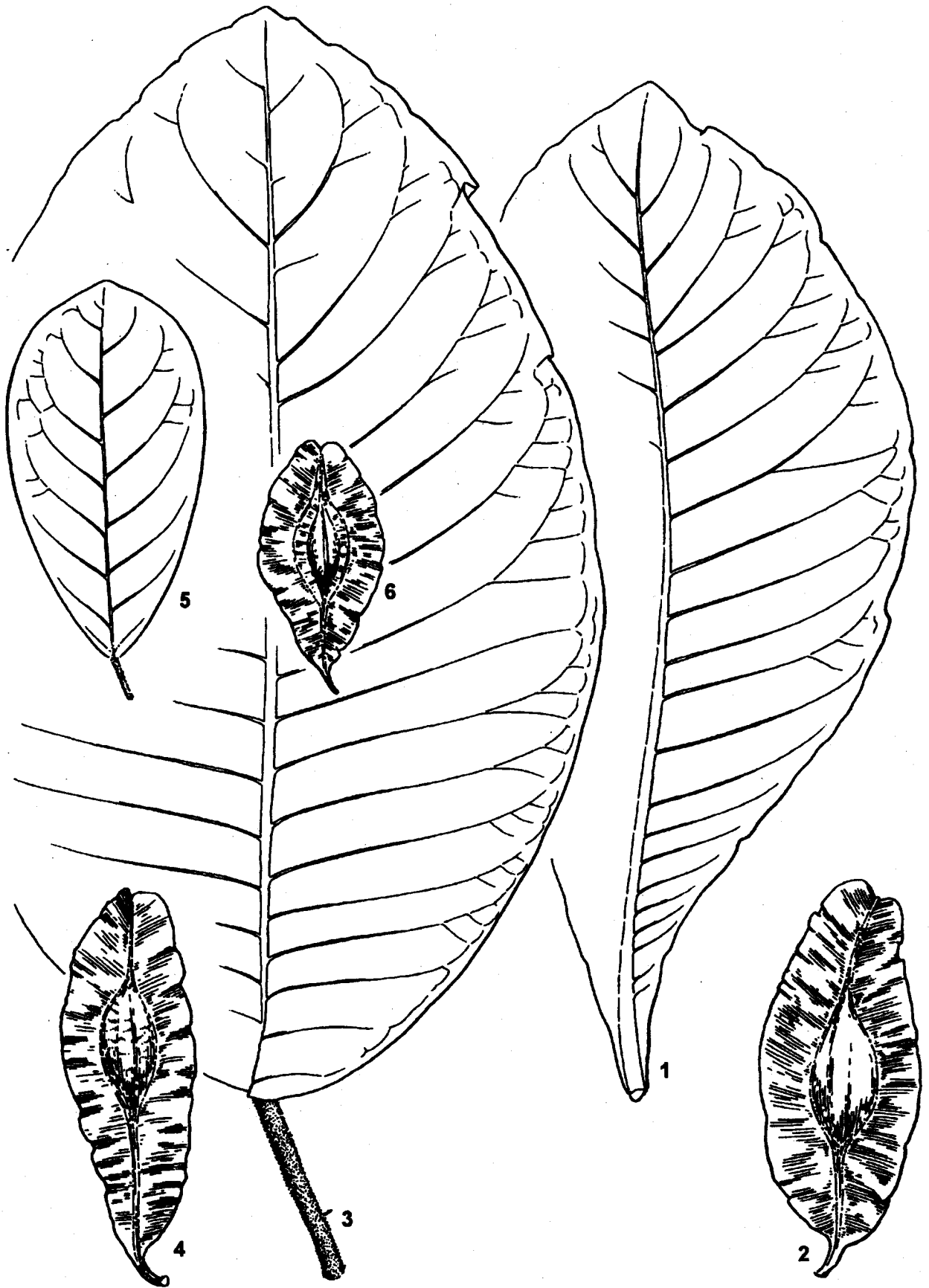


Figure 75.7 *TERMINALIA MACROPTERA*: 1 – leaf  $\times \frac{2}{3}$ ; 2 – fruit  $\times 1$ . *T. LAXIFLORA*: 3 – leaf  $\times \frac{2}{3}$ ; 4 – fruit  $\times 1$ . *T. BROWNII*: 5 – leaf  $\times \frac{2}{3}$ ; 6 – fruit  $\times 1$ . 1 & 2 from Eggerling 1339; 3 & 4 from Friis et al. 2512; 5 from Mooney 8078; 6 from I.E.C.A. B-53. Drawn by Eleanor Catherine.

12. *T. catappa* L. (1753).

Large tree with big spreading flat-topped crown. Leaves up to 30 x 20 cm, obovate, obtuse with subcordate base, turning red before falling; petiole up to 1 cm. Fruit c 6 x 4 cm, ellipsoid, with lateral ridges but not winged, fleshy and edible, reddish when ripe.

Native of tropical Asia, widely planted in all lowland tropical areas as a shade tree and for its edible fruit. In the Flora area known from Mitsiwa. *Sue Edwards* 3726.

*Imperfectly known species.*

*T. hararensis* Engl. ex Diels (1907)

– type: *Ellenbeck* 1191 (B destr.).

Shrub or small tree to 4 m; branches thick, divaricate; branchlets 1.5–3 cm long, with leaves and inflorescences clustered at end. Leaves sericeous beneath, glabrous above; petiole 3–6 mm; blade obovate, c 3 x 1.5–1.8 cm; apex obtuse or emarginate; base attenuate, reticulation impressed above, slightly raised beneath. Spikes 4–5 cm long. Fruit c 3 x 2 cm, ellipsoid, purple, with rounded or slightly decurrent base.

Dense bushland on reddish to yellow loamy soil. BA-HA; only known from the type collection.

According to the author this species is closest to *T. somalensis* (which is here considered a synonym of *T. polycarpa*) from which it is said to differ in smaller leaves which are glabrous above and with impressed reticulation and in the smaller fruit. Probably a synonym of *T. polycarpa* or *T. prunoides*.

*T. hecistocarpa* Engl. ex Diels (1907)

– type: *Ellenbeck* 1982 (B destr.).

Tree, 4–5 m tall; branches subflexuose; branchlets 0.7–1.5 cm long, with leaves and inflorescences clustered at end. Leaves sericeous-tomentellous, paler beneath; petiole 5–10 mm; blade broadly elliptic to broadly obovate, 2.5–3.5 x 2–2.8 cm; apex obtuse to emarginate; base rounded; reticulation prominent beneath, impressed above. Spikes 4–5 cm long, pubescent. Fruit 1–1.4 x c 1 cm (? immature), ellipsoid, minutely pubescent; base truncate.

Bushland. BA; only known from the type collection.

According to the author close to *T. polycarpa* from which it differs in denser leaf-indumentum and smaller fruit. Probably a synonym of *T. polycarpa*.

## 4. ANOGEISSUS (A. DC.) Guill. &amp; Perr. (1832)

A. J. Scott in *Kew Bull.* 33: 555–566 (1979).

Trees or shrubs; indumentum of simple hairs. Leaves alternate or opposite, not crowded towards end of branches, entire. Flowers bisexual, in dense globose heads on short axillary and terminal peduncles. Upper part of lower receptacle forming a stalk-like tube above ovary; upper receptacle cup-like, terminating in 5 triangular sepals. Petals

absent. Stamens 10, exerted. Fruits in dense cone-like heads, 2-winged or 4-ribbed, the persistent stalk-like lower receptacle forming a beak.

Genus with 8 species: 5 in tropical Asia from India to Vietnam, 2 in Arabia, and 1 in Africa.

*A. leiocarpa* (A. DC.) Guill. & Perr. (1832).

*A. leiocarpa* forma *grandifolia* Engl. & Diels in *Monogr. Afr. Pfl.-Fam.* 4: 31 (1900) – type: *Schimper* II:1247 (BM K iso.).

*A. leiocarpa* forma *parvifolia* Engl. & Diels, *l.c.*: 31 (1900) – type: *Schimper* II:816 (K iso.).

*A. schimperi* Hochst. ex Hutch. & Dalz. (1927).

Tree to 15 m, when well-developed with a straight slightly fluted bole and open crown with gracefully drooping branches; bark mottled light and dark brown, flaking off in rectangular patches; branchlets finely sericeous or densely so. Leaves alternate to subopposite, whitish tomentose when young, puberulous to pubescent when mature; petiole 2–5 mm; blade ovate to elliptic or narrowly so, largest 4–10 x 1.5–4 cm; apex acute to subacuminate and apiculate; base cuneate to rounded. Heads solitary, axillary; peduncle 5–20 mm, densely puberulous to tomentellous, with 1–2 pairs of caducous or leafy bracts. Flowers pale or greenish yellow, heavily scented; lower receptacle puberulous or glabrous towards apex, upper glabrous or hairy near base. Fruit 6–10 x 7–11 mm, orbicular, yellowish to reddish brown, puberulous near apex, with 2 entire to jagged wings. Fig. 75.9.1–4.

*Combretum* – *Terminalia* and *Anogeissus* – *Pterocarpus* woodland, wooded grassland and bushland, *Acacia* – *Lannea* bushland, often a dominant element, riverbanks; 450–1900 m. EE EW TU GD GJ SU (Abay Gorge) WG IL; from Senegal to Ethiopia and Eritrea. *Friis* et al. 3818, *Getachew Aweke & Gilbert* 920, *Thomerson* 604.

## 5. CONOCARPUS L. (1753)

*C. lancifolius* Engl. & Diels (1900).

Tree to 10 m. Leaves lanceolate or narrowly ovate, up to 10 x 2 cm, thick and leathery, glabrous apart from tiny stalked glands. Flowers bisexual, cream, very sweetly scented, densely puberulous, in dense heads aggregated into large terminal leafless tomentellous panicles. Sepals 5. Petals absent. Stamens 5, exerted. Fruits in dense cone-like heads, c 2 x 2 mm, with two thick wings, without apical beak. Fig. 75.9.5–8.

Native of NE Somalia, occasionally cultivated as a street tree and for land reclaiming. In the Flora area a common street tree in Mitsiwa. *Mesfin Tadesse* 3927, 3933.

This species is indigenous to the wadis of NE Somalia. Here it grows to a huge tree of 30 m tall and 3 m dbh and is used for building boats. It could possibly occur also as a native in Eritrea or E Ethiopia.

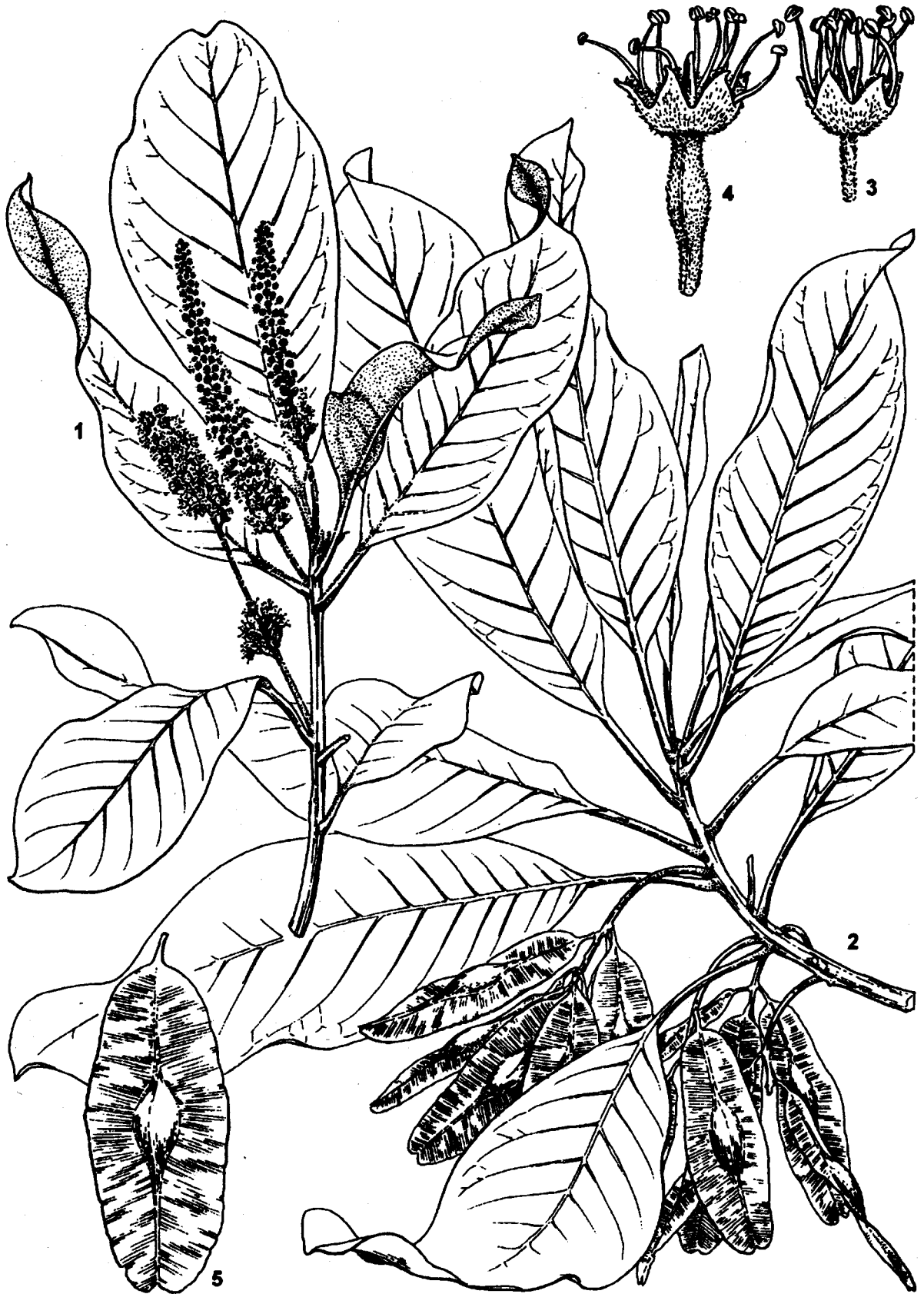


Figure 75.8 *TERMINALIA SCHIMPERIANA*: 1 – flowering branch  $\times \frac{1}{2}$ ; 2 – fruiting branch  $\times \frac{1}{2}$ ; 3 – male flower  $\times 4$ ; 4 – bisexual flower  $\times 4$ ; 5 – fruit  $\times 1$ . 1, 3 & 4 from *Ash* 2397; 2 & 5 from *Myers* 11518. Drawn by Eleanor Catherine.



Figure 75.9 *ANOGEISSUS LEOICARPA*: 1 – flowering branch  $\times \frac{2}{3}$ ; 2 – flower  $\times 6$ ; 3 – inflorescence  $\times 1$ ; 4 – fruit  $\times 4$ . *CONOCARPUS LANCIFOLIUS*: 5 – flowering branch  $\times \frac{2}{3}$ ; 6 – flower  $\times 6$ ; 7 – inflorescence  $\times 2$ ; 8 – fruit  $\times 8$ . 1 from Wickens 5031; 2 from Getachew & Gilbert 920; 3 & 4 from Friis et al. 3818; 5 & 6 from Friis et al. 4557; 7 & 8 from McKinnon S/205. Drawn by Eleanor Catherine.

## 76. RHIZOPHORACEAE

by I. Friis\*

Lewis, *Rhizophoraceae* in *Fl. Trop. E. Afr.*: 20 pp. (1956); Cufodontis, *Enum.*: 613 (1959); Arena and Orsino, 24. *Rhizophoraceae* in *Adumbratio Florae Aethiopiae, Webbia* 28: 135–159 (1973).

Shrubs or trees. Leaves simple, opposite, usually evergreen; stipules interpetiolar, falling quickly or absent. Inflorescences dichotomous cymes, racemes or spikes, or flowers solitary. Flowers usually bisexual, regular, perigynous or epigynous; calyx united, 4–15-partite, valvate, persistent; petals the same number as the sepals, distinct, often clawed, sometimes fleshy. Stamens inserted on the corolla tube, 2–4 times as many as the calyx lobes, usually in one whorl, sometimes in pairs; filaments short or long; anthers with 4 thecae and dehiscing longitudinally, or with numerous thecae dehiscing irregularly in *Rhizophora*. Ovary superior to inferior, (1–)2–4(–5)-locular, placentas axillary, each with 2 ovules; style simple, stigma  $\pm$  divided. Fruit a berry (rarely dehiscent), rarely a drupe or a dehiscent capsule, often viviparous; embryo often with long hypocotyl and green cotyledons.

Family with 16 genera, mainly distributed in the old world tropics. A family mainly of mangrove species on muddy sea shores, but the genera *Cassipourea* and *Anisophyllea* (latter not in Flora area) include only inland species. 2 genera each represented by a single species in the Flora area.

## Key to Genera

1. Plants viviparous, hypocotyls growing from fruits while on tree; flowers in pedunculate cymes; plants of mangrove vegetation. 1. *Rhizophora*
- Plants not viviparous, seeds germinating only after dispersal; flowers single or a few together in the leaf axils; plants of upland forest. 2. *Cassipourea*

Mangroves at sea level. EE; widespread along the

## 1. RHIZOPHORA L. (1753)

Trees or shrubs of muddy shores or estuaries, with stout opposite branches and aerial roots acting as prop-roots from the upper nodes of the main stems. Leaves evergreen, opposite, petiolate, entire, leathery and glabrous. Inflorescences cymose; bracteoles prominent, paired and persistent. Flowers with corolla tube partly joined to ovary; calyx 4–5-partite, persistent, becoming reflexed in fruit; petals the same number as the calyx lobes; stamens 8–12 in a single whorl; anthers subsessile, 3-angled, with numerous pollen sacs within a membranous epidermis. Ovary inferior, 2-locular. Fruit a leathery indehiscent berry. Seeds solitary, viviparous. Hypocotyl rounded, elongated, swollen above the radicle; embryo falling by separation from the cotyledons which remain in the fruit on the tree.

About 6 species; widespread on muddy tropical shores in both the old and new world.

*R. mucronata* Lam. (1797)

– type: 'from Mauritius'.

*R. candelaria* auct., non DC.: A. Rich., *Tent. Fl. Abyss.* 1: 271 (1847).

Glabrous tree up to 10 m (or more) tall; bark reddish brown. Leaves dark green with paler dots beneath; petiole 2–4 cm long; lamina 8–15 x 4–9 cm, apex mucronate. Inflorescence up to 10 cm (or more) long, with 8–12 flowers; bracts leathery, persisting, c 2 mm long. Flowers c 1 cm long, calyx lobes 4, ovate, petals fleshy, hairy; stamens 8. Hypocotyl up to 50 cm (or more) long while on tree.



Figure 76.1 *RHIZOPHORA MUCRONATA*: 1 – flowering branch with lower leaves removed x  $\frac{2}{5}$ ; 2 – longitudinal section through flower x  $\frac{1}{5}$ ; 3 – petal x  $\frac{2}{5}$ ; 4 – fruit and greatly extended hypocotyl x  $\frac{2}{5}$ . 1 from Schlieben 2628; 2 & 3 from Elliot 263; 4 from Greenway 4861. Drawn by E. Margaret Stones. (Reproduced with permission from *Fl. Trop. E. Afr. Rhizophoraceae*: fig. 1.)

\* Botanical Museum, University of Copenhagen, Gothersgade 130, DK-1123 Copenhagen K, Denmark.

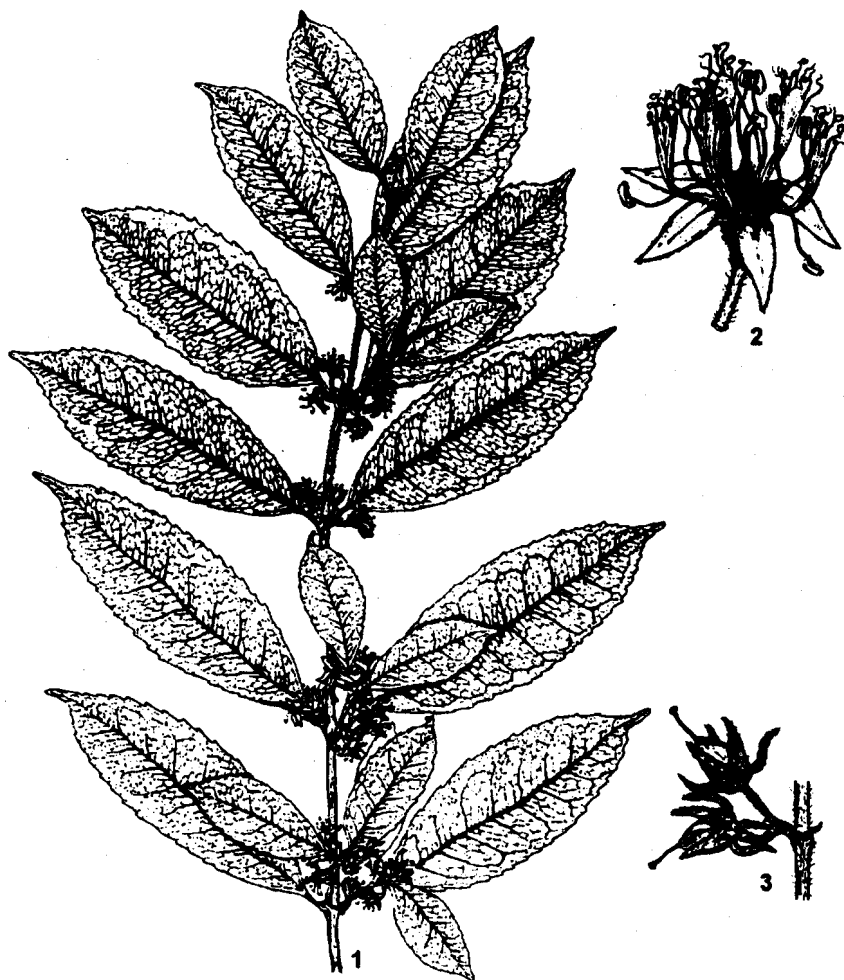


Figure 76.2

**CASSIPOUREA MALOSANA:**

1 – flowering branch x 1/2; 2 – flower x 2; 3 – young fruits x 1. Drawn by Loredana De Floriani. (Reproduced from *Adumbratio Florae Aethiopiae*, 24. **Rhizophoraceae**, *Webbia* 28, 1973: fig. 1.)

shores of the Red Sea and the Indian Ocean, eastwards to Polynesia. *Beccari* 84; *Courbon* 324.

**2. CASSIPOUREA** *Aubl.* (1775)

*Alston in Kew Bull.* 1925: 241 (1925).

Evergreen shrubs or trees without aerial roots. Leaves opposite or rarely whorled, elliptic to obovate or ovate, leathery to membranous, usually with serrate margins. Flowers single to numerous in the leaf axils; pedicels articulate. Flowers with short perianth tube; calyx 4–7-lobed, valvate; petals inflexed in bud, ± lacinate. Stamens 8–45, variously inserted in relation to the disc. Ovary superior to semi-inferior, with 2–4 locules; style single, persistent. Fruit a dehiscent capsule; seeds 2–4, arillate, with leathery testa.

About 50 species in the tropics of the Old World, mainly in inland forests, sometimes riverine, and occasionally on sandy sea shores.

**C. malosana** (*Baker*) *Alston* (1925)

*Weihea malosana* *Baker* (1897) – type: ‘from Malawi’.

*W. abyssinica* *Engl.* (1917); *Cassipourea abyssinica* (*Engl.*) *Alston* (1925) – type: EE/EW, Cohaito, *Schweinfurth* 595 (B holo. destroyed; photo at BM).

*W. avettae* *Chiov.* (1911); *Cassipourea avettae* (*Chiov.*) *Alston* (1925) – type: SU, Entoto, *Negri* 262 (FT holo.).

*W. salvago-raggei* *Chiov.* (1911); *Cassipourea salvago-raggei* (*Chiov.*) *Alston* (1925) – type: EW, Occule-Cusai (*Akele Guzay*), *Amba Debra*, *Pappi* 2577 (FT holo.).

*W. boranensis* *Chiov.* (1939) – type: SD, Mega, *Cufodontis* 644 (FT holo.).

*Cassipourea ruwenzoriensis* [as *ruvenzorensis*?] *auct. non* (*Engl.*) *Alston* (1925): *Cufod*, *Enum.*: 614 (1959).

Evergreen tree to 30 m (or more) tall; bark grey, smooth. Twigs pubescent to glabrescent. Leaves on petioles 4–8 mm long, with indumentum as on twigs; lamina elliptic to obovate, 5–10 x 3–5 cm, cuneate at base, shortly to long acuminate, rarely rounded at apex, margin ± sharply serrate, glabrous above, pubescent beneath. Flowers 1–5 per leaf-axil, on pedicels 4–6 mm long, articulated above the middle, puberulous; calyx with 4–5(–6) lobes, 3.5–5 mm long, narrowly triangular, pubescent on outside; petals of the same number as calyx lobes, lacinate. Stamens 15–20, arising from the margin of a very small disk. Ovary superior, 3–4 locular, glabrous to apically pubescent, velvety or hairy. Capsule ovoid, 6–8 mm long, shortly pubescent to hairy, rarely glabrescent or glabrous, longer than the persisting style.

Upland rain forest, dry upland forest with *Juniperus* and *Podocarpus*; 1250–3100 m. EW GD SU WG IL KF SD BA HA; E Zaire, Uganda, Kenya, Tanzania, Malawi. *Gillett* 5148; *Friis* et al. 1944; *W. de Wilde* 10342.

Elsewhere the species produces good timber, but seems in the Flora area often to be cut to be used for poles before it gets large enough to produce more valuable timber.

## 77. GUTTIFERAE (CLUSIACEAE)

by N.K.B. Robson\*

Milne-Redhead, *Hypericaceae* in *Fl. Trop. E. Afr.*: 23 pp. (1953); Cufodontis, *Enum.*: 588–591 (1959); Moggi & Pisacchi, *Adumb. Fl. Aeth.* 14. *Hypericaceae*, *Webbia* 22: 233–288 (1967); Bamps, Robson & Verdcourt, *Guttiferae* in *Fl. Trop. E. Afr.*: 35 pp. (1978); Thulin & Moggi, 65. *Clusiaceae (Guttiferae)* in *Fl. Somalia* 1: 258–260 (1993).

Trees, shrubs, herbs or (rarely) woody climbers, often containing resins which make the plant aromatic. Leaves opposite (rarely whorled or alternate), almost always without stipules, simple, with venation flabellate or pinnate, usually with glands or resin canals seen as translucent spots or streaks, margin entire or rarely with a fringe of glands. Flowers regular, bisexual or polygamous to unisexual. Sepals (2–3–)4–5(6), imbricate in bud, free or partly united, persistent or deciduous. Petals (3–)4–5(–6–12), usually the same number as the sepals or sometimes absent or indistinguishable from sepals, free, contorted in bud, sometimes ligulate. Stamens basically of two whorls or fascicles, the outer often sterile or absent, the inner free or with filaments variously united, or rarely each fascicle reduced to a single stamen. Ovary superior, free, syncarpus, usually sessile, 1–5(–12)-locular, with axile to parietal or rarely basal placentation and 1-many ovules on each placenta; styles as many as placentas, free or united, or absent; stigmas free or united. Fruit capsular and dehiscent septicidally (very rarely also loculicidally) or indehiscent and either a berry or a drupe. Seeds sometimes arillate or winged.

About 45 genera and 1050–1100 species, widely distributed in tropical regions, with 2 genera also in the temperate zone. In the Flora area, there are 3 genera and 12 species.

The Guttiferae are treated here in a broad sense, i.e. including both the Hypericaceae (*Hypericum*, *Psorospermum*) and the Clusiaceae (*Garcinia*).

### Key to genera

1. Flowers unisexual; sepals and petals 4 or sepals 3–4 and petals 5–8; styles absent or very short and thick; leaf glands linear, translucent between veins and brownish crossing them. 3. *Garcinia*
- Flowers bisexual; sepals and petals 5; styles present, slender; leaf-glands circular to linear spots or streaks, translucent or blackish, between veins or in areoles. 2
2. Seeds numerous, fruit a capsule (sometimes fleshy); petals glabrous, yellow; leaves sessile or subsessile; trees, shrubs or herbs, glabrous or with a simple indumentum. 1. *Hypericum*
- Seeds 5, fruit a berry; petals internally villous, whitish with blackish streaks; leaves petiolate; shrub with stellate indumentum. 2. *Psorospermum*

### 1. HYPERICUM L. (1753)

Robson in *Bull. Br. Mus. Nat. Hist. (Bot.)* 5: 291–355 (1977); *Ibid.* 8: 55–226 (1981); *Ibid.* 12: 163–325 (1985); *Ibid.* 23(2): 67–70 (1993).

Trees, shrubs or perennial to annual herbs, glabrous or with simple uniseriate hairs, with glandular canals or lacunae containing resin (amber coloured), essential oils (translucent) and often hypericin and pseudo-hypericin (red or black). Stems with 2–4 ribs or round. Leaves opposite or rarely whorled, sessile or subsessile with glands scattered and also forming a marginal or submarginal line. Flowers bisexual, solitary or in terminal dichasial cymes or thyrses. Sepals 5, free or partly united, variously glandular, persistent. Petals 5, yellow, glabrous, the parts outside in bud often

tinged red, persistent or falling off late. Stamen fascicles 5, free or united 2 + 2 + 1 to give 3 fascicles, sometimes rather indefinite, each with numerous stamens, persistent or falling off late; filaments slender, united at the base; anthers almost as wide as long, with a gland terminating the connective. Ovary with (2–)3–5 lobes (sometimes incompletely so) with (2–)3 parietal placentas, each with numerous ovules; styles (2–)3–5, slender, free or united; stigmas small or capitate. Fruit a capsule and dehiscent septicidally or rarely somewhat fleshy and tardily dehiscent, with resin canals in valves sometimes prominent. Seeds numerous, small, cylindrical to ellipsoid, sometimes carinate or winged.

About 400 species, almost worldwide but absent from arctic, subarctic and desert regions, and almost absent from tropical lowlands. The above description applies to the 8 species growing in the Flora area; variation elsewhere is greater.

1. Trees or shrubs; stamen fascicles 5; styles 5, united. 2
- Perennial herbs, sometimes woody at the base; stamen fascicles 3; styles (2–)3, free. 6
2. Leaves crowded with short internodes 2–6 mm long; styles free at apex. 1. *H. revolutum*
- Leaves more spaced out with internodes over 6 mm long; styles united to apex or almost so (except in *H. gnidifolium*). 3
3. Leaves without or with very lax reticulate venation; dry petals not staying with fruit. 4
- Leaves with densely reticulate venation; dry petals staying with fruit. 5
4. Leaves sessile, blade 16–90 mm long; sepals ovate-lanceolate to triangular-lanceolate, 2–5 mm wide. 2. *H. martinianum*

\* Department of Botany, The National History Museum, Cromwell Road, London SW7 5BD, UK.



- Leaves with a short 1–2 mm petiole, blade 10–30 mm long; sepals linear-lanceolate, 1.7–2 mm wide.

3. *H. synstylum*

- 5. Leaves with glands as dots or short streaks; styles wholly or almost wholly united. 4. *H. roeperianum*

- Leaves with translucent glands as lines or streaks; styles about  $\frac{7}{10}$  united. 5. *H. gnidiifolium*

- 6. Stems mostly erect; stems and leaves pubescent, at least a few hairs at the nodes and on the underside of the leaves; bracts and sepals with conspicuous black glands on long or short cilia.

6. *H. annulatum*

- Stems trailing to ascending; stems and leaves glabrous; bracts and leaves without black glands or black glands at margins only. 7

- 7. Stems 4-ribbed; flowers 4–8 mm in diameter; styles (2–)3(–4); fruit a dry capsule, 3.5–6 x 2.5–3 mm; glands only translucent, never black.

7. *H. scioanum*

- Stems 2-ribbed or rounded; flowers 8–13(–20) mm in diameter; styles (4–)5; fruit fleshy, indehiscent, 6–11 x 5–9 mm; glands translucent and black, at least some on the sepals. 8. *H. peplidifolium*

1. *H. revolutum* Vahl (1790)

- type: from Yemen, Forsskål 796 (C lecto.).

*H. leucoptychodes* Steudel ex A. Rich. (1847) - types: GD, near Dschenausa, *Schimper* 834 (P lecto.; FI G K L LE M MO PAL S Z isosyn.) and GD, Mt Bachit, *Schimper* 1117 (P syn.; FI G K LE isosyn.)

*H. lanceolatum* sensu Cufod., *Enum*: 588 (1959) pro parte et auctt. mult.

Shrub or tree up to 12 m tall, bushy or slender, glabrous. Stems soon with 2 ribs, internodes very short, 2–6 mm long. Leaves sessile, (7–)15–45(–60) x 2.5–12 mm, narrowly elliptic to narrowly oblong or oblanceolate, with 3–5 main longitudinal veins interrupted by 3–8 cross-veins; apex acute; blade glands translucent, mostly as lines or streaks, marginal glands translucent or black. Flowers solitary, 35–80 mm in diameter. Sepals 5–18 x 3–9 mm, ovate to subcircular, apex acute to subrounded, margin entire or with prominent black glands on teeth or cilia. Petals persistent, spreading, 15–43 x 5–26 mm, entire or almost so. Stamen fascicles 5, distinct, persistent. Ovary 3.5–9 x 3.5–5.5 mm, ovoid to ovoid-globose; styles 5, about  $\frac{1}{2}$  united. Capsule 5-valved, 9–15 x 7–11 mm, ovoid to subglobose, without resin canals.

Open forest, forest margins and montane savannas and grassland, often with *Erica arborea* and/or *Hagenia abyssinica*; 2250–3650 m. EW TU GD GJ WU SU AR IL KF GG SD BA HA; SW Arabia and eastern Africa from Ethiopia to Cape province, also in Nigeria, Cameroon and Fernando Po. *Greathead* 95; *Mooney* 5087; *W. de Wilde* 8979.

The material from the Flora area belongs to the widespread subsp. *revolutum*; subsp. *keniense* (Schweinf.) N. Robson, with few or no cross-veins in the leaf and longer pedicels and stamens, is confined to the East African mountains.

2. *H. quartinianum* A. Rich. (1847)

- type: SU, *Quartin-Dillon & Petit* s.n. (P holo.; K).

Shrub or tree 0.5–6 m tall, loosely branched, glabrous. Stems soon round, with internodes 10–26 mm long. Leaves sessile or shortly petiolate, (16–)20–90 x 5–27 mm, ovate-lanceolate to oblong-elliptic or oblanceolate, with 5–7(–9) main longitudinal veins, with obscure, lax, reticulate tertiary venation; apex acute to subapiculate-obtuse; blade glands translucent, mostly as lines or streaks, marginal glands black. Flowers (1–)3–9 together, 35–70 mm in diameter. Sepals 5–15 x 2–5 mm, ovate-lanceolate to triangular-lanceolate, apex acute to attenuate, margin with prominent black glands on teeth or cilia. Petals falling off late, spreading to reflexed, (17–)20–41 x 10–25 mm, with black glands on cilia on the inner margin. Stamen fascicles 5, distinct, falling off late. Ovary 5–8 x 3–5 mm, ovoid; styles 5, completely united or almost so. Capsule 5-valved, 9–15 x 7–11 mm, broadly to narrowly ovoid, without resin canals. Fig. 77.1.1–6.

In rocky places, gulleys and river banks in upland grassland or deciduous woodland; 1500–3000 m. TU GD GJ WU SU AR WG KF GG SD BA HA; Yemen and eastern Africa from Ethiopia to Zambia, Malawi and Mozambique. *Mooney* 6785; *Burger* 2455; *Greathead* 92.

3. *H. synstylum* N. Robson (1958)

- type: from Somalia, *Glover & Gilliland* 1168 (K holo.; BM EA iso.).

Shrub 1.5–3 m tall, loosely branched, glabrous. Stems soon rounded, with internodes 6–11 mm long. Leaves with petioles 1–2 mm long, blade 10–30 x 5–12 mm, oblong or elliptic-oblong to ovate, with 7–9 main longitudinal veins, the midrib unbranched, with obscure, lax, reticulate tertiary venation; apex apiculate-obtuse to rounded; blade glands short translucent streaks, marginal glands reddish or translucent. Flowers 1–3 together, 25–33 mm in diameter. Sepals 5–7 x 1.7–2.2 mm, linear-lanceolate, apex acute, margin entire. Petals falling off late, spreading, 12–16 x 6–10 mm, obovate, entire. Stamen fascicles 5, free, persistent. Ovary 5–6.5 x 2–3 mm, narrowly ovoid; styles 5, completely united. Capsule 5-valved, 8–10 x 5–6 mm, narrowly ovoid, without resin canals.

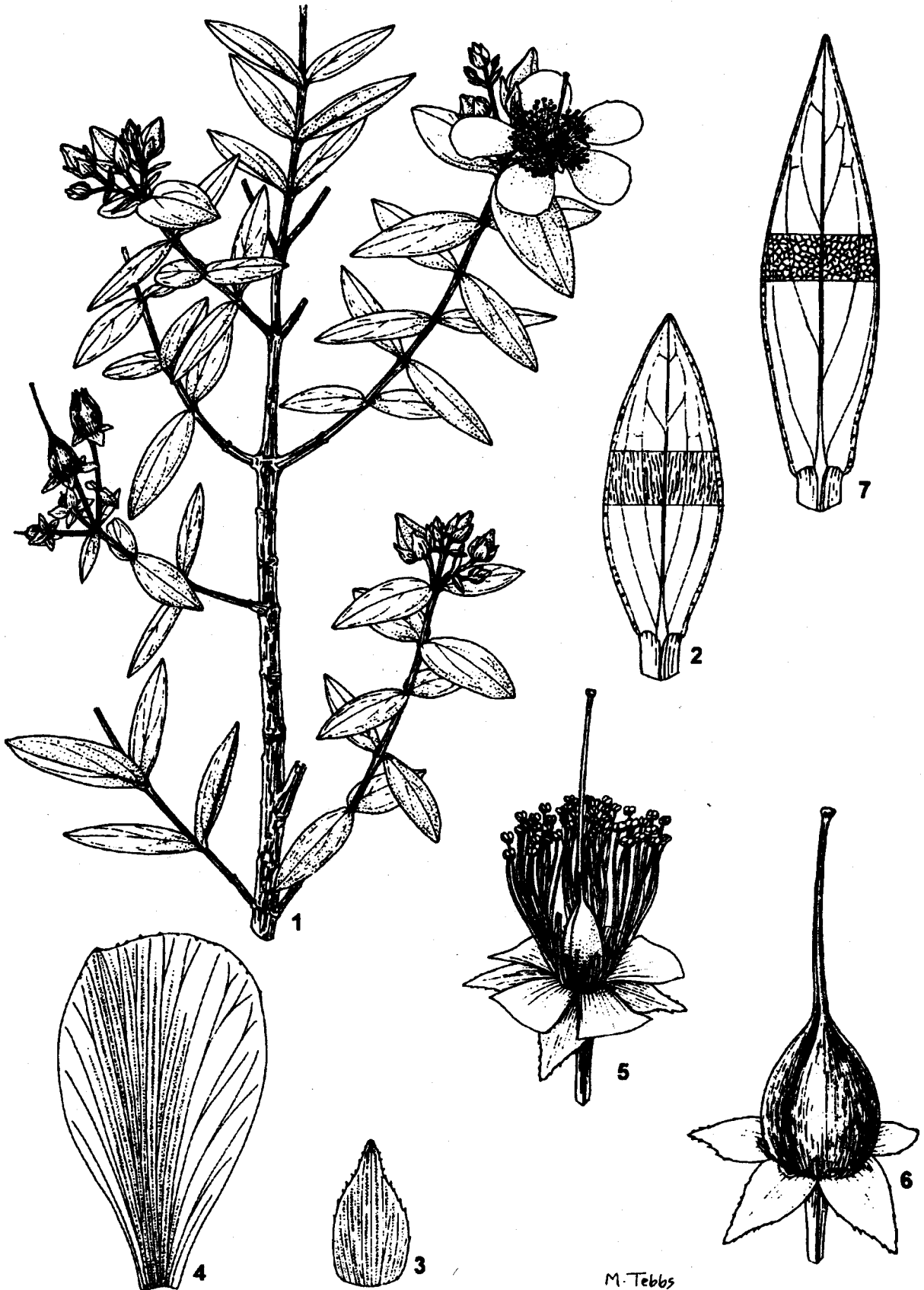
Among limestone rocks on black soil; 2000–2200 m. HA; also in north Somalia. *Boulos* 10271; *Burger* 2422; *Demel Teketay* 655.

4. *H. roeperianum* W.G. Schimp. ex A. Rich. (1847)

- types: GD, near Dschenausa on Mt Aber, *Schimper* 866 (P lecto.; FI G K LE MO, isosyn.) and TU, on Mt Kubbi near Adua, *Schimper* s.n. (P? not seen, isosyn.)

*H. schimperi* Hochst. ex A. Rich. (1847) - types: TU, Mt Kubbi, *Schimper* 132 (P lecto.; E KL LE M PAL W isosyn.) and 'Abyssinia', *Schimper* 1160 (FI G K L LE M P UPS W isosyn.) and 'Abyssinia', *Quartin-Dillon & Petit* s.n. (K P isosyn.).

*H. quartinianum* subsp. *roeperianum* var. *roeperianum* (A. Rich.) Moggi & Pisacchi, in *Webbia* 22: 247 (1967) in synonymy.



M. Tebbs

Figure 77.1 *HYPERICUM QUARTINIANUM*: 1 - flowering branch  $\times \frac{1}{2}$ ; 2 - leaf, lower surface detail to show the translucent glands forming lines or streaks  $\times 1$ ; 3 - sepal  $\times 2$ ; 4 - petal  $\times 2$ ; 5 - petals removed to show stamens and pistil  $\times 2$ ; 6 - fruit  $\times 2$ . *H. ROEPERIANUM*: 7 - leaf, detail of lower surface to show dense reticulate venation  $\times 1$ . 1-6 from *Greathead 92*; 7 from *Philip 815*. Drawn by M. Tebbs.

*H. roeperianum* subsp. *roeperianum* var. *schimperi* (Schimp. ex A. Rich.) Moggi & Pisacchi, in *Webbia* 22: 249 (1967) in synonymy.

Shrub or tree 0.6–5 m tall, bushy, glabrous. Stems soon with 2 ribs or rounded, with internodes 10–30 mm long. Leaves sessile, (25–)30–100(–115) × (5–)10–40 mm, lanceolate to elliptic or oblong-elliptic, with 7(–9) main longitudinal veins and densely reticulate tertiary venation; apex acute to obtuse; blade glands translucent dots or very short streaks, marginal glands black. Flowers 1–3(–many) together, 30–55 mm in diameter. Sepals (2.5–)5–8 × (1.5–)3.5–5 mm, ovate-lanceolate to ovate, apex acute to obtuse, margin subentire or with prominent black glands on teeth or cilia. Petals persistent, spreading to reflexed, (12–)20–35 × (7–)10–20 mm, entire or with black glandular cilia. Stamen fascicles 5, distinct, persistent. Ovary 4–7 × 3–5.5 mm, ovoid to subglobose; styles 5, completely united or rarely almost so. Capsule 5-valved, 9–14 × 7–10 mm, broadly to narrowly ovoid. Fig 77.1.7.

In dry evergreen forest margins, bushland or grassland, or beside rivers or streams; 2000–3000m. TU GD GJ WU SU; from Ethiopia to the S Africa (Transvaal), Zambia and Angola, also in Guinea, Nigeria and Cameroon. *Ash* 1559; *W. de Wilde* 10875; *Sebsebe* D. 359.

In Ethiopia, *H. roeperianum* appears to comprise two taxa that are morphologically but not geographically distinct. These were recognised by Moggi & Pisacchi as: var. *roeperianum* (leaves broadest below the middle, acute, not markedly discolorous, with circular translucent gland dots; sepals ovate-oblong) and var. *schimperi* (leaves broadest at or near the middle, sometimes markedly discolorous, with slightly elongate translucent glands; sepals ovate); but intermediates elsewhere in East Africa prevent the recognition of these variants as distinct taxa.

Moggi & Pisacchi, in *Webbia* 22: 249 (1967), chose *Quartin-Dillon & Petit* s.n., Abyssinia, 1844 (P), as the lectotype of *H. schimperi*, but this choice is unacceptable (see Robson, 1985).

#### 5. *H. gnidiifolium* A. Rich. (1847)

– types: TU, Ouadgerate (Wogera), *Quartin-Dillon & Petit* s.n. (P lecto.; K isosyn.) and Abyssinia, *Quartin-Dillon & Petit* s.n. (P isosyn.).

*H. roeperianum* subsp. *gnidiifolium* (A. Rich.) Moggi & Pisacchi, in *Webbia* 22: 250–253 (1967).

Shrub (?) or tree to 4.5 m tall, bushy, glabrous. Stems soon with 2 ribs or rounded, with internodes 6–10 mm long. Leaves sessile, 17–28 × 4–10 mm, narrowly elliptic to oblong-elliptic, with 3–5(–7) main longitudinal veins, and rather densely reticulate tertiary venation; apex acute to subapiculate; blade glands as short streaks, marginal glands mixed, some translucent and others black. Flowers (1–)3–5 together, c 35 mm in diameter. Sepals 6–7 × 3.5–5 mm, elliptic or ovate-elliptic to oblong, apex acute to obtuse, margin entire or with reddish glands on cilia. Petals persistent, spreading to reflexed, 16–20(–25) × 8–9 mm, partly with black glandular cilia. Stamen fascicles 5, distinct, persistent. Ovary 5–6 × 3.5–4 mm, broadly ovoid;

styles about ¾ united. Capsule 7–8 × 6 mm, broadly ovoid-pyramidal, without resin canals.

Beside streams; 2700–1900 m. TU SU; endemic.

No recent collections of *H. gnidiifolium* (spelt 'gnidiaefolium' in the protologue) have been recorded. It was collected from two disjunct localities: Wogera, Maye-Borhha plateau in Tigray, and somewhere in Shewa (Choa). It is superficially similar to *H. roeperianum* but can be distinguished by (i) the more elongated translucent gland dots and mixed translucent and black marginal glands in the leaves, (ii) sepal margins entire or with reddish glandular cilia and (iii) the partly free styles.

#### 6. *H. annulatum* Moris (1827)

– type: from Sardinia, *Moris* (TO holo.; K iso.).

*H. perfoliatum* var. *annulatum* (Moris) Fiori, in *Fl. Anal. It.* 1: 389 (1898).

*H. degenii* Bornm. (1910).

Perennial herb, sometimes woody at the base, caespitose, pubescent to glabrescent. Stems up to 0.75 m long, erect or shortly decumbent, rounded, shortly pubescent to glabrescent or glabrous, with internodes 8–45 mm long. Leaves sessile, 16–40(–55) × 6–20(–25) mm, triangular-ovate to lanceolate or narrowly oblong, acute to rounded, densely puberulous to glabrescent, with 9–11 main longitudinal veins and rather lax tertiary venation; blade glands as dots, marginal glands black, ± dense. Flowers numerous, 15–20 mm in diameter, in glabrous, broadly pyramidal to corymbose or capitulate compound cymes. Sepals 4.5–5 × 1–1.5 mm, oblong-lanceolate to narrowly oblong, margins with prominent black glands on short or long cilia. Petals persistent, spreading, 10–13 × c 3 mm, entire. Stamen fascicles 3, distinct, persistent. Ovary c 2.5 × 1.5 mm, narrowly ovoid-pyramidal; styles 3, divergent. Capsule 3-valved, 3–4 × 2–2.5 mm, ovoid, with longitudinal resin canals.

1. Stems without or with a few black glands, ± sparsely puberulous to glabrous; leaves mostly without black glands on the blade, ± sparsely and shortly pubescent to glabrous; sepals with marginal cilia shorter than, or up to x2 or more the length of their terminal glands, occasionally with some scattered black glands; petals usually with a few scattered black glands, rarely red-veined in bud.

subsp. *intermedium*

– Stems usually with numerous black glands (may be lacking in the Flora area), usually densely to sparsely puberulous, rarely glabrous; leaves sometimes with few to numerous black blade glands, nearly always puberulous above and densely pubescent beneath; sepals with marginal cilia more than x2 the length of their terminal glands, usually with some or all of the scattered glands black; petals with few to numerous scattered black glands, perhaps always red-tinged in bud.

subsp. *afromontanum*

subsp. *intermedium* (Steud. ex A. Rich.) N. Robson, in *Bull. nat. Hist. Mus. Lond. (Bot.)* 23(2): 69 (1993);

*H. intermedium* Steud. ex A. Rich. (1847); – types: Abyssinia, 1844, *Quartin-Dillon & Petit* s.n. (P syn.) and Abyssinia, *Quartin-Dillon & Petit* s.n. (P syn.).

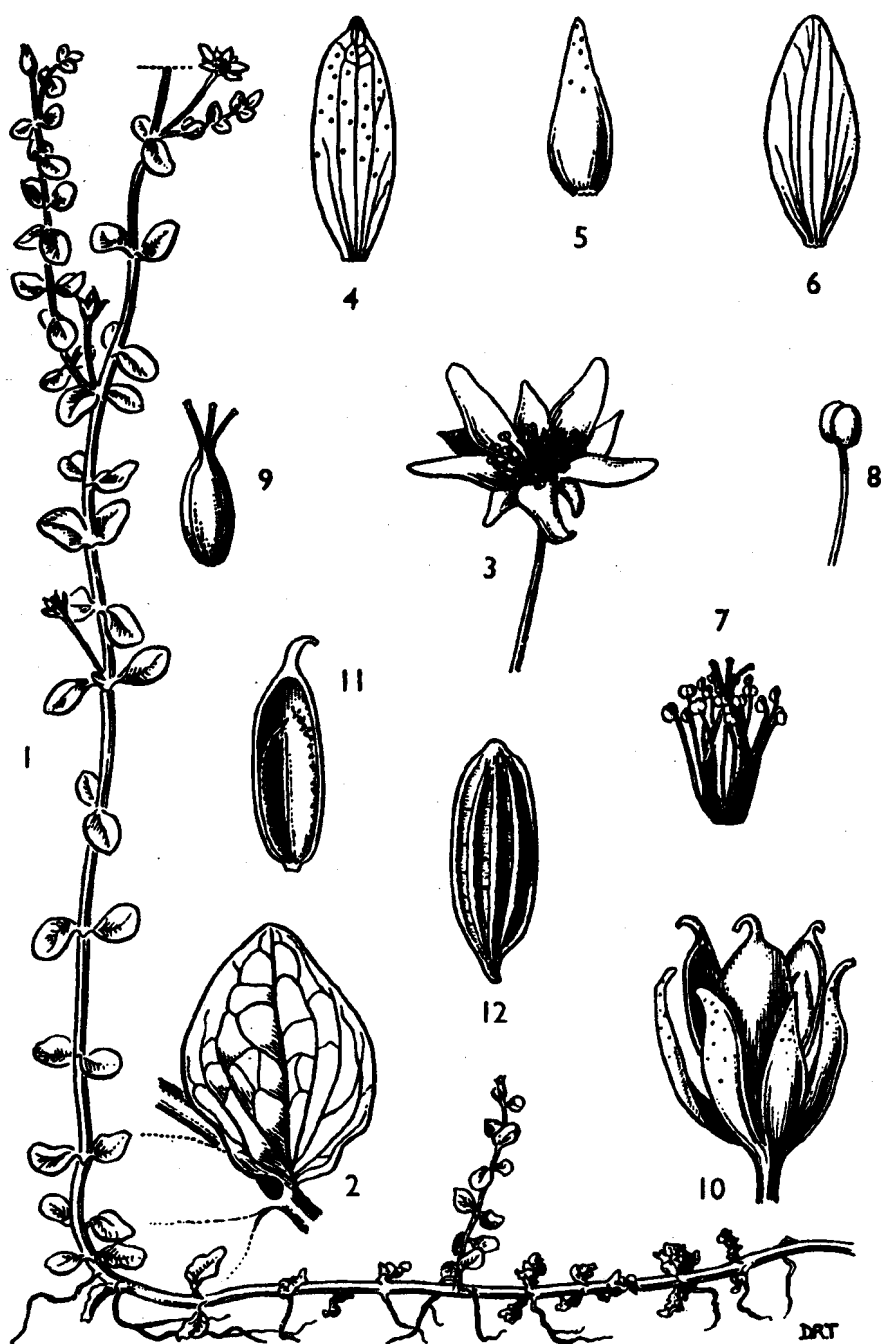


Figure 77.2  
**HYPERICUM SCIOANUM**: 1 – part of flowering plant x 1; 2 – leaf x 4; 3 – flower x 4; 4 & 5 – outer and inner sepals x 8; 6 – petal x 6; 7 – stamens and pistil x 8; 8 – stamen x 20; 9 – pistil x 8; 10 – fruit, after dehiscence x 8; 11 – valve of capsule x 8; 12 – seed x 40. 1–12 from *Chandler & Hancock* 2620. Drawn by D. R. Thompson. (Reproduced with permission from *Fl. Trop. E. Afr. Hypericaceae*: fig. 2.)

*H. intermedium* forma *obtusifolium* R. Keller ex Moggi & Pisacchi, in *Webbia* 22: 272 (1967).

On mountain slopes, and in dry places in grassland and among rocks; 1300–2950 m. EW TU GD WU GG; Saudi Arabia, Sudan (Red Sea Hills). *Schimper* 1509; *Sebsebe* D. 3108, *Mesfin* T. 8683.

subsp. *afromontanum* (Bullock) N. Robson, in *Bull. nat. Hist. Mus. Lond. (Bot.)* 23(2): 69–70 (1993);

*H. afromontanum* Bullock (1932) – type: Kenya, Mt Elgon, *Lugard* 338a (K holo.).

Montane forest, *Erica* scrub and afroalpine grassland; 3000–3300 m. HA; Kenya, Uganda, Tanzania. *Burger* 1002, 2394.

The material of subsp. *afromontanum* found in Ethiopia

generally lacks black glands on the leaf blades and surfaces of sepals and petals.

7. *H. scioanum* *Chiov.* (1911)

– type: Shoa, Entotto, *Negri* 332 (FI holo.; K iso.).

Perennial herb, tufted or carpeting, glabrous. Stems up to 0.3 m long, prostrate to ascending, 4-ribbed, rooting, with internodes 5–20(–24) mm long. Leaves sessile, 3–10 x 2–8 mm, ovate or elliptic to subcircular or obovate, apex rounded, with (5–)7 main longitudinal veins and dense, obscure tertiary venation; leaf-blade glands translucent, dense, marginal glands translucent, dense. Flowers solitary, 4–8 mm in diameter, terminal and on lateral leafy branches, often appearing axillary. Sepals subequal to unequal, 3–4 x 0.5–1.5 mm, oblong to lanceolate, margin entire. Petals 3.5–6(–7) x 2–3 mm, entire, eglandular. Sta-

men fascicles indistinct, 3, or stamens irregularly grouped, persistent. Ovary 1.5–2.5 x 0.9–1.4 mm, ovoid-ellipsoid to subglobose; styles (2–)3(–4), ± outcurving. Capsule 3.5–4.5(–6) x 2.5–3 mm, ellipsoid to subglobose, without resin canals. Fig. 77.2.

In damp habitats in montane grassland, and seepage zones; 1800–3500 m. GD GJ SU KF GG BA SD; from Ethiopia to Malawi, Zambia and eastern Zaire. *Gilbert* 1366; *W. de Wilde* 5992; .

#### 8. *H. peplidifolium* A. Rich. (1847)

– type: ‘Abyssinia’, *Quartin-Dillon & Petit* s.n. (P lecto.).

Perennial herb, tufted, glabrous. Stems (0.05–)0.1–0.6 (–0.9) m long, prostrate to ascending, rounded or slightly 2-ribbed, with internodes 5–30 mm long. Leaves sessile to shortly petiolate, blade 3–26 x 2–17 mm, ovate or elliptic-oblong to oblanceolate or obovate, apex rounded, with 7 main longitudinal veins and lax or obscure tertiary venation; leaf-blade glands translucent dots, dense, marginal glands black, dense or sparse. Flowers solitary, 8–13(–20) mm in diameter, terminal and on lateral, leafy branches, often appearing axillary; pedicels ± recurved in fruit. Sepals 3.5–10 x 1.5–4 mm in flower, enlarging in fruit, elliptic or oblong to ovate, margin entire. Petals persistent, spreading, (5–)7–10(–14) x 2.5–5 mm, entire, with marginal and intramarginal black dots. Stamen fascicles 5, ± distinct or partly united to form 3 or 4 fascicles, or stamens irregularly grouped, persistent. Ovary 1–4 x 1–2 mm, ovoid to subglobose; styles (4–)5, ascending. Fruit 6–11 x 5–9 mm, broadly cone-shaped, ovoid to subglobose, fleshy, indehiscent.

In damp habitats in open forest, streamsides, grassland, and disturbed ground; 1620–3700 m. EW TU GD GJ WU SU AR WG IL KF GG SD BA HA; from northern Ethiopia and Eritrea to Zimbabwe and central Mozambique, also in Cameroon and Fernando Po. *Burger* 1472; *Friis* et al. 1382; *Miehe* 19.

This very variable species, with its wide range in leaf and flower size and in habit, cannot be satisfactorily split into infraspecific taxa.

### 2. PSOROSPERMUM Spach (1836)

Bamps in *Bull. Jard. Bot. Etat. Brux.* 36: 440–453 (1966).

Trees, shrubs or shrublets, with simple and usually also stellate hairs, and with glandular canals or lacunae containing latex (orange) and possibly also hypericin (reddish or black). Stems partly 4-angled, compressed or wholly rounded. Leaves opposite (rarely subopposite to alternate), petiolate or sessile, with glands both on blade and intramarginal (sometimes obscure or invisible). Flowers bisexual, in corymbose or subcorymbose terminal dichasial cymes or umbels. Sepals 5, free, with longitudinal dark glandular lines outside (sometimes obscured by indumentum), persistent. Petals 5, white or greenish-white to yellow or orange, villous within, with longitudinal black glandular lines, deciduous. Stamen fascicles 5, free, each with 2-many stamens, persistent; filaments slender, united for

most of their length; anthers oblong to subglobose, with gland terminating connective; fasciclododes<sup>1</sup> 5, fleshy, alternating with stamen fascicles. Ovary 5-locular, each locule with 1(–2) ovules; styles 5, free; stigmas clavate. Fruit a berry, sometimes with glandular markings. Seeds 5, relatively large, lens-shaped, testa fleshy, prominently glandular-punctate.

About 15 species, in tropical Africa and Madagascar, only 1 species in the Flora area.

#### *P. febrifugum* Spach (1836)

– type: Angola, collector unknown, (P holo.).

*P. niloticum* Kotschy ex Ascherson (1867).

*P. tenuifolium* sensu Kotschy (1864) et auct. Sudan.

Tree, shrub or shrublet up to 6(–10) m, with branches greyish or brownish, bark corky, peeling or flaking. Stems glabrous to densely rusty-red tomentose. Leaves opposite, sessile or with petiole up to 2(–4) mm long; blade very variable, 20–110(–140) x 10–90 mm, elliptic or ovate to obovate or suborbicular, leathery, upper surface darker than lower, glabrous or glabrescent above, glabrous to densely rusty-red tomentose beneath, with dark glandular dots ± confined to apex and margins or scattered; apex acute to rounded; base subcordate to broadly cuneate. Inflorescence subcorymbiform, usually pedunculate. Flowers pedicellate. Sepals 3–4 x 1.5–2 mm, elliptic to lanceolate, tomentose outside or glabrous. Petals white or cream, 4–6 x 2–3 mm, elliptic to obovate, acute. Stamen fascicles each with 5–6 stamens, with filaments villous. Fasciclododes bifid to apiculate. Berry bright red, subglobose, 8–10 mm in diameter. Seeds 4–5 x 2–3 mm. Fig. 77.3.

In *Protea* – *Combretum* wooded grassland on black clay; 1500–1800 m. WG IL; Sudan (Jebel Marra) and the Sudano–Zambesian deciduous woodland belt from Sierra Leone via southern Sudan, Mozambique and Zambia to Angola. *Friis* et al. 2411; *de Wilde* 10706; *Puff* et al. 8208088–2/3.

Until recently *Cienkowski* 154 (BP), collected in 1848 from ‘Fassoglu, Fadoga’, constituted the only record from the Flora area of this widespread and variable species (c.f. *Moggi & Pisacchi*, 1967). Although this locality is c 800 km north-east of the nearest part of its continuous Sudano-Zambesian area, a recent collection of *P. febrifugum* from Jebel Marra suggests that these outlying areas are remains of a more widespread distribution in NE Africa; and the modern Ethiopian collections support this idea.

### 3. GARCINIA L. (1753)

Trees or shrubs (or rarely shrublets), glabrous or with simple hairs, with glandular canals (long or short) containing latex (white to orange), probably resins (brown or blackish) and essential oils (translucent or greyish). Stems 4-angled when young. Leaves opposite or rarely subopposite or whorled, petiolate, sometimes with a ligular outgrowth from petiole, with translucent canals above and

1. fasciclodode: a cluster or uniting of staminodes (sterile stamens) to form a scale-like or solid structure.

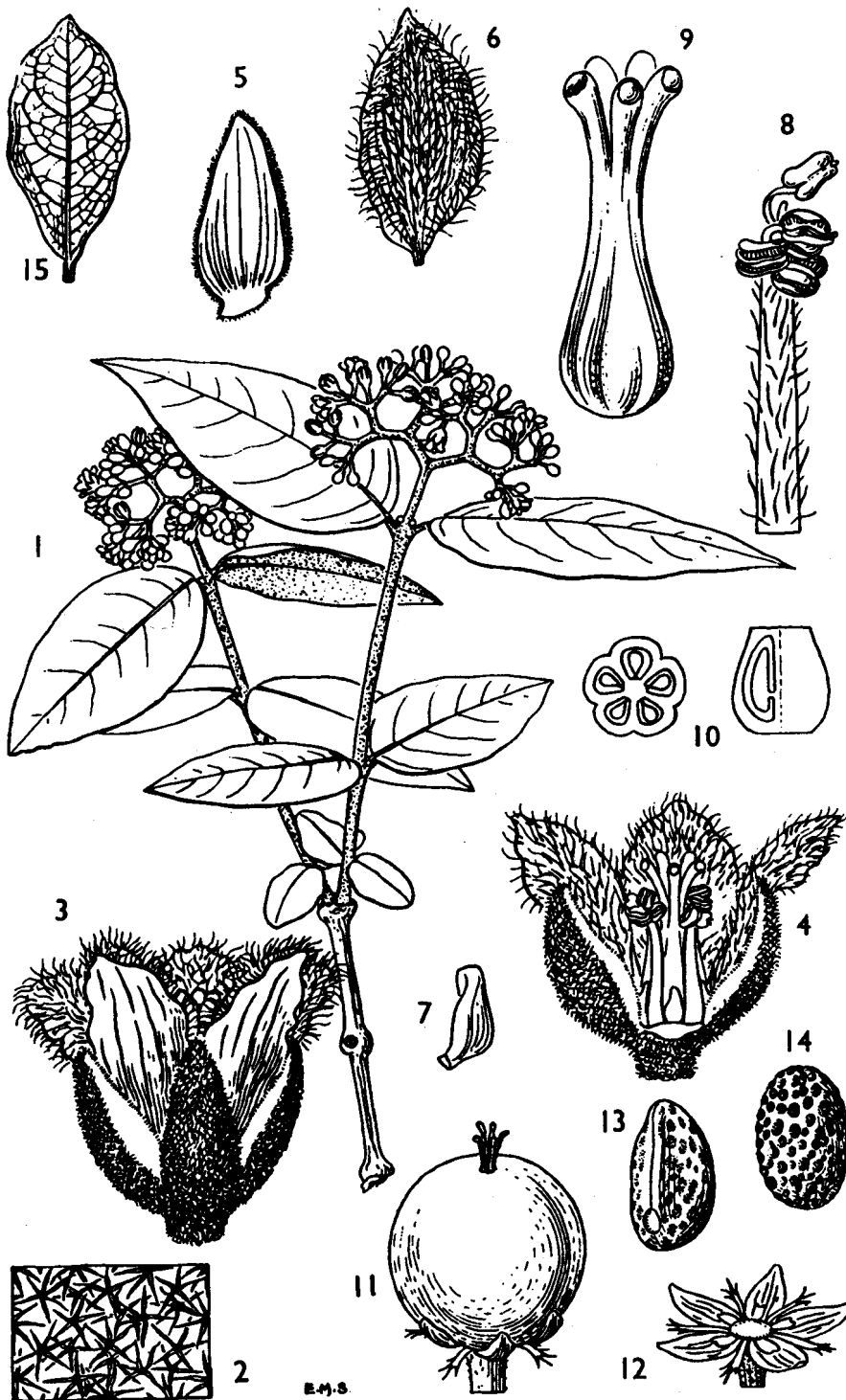


Figure 77.3 *PSOROSPERMUM FEBRIFUGUM*: 1 - flowering branch  $\times \frac{1}{2}$ ; 2 - lower surface of leaf  $\times 14$ ; 3 - flower  $\times 8$ ; 4 - flower with a sepal and two petals removed  $\times 8$ ; 5 - sepal, from within  $\times 8$ ; 6 - petal, from within  $\times 8$ ; 7 - staminode  $\times 24$ ; 8 - bundle of stamens  $\times 16$ ; 9 - pistil  $\times 16$ ; 10 - ovary transverse & longitudinal section  $\times 16$ ; 11 - berry  $\times 4$ ; 12 - calyx, staminodes and staminal bundles after removal of berry  $\times 4$ ; 13 - seed in fresh state  $\times 4$ ; 14 - seed after drying  $\times 4$ ; 15 - leaf, showing lower surface  $\times \frac{1}{2}$ . 1-10 from *Brasnett* 47; 11-14 from *Dawe* 824; 15 from *Eggeling* 180. Drawn by E. Margaret Stone. (Reproduced with permission from *Fl. Trop. E. Afr. Hypericaceae*: fig. 4.)

parallel with veins, and brown or blackish ones crossing beneath them. Flowers unisexual (plants dioecious), in terminal or axillary thyrsoids or triads or fascicles, or rarely solitary. Sepals 4 or 5, rarely 3, free, or 2 united, deciduous. Petals 4-5(-8), usually greenish white to yellow, deciduous. Male flowers: stamen fascicles 4(-5), free or partially to completely united, each with stamens, the filaments apparently free to completely united; staminode fascicles 4(-5), fleshy, free or united, alternating with stamen fascicles; ovary rudiment present or not. Female flowers: staminode fascicles 4(-5), similar to the stamen fascicles in the

male flowers but usually smaller and with fewer members, or absent; fasciclododes sometimes present, free or fused in a ring at base or ovary; ovary 2-5(-12)-locular, locules with 1 apical ovule; styles usually absent; stigma broad, 2-5(-12)-lobed or entire, sometimes large, sticky. Fruit a berry. Seeds 1-4, large: testa smooth, coated with pulpy endocarp.

About 250 species, pantropical (when *Rheedia* L. is included); 3 species in the Flora area.

This genus includes species of economic importance

such as the MANGOSTEEN *G. mangostana* L., some of which have been grown in Tanzania.

*G. buxifolia* (Cufodontis, *Enum.*: 590) does not belong to *Garcinia* but to *Buxus*. The type is a specimen of *B. hildebrandtii* Baillon (see *Fl. Ethiopia*, Vol. 3, 95. *Buxaceae*).

1. Petiole smooth, ligule absent; female flower without staminodes; male flower with stamen filaments in each fascicle completely united, anthers elongate.

3. *G. buchananii*

- Petiole with transverse ridges, ligule prominent; female flower with staminodes; male flower with stamen filaments in each fascicle wholly or partly free, anthers ellipsoid to globose. 2

2. Androecium with 4 fascicles; leaves in opposite pairs, with all veins almost at right angles to midrib.

1. *G. ovalifolia*

- Androecium not fasciculate (stamens/staminodes apparently free); leaves mostly in whorls of 3 with proximal veins oblique to midrib.

2. *G. livingstonei*

1. *G. ovalifolia* Oliver (1868)

- type: Nigeria, *Barter* 807 (K holo.).

Shrub or tree 2.4–25 m tall, with young branches longitudinally grooved. Leaves opposite, with petiole transversely ridged, ligulate; blade 40–150 x 10–60 mm, elliptic to oblanceolate or obovate, with veins almost at right angles to midrib; apex obtuse to long-acuminate. Inflorescences in axils of older or fallen leaves, fasciculate; flowers 3–4 mm in diameter. Male flowers: sepals 4, ovate to suborbicular, outer 1–1.5 x 1–1.5 mm, obovate, inner 2–2.5 x 2–2.5 mm; petals 4, cream-white, 3–4 x 2–2.5 mm, obovate; fascicledodes forming a 4-lobed intrastaminal disc, alternating with 4 stamen fascicles, each of 3–4 stamens with filaments united in lower third, anthers ovoid; pistillode absent. Female flowers: perianth as in male flowers; fascicledodes 4, free, alternating with 4 single staminodes; ovary 2-locular, stigma sessile, 2-lobed. Fruit orange coloured, ellipsoid, 15–25 x 10–20 mm. Seeds 1–2, plano-convex, 12–15 x 6–10 mm.

In evergreen and riverine forest; c 900–1500m. KF; the Congo-Guinean region from Mali and Guinea to Ethiopia, southern Sudan, Uganda, Zaire and Angola. *Meyer* 9013; *Friis et al.* 3977.

2. *G. livingstonei* T. Anders. (1866)

- type: plant collected by Kirk from Mozambique and cultivated at Calcutta, India (CAL holo.).

*G. ferrandii* Chiov. (1916).

*G. ferrandii* var. *affinis* Chiov., in *Result. Sci. Miss. Stef-Paoli, Coll. Bot.* 1: 27 (1916).

Shrub or small tree (0.9–)3–18(–21) m tall, with young branches longitudinally grooved. Leaves mostly in whorls

of 3, with petiole transversely ridged, ligulate; blade 40–140(–170) x 15–115 mm, lanceolate to oblong or obovate or suborbicular, with veins at right angles to midrib distally, becoming oblique proximally; apex emarginate or rounded to acute or apiculate. Inflorescences in axils of older or fallen leaves; flowers 5–10(–15) mm in diameter, sweet scented and attracting insects. Male flowers: sepals (3–)4, oblong to suborbicular, (1–)2–5.5 x (1–)3–6 mm; petals 5(–8), green or cream-white to yellow, 3–6(–11) x 3–6.5 (–11) mm, elliptic to obovate or orbicular; fascicledodes forming a fleshy subglobose cushion 5 mm wide, bearing numerous apparently free stamens, anthers orbicular; pistillode absent. Female flowers: perianth as in male flowers; fascicledodes forming a fleshy annulus below ovary and bearing apparently free staminodes (fewer than stamens in male); ovary 2(–3)-locular, stigma sessile, 2(–3)-lobed. Fruit yellow to red, sometimes tinged pink, ovoid or ellipsoid to globose, sometimes compressed, 10–25 (–40) x 10–30 mm, thick-skinned. Seeds 1–2(–3), cylindrical-ellipsoid to plano-ovoid, 15–21 x 8–11 mm. *Fig.* 77.4.

On river banks in dry hilly areas; 1200–1500 m. GG SD; from Guinea to Cameroon and from Ethiopia south to South Africa (Natal and Transvaal), Botswana, Namibia, and Angola. *De Wilde* 425; *Haugen* 503; *Getachew Aweke* 504.

The fruits are said to be edible.

3. *G. buchananii* Baker (1894)

- type: Malawi, *Buchanan* 183 (K holo.).

*G. huillensis* sensu auct. non Welw. ex Oliver (1868).

*Friis, Rasmussen & Vollesen* in *Op. Bot.* 63: 44, f.20 (1982).

Tree or shrub 1.5–15(–25) m tall, with young branches angular, smooth. Leaves opposite, with petiole smooth, without a ligule; blade (35–)70–160 x (20–)25–75 mm, elliptic to ovate, with veins oblique; apex ± long-acuminate. Inflorescences terminal or axillary, dichasial; flowers 10–24 mm in diameter. Male flowers: sepals 4, suborbicular, outer 2–2.5(–5) x 2–2.5(–5) mm, inner 3.5–4(–10) x 3.5–4(–10) mm; petals 4, white or cream-yellow to orange, 8–9(–12) x 4.5(–10) mm, obovate; fascicledodes absent, stamen fascicles 4, each of 5–6 stamens with filaments completely united, strap-shaped, anthers curved-elongate; pistillode obconic, 4-sided. Female flowers: perianth as in male flowers; fascicledodes and staminodes absent; ovary 4-locular, stigma sessile, weakly 4-lobed. Fruit yellow to red, subglobose, 20–25 mm in diameter, thin-skinned. Seeds 1–4, ellipsoid, 7–15 x 6–8.5 mm.

In riverine forest; 1250–1800 m. KF IL GG; east Africa from Ethiopia south to Mozambique, Zimbabwe and Zambia. *Friis et al.* 2333; *Chaffey* 721; *Haugen* 42.

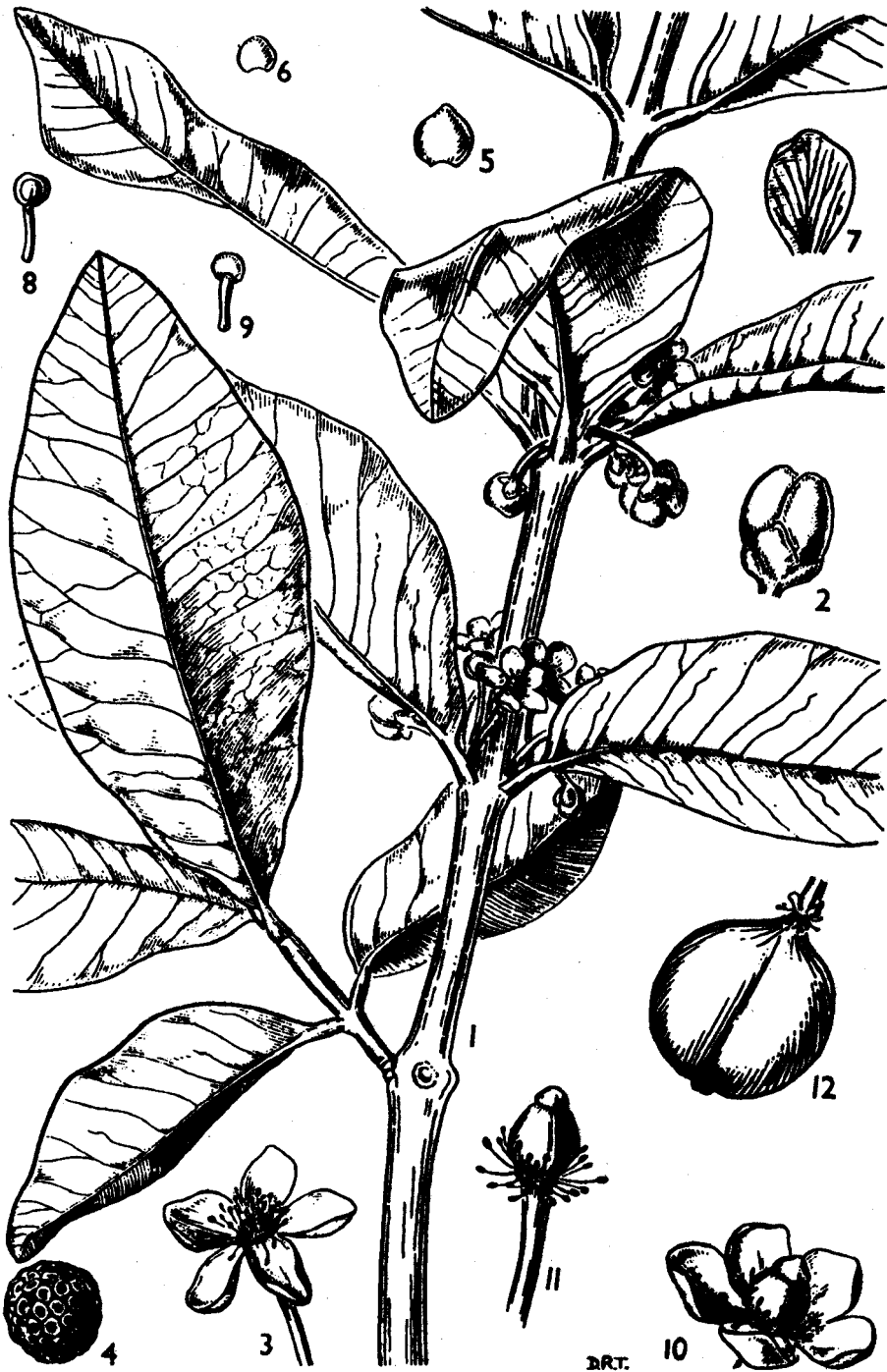


Figure 77.4

***GARCINIA LIVINGSTONEI*:**

1 - flowering branch x 1; 2 - flower-bud x 2; 3 - male flower x 2; 4 - receptacle from above x 4; 5 & 6 - sepals x 2; 7 - petal x 2; 8 & 9 - stamen, front and back views x 4; 10 - hermaphrodite flower x 2; 11 - same with sepals and petals removed x 2; 12 - fruit x 1. All from *Van Someren* in *C. M.* 5099. Drawn by D. R. Thompson. (Reproduced with permission from *Fl. Trop. E. Afr. Guttiferae*: fig.5.)



**78. SCYTOPETALACEAE**

by Mesfin Tadesse\*

Burger, *Families of Flowering Plants in Ethiopia*: 82 (1967); Verdcourt, *Scytropetalaceae* in *Fl. Trop. E. Afr.*: 3 pp. (1968).

Trees or shrubs, sometimes with flowers produced from the tree trunk. Leaves alternate, simple, sessile or petiolate, entire or rarely denticulate; stipules absent. Flowers bisexual, regular, in terminal panicles or axillary racemes, or fasciculate on the old wood. Calyx a cup-shaped structure with an entire or toothed edge, persistent at the base of the fruit. Petals 3–16, free or united at the base. Stamens many, 3–6-seriate, on the annular disk, often falling with the corolla; filaments free or joined at the base; anthers basifixed, opening by a pore or slit at the side or toward the top. Ovary superior or inferior, 3–8-locular, each locule with 2–several ovules; style simple, filiform; stigma small, entire or slightly lobed. Fruit a woody or hard crusty capsule, or indehiscent but scarcely fleshy. Seeds 1–8.

A family of 5 genera and about 20 species confined to tropical African forests (Senegal, Cameroon, Uganda, Zaire, Gabon). The only species recorded from E Africa is *Bazzia longipedicellata* Verdc. found in dense rain and riverine forest in Uganda.

---

\* The National Herbarium, Addis Ababa University, P.O. Box 3434,  
Addis Ababa, Ethiopia.

## 79. TILIACEAE

by K. Vollesen\* and Sebsebe Demissew (*Grewia*)\*\*Cufodontis, *Enum.*: 514–531 (1958); Wild, *Tiliaceae* in *Fl. Zamb.* 2: 33–91 (1963); Wilczek, *Tiliaceae* in *Fl. Congo* 10: 1–91 (1963).

Small trees, shrubs or herbs; indumentum simple or stellate. Leaves alternate, simple to deeply digitately lobed; stipules present. Flowers solitary or in axillary or leaf-opposed fascicles, umbels or panicles, bisexual, regular. Sepals (2–)4–5(–7), free or united at base. Petals (0–)4–5(–7), free, often with a glandular appendage or claw at base. Stamens 4-many, free or united at base into 5 or 10 groups, often on a torus<sup>1</sup> or androgynophore<sup>2</sup>, all fertile, or outer ones sterile. Ovary superior, 2–10-locular, with 1-many ovules per locule; style simple, entire or lobed at apex. Fruit a capsule, drupe, berry or nut, 2–10-locular or 1-locular by abortion; seeds 1-many.

About 65 genera and 1500 species. Widespread in all tropical, subtropical and temperate regions. In the Flora area 4 genera and 47 species.

## Key to genera

1. Fruit a 1–4-lobed drupe, glabrous or hairy but not spiny or bristly. 1. *Grewia*
  - Fruit a capsule or nut, glabrous, hairy, spiny or bristly. 2
2. Flowers white to pink or purple, in long-peduncled umbels; outer stamens sterile with moniliform filaments. 3. *Sparmannia*
  - Flowers yellow, in subsessile fascicles; all stamens fertile, filaments not moniliform. 3
3. Fruit elongated, cylindrical (rarely ellipsoid), dehiscent, with more than 2 ovules per locule. 2. *Corchorus*
  - Fruit ovoid to globose, bristly or spiny, dehiscent or not, with 2 ovules per locule. 4. *Triumfetta*

## 1. GREWIA L. (1753)

Burret in Engl., *Bot. Jahrb.* 44: 198–238 (1910); *op. cit.* 45: 156–203 (1910); Sebsebe D. in *SINET: Eth. J. Sci.* 9 (suppl.): 215–226 (1986).

Trees or shrubs. Leaves alternate, simple, elliptic, oblong, ovate, obovate or orbicular, margin entire to crenate or serrate, 3–5 nerved at base; stipules entire, digitate or bifid, persistent or falling off quickly. Flowers solitary or in axillary, extra-axillary, leaf-opposed or terminal cymes; (4–)5-merous. Sepals hooded at tip, outside with stellate hairs, inside similarly coloured to petals, glabrous. Petals shorter than sepals, base often with nectar-producing claw, yellow, white, lilac, purple or pink. Stamens many, arising from a raised receptacle. Ovary 1–4-locular, each locule with 2-many ovules; style simple, stigma capitate, lobed or lacinate. Fruit solitary or 2–4-lobed drupe with 1–4 stones (pyrenes) each containing 1-several seeds. Seeds brownish, covered with smooth light purplish seed coat.

A genus of about 150 species in the tropical regions of Africa, Asia and Australia; 21 species found in the Flora area.

The bark of several species is used as string and rope. The wood of some species is soft and easily carved to make

combs. The fruits of all species found in the Flora area are edible and are eaten by children and adults. They can also be dried and stored as a reserve against crop failure.

## Key to sections:

1. Inflorescences axillary; flowers always yellow. 2
  - Inflorescences terminal, leaf-opposed or extra-axillary; flowers white, lilac, purple, pink or yellow (in *G. schweinfurthii*) 3
2. Branches rounded or flattened; stigma lobes broad; ovules 3–8 in each locule.
  - Section 1. AXILLARES (species 1–8)
    - Branches 4-angled (in our area); stigma lobes subulate; ovules 10–20 in each locule.
      - Section 2. PLURIOVULATAE (species 9 & 10)
3. Inflorescences lax, leaf-opposed, never terminal; flowers always bisexual; petals white, lilac or purple; stigma-lobes broad.
  - Section 3. GREWIA (OPPOSITIFLORAE) (species 12–19)
    - Inflorescences usually congested, rarely lax, terminal and leaf-opposed or extra-axillary, sometimes several together, flowers usually unisexual, rarely bisexual; petals yellow or reddish; stigma-lobes lacinate or subulate. 4
4. Inflorescence lax; stigma-lobes subulate; fruit dry, unlobed with 4 stones, ovules 8 per locule.
  - 11. *G. schweinfurthii*
    - Inflorescence congested; stigma-lobes lacinate; fruit thinly fleshy, with 4 stones, sometimes lobed, ovules 2–4 per locule.
      - Section 4. GLOMERATAE (species 20 & 21)

*G. schweinfurthii* is not included in any section because it has unique features in the leaf opposed and terminal inflorescences and 8 ovules in each locule. It is closest to section PLURIOVULATAE which has axillary inflorescences and 10–20 ovules in each locule.

## Section AXILLARES Burret

Inflorescence axillary; petals yellow; ovary 1–2-locular with 3–6 ovules in each locule; style with 3–6 branched

\*The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK.

\*\*The National Herbarium, Science Faculty, Addis Ababa University, P. O. Box 3434, Addis Ababa, Ethiopia.

1. torus: a raised part of the receptacle.

2. androgynophore: raised part of the receptacle carrying both androecium and gynoecium between the corolla and the stamens.

broad stigma lobes; fruit solitary or 2-lobed; stones reticulate to rugose.

1. Leaves thick, base strongly asymmetrical; petals suborbicular; fruit with lobes more than 12 mm in diameter. 1. *G. arborea*

– Leaves thin, base symmetrical or nearly so; petals obovate; lobes of fruit less than 8 mm in diameter. 2

2. Leaf-margin regularly crenate; petals without nectar-producing claw; receptacle 1 mm long.

2. *G. bicolor*

– Leaf-margin irregularly crenate to double-serrate; petals usually with nectar-producing claw; receptacle 1–2 mm long. 3

3. Inflorescence (1–)2–6 in each axil; ovary 1-locular with 3–8 ovules; fruit unlobed. 4

– Inflorescence always solitary in each axil; ovary 2-locular with 4 ovules in each loculus; fruit 2-lobed. 6

4. Flowering branches elongated, rather flattened, lenticels few or absent; leaf-base symmetrical, cuneate to rounded; ovary 1-locular with 3 ovules, stigma 3-lobed; fruits covered with thick grey felt.

3. *G. mollis*

– Flowering branches rounded, lenticels numerous, white; leaf-base rounded, often slightly asymmetrical; ovary 1-locular with 4–8 ovules per locule, stigma (3–)4-lobed; fruits glabrous or pilose. 5

5. Leaf-blade widest at or below middle, glabrous above, glabrous to few scattered hairs beneath, tip acuminate, margin coarsely double-crenate to serrate; fruit glabrous. 4. *G. trichocarpa*

– Leaf-blade widest at or above middle, pubescent to tomentose on both surfaces, tip obtuse to acute, never acuminate, margin irregularly crenate; fruit sparsely hairy. 7. *G. velutina*

6. Leaf-blade elliptic, elliptic-oblong to obovate, asymmetrical to rounded at the base, margin closely crenate to serrate. 7

– Leaf-blade ovate to rounded, asymmetrical to subcordate at the base, margin widely crenate-serrate.

8. *G. sp.* = *Gilbert & Sebsebe* 8598

7. Leaf-margin acutely toothed; inflorescence 1.5–2.5 cm long; petals obovate; stone rugose. 5. *G. gillettii*

– Leaf-margin obtusely toothed; inflorescence 1–1.5 cm long; petals elliptic; stone reticulate. 6. *G. tristis*

1. *G. arborea* (Forssk.) Lam. (1789);

*Chadra arborea* Forssk. (1775) – type: Yemen Forsskål 490 (BM holo; C syn.).

*Grewia fallax* K. Schum. (1894).

Shrub or tree up to 6 m high. Branches cylindrical, grey to dirty white with few lenticels, pubescent in young parts becoming glabrous in old parts. Leaf-blade pale green and glabrous above, white densely tomentose below, obovate to oblong, 14–19.5 x 2.5–12.5 cm; apex rounded to acute; base very asymmetrical; margin crenate. Inflorescence solitary, 2–3 cm long and 3-flowered. Petals yellow, obovate, with or without nectar-producing claws, 7–8 mm long. Stamens yellow. Ovary 2-locular, 5–6 ovules in each locule; stigma lobes 5(–6)-branched. Fruit solitary or 2-

lobed, each lobe (8–)10–12 mm in diameter, with scattered stellate hairs, exocarp woody; stone reticulate.

Open *Acacia* – *Commiphora* woodland, along river banks and on stony hills; 550–1500 m. TU GG SD BA HA; Yemen, Somalia, Kenya and Tanzania. *Burger* 2292a; *Friis* et al. 2943; *Gilbert & Sebsebe* D. 8749.

2. *G. bicolor* Juss. (1804)

– type: Senegal, *Adanson* s.n. (P holo.).

*G. discolor* Fresen. (1837) – type: TU/GD, Wege, between Tembien and Semien, *Rüppell* s.n. (B holo. destr.).

*G. pallida* Hochst. (in *Pl. Schimp. Abyss.*, sect II: 727) nom. nud.

*G. cinerea* A. Rich. (1847) – type: TU, Tchelatckehanne, *Quartin-Dillon* s.n. (P holo.).

*G. heterophylla* A. Rich. (1847) – type: TU, Chire (Shire), Djeladjekanne, *Quartin-Dillon* s.n. (P holo.).

Densely branched shrub or small tree up to 6 m high. Young branches cylindrical, dark grey to purple, glabrous to puberulous with many lenticels. Leaf-blade green and glabrous above, minutely tomentose whitish to grey below, elliptic to lanceolate, 1.5–12.5 x 1–6 cm; apex acute to obtuse; base rounded to slightly asymmetrical. Inflorescence 1–3 together, each up to 2.5 cm long and 2–3-flowered. Petals yellow, obovate, 6–7 mm long, without claws. Stamens yellow. Ovary 2-locular, ovules 4–5 in each locule; stigma lobes broad, 4-branched. Fruit 2-lobed or unlobed by abortion, each lobe 6–7 mm in diameter, glabrous or with scattered hairs when young. Stone reticulate. Fig. 79.1.1–5.

*Acacia* woodland, wooded grassland, along river beds and streams, on sandy soils and rocky areas; 500–1800 m. EE EW TU GD GJ WU SU WG IL KF GG SD BA HA; widespread in the drier parts of tropical Africa, Arabia to India. *Ash* 1564; *Friis* et al. 2731; *Sebsebe* D. 201.

3. *G. mollis* Juss. (1804)

– type: Nigeria, *Barter* 1097 (K neo.).

*G. venusta* Fresen. (1837) – type: TU/GD, Wege between Gonder and Adowa, *Rüppell* s.n. (B holo.).

*G. velutina* A. Rich. (1847), non (Forssk.) Vahl (1790).

*G. petitiana* A. Rich. (1847); *G. mollis* var. *petitiana* (A. Rich.) Burret (1910) – type: TU, *Petit* s.n. (P holo.).

Shrub or tree up to 7 m high, sometimes with hanging branches. Young branches elongated, rather flattened, purplish to grey, pubescent, with few or no lenticels. Leaf-blade pale green and glabrous above, greyish and covered with white indumentum below, elliptic to lanceolate, 4–16 x 2–6.5 cm; apex acute to subacuminate; base truncate, rounded to cuneate; margin coarsely and irregularly crenate-serrate. Inflorescences (1–)2–6 together, each 2–3.5 cm long and 3-flowered. Petals yellow, obovate, 5–6 mm long, with or without claws. Stamens yellow. Ovary 1-locular, ovules 3; stigma lobes broad, 3-branched. Fruit unlobed, with thick grey indumentum 5–6 mm in diameter; stone rugose.



Figure 79.1 *GREWIA BICOLOR*: 1 – flowering shoot x 1; 2 – individual flower x 3; 3 – petal x 6; 4 – fruit x 2; 5 – fruit with fleshy pericarp removed to show reticulate surface x 2. *G. FLAVESCENS*: 6 – flowering branch x 1; 7 – two fruits x 2; 8 – fruit with fleshy pericarp removed to show pitted stones x 2. 1–3 from Ash 1564; 4 & 5 from Mercier 2812; 6 from Mooney 7062; 7 & 8 from Tewolde B.G.E. 2418. Drawn by Dantew Teferra.

Common in *Acacia*–*Combretum* woodland; 600–2200 m. TU GD GJ SU WG IL KF GG BA; Somalia, Kenya, west to Senegal, South Yemen. *Friis et al.* 2499; *Sebsebe D. & Berhanu A.* 1454; *W. de Wilde* 6267.

The wood is tough and used to make bows and arrows in East Africa; the bark contains mucilage and is used to make soup in Niger.

4. *G. trichocarpa* Hochst. ex A. Rich. (1847);

*G. mollis* Juss. var. *trichocarpa* (Hochst. ex A. Rich.) Burret (1910) – type: TU, Gafta or Gundepita, *Schimper* II:1216 (P holo., BM K iso.).

*G. bicolor* Juss. var. *tephrodermis* (K. Schum.) Burret (1910) p.p. incl. specimen *Beccari* 39.

*G. trichocarpa* Hochst. ex A. Rich. var. *morifolia* Fiori (1912); *G. mollis* Juss. var. *morifolia* (Fiori) Cufod. (1958) – type: EE, Achele Guzai, Coatit, *Fiori* 252 (FT holo.).

Shrub or tree up to 5 m high. Branches cylindrical, purplish with pale lenticels, glabrous to puberulous in young parts. Leaf-blade pale green and glabrous above, whitish and glabrous or with a few scattered hairs below, elliptic to ovate, (1–)2.5–12(–17) × 1.5–5(–7) cm; apex acuminate; base rounded, cuneate to slightly asymmetrical; margin crenate-serrate. Inflorescence 1–2 together each 2–3 cm long and 2–3-flowered. Petals yellow, 5–7 mm long, obovate with or without nectar-producing claws. Stamens yellow. Ovary 1-locular, ovules 4(–6); stigma broadly lobed, 4-branched. Fruit unlobed, 5–7 mm in diameter, glabrous or with a few scattered hairs; stone reticulate.

*Acacia* – *Commiphora* woodland and riverine forests; 650–1900(–2390) m on sandy and rocky soil. EW TU GD GJ WU SU AR WG IL KF GG SD BA HA; Somalia, Sudan, Uganda, Kenya, Tanzania, Rwanda and Burundi. *Alemayehu H.* 1135; *Hemming* 1204; *Sebsebe D.* 1428.

5. *G. gillettii* Sebsebe & Mathew (1990)

– type: Somalia (north), Near Eil Demet, *Gillett* 4320 (K holo.).

Shrub 2–3 m high. Branches cylindrical, dark grey to purplish with conspicuous lenticels, glabrous in older parts. Leaf-blade green and glabrous to sparsely pubescent above, green and glabrous to whitish tomentose below, elliptic, 2–4.5 × 0.8–2 cm long; apex acute; base rounded, cuneate; margin strongly serrate. Inflorescence solitary, 1.5–2.5 cm long and 3-flowered. Petals yellow, obovate, with or without nectar-producing claw, 5–8 mm long. Stamens yellow. Ovary 2-locular with 4 ovules in each locule; stigma 4-branched. Fruit 2-lobed (or unlobed by abortion), each lobe 5–6 mm in diameter, with scattered stellate hairs; stone rugose.

*Acacia* – *Commiphora* woodland; 460–1400 m in the Flora area, as low as 90 m in Somalia. SD BA HA; Somalia and Yemen. *Burger* 1681; *Puff et al.* 870507–2/12; *Sebsebe D. & Ensermu K.* 2768.

The species closely resembles *G. trichocarpa* Hochst. ex A. Rich. in leaf shape and margin. However it is easily distinguished from it by the ovary being 2-locular with 4 ovules in each locule, the fruit 2-lobed and the stones

having rugose surfaces. In contrast *G. trichocarpa* has a 1-locular ovary with 4(–6) ovules, fruit 1-lobed and stone reticulate.

6. *G. tristis* K. Schum. (1893)

– type: Kenya, between Ndi and Tsavo, *Hildebrandt* 2594.

Shrub up to 3 m high. Branches grey, pubescent in young parts, glabrous in older ones, with numerous lenticels. Leaf-blade green above, pale green below with short stellate hairs, elliptic, elliptic-oblong to narrowly obovate, 2–6 × 1–2.5 cm; apex rounded to acute; base rounded to slightly asymmetrical; margin irregularly crenate-serrate. Inflorescence solitary, 1–1.5 cm long (up to 2 cm long in fruit) and 3-flowered. Petals yellow, elliptic 5–7 mm long, with or without claws. Stamens yellow. Ovary 2-locular with 4 ovules in each locule; stigma 4–5 branched. Fruit 2-lobed or unlobed by abortion, each lobe 5–6 mm in diameter, pubescent; stone reticulate.

*Acacia* – *Commiphora* woodland, on coarse sandy soil; 850–1700 m. EW TU WU SU AR SD BA HA; Kenya and Tanzania. *Friis et al.* 2960; *Gilbert & Thulin* 151; *Thulin et al.* 3778.

7. *G. velutina* (Forssk.) Vahl (1790);

*Chadra velutina* Forssk. (1775) – type: Yemen *Forsskål* 489 (C holo.).

Spreading shrub or tree up to 8 m high. Young branches cylindrical, purple to grey, pubescent, with numerous lenticels. Leaf-blade whitish-grey with soft tomentellous hairs on both sides, or green pubescent above and white tomentose below, elliptic, obovate or rhomboidal, 2–8 × 1.5–3.5 cm; apex obtuse to subacuminate; base rounded to slightly asymmetrical; margin irregularly crenate-serrate. Inflorescence (1–)2–3 in each axil, each 1.5–3.5 cm long and 3(–4) flowered. Petals yellow, broadly elliptic to obovate, 6–7 mm long with or without claws. Stamens yellow. Ovary 1-locular, ovules (4–)6–8; stigma broad, 3-branched. Fruit unlobed, 5–7 mm in diameter, glabrescent to pubescent; stone reticulate.

Open *Acacia* woodland on gravely granite soil; 550–2450 m. TU GJ WU SU AR IL KF GG SD BA HA; Somalia, Kenya, Uganda, Tanzania and Yemen. *Burger* 1114; *Mesfin et al.* 4075; *Sebsebe D. & Berhanu A.* 1887.

8. *G. sp.* = *Gilbert & Sebsebe* 8598

Shrub up to 4 m high. Young branches cylindrical with yellow tomentose indumentum, glabrous, purplish to pale brown in older parts without or with pale white lenticels. Leaf-blade green with short, uniform, stellate hairs above, and white densely tomentose below with short and long stellate hairs interspersed, ovate, broadly elliptic, elliptic-oblong to obovate, 1–6 × 0.6–3.2 cm; apex rounded to shortly acute; base cordate, truncate (in outline) to asymmetrical; margin crenate-serrate and slightly reflexed. Inflorescence solitary, 1–2.2 cm long and 2–3 flowered. Petals yellow, broadly elliptic to obovate 7–8 mm long with nectar-producing claw. Stamens yellow. Ovary 2-locular with 3–4 ovules in each locule; stigma broad, 4–5

branched. Fruit 2-lobed or unlobed by abortion, each lobe 4–6 mm in diameter, pubescent; stone rugose.

*Acacia* – *Combretum* – *Terminalia* woodland on dark red to brownish sandy soil; 1060–2050 m. SD BA; Kenya and Somalia. *Mesfin T.* 4415; *Puff et al.* 870509-7/4.

#### Section PLURIOVULATAE *Burret*

Inflorescence axillary; petals yellow; ovary 2-locular with 10–20 ovules in each locule; style with 2-subulate stigma lobes; fruit solitary or 2–4-lobed; stones rugose with pits.

1. Fruits not warted or subspinose; ovary 2-locular with 12–14 ovules in each locule. 9. *G. flavescens*  
– Fruits warted or spinose; ovary 2-locular with 14–20 ovules in each locule. 10. *G. forbesii*

9. *G. flavescens* *Juss.* (1804)  
– type: 'from India'.

Spreading or climbing shrub up to 4 m high. Branches strictly 4-angled in older ones, grey to brown, glabrous to pubescent with pale white lenticels. Leaf-blade uniformly pale green, or green above and pale green below with scattered stellate hairs on both surfaces to pubescent below, elliptic, oblong-lanceolate to obovate, 4–11.5 x 2–6 cm; apex acute to acuminate; base rounded to subcordate; margin irregularly crenate-serrate. Inflorescence 1(–2) in each axil, each 1–2.5 cm long and 2–3-flowered. Petals yellow, oblong, 6–9 mm long with nectar-producing claw. Stamens yellow. Ovary 2-locular with 12–14 ovules in each locule; stigma subulate, 4-branched. Fruit 7–12 mm in diameter with (1–)4-shallow lobes, covered with short appressed stellate hairs; stone rugose with pits, the pits being covered by whitish parenchymatous tissues. *Fig.* 79. 1.6–8.

Open *Acacia* – *Terminalia* woodland, on sandy, gravelly and loamy clay soils; 900–1900(–2300) m. EE EW TU GD GJ WU SU IL GG SD BA HA; widespread in tropical Africa, the Transvaal, SW Africa, also in Arabia and India. *Mooney* 7062; *Sebsebe D.* 3068; *Tewolde B.G.E.* 2418.

10. *G. forbesii* *Harv. ex Mast.* (1868)  
– type: Mozambique, *Forbes* s.n.

Branched shrub up to 3 m high or small tree (in other areas). Branches strictly 4-angled brownish with white lenticels, glabrous in older ones to terete and ferruginously hairy in young ones. Leaf-blade uniformly pale green or green above and pale green below with scattered stellate hairs on both surface to pubescent below, ovate-oblong, obovate-oblong to broadly elliptic, 5–10(–12) x 3–5(–7) cm, apex acute to acuminate, base rounded, truncate to subcordate; margin crenate to crenate-serrate. Inflorescence 1–2 in each axil, each 1–2.5 cm long and 2–3 flowered. Petals yellow, oblong, 6–9 mm long with nectar-producing claw. Stamens yellow. Ovary 2-locular with 14–20 ovules in each locule; stigma subulate, 4-branched. Fruit (1–)2–4 shallowly lobed, 7–12 mm in diameter, covered with sparse setose hairs and warty rough protuberances; stone rugose with pits, the pits being covered by whitish parenchymatous tissues.

Near confluence of rivers; c 650 m. GG (Omo river valley); coastal regions of Kenya, Tanzania and Mozambique, and inland in Malawi and Kenya. *Gereau* 1340.

*Gereau* 1340 differs from other specimens in this species by its longer pedicel 6–10 mm long, puberulous style and fruit with lateral beak. Specimens from other areas have pedicels 2–4 mm long, style villous throughout except at the apex and and fruit lacking a beak.

11. *G. schweinfurthii* *Burret* (1910)  
– type: Yemen: Gebel Bura, *Schweinfurth* 517 and Gebel Melhan, *Schweinfurth* 793.

Shrub up to 4 m high. Branches rounded, dark red to greyish, glabrous to pubescent in young parts with pale lenticels. Leaf-blade uniformly green, with scattered stellate hairs on both sides, ovate to trilobed, 4–7(–9.5) x 2–6 cm; apex acute to obtuse; base rounded to truncate; margin crenate-serrulate. Inflorescence 2–3 together terminal and/or solitary leaf-opposed, each 1.5–2.5 cm long and 3-flowered. Petals yellow, elliptic-oblong to obovate, 7–11 mm long with nectar-producing claws. Stamens yellow. Ovary 2-locular with 8 ovules in each locule; stigma subulate, 4-branched. Fruit solitary, 4–8 mm long, covered with scattered long hairs; stone rugose.

Open grassland, *Acacia* woodland on rocky limestone slopes, between basalt rocks and in sandy soils; 600–1600 m. WU SU AR HA; Somalia and the Yemen Arab Republic. *Ash* 1585; *Gilbert* 2361; *Sebsebe D. & Tamirat B.* 2349.

Specimen Rocher d'Herie included under *Grewia* sp. indet. in *Cufodontis* (1958) belongs to this species.

#### Section GREWIA (OPPOSITIFLORAE *Burret*)

Inflorescence leaf-opposed; petals white, lilac, purple or pink; ovary 2-locular with 2–4 ovules in each locule; style with 2–4 branched broad stigma lobes; fruit 2–4 lobed; stone smooth to rugose.

1. Inflorescences with 3–15 flowers. 2  
– Inflorescences with 1–3 flowers. 3
2. Leaves always with some apexes acuminate, margins irregularly double crenate-serrate; indumentum (best seen on inflorescence) rust-coloured; petals white. 12. *G. ferruginea*  
– Leaf-apexes all rounded to obtuse, margin regularly crenate-serrate; indumentum off-white; petals purple. 13. *G. similis*
3. Inflorescence always 2–3 flowered. 4  
– Inflorescence always 1-flowered. 5
4. Leaf-blade oblong to obovate, apex rounded to truncate; fruit 2–4-lobed, each lobe 6–10 mm in diameter, stone smooth. 14. *G. lilacina*  
– Leaf-blade elliptic to ovate, apex obtuse to acute; fruit 2–4-lobed, each lobe 4–6 mm in diameter, stone rugose. 15. *G. tembensis*
5. Flowers produced before or with the leaves; pedicel always with a whorl of 3 persistent bracts at base; filaments pink to pale purple. 16. *G. kakothamnos*  
– Flowers always produced after the leaves appear; bracts 1–2, minute, falling soon; filaments white. 6

6. Leaf-blade broadly ovate to orbicular, margin crenate; inflorescence 2–5 cm long; ovary glabrous; stone smooth.

17. *G. tenax*

– Leaf-blade obovate to elliptic, margin entire to serrate; inflorescence 1–2.5 cm long; ovary hairy; stone distinctly rugose-pitted.

7

7. Leaf-blade obovate, up to 2.5 cm long, margin crenate-serrate, base cuneate to rounded; sepals 10–12 mm long; stone laterally flattened and without a dorsal groove.

18. *G. erythraea*

– Leaf-blade elliptic, up to 8 cm long, margin entire, base cordate; sepals 15–22 mm long; stones pea-shaped and with a dorsal groove.

19. *G. ogadenensis*

12. *G. ferruginea* Hochst. ex A. Rich. (1847)

– types: TU, Chire (Shire), *Quartin-Dillon* s.n. (P syn.); Mt. Scholoda, near Adwa, *Schimper* I:183 (P K UPS syn.); *Schimper* I:215 (P syn.); Ferrokoba, *Schimper* II:967 (P syn.).

*G. columnaris* Hochst. non Smith (1811).

*G. beguinotii* Lanza (1939) – type: SD, Arero (Meta Gefersa), *Cufodontis* 260 (FT holo.).

Straggling shrub or tree up to 6 m high. Young branches purplish, glabrous to puberulous with scattered lenticels. Leaf-blade green and glabrous above, pale green with scattered stellate hairs below, elliptic to rarely obovate, 3.5–12.5(–20) x 2–6(–10) cm; apex acuminate to sometimes obtuse; base rounded; margin crenate to serrate. Inflorescence leaf-opposed, solitary, 2–5.5 cm long and 3–15 flowered. Petals white, lanceolate, 8–12 mm long, tapering at the apex and with nectar-producing claw. Stamens white. Ovary 2-locular with 4 ovules in each locule; stigma broad, 4-branched. Fruit (2–)4-lobed, each lobe 6–7 mm in diameter, glabrous; stone smooth. Fig. 79.2.

In gallery forest near lakes, along rivers and in open *Acacia*–*Combretum* woodland, on dark brown soil; 1350–2700 m. EE EW TU GD GJ WU SU AR WG IL KF SD BA HA; Red Sea hills in the Sudan. *Lemma* G.S. 16; *Sebsebe* D. 3078; *Thulin* et al. 3324.

13. *G. similis* K. Schum. (1893)

– type: Tanzania, between Ukoro and Jkitschu, *Fischer* 55 (K iso.).

Straggling shrub or tree up to 5 m high. Young parts purplish, pubescent in older parts becoming glabrous with white lenticels. Leaf-blade green above, pale green below, glabrous in mature leaves, broadly elliptic, 2–5(–9) x 1.5–3.5(–6) cm; apex obtuse to acute; base rounded; margin regularly serrate. Inflorescence leaf-opposed, solitary, 2–3 cm long and 3–5 flowered. Petals purple, oblong to elliptic c 11 mm long with nectar-producing claw. Stamens purple. Ovary 2-locular with 4 ovules in each locule; stigma broad, 4-branched. Fruit (2–)4-lobed, each lobe 6–7 mm in diameter, glabrous to puberulous with few scattered hairs; stone rugose.

In evergreen bushland and degraded montane forest, on black cotton and sandy soil; (1000–)1450–2300 m. SD BA HA; Uganda, Kenya and Tanzania. *Gilbert* et al. 7892; *Mesfin* T. et al. 3411; *Sebsebe* D. 1231.

14. *G. lilacina* K. Schum. (1904)

– type: Kenya, Kilimanjaro, near Voi, *Engler* 1967.

Shrub up to 2.5 m high. Branches grey, glabrous except on the very young parts, with few white lenticels. Leaf-blade pale green with scattered hairs above and whitish tomentose below, oblong to obovate, 1–4.2 x 0.6–2.5 cm; apex rounded to truncate; base rounded, subcordate cuneate; margin crenate-serrulate. Inflorescence solitary, 1–1.8 cm long, and (1–)2–3 flowered. Petals lilac, broadly elliptic to lanceolate, 7–8 mm long, pubescent on mid-vein, with nectar-producing claw. Stamens lilac (pale mauve). Ovary 2-locular with 5–6 ovules in each locule; stigma broad, 4-branched. Fruit (2–)4-lobed, each lobe 6–10 mm in diameter, glabrous to puberulous with a few scattered hairs; stone smooth.

*Acacia* – *Commiphora* woodland on sandy soil and among rocky outcrops; 450–1400 m. GG SD; Kenya, Somalia and Tanzania. *Corradi* 6511; *Puff* et al. 870501-27; *Gilbert & Sebsebe* D. 8711.

15. *G. tembensis* Fresen. (1837)

– type: TU: between Tembien and Semien, *Rüppel* s.n. (FR holo. not seen).

Shrub up to 4 m high. Branches grey to purplish, glabrous, pubescent only in young parts without or with a few lenticels. Leaf-blade green above and below, or pale green above and white below, glabrous above and glabrous or densely tomentose below (in var. *ellenbeckii*), elliptic to sometimes ovate, 1–9.5 x 1–5.5 cm; apex obtuse to acute; base rounded; margin finely regularly crenate-serrate. Inflorescence leaf-opposed, solitary, 1.2–4.5 cm long and 3 flowered. Petals white, elliptic, c 7 mm long, with a basal nectar-producing claw. Stamens pink to purplish. Ovary 2-locular with 2 ovules in each locule; style with 4-lobed stigma. Fruit 2–4 lobed, each lobe 4–6 mm in diameter, glabrous; stone rugose.

1. Leaves green on both surfaces; glabrous.

var. *tembensis*

– Leaves green and glabrous above; white tomentose beneath.

var. *ellenbeckii*

var. *tembensis*.

*G. membranacea* A. Rich. (1847) – type: TU, between Chire (Shire) and Choho, *Quartin-Dillon & Petit* s.n. (P holo.).

*G. parviflora* Hochst. ex A. Rich. (1847) p.p. – types: TU, near Sabra, *Schimper* II:978 (P syn.); TU, no location given, *Quartin-Dillon & Petit* s.n. (P syn.).

*G. reticulata* Hochst. (1856) nom. nud.

*Acacia* woodland, on rocky ground; 450–1900(–2250) m. EE EW TU GD GJ WU SU SD BA HA; Somalia, N. Yemen, and Saudi Arabia. *Sue Edwards & Tewolde* B.G.E. 3666; *Mesfin* T. & *Sebsebe* D. 3808; *Schimper* 2138.

var. *ellenbeckii* Burret (1910)

– types: HA, *Ellenbeck* 613 (B holo. destroyed.); AR/SU, Bolo, along the river Awash, *Ellenbeck* 1528 (B holo. destroyed.).



Figure 79.2 *GREWIA FERRUGINEA*: 1 – fructing branch x 1; 2 – part of inflorescence with an open flower x 3; 3 – lobe of dried fruit x 4; 4 – fruit with fleshy pericarp removed to show smooth stone x 4. 1, 3 & 4 from *Ensermu K. & Melkie T.* 1730; 2 from *Chaffey* 480. Drawn by Damtew Teferra.



*Acacia* woodland; 1300–1800 m. WU SU AR HA; Somalia. *Burger* 3790; *Mooney* 9124; *W. de Wilde* 6540.

16. *G. kakothamnos* *K. Schum.* (1904)

– types: Tanzania, Pare Region, *Engler* 1622, 1699.

*G. tembensis* *Fresen.* var. *kakothamnos* (*K. Schum.*)

*Burret* (1910) in *Engl., Bot. Jahrb. Syst.* 45: 194 (1910).

Shrub up to 4 m high, usually flowering without leaves. Branches glabrous except when very young, with pale lenticels. Leaf-blade uniformly green, glabrous to puberulous with a few scattered hairs on both surfaces, obovate to broadly elliptic narrowing to the base, 2–7 x 1.5–5 cm; apex and base both rounded; margin irregularly crenate. Inflorescence leaf-opposed, solitary, 1–2 cm long with a solitary flower. Petals white to pale lilac, obovate, 5–8 mm long with poorly developed nectar-producing claw. Stamens pink to purple. Ovary 2-locular with 2 ovules in each locule; stigma 4-branched. Fruits greenish with purple tinge when young maturing to orange, 2–4-lobed, each lobe 4–5 mm in diameter, glabrous; stone rugose.

*Acacia* – *Commiphora* woodland, on limestone, quartzschist and sandy soils; (450–)600–1850 m. SD BA; Somalia, Kenya, Uganda and Tanzania. *Gilbert et al.* 8112; *Mooney* 9725; *Puff et al.* 870429-1/17.

17. *G. tenax* (*Forssk.*) *Fiori* (1912);

*Chadra tenax* *Forssk.* (1775) – types: Yemen *Forsskål* 491 & 1085 (C syn.).

*G. tenax* var. *ribesifolia* *Fiori* (1912) – types: TU, Gursarfa in Agau, *Schimper* ed. *Hohen.* 2202 (K syn.); EW, Mt. Zedamba, *Beccari* 108, 118 (FT syn.); TU, between Agordat and Domba, *Senni* 79 (FT syn.).

*G. tenax* var. *capillipes* *Lanza* (1939) – type: SD, Melka Guba at the Dawa Parma River, *Cufodontis* 71 (FT holo.).

Shrub 1–4 m high. Branches grey to brown, glabrous to puberulous with numerous white lenticels. Leaf-blade uniformly green to pale green, glabrous to pubescent, ovate to orbicular, 1.5–6 x 1.5–4.5 cm; apex rounded to acute; base rounded to subcordate; margin crenae-serrate. Inflorescence leaf-opposed, solitary, up to 3(–4) cm long. Petals white, elliptic-oblong to obovate, 7–10 mm long, with nectar-producing claw. Stamens white. Ovary 2-locular with 4 ovules in each locule; stigma broad, 4-branched. Fruit 2–4-lobed, each lobe 5–6 mm in diameter, stone smooth.

*Acacia* – *Terminalia* – *Combretum* woodland, between lava rocks and in sandy soils; 0–1450(–1800) m. EE TU WU SU AR KF GG SD BA HA; widely distributed throughout Africa from the Flora area to South Africa and from Somalia to Senegal, also in Arabia. *Burger* 2013; *Friis et al.* 2837; *Sebsebe D.* 304.

18. *G. erythraea* *Schweinfurth* (1868)

– types: Sudan, Mt Uartab near Suakin, *Schweinfurth* 2490 (BM syn.); *Schweinfurth* 2488, 2489, 2491 not seen.

Many-branched prostrate shrub with branches up to 2 m high. Branches pale to dark grey, glabrous, without or with

a few lenticels. Leaf-blade uniformly pale green, glabrous to pubescent with scattered stellate hairs, obovate to elliptic, 1–3 x 0.5–3 cm; apex rounded; base cuneate to rounded; margin widely crenate to acutely serrate, sometimes minutely denticulate. Inflorescence solitary, leaf-opposed, 1–2.5 cm long. Petals white, 7–10 mm long, linear-oblong to obovate with nectar-producing claws. Stamens white. Ovary 2-locular, with 2 ovules in each locule; stigma broad, 4-branched. Fruits 2–4-lobed, each lobe 4–5 mm in diameter, glabrous to puberulous with scattered long hairs; stone rugose.

*Acacia* – *Commiphora* woodland, between lava and limestone rocks and in stony soils; 450–1650 m. EW TU WU SU GG SD HA; Egypt, Sudan, Kenya, Somalia, Socotra, Yemen, Oman and Afghanistan. *Gilbert et al.* 8095; *Glover & Gilliland* 390; *Sebsebe D. & Tamirat B.* 2300.

19. *G. ogadenensis* *Sebsebe* (1988)

– type: HA, Ogaden, 40 miles NNW Ferfer, *Hemming* 378 (K holo., FT iso.).

Shrub up to 2 m high. Branches purplish to dark brown, glabrous with a few lenticels. Leaf-blade uniformly pale green, glabrous, elliptic, 3–8 x 1–6 cm; apex rounded to rarely retuse; base rounded to deeply cordate; margin entire. Inflorescence leaf-opposed, solitary, 2–2.5 cm long. Petals white, linear, 9–12 mm long with nectar-producing claws. Stamens white. Ovary 2-locular with 2–4 ovules in each locule; stigma 2-branched. Fruit 2–4 lobed, each lobe 6–8 mm in diameter, with scattered hairs; stone rugose.

*Acacia* – *Commiphora* – *Boswellia* woodland on limestone, gypsum and sandy soils; 250–450 m. SD BA HA; Somalia. *Gilbert et al.* 8167; *Puff et al.* 870506-1/1; *Simmons* S92.

Section GLOMERATAE *Burret*

Inflorescence leaf-opposed, dense, several to many flowered with very short peduncles; petals yellow or pink; ovary 2-locular with 4(–5) ovules in each locule; style with lacinate (slashed into narrow divisions with taper pointed incisions) stigma lobes; fruit fleshy, solitary or shallowly 4-lobed; stones with irregular depressions.

1. Leaf-blade obovate to broadly elliptic, 3-nerved at base; inflorescence always leaf-opposed; sepals with prominent tuft of hairs at tip; petals yellow.

21. *G. pennicillata*

– Leaf-blade suborbicular, 5-nerved at base; inflorescences leaf-opposed, terminal and/or extra-axillary; sepals without long hairs at tip; petals light red or yellow.

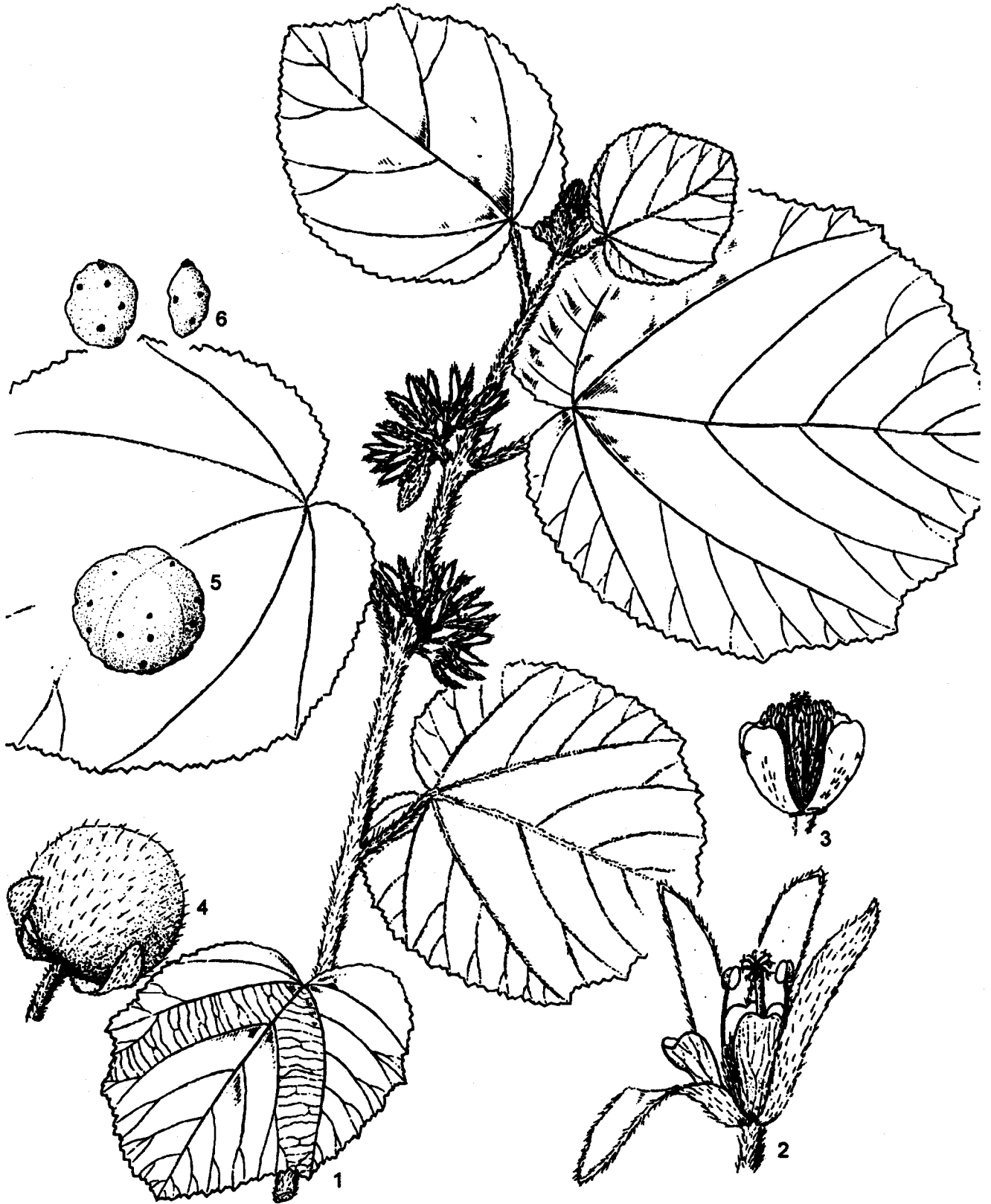
20. *G. villosa*

20. *G. villosa* *Willd.* (1804)

– type: 'from India'.

*G. echinulata* *Del.* (1826) – types: TU: *Schimper* II:1278 (P syn.); River Tekeze, *Schimper* 878 (K P syn.).

*G. corylifolia* *A. Rich.* according to *Guill. & Perr.* (1831).



DAMTEW T.

Figure 79.3 *GREWIA VILLOSA*: 1 - flowering shoot x 1; 2 - female flower with prominent stigma x 5; 3 - bisexual flower with sepals removed to show stamens and stigma x 4; 4 - fruit x 4; 5 - fruit with fleshy pericarp removed to show irregular and sparsely pitted stone x 4; 6 - individual stones x 4. 1 & 2 from Gilbert & Getachew A. 2324A; 3 from Sebsebe D. & Tamrat B. 2336; 4 from Ayele G/Mariam 17. Drawn by Dantew Teferra.

Branching shrub 1–3 m high. Branches rounded to flattened, purplish brown, without or with a few lenticels. Leaf-blade green and sparsely pubescent above, white and densely tomentose below, semi-circular to sometimes elliptic, 2–16(–25) x 1.5–14.5(–23) cm; apex rounded; base rounded to cordate; margin serrate. Inflorescence leaf-opposed or extra-axillary, each 1–2 cm long and 1–3-flowered; flowers functionally unisexual. Petals pink turning yellow at maturity, obovate, 6 mm long, with nectar-producing claws. Stamens yellow. Ovary 2-locular with 4(–5) ovules in each locule; stigmas lacinate, many. Fruit 12–15 mm in diameter, unlobed or shallowly 4-lobed, covered with scattered setulose hairs; stone with irregular depressions. Fig. 79.3.

*Acacia* – *Terminalia* – *Combretum* woodland in rocky, sandy and limestone areas; 400–1800 m. EE EW TU WU SU IL KF GG SD BA HA; widely distributed throughout the drier parts of Africa, Cape Verde Is., Arabia and India. *Burger* 1166; *Gilbert & Getachew A.* 2324A; *Sebsebe D.* 214.

## 21. *G. pennicillata* Chiov. (1932)

– type: Somalia, Cijuba, *Senni* 782 (FT holo.).

Semi-scandent shrub up to 2 m high. Young branches cylindrical, dark brown to purplish, glabrous to slightly puberulous with a few lenticels. Leaf-blade pale green and glabrous to sparsely pubescent above, white tomentose beneath, broadly elliptic to obovate, 1–4.5 x 0.8–2.8 cm; apex obtuse to rounded; rarely acute; base rounded; margin crenate. Inflorescence leaf-opposed, solitary or 2 together, each 1–2 cm long and 2–3-flowered. Flowers unisexual. Sepals with tufts of hairs at the tip. Petals yellow, obovate to elliptic, 4–6 mm long, with poorly developed nectar-producing claws. Stamens yellow. Ovary 2-locular with 4 ovules in each locule; stigmas lacinate, many. Fruit unlobed, 7–9 mm in diameter, with tomentose hairs; stone with irregular depressions.

*Acacia* – *Commiphora* woodland, on red sandy soils; 700–1350 m. WU SU SD BA HA; Somalia and Kenya. *Gilbert et al.* 8100; *Puff et al.* 870425-2/4; *Sebsebe D.* 2128.

## 2. CORCHORUS L. (1753)<sup>1</sup>

Annual or perennial herbs or shrublets; indumentum simple or stellate. Leaves simple, unlobed; margins crenate, dentate or serrate, basal teeth often prolonged into setaceous appendages; stipules subulate to triangular. Flowers solitary or in leaf-opposed fascicles. Sepals 4–5, hooded at apex, ciliolate at base. Petals about as long as sepals, yellow, linear to obovate, with a ciliate claw. Stamens 7-many, all fertile. Ovary 2–5-locular with 3-many ovules per locule; style with cup-shaped or slightly lobed stigma. Capsule glabrous, hairy, prickly or spiny, 2–5-valved, locules 2-many-seeded, sometimes with transverse septae; seeds greyish to blackish or brown, square, ellipsoid or cylindrical.

About 75 species in all tropical and subtropical regions.

The fibres (jute) of some species (e.g. *C. olitorius*) are used commercially in parts of Asia, especially India. Other species are widespread weeds. Young plants of the weedy species are edible and are used as pot herbs by some peoples.

1. Indumentum stellate; style 3–4 mm long. 2  
– Plant glabrous or with simple hairs; style 0.5–2 mm long. 3
2. Flowers in (2–)3–7-flowered fascicles (always some with 4 or more flowers); peduncle 0–2(–3) mm long; stamens *c* 75–100; capsule densely floccose tomentose. 1. *C. cinerascens*  
– Flowers solitary or in 1–2(–3)-flowered fascicles; peduncle up to 6 mm long; stamens *c* 30–50; capsule pubescent to tomentose. 2. *C. baldaccii*
3. Capsule spiny, ellipsoid, 4–7(–10) mm long. 12. *C. pseudocapsularis*  
– Capsule glabrous to hairy, sometimes rough on edges, cylindrical, 7–80 mm long. 4
4. All or most capsules 5(–6)-valved. 5  
– All or most capsules 3–4-valved. 6
5. Capsule 20–80 mm long, glabrous and smooth; coarse herb up to 2 m tall; sepals 4–7 mm long, glabrous. 3. *C. olitorius*  
– Capsule 7–15 mm long, hairy and scabrid; slender herb up to 30 cm tall; sepals 2–3 mm long, pilose. 4. *C. brevicornutus*
6. Capsule with 3 spreading horns at apex. 7  
– Capsule blunt to rostrate but not with spreading horns. 8
7. Capsule winged, horns 2–4 mm long; stems pilose and with a denser band of crisped pubescence. 7. *C. aestuans*  
– Capsule not winged, horns up to 2 mm long; stems glabrous to sparsely pilose, but not with a denser band of hairs. 8. *C. tridens*
8. Plant with prostrate stems, usually from a woody taproot; blade 3–25 mm long, usually shorter than petiole; capsule 4-valved, 8–20 mm long; stamens 10–15. 9. *C. depressus*  
– Stems not prostrate, or if so, then blade longer than above and much longer than petiole; capsule 3 (–4)-valved. 9
9. Capsules all erect or somewhat curved, on erect pedicels; sepals glabrous to sparsely pilose. 10  
– Some or all capsules reflexed towards stem, on reflexed pedicels; sepals pilose; stamens *c* 10. 11
10. Capsule (15–)25–80 mm long; stem with band of crisped pubescence; peduncle and pedicels up to 6 mm long; sepals 3–9 mm long; stamens (10–)20–40. 5. *C. trilocularis*  
– Capsule 80–15 mm long; stem glabrous; peduncle and pedicels up to 1 mm long; sepals 1–2 mm long; stamens 5–10. 6. *C. fascicularis*
11. Capsule with rough or sharply toothed angles, otherwise glabrous, usually distinctly curved. 10. *C. schimperi*  
– Capsule with smooth angles, pilose, usually straight. 11. *C. urticifolius*

1. When the account for this and the following genera were prepared, it was not required to give non-Ethiopian types for taxa.

1. *C. cinerascens* *Deflers* (1895).*C. bricchettii* *Weimarck* (1936).

Perennial herb or shrublet up to 0.5 m tall; indumentum stellate; branchlets tomentellous. Leaf-blade pubescent to tomentellous beneath, pubescent above, narrowly ovate or narrowly elliptic, 1.3–7.5 x 0.4–2.2 cm; apex acute to rounded; petiole 3–20 mm. Flowers in (2–)3–7-flowered tomentellous fascicles (always some with 4 or more flowers); peduncle 0–2(–3) mm; pedicels 2–9 mm. Sepals 5–8 mm long, tomentellous. Stamens *c* 75–100. Ovary tomentose. Capsule 3-valved, 0.8–3.5 cm long, cylindrical to slightly torulose, straight to slightly curved on spreading pedicels, floccose tomentose with stellately hairy bristles; seed *c* 2 mm long, very finely striate. Fig. 79.4.16–17.

*Acacia* – *Commiphora* woodland and bushland on red sandy to gravelly soil overlying limestone; 400–900 m. HA; Somalia, the Yemen. *Bally* 10142; *Ellis* 64, 170.

2. *C. baldaccii* *Mattei* (1908).

Annual or perennial herb or shrublet up to 0.5 m tall; indumentum stellate; branchlets and inflorescences densely pubescent to tomentellous. Leaf-blade sparsely pubescent to tomentellous beneath, subglabrous to puberulous above, narrowly ovate, elliptic or oblong, 1–6.5 x 0.2–1.8 cm; apex acute to rounded; petiole 3–15 mm. Flowers solitary or in 1–2(–3)-flowered fascicles; peduncle up to 6 mm; pedicels 4–15 mm. Sepals 4–8 mm long, pubescent. Stamens *c* 30–50. Ovary tomentose. Capsule 3-valved, 1–2.2 cm long, ellipsoid to cylindrical, straight to slightly curved on erect to spreading pedicels, pubescent to tomentose, sometimes with stellately hairy bristles; seed *c* 2 mm long, striate-reticulate. Fig. 79.4.14–15.

*Acacia* – *Commiphora* woodland and bushland on red sandy soil and rocky limestone ridges; 1200–1500 m. BA; S Somalia, NE and E Kenya, C Tanzania. *Gilbert* et al. 7877, 7992.

3. *C. olitorius* *L.* (1753).

Coarse annual herb up to 2 m tall; all parts glabrous. Leaf-blade narrowly ovate, ovate or elliptic, 2.5–17 x 1–5 cm, with up to 15 mm long basal setae; apex acuminate to acute; petiole 5–40 mm. Flowers in 1(–2)-flowered fascicles; peduncle and pedicels up to 2 mm. Sepals 4–7 mm long, distinctly ciliolate at base. Stamens *c* 25–50. Ovary minutely setulose. Capsule (4–)5-valved, 2–8 cm long, cylindrical, straight or slightly curved on erect pedicels, glabrous and smooth; seed 1.5–2 mm long, irregularly ribbed. Fig. 79.4.4.

Grassland on black cotton soil, riverine forest, riverbeds, weed in irrigated fields; 250–1250(–1750) m. EE AF EW GJ SU IL KF GG SD HA; pantropic, cultivated for its fibres (jute), especially in India. *Burger* 2887; *Gilbert & Thulin* 190; *IECA* BH-58.

4. *C. brevicornutus* *Vollesen* (1986)

– type: BA; S of Menna, *Friis* et al. 3737 (K holo., C ETH UPS iso.).

Erect annual herb up to 30 cm tall; stems glabrous to hispid-pubescent. Leaves strigose on petioles and veins; blade ovate to elliptic, 1–4.5 x 0.7–2.8 cm, without setae, apex subacute to broadly rounded; petiole 3–8 mm. Flowers in 1–2-flowered fascicles; peduncle and pedicels up to 1 mm long. Sepals 2–3 mm long, pilose. Stamens *c* 10. Ovary densely strigose with bulbous-based hairs. Capsule 5(–6)-valved, 0.7–1.5 cm long, cylindrical, straight on erect pedicels, scabrid to sparsely strigose, with 5(–6) *c* 1 mm long spreading to incurved horns at apex; seed *c* 1.5 mm long, reticulate.

*Acacia* – *Commiphora* – *Kirkia* bushland on greyish clay; *c* 1050 m. BA; N Tanzania. The only collection from the Flora area is the type.

This very distinctive species is only known from two collections, the other being from Tanzania. Despite the big disjunction the two collections are identical in all important characters.

5. *C. trilocularis* *L.* (1767).

*C. serraeifolius* *sensu* A. Rich. (1847), not Burch. (1822).

*C. gracilis* *R. Br.* in Salt (1814), *nom. nud.*

Erect to procumbent annual or perennial herb up to 0.5 m tall; stems with a band of crisped pubescence, otherwise glabrous to pilose. Leaf-blade sparsely setulose to pubescent, narrowly ovate to ovate, narrowly elliptic or oblong, 1.5–11 x 0.5–3.5 cm, with up to 7 mm long basal setae; apex subacuminate to rounded; petiole 0.3–1.5(–2.2) cm. Flowers in 1–3(–4)-flowered pilose fascicles; peduncle and pedicels up to 6 mm long. Sepals 3–9 mm long, glabrous to sparsely pilose. Stamens (10–)20–40. Ovary with sparse to dense tufted hairs. Capsule 3(–4)-valved, (1.5–)2.5–8 cm long, cylindrical, straight to curved on erect pedicels, usually scabrid; seed 1–1.5 mm long, very finely reticulate. Fig. 79.4.1–3.

*Acacia* – *Commiphora* and *Combretum* – *Terminalia* woodland and bushland, *Acacia drepanolobium* grassland, alluvial plains, riverbeds, coastal sand dunes, roadsides, weed; sea-level to 2050 m. EE AF EW TU GD GJ WU SU KF GG SD BA HA; widespread in tropical Africa and Asia. *Bally* 6945; *Gilbert & Thulin* 241, 269.

6. *C. fascicularis* *Lam.* (1786).

Erect to procumbent annual herb up to 0.5 m tall; stems and leaves glabrous. Leaf-blade lanceolate to narrowly ovate or elliptic, 1.5–7.5 x 0.3–1.8 cm, without setae; apex acute to rounded; petiole 2–18 mm. Flowers in (1–)2–5-flowered sparsely pubescent fascicles; peduncle and pedicels up to 1 mm. Sepals 1–2 mm long, glabrous. Stamens 5–10. Ovary sparsely appressed pilose. Capsule 3(–4)-valved, 0.8–1.5 cm long, cylindrical, straight on erect pedicels, smooth, glabrous to puberulous (rarely strigose); seed 1–1.5 mm long, finely reticulate. Fig. 79.4.6.

Grassland on black cotton soil, in wet depressions, weed in irrigated fields; 400–1800 m. EE EW TU GD GJ SU IL GG; widespread in tropical Africa, India and in

Australia. *Corradi* 6678; *Gilbert & Thulin* 191; *Pappi* 7691.

7. *C. aestuans* L. (1759).

Erect to procumbent annual herb up to 20 cm high or with up to 40 cm long branches; stems pilose and with a denser band of crisped pubescence. Leaf-blade sparsely setulose, ovate, broadly ovate or elliptic, 1.5–6.5 x 1–4 cm, some or all with up to 5 mm long basal setae; apex acute to rounded; petiole 5–30 mm. Flowers in 1–2(–3)-flowered fascicles; peduncles up to 2 mm, pilose; pedicels up to 3 mm, glabrous. Sepals 3–4 mm long, glabrous. Stamens *c* 10. Ovary strigose. Capsule 3-valved, 1.5–2.7 cm long, cylindrical, straight on stiffly erect pedicels, glabrous, with up to 2 mm wide membranaceous wings on angles and terminated by 3 spreading 2–4 mm long horns; seed *c* 0.5 mm long, pitted. Fig. 79.4.12.

Sandy riverbeds; 500–600 m. IL; pantropic. *Friis* et al. 2541.

8. *C. tridens* L. (1771).

Erect to procumbent annual herb up to 0.5 m tall; stems glabrous to sparsely pilose. Leaf-blade glabrous to sparsely setulose on main veins, narrowly ovate to ovate, narrowly elliptic or narrowly oblong, 1.5–11(–14) x 0.5–2.7 cm, some or all with up to 8 mm long basal setae; apex acuminate to rounded; petiole 2–15 mm. Flowers in 1–3(–4)-flowered glabrous fascicles; peduncle and pedicels up to 1 mm long. Sepals 2–4 mm long, glabrous or with a few appressed hairs. Stamens *c* 10. Ovary papillose to setulose. Capsule 3-valved, 1.7–5 cm long, straight or usually curved on erect pedicels, cylindrical, slightly ribbed, terminated by 3 up to 2 mm long horns; seed 1–1.5 mm long, finely reticulate. Fig. 79.4.5.

*Acacia*, *Acacia* – *Commiphora*, *Combretum* – *Terminalia* and *Anogeissus* woodland and bushland, usually in shade, weed in irrigated cotton; 400–1700 m. AF EW TU GD GJ SU KF GG SD HA; widespread in tropical Africa and Asia. *Friis* et al. 2872; *Gilbert & Thulin* 14, 150.

Modern floras usually reports this species as a weed of cultivation, but the collections from the Flora area are mostly from natural vegetation.

9. *C. depressus* (L.) C. Chr. (1922).

*C. microphyllus* Fresen. (1837) – type: EE; near Massawa, *Rüppel* s.n. (FR holo.).

Prostrate annual or perennial herb, often developing a thick, woody rootstock; stems up to 30 cm long, glabrous to sparsely pubescent. Leaf-blade glabrous to sparsely setulose on veins, ovate to elliptic or oblong, 3–25 x 2–15 mm, without setae; apex acute to rounded; petiole 3–40 mm. Flowers in 1–2(–3)-flowered glabrous fascicles; peduncle and pedicels up to 2 mm, curved outwards and downwards in fruit. Sepals 2–3 mm long, glabrous. Stamens 10–15. Ovary densely covered with bulbous-based bristly hairs. Capsule 4-valved, 0.8–2 cm long, cylindrical, scabrid, straight to strongly bent and/or twisted, often

buried in the ground; seed 1–1.5 mm long, very finely reticulate. Fig. 79.4.7.

Open *Acacia* – *Commiphora* bushland on red sandy soil, coastal bushland on grey sand; near sea-level to 800 m. EE AF GG HA; from Guinea along the southern edge of the Sahara to Eritrea, Ethiopia and Somalia, also in Egypt, Arabia, Afghanistan, India. *Bally* 6770; *Greathead* 140; *Hemming* 1143.

Eaten as a vegetable in Eritrea.

10. *C. schimperi* Cufod. (1958)

– type: TU; Gafta, *Schimper* II.1191 (P holo., BM FI(Webb) K UPS iso.).

*C. muricatus* Hochst. ex A. Rich. (1847), not Schumacher & Thonn. (1827). – type: as above.

Annual herb, main stem up to 15 cm tall, branches tending to be decumbent or ascending and up to 30 cm long; stems glabrous to sparsely pilose and with a denser band of crisped pubescence. Leaf-blade sparsely setulose on veins, narrowly ovate to oblong or elliptic, 0.5–6 x 0.3–2.7 cm, without setae; apex acute to rounded; petiole 3–15 mm. Flowers in 1–2-flowered pubescent fascicles; peduncle and pedicels up to 2 mm, recurved in fruit. Sepals 3–4 mm long, pilose. Stamens *c* 10. Ovary with toothed angles, each tooth hair-tipped, otherwise glabrous. Capsule 3-valved, 1–2.5 cm long, straight or usually curved, reflexed, cylindrical to trigonous, angles rough to sharply toothed; seed *c* 1.5 mm long, finely pitted. Fig. 79.4.10–11.

*Acacia* bushland on rocky granitic slopes, weed in crops on black cotton soil; (600–)1800–2200(–2600) m. EW TU GD WU SU GG SD HA; Kenya, Tanzania, Malawi, Zambia, Zimbabwe, Botswana, Namibia, S Africa. *Gilbert* 4073; *Mesfin* T. et al. 4254; *Mooney* 7964.

11. *C. urticifolius* Wight & Arn. (1834).

*C. quinquenervis* Hochst. ex A. Rich. (1847) – type: TU; Tacazze Valley, *Schimper* III.1454 (P holo., BM FI(Webb) FT K iso.).

Erect ephemeral or annual herb up to 40 cm tall; stems sparsely pilose and usually with a denser band of crisped pubescence. Leaf-blade sparsely setulose on veins, narrowly ovate to ovate, 1–7 x 0.3–3.5 cm, without setae; apex acuminate to acute; petiole 3–16 mm. Flowers in 1–2-flowered sparsely pilose fascicles; peduncle and pedicels up to 2 mm, in solitary flowers reflexed, in pairs one reflexed and one curved upwards. Sepals *c* 3 mm long, pilose. Stamens *c* 10. Ovary densely strigose. Capsule 3-valved, 1–2.5 cm long, cylindrical to trigonous, pilose or sparsely so, straight to slightly curved, reflexed if solitary, one reflexed and one pointing upwards if paired; seed *c* 1.5 mm long, pitted. Fig. 79.4.8–9.

*Acacia* – *Commiphora* bushland, in shade; 200–1000 m. EE EW TU SD; NE Kenya, N Somalia, C Tanzania, S India, Ceylon. *Friis* et al. 3212; *Pappi* 6016, 7026.

12. *C. pseudocapsularis* Schweinf. (1868).

*C. echinatus* Hochst. ex Garcke (1867), not Benth. (1863).

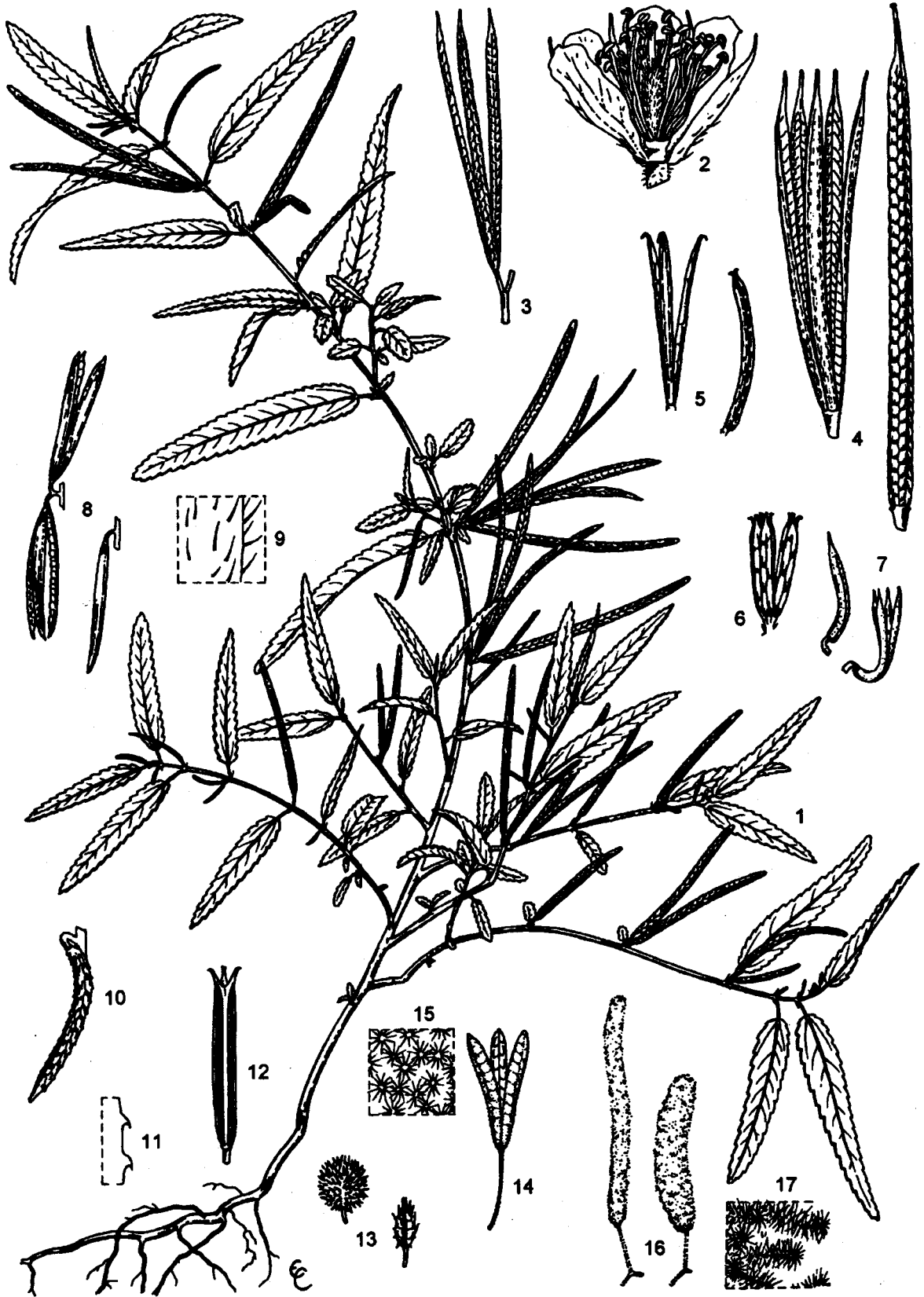


Figure 79.4 *CORCHORUS TRILOCULARIS*: 1 - whole plant  $\times \frac{2}{3}$ ; 2 - flower (one sepal and one petal removed)  $\times 4$ ; 3 - fruit dehisced  $\times 1$ . *C. OLITORIUS*: 4 - fruit, closed and dehisced  $\times 1$ . *C. TRIDENS*: 5 - fruit, closed and dehisced  $\times 1$ . *C. FASCICULARIS*: 6 - cluster of fruits  $\times 1$ . *C. DEPRESSUS*: 7 - fruit, closed and dehisced  $\times 1$ . *C. URTICIFOLIUS*: 8 - fruits, closed and dehisced  $\times 1$ ; 9 - detail of fruit-indumentum  $\times 14$ . *C. SCHIMPERI*: 10 - fruit  $\times 1$ ; 11 - detail of edge of capsule valve  $\times 14$ . *C. AESTUANS*: 12 - fruit  $\times 1$ . *C. PSEUDOCAPSULARIS*: 13 - fruit, closed and dehisced  $\times 1$ . *C. BALDACCII*: 14 - fruit  $\times 1$ ; 15 - detail of fruit-indumentum  $\times 14$ . *C. CINERASCENS*: 16 - fruits  $\times 1$ ; 17 - detail of fruit-indumentum  $\times 14$ . 1 from Gilbert & Thulin 241; 2 from Ciferri 53; 3 from Ash 879; 4 from IECA BH-58; 5 from Ash 879B; 6 from Gilbert & Thulin 191; 7 from Kotschy 342; 8-9 from Bullock 3776; 10 & 11 from Parker E97; 12 from Schweinfurth 2515; 13 from Andrews 68; 14 & 15 from Greenway et al. 12951; 16 & 17 from Ellis 170 (long fruit) and Elmi 516. Drawn by Eleanor Catherine.

*C. hochstetteri* Milne-Redth. (1948) – type: TU; Hamedia, Schimper 170 (BM K iso.).

Ephemeral or annual herb 0.6(–1) m tall; stems pilose. Leaf-blade sparsely setulose on veins, narrowly ovate to ovate or narrowly elliptic to elliptic, 2–10 x 0.5–2.5 cm, some or all with up to 8 mm long basal setae; apex acuminate to acute; petiole 3–20 mm. Flowers in 1–2(–3)-flowered pilose fascicles; peduncle and pedicels up to 3 mm. Sepals 3–5 mm long, pilose. Stamens c 25. Ovary covered in small spines. Capsule 5-valved, 4–7(–10) mm long, ellipsoid, densely spiny, with 3–5 seeds per locule; seed c 2 mm long, tuberculate. Fig. 79.4.13.

*Acacia drepanolobium* bushland and grassland on seasonally water-logged black cotton soil, weed in crops on black soil; 1000–1600 m. TU GD GJ SD BA; E Sudan, NE Uganda, C & W Kenya, C Tanzania, Mozambique, Zambia. Corradi 6522, 6574; Friis et al. 3738.

### 3. SPARMANNIA L. f. (1781), nom. conserv.

Weimarck in *Svensk Bot. Tidsskr.* 27: 400–413 (1933).

Shrubs or subshrubs; indumentum stellate or with intermixed simple hairs. Leaf-blade 3–7-angled or -lobed, palmately veined; margin crenate, dentate or serrate; stipules subulate to lanceolate. Inflorescence extra-axillary or leaf-opposed, umbellate; pedicels articulated in upper half; bracts subulate to triangular, fused at base. Sepals 4, narrowly ovate to elliptic. Petals 4, white to pink or purplish, oblanceolate to obovate. Stamens more than 50, outer ones sterile, most or all with moniliform filaments. Ovary 4–5-locular, ovules many; style slender, with 4–5-toothed stigma. Capsule 4–5-locular, covered by rigid bristles each terminated by a single seta.

5 species, 1 widespread in eastern tropical and S Africa, 1 in the Flora area, 1 in S Africa and 2 in Madagascar.

1. Stems, leaves, pedicels and calyx (or some of them) with long simple hairs; leaves beneath hairy on veins only; sepals 8–13 mm long; petals 9–13 mm long; fruit-body 0.8–1.5 cm long, sparsely pubescent.

#### 1. *S. ricinocarpa*

– No part of plant with long simple hairs (rarely present on leaves but then surface tomentellous and not visible); sepals 10–15 mm long; petals 12–16 mm long; fruit-body (1.3–)1.5–2 cm long, tomentose.

#### 2. *S. macrocarpa*

1. *S. ricinocarpa* (Eckl. & Zeyh.) O. Ktze. (1898).

*S. abyssinica* Hochst. ex A. Rich. (1847) – types: EW/TU; Mareb valley, *Quartin-Dillon & Petit* s.n. (not seen). GD; Semien, Schoata to Endchetcab, Schimper II.567 (P syn., BM FI(Webb) isosyn.).

*S. abyssinica* var. *concolor* Chiov. in *Ann. di Bot.* 9: 52 (1911) – types: GD, Uoghera, Mt. Augieva, *Chioventa* 2886 (FT syn.); GD, Semien, Debarek, *Chioventa* 3009 (FT syn.).

*S. ricinocarpa* subsp. *abyssinica* (Hochst. ex A. Rich.) Weimarck in *Svensk Bot. Tidsskr.* 27: 405 (1933).

*S. ricinocarpa* subsp. *hirsuta* (Oliv.) Weimarck, l.c.: 404 (1933).

*S. ricinocarpa* subsp. *hirsuta* var. *fischeri* (Engl.) Weimarck, l.c.: 404 (1933).

Slender subshrub or shrub up to 3 m tall, often scrambling; indumentum pubescent and with sparse to dense long simple hairs (rarely without). Leaf-blade beneath with hairs usually confined to veins, surface clearly visible, broadly cordiform in outline, deeply 3–5-lobed, 2–13(–15) x 1–13 cm, lobes triangular, middle one much longer, apex acuminate to cuspidate; petiole 1–5.5 cm. Umbels 3–25-flowered; peduncle 1–10 cm; pedicels 1–2.5 cm; bracts up to 12 mm long. Sepals 8–13 x 2–4 mm, pilose and with scattered stellate hairs. Petals 9–13 x 4–6 mm, pale pink or almost white to purplish or lilac. Filaments yellow, 4–6 mm. Style 3–7 mm. Capsule ellipsoid, body 0.8–1.5 cm long, sparsely pubescent; bristles 2–10 mm. Seed c 2 mm long, obtetrahedroid, dark brown. Fig. 79.5.1–6.

Edges and clearings in montane forest, secondary forest and scrub, montane grassland with bush-clumps, persisting in hedges and in *Eucalyptus* plantations; 2400–3300 (–3500) m. EW TU GD GJ SU AR WG KF GG SD BA HA; from S Sudan through eastern Africa to S Africa and Angola. IECA H-60; Mooney 5983, 6182.

2. *S. macrocarpa* Ulbr. (1914)

– type: AR; Abul Kassim, *Ellenbeck* 1407 (B holo., destr.).

*S. ricinocarpa* (Eckl. & Zeyh.) O. Ktze. subsp. *abyssinica* (Hochst. ex A. Rich.) Weimarck var. *macrocarpa* (Ulbr.) Weimarck in *Svensk Bot. Tidsskr.* 27: 405 (1933).

Stiffly erect shrub up to 2.5 m tall; indumentum tomentellous, without long simple hairs. Leaf-blade tomentellous beneath, surface usually not visible (rarely with long simple hairs); blade broadly cordiform in outline, deeply (3–)5–7-lobed, 4–19 x 4–18 cm, lobes triangular to ovate, middle one much longer, apex acuminate to cuspidate; petiole 1.5–6 cm. Umbels 7–25-flowered; peduncle 1.5–7.5 cm; pedicels 1–2.5 cm; bracts up to 15 mm long, often lacinate. Sepals 10–15 x 3–5 mm, tomentose. Petals 12–16 x 5–7 mm, pink to purple. Filaments yellow, 5–7 mm. Style 3–8 mm. Capsule ellipsoid, body (1.3–)1.5–2 cm long, tomentose, surface not visible; bristles 2–10 mm. Seed as in *S. ricinocarpa*. Fig. 79.5.7–8.

Edges of montane forest, montane scrub and scrub-grassland; 1800–3000 m. GD GJ WU SU AR WG KF GG HA; not known elsewhere. *Burger* 1963, *Friis* et al. 502, *Getachew Aweke & Gilbert* 1011.

Since Weimarck's revision, this has been considered conspecific with *S. ricinocarpa*. But in the author's opinion it is clearly a distinct species. The stiffly erect habit and tomentellous leaves gives it quite a different appearance from the slender and usually scrambling *S. ricinocarpa*.

### 4. TRIUMFETTA L. (1753)

Sprague & Hutchinson in *J. Linn. Soc. Bot.* 39: 231–276 (1909).

Annual or perennial herbs, subshrubs or shrubs; indumentum stellate or with simple hairs intermixed. Leaf-blade



Figure 79.5 *SPARMANNIA RICINOCARPA*: 1 – flowering stem  $\times \frac{3}{5}$ ; 2 – detail of stem-indumentum  $\times 5$ ; 3 – flower  $\times 2$ , sepals and petals partly removed; 4 – fertile stamen  $\times 10$ ; 5 – sterile stamen  $\times 10$ ; 6 – fruit  $\times 1$ , with detail of indumentum  $\times 5$ . *S. MACROCARPA*: 7 – detail of stem-indumentum  $\times 5$ ; 8 – fruit  $\times 1$ , with detail of indumentum  $\times 5$ . 1–5 from Mooney 6182; 6 from Ash 70; 7–8 from Friis et al. 502. Drawn by Eleanor Catherine.



unlobed to digitately lobed or divided; margin crenate, dentate or serrate; stipules subulate to narrowly triangular. Flowers in leaf-opposed fascicle-like cymes, these sometimes merging into narrow terminal racemoid panicles. Sepals 5, linear, usually with a subapical horn, more rarely hooded. Petals yellow to orange, linear to obovate, with ciliolate claw, of about same length as sepals. Stamens 5–40, all fertile. Ovary 2–5-locular, with 2 ovules per locule; style slender, stigma entire or 2–5-lobed. Capsule spiny or bristly, 3–5-valved, often indehiscent. Seed obovoid to subreniform, brown.

About 100–150 species in all tropical regions. Many species are widespread weeds.

1. Fruit dehiscent. 2
- Fruit indehiscent. 10
2. Most or all bristles terminating in several setae.
  1. *T. setulosa*
  - All bristles terminating in a single seta. 3
3. Bristles terminating in hooked setae. 4
- Bristles terminating in straight or curved setae. 8
4. Ephemeral or annual herbs; stems with 1–2 bands of crisped pubescence; sepals 2–4 mm long. 5
- Perennial herbs or shrubs; stems uniformly hairy; sepals 6–14 mm long. 6
5. Bristles glabrous. 2. *T. annua*
- Bristles pilose. 3. *T. trichocarpa*
6. Sepals 4–6 mm long; bristles 2–3 mm long.
  6. *T. cordifolia*
  - Sepals 6–16 mm long; bristles 3–8 mm long. 7
7. Stem-leaves unlobed; inflorescence leafy to apex or nearly so; fruit pubescent; bristles pilose to densely so; sepals 6–10 mm long; stamens *c* 10.
  5. *T. pilosa*
  - Stem-leaves 3-lobed; inflorescence not leafy; fruit glabrous; bristles glabrous to sparsely pilose at base, sepals 9–16 mm long; stamens 10–25. 7. *T. brachyceras*
8. Sepals with long simple pilose hairs. 4. *T. tomentosa*
- Sepals with short indumentum of stellate hairs only. 9
9. Sepals 6–10 mm long; basal leaves unlobed (rarely shallowly 3-lobed). 5. *T. pilosa*
- Sepals 4–6 mm long; basal leaves shallowly 3-lobed. 6. *T. cordifolia*
10. Bristles 8–15 mm long, slender and flexible, pilose; shrub. 8. *T. actinocarpa*
- Bristles 0.5–3 mm long, not flexible; annual or perennial herbs or shrubs. 11
11. Inflorescence leafy to apex or almost so; sepals without apical horns, hooded; bristles hooked. 12
- Inflorescence not leafy or only at lowermost nodes; sepals with distinct subapical horns; bristles straight, curved or hooked. 13
12. Fruit globose; bristles glabrous; stamens *c* 15; sepals 3–5 mm long; perennial (rarely annual) herb.
  9. *T. rhomboidea*
  - Fruit ovoid; bristles ciliate; stamens *c* 5; sepals 2–3 mm long; annual herb. 10. *T. pentandra*

13. Flower-buds yellowish to golden lanate; stamens *c* 20; sepals (3–)5–8 mm long; bristles 0.5–1.5 mm long, ascending. 11. *T. flavescens*
- Flower-buds glabrous to greyish pubescent (rarely tomentose); stamens 25–40; sepals 3–6 mm long; bristles 1–3 mm long, spreading. 12. *T. heterocarpa*

1. *T. setulosa* Mast. (1868).

*T. intermedia* De Wild. (1903).

Erect annual or perennial herb up to 75 cm tall; stems, leaves and inflorescences yellowish pubescent. Leaf-blade narrowly elliptic, elliptic or ovate, unlobed, 2–6 x 0.7–3 cm; apex acute to rounded; base rounded to subcordate; petiole 2–10 mm. Inflorescence leafy to apex, of fascicles clustered in axils of normal leaves; peduncle and pedicels up to 3 mm long. Sepals 3–5 mm long, pubescent, apical horns less than 0.5 mm long. Stamens *c* 10. Fruit globose, body *c* 4 mm in diameter, glabrous to sparsely puberulous; bristles 2–3 mm long, pubescent, terminated by (1–)2–5 straight spreading setae; seed *c* 2 mm long, glossy. Fig. 79.7.9.

Woodland and bushland, old gravel pits; 1650–2000 m. KF SD; Guinea to S Sudan, Uganda, W Tanzania, Burundi, E Zaire, Malawi, Zambia, Angola. *Mesfin Tadesse* 3193; *Mooney* 6023.

2. *T. annua* L. (1767).

*T. schimperi* Hochst. (1841), nom. nud.

Erect to procumbent annual herb up to 75 cm tall; stems and inflorescences with 1–2 bands of crisped pubescence, otherwise glabrous to sparsely pubescent. Leaf-blade sparsely setulose to pubescent, ovate to broadly elliptic, unlobed, 2.5–16 x 1.5–9.5 cm; apex acuminate to cuspidate; base rounded to truncate; petiole 0.5–10 cm. Inflorescence leafy to apex, of fascicles clustered in axils of normal leaves; peduncle up to 5(–10) mm and pedicels up to 4 mm long. Sepals 2–4 mm long, subglabrous to setulose, apical horns up to 0.5 mm long. Stamens 5–10. Fruit globose, body 3–6 mm in diameter, glabrous; bristles 2–6 mm long, glabrous, terminated by hooked setae; seed *c* 2 mm long. Fig. 79.7.10.

Clearings, tracks and forest margins, riverine forest, in shade in woodland and bushland; 1200–2150 m. EW TU GD GJ SU WG KF GG BA HA; Nigeria, Cameroon, Sudan and through eastern Africa to Natal and west to Angola and Namibia, also Madagascar and tropical Asia. *Friis* et al. 73, 3595; *Gilbert & Thulin* 859.

3. *T. trichocarpa* Hochst. ex A. Rich. (1847)

– types: TU; Gafta, *Schimper* II.1204 (P syn., BM FI(Webb) K isosyn.); TU; near Djeladjeranne, Mai Mezano, *Schimper* III.1682 (P syn., BM FI(Webb) K UPS isosyn.) and III.1683 (P syn., BM FT FI(Webb) K isosyn.).

Erect annual herb up to 50 cm tall; indumentum as in *T. annua*. Leaf-blade ovate, unlobed, 2–9 x 1–5 cm; apex acuminate; base rounded to truncate; petiole 0.5–5 cm. Inflorescence and flowers as in *T. annua*. Fruit globose,

body *c* 5 mm in diameter, puberulous; bristles 3–4 mm long, densely pilose; seed as in *T. annua*. Fig. 79.7.11.

Bushland (in shade), abandoned cultivations, weed; 1500–1700 m. TU; Cameroon, Central African Republic, Sudan (Jebel Marra), S Tanzania, SE Zaire, Mozambique, Malawi, Zambia. *Schimper* 369A.

This species seems not to have been collected in the Flora area since 1862! Its occurrence elsewhere also seems to be very scattered, which is odd considering its generally weedy nature.

#### 4. *T. tomentosa* Boj. (1842).

*T. tomentosa* var. *macrocerata* Chiov. in *Malpighia* 34: (1937) – type: GJ; Zimkil River, *Taschdjian* 232 (FT holo.).

*T. pilosa* Roth var. *glabrescens* Sprague & Hutch. forma *tricuspidata* Sprague & Hutch. in *J. Linn. Soc. Bot.* 39: 274 (1909) – type: BA; Sheik Husein, *Ellenbeck* 1250 (B holo., destr.).

Shrub up to 3 m tall (rarely annual or perennial herb); stems tomentose. Leaf-blade densely pubescent to tomentose, cordiform or broadly so, some or all stem-leaves deeply 3-lobed, 4–14 × 1.5–8.5 cm; apex acuminate; petiole 1–7 cm. Inflorescence leafy to apex, of fascicles clustered in axils of gradually narrower and unlobed leaves, pubescent; peduncle up to 5 mm and pedicels up to 5(–12) mm long. Sepals 5–9 mm long, subglabrous to pubescent and with long simple hairs in apical part or all over, apical horns up to 1 mm. Stamens *c* 10. Fruit globose, body 3–4 mm in diameter, pubescent; bristles 3–7 mm long, densely pilose, terminated by straight or curved setae. Seed *c* 2.5 mm long, glossy. Fig. 79.7.15.

Forest edges and clearings, secondary forest, disturbed bushland, roadsides, weed; 1600–2400 m. GJ SU WG SD BA HA; widespread in tropical Africa. *Burger* 2768, 3269; *Friis* et al. 3594.

The type of forma *tricuspidata* has not been seen, but from the description it seems more likely that it belongs here than in *T. pilosa*.

#### 5. *T. pilosa* Roth (1821).

*T. abyssinica* K. Schum. (1892) – type: TU; Lake Amba and Scholloda, *Schimper* 853 (BM K iso.).

Perennial herb or shrub 1(–2) m tall; stems, leaves and inflorescences pubescent to tomentose. Leaf-blade narrowly elliptic to elliptic or narrowly to broadly ovate, unlobed (rarely indistinctly 3-lobed), 3–13(–16) × 1.5–6.5(–9.5) cm; apex acuminate to acute; base truncate to cordate; petiole 0.5–3(–6) cm. Inflorescence leafy to apex or almost so, of fascicles in axils of normal or gradually smaller leaves; peduncle up to 1 cm; pedicels up to 5 mm. Sepals 6–10 mm long, pubescent to tomentose, without long simple hairs, apical horns up to 0.5 mm. Stamens *c* 10. Fruit globose, body 3–5 mm in diameter, sparsely pubescent; bristles 1–5 mm long, pilose or densely so, terminated by a straight, curved or hooked seta. Seed *c* 3 mm long. Fig. 79.7.13–14.

*Combretum* – *Terminalia* woodland, upland grassland and bushland, riverine thicket, old cultivations, weed;

1000–2200(–2750) m. EW TU GD GJ SU WG KF GG SD BA HA; widespread in tropical Africa, Madagascar and tropical Asia. *Friis* et al. 3444; *Gilbert* et al. 2519; *Mogk* 222.

This species has traditionally been divided into a number of varieties (latest in *Fl. Zamb.*), but the total variation seems to the author to be so complex, that a study of the species (and its relations to *T. tomentosa*) in its whole area must be undertaken before any reliable subdivisions can be made. *T. abyssinica* in its typical form represents no more than a glabrescent end of a continuous variation.

#### 6. *T. cordifolia* A. Rich. (1831).

Shrubby herb up to 1 m tall; stems and inflorescences puberulous to tomentose. Leaf-blade densely pubescent to tomentose or tomentellous, ovate or cordiform to orbicular in outline, stem-leaves shallowly 3-lobed to almost unlobed, 4.5–18.5 × 3.5–12.5 cm; apex subacuminate to subacute; base truncate to cordate; petiole 1–9 cm. Inflorescence leafy to apex or at lower nodes only, of fascicles in axils of unlobed leaves or along the leafless axes; peduncle up to 6 mm and pedicels up to 3 mm long. Sepals 4–6 mm long, tomentose or tomentellous, without long simple hairs, apical horns less than 0.5 mm. Stamens *c* 10. Fruit globose, body 3–4 mm in diameter, subglabrous to sparsely pubescent; bristles 2–3 mm long, glabrous to pilose, terminated by a straight, curved or hooked seta. Seed *c* 2 mm long.

*Combretum* – *Terminalia* wooded grassland with tall *Hyparrhenia* underneath, on rocky outcrops; 600–1300 m. KF GG; from W Africa to S Sudan and south to Tanzania, N Zambia and Angola. *Friis* et al. 3938.

Close to *T. pilosa* and also to *T. brachyceras* from which the glabrescent form mainly differs in smaller flowers and fruits.

#### 7. *T. brachyceras* K. Schum. (1900).

*T. macrophylla* K. Schum. (1892), not Vahl (1798).

*T. brachyceras* var. *macrophylla* (K. Schum.) Cufod. *Enum.*: 527 (1958).

*T. brachyceras* var. *rothii* (Sprague & Hutch.) Cufod., *l.c.*: 527 (1958) – type: SU; Ankober, *Roth* 52 (K holo.).

*T. pilosa* Roth var. *lejocarpa* Fiori in *N. Giorn. Bot. Ital.* 47: 33 (1940) – type: KF; Anderracchia, *Saccardo* 30 (FT holo.).

Shrubby herb or shrub up to 3(–5) m tall; stems, leaves and inflorescences pubescent to tomentose and with long simple hairs (rarely not). Leaf-blade conspicuously ciliate along main veins; cordiform to suborbicular, some or all stem-leaves 3-lobed, 6–16 × 4–11.5(–14) cm; apex acuminate; base subcordate to cordate; petiole 1.5–10 cm. Inflorescence an unbranched or branched panicle, only leafy at lowermost nodes (rarely higher up), with fascicles clustered along axes; peduncle up to 10(–20) mm and pedicels up to 4 mm long. Sepals 9–16 mm long, pubescent to tomentellous, sometimes with long hairs basally, apical horns up to 1 mm. Stamens 10–25. Fruit globose, body 4–6 mm in diameter, glabrous or with a few scattered hairs

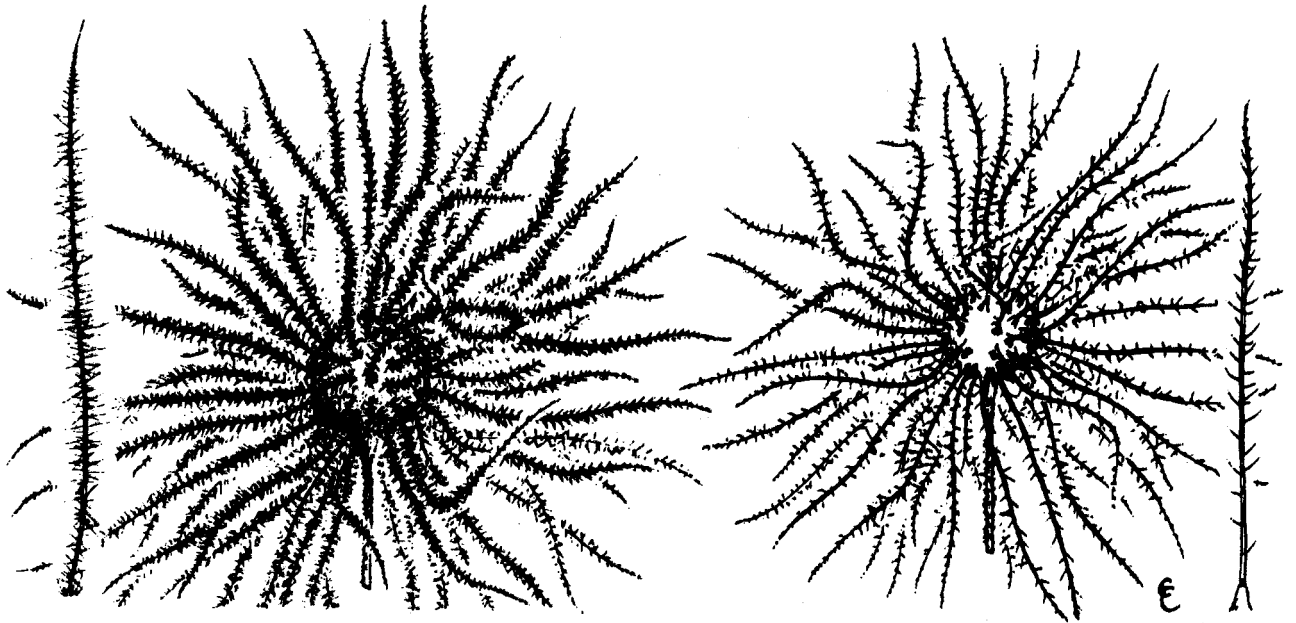


Figure 79.6 *TRIUMFETTA ACTINOCARPA*: Fruits  $\times 3$ , with single bristle enlarged  $\times 4\frac{1}{2}$ , from *Bally* 9245 (left) and *Popov* 1107 (right). Drawn by Eleanor Catherine.

pilose basally, terminated by a hooked seta. Seed 2–3 mm long. Fig. 79.7.12.

Montane forest, mostly on edges and in clearings, secondary forest and scrub, riverine forest; 1400–2650 m. WU GJ SU WG IL KF GG SD BA; S Sudan, E Zaire, Uganda, Kenya, Tanzania, Rwanda, Burundi. *Friis* et al. 376; *Mooney* 5652, 8682.

The only collection from SU (*Roth* 52) has more densely hairy fruits than usual, but merely seems to be at the extreme end of a continuous variation.

8. *T. actinocarpa* S. Moore (1877).

*T. pleiacantha* Sprague & Hutch. (1909) – type: BA/HA; Shebele River, *James & Thrupp* s.n. (K holo.).

Aromatic shrub up to 2 m tall; branchlets and leaves glabrous to tomentellous or tomentose, older branches with grey slightly ridged bark. Leaf-blade broadly ovate or broadly elliptic to orbicular, unlobed, 0.3–2.5(–3)  $\times$  0.3–2(–2.8) cm; apex subacute to rounded; base rounded to subcordate; petiole 3–15 mm. Inflorescence with solitary or paired puberulous or pubescent fascicles in axils of normal leaves or merging into a terminal panicle with bracts in basal part only; peduncle up to 5 mm; pedicels up to 8 mm. Sepals 6–11 mm long, sparsely pubescent to tomentellous, apical horns 1–2(–3) mm. Stamens  $c$  30–40. Fruit globose, body 3–5 mm in diameter, glabrous to densely pilose; bristles 8–15 mm long, thin and flexible, sparsely to densely pilose, terminated by a single or several straight setae. Fig. 79.6.

*Acacia* – *Commiphora* bushland on red sandy soil overlying limestone or on alluvial soil; 400–800 m. HA; Somalia. *Ellis* 62; *Gilbert* 2109; *Hemming* 1532.

9. *T. rhomboidea* Jacq. (1760).

*T. dembianensis* Chiov. (1911) – type: GD; Dembia, *Chiovenda* 2108 (FT holo.).

*T. rhomboidea* var. *angulata* (Lam.) Baker in *Fl. Maurit. and Seych.*: 32 (1877).

*T. rhomboidea* var. *glandulosa* (Lam.) Baker, *l.c.*: 32 (1877).

Coarse perennial (rarely annual) herb up to 1 m tall; stems and leaves pubescent to tomentose and with scattered long simple hairs. Leaf-blade ovate to broadly elliptic or obovate in outline, stem-leaves deeply 3-lobed, 2–13  $\times$  1.5–8.5 cm; apex acuminate to acute; base cuneate to truncate; petiole 1–6 cm. Inflorescence leafy to apex (rarely not in apical part), of pubescent fascicles clustered in axils of gradually narrower often unlobed leaves; peduncle and pedicels up to 3(–5 in fruit) mm long. Sepals 3–5 mm long, pubescent, hooded at apex. Stamens  $c$  15. Fruit globose, body 3–4 mm in diameter, tomentose; bristles 1–2 mm long, patent, glabrous or with a few hairs, terminated by a hooked seta. Fig. 79.7.1, 2 & 4.

Clearings and paths in rainforest, secondary forest and scrub, riverbanks, degraded bushland, weed; 400–2000 (–2750) m. EE EW TU GD SU WG IL KF GG SD BA HA; pantropic. *Friis* et al. 1759, 3571; *Mooney* 5316.

10. *T. pentandra* A. Rich. (1831).

*T. cuneata* Hochst. ex A. Rich. (1847) – types: TU; Djeladjeranne, Mai Mezano, *Schimper* III.1445 (P syn., BM FI(Webb) K isosyn.) and III.1460 (P syn., BM FT FI(Webb) K UPS isosyn.). EE; Modat, *Schimper* III.1756 (P syn., BM FT FI(Webb) K isosyn.).

Annual herb up to 1 m tall; stems pubescent and with scattered long simple hairs. Leaf-blade sparsely pubescent, broadly elliptic to suborbicular, unlobed to shallowly 3-lobed, 2–10  $\times$  1.5–8.5 cm; apex acute; base cuneate to truncate; petiole 0.7–5.5 cm. Inflorescence leafy to apex or nearly so, of pubescent fascicles clustered in axils of normal leaves; peduncle and pedicels up to 3 mm. Sepals 2–3 mm long, sparsely to densely pubescent, hooded at apex. Stamens  $c$  5. Fruit ovoid, body 3–4 mm long, densely

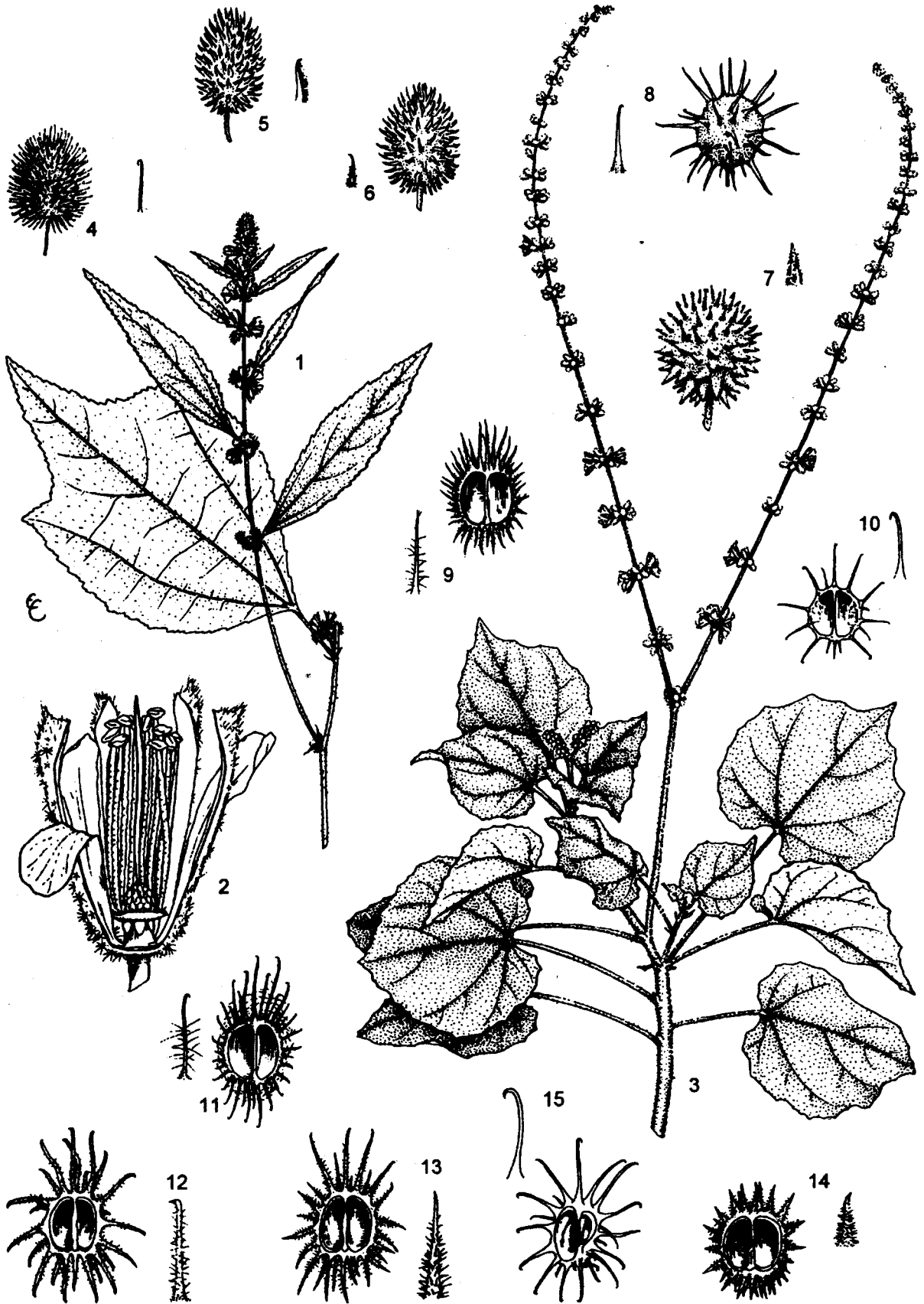


Figure 79.7 *TRIUMFETTA RHOMBOIDEA*: 1 – flowering stem  $\times \frac{1}{2}$ ; 2 – flower  $\times 6$ , sepals, petals and stamens partly removed. *T. FLAVESCENS*: 3 – flowering stem  $\times \frac{1}{2}$ . Fruits  $\times 3$  (each with a single magnified bristle  $\times 4\frac{1}{2}$ ) from *T. RHOMBOIDEA* (4), *T. PENTANDRA* (5), *T. FLAVESCENS* (6), *T. HETEROCARPA* (7–8), hairy and glabrescent forms, *T. SETULOSA* (9), *T. ANNUA* (10), *T. TRICHOCARPA* (11), *T. BRACHYCERAS* (12), *T. PILOSA* (13–14), forms with long and short bristles and *T. TOMENTOSA* (15). 1 & 2 from Turton 42; 3 from Friis et al. 960; 4 from Meyer 8015; 5 from Sherif A4002; 6 from Schimper 1020; 7 from Glover & Gilliland 456; 8 from Ash 1238; 9 from Milne-Redhead & Taylor 10712; 10 from de Wilde 7233; 11 from Schimper 369; 12 from Mooney 5652; 13 from Mogk 222; 14 from Pichi Sermolli 302; 15 from Tesfaye Haile 1155. Drawn by Eleanor Catherine.

pubescent; bristles 1–2 mm long, ascending, densely pilose on upper side, terminated by a hooked seta. Fig. 79.7.5.

*Acacia* – *Commiphora* and *Anogeissus* bushland (in shade); 100–1500 m. EE EW TU SU SD HA; widespread in tropical Africa and Asia. Friis et al. 2984; Gilbert et al. 4014; Gilbert & Thulin 958.

11. *T. flavescens* Hochst. (1842)

– type: TU; Modat, Adegunna, Schimper II. 1020 (P holo., BM FI (Webb) K UPS iso.).

*T. neghelliensis* Lanza (1939). – types: SD; Neghelle, *Cufodontis* 40 (FT syn.) and 214 (FT syn.).

*T. neghelliensis* var. *obtusifolia* Lanza in *Miss. Biol. Borana*: 126 (1939). – type: SD; Arero, *Cufodontis* 325 (FT holo.).

Perennial herb or subshrub up to 1 m tall; stems and inflorescences yellowish pubescent to tomentose. Leaf-blade tomentose to lanate (more rarely densely pubescent), ovate or cordiform to suborbicular, sometimes obscurely 3-lobed, 2–11.5 x 1.5–10.5 cm; apex acuminate to rounded; base truncate to cordate; petiole 1–10 cm. Inflorescence an unbranched or usually bifurcate terminal racemoid panicle with fascicles clustered along axes, leafy only at lowermost nodes, 8–25(–50) cm long with 3–20 cm long peduncle; fascicles sessile or with peduncle up to 5 mm long; pedicels up to 3 mm. Sepals (3–)5–8 mm long, yellowish to golden tomentose to lanate, apical horns less than 0.5 mm. Stamens *c* 20. Fruit ovoid, body 4–7 mm long, pubescent to tomentose; bristles ascending, 0.5–1.5 mm long, pubescent, terminated by a single or several straight setae. Fig. 79.7.3 & 6.

*Acacia* – *Commiphora* and *Acacia* – *Combretum* woodland and bushland on reddish sandy to loamy soil or on black cotton soil, *Anogeissus* – *Boswellia* bushland on rocky slopes, dry *Juniperus* forest; near sea-level to 2000 m. EE EW TU GD WU SU GJ (last 4 in Abay Gorge only), GG SD BA HA; Egypt (Jebel Elba), Sudan (Red Sea hills), NE Uganda, N & E Kenya, Somalia, NE Tanzania, Arabia. Burger 1843; Friis et al. 960, 3355.

The material from Eritrea is generally less hairy than that from the south, but is otherwise identical. Pappi 6826 has been annotated as var. *macrocarpa* Chiov. but the name has apparently never been published.

12. *T. heterocarpa* Sprague & Hutch. (1909)

– types: BA/HA; Schebelli River, Donaldson Smith s.n. (BM syn.); HA; Turfa, Donaldson Smith s.n. (BM syn.) and Modji, Ellenbeck 1099b (K isosyn.); BA/HA; Gollaboda, Ellenbeck 1188 (B syn., destr.); SD/BA; Tarro Gumbi, Ellenbeck 2082a (B syn., destr.).

*T. arussorum* Chiov. (1911). – type: SU; Mt. Fantalle, Negri 1215 (FT holo.).

*T. heterocarpa* var. *glabrior* Sprague & Hutch. in *J. Linn. Soc. Bot.* 39: 265 (1909). – types: HA; Milmil, Donaldson Smith s.n. (BM syn.); Arowegna, Ellenbeck 406 (K isosyn.); no loc., Ellenbeck 1035 (B syn., destr.); Gobelle Valley, Ellenbeck 1049 (K drawing); Ogaden, Robecchi-Bricchetti 591 (FT syn.).

Shrubby herb or shrub up to 1.5(?–2.5) m tall; stems and inflorescences glabrous to pubescent (rarely densely so). Leaf-blade sparsely pubescent to tomentose, elliptic to orbicular or cordiform, unlobed, 1–5.5(–11) x 0.7–5.5 (–9.5) cm; apex subacute to rounded; base truncate to cordate; petiole 0.5–4 cm. Inflorescence an unbranched or (more rarely) bifurcate racemoid panicle with leafy bracts at lowermost 1–3 nodes, with sessile fascicles clustered along axes, 5–15 cm long with 2–6 cm long peduncle; pedicels up to 3 mm. Sepals 3–6 mm long, glabrous to greyish pubescent (rarely tomentose), apical horns 0.5–1 mm. Stamens *c* 25–40. Fruit ovoid to ellipsoid, body 3–6 mm long, glabrous to tomentose; bristles 1–3 mm long, spreading, glabrous to pubescent, terminated by a single falcate or hooked seta. Fig. 79.7.7–8.

*Acacia* – *Commiphora* bushland on yellowish to reddish or brownish sandy to loamy or stony soil, alluvial *Acacia* woodland, sandy riverbanks; 400–1600 m. SU (Lower Awash Valley), SD BA HA; Somalia, NE Kenya. Ash 1238; Burger 636a, Gilbert & Thulin 163.

In Ethiopia the plants from lower altitudes (up to 800 m) are generally more densely hairy than plants from higher altitudes. Corresponding respectively to var. *heterocarpa* and var. *glabrior* of Sprague & Hutch. But the specimens from SU are intermediate and the ecological separation also breaks down when one moves into Somalia and Kenya. The author has therefore decided not to recognize any varieties.

## 80. STERCULIACEAE

by K. Vollesen\*

Schuman, *Monogr. Afr. Pfl.-Fam. und -Gatt.* 5: 1-140 (1900); Cufodontis, *Enum.*: 576-586 (1959); Wild, *Sterculiaceae in Fl. Zamb.* 1: 517-564 (1961).

Trees, shrubs or herbs; indumentum stellate (more rarely simple). Leaves alternate, simple (rarely compound); stipules present. Flowers in cymes or panicles or solitary, regular, bi- or unisexual; calyx (2-)5(-6)-lobed or sepals free. Petals 5 (or absent), free or adhering to staminal tube. Stamens 5-many, filaments united into a basal tube or at apex of androphore (rarely free), sometimes alternating with staminodes or in fascicles. Ovary superior, sessile or stipitate, 1-5-locular or with 2-5 coherent carpels separating in fruit, 1-many ovules per locule; style(s) simple or in equal numbers to locules. Fruit a loculicidal capsule (rarely indehiscent) or of woody follicles. Seeds 1-many.

About 60 genera and 1100 species; widely distributed in all tropical regions. In the Flora area 9 genera and 44 species.

*Cola* spp. is a genus with about 60 species in tropical Africa. For the edible species, the seeds are chewed as a stimulating narcotic and a drink is made by boiling powdered seeds in water. This genus has given its name to the famous soft drinks Pepsi-cola and Coca-cola.

## Key to Genera

1. Flowers unisexual, with single perianth; fruit of 5 free follicles. 9. *Sterculia*
  - Flowers bi-sexual, with calyx and corolla; fruit a capsule or indehiscent. 2
2. Fruit 10-25 cm long, indehiscent; flowers and fruits borne on trunk or larger branches below leaves; cultivated. 1. *Theobroma*
  - Fruit a much smaller capsule; flowers and fruits not borne on trunk. 3
3. Fruit, globose, 2-3 cm in diameter, with 5-13 mm long spines, opening explosively; petals hooded (see Fig. 80.1.4) in basal part. 2. *Byttneria*
  - Fruit not spiny (rarely prickly), not opening explosively, usually less than 1 cm long; petals flat or with slightly incurved margins, not hooded. 4
4. Stamines present and conspicuous. 5
  - Stamines absent. 7
5. Bracteoles some distance below calyx; ovary 2-locular, fruit only partly opening from base, prickly; stamens in groups of 3 alternating with staminodes. 4. *Harmsia*
  - Bracteoles just below calyx (rarely removed), forming an epicalyx, or falling soon; ovary 3-5-locular; fruit opening fully from apex, not prickly. 6
6. Petals white to pink or purple, persistent in fruit; bracteoles falling soon; stamens in groups of 2-3 (-4), alternating with staminodes; large shrubs or trees. 3. *Dombeya*
  - Petals yellow, detached in fruit; bracteoles persistent, forming an epicalyx; stamens solitary, alternating with staminodes; herbs or shrublets. 5. *Melhania*
7. Ovary 1-locular with 2 ovules; capsule 2-locular; petals yellow; filaments united into a tube. 7. *Waltheria*
  - Ovary 5-locular; capsule 5-locular. 8
8. Petals white; filaments united into a tube; anthers oblong or elliptic, glabrous; locules with 2 ovules. 6. *Melochia*
  - Petals yellow, pink, red or purple, not white; filaments free or very shortly united; anthers tapering to an acuminate apex, pilose; locules with 1-many ovules. 8. *Hermannia*

## 1. THEOBROMA L. (1753)

*T. cacao* L. (1753).

Small tree. Leaves simple, unlobed, up to 35 x 15 cm. Flowers in 1-5-flowered cauliflorous clusters on trunk and larger branches; pedicels 0.5-2 cm. Sepals 5, 6-8 mm long. Petals 5, cream, about the same length as sepals, narrowed at base, with spatulate incurved apical appendix enclosing the stamens. Stamens 5, each with 1-3 anthers, alternating with 5 filiform c 6 mm long pink staminodes. Ovary 5-locular with 10-12 ovules per locule. Fruit baccate, 5-locular, woody, 10-25 cm long, yellow to orange when mature. Seeds (cocoa-beans) c 2 cm long, ellipsoid, immersed in a whitish pulp.

Originally from tropical S America, now widely cultivated also in W Africa for its seeds which are used for making cocoa. In Ethiopia known from trial plots around Mizan Teferi (KF). *Friis et al.* 3968.

2. BYTTNERIA Loefl. (1758), *nom. conserv.*

Trees, shrubs or woody climbers, often spiny or prickly; indumentum stellate. Leaves unlobed, palmately veined from base, penninerved higher up; stipules minute, lanceolate. Flowers bisexual, in axillary cymes. Sepals 5, united. Petals 5, free, hooded and clawed at base, hood 2-lobed, produced at the back into an entire or 3-fid ligule. Stamens: staminal tube covered by basal part of petals, anthers 5, subsessile, inserted at apex of tube, alternating with 5 short staminodes. Ovary 5-locular, locules with 2 ovules, style 5-fid or subentire. Capsule globose, spiny, separating ex-

\* The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK.

plosively at maturity into 5 septicial parts which again split from apex, each with 1 seed.

About 75 species, most numerous in tropical America, tropical Asia and Madagascar, only a few in tropical Africa.

***B. catalpifolia* Jacq. (1797) subsp. *africana* (Mast.)  
Exell & Mendonça in *Consp. Fl. Angol.* 1: 197 (1951).**

Tree to 15 m (but usually a woody climber); branchlets, leaves and inflorescences subglabrous to puberulous. Leaves: petiole 3–14 cm; blade cordiform or broadly so, 8–20 x 4–15 cm, margin entire, apex acuminate, base often oblique. Flowers in axillary cymes, often merging into panicles; peduncles up to 50 mm; pedicels up to 12 mm; bracts and bracteoles minute, falling off soon. Sepals 5–7 mm long, lanceolate, puberulous, spreading. Petals white, erect, 5–7 mm long of which *c* 1 mm is the basal hooded part. Stamens: staminal tube *c* 1 mm. Ovary with a rough surface, style *c* 1 mm, 5-lobed. Capsule depressed globose, *c* 2 x 3 cm, covered with numerous 5–13 mm long spines. Seed ellipsoid with a raphe down one side, *c* 8 mm long, pale brown. Fig. 80.1.

*Aningeria altissima* – *Celtis zenkeri* lowland evergreen forest; 1050–1150 m. KF; Liberia, Ghana, Nigeria, Cameroon, Central African Republic, Zaire, S Sudan, Uganda, Angola. Friis et al. 3921, 4016.

Subsp. *catalpifolia* occurs in tropical America.

The Ethiopian collections were made from erect trees while elsewhere in Africa the species always seems to be scandent or climbing. Otherwise there are no obvious differences and the difference in growth form is unlikely to be worthy of any taxonomic recognition.

### 3. *DOMBEYA* Cav. (1786)

J. H. Seyani, *Dombeya* in Africa. – *Opera Bot. Belgica* 2: 1–186 (1991).

Trees or shrubs; indumentum stellate, often with intermixed simple and glandular hairs. Leaves unlobed to lobed, palmately veined; stipules linear to ovate or narrowly triangular. Flowers bisexual, in axillary panicles or umbel-like cymes; bracteoles falling off quickly, just below calyx or dispersed on the pedicel. Sepals 5, shortly united, narrowly triangular, usually reflexed after anthesis. Petals 5, white to pink or purple, obliquely obovate, persistent and papery in fruit. Stamens in groups of 2–3(–4) alternating with 5 linear staminodes, all united into a short basal tube. Ovary 3–5-locular, locules with 2-many ovules, style simple, with 3–5 stigmas. Capsule 3–5-locular, with 1-many seeds.

Genus of 150–200 species; mainly in Madagascar with 19 species on the African mainland, one of which extends to the Yemen. Cultivated in tropical Asia and Australia.

1. Style with 5 stigmas; ovary 5-locular; staminal tube 1.5–5(–10) mm long; bracteoles 5–25 mm long; calyx-lobes 5–16(–22) mm long; style 4–9 mm long. 2
- Style with 3 stigmas; ovary 3-locular; staminal tube 0.5–1 mm long; bracteoles 1–3 mm long; calyx-lobes 4–8 mm long; style 1–4 mm long. 6

2. Sepals 18–22 mm long; petals 20–25 mm long; staminal tube *c* 10 mm long.

5. *D. sp.* = *Vatova* 1153

- Sepals 5–16 mm long; petals 8–20 mm long; staminal tube 1.5–5 mm long. 3

3. Bracteoles 15–25 x 1–2 mm, linear to lanceolate, cuspidate, pilose from long simple hairs.

1. *D. longibracteolata*

- Bracteoles 5–12 x 2–5 mm, ovate, acute to acuminate, stellate pubescent, often also with long simple hairs. 4

4. Leaves tomentellous, upper surface dark green, lower whitish pale green, surface not visible, without long simple hairs on veins; pedicels tomentellous (rarely with scattered long hairs); calyx without long hairs; petals pale to deep pink (rarely white); stipules up to 2 mm wide. 4. *D. aethiopica*

- Leaves puberulous to tomentose, upper surface only slightly darker than lower or both the same colour, surface clearly visible (if tomentellous then other characters not as above); petals white to slightly pink (rarely pink). 5

5. Tree or shrub to 15(–20) m tall, single-stemmed from base; style hairy to top or at least 1/2 up; upland forest or secondary bushland. 2. *D. torrida*

- Shrubby herb to 3 m, multi-stemmed from base; style glabrous or hairy no more than 1/3 up; lowland woodland. 3. *D. buettneri*

6. Flowering with the leaves; inflorescences solitary in leaf-axils; petals 7–8 mm long, white; capsule *c* 3 mm in diameter. 6. *D. kirkii*

- Flowering usually before the leaves appear or with old leaves; inflorescences clustered on short axillary branches (rarely solitary); petals 7–16 mm long, white to purple; capsule *c* 5 mm in diameter. 7

7. Leaves longer than wide, acute to acuminate, reticulation rather indistinct; petals pale pink to purple; style 1–2 mm long, densely pubescent; bark on older branches grey to pale brown (rarely brown).

7. *D. quinqueseta*

- Leaves usually wider than long, rounded (rarely subacute), reticulation prominently raised; petals white to pale pink; style 2–4 mm long, glabrous to pubescent; bark on older branches dark brown to purplish. 8. *D. rotundifolia*

1. *D. longibracteolata* Seyani (1990)

– type: GG; Arba Minch, Gilbert, Thulin & Aweke 437 (K holo., ETH UPS WAG iso.).

Shrub or tree to 4(–6) m; branchlets subglabrous to pilose. Leaves pubescent; petiole 6–12.5 cm; stipules *c* 1.5 x 0.3 cm; blade cordiform to broadly so, 11–17 x 9–14 cm, margin irregularly crenate to dentate, apex abruptly acuminate. Inflorescence umbellate or subumbellate, glabrous to pilose; peduncle 60–110 mm; branches 0–15 mm; pedicels 15–35 mm; bracteoles 15–25 x 1–2 mm. Sepals 10–15 x 3–4 mm, glabrous to densely pilose. Petals white, 10–20 x 7–18 mm. Stamens: staminal tube 3–5 mm long; staminodes 8–11 mm. Style 6–9 mm, glabrous or pubescent in basal half. Fruit not known.

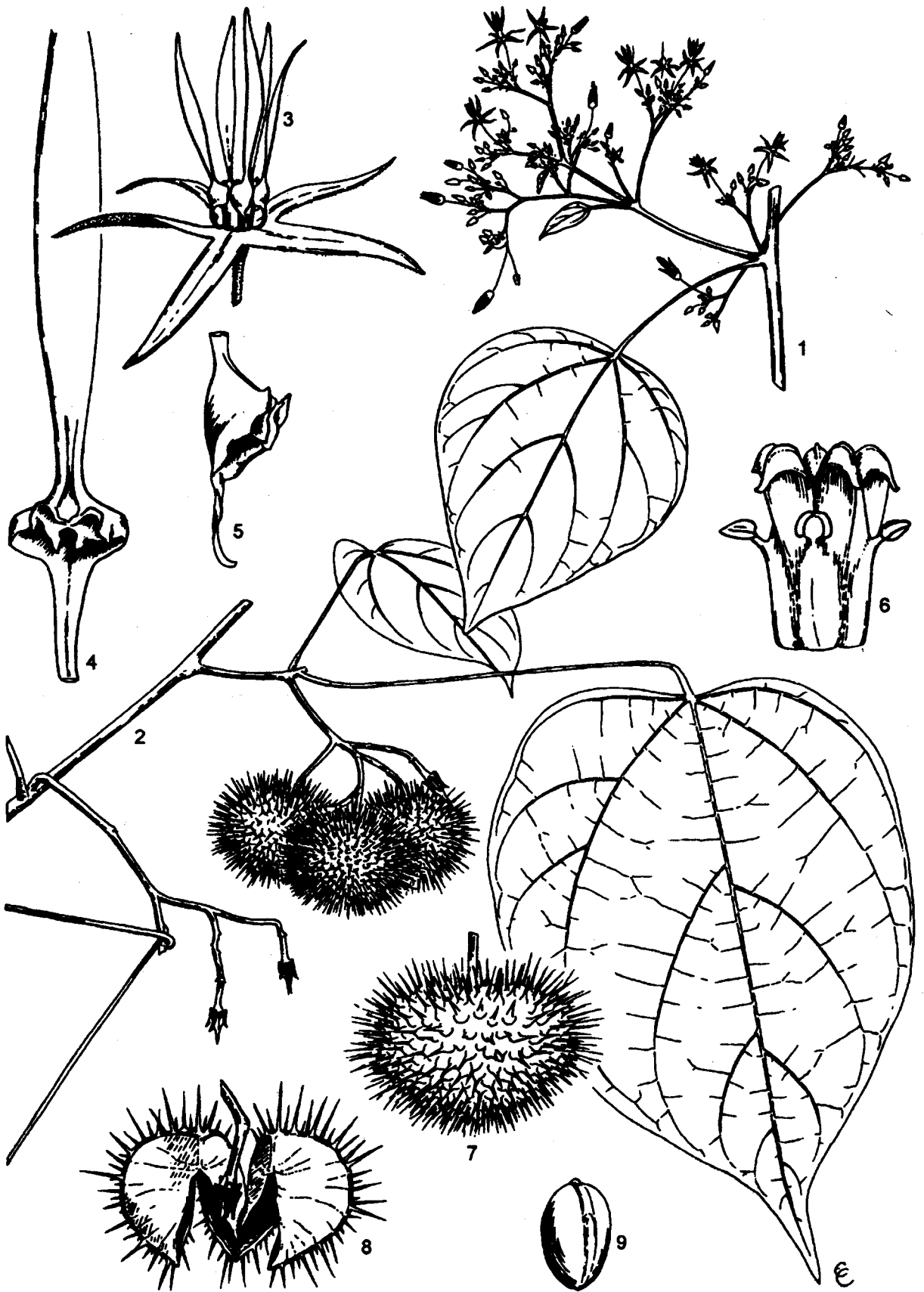


Figure 80.1 *BYTTNERIA CATALPIFOLIA*: 1 – flowering branch  $\times \frac{1}{2}$ ; 2 – fruiting branch  $\times \frac{1}{2}$ ; 3 – flower  $\times 6$ ; 4 – petal, ventral view  $\times 10$ ; 5 – basal part of petal, lateral view  $\times 10$ ; 6 – stamens and staminodes  $\times 20$ ; 7 – young fruit  $\times 1$ ; 8 – dehiscent fruit  $\times 1$ ; 9 – seed  $\times 2$ . 1 & 3–6 from *Breteler* 1608; 2, 7 & 9 from *Friis et al.* 3921; 8 from *de Wilde* 1231. Drawn by Eleanor Catherine.



*Combretum* – *Terminalia* woodland and bushland; c 1900 m. KF GG SD; not known elsewhere. *Beals* 921; *Meyer* 7886.

Only known from these three collections. Undoubtedly closely related to *D. torrida*, but easily distinguished by the large bracteoles.

2. *D. torrida* (J. F. Gmel.) P. Bamps (1962)

– type: plate 20 in Bruce, *Voy. Meroe* 5 (1790).

*D. bruceana* A. Rich. (1847) – types: TU; Sholoda, *Quartin-Dillon & Petit* s.n. (P syn.). TU; Addischoa, *Schimper* I:378 (P syn., K UPS isosyn.).

*D. schimperiana* A. Rich. (1847) – type: GD; Mt. Aber, Adde Selam, *Schimper* II:845 (P syn., FT K isosyn.).

*D. albiflora* K. Schum. (1903) – type: SU; Mt. Mengesha, *Ellenbeck* 1632 (B destroyed).

*D. gallana* K. Schum. & Engl. (1907) – type: HA; Mt. Gara Mullata, *Ellenbeck* 558 (B destroyed).

*D. stipulosa* Chiov. (1941) – type: WG; Sajo, *Gior-dano* 2471 (FT holo.).

*D. schimperiana* var. *glabrata* K. Schum. in *Monogr. Afr. Pfl.-Fam.* 5: 23 (1900) – types: *Steudner* 1156 (not seen). GD; Semien, *Steudner* 1157 (K isosyn.).

*D. mastersii* sensu Cufod. (1959) for Ethiopian distrib., *non* Hook. (1867).

Shrub or tree to 15(–20) m; branchlets, leaves and inflorescences glabrous to tomentellous or tomentose and with long simple hairs. Leaves: petiole 1.5–20 cm (–28 cm in saplings and shade leaves); stipules up to 1.5(–2) cm long, usually over 0.2 cm wide; blade cordiform to broadly so, 3–32 x 2.5–23 cm (to 42 x 32 cm in saplings), margin crenate, dentate or serrate, apex abruptly acuminate. Inflorescence umbellate, subumbellate or 1–2 times bifurcate with umbellate branches; peduncle 20–160 mm; branches 0–30(–50) mm; pedicels 10–60 mm; bracteoles 5–12 x 2–5 mm. Sepals 5–13 x 1.5–3.5 mm, tomentellous, often with long hairs basally. Petals white or slightly pink at base, more rarely pink, 8–15 x 7–13 mm. Staminal tube red, 1.5–5 mm long; staminodes 5–9 mm; style 4–8 mm, pubescent to tomentose or glabrous apically. Capsule ovoid to globose, 4–10 mm long, tomentose. Seed 3–4 mm long, reddish brown to dark brown. Fig. 80.2.1–3.

Montane *Aningeria* – *Albizia* – *Croton* and *Juniperus* – *Podocarpus* forest, montane scrub, surviving after forest clearing in secondary bushland and grassland and in cultivated areas; 1600–3100 m. EW TU GD GJ WU SU AR WG IL KF GG SD BA HA; S Sudan, Djibouti, Uganda, W Kenya, N Tanzania. E Zaire, Rwanda, Burundi, Yemen. *Burger* 1040; *Friis* et al. 1151; *Mooney* 8718.

An extremely variable species which seems to defy all attempts at subdivision. It is closely related to the preceding and the two following species. However, it grows in quite different habitats from *D. buettneri*, and the two are easily separable in Ethiopia. On the other hand, the distinction between this and *D. aethiopica* is less clear-cut. A few collections (*Friis* et al. 1394, *Gillett* 5309, *W. de Wilde* et al. 9611) are almost completely intermediate, but seem on

the whole better placed in this species. They all have broad non-tomentellous stipules.

3. *D. buettneri* K. Schum. (1892).

Shrub or shrubby herb to 3 m, with several unbranched stems from base, bark very tough and fibrous, exuding a sticky sap when cut; all parts pubescent or pilose to tomentose from long simple or long-rayed stellate hairs. Leaves: petiole 4–19 cm; stipules up to 1.3 cm long, over 0.2 cm wide; blade cordiform or broadly so, unlobed or shallowly 3-lobed, 5–26 x 3.5–22 cm, margin dentate, apex acuminate. Inflorescence umbellate or 1–3 times bifurcate with umbellate branches; peduncle 40–170 mm; branches 0–50 mm; pedicels 15–40 mm; bracteoles up to 12 x 3 mm. Sepals 7–10 x 2–3 mm. Petals white to very pale pink, 10–18 mm long. Stamens: staminal tube of same colour as petals, 1–3 mm long; staminodes 6–9 mm. Style 4–6 mm, pubescent in basal 1/3. Capsule ovoid to globose, 6–9 mm long, tomentose. Seed c 3 mm long, reddish brown.

*Combretum* – *Terminalia* wooded grassland with tall *Hyparrhenia*, on rocky hillsides and outcrops; 1300–1800 m. IL KF; widespread from W Africa to SE Sudan, Uganda, W Tanzania and N Zambia. *Friis* et al. 3944, 4146.

Close to *D. torrida*, but always a woodland species with different habit and at lower altitudes. The branchlets are conspicuously long-haired from simple or long-rayed stellate hairs.

4. *D. aethiopica* Gilli (1971)

– type: SD; MT. Mega, *Gillett* 14458 (W holo., EA K iso.).

*D. gallana* K. Schum. & Engl. (1907) var. *floribunda* Fiori in *N. Giorn. Bot. Ital.* 47: 34 (1940) – type: SD; Uadera, *Saccardo* s.n. (FT holo.).

Tree to 8 m; all parts pallid tomentellous, long simple hairs absent (or on basal part of midrib and inflorescence branches); branchlets, petiole and peduncle sulcate. Leaves: petiole 2–8.5 cm; stipules up to 0.9 x 0.2 cm; blade cordiform or broadly so, rarely a few shallowly 3-lobed, 3–18 x 2–13 cm, margin irregularly crenate to dentate, apex subacuminate to subacute. Inflorescence umbellate, subumbellate or with paniculate umbels; peduncle 15–70 mm; branches 0–25 mm; pedicels 10–35 mm; bracteoles 5–8 x c 3 mm. Sepals 8–16 x 2–4 mm. Petals pale to deep pink (rarely white), 10–17 x (10–)12–19 mm, broader than long. Stamens: staminal tube 2–5 mm long; staminodes 6–10 mm. Style 5–7 mm, pubescent in basal part. Mature fruit not seen. Fig. 80.2.4–8.

Dry *Juniperus* forest, forest margins, secondary forest, *Combretum* woodland derived from forest; 1700–2200 m. GJ SU KF GG SD; not known elsewhere. *Ash* 2292; *Friis* et al. 525; *Mesfin* T. 2678.

5. *D.* sp = *Vatova* 1153.

Small tree; all parts tomentellous, without long simple hairs, branchlets blackish. Leaves: petiole 0.5–1.4 cm; stipules falling off soon; blade broadly cordiform to reniform, 7–16 x 6–14 cm, margin irregularly dentate, apex broadly rounded. Inflorescence umbellate; peduncle 10–15

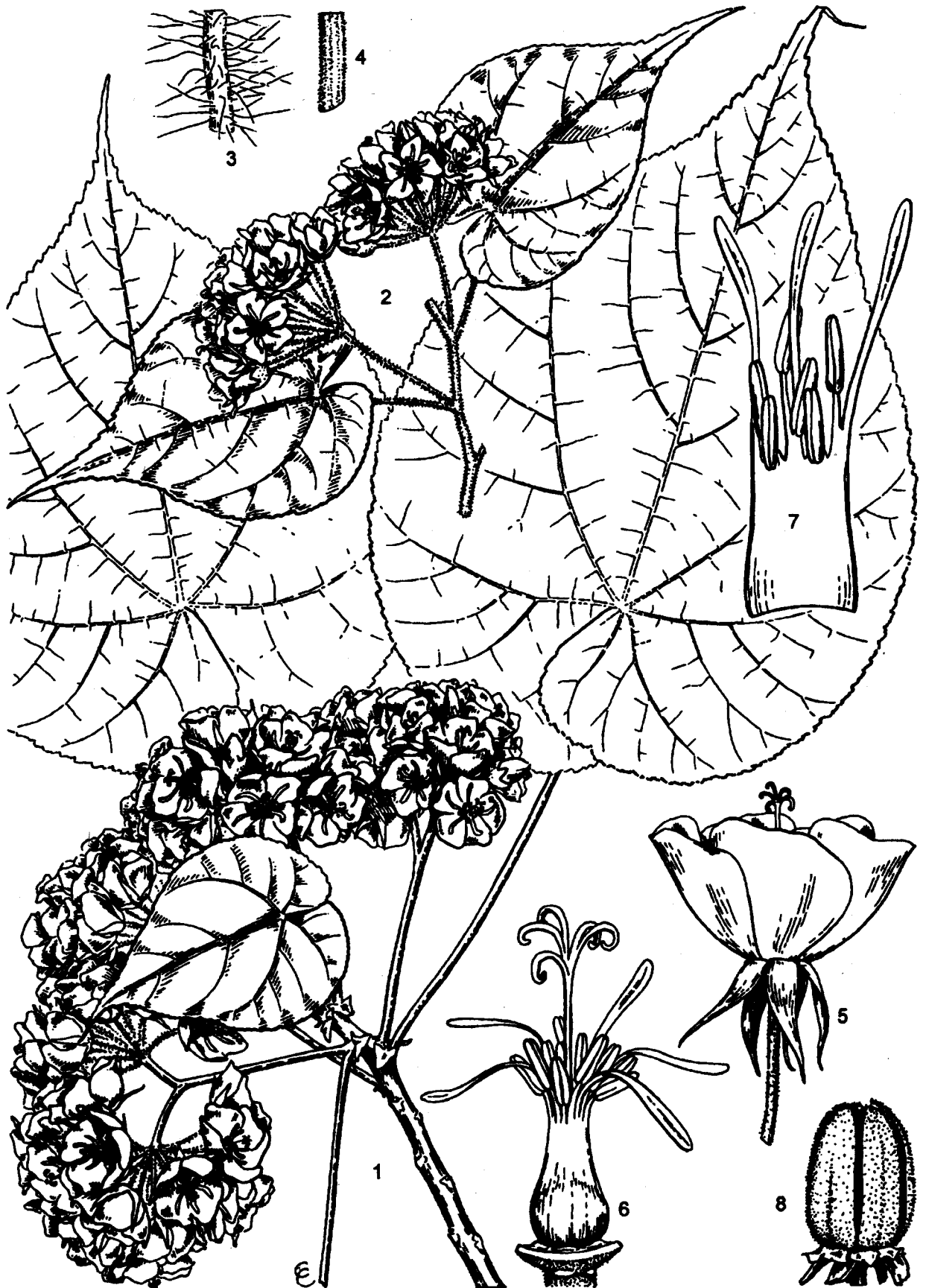


Figure 80.2 *DOMBEYA TORRIDA*: 1 – flowering branch with large leaves  $\times \frac{3}{4}$ ; 2 – flowering branch of small-leaved plant  $\times \frac{1}{2}$ ; 3 – detail of petiole-indumentum  $\times 6$ . *D. AETHIOPICA*: 4 – detail of petiole-indumentum  $\times 6$ ; 5 – flower  $\times 2$ ; 6 – staminal column and style  $\times 4$ ; 7 – staminal column opened up  $\times 4$ ; 8 – fruit  $\times 3$ . 1 from *Gillett* 2223; 2 & 3 from *Friis et al.* 456; 4–7 from *Friis et al.* 525; 8 from *Gillett* 5309. Drawn by Eleanor Catherine.

mm; pedicels 20–25 mm; bracteoles falling off soon. Sepals 18–22 x 4–6 mm. Petals 20–25 mm long, much longer than wide. Stamens: staminal tube c 10 mm long. Immature fruit c 7 mm long.

Probably *Combretum* – *Terminalia* bushland; no altitude given. SD (Soddu area); not known elsewhere.

Only known from this collection. The specimen at Florence has been annotated as *D. vatovae* Chiov., but this name has apparently never been published.

A very peculiar species. Easily recognised by its very large flowers.

#### 6. *D. kirkii* Mast. (1868).

Shrub or tree to 4(–7) m, sometimes scandent; branchlets pubescent to tomentellous. Leaves glabrous to sparsely pubescent; petiole 1–5 cm; stipules 0.2–0.7 x c 0.1 cm; blade ovate or obovate to orbicular or cordiform, 2–11 x 1.5–8.5 cm, margin crenate to grossly dentate, apex rounded to acute (rarely acuminate); base truncate to cordate. Inflorescence 1–3 times bifurcate, subumbellate or paniculate, pubescent (rarely with long simple hairs); peduncle 15–65 mm; branches 5–20(–30) mm; pedicels 5–15 mm; bracteoles 1–3 x c 0.5 mm. Sepals 4–6 x 1–1.5 mm, pubescent; petals white, 7–8 x 3–5 mm; staminal tube 0.5–1 mm long; staminodes 5–7 mm. Style 1–3 mm, glabrous. Capsule depressed globose, c 3 mm in diameter, tomentose. Seed c 2 mm long, dark brown.

*Acacia* – *Commiphora* and *Combretum* – *Terminalia* woodland and bushland, on limestone ridges and rocky slopes with basement rocks; 1250–1600 m. GG SD BA; NE Zaire and Uganda through eastern Africa to Transvaal. Friis et al. 2808; Gilbert et al. 8004; Gilbert & Thulin 367.

#### 7. *D. quinqueseta* (Del.) Exell (1935).

*D. multiflora* (Endl.) Planch. (1851).

*D. alascha* K. Schum. (1900). – type: TU; near Adua, Worrhey, Schimper 695 (K iso.).

Shrub or tree to 8 m; all parts glabrous to tomentellous; older branches grey to pale brown (rarely brown). Leaves: petiole 2–11 cm; stipules 0.4–0.9 x 0.1–0.3 cm; blade cordiform or broadly so, sometimes shallowly 3-lobed, 4.5–15 x 2.5–14 cm (longer than wide), margin crenate to dentate, lobes acute to acuminate. Inflorescence 1–2 times bifurcate, paniculate (rarely umbellate), usually appearing before the leaves; peduncle 10–60(–145) mm; branches (0–)5–30 mm; pedicels 5–15(–35) mm; bracteoles 1–3 x c 0.5 mm. Sepals 5–8 x 1.5–2.5 mm, puberulous (rarely pubescent). Petals pale pink to purple, 8–16 x 2.5–8 mm. Stamens: staminal tube 0.5–1 mm long; staminodes 5–10 mm. Style 1–2 mm, densely pubescent (also stigmas). Capsule globose, c 5 mm in diameter, tomentose. Seed c 3 mm long, dark brown.

*Combretum* – *Terminalia* – *Stereospermum* and *Pterocarpus* woodland, wooded grassland and bushland, mostly on rocky slopes; 850–1900(–2200) m. EW TU GD GJ SU WG IL KF GG; from Gambia to W Ethiopia and Uganda. Chaffey 1177; Mooney 7732; Tekle Hagos 86.

#### 8. *D. rotundifolia* (Hochst.) Planch. (1851).

Tree to 4 m; branchlets tomentellous, older branches dark brown to purplish. Leaves puberulous to tomentellous; petiole 1–5.5 cm; stipules 0.4–0.6 x 0.1–0.2 cm; blade broadly obovate to broadly reniform, 4–16.5 x 4–19.5 cm (usually wider than long), reticulation distinctly raised, margin subentire to crenate or dentate, apex subacute to rounded; base shallowly to deeply cordate. Inflorescences 1–2 times bifurcate, subumbellate to paniculate, appearing before new leaves or with old leaves, floccose tomentellous to tomentose; peduncle 10–50(–65) mm; branches 5–25 mm; pedicels 4–18 mm; bracteoles 1–3 x c 0.5 mm. Sepals 5–7 x 1.5–2.5 mm, densely puberulous to tomentellous. Petals white to pale pink, 7–13 x 4–8 mm. Stamens: staminal tube 0.5–1 mm long; staminodes 4–7 mm. Style 2–4 mm, glabrous to pubescent. Capsule depressed globose, c 5 mm in diameter, tomentose. Seed c 3 mm long, dark brown.

*Acacia* – *Combretum* woodland verging towards *Juniperus* forest, on gneissic ridges; 1800–1900 m. SD; south through eastern Africa to Transvaal and west to Angola and Namibia. Gillett 14736; Haugen 540; Ruspoli & Riva 715(1487).

These are the northernmost records of this species, which replaces *D. quinqueseta* in eastern and southern Africa. The two species are closely related and could with some justification be treated as two subspecies if the distributions are taken into consideration. However, intermediates are virtually non-existent where the two taxa overlap in Uganda.

#### 4. HARMSIA K. Schum. (1897)

Shrub; indumentum stellate. Leaves penninerved; stipules subulate, persistent. Flowers bisexual, in a few-flowered umbel-like or raceme-like cyme; bracteoles subulate, some distance below calyx. Sepals 5, free. Petals 5, broadly obovate with truncate apex, persistent and papery in fruit. Stamens 15, in groups of 3 alternating with 5 ligulate staminodes, all united into a short basal tube. Ovary 2-locular, locules with 1 ovule; style simple, club-shaped. Capsule 5-sided, prickly, only partly dehiscing from base and dropping as a whole; seeds plano-convex.

Only 1 species in NE Africa.

#### *H. sidoides* K. Schum. (1897)

– types: SD; Giacorso, Ruspoli & Riva 500 (954) (FT syn.); BA; Web Valley, Ruspoli & Riva 504 (595) (FT syn.); SD; Ualeme, Ruspoli & Riva 1697 (1762) (FT syn.).

*H. emarginata* Schinz (1902). – type: HA; Abdallah, Keller s.n. (K iso.).

*H. microblastos* K. Schum. (1903). – type: SD; Djaro, Ellenbeck 2059 (B destroyed).

Shrub to 2 m; branchlets, leaves and inflorescences yellowish to greyish pubescent to tomentose. Leaves: petiole 0.2–1 cm; stipules up to 1 cm; blade elliptic to obovate, 1–5 x 0.5–2.8 cm, margin subentire to serrate, apex subacute to emarginate, base cordate to truncate. Inflorescence 1–5

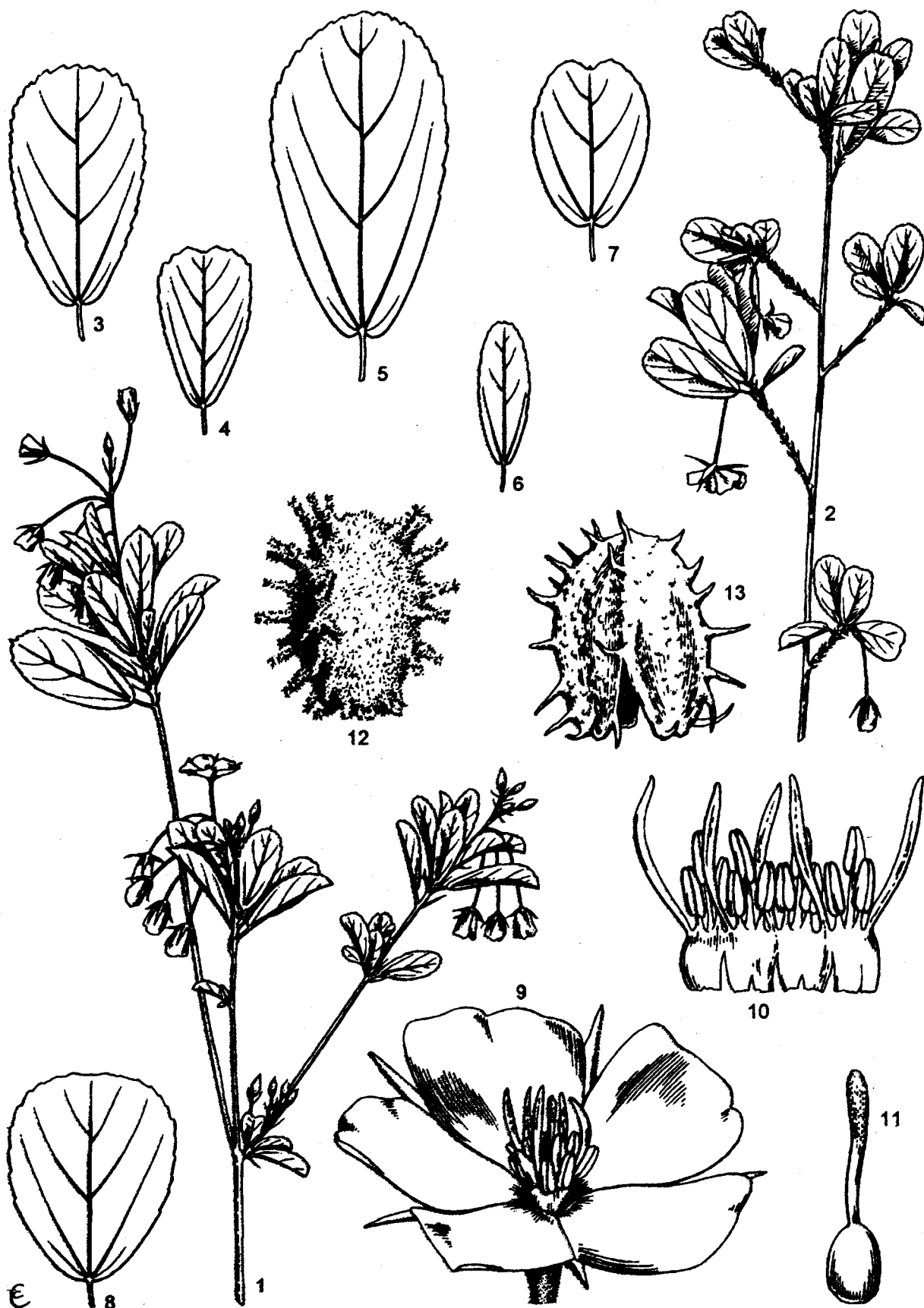


Figure 80.3 *HARMSIA SIDOIDES*: 1 – flowering stem  $\times \frac{1}{2}$ ; 2 – fruiting stem  $\times \frac{1}{2}$ ; 3–8 – leaves  $\times 1$ , to show variation in shape and size; 9 – flower  $\times 4$ ; 10 – staminal column opened up  $\times 8$ ; 11 – ovary and style  $\times 8$ ; 12 – young fruit  $\times 6$ ; 13 – old dehiscent fruit  $\times 6$ . 1 from Friis et al. 959; 2–4 & 10–11 from Thulin et al. 3586; 5 & 9 from Friis et al. 2795; 6 from Ash 809; 7 from Keller s.n.; 8 & 12 from Ellis 387; 13 from Gilbert et al. 7857. Drawn by Eleanor Catherine.

flowered; peduncle (5-)10-25(-40) mm; pedicels 8-20 mm, articulated a few mm above base and with 3 up to 8 mm long bracteoles at joint. Sepals 5-9 mm long, linear to narrowly ovate, greyish tomentose. Petals 6-8 mm long, yellow. Stamens: staminal tube 1-2 mm; filaments 1-2 mm; staminodes 4-5 mm. Style *c* 4 mm. Capsule 4-6 mm long, ellipsoid to obovoid, with 5 rows of short prickles, tomentose. Seed obovoid, *c* 4 x 2 mm. Fig. 80.3.

*Acacia* - *Commiphora* woodland and bushland on limestone slopes and ridges and on pale brown to reddish sandy soil overlying limestone, often a conspicuous and dominant element in the shrub-layer; 400-1500 m. SD BA HA; Somalia, NE Kenya. *Friis* et al. 2795; *Gilbert* 3405; *Gilbert* et al. 7857.

Schuman distinguished *H. microblastos* from *H. sidoides* by the fruit being non-prickly. His diagnosis, however, does not describe a mature fruit but only the ovary. It has been observed on specimens of *H. sidoides* that the prickles often develop rather late, and whenever mature (or nearly mature) fruits are present, they are invariably prickly. *H. emarginata* was supposed to be distinguished by its emarginate leaves, but the material now available show all transitions from subacute to emarginate leaves.

This genus in some ways occupies an intermediate position between Sterculiaceae and Tiliaceae. The fruit is strongly reminiscent of the fruit of some species of *Triumfetta*, except for it being 2-locular with 1 ovule per locule (5-locular with 2 ovules per locule in *Triumfetta*). The structure of the androecium, on the other hand, is almost exactly as in *Dombeya*.

#### 5. MELHANIA *Forssk.* (1775)

Herbs or shrublets; indumentum stellate. Leaves penninerved with rounded to cordate bases; stipules subulate to lanceolate. Flowers bisexual, solitary or in 2-several-flowered axillary cymes; bracteoles 3, forming an epicalyx immediately below calyx. Sepals 5, narrowly triangular or narrowly ovate, almost free. Petals 5, yellow, unequal-sided, broadly obovate with truncate apex, persisting on top of capsule. Stamens 5, alternating with 5 ligulate staminodes, all united into a short basal tube. Ovary 5-locular, locules with 1-several ovules. Style single, with 5 linear stigmas. Capsule 5-valved; seeds obtrigonal, with rounded back and two flat frontal sides.

About 60 species, mainly in tropical and S Africa. Also in Madagascar, Arabia, India, Indonesia and Australia.

1. Bracteoles (epicalyx) subulate to ovate with acuminate to cuspidate apices (if acute or rounded then base not cordate), not enlarged and membranous in fruit and distinctly longer than wide. 2
  - Bracteoles (epicalyx) cordiform to broadly reniform with rounded to acute apices and truncate to deeply cordate bases, enlarged, membranous and distinctly wider than long in fruit. 13
2. Bracteoles subulate to ovate, base not cordate. 3
  - Bracteoles ovate with cordate base. 9
3. Most or all stipules more than 1 cm long; stems whitish lanate; style hairy. 2. *M. sp.* = *Thesiger* 1945

- All stipules less than 1 cm long; stems pubescent to tomentose or tomentellous; style glabrous. 4
- 4. Bracteoles subulate to linear, 0.5-1.5 mm wide. 5
  - Bracteoles lanceolate to ovate, 2-7 mm wide. 6
- 5. Leaves lanceolate to narrowly oblong, 3 or more times longer than wide; all flowers solitary. 6. *M. somalensis*
  - Leaves ovate to elliptic, less than 2 times longer than wide; some flowers in 2-3-flowered cymes. 1. *M. ovata*
- 6. Capsule 8-13 mm long, locules 4-seeded; petals 10-14(-18) mm long; bracteoles 10-20 mm; sepals 10-18 mm; shrub. 5. *M. rotundata*
  - Capsule 5-7 mm long, locules 2-3-seeded; petals 5-8 mm long; bracteoles 5-11 mm; sepals 6-12 mm; annual or perennial herbs. 7
- 7. Plant with procumbent to ascending stems (or erect main stem and long spreading branches), conspicuously greyish tomentose; peduncle 10-25 mm. 10. *M. beguinotii*
  - Plant usually erect not with procumbent or ascending stems, not greyish tomentose; peduncle 3-15 mm. 8
- 8. Bracteoles 2-4 mm wide; seeds with a dense rough surface. 3. *M. parviflora*
  - Bracteoles 4-7 mm wide; seeds tuberculate. 4. *M. sp.* = *Gilbert* et al. 7432
- 9. Plant with procumbent to ascending stems (or erect main stem and long spreading branches), conspicuously greyish tomentose. 10. *M. beguinotii*
  - Plant not with procumbent or ascending stems, not greyish tomentose. 10
- 10. Capsule 7-10 mm long, locules 4-5-seeded; leaves yellowish pubescent to tomentose; petals 7-11 mm long; staminodes 3-7 mm; style 0.5-2 mm. 7. *M. velutina*
  - Capsule 5-7(-9) mm long, locules 2-3-seeded; leaves with whitish or greyish to dark brownish indumentum. 11
- 11. Shrub; sepals 10-16 mm long; petals 9-15(-20) mm; staminodes 6-8 mm; style 4-6 mm; seed with a rough surface; leaves whitish to greyish pubescent to tomentellous. 8. *M. steudneri*
  - Annual or perennial herbs (rarely shrubs); sepals 6-10 mm long; petals 6-11 mm; staminodes 4-6 mm; style 1-4 mm; seed tuberculate; leaf indumentum greyish or brownish. 12
- 12. Stems with dark brown indumentum; peduncle 7-35 mm long; petals 8-11 mm; staminodes 5-6 mm; style 2-4 mm. 9. *M. zavattarii*
  - Stems with greyish indumentum; peduncle 5-8 mm long; petals *c* 6 mm; staminodes *c* 4 mm; style *c* 1 mm. 4. *M. sp.* = *Gilbert* et al. 7432
- 13. Petals 7-10 mm long; capsule 7-10 mm, locules 2-3-seeded; seed tuberculate; flowers in 2-6-flowered cymes. 13. *M. phillipsiae*
  - Petals 2-7 mm long; capsule 3-7 mm long; seed with a rough surface or smooth (rarely tuberculate). 14

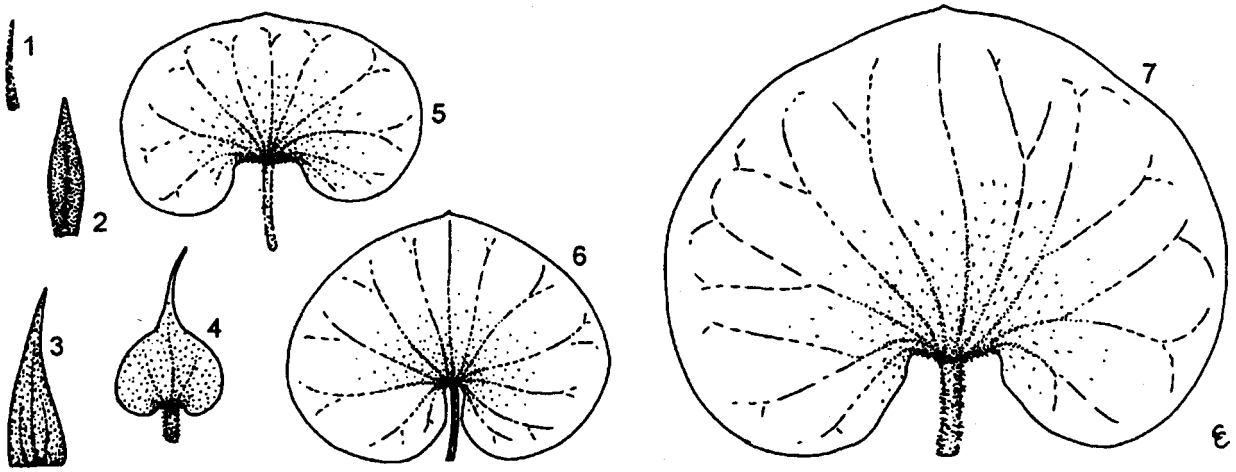


Figure 80.4 Bracteoles (epicalyx-bracts) of *MELHANIA* spp. all  $\times 2$ . *M. OVATA* (1); *M. PARVIFLORA* (2); *M. ROTUNDATA* (3); *M. VELUTINA* (4); *M. sp.* = Friis et al. 2971 (5); *M. DENHAMII* (6); *M. PHILLIPSIAE* (7). 1 from Ash 1609; 2 from Friis et al. 2932; 3 from Schimper 2286; 4 from Pappi 4459; 5 from Friis et al. 2971; 6 from Popov 1105; 7 from Bally 9621. Drawn by Eleanor Catherine.

14. Flowers solitary (rarely a few 2-flowered cymes); locules 2-4(-5)-seeded; seed with a rough surface or tuberculate. 15  
 - Flowers in 2-8-flowered cymes (or some solitary); locules 1-2-seeded; seed smooth. 16
15. Leaves 7-25(-30) mm wide, oblong or elliptic; stipules 2-4 mm long; bracteoles united at base, with a 5-8 mm deep sinus in fruit; seed grey, ovoid-triangular, with a rough surface.  
 11. *M. sp.* = Gilbert et al. 7589  
 - Leaves 2-8 mm wide, lanceolate or narrowly oblong; stipules (3-)5-20 mm long; bracteoles free at base, with a 2-4 mm deep sinus in fruit; seed brown, pear-shaped, tuberculate. 12. *M. stipulosa*
16. Leaves more than 3 times as long as wide; peduncle 5-40 mm; bracteoles united at base, cymes 2-3 (-4)-flowered. 15. *M. sp.* = Hemming 1465  
 - Leaves less than 3 times as long as wide, bracteoles free at base; peduncle 2-20 mm. 17
17. Cymes 2-3(-4)-flowered; petals (4-)5-7 mm long; staminodes (3-)4-5 mm; capsule (4-)5-7 mm, locules (1-)2-seeded. 14. *M. denhamii*  
 - Cymes 2-8-flowered (always some with 4 or more flowers); petals 2.5-5 mm long; staminodes 2-3 mm; capsule 3-5 mm, locules 1(-2) seeded. 18
18. Bracteoles 7-15 x 9-17 mm in fruit, at most 2 mm wider than long; sepals only hairy along median line. 16. *M. kelleri*  
 - Bracteoles 8-15 x 13-32 mm in fruit, at least 5 mm wider than long; sepals pilose all over.  
 17. *M. sp.* = Friis et al. 2971

1. *M. ovata* (Cav.) Spreng. (1826).

*M. abyssinica* A. Rich. (1847) -type: TU; Aderbati, Quartin-Dillon & Petit s.n. (P holo.).

*M. ovata* var. *abyssinica* (A. Rich.) K. Schum. in *Mon. Afr. Pfl.-Fam.* 5: 7 (1900).

*M. ovata* var. *oblongata* K. Schum., *loc. cit.*: 7 (1900) - types (p.p.): EW; Habab, Hildebrandt 552 (BM isosyn.). TU; Dschadscha, Schimper in *Hohenacker* 2108 (K P isosyn.).

Annual or perennial herb or subshrub to 0.5 m; stems tomentose. Leaves puberulous to tomentose; petiole 5-22 mm; stipules 3-8 mm; blade ovate to elliptic, 10-75 x 7-45 mm, usually less than twice as long as wide, margin dentate to serrate, apex acute to retuse. Flowers solitary or in 2-3-flowered tomentose cymes; peduncle 3-35 mm; pedicels up to 10 mm; bracteoles 5-8 x 0.5-1 mm, subulate to linear, tomentose, shorter than sepals. Sepals 7-12 x 2-3 mm, tomentose. Petals 4-8 mm long. Stamens: staminodes 3-5 mm. Style 1-2 mm. Capsule 6-9 mm long, ovoid; tomentose; locules 3-5-seeded. Seed  $c$  2 mm long, with scattered tubercles. Fig. 80.4.1.

*Acacia* and *Acacia* - *Balanites* wooded grassland and bushland, mostly on stony soil and rocky slopes, often in overgrazed areas; 500-1900 m. EE AF EW TU WU SU AR GG SD HA; Cape Verde Islands, Senegal, Somalia, Uganda, Kenya, Tanzania, also in Arabia, India and Australia. *Burger* 274, 2909; *Gilbert & Thulin* 158.

The type was grown in Madrid from seeds said to be "ex Nova Hispanica". But *Melhania* is strictly confined to Old World tropics, and the seeds more probably originated in India. The Ethiopian material closely matches the plate with the original description.

2. *M. sp.* = *Thesiger* 1945.

Annual or perennial herb to 0.5 m; stems lanate. Leaves pubescent to lanate; petiole 5-30 mm; stipules 8-20 mm (most or all longer than 10 mm); blade ovate to broadly elliptic, 25-70 x 15-45 mm, margin dentate to serrate, apex subacute to truncate. Flowers solitary or in 2-3-flowered tomentose to lanate cymes; peduncle 10-20(-35) mm; pedicels up to 10 mm; bracteoles (8-)10-20 x 1-2(-3) mm, subulate to linear or narrowly lanceolate, tomentose, most or all as long as or longer than the sepals. Sepals (9-)11-18 x 3-4 mm, tomentose to lanate. Petals 6-10 mm long. Stamens: staminodes 4-6 mm. Style 2-3 mm, hairy. Capsule 7-9 mm long, ovoid, tomentose, ovules 4-seeded. Seed  $c$  2 mm long, tuberculate.

*Acacia - Commiphora* bushland on stony soil derived from basement rocks; 1000–1600 m. GG; N Kenya, Somalia. *Corradi* 3635; *Thesiger* 1945; *Gilbert et al.* 9098.

Related to *M. ovata*, but differs in having a denser lanate indumentum, longer stipules, longer bracteoles and longer sepals. The hairy style is a character not observed in any other Ethiopian species.

3. *M. parviflora* *Chiov.* (1932).

Annual or perennial herb to 0.5 m; young branches tomentellous. Leaves densely pubescent to tomentose; petiole 5–25 mm; stipules 2–6 mm; blade narrowly ovate or narrowly oblong (or lowermost elliptic), 15–75 x 5–30 mm (usually 2–4 times as long as wide), margin crenate to serrate, apex acute to truncate. Flowers solitary or in 2–5-flowered tomentose cymes; peduncle 3–15 mm; pedicels up to 10 mm; bracteoles 5–11 x 2–4 mm, ovate (rarely lanceolate), tomentose, broader than sepals. Sepals 6–10 x 2–3 mm, tomentose. Petals 5–8 mm long. Stamens: staminodes 3–6 mm. Style *c* 2 mm. Capsule 5–7 mm long, subglobose, tomentose, locules 2–3-seeded. Seed *c* 2 mm long, with a dense rough surface. Fig. 80.4.2.

*Acacia - Commiphora* woodland and bushland, on limestone soils, grey sand derived from gneissic rocks, volcanic soil and black cotton soil; 850–1550 m. WU SD BA HA; NE Uganda, N & E Kenya, Somalia, E Tanzania. *Friis et al.* 2932; *Gilbert et al.* 7813, 7896.

4. *M. sp.* = *Gilbert et al.* 7432.

Perennial herb to 20 cm; young stems tomentellous. Leaves pubescent to tomentose; petiole 5–15 mm; stipules 3–9 mm; blade narrowly ovate or narrowly oblong, 13–60 x 4–9 mm (3 or more times as long as wide), margin serrate, apex subacute. Flowers solitary or in 2–3-flowered tomentose cymes; peduncle 5–8 mm; pedicels up to 5 mm; bracteoles 7–11 x 4–7 mm, ovate with truncate to subcordate base, tomentose. Sepals *c* 6 (9 in fruit) x 1–2 mm, tomentose. Petals *c* 6 mm long; staminodes *c* 4 mm; style *c* 1 mm. Capsule *c* 7 mm long, ovoid, densely pubescent, locules 3-seeded. Seed *c* 2 mm long, tuberculate.

*Acacia - Commiphora* bushland on shallow brownish soil overlying limestone; *c* 1250 m. SD; not known elsewhere. *Gilbert et al.* 7432.

Only known from this collection. With its acute to subacuminate bracteoles with subcordate bases this species forms a transition from the *M. ovata* group to the species around *M. velutina*. It seems to be closest to *M. angustifolia*, a species endemic on Zanzibar.

5. *M. rotundata* *Hochst. ex Mast.* (1868)

– type: TU; Gurrarfa, *Schimper* in *Hohenacker* 2286 (K holo., BM P iso.).

*M. cyclophylla* *Hochst. ex Mast.* (1868) – type: TU; Gurrarfa, *Schimper* in *Hohenacker* 2205 (K holo., BM P iso.).

Shrub to 1 m; branchlets silky to tomentose. Leaves pubescent to tomentellous; petiole 5–35 mm; stipules 3–7 mm; blade broadly ovate to orbicular, 15–65 x 13–65 mm, margin crenate, dentate or serrate, apex subacute to retuse.

Flowers solitary or in 2–3-flowered pubescent to tomentose cymes; peduncle 15–75 mm; pedicels up to 15 mm; bracteoles 10–20 x 3–7 mm, lanceolate to narrowly ovate, tomentose, recurved in fruit. Sepals 10–18 x 3–5 mm, tomentose. Petals 10–14(–18) mm long. Stamens: staminodes 6–9 mm. Style 4–9 mm. Capsule 8–13 mm long, ellipsoid, tomentose, locules 4-seeded. Seed *c* 2 mm long, with scattered tubercles. Fig. 80.4.3.

*Acacia - Commiphora* woodland and bushland on coarse grey sand derived from granitic and basaltic rocks; 800–1250 m. TU (Takeze Valley) GG SD BA; Somalia, N & E Kenya. *Friis et al.* 2925, *Gilbert et al.* 7974, *Sebsebe D.* 265.

6. *M. somalensis* *Bak. f.* (1898)

– type: BA; Sheik Husein, *Donaldson Smith* 152 (BM holo.).

Annual or shrubby herb to 40 cm; young stems tomentellous. Leaves pubescent to tomentellous; petiole 4–15 mm; stipules up to 4 mm; blade lanceolate or narrowly oblong, 20–60 x 5–15 mm (more than 3 times as long as wide), margin serrulate, apex subacute. Flowers solitary; pedicels up to 25 mm, tomentellous; bracteoles 5–10 x 0.5–1.5 mm, linear, tomentose, recurved in fruit. Sepals 8–14 x 1.5–3.5 mm, tomentellous. Petals 7–10 mm long. Stamens: staminodes *c* 5 mm. Style *c* 1.5 mm. Capsule 7–10 mm long, ovoid to ellipsoid, tomentellous, locules 3–5-seeded. Seed *c* 2 mm long, with scattered tubercles.

*Acacia - Commiphora* bushland on red sandy soil overlying limestone; *c* 1400 m. BA; not known elsewhere. *Friis et al.* 3669.

This very distinct species is only known from these two collections. It is closest to *M. rotundata* with which it shares the reflexed bracteoles and many-seeded capsules with seeds covered in scattered tubercles.

7. *M. velutina* *Forssk.* (1775).

*M. ferruginea* *A. Rich.* (1847) – type: TU; Aderbati, *Quartin-Dillon & Petit* 38 (P holo., K iso.).

Perennial herb or subshrub to 1 m; young stems yellowish to brownish lanate, hairs spreading. Leaves yellowish pubescent to tomentose; petiole 10–35 mm; stipules 5–18 mm; blade ovate to elliptic, 35–130 x 18–60 mm, margin serrate (rarely dentate), apex subacuminate to rounded. Flowers solitary or in 2–4-flowered tomentose cymes; peduncle 15–80 mm; pedicels up to 17 mm; bracteoles 7–13 x 4–8 mm, ovate with cordate base, tomentose. Sepals 10–13(–20 in fruit) x 3–5 mm, tomentose; petals 7–11 mm long; staminodes 3–7 mm; style 0.5–2 mm. Capsule 7–10 mm long, ovoid, tomentose, locules 4–5-seeded. Seed 2–2.5 mm long; with scattered tubercles. Fig 80. 4.4 & Fig 80.5.1–4.

*Acacia - Commiphora, Acacia - Combretum - Terminalia* and *Boswellia* woodland, wooded grassland and bushland, riverine forest, also in cultivated areas; (200–) 700–1950(–2550) m. EE EW TU TU/GD (Tekeze valley) SU(Blue Nile Gorge) GG SD BA HA; Sudan,

Somalia, Uganda, Kenya, Tanzania, Arabia. *Friis et al.* 955; *Gilbert* 2178; *Gilbert & Thulin* 264.

Tentative hybrid, *M. velutina* x *M. ovata*.

*Gilbert & Getachew Aweke* 2749 is more or less intermediate between these two species (which are the only ones occurring in the area where it was collected). The plant has young flowers only, and it has therefore been impossible to check whether any seeds could have developed. The plant has leaves up to 80 x 55 mm which are pubescent (tomentose when young); bracteoles *c* 12 x 3–5 mm, ovate with cuneate base; sepals *c* 11 x 4 mm, ovate; petals *c* 9 mm long; staminodes *c* 6 mm; style *c* 2 mm.

Steep slopes with open *Commiphora* wooded grassland; *c* 1450 m. TU; not known elsewhere.

8. *M. steudneri* Schweinf. (1868)

– type: EW; Bogos, Debra Sina, *Steudner* 1162 (BM K P iso.).

Shrub to 1 m; branchlets greyish to yellowish or brownish pubescent to tomentellous. Leaves whitish or greyish pubescent to tomentellous with appressed hairs; petiole 3–20 mm; stipules 2–8 mm; blade narrowly to broadly ovate or narrowly to broadly elliptic, 10–70(–90) x 5–35(–45) mm, margin serrate to dentate, apex acute to truncate. Flowers solitary or in 2–3(–4)-flowered tomentellous cymes; peduncle 10–55 mm; pedicels up to 13(–18) mm; bracteoles 6–14 x 4–8(–10) mm, ovate with cordate base, tomentellous to tomentose. Sepals 10–16 x 2–4 mm, tomentose. Petals 9–15(–20) mm long. Stamens: staminodes 6–8 mm. Style 4–6 mm. Capsule 7–9 mm long, ovoid to subglobose, tomentose with long-rayed hairs, locules 3-seeded. Seed *c* 3 mm long, with a rough surface.

Dry hillsides with scrub and grassland; 500–2150 m. EE EW TU; Sudan (Red Sea Hills), Egypt (Jebel Elba). *Mooney* 8002A; *Mesfin T. & Sebsebe D.* 3814; *J. de Wilde* 4580.

9. *M. zavattarii* Cufod. (1939)

– type: SD; Neghelle, *Cufodontis* 248 (FT holo.).

Annual or perennial herb or shrub to 50 cm; stems dark brownish tomentellous. Leaves pubescent to tomentellous; petiole 2–15 mm; stipules 2–8(–12) mm; blade narrowly oblong or narrowly elliptic, 25–85(–110) x 5–20(–25) mm, margin subentire to serrate, apex acute to truncate. Flowers solitary or in 2–3-flowered tomentellous cymes; peduncle 7–35 mm; pedicels up to 10 mm; bracteoles 7–10 x 4–8 mm, ovate with cordate base, tomentellous. Sepals 7–10 x 3–4 mm, tomentellous. Petals 8–11 mm long. Stamens: staminodes 5–6 mm. Style 2–4 mm. Capsule 6–7 mm long, subglobose, tomentellous with mainly short-rayed hairs, locules 3-seeded. Seed *c* 2 mm long, with scattered tubercles.

*Acacia* – *Commiphora* bushland, *Acacia* – *Combretum* – *Cussonia* wooded grassland with remnants of *Juniperus* forest, on limestone or brownish loamy soil; 1400–1850 (–2200) m. SD BA HA; not known elsewhere. *Friis et al.* 865; *Gilbert et al.* 7909; *Mooney* 9929.

Closely related to *M. steudneri*, but with a different indumentum, smaller flowers with shorter style, different fruit-indumentum and differently ornamented seeds. Also close to *M. prostrata* from southern Africa (north to S Tanzania) which has larger flowers and fruits.

10. *M. beguinotii* Cufod. (1939)

– type: SD; Neghelle, *Cufodontis* 226 (FT holo.).

Perennial herb with procumbent to ascending stems (or erect main-stem and procumbent branches), to 40 cm; all parts with conspicuously greyish indumentum; young stems, leaves and inflorescences tomentose. Leaves: petiole 3–20 mm; stipules 3–11 mm; blade narrowly ovate or narrowly elliptic, 20–70 x 5–20(–25) mm, margin subentire to crenate or dentate near apex, apex acute to truncate. Flowers solitary or in 2–3-flowered cymes; peduncle 10–25 mm; pedicels up to 10 mm; bracteoles 6–10 x 2.5–5 mm, narrowly to broadly ovate with cuneate to subcordate base, tomentose. Sepals 7–12 x 2–3 mm, tomentose. Petals 5–7 mm long. Stamens: staminodes 3–4 mm. Style 2–3 mm. Capsule 5–7 mm long, subglobose, densely pubescent, locules 2-seeded (mature seeds not seen).

Open *Juniperus* forest, *Acacia* – *Commiphora* and *Combretum* – *Cussonia* wooded grassland and bushland, on limestone ridges and on brown soil overlying limestone, often along tracts; 1250–1600 m. SD; not known elsewhere. *Gilbert et al.* 7737, 8235; *Haugen* 1537.

11. *M. sp.* = *Gilbert et al.* 7589.

Perennial herb or shrublet to 20 cm; young stems tomentose. Leaves pubescent to tomentose; petiole 3–15 mm; stipules 2–4 mm; blade elliptic or oblong, 10–48 x 7–25(–30) mm, margin serrate, apex rounded to truncate. Flowers solitary (rarely a few 2-flowered cymes); pedicels up to 20 mm, tomentose; bracteoles 10–15 x 10–15 mm in flower and 15–25 x 15–25 mm in fruit, reniform, tomentose (pubescent in fruit), united at base, sinus 5–8 mm deep. Sepals 2–5 x 1.5–2 mm, pilose. Petals 4–7 mm long. Stamens: staminodes 2–4 mm. Style *c* 1.5 mm. Capsule 4–7 mm long, ovoid to subglobose, tomentose, locules 2–4-seeded. Seed *c* 2 mm long, grey, trigonous-ovoid, with a dense rough surface.

*Acacia* – *Commiphora* woodland and bushland, usually on rocky limestone slopes but also on coarse grey sand derived from granitic rocks; near sea-level to 950 m. EE SD HA; NE Kenya, Yemen. *Friis et al.* 2970; *Gilbert et al.* 7691, 8215.

Close to – but clearly distinct from – *M. muricata* Balf. f. from Arabia, Socotra and Somalia which has a more appressed indumentum, shorter stipules and pedicels, bracteoles up to 20 x 20 mm with a less than 5 mm deep sinus, longer sepals and 2–3-seeded locules.

12. *M. stipulosa* J. R. I. Wood (1984).

Perennial or shrubby perennial to 10 cm; young stems tomentose. Leaves pubescent to tomentose; petiole 3–15 mm; stipules (3–)5–20 mm, persistent; blade lanceolate or narrowly oblong, 10–45(–75) x 2–8 mm, margin subentire or serrate in apical half, apex subacute to truncate. Flowers



solitary; pedicels up to 15 mm, tomentose; bracteoles 5–9 x 5–9 mm in flower and 11–15(–20) x 11–15(–18) mm in fruit, reniform, tomentose (pubescent in fruit), free at base, sinus 2–4 mm deep. Sepals 4–7(–11 in fruit) x 2–4 mm, pilose. Petals 4–5 mm long. Stamens: staminodes *c* 3 mm. Style *c* 1 mm. Capsule 5–8 mm long, ovoid to subglobose, densely pilose, locules 2–4(–5)-seeded. Seed *c* 2 mm long, brown, pear-shaped, tuberculate.

*Acacia* – *Balanites* woodland on sandy granitic soil, *Acacia* – *Commiphora* bushland on rocky limestone ridges, *Acacia* – *Dodonaea* bushland on rocky granitic ridge; 900–1500(–2200) m. SU(Awash Valley) SD BA HA; Somalia, Arabia. Friis et al. 3704, Gilbert et al. 8094, Gilbert & Thulin 77.

Differs from *M. muricata* Balf. f. in the longer persistent stipules, the less dentate leaves and in differently ornamented seeds.

13. *M. phillipsiae* Bak. f. (1898).

*M. grandibracteata* (K. Schum.) K. Schum. (1900) – types: HA; Ogaden, Merehan, Robecchi-Bricchetti 440 and 441 (both FT syn.).

*M. fiorii* Chiov. (1912) – types: EE; Habab, Grammé, Pappi 7955 (FT syn.). EE; Habab, Kub-Kub, Pappi 8022 (FT syn.). EE; Habab, Magber, Pappi 8119 (FT syn.).

Shrubby perennial to 1 m; branchlets tomentose to lanate. Leaves pubescent to tomentose; petiole 15–55 mm; stipules 3–20 mm; blade ovate to broadly so, 25–90(–120) x 20–60(–85) mm, margin crenate to serrate, apex rounded to truncate. Flowers in 2–6-flowered tomentose to lanate (rarely pubescent) cymes; peduncle 15–40(–50) mm; pedicels up to 15 mm; bracteoles 10–22 x 12–25 mm in flower and 17–40 x 20–50 mm in fruit, broadly cordiform or reniform, tomentose (pubescent in fruit), free at base, sinus 3–10 mm deep. Sepals 9–12 x *c* 3 mm (to 25 x 5 mm in fruit), densely pilose. Petals 7–10 mm long. Stamens: staminodes 4–7 mm. Style 1–3 mm. Capsule 7–10 mm long, ovoid to subglobose, tomentellous, locules 2–3-seeded. Seed 3–4 mm long, tuberculate. Fig. 80.4.7.

*Acacia* – *Commiphora* bushland, on limestone slopes, red sandy soil overlying limestone and on volcanic rocks; 450–1250 m. EE WU SD HA HA-AF; Niger, Chad, Egypt (Jebel Elba), NE Kenya, Somalia, Arabia. Gilbert & Thulin 160; Gilbert et al. 8212; Mooney 9650.

14. *M. denhamii* R. Br. (1826).

Shrubby perennial or shrub to 1 m; branchlets, leaves and inflorescences tomentose to lanate. Leaves: petiole 5–15 mm; stipules 3–9 mm; blade ovate to elliptic, 10–45 x 7–22 mm (up to 2 times as long as wide), margin dentate to serrate, apex rounded to truncate. Flowers in 2–3(–4)-flowered cymes (or some solitary); peduncle 5–15 mm; pedicels up to 7 mm; bracteoles 5–9 x 5–11 mm in flower and (10–)13–20 x 14–25 mm in fruit, reniform, tomentose to lanate (pubescent in fruit), free at base, sinus (1–)2–8 mm deep. Sepals (4–)5–6(–9 in fruit) x 2–3 mm, densely pilose (rarely pubescent). Petals (4–)5–7 mm long. Stamens: staminodes (3–)4–5 mm. Style *c* 0.5 mm. Capsule (4–)5–7 mm

long, ovoid to subglobose, pubescent, locules (1–)2-seeded. Seed 2–3 mm long, smooth. Fig. 80.4.6 & Fig. 80.5.5–7.

*Acacia* – *Commiphora* bushland and thickets on red sandy soil overlying limestone, dry sandy river-beds; 75–1000 m. EE HA; Senegal, Mauritania, Mali, Niger, Chad, Sudan, Egypt (Jebel Elba), Somalia, Arabia, India. Bally 6843; Ellis 218; Simmons 94.

15. *M. sp.* = *Hemming* 1465.

Perennial herb or subshrub to 50 cm; branchlets lanate. Leaves pubescent to lanate; petiole 4–13 mm; stipules 3–10 mm; blade lanceolate to narrowly ovate or narrowly oblong, 15–67 x 5–22 mm (3 or more times longer than wide), margin entire or dentate in upper half, apex subacute to retuse. Flowers solitary or in 2–3(–4)-flowered pilose to tomentose cymes; peduncle 5–40 mm; pedicels 5–10(–35 in solitary flowers) mm; bracteoles 5–11 x 6–13 mm in flower and 12–25 x 10–25 mm in fruit, broadly cordiform to reniform, tomentose to lanate (pilose in fruit), free or united at base, sinus 3–8 mm deep. Sepals 3–7(–9 in fruit) x 1–3 mm, pilose to pubescent. Petals 4–5 mm long. Stamens: staminodes 2–4 mm. Style *c* 1 mm. Capsule 4–5 mm long, ovoid to subglobose, pubescent, locules 1(–2)-seeded. Seed 2–3 mm long, smooth.

*Acacia* – *Commiphora* bushland on sandy soil; 550–1075 m. HA; Somalia, NE Kenya. Gillett 4213; Popov 1108.

16. *M. kelleri* Schinz (1902).

Shrubby herb to 1 m; branchlets tomentose. Leaves pubescent to tomentose; petiole 5–43 mm; stipules 4–12 mm; blade ovate or elliptic to broadly so, 15–60 x 10–42 mm, margin serrate (rarely crenate), apex subacute to truncate. Flowers in (2–)3–8-flowered tomentose cymes (always some with 5 or more flowers); peduncle 2–10 mm; pedicels up to 8 mm; bracteoles 4–7 x 4–7 mm in flower and 7–15 x 9–17 mm in fruit, broadly cordiform to reniform, tomentose (pubescent in fruit), free at base, sinus absent. Sepals 2–4(–7 in fruit) x 1–2 mm, subglabrous to pilose along median line; petals 3–4 mm; staminodes 2–3 mm; style 1–2 mm. Capsule 3–4 mm long, subglobose, pubescent, locules 1-seeded; seed 2–2.5 mm long, smooth.

*Acacia* – *Commiphora* bushland on sandy to stony soil; 800–1000 m. HA; Somalia. Ellis 219; Gillett 4209; Simmons 100.

17. *M. sp.* = *Friis* et al. 2971.

Shrubby herb or shrub to 30 cm; branchlets lanate. Leaves pubescent to lanate; petiole (12–)15–30 mm; stipules 4–10 mm; blade ovate to oblong or elliptic, 20–70 x 12–32 mm, margin irregularly dentate or crenate usually with a single conspicuously larger tooth near middle, apex rounded to truncate. Flowers in 2–5(–6)-flowered pubescent to tomentose cymes (always some with 4 or more flowers); peduncle 8–20 mm; pedicels up to 7 mm; bracteoles 4–8 x 6–11 mm in flower and 8–15 x 13–32 mm in fruit (at least 5 mm wider than long), broadly reniform, tomentose to lanate (pubescent or pilose in fruit), free at base, sinus 0–4 mm



Figure 80.5 *MELHANIA VELUTINA*: 1 – leafy branch with flowers and fruits  $\times \frac{2}{3}$ ; 2 – flower  $\times 3$ ; 3 – staminal tube, ovary and style  $\times 4$ ; 4 – opened fruit  $\times 1$ . 5. *M. DENHAMII*: 5 – leafy branch with flowers and fruits  $\times \frac{2}{3}$ ; 6 – flower  $\times 3$ ; 7 – staminal tube, ovary and style  $\times 4$ . 1 from Russell 51951; 2–3 from Ash 1607; 4 from Pappi 4459; 5–7 from Jackson 4358. Drawn by Eleanor Catherine.

deep. Sepals 3–5(–9 in fruit) x 2–3 mm, densely pilose; petals 2.5–5 mm long; staminodes 2–3 mm. Style c 0.5 mm. Capsule 4–5 mm long, subglobose, pilose to tomentose, locules 1(–2)-seeded. Seed 2–3 mm long, smooth. Fig. 80.4.5.

*Acacia* – *Commiphora* bushland on red sandy to loamy soil overlying limestone or on coarse grey sand over granite; 400–1325 m. SD HA; NE Kenya. *Gilbert* 2046; *Gilbert* et al. 8213; *J. de Wilde* 5938.

## 6. MELOCHIA L. (1753)

Goldberg in *Contrib. U. S. Nat. Herb.* 34: 191–363 (1967).

Herbs or subshrubs; indumentum stellate or simple. Leaves penninerved; stipules subulate to lanceolate. Flowers bisexual, in condensed terminal or axillary few- to many-flowered cymes; bracteoles subulate to linear, some distance below calyx. Calyx campanulate, shortly 5-lobed. Petals 5, obovate, free, not persistent. Stamens 5, united into a tube; no staminodes. Ovary 5-locular, locules with 2 ovules; styles 5, free or united at base. Capsule 5-valved, locules 1-seeded. Seed ellipsoid in outline, with rounded dorsal and two flat lateral faces.

About 50 species, mainly in tropical America. 3 species in Africa.

### *M. corchorifolia* L. (1753).

Erect to procumbent annual or perennial herb to 1 m; young stems pubescent, most hairs in a band decurrent from petiole base. Leaves hispidulous on petiole and veins; petiole 0.3–2(–3) cm; stipules up to 0.8 cm; blade narrowly to broadly ovate, 1–6.5(–7.5) x 0.3–4.5(–5.5) cm, margin serrate, apex acute to rounded, base cuneate to truncate. Inflorescence hispidulous, subsessile; pedicels up to 2 mm; bracts up to 7 mm. Calyx c 2 mm long, hispidulous, teeth c 0.5 mm long, acute. Petals c 5 mm long, white. Stamens: filaments united almost to apex, tube c 2 mm. Styles c 2 mm, united in basal half. Capsule c 5 mm in diameter, subglobose, hispidulous. Seed c 3 x 2 mm, testa striate. Fig. 80.6.1–5.

Sandy river-beds, river banks, lake shores, alluvial plains; 400–600 m. IL GG; widespread in tropical Africa, Asia and Australia, introduced in America. *Carr* 682; *Friis* et al. 2542, *Mesfin T. & Kagnev* GY. 2409.

## 7. WALTHERIA L. (1753)

Herbs or shrubs; indumentum stellate. Leaves penninerved; stipules subulate. Flowers bisexual, in condensed to open or scorpioid cymes or corymbs; bracteoles subulate to lanceolate, some distance below calyx. Calyx campanulate, 5-lobed. Petals 5, free, obovate, not persistent. Stamens 5, united into a tube, anthers rounded at apex; no staminodes. Ovary 1-locular with 2 ovules. Style 1, somewhat eccentric. Capsule 2-valved with 1(–2) seeds. Seed obovoid.

About 50 species; mostly in tropical America. A single pantropic species which is often weedy.

### *W. indica* L. (1753).

*W. americana* L. (1753).

*W. americana* var. *indica* (L.) K. Schum. in *Mon. Afr. Pfl.-Fam.* 5: 47 (1900).

Perennial herb or subshrub to 75 cm; stems, leaves and inflorescences pubescent to tomentose. Leaves: petiole 0.2–2 cm; stipules up to 0.5 cm; blade narrowly oblong to ovate or elliptic, 1.5–9 x 0.5–4.5 cm, margin serrate, apex acute to truncate; base truncate to subcordate. Inflorescences and flowers subsessile; bracts up to 4 mm. Calyx c 4 mm long, tomentose, teeth c 2 mm long, acuminate. Petals c 4 mm long, yellow; filaments united almost to apex, tube c 2 mm. Style c 1 mm, stigma with a tuft of hairs. Capsule c 3 x 2 mm, obovoid, villous. Seed c 2 x 1.5 mm, dark brown, testa smooth. Fig. 80.5.6–9.

*Acacia* – *Combretum*, *Acacia* – *Commiphora*, *Acacia* – *Balanites*, *Boswellia* and *Combretum* – *Terminalia* woodland and bushland, often on rocky hills or on gravelly soil, river-beds; 600–1650 m. EE EW TU SU KF GG SD BA HA; pantropic. *Gilbert* 2179, *Gilbert & Thulin* 236, *Mooney* 9903.

## 8. HERMANNIA L. (1753)

Vollesen, *Kew Bull* 40(3): 643–646 (1985).

Herbs or shrubs; indumentum stellate or with simple and/or glandular hairs intermixed. Leaves penninerved, cuneate to subcordate at base; stipules subulate to ovate. Flowers bisexual, solitary or on 2-several-flowered peduncles in leaf-axils or in terminal panicles; bracteoles present or not, some distance below calyx. Calyx campanulate with 5 triangular lobes. Petals 5, free, elliptic to obovate, with inrolled edges in lower part, not persistent. Stamens 5, filaments free or shortly united, linear or obovate with membranous wings or tufts of hairs on either side, anthers attenuate to acuminate, usually ciliolate; no staminodes. Ovary 5-locular, locules with 1-many ovules. Styles 5, united. Capsule 5-valved. Seed horn-shaped.

About 100 species in tropical and S Africa (about 70 in S Africa). Also a few in Arabia, Mexico and southern USA.

1. Perennial herbs, subshrubs or shrubs; flowers in terminal panicles or on axillary peduncles; filaments linear or cruciform; capsule-valves not horned 2
  - Ephemeral or annual herbs; flowers solitary in leaf-axils; filaments obovate with membranous wings; capsule-valves with an apical horn. 6
2. Procumbent perennial herb from woody rootstock; stipules dentate; flowers on axillary peduncles; filaments cruciform. 5. *H. quartiniana*
  - Subshrubs or shrubs, usually erect; stipules entire; flowers in terminal panicles; filaments linear. 3
3. Capsule 1.5–3 mm long, locules 1-seeded; anthers 2–3 mm long; pedicels up to 5 mm long; calyxlobes 1.5–2.5 mm long; petals 2–6 mm long. 4
  - Capsule 6–15 mm long, locules several-seeded; anthers 4–6 mm long; pedicels 4–20 mm long; calyxlobes 2.5–6 mm long; petals 4–10 mm long. 5

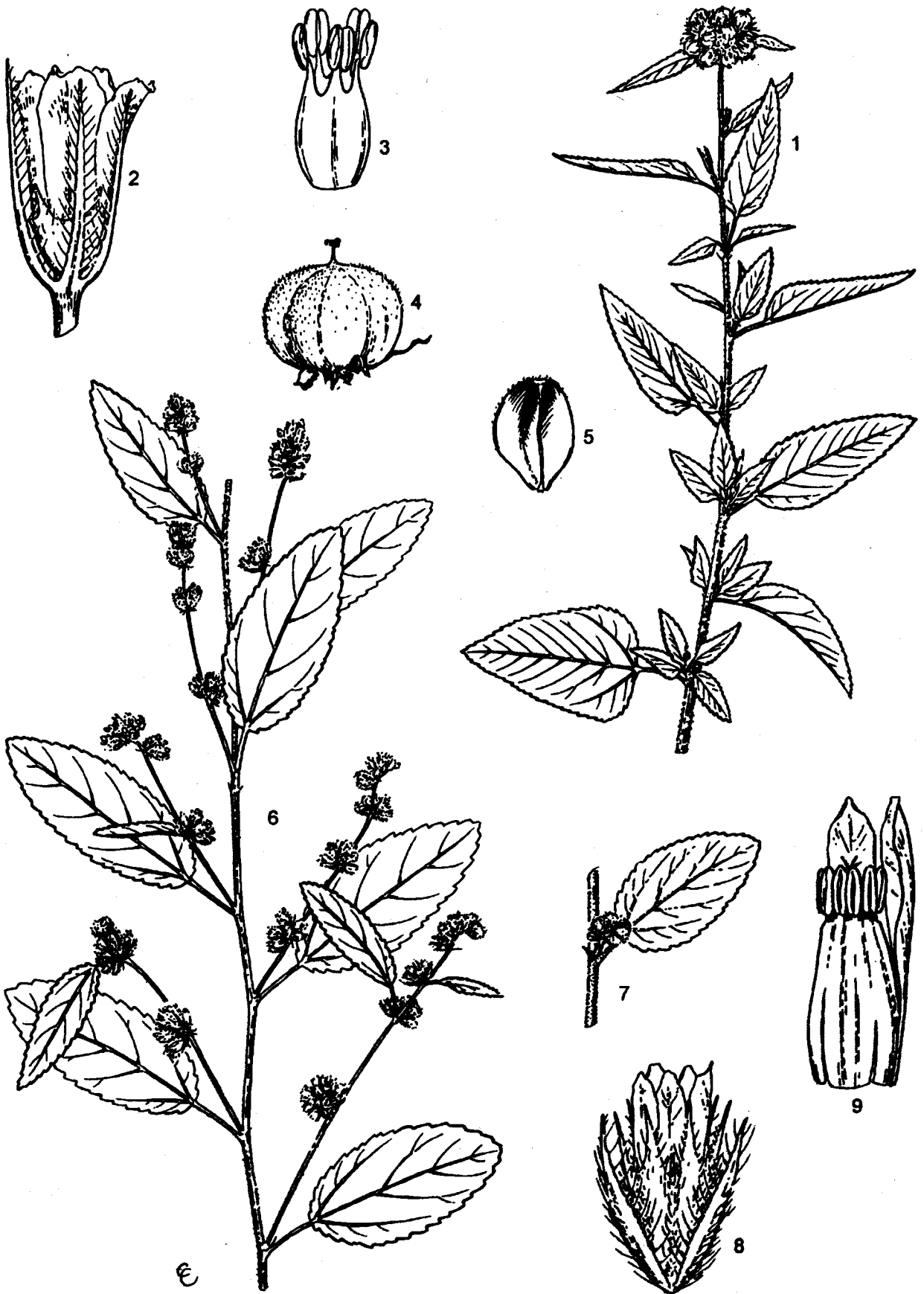


Figure 80.6 *MELOCHIA CORCHORIFOLIA*: 1 – flowering stem  $\times \frac{2}{3}$ ; 2 – flower  $\times 6$ ; 3 – staminal tube  $\times 10$ ; 4 – fruit  $\times 5$ ; 5 – valve of dehiscent fruit  $\times 5$ . *WALTHERIA INDICA*: 6 – flowering stem  $\times \frac{2}{3}$ ; 7 – inflorescence  $\times \frac{2}{3}$ ; 8 – flower  $\times 6$ ; 9 – staminal tube with two petals attached  $\times 10$ . 1 from Sillitoe 343; 2 & 3 from Drummond & Hemsley 3928; 4 & 5 from Friis et al. 2542; 6 from Glover & Gilliland 292; 7–9 from Gilbert et al. 236. Drawn by Eleanor Catherine.

4. Inflorescence open, all bracts supporting a single flower; capsule 1.5–2 mm long; petals 2–3.5 mm long, shorter than sepals. 3. *H. paniculata*  
 – Inflorescence contracted, at least upper bracts supporting clusters of up to 5 flowers; capsule *c* 3 mm long; petals (3–)4–6 mm long, longer than sepals (rarely same length).  
 4. *H. sp.* = Friis et al. 2977
5. Stipules and lower bracts ovate with cordate base; petals spreading at anthesis; seed tuberculate.  
 1. *H. exappendiculata*  
 – Stipules and lower bracts linear; petals reflexed at anthesis; seed not tuberculate. 2. *H. boranensis*
6. Petals yellow (rarely red); indumentum stellate and stems without stalked glands. 6. *H. tigreensis*  
 – Petals pink, red or purple; indumentum of simple hairs (or with stellate intermixed); stems with stalked glands. 7
7. Leaves entire (rarely with two apical teeth); seed with tuberculate testa; capsule 5–9 mm long; bracteoles absent. 7. *H. modesta*  
 – Some or all leaves serrate; testa granular; capsule 4–6 mm long. 8
8. Petals 4–5 mm long; anthers *c* 1.5 mm long; bracteoles orbicular or broadly elliptic. 8. *H. testacea*  
 – Petals 7–9 mm long; anthers 4–5 mm long; bracteoles absent. 9. *H. kirkii*

1. *H. exappendiculata* (Mast.) K. Schum. (1900).  
*H. donaldsonii* Bak. (1901) – type: GG; N of Lake Turkana, Donaldson Smith 395 (BM holo.).

Shrubby herb or shrub to 1.25 m; branchlets and leaves pubescent. Leaves: petiole 2–17 mm; stipules up to 12 x 7 mm, ovate with cordate base; blade ovate (rarely elliptic), 10–65 x 7–25(–45) mm, margin dentate or serrate (rarely crenate), apex acute to retuse. Panicle up to 120 mm long, open to contracted, few- to many-flowered, pubescent and glandular; pedicels 4–15 mm; bracts ovate (near base) to linear, from 10 x 6 to 2 x 0.5 mm. Calyx 4–8(–9) mm long, subglabrous to pubescent, lobes 3–6 mm long. Petals 6–10 mm long, yellow, spreading. Stamens: filaments 1–2 mm, anthers 4–6 mm. Styles 4–6 mm. Capsule 7–13 mm long, ellipsoid to subglobose, densely pubescent from numerous appendages each with an apical tuft of hair. Seed *c* 1.5 mm long, irregularly lumpy, testa tuberculate. Fig. 80.7.4–5.

*Acacia* – *Commiphora* – *Combretum* bushland on sandy to gravelly soil derived from granite, often on rocky slopes; 500–1500 m. GG; NE Uganda, S Somalia, Kenya, NE Tanzania, Zanzibar. Brown 47; Gilbert 8942.

There is a tendency for plants from the northern part of the distribution to have smaller flowers and fruits than typical material. But the differences are in no way clear-cut and do probably not merit any taxonomic recognition.

2. *H. boranensis* K. Schum. (1903)  
 – type: SD; Andada, *Ellenbeck* 2153 (B destroyed).  
*H. erythraeae* Chiov. (1911) – types: EE; Ingal to Ras Koral, *Terraciano* 23 (FT syn.). EE; Dahlak Islands, *Terraciano* 307 (FT syn.). EE; Assaorta, Mte. Ghedem, *Terraciano & Pappi* 12 (FT syn.).

Shrubby herb or shrub to 1 m; branchlets subglabrous to pubescent. Leaves pubescent; petiole 5–25 mm; stipules up to 5 x 0.5 mm, linear, blade ovate, 10–45 x 5–30 mm, margin crenate, dentate or serrate, apex rounded to retuse. Panicle up to 300(–500) mm long, open to contracted, many-flowered, sparsely pubescent and glandular; pedicels 5–20 mm; bracts linear, up to 5 x 0.5 mm. Calyx 4–8 mm long, pubescent, sometimes splitting into two lobes only, lobes 2.5–7 mm long. Petals 4–9 mm long, yellow, reflexed, often twisted. Stamens: filaments 1–2 mm, anthers 4–6 mm. Style 3–5 mm. Capsule 6–8(–15) mm long, ellipsoid to subglobose, pubescent, not with appendages. Seed *c* 1.5 mm long, irregularly lumpy, testa minutely pitted, not tuberculate.

*Acacia* – *Commiphora* bushland on grey sand derived from granite, *Acacia drepanolobium* bushland on black cotton soil, river banks, alluvial valley bottoms; near sea level to 1200 m. EE GG SD; NE Uganda, N & E Kenya, Somalia. Brown 61; *Mesfin T.* et al. 4202.

The tendency for the calyx to split into two lobes only (one consisting of three sepals and the other of two) has not been observed in any other species. But there seems to be no other differences from specimens with a normal 5-lobed calyx.

3. *H. paniculata* Franch. (1882).

Shrubby perennial or shrub to 60 cm; branchlets and leaves pubescent to tomentose. Leaves: petiole 5–20 mm; stipules lanceolate, up to 6 x 1.5 mm; blade ovate to elliptic, 10–35 x 5–25 mm, margin dentate to serrate, apex rounded to truncate. Panicle up to 100 mm long, open to contracted, many-flowered, pubescent; pedicels up to 4 mm; bracts ovate, from 6 x 2 to 2 x 0.5 mm. Calyx 2.5–4 mm long, pilose to densely pubescent, lobes 1.5–2.5 mm long, erect. Petals 2–3.5 mm long, yellow, reflexed. Stamens: filaments 1–1.5 mm, anthers 2–3 mm. Styles 3–4 mm. Capsule 1.5–2 mm long, globose, pilose. Seed *c* 1 mm long, irregularly lumpy, testa pitted. Fig. 80.7.1–3.

*Acacia* – *Commiphora* bushland on red sandy to stony soil overlying limestone; 400–800 m. HA; Djibouti, Somalia, NE Kenya, Arabia. *Ellis* 202; *Gilbert* 2076; *Simmons* 127.

4. *H. sp.* = Friis et al. 2977.

Procumbent shrubby herb or shrub, stems up to 1 m long; branchlets and leaves pubescent to tomentose. Leaves: petiole 2–17 mm; stipules lanceolate to ovate, up to 4 x 2.5 mm; blade elliptic, 10–60 x 5–35 mm, margin dentate to serrate, apex acute to truncate. Panicle up to 120 mm long, narrow, contracted, many-flowered, pubescent; pedicels up to 8 mm; bracts ovate to linear, from 4 x 2 to 2 x 0.5 mm. Calyx 3–5 mm long, pubescent, lobes 1.5–2 mm long, erect. Petals (3–)4–6 mm long, yellow, erect or spreading. Stamens: filaments 2–3 mm, anthers 2–3 mm. Styles 3–4.5 mm. Immature capsule *c* 3 mm long, globose, densely pilose.

*Acacia* – *Commiphora* woodland and bushland on grey sandy to gravelly soil derived from granite or sandstone;

800–1600(–1800) m. GG SD; NE Kenya. *Friis* et al. 2977; *Gilbert* et al. 8064; *Mesfin T.* et al. 4337.

This characteristic species is locally very abundant in the Moyale-Mega-Yabelu area. It is easily recognised by the habit and narrow inflorescence. *Mooney* 9914 is very small-flowered, but it was collected from a locality where big-flowered specimens have also been collected.

5. *H. quartiniana* *A. Rich.* (1847)

– types: TU; Adua, *Quartin-Dillon & Petit* s.n. (P syn., K photo). TU; Adua, *Schimper* II:1103 (P syn., FI(Webb) UPS isosyn.).

*H. abyssinica* (Hochst. ex Harv.) K. Schum. (1890)  
– type: TU; Adua, *Schimper* I:320 (FI(Webb) K P iso.).

Procumbent perennial herb from woody rootstock, stems up to 50 cm long, pubescent. Leaves subglabrous to sparsely pubescent on veins; petiole 3–15 mm; stipules ovate, up to 12 x 4 mm, dentate; blade lanceolate to ovate, 15–60(–80) x 3–25(–40) mm, margin serrate, apex acute. Flowers in axillary 1–2-flowered pubescent cymes; peduncle up to 25(–40) mm; pedicels up to 10(–15) mm; bracteoles lanceolate to elliptic, up to 5 mm long. Calyx 5–7 mm long, pubescent, lobes 3–5 mm long. Petals 5.5–8 mm long, yellow. Stamens: filaments 1–2 mm, cruciform, anthers 4–5 mm. Styles 2–3 mm. Capsule *c* 6 mm long, ellipsoid, sparsely pubescent. Seed *c* 1.5 mm long, smooth, testa finely pitted. Fig. 80.7.9–12.

Dry eroded hillsides and rocky outcrops, roadsides, abandoned cultivations; 1325–2700 m. EW TU SU; Sudan (Jebel Marra), W Zambia, Angola, Zimbabwe, Botswana, Namibia, S Africa. *Mooney* 9559; *Pappi* 1758; *Puff* et al. 810911-5/6.

An extremely disjunct and most remarkable distribution. But the collections from southern Africa are indistinguishable from the ones from the Flora area.

6. *H. tigrensensis* *Hochst. ex A. Rich.* (1847)

– types: TU; Djeladjeranne, *Quartin-Dillon & Petit* s.n. (not seen). TU; Tekeze River, *Schimper* II:812 (P syn., BM FI(Webb) K UPS isosyn.). TU; Djeladjeranne, *Schimper* III:1470 (P syn., FT K isosyn.).

Ephemeral herb to 40(–60) cm rarely becoming woody at base; stems stellate pubescent and with scattered sessile glands. Leaves pubescent; petiole 0.5–5(–10) mm; stipules linear, up to 5 mm; blade ovate to elliptic, 7–47(–65) x 3–20(–25) mm, margin serrate (uppermost often entire), apex acute. Peduncle and pedicel not or indistinctly jointed, together 15–40 cm, glabrous to pubescent, joint if present 1–3(–5) mm below calyx; bracteoles absent or 1(–2), linear, up to 1 mm. Calyx 3–4.5 mm long, pubescent, lobes 1.5–2.5 mm long. Petals 3–4.5 mm long, yellow (rarely red). Stamens: filaments *c* 1.5 mm, anthers 1–1.5 mm. Styles 1–1.5 mm. Capsule 3–6 mm long, subglobose to transversely ellipsoid (rarely ellipsoid). Seed *c* 1 mm long, with transverse folds, testa minutely granular.

*Acacia* – *Commiphora*, *Acacia* – *Combretum*, *Combretum* – *Terminalia* and *Acacia* – *Anogeissus* woodland and bushland, on soils derived from granite and sandstone; 1200–1800(–2600) m. EW TU GD WU SU GG SD BA

HA; Senegal, Upper Volta, Nigeria, Cameroon, Central African Republic, Chad, Sudan, NE Zaire, Uganda, Tanzania, Mozambique, Malawi, Zimbabwe, Angola. *Ash* 2981; *Gilbert & Getachew Aweke* 3088; *Gilbert & Thulin* 209.

7. *H. modesta* (*Ehrenb.*) *Mast.* (1868).

Ephemeral herb to 30 cm; stems pubescent (hairs mostly simple) and with short glandular hairs. Leaves sparsely pubescent; petiole 0.5–2(–3) mm; stipules linear, up to 2 mm; blade linear, 10–30 x 1–3 mm, margin entire (rarely with two apical teeth), apex acute. Peduncle 10–30 mm; pedicel 3–7 mm, both sparsely pubescent; bracteoles absent. Calyx 4–5 mm long, subglabrous to sparsely pubescent, lobes 2.5–3 mm long. Petals 5–7 mm long, red to purple. Stamens: filaments 2–3 mm, anthers *c* 3 mm; styles *c* 2 mm. Capsule 5–9 mm long, ellipsoid to obovoid, sparsely pubescent. Seed *c* 1.5 mm long, with transverse folds, testa with scattered tubercles.

Dry coastal plains; 25–75 m. EE; Egypt, Sudan, Somalia, NE Kenya, Angola, Zimbabwe, Botswana, Namibia, S Africa, Arabia. *Bally* 6910; *Paskin* 45.

Another species with a very disjunct distribution, but not quite as extreme as *H. quartiniana*.

8. *H. testacea* *Vollesen* (1985)

– type: HA; Harar to Jijiga, *Gilbert* 1836 (K holo., C EA ETH UPS iso.).

Ephemeral herb to 25(–45) cm; stems pubescent (hairs mostly simple) and with glandular hairs. Leaves sparsely pubescent; petiole 1–5 mm; stipules linear, up to 3 mm; blade linear to narrowly ovate or narrowly elliptic, 10–42 x 1–8 mm, margin serrate (uppermost often entire), apex acute. Peduncle 15–40 mm; pedicels 1–4 mm, both sparsely glandular pubescent; bracteoles 2, broadly elliptic to orbicular, up to 0.5 mm. Calyx 3–4 mm long, sparsely pubescent, lobes *c* 1.5 mm long. Petals 4–5 mm long, red or brick-red. Stamens: filaments *c* 1.5 mm, anthers *c* 1.5 mm. Styles *c* 1 mm. Capsule 4–6 mm long, ellipsoid to subglobose, sparsely pubescent. Seed *c* 1.5 mm long, with transverse folds, testa granular. Fig. 80.7.6–8.

*Acacia* – *Commiphora* woodland and bushland, usually on limestone but also on granite; 850–1800 m. TU SU SD BA HA; not known elsewhere. *Friis* et al. 3155, *Gilbert & Getachew Aweke* 2653, *Gilbert* et al. 7990.

At first sight this is strikingly like *H. tigrensensis*, but at closer examination a number of differences appear. The indumentum consists of simple and glandular (not stellate) hairs. The peduncle is distinctly jointed and the bracteoles are differently shaped. The petals are red and the seeds have a more distinctly granular testa. *H. testacea* also shows a strong preference for limestone soils while *H. tigrensensis* never grows on limestone.

9. *H. kirkii* *Mast.* (1868).

Annual herb to 50 cm; stems pubescent (hairs simple) and with glandular hairs. Leaves subglabrous to pubescent; petiole 3–13 mm; stipules linear to lanceolate, up to 4 mm; blade narrowly ovate to ovate or elliptic, 10–40 x 2–15(–20) mm, margin serrate (uppermost often entire), apex acute.

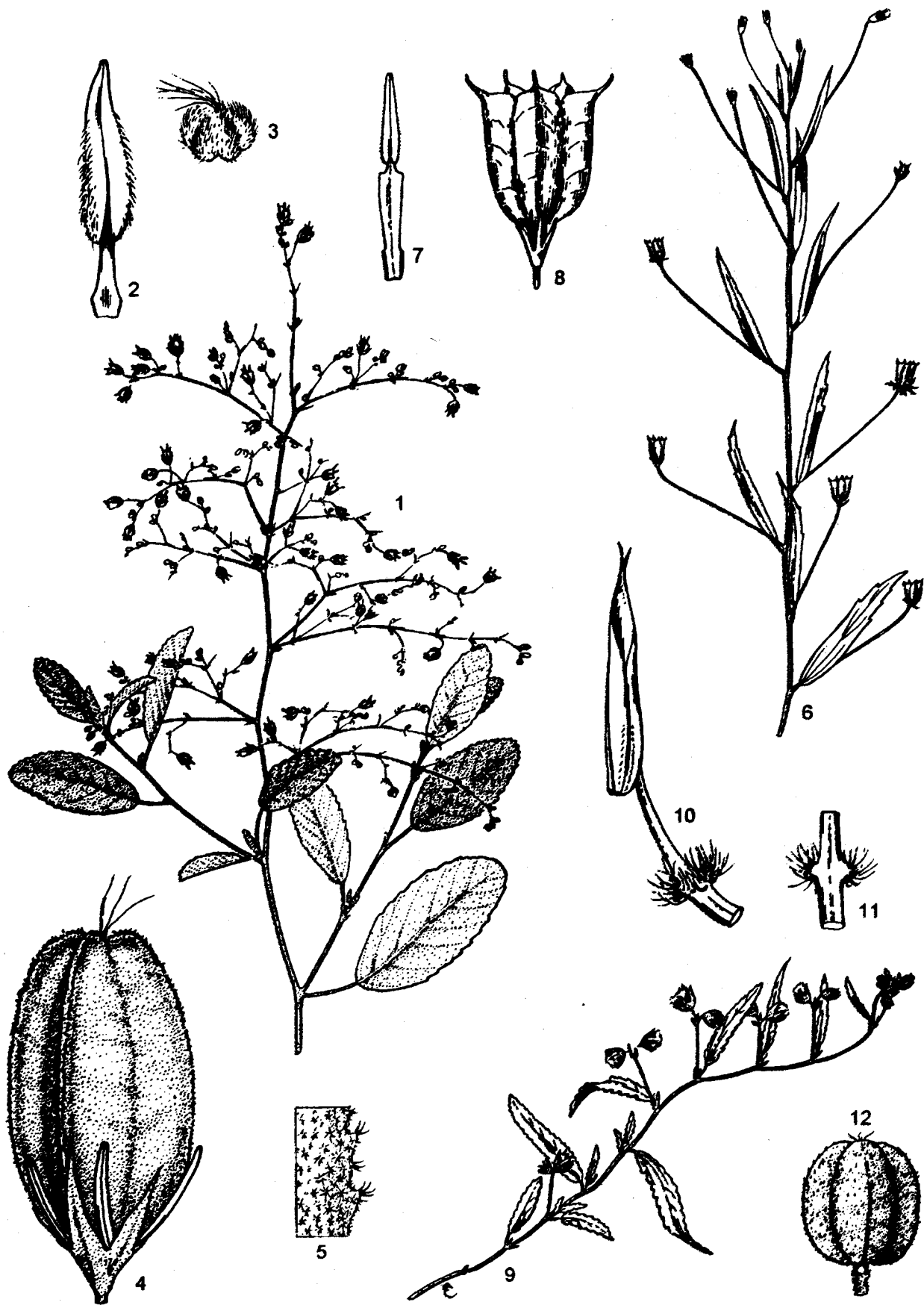


Figure 80.7. *HERMANNIA PANICULATA*: 1 - flowering and fruiting stem  $\times \frac{1}{2}$ ; 2 - stamen  $\times 10$ ; 3 - capsule  $\times 4$ . *H. EXAPPENDICULATA*: 4 - capsule  $\times 4$ ; 5 - detail of edge of capsule-valve  $\times 10$ . *H. TESTACEA*: 6 - flowering stem  $\times \frac{1}{2}$ ; 7 - stamen  $\times 10$ ; 8 - capsule  $\times 4$ . *H. QUARTINIANA*: 9 - flowering stem  $\times \frac{1}{2}$ ; 10 - stamen  $\times 10$ ; 11 - detail of cruciform part of filaments  $\times 10$ ; 12 - capsule  $\times 4$ . 1-2 from Gillett & Hemming 24811; 3 from Gillett & Hemming 23424; 4-5 from Thulin 4737; 6 & 8 from Burger 2862; 7 from Friis et al. 3155; 9 from Schimper 320; 10-12 from Klug 688. Drawn by Eleanor Catherine.

Peduncle and pedicel not or indistinctly jointed, together 10–25 mm, glandular pubescent; bracteoles absent. Calyx 3.5–5 mm long, subglabrous to pubescent, lobes 2–3 mm long. Petals 7–9 mm long, pink to red. Stamens: filaments 3–4 mm, anthers 4–5 mm, dark blue. Styles 3–4 mm. Capsule 4–6 mm long, ellipsoid to subglobose, pubescent. Seed *c* 1.5 mm long, with transverse folds, testa densely granular.

*Acacia* – *Commiphora* bushland, on stony or gravelly hillsides with grey soils derived from granite; 400–1600 m. GG SD; NE Uganda, Kenya, Tanzania, Mozambique, Zimbabwe, Botswana, Angola, Namibia, S Africa. *Thesiger* 1936; *Puff* et al. 870425–2/2; *Gilbert* 9102.

#### Doubtful species

#### *H. erlangeriana* K. Schum. (1903)

– type: HA; Aroris, Majo, *Ellenbeck* 1068 (B destroyed).

Low subshrub; branches, leaves, pedicels and calyx subtomentose. Leaves: petiole 3–5 mm; stipules subulate, *c* 2 mm; blade ovate to oblong, 8–20 x 4–8 mm, margin serrulate, apex rounded to truncate. Flowers solitary in axils of filiform bracts; pedicels *c* 5 mm. Calyx *c* 8 mm long, turbinate, divided to below middle. Petals *c* 9 mm long, yellow. Stamens: filaments without appendages, anthers *c* 6 mm. Styles *c* 8 mm. Fruit not known.

*Acacia* woodland; no altitude given. HA; only known from the type.

The type of this species is no longer extant, and no species of *Hermannia* has ever since been collected near the type locality.

Schuman states that the species belongs in subgen. *Hermannia* which is characterized by obovate filaments with winged upper parts. But at the same time he says in the diagnosis that the filaments are ‘exappendiculatis’.

All other species in this subgenus occur in southern Africa, and it would be surprising to find a species in our area. But it must be admitted that some peculiar distributions do occur in *Hermannia*, e.g. *H. quartiniana*.

I suspect that this ‘species’ is actually a misinterpreted collection of *H. boranensis* or *H. exappendiculata*.

### 9. STERCULIA L. (1753)

Trees (rarely shrubs); indumentum stellate. Leaves unlobed to digitately divided, penninerved or (in Ethiopia) palmately nerved, with entire margin; stipules subulate to narrowly triangular. Flowers unisexual, monoecious or dioecious, in panicles or racemes: bracteoles subulate to lanceolate, some distance below calyx. Calyx 4–5(–6)-lobed. Petals absent. Male flowers with 10–20 stamens in a capitate cluster at apex of slender androphore. Female flowers with a single ovary at top of gynophore, with staminodes at base of ovary. Ovary with 4–5 coherent carpels with 2-many ovules; styles coherent, reflexed, stigma peltate or 4–5-lobed. Carpels separating at maturity, becoming woody or leathery follicles, often with irritating

hairs on placentas. Seed ellipsoid, smooth, with fleshy aril at base.

About 300 species in all tropical regions.

*Sterculis setigera* Del. and *S. tragacantha* Lindl. are a source of important non-toxic, edible gums.

1. Calyx with numerous small dark red dots; follicles thin-walled, opening up and flattening out completely at maturity, gradually tapering to apex, irritating hairs all over inner surface.

#### 5. *S. stenocarpa*

– Calyx not with small red dots; follicles with irritating hairs on placentas only. 2

2. Mature leaves 1–4.5(–6) cm long; petiole 0.5–2 cm; flowers in a 0.2–1.5 cm long raceme; follicles with a strong rough surface; seed (11–)12–14 x 8–10 mm.

#### 4. *S. rhyncocarpa*

– Mature leaves 4.5–19 cm long; petiole 1.5–12(–16) cm; flowers in a 2–12 cm long panicle; follicles not with a rough surface; seed 9–11 x 5–7 mm. 3

3. Panicle narrow, racemoid, side branches up to 0.5(–1) cm; flowers puberulous to pubescent, surface clearly visible; leaves sparsely puberulous to pubescent; stipule-scars (2–)3–5 mm wide.

#### 3. *S. africana*

– Panicle open, side branches 1–4 cm; flowers tomentellous, surface not visible; leaves pubescent to tomentose or lanate; stipule-scars 1–2 mm wide. 4

4. Leaves whitish lanate beneath; bracts up to 4 mm long; calyx 6–9(–10) mm long; follicles 3.5–7 cm long (usually 5 or less); aril *c* 3.5 mm wide.

#### 2. *S. cinerea*

– Leaves greyish pubescent to tomentose; bracts 5–8 mm long; calyx (10–)12–14 mm long; follicles 4–9.5 cm long (usually over 7); aril 5–7 mm wide.

#### 1. *S. setigera*

1. *S. setigera* Del. (1826).

Tree to 15(–20) m, dbh to 60 cm; bark flaking in greyish to purplish papery flakes, whitish green underneath; branchlets tomentellous or tomentose. Leaves greyish pubescent to tomentose; petiole 4–14 cm; stipules up to 1.5 cm; blade broadly cordiform, unlobed to deeply 3–5(–7)-lobed, 6–21 x 5–20 cm; lobes acuminate to cuspidate. Panicle 2–10 cm long, densely pubescent to tomentose and glandular; side branches 1–3.5 cm; pedicels up to 0.8(–1.5) cm. Calyx (10–)12–14 mm long, reddish to brownish-greenish outside, tomentellous. Male flowers: androphore up to 10 mm. Female flowers: gynophore up to 7 mm. Follicles 4–9.5 cm long (usually over 7), thick-walled, only opening partly, yellowish to brownish tomentellous, longitudinally ribbed and lumpy, beak up to 2.5 cm. Seed *c* 10 x 7 mm, greyish black, aril 5–7 mm wide.

*Acacia* – *Commiphora* woodland, wooded grassland and bushland, on rocky slopes or black cotton soil, dry riverine forest; 700–1900 m. EE EW TU GD GJ WU (last 2 in Abbay Gorge only) SU KF SD (last 2 in Ghibie Gorge only); W Africa to W Ethiopia, Uganda, E Zaire, W Tanzania. *Mooney* 8582, 9033; *Schimper* II: 889.



2. *S. cinerea* A. Rich. (1847)

– type: EE, Choho, *Quartin-Dillon & Petit* s.n. (P holo., K iso.).

*S. hartmanniana* Schweinf. (1868) – type: *Steudner* 1183 (B syn. destroyed).

Tree to 12 m, dbh to 70 cm; bark flaking off in red to purplish papery flakes, yellowish to greenish underneath; branchlets tomentellous to tomentose. Leaves whitish lanate beneath; petiole 2–12(–16) cm; stipules up to 0.8 cm; blade narrowly to broadly cordiform, deeply 3–5-lobed (rarely unlobed), 4.5–18 x 4–22 cm, lobes acuminate to cuspidate. Panicle 2–12 cm long, densely puberulous to densely pubescent, not glandular; side branches 1–4 cm; pedicels up to 0.8 cm. Calyx 6–9(–10) mm long, reddish with greenish outside and tips of lobes, tomentellous. Male flowers: androphore up to 7 mm. Female flowers: gynophore up to 4 mm. Follicles 3.5–7 cm long (usually 5 or less), golden to yellowish tomentellous, thin-walled, transversely undulate, opening up completely (flatten out), beak up to 1 cm. Seed  $c$  9 x 6 mm, greyish black, aril  $c$  3.5 mm wide Fig. 80.8.8.

*Combretum* – *Lannea* – *Pseudoedreia* wooded grassland on greyish to blackish clay; near sea-level to 650 m. EE IL; Sudan. *Batt* s.n.; *Chaffey* 916; *Friis* et al. 2454.

3. *S. africana* (Lour.) Fiori (1912).

*S. abyssinica* R. Br. ex Bennett (1844) – type: Abyssinia, no loc., *Salt* s.n. (BM holo.).

*S. africana* var. *socotrana* (K. Schum.) Fiori in *Boschi e Piante Lignose dell'Eritrea*: 260 (1912), quoad syntype *Steudner* 1154 (K isosyn.).

Tree to 10(–15) m, dbh to 50 cm; bark peeling in greyish to purplish papery flakes; branchlets puberulous to tomentellous. Leaves puberulous to pubescent; petiole (1.5–)3–10 cm; stipules up to 1.5 cm; blade broadly cordiform, deeply 3–5(–7)-lobed (rarely unlobed), 6–15 x 5–13 cm, lobes acuminate. Panicle 3–12 cm long, puberulous; side branches up to 0.5(–1) cm; pedicels up to 0.3(–0.6) cm. Calyx up to 12 mm long, reddish with yellowish green lobes, puberulous to pubescent. Male flowers: androphore up to 10 mm. Female flowers: gynophore up to 7 mm. Follicles 4–6.5 cm long, yellowish to brownish tomentellous, longitudinally ribbed, thick-walled, only opening up partly, beak up to 1 cm. Seed 9–11 x 5–6 mm, greyish black, aril 3–5 mm wide.

*Acacia*, *Acacia* – *Commiphora* and *Acacia* – *Terminalia* woodland and bushland on gravelly to stony soil, often on rocky slopes and lava-flows; near sea-level to 1775 m. EE EW WU SU IL GG BA HA HA-AF; Sudan (Red Sea Hills), N Somalia, S Tanzania, Mozambique, Malawi, E Zambia, Zimbabwe, Botswana, Namibia. *Burger* 638, 667; *Robertson* 1427; *Sebsebe D. & Berhanu A.* 1762.

A most interesting distribution. But considering the amount of collecting which has been done in Kenya and N Tanzania, the gap is probably real. There are no apparent differences between plants from north and south.

The Socotran material of var. *socotrana* seems to belong to a distinct and undescribed endemic species.

4. *S. rhynchocarpa* K. Schum. (1904).

*S. rivae* (K. Schum.) Chiov. (1916) – type: GG/SD, Sagan River, *Ruspoli & Riva* 1767(1695) (FT holo.).

*S. africana* var. *rivae* (K. Schum.) Cufod. in *Bull. Jard. Bot. Brux.* 29, suppl.: 584 (1959).

Spreading shrub to 1.5 m or tree to 5 m; bark smooth or peeling in greyish to reddish papery flakes; branchlets puberulous to pubescent. Leaves pubescent; petiole 0.5–2 cm; stipules up to 0.3 cm; blade broadly ovate or broadly cordiform, unlobed or very shallowly 3-lobed, 1–4.5(–6) x 0.7–5(–8) cm, lobes acute to rounded, sometimes apiculate. Raceme 0.2–1.5(–2) cm long, puberulous; pedicels up to 0.5 cm. Calyx up to 10 mm long, yellowish with reddish veins to reddish brown, with greenish lobes, pubescent. Male flowers: androphore up to 7 mm. Female flowers: gynophore up to 5 mm. Follicles (4–)5–8.5(–12) cm long, greyish to yellowish tomentellous, with a rough surface to almost spiny, thick-walled, only opening up partly, beak 1–3(–5) cm long. Seed (11–)12–15 x 8–10 mm, bluish grey, aril  $c$  5 mm wide. Fig. 80.8.9.

*Acacia* – *Commiphora* woodland and bushland on limestone or on red sandy soil overlying limestone, *Combretum* – *Sterculia* woodland on lava hills; 300–1300 m. GG SD BA HA; Somalia, NE & E Kenya, NE Tanzania. *Allen & Hammersley* 88; *Friis* et al. 1042; *Simmons* 23.

This species is very closely related to and possibly not distinct from *S. arabica* (R. Br.) T. Anders. from the Yemen which has slightly larger glabrous or subglabrous leaves, glabrous branches and slightly larger flowers. The two taxa ought perhaps to be treated as subspecies.

5. *S. stenocarpa* H. Winkler (1922).

Tree to 15 m, dbh to 1.25 m; bark liver-coloured to purplish, peeling in papery flakes; branchlets pilose to tomentose, sometimes also with longer spreading hairs. Leaves pilose to subtomentose; petiole 1.5–7.5 cm; stipules up to 0.5 cm; blade broadly cordiform or reniform, shallowly 3–5-lobed, 3–12 x 3.5–11.5 cm, lobes acute to rounded. Flowers in subsessile clusters or in up to 2 cm long pilose to tomentose racemoid panicles clustered terminally on short spurs, pedicels up to 6 mm. Calyx 8–10 mm long, yellowish green with reddish lines and blotches and numerous small red dots, densely pilose to tomentose. Male flowers: androphore up to 8 mm. Female flowers: gynophore up to 6 mm. Follicles 5–10 cm long, often tinged purplish, tomentellous, thin-walled, opening up completely (flattens out) at maturity, transversely undulate, gradually tapering to an often recoiled beak, with irritating hairs all over inner surface. Seed 7–8 x  $c$  6 mm, bluish grey, aril  $c$  5 mm wide. Fig. 80.8.10.

*Acacia* – *Commiphora* and *Acacia* – *Combretum* bushland, on rocky slopes and on limestone ridges and slopes; 500–1400 m. GG SD BA HA; SE Sudan, NE Uganda, Kenya, S Somalia, NE Tanzania. *Corradi* 7875, 7876; *Mesfin T. & Vollesen* 4178.

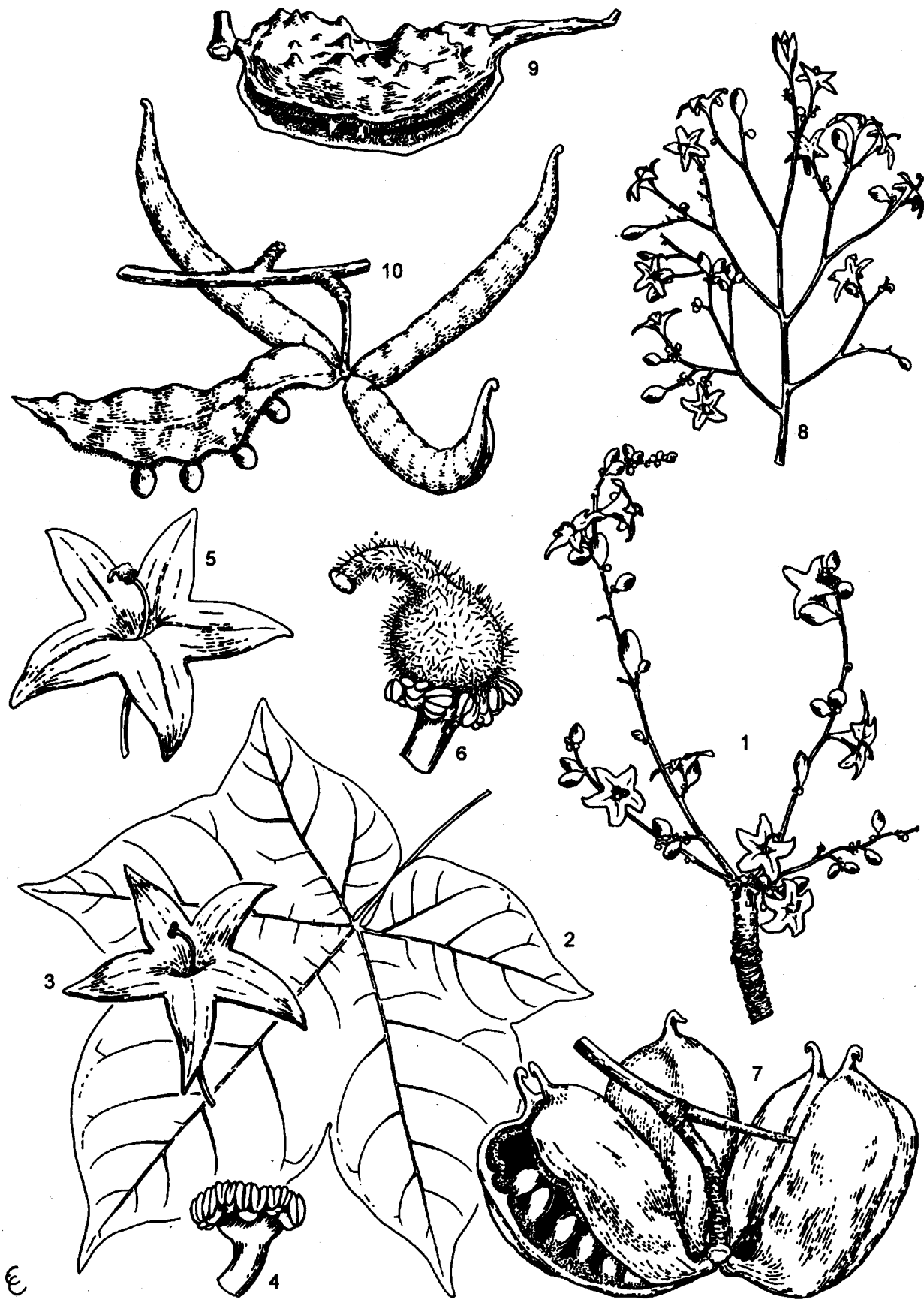


Figure 80.8 *STERCULIA AFRICANA*: 1 – flowering branch  $\times \frac{2}{3}$ ; 2 – leaf  $\times \frac{2}{3}$ ; 3 – male flower  $\times 1.5$ ; 4 – apical part of androphore with stamens  $\times 7.5$ ; 5 – female flower  $\times 1.5$ ; 6 – apical part of gynophore with ovary and staminodes  $\times 7.5$ ; 7 – fruit  $\times \frac{2}{3}$ . *S. CINEREA*: 8 – inflorescence  $\times \frac{2}{3}$ . *S. RHYNCHOCARPA*: 9 – part of fruit  $\times \frac{2}{3}$ . *S. STENOCARPA*: 10 – fruit  $\times \frac{2}{3}$ . 1 from Robertson 1427; 2 from Burger 667; 3–4 from Ash 3334; 5–6 from Bally 6702; 7 from Drummond & Hemsley 1458; 8 from Friis et al. 2454; 9 from Kirk s.n.; 10 from Greenway & Napper 574. Drawn by Eleanor Catherine.

## 81. BOMBACACEAE

by K. Vollesen\*

Cufodontis, *Enum.*: 575–576 (1959); Wild, 29. *Bombacaceae* in *Fl. Zamb.* 1: 511–517 (1961); Beentje, *Bombacaceae* in *Fl. Trop. E. Afr.*: 9 pp. (1989).

Trees, often very large; indumentum of small rough scales. Leaves alternate, simple or digitately divided; stipules present. Flowers regular, bisexual, large and showy, solitary or in cymes. Calyx tubular, truncate to 5-toothed or 5-lobed. Epicalyx present or not. Petals 5, free. Stamens 15-many, free or filaments united into a tube or in groups of 2–3; pollen smooth (easily seen with a x10 hand lens). Ovary superior, 2–10-locular with axile placentation, ovules 2 or more per locule; style simple, stigma capitate or lobed. Fruit often large, a woody capsule or indehiscent; seeds embedded in a powdery matrix or in hairs on the fruit-walls.

About 30 genera and 250 species. In all tropical regions but mostly in America. In the Flora area 3 genera and 3 species.

## Key to Genera

1. Staminal column divided above into numerous free filaments; flowers solitary, pendulous; fruit indehiscent, seeds embedded in a white floury pulp; petals 6–10 cm long. 1. *Adansonia*
  - Stamens without free filaments, anthers in groups apically on phalanges; flowers in fascicles, cymes or solitary; fruit dehiscent, filled with silky hairs. 2
2. Staminal column divided above into 5 phalanges each bearing 2–3 anthers, column without corona-like lobes at base; petals up to 3.5 cm long. 2. *Ceiba*
  - Staminal column undivided, with a ring of anthers at top, column with 5 corona-like lobes at base; petals up to 10 cm long. 3. *Chorisia*

## 1. ADANSONIA L. (1753)

Wickens in *Kew Bull.* 37: 173–209 (1982).

Trees, trunk often of gigantic girth (10 m or more in circumference). Leaves digitately 3–9-foliolate, leaflets entire. Flowers large, solitary in leaf-axils, pendulous. Calyx deeply 5-lobed. Petals 5. Stamens many, column ending in numerous filaments bearing single reniform anthers. Ovary 5–10-locular, locules with many ovules; stigma 5–10-lobed. Fruit woody, indehiscent, oblong-cylindric to globose. Seeds many, embedded in a white floury pulp.

About 10 species in the drier parts of tropical Africa, Madagascar, India (possibly originally introduced) and Australia.

*A. digitata* L. (1753).

Massive deciduous tree up to 20 m tall, trunk up to 5 m or more in diameter; bark greyish, smooth; branchlets glabrous to tomentose. Leaves glabrous to pubescent; petiole up to 12 cm; stipules falling very quickly, linear to sharply pointed, up to 1 cm; leaflets 5–6, elliptic to obovate, up to 15 x 7 cm, apex acuminate to acute, base cuneate, decurrent. Flowers on up to 20 cm long tomentose pedicels with 2(–3) small bracteoles near apex which fall off soon. Calyx 5–8 cm long, divided  $\frac{1}{2}$ – $\frac{3}{4}$  down, (rarely circumcissile at base and dehiscing as a whole), tomentellous out-

side, velvety inside, lobes triangular-ovate, acute. Petals 6–10 x 7–12 cm, white, broadly obovate to oblate, rounded. Stamens: column 1.5–3 cm, filaments slender, of same length. Fruit up to 25 x 12 cm, pointed or obtuse; seeds c 13 x 9 mm, dark brown, smooth.

*Acacia* – *Balanites* – *Adansonia* woodland and wooded grassland on sandy soil over granite, rocky outcrops, river-banks; 700–1700 m. EW TU/GD (Tekeze Valley) SD (see note below); widespread in the drier parts of tropical Africa, Madagascar and in India (possibly introduced). *Greathead* 105; *Mooney* 8583; *Schimper* II:1227.

This is the BAOBAB of tropical Africa. The white pulp of the fruits makes a refreshing drink with water, young leaves are eaten as a vegetable and the bark makes rope.

The seedlings have simple leaves and a swollen turnip-like taproot and look rather different from the older plants.

Gillett (pers. comm.) records having seen a single specimen in S Sidamo near Moyale where it was considered a sacred tree and was said to be the only one within a vast distance.

## 2. CEIBA Mill. (1754)

Tall trees, often with spiny trunks. Leaves digitately 3–9-foliolate. Flowers large, solitary or in fascicles. Calyx truncate or 5-lobed. Petals 5. Staminal column divided above into 5 phalanges each bearing 2–3 coiled anthers apically. Ovary 5-locular, locules with many ovules; stigma club-shaped, pentagonal. Fruit a 5-valved woody capsule filled with copious white silky wool. Seeds many.

About 10 species; 1 pantropical, the rest in S America.

*C. pentandra* (L.) Gaertn. (1791).

Tree up to 25 m tall, with straight trunk and horizontal branches; bark grey, smooth with conical sharp-tipped bosses; branchlets spiny; all parts glabrous. Leaves: petiole up to 15 cm; stipules linear to narrowly triangular, up to 1 cm; leaflets 5–9, elliptic, articulated to a small disk at apex of petiole, up to 16 x 5 cm, entire to remotely dentate near apex, acuminate and apiculate; base cuneate. Flowers in 1–3-flowered axillary fascicles; pedicels up to 3 cm. Calyx 1–1.5 cm long, glabrous outside, pubescent inside, lobes up to 3 mm long, broadly triangular, rounded. Petals white to rose, up to 3.5 x 0.7 cm, oblong to spatulate, tomentose.

\*The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK.



Figure 81.1  
**CEIBA PENTANDRA**: 1 - habit; 2 - branch with spines  $\times \frac{2}{3}$ ; 3 - leaf  $\times 1$ ; 4 - part of inflorescence  $\times 1$ ; 5 - fruit  $\times \frac{2}{3}$ ; 6 - seed  $\times 4$ . 2-4 from Wickens 1116; 5 & 6 from Sampson s.n. Drawn by Heather Wood. (Reproduced with permission from *Fl. Trop. E. Afr.*, **Bombacaceae**, fig. 4.)

**Stamens**: basal column  $c$  5 mm long, phalanges  $c$  2 cm. Capsule up to 20 x 10 cm, oblong to ellipsoid, smooth, brown; seeds  $c$  5 mm in diameter, subglobose, dark brown.

Lowland evergreen forest, ground-water forest, also planted; 500-1200(-2250 where planted) m. IL (native) EE TU AR WG HA (planted, probably also elsewhere); native in tropical America, tropical Africa and India, also widely planted in these areas and thus obscuring its original distribution. *Brehme* in *Mooney* 8981; *Chaffey* 963.

I think that the collections from lowland Illubabor are from genuinely native trees. It was collected here in much the same circumstances as in the Imatong mountains in S Sudan where it certainly seems native.

It is also planted, though not so commonly in Eritrea and Ethiopia as in East Africa. The silky wool in the capsules supplies the KAPOK fibres of commerce.

### 3. **CHORISIA** H.B. & K. (1821)

#### *C. speciosa* St. Hil. (1828).

Tree to 10 m with large spreading crown, trunk with large knobs, bosses or spines. Leaves digitately 4-7-foliolate, glabrous; leaflets elliptic, dentate, up to 12 x 4.5 cm. Flowers solitary in leaf-axils or in well-developed axillary or terminal cymes. Petals pale reddish purple distally, cream with purple stripes basally, up to 10 cm long. Stamens: column up to 8 cm, undivided, with a ring of anthers at top and 5 corona-like appendages near base. Fruit (never seen in African specimens) a 3-valved capsule filled with copious woolly hair.

Ornamental; 1100-2200 m. TU WU SU HA; originally from S America, now grown here and there throughout the tropics. *Haugen* 383; *Mesfin* T. 5839, 6488.



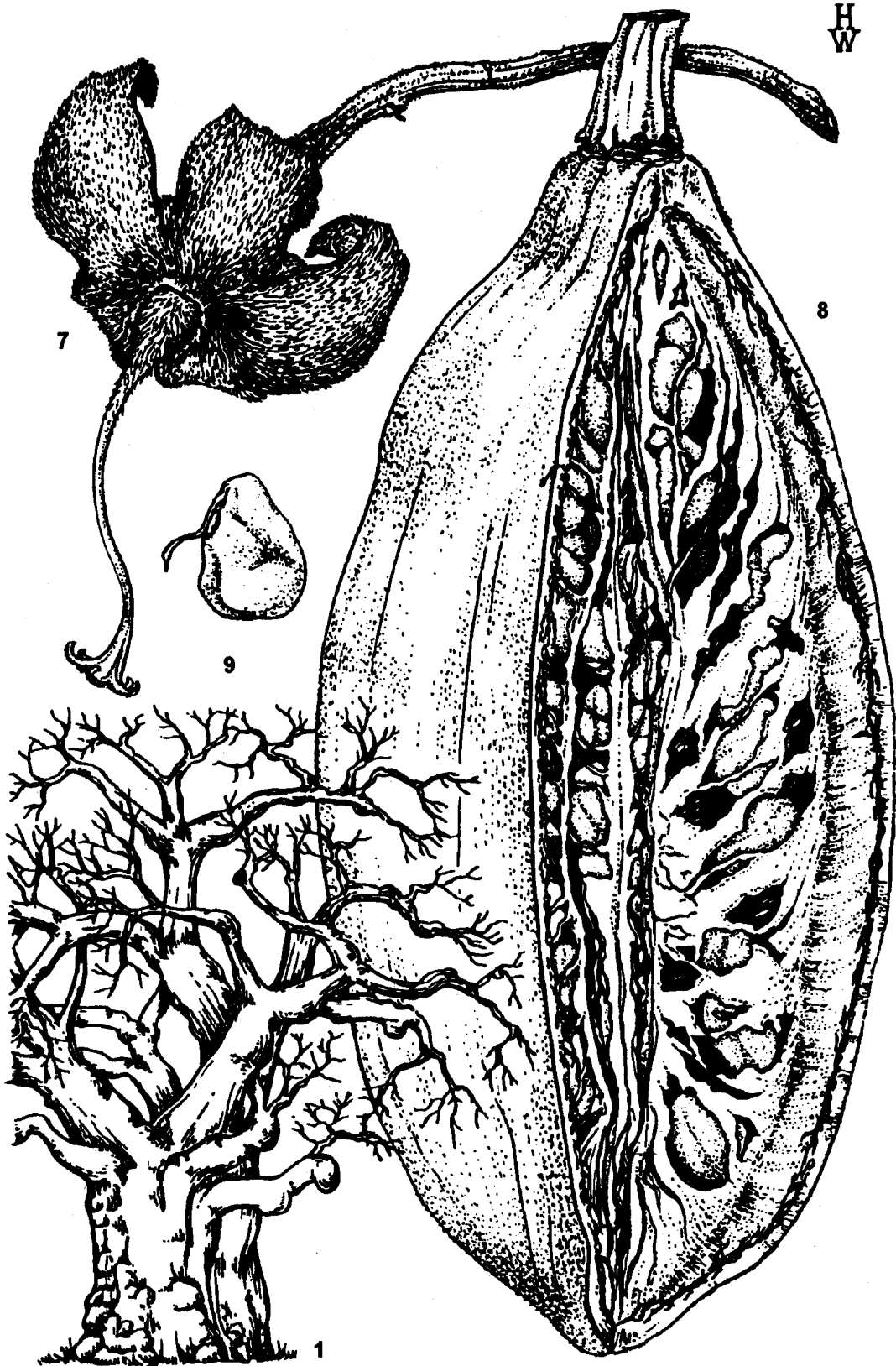


Figure 81.2 *ADANSONIA DIGITATA*: 1—habit; 2—tip of leafy shoot x  $1\frac{1}{2}$ ; 3—stellate hairs on underside of young leaf x 50; 4—flower bud x 1; 5—flower x 1; 6—anther x 10; 7—calyx and style x 1; 8—fruit, part cut away x 1; 9—seed x  $1\frac{1}{2}$ . 2 & 3 from *Greenway & Kirrika* 10953; 4–6 from *E. M. Bruce* 210; 7–9 from *Muriel*. Drawn by Heather Wood. (Reproduced with permission from *Fl. Trop. E. Afr. Bombacaceae*: fig 1 & 2.)

## 82. MALVACEAE

by K. Vollesen\*

Cufodontis, *Enum.*: 533–575 (1959); Exell & Meeuse *Malvaceae* in *Fl. Zamb.* 1: 420–511 (1961); Hauman *Malvaceae* in *Fl. Congo* 10: 92–190 (1963); Borssum Waalkes in *Blumea* 14: 1–213 (1966).

Herbs, shrubs or small trees; indumentum stellate or simple. Leaves alternate, simple, often digitately lobed, rarely divided; stipules present. Flowers solitary or clustered in leaf-axils, often merging into more or less well-defined terminal inflorescences, regular, bisexual; calyx usually 5-lobed; epicalyx present or not. Petals 5, free but adnate to staminal column, usually obliquely obovate and retuse to emarginate. Stamens 5-many, filaments united into a column around the style; pollen spiny (easily seen with a hand lens). Ovary superior, (1–)2-many-locular, ovules 1-many per locule, style simple at base, often deeply divided, branches as many or twice as many as carpels. Fruit a capsule or a schizocarp of achenes or follicles around a central columella or indehiscent; seeds 1-many.

About 90 genera and 2000 species. Widespread in all tropical, subtropical and temperate regions, but particularly numerous in tropical America and Africa to India. In the Flora area, certainly 18 (perhaps 19) genera and 139 species.

## Key to genera

- |   |                         |   |                        |
|---|-------------------------|---|------------------------|
| 1. Epicalyx absent (rarely of minute teeth).  | 2                       | 11. Epicalyx bracts ovate to reniform, with cordate base.   | 9. <i>Gossypium</i>    |
| – Epicalyx present and well-developed.  | 6                       | – Epicalyx bracts linear to narrowly triangular, without cordate base.  | 12                     |
| 2. Fruit a loculicidal capsule.   | 3                       | 12. Calyx without distinct dark-coloured oil-glands; style usually with 5 distinct branches.  | 1. <i>Hibiscus</i>     |
| – Fruit a schizocarp of achenes or follicles.   | 4                       | – Calyx with distinct oil-glands; style not distinctly branched.  | 13                     |
| 3. Tree with leaves covered with small whitish scales (lepidote).   | 4. <i>Lagunaria</i>     | 13. Epicalyx of c 9 bracts; oil-glands in double rows along calyx-veins.  | 8. <i>Cienfugosia</i>  |
| – Herbs or shrubs; leaves glabrous or hairy but not lepidote.   | 1. <i>Hibiscus</i>      | – Epicalyx of 3 bracts; oil glands irregularly scattered.   | 9. <i>Gossypium</i>    |
| 4. Carpels contracted near middle and here with a transverse septum; mericarps and styles 3–5.                                | 17. <i>Wissadula</i>    | 14. Epicalyx bracts 3, ovate to broadly so, with cordate base.  | 7. <i>Senra</i>        |
| – Carpels not contracted near middle nor with a transverse septum; mericarps and style-branches 5–30.                         | 5                       | – Epicalyx bracts 6–10(–12), filiform to linear or narrowly spatulate, without cordate base.  | 15                     |
| 5. 3 or more ovules per carpel; mericarps (6–)10–30, with 1–3 seeds, opening by apical slits.                                 | 18. <i>Abutilon</i>     | 15. Fruit a schizocarpaceous capsule, at maturity splitting into 3 parts of which 2 stay unopened with the seeds enclosed; epicalyx bracts linear to narrowly spatulate.        | 5. <i>Fioria</i>       |
| – 1 ovule per carpel; mericarps 5–13, with 1 seed, not opening by apical slits.   | 19. <i>Sida</i>         | – Fruit a proper capsule, splitting at maturity into 5 parts all shedding seeds; epicalyx bracts filiform.  | 16                     |
| 6. Fruit indehiscent, somewhat fleshy; indumentum of small scales (lepidote); calyx cupuliform, truncate or with small teeth. | 10. <i>Thespesia</i>    | 16. Locules with 3 or more ovules (but occasionally with fewer seeds); petals 2–5 cm long, yellow with dark red centre.   | 1. <i>Hibiscus</i>     |
| – Fruit a capsule or a schizocarp, dry; indumentum not lepidote.  | 7                       | – Locules each with 1 ovule and 1 seed; petals 0.7–2.5 cm long, white to pink or purple with darker centre.   | 6. <i>Kosteletzkya</i> |
| 7. Fruit a capsule.   | 8                       | 17. Epicalyx bracts 5 or more.  | 18                     |
| – Fruit a schizocarp of indehiscent mericarps.  | 17                      | – Epicalyx bracts 3.  | 20                     |
| 8. Capsule valves separating from receptacle at maturity.   | 14                      | 18. Column with stamens all along its length; style-branches twice the number of carpels.   | 19                     |
| – Capsule valves not separating from receptacle at maturity.  | 9                       | – Column with apical stamens only; style-branches equal to number of carpels.   | 15. <i>Alcea</i>       |
| 9. Calyx splitting laterally, circumsessile at base, falling with the corolla.  | 2. <i>Abelmoschus</i>   | 19. Mericarps with numerous glochidiate awns; epicalyx bracts united in basal half; leaves with gland on midrib.  | 11. <i>Urena</i>       |
| – Calyx (2–)5-lobed or -toothed, persistent.  | 10                      | – Mericarps without glochidiate awns, but sometimes with 3 retrorsely barbed awns or with straight spines; epicalyx bracts free (rarely connate at base); leaves without gland. | 12. <i>Pavonia</i>     |
| 10. Calyx 2(–)3-lobed almost to base, falling quickly; epicalyx campanulate, 9–11-toothed, united at least ½ up.              | 3. <i>Symphychlamys</i> |   |                        |
| – Calyx 5-lobed or -toothed, persistent; epicalyx divided to base or almost so.   | 11                      |   |                        |

\* The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK.

20. Epicalyx bracts united at base; petals 1.5–2.5 cm long, shrubby perennial herb. 14. *Lavatera*  
 – Epicalyx bracts free (but sometimes united with calyx); petals up to 1 cm long; annual or perennial herbs. 21
21. Petals white to pink or purple. 13. *Malva*  
 – Petals yellow. 16. *Malvastrum*

In the following account the genera have been grouped into 3 tribes according to Borssum Waalkes (*l.c.*):

1. Staminal column 5-toothed at apex; stamens projecting from the whole length of the column or from part of it. 2  
 – Staminal column not toothed at apex, with apical stamens only; style-branches as many as carpels; fruit a schizocarp. (Genera 13–19) III. MALVEAE
2. Style branches as many as carpels (usually 5) or style not branched; fruit a capsule, or indehiscent and fleshy. (Genera 1–10) I. HIBISCEAE  
 – Style branches twice as many as carpels, always 10; fruit a schizocarp. (Genera 11–12) II. URENEAE

### 1. HIBISCUS L. (1753)

Annual or perennial herbs, subshrubs or shrubs; indumentum stellate (rarely also with simple hairs). Leaves unlobed to deeply lobed (rarely divided), usually crenate, dentate or serrate, base truncate to cordate, stipules usually subulate to linear. Flowers axillary, often merging into terminal racemose or corymbose inflorescences. Epicalyx of 5–20 bracts (rarely absent), very variable, free or joined to calyx. Calyx 5-toothed or -lobed, lobes usually triangular, acute. Filaments usually short. Ovary 4–5-locular, locules 3-many-ovulate, style with 5 distinct branches. Fruit a loculicidal capsule, usually not separating from the receptacle at maturity. Seeds 3 or more per locule, reniform.

About 300 species. In all tropical and subtropical regions. A number are widely cultivated ornamentals.

#### Key to sections.

1. Mature seeds with white cottony floss. 10. Sect. BOMBYCELLA  
 – Mature seeds glabrous to tomentose, but not with cottony floss. 2
2. Epicalyx absent or of up to 1 mm long teeth. 3  
 – Epicalyx present, bracts 3 mm or longer. 4
3. Annual herbs; petals small white, entire. 8. Sect. SOLANDRA  
 – Shrubs; petals large, pink or purple, deeply lacinate. 4. Sect. LILIBISCUS
4. Calyx inflated and bladder-like in fruit, enclosing the capsule, divided less than  $\frac{1}{3}$  down. 5. Sect. TRIONUM  
 – Calyx not inflated and bladder-like in fruit, usually not enclosing the capsule, divided at least  $\frac{1}{2}$  down. 5
5. Calyx strongly accrescent at maturity, funnel-shaped with broadly rounded lobes; epicalyx bracts with long filiform basal part, widened apically; petals red. 3. Sect. GIGANTOCALYX  
 – Calyx not funnel-shaped with broadly rounded

lobes, epicalyx bracts not as above; petals usually white to yellow with or without dark centre. 6

6. Epicalyx bracts bifurcate; plant usually scrambling or scandent. 2. Sect. FURCARIA  
 – Epicalyx bracts not bifurcate; plant usually erect. 7
7. Calyx leathery or fleshy at maturity, principal veins with a large conspicuous gland; plant usually prickly. 2. Sect. FURCARIA  
 – Calyx not leathery or fleshy at maturity, usually scarious, principal veins without a gland; plant not prickly. 8
8. Column longer than petals; cultivated shrub with large showy red or pink (rarely white) flowers. 4. Sect. LILIBISCUS  
 – Column shorter than petals; indigenous species. 9
9. Epicalyx bracts 5(–6), 1–11 mm wide, linear to lanceolate or narrowly ovate. 1. Sect. CALYPHYLLI  
 – Epicalyx bracts 6–12, usually less than 1 mm wide, usually filiform (rarely spatulate). 10
10. Leaves with whitish woolly hairs beneath; stipules 2–3 side by side; epicalyx bracts widened near apex. 6. Sect. PANDURIFORMES  
 – Leaves without whitish woolly hairs; stipules solitary; epicalyx bracts subulate to linear, not widened near apex. 11
11. Capsule at maturity separating from receptacle and disintegrating, valves cuspidate to aristate. 9. Sect. PTEROCARPUS  
 – Capsule at maturity not separating from receptacle and not disintegrating, valves usually rounded to acute. 7. Sect. KETMIA

1. Sect. CALYPHYLLI *Ulbr.* (1921).

Epicalyx bracts 5(–6), linear to lanceolate or narrowly ovate.

1. Epicalyx bracts 1–3 mm wide, linear. 2  
 – Epicalyx bracts 2.5–11 mm wide, distinctly widened near middle or near base. 4
2. Flowers 1–4 in upper leaf-axils; style-branches glabrous; seed 5–6 mm long, with woolly hairs. 3. *H. seineri*  
 – More than 4 flowers per branch; style-branches hairy; seed 3–4 mm long, glabrous or with scattered hairs. 3
3. Stems glabrous to densely pubescent; leaves glabrous to pubescent, unlobed (or lower most 3-lobed); seeds glabrous, with concentric lines. 4. *H. dongolensis*  
 – Stems densely pubescent to tomentose; leaves pubescent to densely so, 3-lobed; seeds rugose or with scattered hairs, without concentric lines. 5. *H. lunariifolius*
4. Epicalyx bracts widened near middle; plant without irritating hairs; style-branches glabrous. 5  
 – Epicalyx bracts widest near base; plant with irritating hairs; style-branches hairy. 6
5. Calyx-lobes triangular, with a strong central rib-like vein (sometimes also two weaker laterals); capsule pubescent to tomentellous, longer than calyx. 1. *H. calyphyllus*



- Calyx-lobes ovate (narrowed at base), central vein not rib-like, not much stronger than laterals and anastomosing with them; capsule glabrous to puberulous, shorter than and enclosed in calyx.

2. *H. ovalifolius*

6. Calyx-lobes with strong central rib-like vein and two weaker laterals; epicalyx longer than calyx in fruit; petals white to yellow, often tinged violet outside; column 4–7.5 cm long. 6. *H. macranthus*
- Calyx-lobes with 3–5(–7), about equally strong, not rib-like veins; epicalyx shorter than calyx in fruit; petals yellow; column 1.5–3.5 cm long.

7. *H. ludwigi*

1. *H. calyphyllus* Cavan. (1788).

*H. calycinus* Willd. (1800), nom. illeg.

*H. grandifolius* Hochst. ex A. Rich. (1847) – types: TU, Djeladjeranne, *Schimper* II:510 (P syn., FI (Webb) K isosyn.); TU, Djeladjeranne, *Schimper* III:1717 (P syn., FI (Webb) K isosyn.).

Shrubby herb or shrub to 2(?–4.5) m; all parts subglabrous to densely pubescent (rarely tomentose). Leaves: petiole 1–13 cm; lamina ovate to cordiform, unlobed (rarely shallowly 3-lobed), 4–16 x 2.5–13 cm, acuminate to acute. Flowers in leaf-axils (but often congested apically); pedicels 0.3–1.8(–3.5 in fruit) cm, articulated at base. Epicalyx bracts 5, 1.3–2.5(–3.5) x 0.25–0.5 cm, lanceolate, caudate to cuspidate, 3–7-veined. Calyx 1–2 cm long; lobes with a strong central often rib-like vein and sometimes 2 weaker laterals. Petals 3.5–5 cm long, yellow with maroon centre; column *c* 1.5 cm. Capsule 1.5–3 cm long, ovoid to ellipsoid, longer than calyx, stellate pubescent to tomentellous; valves acute to acuminate (or aristate with up to 3 mm long awns); seed 3–4 mm long, tomentellous. Fig. 82.1.6–8.

Lowland rainforest, ground-water forest, riverine forest, extending into upland bushland; 450–2100 m. EE EW TU GD GJ SU WG IL KF GG SD BA; widespread in tropical and S Africa, Madagascar, the Mascarenes, and the Yemen. *Ash* 2764; *Getachew Aweke* 502; *W. de Wilde* et al. 8863.

2. *H. ovalifolius* (Forssk.) Vahl (1790).

*H. calycosus* A. Rich. (1847) – type: TU, Adua, *Petit* 320 (P holo., K iso.).

*H. lanzae* Cufod. (1939) – type: SD, Arero, *Cufodontis* 301 (FT holo.).

Perennial herb or shrub to 2(–3) m; all parts subglabrous to tomentose. Leaves: petiole 1–11 cm; lamina ovate to orbicular, unlobed or shallowly 3-lobed, 2.5–10.5(–14.5) x 2–10.5(–15) cm, acute to rounded. Flowers in leaf-axils; pedicels 0.5–3(–5 in fruit) cm, articulated at base. Epicalyx bracts 5, (10–)15–30 x 3–11 mm, elliptic to spatulate, acuminate to cuspidate, 5–9-veined, scarious in fruit. Calyx 12–30(–35 in fruit) mm long; lobes ovate, distinctly narrowed at base, central vein not rib-like, about as strong as and often anastomosing with the two laterals. Petals 3–7 cm long, yellow with maroon centre; column 1.2–2.2 cm. Capsule 1–2 cm long, subglobose, shorter than and enclosed in calyx, glabrous or with sparse simple hairs near

apex; valves acute to acuminate; seed 3–4 mm long, puberulous. Fig. 82.1.1–5.

*Acacia* – *Combretum* – *Terminalia* bushland and scrub, upland bushland, riverine forest and scrub; 400–2100 m. EE EW TU WU SU AR KF GG SD BA HA; Senegal, Sudan, Somalia, Kenya, Tanzania, E Zaire, Malawi, Zambia, Zimbabwe, Botswana, Namibia, Transvaal, the Yemen. *Friis* et al. 928; *Gilbert* 1069; *Mooney* 7362.

In most newer floras *H. ovalifolius* is considered a synonym of *H. calyphyllus*, but this view is not followed here. The calyx and fruit characters used in the key and descriptions separate them perfectly, and the author considers them two good distinct species.

3. *H. seineri* Ulbr. ex Engl. (1921).

Shrub to 2 m; branchlets pubescent to tomentellous. Leaves discolorous, greyish tomentellous beneath; petiole 1–5(–8) cm; lamina ovate to cordiform, unlobed, 2–9(–15) x 1.7–7(–10) cm, acute to subacuminate. Flowers 1–4 in upper leaf-axils; pedicels 3–20 mm, articulated at base, pubescent. Epicalyx bracts 5, 15–28 x 1.5–3 mm, linear or slightly widened near middle, acute to acuminate. Calyx 12–22 mm long, uniformly puberulous to pubescent (or densest along veins); lobes with prominent central and two submarginal veins. Petals 3.5–6 cm long, pale yellow with maroon centre; column 1–2 cm. Capsule 1.5–2.5 cm long, ovoid to globose, longer than calyx, tomentose; valves acuminate; seed 5–6 mm long, whitish lanate.

*Acacia* – *Commiphora* woodland on rocky limestone ridges; *c* 1100 m. SD; Tanzania, Mozambique, Zambia, Zimbabwe, Namibia, S Africa (Transvaal). *Thulin* et al. 3613.

A very disjunct distribution, but the solitary Ethiopian collection is quite typical.

4. *H. dongolensis* Del. (1826).

? *H. neumannii* Ulbr. (1922) – types: SD, Lake Awasa, *Ellenbeck* 1723 (B destr.); SD, Kritscha, *Neumann* 73 (B destr.).

Shrubby herb or shrub to 1(–2) m; all parts glabrous to densely pubescent. Leaves: petiole 1.5–9 cm; lamina ovate to cordiform, unlobed or lowermost shallowly 3-lobed, 2–13 x 1.5–11 cm, acuminate to rounded. Flowers in leaf-axils or congested apically; pedicels 0.5–1(–1.5 in fruit) cm, articulated at base. Epicalyx bracts 5–6, 10–18(–25) x 1–3 mm, linear or very slightly widened near middle, acuminate to cuspidate, 1–3-veined. Calyx 12–20(–25 in fruit) mm long; lobes with strong central rib-like vein and two slightly weaker laterals. Petals 4–6 cm long, yellow, with or without small maroon centres; column 1.5–2.5 cm. Capsule 1.5–2.5 cm long, globose, longer than calyx, hispid-strigose and finely puberulous underneath; valves acute to acuminate (or aristate with up to 5 mm long awns); seed 3–4 mm long, glabrous, with concentric lines. Fig. 82.2.4–7.

Marshy grassland and *Acacia drepanolobium* grassland on black cotton soil, secondary and degraded *Acacia* – *Combretum* woodland and bushland, edges of upland

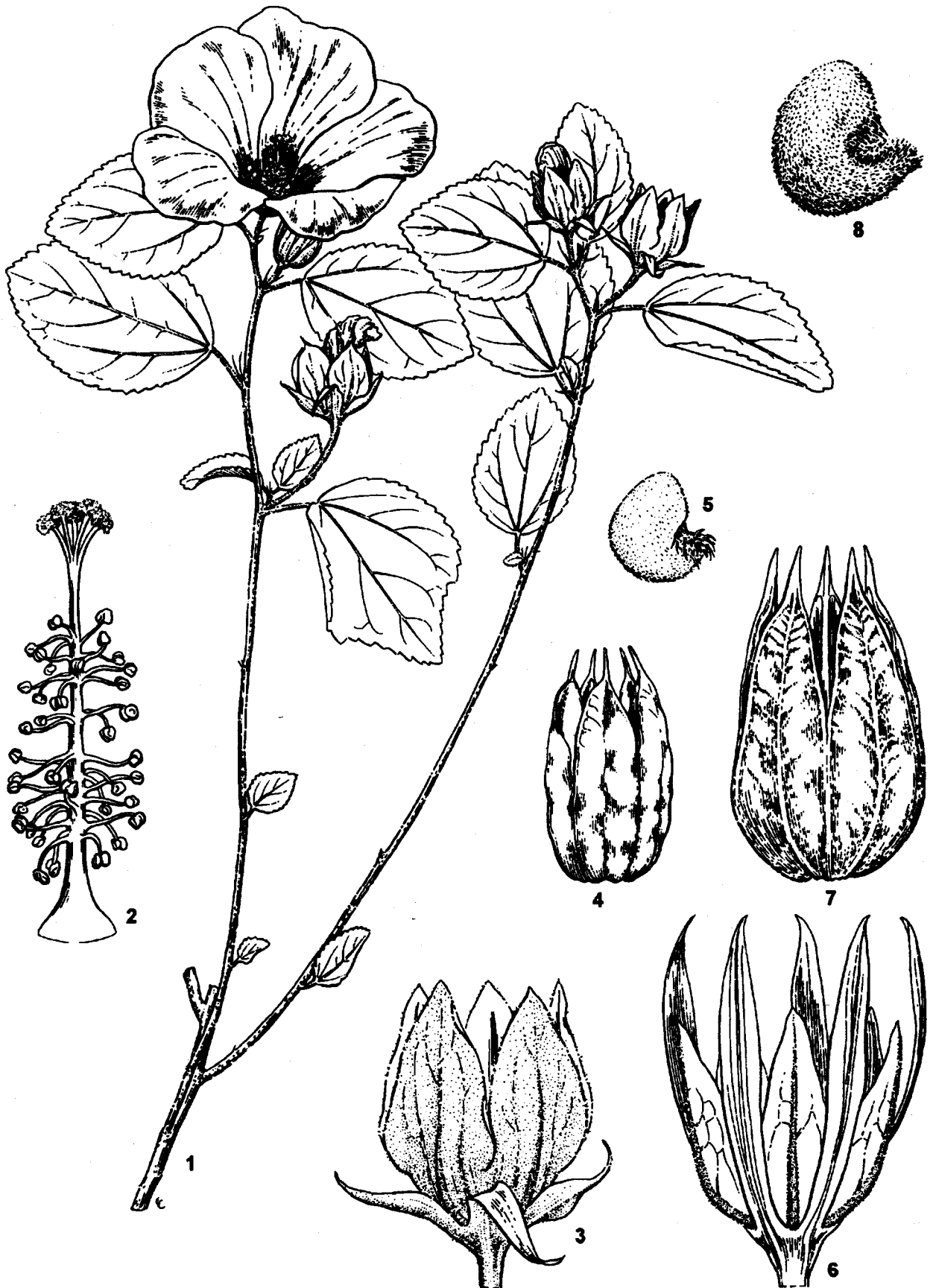


Figure 82.1 *HIBISCUS OVALIFOLIUS*: 1 – flowering stem  $\times \frac{1}{2}$ ; 2 – staminal column  $\times 3$ ; 3 – epicalyx and calyx  $\times 2$ ; 4 – capsule  $\times 2$ ; 5 – seed  $\times 6$ . *H. CALYPHYLLUS*: 6 – epicalyx and calyx  $\times 2$ ; 7 – capsule  $\times 2$ ; 8 – seed  $\times 6$ . 1 & 3–5 from Gilbert 1069; 2 from Turton 18; 6–8 from Ash 2764. Drawn by Eleanor Catherine.

forest, roadsides; 600–2000 m. EE AF EW TU GD WU SU KF GG SD BA HA; Sudan, Uganda, Kenya, Somalia, N Tanzania, Arabia. *Ash* 1596; *Boulos* 9342; *Friis* et al. 3170.

This is very close to and possibly only subspecifically distinct from *H. lunariifolius*. It differs in the usually unlobed leaves, the much sparser indumentum and the glabrous seeds with concentric lines.

Judging by the sparse description, *H. neumannii* most likely belongs here. It is described as having linear epicalyx bracts, but there is little else in the diagnosis which is of any help in identifying it.

#### 5. *H. lunariifolius* Willd. (1800).

Very similar to *H. dongolensis*, but with densely pubescent to tomentose stems with easily detached irritating hairs; leaves relatively broader, shallowly 3-lobed, pubescent to densely so; flowers in short terminal racemes (lowermost supported by leaves); pedicels slightly shorter, tomentose; seeds *c* 2.5 mm long, rugose or with scattered stellate hairs, not with concentric lines.

Weed; *c* 2600 m. HA; widespread in tropical Africa and Asia. *Burger* 2355.

While *H. dongolensis* is clearly a native species, *H. lunariifolius* is probably an Asian species which has only recently been introduced to Africa. It shows much less variability here than, for example, in India, and most African collections are ruderal or from disturbed habitats.

#### 6. *H. macranthus* Hochst. ex A. Rich. (1847)

– types: TU, Scholoda, *Schimper* I:362 (P syn., BM K isosyn.); Abyssinia, no loc., *Schimper* III:1883 (P syn., K isosyn.).

? *H. teramnensis* Ulbr. (1907) – type: EW, Teramni, *Rosen* s.n. (B destr.).

? *H. ellenbeckii* Ulbr. (1922) – type: HA, Harar, *Ellenbeck* 662 (B dest.).

Shrubby herb or shrub to 3(–4) m, with thin often arching branches; all parts pubescent to tomentose with easily detached irritating hairs. Leaves: petiole 1–7(–11) cm; lamina ovate to cordiform, unlobed (rarely shallowly 3-lobed), 2–10(–12) x 1–7(–10) cm, acute to acuminate. Flowers in leaf-axils or in well-defined racemes; pedicels 0.5–1.5(–2.5 in fruit) cm, articulated at base. Epicalyx bracts 5, (12–)15–35 x 3–8 mm, narrowly triangular or narrowly ovate, acuminate to cuspidate, (3–)5-many-veined. Calyx 1–2(–2.5 in fruit) cm long; lobes veined as in *H. dongolensis*. Petals 5–10 cm long, white to pale yellow or yellow, often pink to violet tinged outside, with or without maroon centre; column 4–7.5 cm. Capsule 1.5–2(–2.5) cm long, ovoid to globose, obtuse to acute, indumentum as in *H. dongolensis*; seed 3–4 mm long, muricate with hairs on the warts or stellate pubescent. Fig. 82.2.1–3.

Forest edges, riverine forest, riverbanks, secondary bushland, roadsides, old cultivations; (1300–)1600–2850 m. EW TU GD GJ WU SU AR WG IL KF SD HA; Cameroun, E Zaire, S Sudan, Uganda, Kenya, Tanzania,

Rwanda, Malawi, Zimbabwe. *Ash* 2304; *Gilbert* 4064; *Tewolde Berhan* 1203.

Treated as flax and the fibres thus obtained used for making rope (Tigray and Harerge).

This is usually considered to be a synonym of *H. ludwigii*, but in the author's opinion there is no justification for this.

According to the description, *H. teramnensis* most likely belongs here. It is described as having 7–8 cm long pale violet flowers and epicalyx bracts 1.5 cm or longer, acuminate, and twice as long as the calyx. *H. ellenbeckii* most likely also belongs here. It is described as having a very large corolla. But in the absence of types for both names it is, of course, impossible to be sure in a genus as large as this.

#### 7. *H. ludwigii* Eckl. & Zeyh. (1834).

Subshrub or shrub to 3 m; all parts densely pubescent to tomentose with yellow irritating, easily detached hairs (on leaves somewhat sparser). Leaves: petiole 2–9(–11) cm; lamina cordiform, lower usually shallowly 3-lobed, upper unlobed, 3–13 x 2.5–11 cm, acuminate to acute. Flowers in well defined racemes (or lower in leaf-axils); pedicels 0.5–1.5(–2.5 in fruit) cm, articulated at base. Epicalyx bracts 5, 13–25 x (3–)5–10 mm; narrowly triangular or narrowly ovate, acute to cuspidate, 5-many-veined. Calyx 15–30(–40 in fruit) mm long; lobes with 3–5(–7) equally strong, not rib-like, veins. Petals (3.5–)4.5–7.5 cm long, yellow with small maroon centre; column 1.5–3.5 cm. Capsule (2–)2.5–3.5 cm long, ovoid, acuminate (rarely acute), densely hispid-strigose; seed 3–4 mm long, glabrous or appressed stellate pubescent.

Dry *Juniperus* – *Podocarpus* forest, mostly on edges, secondary upland bushland and scrub; (1450–)1800–2800 m. SU SU-AR KF SD BA; through eastern Africa to S Africa. *Ash* 3292; *Friis* et al. 473, 1439.

#### 2. Sect. FURCARIA DC. (1824).

Epicalyx bracts 7–12, often bifurcate. Calyx leathery or fleshy at maturity, principal veins usually with a large conspicuous gland. Plant usually with prickles.

1. Epicalyx bracts bifurcate; plant usually scrambling or scandent. 2
- Epicalyx bracts not bifurcate; plant usually erect. 5
2. Plant without prickles, tinged dark red, erect; petals uniformly wine or dark red. 13. *H. acetosella*
- Plant with prickles, not tinged dark red, scrambling or scandent; petals yellow with maroon centre. 3
3. Stipules auriculate, amplexicaul, 6 mm wide or more. 14. *H. surattensis*
- Stipules neither auriculate, nor amplexicaul, up to 4 mm wide. 4
4. Leaf-lobes lanceolate to narrowly elliptic; pedicels 2–10(–17) mm long, articulated at base; calyx 10–20(–30 in fruit) mm long. 16. *H. noldeae*
- Leaf-lobes triangular, pedicels 15–90 mm long, articulated above middle; calyx 20–28(–35 in fruit) mm long. 15. *H. rostellatus*



Figure 82.2 *HIBISCUS MACRANTHUS*: 1 – flowering and fruiting stem  $\times \frac{1}{2}$ ; 2 – staminal column  $\times 1$ ; 3 – epicalyx (partly removed) and calyx  $\times 1$ . *H. DONGOLENSIS*: 4 – flowering and fruiting  $\times \frac{1}{2}$ ; 5 – epicalyx and calyx  $\times 1$ ; 6 – capsule  $\times 1$ ; 7 – seed  $\times 8$ . 1 & 3 from Meyer 8134; 2 from Ash 1351; 4 from Ash 2573; 5–7 from Ash 924. Drawn by Eleanor Catherine.

5. Calyx (and often whole plant) red and fleshy at maturity; plant not prickly. 12. *H. sabdariffa*  
 – Calyx leathery at maturity, not red and fleshy; plant prickly. 6
6. Annual herb; leaves deeply 3–7-lobed or divided (or entire towards base). 11. *H. cannabinus*  
 – Shrub or subshrub; leaves unlobed or shallowly 3–5-lobed. 7
7. Prickles conical, broad-based (2–5 mm wide at base), 1–3 together at base of petioles (sometimes a few scattered on stems); leaves 0.5–3(–4) cm long. 10. *H. sparseaculeatus*  
 – Prickles with narrow base, not conical, scattered uniformly on the stems; leaves 1.5–12(–18) cm long. 8
8. Stiffly erect virgately branched plant; prickles pointing upwards; leaves unlobed (rarely 3-lobed), longer than wide; epicalyx bracts 7–8. 9. *H. berberidifolius*  
 – Usually scrambling and forming dense tangles; prickles patent or pointing downwards; some or all leaves 3–5-lobed, usually as wide or wider than long; epicalyx bracts 10–12. 8. *H. diversifolius*

8. *H. diversifolius* Jacq. (1788).

Shrub to 3(–5) m, usually scrambling and forming dense tangles; stems densely prickly (prickles patent or pointing down), otherwise puberulous to densely pubescent. Leaves pubescent; petiole 2–12(–17) cm; lamina cordiform to reniform, lower shallowly 3–5-lobed, upper unlobed, 4–12(–18) x 5–13(–16) cm, usually wider than long, acute to rounded. Flowers in distinct racemes; pedicels 3–8(–12) mm, articulated near middle, densely hispid. Epicalyx bracts 10–12, 6–12 x 1–2 mm, linear. Calyx 13–18(–25 in fruit) mm long; lobes uniformly densely hispid, with broad central rib-like and two submarginal veins, central with large conspicuous gland. Petals 4–6 cm long, lemon-yellow with maroon centre; column 1.5–3 cm. Capsule 1–1.7 cm long, ovoid to subglobose, acute, densely hispid-strigose; seed c 4 mm long, glabrous with concentric lines. Fig. 82.3.7 & 8.

Swamps, lakeshores, riverbanks, often actually in water; 1400–2000 m. TU GD GJ SU WG KF SD; pan-tropic. *Ash* 1357; *Getachew Aweke* 1804; *Gilbert* 1966.

9. *H. berberidifolius* A. Rich. (1847)

– type: GD, Sanka Berr, *Quartin-Dillon & Petit* 119 (P holo.).

*H. diversifolius* Jacq. var. *witteanus* Hochr. in *Bull. Jard. Bot. Brux.* 18: 276 (1947).

Stiffly erect shrub to 2.5 m, many-stemmed from base; stems sparsely to densely prickly (prickles pointing up), otherwise subglabrous to pubescent. Leaves subglabrous to pilose on veins; petiole 0.3–3(–5) cm; lamina ovate or elliptic to orbicular, unlobed (rarely shallowly 3-lobed), 1.5–6(–9) x 0.5–5(–8.5) cm, longer than wide, acuminate to acute. Flowers in leaf-axils or in well-defined racemes; pedicels 3–20 mm, articulated near middle, densely hispid-hirsute. Epicalyx bracts 7–8, 8–15 x 1–2 mm, lanceolate. Calyx 13–20(–25 in fruit) mm long; lobes

hirsute at base, puberulous to pubescent towards apex, veins as in *H. diversifolius*. Petals 3.5–7 cm long, white to pale yellow or pale pink, with maroon centre; column 2–4 cm. Capsule 1–1.5 cm long, ovoid to subglobose, acute, densely hispid-strigose; seed c 4 mm long, with scattered hairs. Fig. 82.3.1–6.

Riverine forest, secondary forest and scrub, mostly at edges, montane bushland and grassland, roadsides, old cultivations; (1400–)1750–2650 m. TU GD SU GJ SU/AR WG IL KF SD BA HA; NE & E Zaire, Uganda, Kenya, Tanzania, Rwanda. *Friis et al.* 367; *Gilbert & Thulin* 579; *Mooney* 8716.

This is usually considered to be conspecific with *H. diversifolius* (e.g. *Fl. Zamb.* and *Fl. Congo*), but in the author's opinion the two species are quite distinct. *H. berberidifolius* grows in dry habitats, is stiffly erect and virgate, the prickles point upwards, the calyx indumentum is different, the epicalyx bracts fewer, the leaves are smaller, of a different shape and with shorter petioles, the seed is also different.

*Jones* 6909 (from near Agaro in Kefa) is the only intermediate collection which was seen by the author. It has the habit and calyx of *H. berberidifolius* but the prickles are patent or point down and the leaves are broad. It was collected near typical *H. diversifolius* (*Jones* 6908) and could indicate that very occasionally hybridisation might take place, but the very different habitats would normally keep the two species separate.

10. *H. sparseaculeatus* Bak. f. (1938).

*H. greenwayi* Bak. f. (1937) var. *megensis* J. P. Lebrun in *Adansonia*, ser. 2, 15: 379 (1976).

*H. greenwayi* sensu Cufod. (l.c.) quoad *Bally* 9128, non Bak. f. (1937).

Virgately branched shrub to 4 m, sometimes scandent with long arching branches; stems with broad-based (2–5 mm wide at base) conical prickles in 1–3's at base of petiole and sometimes a few scattered on stems, otherwise subglabrous. Leaves puberulous; petiole 0.3–3.5(–5.5) cm; lamina ovate to orbicular or reniform, unlobed (rarely shallowly 3-lobed), 0.5–3(–4) x 0.6–3.8(–4.5) cm, acute to rounded. Flowers in leaf-axils or in short racemes; pedicels 5–20 mm, articulated at base, puberulous and prickly. Epicalyx bracts 8–10, 5–12 x c 1 mm, linear. Calyx 11–18(–23 in fruit) mm long; lobes puberulous and prickly (rarely not), veins as in *H. diversifolius*. Petals 4–7 cm long, yellow with maroon centre; column 3–5 cm. Capsule 13–22 mm long, ovoid, acute, hispid-strigose; seed c 5 mm long, with sparse to dense pectinate hairs. Fig. 82.3.9.

*Acacia* – *Commiphora* – *Boswellia* bushland on red sandy to loamy soil overlying limestone, *Terminalia* bushland on granitic outcrops; 1200–1800 m. SD BA; Somalia, NE & E Kenya, NE Tanzania. *Ash* 2783; *Friis et al.* 3664; *Mooney* 7334.

Closely related to *H. greenwayi* Bak. f. from SE Kenya and NE Tanzania which has pubescent stems, larger deeply lobed leaves, larger flowers and seeds with a brownish indumentum of apically branched hairs.

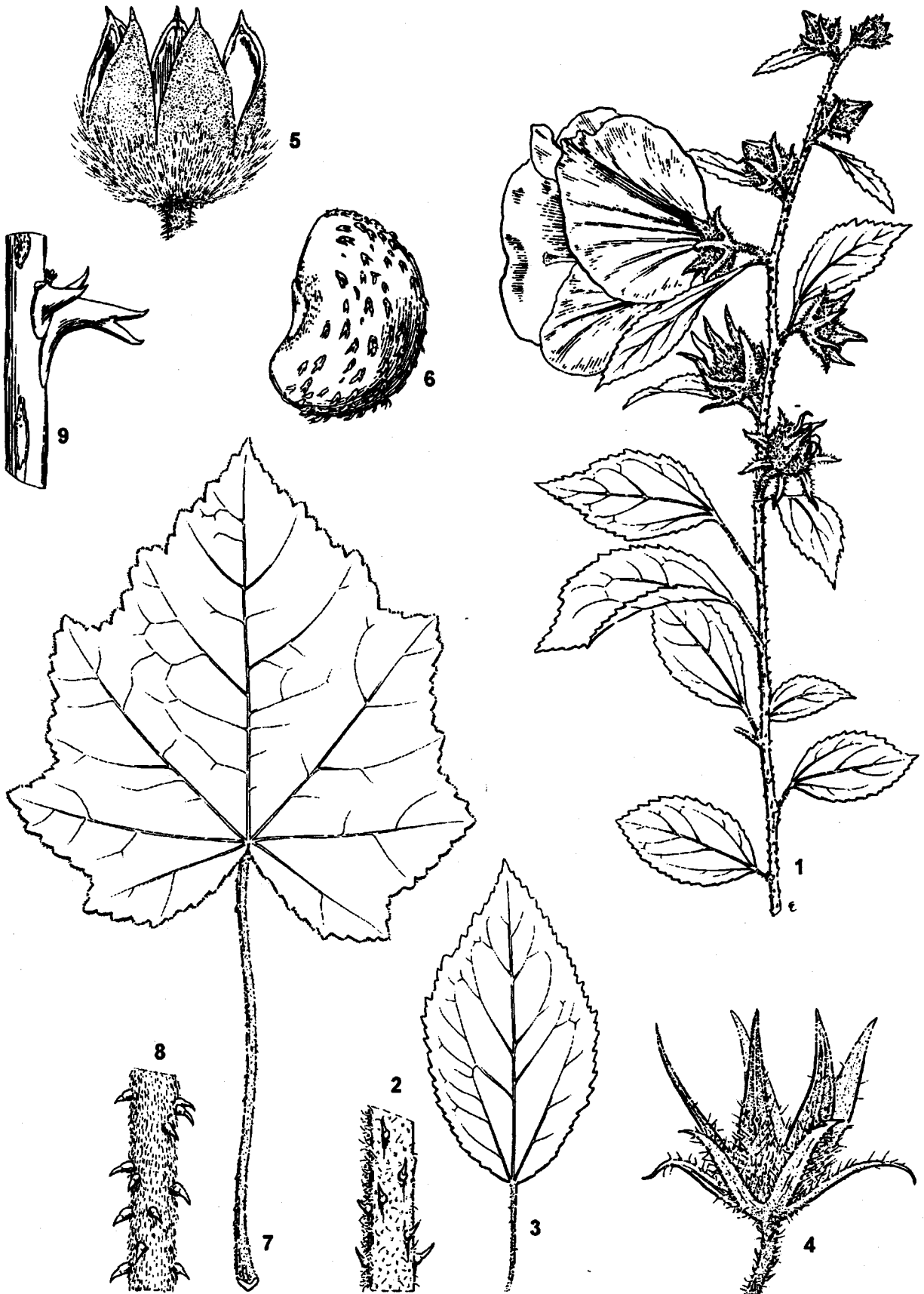


Figure 82.3 *HIBISCUS BERBERIDIFOLIUS*: 1 – flowering and fruiting stem  $\times \frac{2}{3}$ ; 2 – detail of stem-indumentum and prickles  $\times 3$ ; 3 – leaf  $\times \frac{2}{3}$ ; 4 – epicalyx and calyx  $\times 1.5$ ; 5 – capsule  $\times 2$ ; 6 – seed  $\times 8$ . *H. DIVERSIFOLIUS*: 7 – leaf  $\times \frac{2}{3}$ ; 8 – detail of stem-indumentum and prickles  $\times 3$ . *H. SPARSEACULEATUS*: 9 – detail of stem with prickles  $\times 3$ . 1, 2 & 4 from Friis et al 367; 3 from Jones 6912; 5 & 6 from Evans 383; 7 & 8 from Ash 1357; 9 from V.C.Gilbert 4073. Drawn by Eleanor Catherine.

11. *H. cannabinus* L. (1759).*H. verrucosus* Guill. & Perr. (1831).*H. asper* Hook. f. (1849).*H. cannabinus* var. *punctatus* (A. Rich.) Hochr. in *Ann. Cons. Bot. Geneve* 20: 82 (1916) – types: TU, Chiré, *Quartin-Dillon & Petit* s.n. (not seen); TU, Djeladjeranne, *Schimper* II:717 (P syn., FI(Webb) iso-syn.).*H. cannabinus* var. *tripartitus* (Forssk.) Chiov. (1923).

Stiffly erect coarse annual herb to 2.5 m; stems sparsely to densely prickly (prickles small, patent or pointing up), otherwise glabrous to pubescent. Leaves glabrous to puberulous; petiole 3–19(–26) cm; lamina broadly ovate to cordiform in outline, unlobed near base, deeply 3–7-lobed or almost divided near apex, 4–14(–22) x 3–13(–24) cm; lobes lanceolate to ovate or elliptic, acute to acuminate. Flowers in leaf-axils or in well-defined racemes; pedicels 2–10 mm, articulated at base, setose. Epicalyx bracts 7–8, 5–12 x 1–2 mm, lanceolate. Calyx 13–20(–30 in fruit) mm long; lobes setose to aculeate, bristles reddish based, veins as in *H. diversifolius*. Petals 3–6 cm long, white to pale yellow or greyish, with maroon centre; column *c* 15 mm. Capsule 1–2.5 cm long, ovoid, acuminate, densely hispid-strigose, later glabrous; seed *c* 4 mm long, glabrous or with scattered pectinate hairs. Fig. 82.4.1–7.

*Acacia* woodland and wooded grassland on grey to black alluvial soil, swamps, grassland, seepages, riverbanks, *Acacia* – *Commiphora* bushland on red sand, roadsides, weed in irrigated crops; 400–1900(–2200) m. EW TU GD GJ SU WG IL KF GG SD BA HA: widespread in all tropical and subtropical regions. *Burger* 789, 956; *Mesfin Tadesse* 2414.

In India, the Sudan and southern tropical Africa *H. cannabinus* is grown as a fibre plant giving JUTE. In Ethiopia, trials on this crop have been carried out in the Awash valley, but it had not been taken up by either large scale or small scale farmers.

The young leaves are sometimes eaten as a vegetable.

12. *H. sabdariffa* L. (1753).

Annual herb to 1.5 m, whole plant often reddish, glabrous to pubescent, not prickly. Leaves unlobed to deeply 3–5-lobed, up to 15 x 15 cm; petiole up to 10 cm. Flowers in leaf-axils or in well-defined racemes; pedicels up to 2 cm. Epicalyx bracts 9–10, 1–2(–3) cm long, lanceolate to narrowly triangular. Calyx up to 5 cm long, red, fleshy. Petals pale yellow with maroon centre. Capsule up to 2.5 cm long, subglobose, hispid; seed *c* 5 mm long, glabrous or sparsely pubescent.

Cultivated throughout the tropics, probably originating from India. *IECAMA* D–72; *Massa* 741; *Pappi* s.n.

The leaves and fleshy calyces are eaten as a vegetable. The dried calyx and fruit are used for making a kind of tea, ROSELLE, which is drunk either hot or cold.

13. *H. acetosella* Welw. ex Hiern (1896).

Annual or perennial herb or shrub to 1 m; stems glabrous,

not prickly; whole plant tinged purplish red. Leaves unlobed to deeply 3–5-lobed, up to 8 x 7 cm. Flowers in leaf axils. Epicalyx bracts bifurcate near apex, inner branch linear, outer spatulate. Petals wine-red or dark red, up to 5.5 cm long.

Ornamental cultivated for its striking red colours; native of Angola and Zambia now cultivated in most of tropical Africa. In Ethiopia seen in Moyale. *Mesfin Tadesse* et al. 4208.

In southern Africa the leaves are eaten as salad. They have a refreshing acid taste. The plant used as such is the native form which is usually not reddish tinged, and the species seems purely ornamental further north.

14. *H. surattensis* L. (1753).

Prostrate or scrambling herb, stems up to 3 m long, prickly (prickles pointing down), otherwise pubescent or pilose from long simple hairs. Leaves subglabrous to sparsely pubescent, prickly on main veins; petiole 2–7 cm; stipules auriculate, amplexicaul, up to 20 x 12 mm (6 mm or wider); lamina broadly ovate to reniform in outline, almost unlobed near base to deeply 3–5-lobed, up to 9 x 10 cm; lobes lanceolate to narrowly elliptic, acute to acuminate. Flowers in leaf-axils; pedicels 2–13 cm, articulated above middle, pilose and prickly below joint, hispid above. Epicalyx bracts 8–10, bifurcate, basal part 5–7 mm long, cylindric, inner branch lanceolate, erect, 1–2 cm long, outer ovate to elliptic, 7–10 mm long, patent. Calyx 13–22 mm long; lobes 1-nerved, hispid to prickly on veins and margins, otherwise glabrous or sparsely pubescent. Petals 3.5–5.5 cm long, yellow with maroon centre; column *c* 15 mm. Capsule *c* 1.5 cm long, ovoid, acute to acuminate, densely hispid-strigose, becoming glabrous; seed *c* 3 mm long, with scattered pectinate hairs. Fig. 82.5.1–5.

Edges, clearings and tracks in lowland rain forest, riverbanks; 1000–1100 m. IL KF; widespread in tropical Africa and Asia. *Friis* et al. 3996, 4071.

15. *H. rostellatus* Guill. & Perr. (1831).

Scrambling or scandent shrub, stems up to 4 m long, prickly (prickles pointing down), stems and leaves pubescent or pilose. Leaves prickly on veins; petiole (2–)4–10 cm; stipules up to 12 x 2 mm, linear to lanceolate; lamina broadly cordiform in outline, shallowly 3–5-lobed (rarely unlobed), 6–13 x 6–15 cm; lobes triangular, acute. Flowers in leaf-axils; pedicels 1.5–9 cm, articulated above middle, pilose. Epicalyx bracts 10–12, bifurcate, basal part 5–10 mm long, cylindric, inner branch lanceolate, erect, outer flattened, ovate, 10–15 mm long, patent. Calyx 2–2.8(–3.5 in fruit) cm long; lobes setose on veins and edges, otherwise puberulous, veins as in *H. diversifolius*, without gland. Petals 5.5–7.5 cm long, yellow with maroon centre; column 2–4 cm. Capsule 1–2.5 cm long, ovoid to subglobose, densely hispid-strigose; seed *c* 4 mm long, with concentric lines and scattered pectinate hairs.

Riverine forest; *c* 800 m. SD; widespread in tropical Africa south to N Mozambique, N Zambia and Angola,



Figure 82.4 *HIBISCUS CANNABINUS*: 1 – apical part of flowering stem  $\times \frac{2}{3}$ ; 2 – leaf from lower part of stem  $\times \frac{1}{3}$ ; 3 & 4 – variations in leaf-shape  $\times \frac{2}{3}$ ; 5 – epicalyx and calyx  $\times 1.5$ ; 6 – capsule  $\times 1.5$ ; 7 – seed  $\times 6$ . *H. TRIONUM*: 8 – leaf  $\times \frac{1}{3}$ ; 9 – epicalyx and calyx  $\times \frac{1}{2}$ . 1 from Meyer 7887; 2–4 from Burger 956; 5–7 from Burger 2451; 8 from Burger 3195; 9 from Burger 749. Drawn by Eleanor Catherine.



not in Kenya and Somalia. *Ruspoli & Riva* s.n. (fide Cufod., l.c.).

All the *Ruspoli & Riva* collections of *Hibiscus* are missing at FT. They were probably on loan to Berlin during the war and were thus destroyed. But this species is so conspicuous that it has been included on the record in Cufodontis. It occurs in S Sudan and Uganda.

16. *H. noldeae* Bak. f. (1939).

Scrambling or scandent shrub, stems up to 4 m long, unbranched or forming tangles, prickly (prickles pointing down), stems and leaves pubescent. Leaves: petiole 3–9 cm; stipules up to 10 x 4 mm (2 mm wide or more), lanceolate to elliptic; lamina cordiform, deeply 3–5-lobed (or unlobed near base), (2–)3.5–10 x (2.5–)4–12 cm; lobes lanceolate to narrowly elliptic, acute to acuminate. Flowers in leaf-axils; pedicels 2–10(–17) mm, articulated at base, setose and puberulous to pubescent. Epicalyx bracts c 8, 10–15 x 1–2 mm, linear-spathulate, bifurcate near apex. Calyx 1–2(–3 in fruit) cm long; lobes setose, veins as in *H. diversifolius*. Petals 3.5–6.5 cm long, bright yellow with maroon centre; column 1–2 cm. Capsule 1–2 cm long, ovoid to subglobose, acute, densely hispid-strigose; seed 4–5 mm long, with concentric lines and scattered pectinate hairs. Fig. 82.5.6 & 7.

Riverine forest, riverbanks, seepages, *Combretum* wooded grassland on clay, roadsides; 950–1900 m. WG KF; Sierra Leone, Nigeria, Cameroun, Central African Republic, S Sudan, Zaire, Uganda, Rwanda, Tanzania, Angola. *Friis* et al. 3868; *Mesfin Tadesse* 2191; *W. de Wilde* et al. 8866.

3. Sect. GIGANTOCALYX *Ulbr.* (1921).

Epicalyx bracts 12–15, with long filiform basal part, spatulate apically. Calyx broadly funnel-shaped with broadly rounded lobes, strongly accrescent in fruit.

17. *H. bricchettii* Gurke ex *Ulbr.* (1912)

– types: HA, Merehan, *Robecchi-Bricchetti* 436 and 461 (both FT syn.).

Shrub to 1 m; branchlets pubescent from scattered large and denser small hairs. Leaves pubescent; petiole 3–6 cm; lamina cordiform to reniform in outline, deeply 3-lobed, 3–6 x 3–7 cm; lobes ovate to elliptic, broadly rounded. Flowers in leaf-axils; pedicels 0.3–1 cm, pubescent. Epicalyx bracts 12–15, with long filiform basal part and widened apically, 22–32 mm long and up to 4 mm wide in the apical part. Calyx 2.5–3(–5.5 in fruit) cm long, broadly funnel-shaped, divided c 1/3 down, membranous, strongly accrescent in fruit, reddish on lobes or all over; lobes broadly rounded, with central and two lateral about equally strong veins, central with conspicuous gland. Petals 4–5 cm long, uniformly red; column c 2 cm. Capsule c 1 cm long, ovoid, acute, hirsute; seed 5–6 mm long, tuberculate.

*Acacia* – *Commiphora* bushland on red sandy soil; c 500 m. HA-Som.; Somalia. Only the two syntypes have been seen from Ethiopia.

This extremely peculiar species is only known from the two syntypes from the border area between Ethiopia and Somalia and from one recent collection from Somalia. The peculiar epicalyx and even more peculiar calyx is – to the author's knowledge – not even approached in any other species of *Hibiscus*.

4. Sect. LILIBISCUS *Hochr.* (1900).

Cultivated shrubs; petals large, red, pink or purple, (rarely white) sometimes deeply laciniate; column longer than petals.

1. Epicalyx bracts c 1 cm long; calyx teeth of same length as tube; petals erect or spreading, entire to laciniate apically. 18. *H. rosa-sinensis*  
– Epicalyx bracts c 1 mm long; calyx united almost to top, often splitting unilaterally; petals reflexed, deeply laciniate. 19. *H. schizopetalus*

18. *H. rosa-sinensis* L. (1753).

Large shrub with dark green, unlobed, dentate leaves; large showy usually red or pink flowers (often variegated and double and with laciniate petals); epicalyx bracts c 1 cm long; calyx teeth of same length as tube; petals erect to spreading; column longer than petals.

Widely cultivated in Ethiopia as an ornamental shrub. Native of tropical Asia, now much planted throughout the tropics and subtropics, often used as hedge plant. *Ge-tachew Aweke* 1351; *IECAMA*–F31.

19. *H. schizopetalus* (*Mast.*) *Hook. f.* (1880).

Shrub, sometimes scandent. Leaves elliptic, dentate, subglabrous. Flowers solitary, on long slender glandular pedicels; epicalyx-teeth c 1 mm long; calyx united almost to top, often splitting unilaterally; petals reflexed, deeply laciniate, pink to purple; column distinctly longer than petals.

Native of coastal E Africa, occasionally cultivated elsewhere. In Ethiopia known from Lake Langano and Zwai. *Vollesen* 86/18.

It is not at all certain that these two species are closely related. The epicalyx and calyx are quite different. They are kept together here mostly for the sake of convenience as they are both cultivated ornamentals.

5. Sect. TRIONUM *DC.* (1824).

Epicalyx bracts 10–13, filiform to linear. Calyx inflated and bladder-like, enclosing the fruit, divided less than 1/3 down.

20. *H. trionum* L. (1753).

Annual herb to 0.5 m, erect to procumbent; all parts sparsely to densely hispid, stems also with a band of crisped pubescence. Leaves: petiole 1–4.5 cm; lamina broadly ovate to broadly cordiform in outline, deeply 3-lobed to divided (or lowermost unlobed), 1.5–7.5 x 1.5–9 cm; lobes pinnately incised, rounded. Flowers in leaf-axils; pedicels 1–5 cm. Epicalyx bracts 10–13, up to 15 mm, filiform to linear. Calyx 7–15 mm long in flower, inflated, bladder-like and up to 2.5 cm in fruit, with

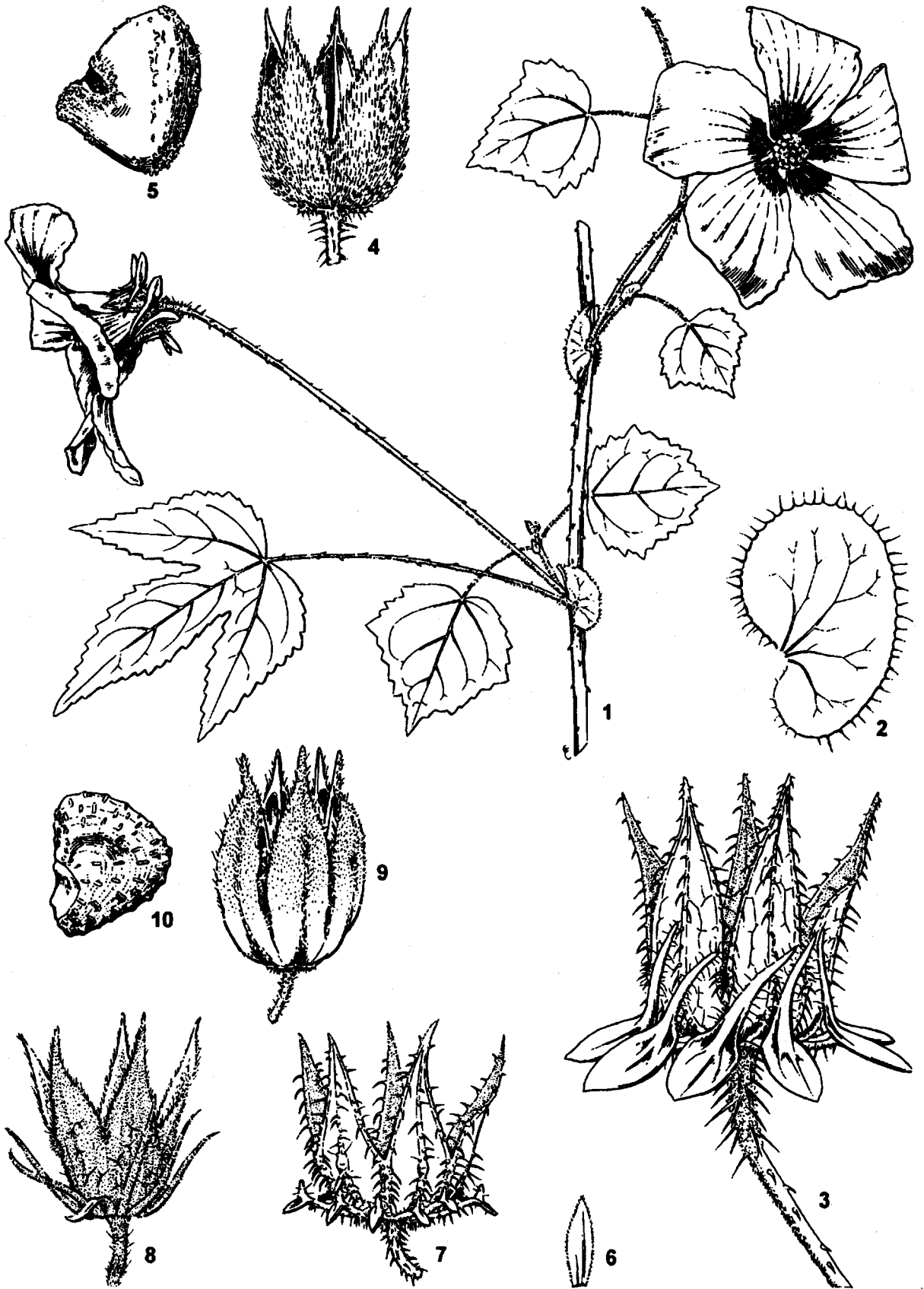


Figure 82.5 *HIBISCUS SURATTENSIS*: 1 - part of flowering stem  $\times \frac{1}{2}$ ; 2 - stipule  $\times 2$ ; 3 - epicalyx and calyx  $\times 2$ ; 4 - capsule  $\times 2$ ; 5 - seed  $\times 8$ . *H. NOLDEAE*: 6 - stipule  $\times 2$ ; 7 - epicalyx and calyx  $\times 2$ . *H. RHABDOTOSPERMUS*: 8 - epicalyx and calyx  $\times 2$ ; 9 - capsule  $\times 2$ ; 10 - seed  $\times 8$ . 1 & 3 from Friis et al. 4071; 2 from Friis et al. 3996; 4 & 5 from Newbould 2040; 6 & 7 from Friis et al. 3868; 8-10 from Lea 53. Drawn by Eleanor Catherine.

conspicuous purplish veins; lobes 5-veined. Petals 1.5–3.5 cm long, white to pale yellow with maroon centre; column up to 8 mm. Capsule 1–1.7 cm long, ellipsoid to subglobose, pilose to hispid, completely enclosed in the inflated calyx; seed *c* 2.5 mm long, warted. Fig. 82.4.8 & 9.

Wet grassland on clay, *Acacia drepanolobium* bushland, around pools, roadsides, weed; 1200–2600 (–2800) m. EW TU GD GJ SU AR KF GG SD BA HA; in all tropical and subtropical regions and ruderal elsewhere. *Burger* 3195; *Getachew Aweke & Gilbert* 827; *Gilbert* 3333.

6. Sect. PANDURIFORMES *Ulbr.* (1921).

Stipules 2–3 side by side at nodes. Epicalyx bracts 8–12, spatulate.

21. *H. panduriformis* *Burm. f.* (1768).

Erect perennial herb to 2.5 m; stems, pedicels and calyx densely puberulous to tomentellous and with long simple or branched irritating hairs. Leaves whitish tomentellous to lanate; petiole 2.5–10(–12.5) cm; stipules 2–3 side by side; lamina ovate to cordiform, unlobed to shallowly 3–5-lobed, up to 13.5 x 12 cm, acute. Flowers in leaf-axils or in well-defined racemes; pedicels 5–30(–55 in fruit) mm, articulated near middle. Epicalyx bracts 8–12, 7–17 mm long, narrowly spatulate. Calyx 1–1.5(–2 in fruit) cm long; lobes conspicuously 3-veined or -ribbed. Petals 2.5–4 cm long, pale yellow to yellow with maroon centre; column *c* 1.5 cm. Capsule *c* 1.5 cm long, ovoid to subglobose, densely hispid-strigose; seed *c* 3 mm long, densely pubescent. Fig. 82.6.8–10.

*Acacia* woodland and wooded grassland on black cotton soil, alluvial clay flats, riverbanks, weed on black soil, roadsides; 400–2000 m. AF EW TU GD SU SU-SD GG BA HA; widespread in tropical Africa, Madagascar, the Yemen, tropical Asia and Australia. *Ash* 1348; *Gilbert* 1637; *IECAMA* I–58.

7. Sect. KETMIA *Endl. emend. Hochr.* (1900).

Sect. *Trichospermum* *Hochr.* (1900).

Epicalyx bracts 6–13, filiform. Capsule not separating from receptacle and not disintegrating at maturity.

1. Capsule valves acuminate; petals pink; seeds with concentric lines and pectinate hairs.

23. *H. rhabdotospermus*

– Capsule valves obtuse to acute or apiculate; seeds puberulous to tomentellous, smooth to muricate. 2

2. Petals *c* 1 cm long, white to pale pink (turning reddish); column *c* 4 mm long; epicalyx bracts united at base.

27. *H. obtusilobus*

– Petals (0.5–)1.5–5 cm long, yellow with or without maroon centre; column 5–15 mm long; epicalyx bracts free. 3

3. Flower with maroon centre. 4

– Flower without maroon centre. 5

4. Leaves with chalky incrustations near base; annual herb to 1.5 m, with irritating hairs; seeds puberulous or scaly.

26. *H. physaloides*

– Leaves without incrustations; pyrophytic herb from woody rootstock, to 0.2 m, without irritating hairs; seeds tomentellous. 22. *H. aethiopicus*

5. Stems stiffly erect; flowers in leafless racemes; epicalyx bracts 6–8, 2–5 mm long.

25. *H. corymbosus*

– Stems procumbent to ascending; flowers in leaf-axils; epicalyx bracts 8–10, 4–8 mm long.

24. *H. articulatus*

22. *H. aethiopicus* *L.* (1771).

*H. ambelacensis* *Schweinf. ex Ulbr.* (1922) – type: EW, near Mald, Ambelaco, *Schweinfurth* 496 (not seen).

*H. aethiopicus* var. *helvolus* *Harv.* in *Fl. Cap.* 1: 174 (1860).

Pyrophytic herb with up to 20 cm long erect to procumbent annual stems from a woody rootstock; all parts pubescent or densely so. Leaves: petiole 2–8 mm; lamina narrowly ovate to ovate or elliptic, unlobed, 1–5.5 x 0.5–2.5 cm, often not fully developed when flowering, entire or remotely dentate near apex, acute to rounded. Flowers in leaf axils; pedicels 0.5–7 cm, articulated above middle. Epicalyx bracts 8–10, 7–14 mm long, linear. Calyx 1.2–2 cm long; lobes with strong central and two weaker lateral veins. Petals (0.5–)1.5–4 cm long, lemon yellow with maroon centre; column 0.5–1 cm. Capsule *c* 1 cm long, subglobose, obtuse and apiculate, strigose; seed *c* 3.5 mm long, tomentellous. Fig. 82.6.6 & 7.

Fireswept *Combretum* – *Terminalia* – *Piliostigma* woodland and bushland, *Acacia* bushland on rocky ridges; 1000–2600 m. EE/EW EW SU SD BA; from Ethiopia through eastern Africa to S Africa, the Yemen. *Chojnacki* in *Mooney* 8884; *Mooney* 8430; *Pappi* 869.

The different varieties proposed in *Fl. Capensis* and still accepted in newer African floras (e.g. *Fl. Congo* and *Fl. Zamb.*) seem to merge gradually into each other and are hardly worth maintaining. Pyrophytes are always notorious for their extreme variability even within restricted areas. *H. ambelacensis* was described as having very small flowers (petals *c* 5 mm long) which – according to the diagnosis – seems to be the only difference from *H. aethiopicus*. Equally small-flowered specimens have been collected growing among larger flowered specimens in Uganda (*Symes* 686 and 690 at Kew), and also near the type locality in Eritrea. They are probably not worthy of any taxonomic rank.

23. *H. rhabdotospermus* *Garcke* (1849).

Annual herb to 1(–1.5) m; all parts puberulous to pubescent and with scattered large hispid hairs. Leaves: petiole 1–9.5(–15) cm; lamina ovate to cordiform, unlobed (rarely lowermost shallowly 3-lobed), 3–10(–16) x 1.5–7(–13) cm, acute to acuminate. Flowers in leaf-axils below (often a solitary plus a small cyme or two solitary together) and congested into a pseudoumbel apically; pedicels 0.3–4 (–5.5) cm, articulated above middle. Epicalyx bracts 11–13, 6–15 mm long, filiform. Calyx 0.8–1.7(–2.3 in fruit) cm long; lobes indistinctly 3–5-veined. Petals (1–)2–3.5 cm long, pink (? or yellow with a pink tinge), without dark



Figure 82.6 *HIBISCUS ARTICULATUS*: 1 – flowering stem  $\times \frac{1}{2}$ ; 2 – leaf  $\times \frac{1}{3}$ ; 3 – epicalyx and calyx  $\times 2$ ; 4 – capsule  $\times 2$ ; 5 – seed  $\times 8$   
*H. AETHIOPICUS*: 6 – habit  $\times \frac{1}{2}$ ; 7 – epicalyx and calyx  $\times 2$ . *H. PANDURIFORMIS*: 8 – epicalyx and calyx  $\times 2$ ; 9 – capsule  $\times 2$ ; 10  
 – seed  $\times 8$ . 1 from Gilbert & Getachew 2894; 2 & 3 from Thulin & Asfaw 4035; 4 & 5 from Andrews 860; 6 from Chojnacki in Mooney  
 8884; 7 from Gilbert 4339; 8–10 from Gilbert 1637. Drawn by Eleanor Catherine.

centres; column (0.5–)1–2 cm. Capsule (0.5–)1–1.7 cm long, ovoid, acuminate to aristate with up to 4 mm long awns, strigose along edges of valves, otherwise glandular pubescent; seed *c* 3 mm long, with concentric lines and pectinate hairs. Fig. 82.5.8–10.

Riverbanks and alluvial flats, *Acacia* woodland on clay; 300–1400 m. EW SD; Sudan, Kenya, Mozambique, Zambia, Zimbabwe, Botswana, Angola, Namibia. *Gilbert* et al. 8187; *Pappi* 5944, 6404.

24. *H. articulatus* Hochst. ex A. Rich. (1847)

– type: TU; Gafta, *Schimper* II:1201 (P holo., BM FI(Webb) K iso.).

*H. articulatus* var. *stenolobus* Hochst. ex Mast. in *Fl. Trop. Afr.* 1: 201 (1868) – type: TU; Sana, Mt Walcha, *Schimper* III:1620 (K syn., FI(Webb) FT P isosyn.).

Perennial herb, stems procumbent to ascending, up to 40 cm long, from woody rootstock or taproot, pilose. Leaves glabrous to pubescent; petiole 0.5–3 cm (uppermost sessile); stipules often bifid; lamina lanceolate to orbicular, unlobed to deeply 3-lobed, 2.5–14 x 0.5–8 cm; lobes ovate to lanceolate, entire to dentate, acute. Flowers in leaf-axils; pedicels 1.5–6 cm, puberulous and with long hispid hairs, articulated above middle. Epicalyx bracts 8–10, 4–8 mm long, linear to subulate. Calyx 1.1–1.9(–2.2 in fruit) cm long; lobes subglabrous to puberulous and setose, with strong central and two weak lateral veins. Petals 2–4 cm long, white to pale yellow, no dark centres; column *c* 1.5 cm. Capsule 1–1.8 cm long, ellipsoid to subglobose, apiculate, puberulous and strigose on edges of valves; seed *c* 2.5 mm long, verrucose, with short hairs on warts. Fig. 82.6.1–5.

*Combretum* – *Terminalia* woodland on clay, grassland on black cotton soil, weed in cultivations on clay soils; 350–2000 m. TU GD GJ WG IL GG SD; widespread in tropical Africa. *Friis* et al. 2451; *Gilbert* 2894; *Thulin* et al. 4035.

25. *H. corymbosus* Hochst. ex A. Rich. (1847)

– type: TU, Sana to Ferrferam, *Schimper* II:787 (P holo., FI(Webb) K iso.).

*H. corymbosus* var. *integrifolia* Chiov. in *Ann. di Bot.* 9: 52 (1911) – type: GD, Asoso, *Chioventa* 2691 (FT holo.).

*H. corymbosus* var. *palmatilobata* Chiov. in *Ann. di Bot.* 9: 52 (1911) – type: GD, near Gonder, Mt Inceduba, *Chioventa* 1604 (? FT, not found).

Perennial herb to 1 m, stems erect, unbranched, from woody rootstock; all parts puberulous to pubescent. Leaves glaucous; petiole 2–8 cm, (uppermost sessile); lamina ovate or elliptic to suborbicular, gradually narrower upwards, uppermost usually lanceolate, unlobed to deeply 3-lobed, basal 5–14 x 3.5–11 cm; lobes ovate to lanceolate, entire, crenate or dentate, acute to rounded. Flowers in usually condensed leafless racemes; pedicels 0.5–3 cm, articulated above middle. Epicalyx bracts 6–8, 2–5 mm long, subulate. Calyx 0.8–1.2(–1.5 in fruit) cm long; lobes veined as in *H. articulatus*. Petals 3–5 cm long,

lemon yellow, without dark centres; column 1–1.5 cm. Capsule 1–1.5 cm long, ellipsoid, puberulous and strigose on edges of valves; seed *c* 3 mm long, smooth to verrucose.

*Combretum* – *Terminalia* woodland and bushland and grassland on black soil, old cultivations; 1400–1900 m. EW TU GD SU WG BA; Sudan, NE Zaire, Uganda, Kenya, Tanzania. *Benedetto* 445; *Mooney* 8442; *Pappi* 246.

26. *H. physaloides* Guill. & Perr. (1831).

Annual herb to 1.5 m; all parts puberulous to tomentellous and with long irritating hispid hairs. Leaves with chalky incrustations near base on lower surface; petiole 2–12 (–18) cm; lamina ovate to broadly cordiform in outline, shallowly to deeply 3–5-lobed, 3–14 x 1.5–17 cm; lobes triangular, acute. Flowers in leaf-axils; pedicels 2–8 cm, articulated above middle. Epicalyx bracts 7–10, 5–10 mm long, filiform. Calyx 1–1.5(–2 in fruit) cm long; lobes ovate to triangular, with 3(–5) equally strong veins. Petals 3.5–5 cm long, yellow with maroon centres; column 1–1.5 cm. Capsule 1.3–1.7 cm long, ovoid, acute, puberulous to pubescent or pilose and hispid on edges of valves; seed 2–2.5 mm long, sparsely scaly or stellate puberulous.

Dry woodland and bushland; below 1000 m. (EW GD WG); widespread in tropical and S Africa, Madagascar, the Seychelles. No Ethiopian collections seen.

Cufodontis' record of this species from Ethiopia is based on a misidentified collection of *H. rhabdoto-spermus* (Corni et al. 77). But the species has been collected repeatedly in the Sudan close to the border and also occurs in Uganda and N Kenya. It, therefore, almost certainly occurs in Ethiopia and should be included in this account.

27. *H. obtusilobus* Garcke (1849).

*H. amblycarpus* Hochst. ex Webb (1854).

Erect annual or perennial herb or subshrub to 1.25 m; all parts pubescent. Leaves: petiole 1.5–6.5(–8) cm; lamina ovate to cordiform in outline, unlobed to shallowly 3-lobed, 2–10 x 1.8–8.5 cm, subentire to grossly dentate; lobes broadly ovate, rounded to subacute. Flowers solitary or forming 2–3-flowered cymes in some axils; pedicels 2.5–7(–11) cm, articulated above middle. Epicalyx bracts 6–9, 3–7 mm long, linear. Calyx 6–8(–15 in fruit) mm long; lobes with central vein and commissural veins branching below sinus with the branches gradually reaching margin of lobes. Petals *c* 1 cm long, uniformly white to pale pink (turning reddish); column *c* 4 mm. Capsule 7–12 mm long, ellipsoid, acute and apiculate, hispid-strigose; seed *c* 2.5 mm long, densely muricate with short hairs on warts.

Seasonally flooded alluvial *Acacia* wooded grassland and grassland, weed in cultivations on clay soils; *c* 400 m. HA; Niger, Sudan (Nile Valley), NW Kenya, Pakistan, India. *IECAMA* J–7.

Superficially this looks very like the species in Sect. BOMBYCELLA, but it differs in the calyx-venation, the acute capsule and seeds. It is much closer to the following two species.

8. Sect. *SOLANDRA* Hochr. (1900).

Epicalyx absent or of teeth up to 1 mm long.

1. Flowers white to pale yellow, in leafless racemes; calyx shorter than capsule. 28. *H. lobatus*  
 - Flowers yellow, in leaf-axils; calyx longer than capsule. 29. *H. sidiformis*

28. *H. lobatus* (Murr.) O. Ktze. (1898).

*H. abyssinicus* Steud. (1840), *nom. nud.*

*Laguna abyssinica* Hochst. ex A. Rich. (1847) - type: TU, Djeladjeranne, *Schimper* III:1676 (P holo.).

Annual herb to 1 m, usually unbranched and erect; all parts subglabrous to pubescent and often with scattered long simple hairs. Leaves: petiole 2-8 cm; lamina ovate to cordiform, unlobed or upper deeply 3-lobed, 4-10 (-14) x 3-9(-13) cm, acuminate to acute. Flowers in leafless racemes; pedicels 1-5.5 cm, articulated above middle. Epicalyx absent. Calyx 5-7(-15 in fruit) mm long; lobes with central vein and two submarginal branching off from commissural veins near base. Petals 8-15 mm long, uniformly white to pale yellow; column up to 6 mm. Capsule 7-15 mm long, ellipsoid, valves aristate with 1-2 mm long awns, puberulous and with long hispid hairs on edges of valves; seed *c* 2 mm long, warted and sparsely puberulous.

Woodland, riverine forest, weed; *c* 1550 m. TU; widespread in tropical Africa, Madagascar and tropical Asia. *Schimper* 403.

This species has apparently not been collected in Ethiopia since Schimper's last collection in 1854.

29. *H. sidiformis* Baill. (1885).

Annual herb to 0.75 m (but usually much smaller); all parts puberulous and with scattered pilose hairs. Leaves: petiole 1-6 cm; lamina ovate to broadly cordiform in outline, unlobed at base, gradually more deeply 5-lobed upwards and divided near apex (more rarely all unlobed), 1-5.5 x 0.7-7.5 cm; lobes ovate or elliptic to linear, narrowing upwards, entire (apical) to dentate near base, acuminate to rounded. Flowers in leaf-axils; pedicels 0.5-6 cm, articulated above middle. Epicalyx absent or of a number of up to 1 mm long teeth. Calyx 6-10(-15 in fruit) mm long, whitish with green veins; lobes narrowly triangular, veins as in *H. lobatus*. Petals 1-2 cm long, uniformly yellow; column up to 1 cm. Capsule 5-10 mm long, ellipsoid to globose, pilose; seed *c* 2 mm long, irregularly lumpy and warted. Fig. 82.7.10 & 11.

*Acacia* - *Commiphora* woodland and bushland, *Combretum* - *Terminalia* woodland, alluvial grassland; near sea-level to 1550 m. EE EE-EW TU SU GG SD BA HA; widespread in tropical and S Africa, Madagascar. *Friis* et al. 2706; *Gilbert* 1271; *Gilbert & Thulin* 311.

9. Sect. *PTEROCARPUS* Garcke (1849).

Sect. *Aristivalvis* Ulbr. (1921).

Epicalyx bracts 8-10, filiform. Capsule with cuspidate to aristate valves, at maturity separating from receptacle and disintegrating.

1. Leaves shallowly to deeply lobed, lobes triangular,

petals 2-5 cm long; capsule winged; seeds glabrous or warted. 31. *H. vitifolius*

- Leaves deeply lobed or divided, lobes linear to elliptic; petals 1.5-2.5 cm long; capsule not winged; seeds silky-pubescent. 30. *H. palmatus*

30. *H. palmatus* Forssk. (1775).

*H. aristivalvis* Garcke (1849).

*H. intermedius* A. Rich. (1847), non Bélanger (1834).

*H. richardii* Riedl (1976) - type: EE, Choho, *Quartin-Dillon & Petit* s.n. (P holo.).

Erect to procumbent annual or perennial herb, usually many-stemmed from base; all parts hispid, stems also with a line of crisped pubescence. Leaves: petiole 1.5-7 cm; lamina broadly cordiform in outline, deeply 3-5-lobed or divided, 1.5-7.5(-13.5) x 2-12(-16) cm; lobes linear to elliptic or narrowly ovate, entire to irregularly dentate or incised, rounded. Flowers in leaf-axils; pedicels 0.5-2 cm, articulated near base. Epicalyx bracts *c* 8, up to 15 mm long, linear to narrowly lanceolate. Calyx 8-10(-15 in fruit) mm long; lobes 3-veined. Petals 1.5-2.5 cm long, pale yellow to yellow, with or without pale red to red centre; column 7-10 mm. Capsule at maturity separating from receptacle and disintegrating, 6-8 mm long, subglobose, valves aristate with 1-3 mm long awns, subglabrous to hispid; seed *c* 2.5 mm long, appressed silky-pubescent. Fig. 82.7.6-9.

*Acacia* - *Commiphora* bushland, alluvial grassland, weed; near sea-level to 2000 m. EE EW TU GD SU (Awash Valley) GG SD; widespread in tropical and S Africa, Arabia, India. *Bally* 6835; *Friis* et al. 2929A.

31. *H. vitifolius* L. (1753).

*H. jatrophiifolius* A. Rich. (1847) - type: TU, Aderbati, *Quartin-Dillon & Petit* s.n. (P holo.).

*H. modaticus* Hochst ex A. Rich. (1847) - type: TU, Modat, Aguar Valley, *Schimper* II:1029 (P holo., K iso.).

*H. obscurus* A. Rich. (1847) - type: TU, Adua, *Quartin-Dillon & Petit* s.n. (P holo.).

*H. parvifolius* R. Br. in Salt (1814), *nom. nud.*

*H. vitifolius* ssp. *vulgaris* Brenan & Exell in *Bol. Soc. Brot.*, ser. 2, 32: 73 (1958).

Annual or perennial herb or shrub to 2 m, sometimes scrambling; all parts pubescent to pilose, stems sometimes glandular and slightly prickly. Leaves: petiole 2-13(-17.5) cm; lamina broadly ovate to broadly cordiform in outline, deeply 3-5(-7)-lobed to almost divided, 3-14.5(-19) x 2-15.5(-21) cm; lobes triangular, acute to acuminate. Flowers in leaf-axils or in well-defined racemes; pedicels 1-8(-9) cm, articulated above middle. Epicalyx bracts *c* 10, up to 15 mm long, filiform to narrowly triangular. Calyx 1-1.8(-2.5 in fruit) cm long; lobes ovate to triangular, 3-5-veined. Petals 2-5 cm long, yellow with maroon centre; column up to 15 mm. Capsule 7-12 x 10-15 mm, globose to transversely ellipsoid, at maturity separating from receptacle and disintegrating, hispid and sometimes pubescent, valves winged and with conspicuous transverse veins, with up to 5 mm long awns; seed *c* 3 mm long, glabrous to warted. Fig. 82.7.1-5.

Clearings in rainforest after cultivation, forest edges and paths, upland bushland and grassland, weed; (0-) 200-2400 m. EE EW TU GD WU SU WG IL KF GG SD BA HA; widespread in tropical Africa and Asia, introduced in America. *Gilbert et al.* 2517; *Mooney* 8452; *W. de Wilde et al.* 7967.

Most of the Ethiopian collections are intermediate between subsp. *vitifolius* and subsp. *vulgaris* as they are defined by Brenan & Exell. In the author's opinion, there is no justification for maintaining infraspecific taxa at subspecific level.

The disintegrating capsules of *H. vitifolius* and *H. palmatus* indicate the connection to other genera related to (and possibly derived from) *Hibiscus*, especially *Kosteletzkya*, *Fioria* and *Senra* all of which have winged capsules which disintegrate at maturity. Mattei (1917) - when describing *Fioria* - erroneously included *H. vitifolius*, failing to recognise that the fruit-dehiscence is quite different.

#### 10. Sect. BOMBYCELLA DC. (1824).

Flowers usually small, uniformly white to pink or bright red to scarlet, always solitary in leaf-axils. Capsule small, subglobose, appressed puberulous, obtuse to retuse. Mature seeds with white cottony floss.

The BOMBYCELLA group is very characteristic, and a plant can immediately be referred to it. Within the group the differences between the species are, however, small, and some initial difficulties can be expected when naming specimens from this group.

1. Petals white to pink (rarely lilac or purple). 2  
- Petals bright red or scarlet. 10
2. Calyx-lobes 3-5-nerved, ovate (narrowed at base). 3  
- Calyx-lobes 1-nerved, triangular (not narrowed at base). 4
3. Stem and calyx indumentum red-brown; petals 15-25 mm long; style-branches hairy. 32. *H. fuscus*  
- Stem and calyx indumentum white to yellow or pale brown; petals 12-18 mm long; style-branches glabrous. 33. *H. flavifolius*
4. Stem and calyx indumentum dark brownish; petals erect at anthesis, with dark brown hairs. 40. *H. sp.* = *Gillett* 14256  
- Stem and calyx indumentum white to yellow; petals reflexed (rarely spreading) at anthesis, with white to pale yellow hairs (*micranthus*-group). 5
5. Column 5-13 mm long, basal part usually without stamens. 6  
- Column 1-4 mm long, with stamens from top to base. 7
6. Epicalyx bracts (2-)3-4 mm long; calyx 5-8 mm long; pedicels articulated above middle. 44. *H. pycnostemon*  
- Epicalyx bracts 0.25-1.5 mm long; calyx 2-3(-4) mm long; pedicels articulated below middle (usually near base). 45. *H. sp.* = *Carr* 945
7. Petals 4-5 mm long, pink; column 1-1.5 mm long, straight; indumentum whitish. 48. *H. hochstetteri*  
- Petals 4-14 mm long, white to pink; column (1-)2-4

mm long, curved or sharply bent (if straight then more than 2 mm long and petals more than 8 mm long). 8

8. Epicalyx bracts 0.5-2 mm long, shorter than sinuses between calyx-lobes; indumentum whitish. 46. *H. sp.* = *Beals* 951  
- Epicalyx bracts (1.5-)2-7 mm long, usually exceeding sinuses; indumentum pale yellow to yellow. 9
9. Calyx 5-7 mm and petals 8-14 mm long; branchlets densely pubescent to tomentose; pedicels articulated below middle (rarely above). 43. *H. eriospermus*  
- Calyx 3-5(-6) mm and petals 5-9(-12) mm long; branchlets pubescent or sparsely so; pedicels articulated above middle (rarely below). 47. *H. micranthus*
10. Leaves linear to lanceolate, 2-5 mm wide, entire or with a few irregular teeth; calyx 10-15(-18) mm long, with ovate 3-nerved lobes. 35. *H. spartioides*  
- Leaves narrowly ovate to orbicular, wider, regularly crenate, dentate or serrate. 11
11. Calyx-lobes 3-5-nerved, ovate (narrowed at base) or triangular; column c 1 cm long. 12  
- Calyx-lobes 1(-3)-nerved, triangular; column 3-8 mm long. 13
12. Epicalyx bracts 7-8, 1-5 mm long; calyx-lobes ovate, 3-5-nerved; stem-indumentum yellowish. 34. *H. hildebrandtii*  
- Epicalyx bracts 9-10, 4-7 mm long; calyx-lobes triangular or indistinctly ovate, 3-nerved; stem-indumentum brownish. 41. *H. aponeurus*
13. Stems and leaves glabrous or with a few appressed hairs. 36. *H. deflersii*  
- Stems and leaves hispid-pubescent to tomentellous. 14
14. Stems with dark brown tawny hairs (rarely without); free part of filaments 2-4 mm long. 42. *H. crassinervius*  
- Stems without dark brown hairs; free part of filaments 0-1 mm. 15
15. Calyx 7-10(-15 in fruit) mm long; epicalyx bracts 3-5(-7) mm long, exceeding sinuses between calyx-lobes. 37. *H. somalensis*  
- Calyx 3-6 mm long; epicalyx bracts 1-4 mm long, not or only just reaching sinus. 16
16. Epicalyx bracts 8-10; petals 8-12 mm long; leaves tomentellous. 38. *H. boranensis*  
- Epicalyx bracts 6; petals 15-17 mm long; leaves pubescent. 39. *H. sp.* = *Burger* 3095
32. *H. fuscus* *Garcke* (1849).  
Shrubby herb or shrub to 2 m; all parts fuscous hispid to densely so. Petiole 3-25(-45) mm; lamina broadly ovate to orbicular, unlobed or slightly 3-lobed, up to 5(-7) x 5(-6) cm, subacute to rounded. Flowers nodding; pedicels 1.5-10.5 cm, articulated near apex. Epicalyx bracts 8-10, 5-12(-18) mm long, filiform. Calyx 8-15(-23 in fruit) mm long; lobes narrowly ovate, 3-5-veined. Petals 15-25 mm long, white with orange column, reflexed at anthesis; column 8-20 mm, with stamens apically and antherless

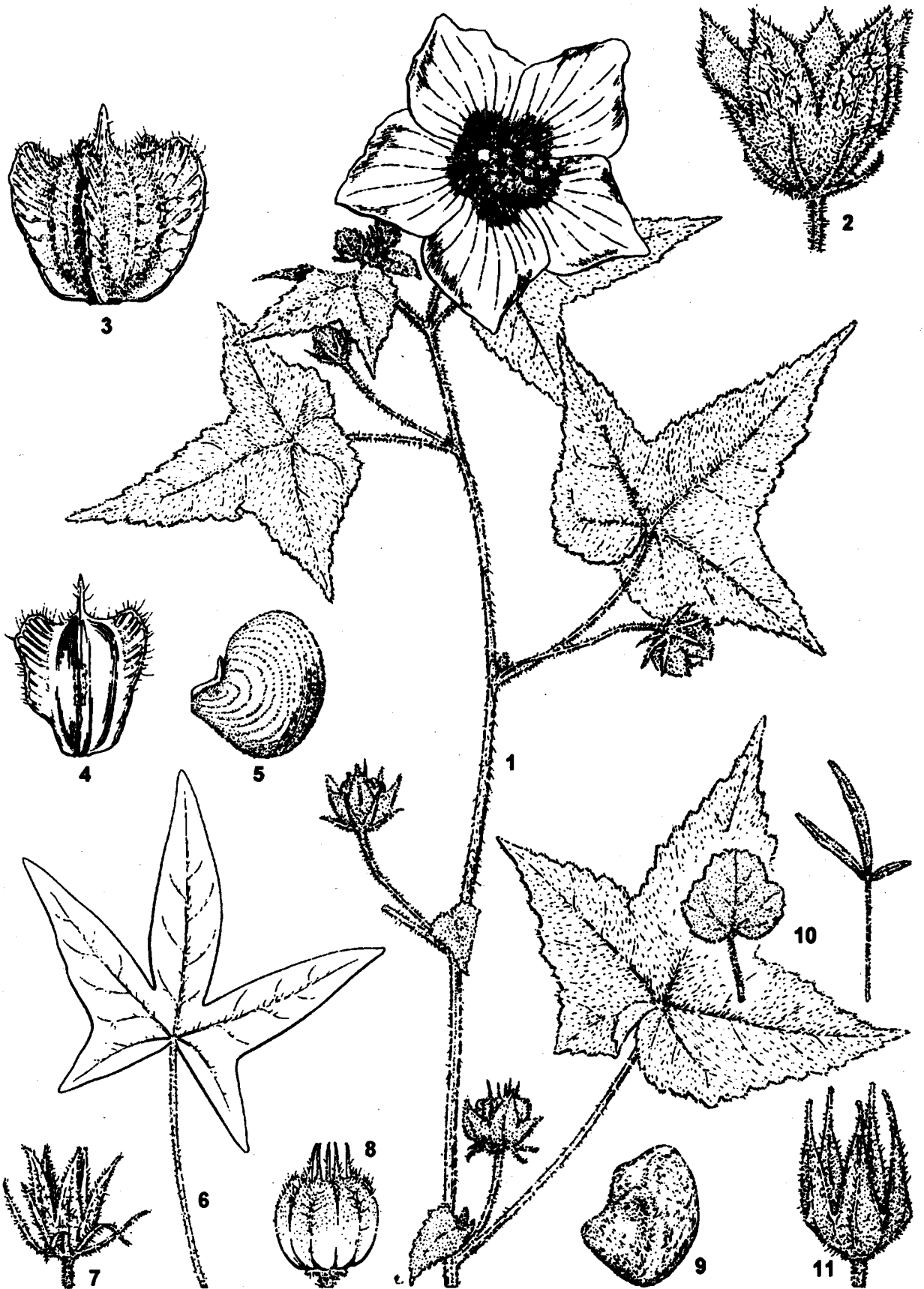


Figure 82.7 *HIBISCUS VITIFOLIUS*: 1 – flowering and fruiting stem  $\times \frac{2}{3}$ ; 2 – epicalyx and calyx  $\times 2$ ; 3 – capsule  $\times 2$ ; 4 – segment of dehiscent capsule  $\times 2$ ; 5 – seed  $\times 8$ . *H. PALMATUS*: 6 – leaf  $\times \frac{2}{3}$ ; 7 – epicalyx and calyx  $\times 2$ ; 8 – capsule  $\times 2$ ; 9 – seed  $\times 8$ . *H. SIDIFORMIS*: 10 – basal (left) and apical leaf  $\times \frac{2}{3}$ ; 11 – calyx (epicalyx absent)  $\times 2$ . 1–5 from *Getachew 787*; 6–9 from *Brown 1445*; 10 & 11 from *Gilbert & Thulin 311*. Drawn by Eleanor Catherine.



staminodes towards base, filaments 0.5–2 mm; style-branches hairy. Capsule 10–15 mm long.

Dry *Juniperus* forest and scrub, secondary *Juniperus* scrub, *Acacia*–*Commiphora* woodland; 1600–2300 m. SD; south through eastern Africa to S Africa. *Mooney* 7324; 9819; *Sebsebe Demissew* 920.

33. *H. flavifolius* *Ulbr.* (1920).

Shrubby herb or shrub to 2 m; stems and pedicels whitish to yellowish hispid-tomentose. Leaves densely whitish pubescent to tomentose; petiole 2–20(–40) mm; lamina ovate to broadly so, up to 6 x 4.5 cm, acute to rounded. Pedicels 0.5–6.5 cm, articulated above middle. Epicalyx bracts 8–10, 3–10 mm long, filiform. Calyx (6–) 8–11 (–15) mm long, whitish hispid-tomentose; lobes narrowly ovate, 3–5-veined. Petals 12–18 mm long, white with orange-reddish anthers (very rarely pink with pink anthers), spreading at anthesis; column *c* 1 cm, with stamens to base or almost so; filaments 0.5–1 mm. Capsule *c* 1 cm long.

*Acacia* – *Commiphora* woodland and bushland on red sandy loam or on grey to black alluvial clay, roadsides, persisting in cultivated areas; 1150–2000 m. GG SD BA HA; NE Uganda, Kenya, S Somalia, N Tanzania. *Friis* et al. 3354, 3692; *Mooney* 5597.

A single collection (*Gilbert* et al. 8243) has pink flowers and was at first suspected to be of hybrid origin. But in all other characters it fits perfectly well within *H. flavifolius*. It also shows plenty of mature fruits and seed.

34. *H. hildebrandtii* *Sprague & Hutch.* (1907)

– type: HA, Adda Gallah, *James & Thrupp* s.n. (K syn.).

Shrubby herb or subshrub to 1 m; stems, pedicels and calyx yellowish hispid-tomentellous. Leaves densely whitish to yellowish pubescent to tomentose; petiole 5–17 mm; lamina ovate or elliptic to suborbicular, up to 4.5 x 3.5 cm, subacute to rounded. Pedicels 1–3.5 cm, articulated above middle. Epicalyx bracts 7–8, 1–5 mm long, linear. Calyx 6–10(–12) mm long; lobes ovate, 3–5-veined. Petals 10–15 mm long, red to scarlet, erect to spreading at anthesis; column *c* 1 cm, curved in upper half, stamens in upper half and none or a few scattered below, filaments 0.5–1 mm. Capsule 8–10 mm long.

Dry *Acacia* and *Acacia* – *Commiphora* wooded grassland and bushland on stony soil overlying basement rocks; 500–1650 m. AF HA; Somalia, Djibouti, SE Kenya, NE Tanzania. *Burger* 630, 921; *IECAMA* C–22.

35. *H. spartioides* *Chiov.* (1929).

Glaucous shrub to 0.5(–1) m; stems, pedicels and calyx sparsely appressed yellowish hispid, hairs simple or bifurcate. Leaves glabrous to sparsely yellowish strigose; petiole 1–6 mm; lamina linear to lanceolate, up to 7 x 0.5 cm, entire or with a few irregular apical teeth, acute to rounded. Pedicels 3–12 mm, articulated above middle. Epicalyx bracts *c* 8, 7–15 mm long, linear. Calyx 10–15(–18 in fruit) mm long; lobes narrowly ovate, 3-veined (sometimes

indistinct). Petals 10–15 mm long, scarlet, erect at anthesis; column 5–8 mm, with sessile stamens in upper half. Capsule *c* 1 cm long, valves acute and with slightly raised edges.

*Acacia* – *Commiphora* bushland on rocky limestone slopes; *c* 1100 m. HA; Somalia. *Gillett* 4205.

The long narrow subtire leaves makes this one of the more easily recognised species in this difficult group.

36. *H. deflersii* *Schweinf. ex Cufod.* (1948).

*H. hansalii* *Cufod.* (1948) – type: EW, Bogos, *Hansal* 20 (W not seen).

Shrubby often glaucous herb or shrub to 1.5 m; stems, pedicels and calyx glabrous to sparsely strigose. Leaves glabrous to sparsely pubescent; petiole 3–12 mm; lamina narrowly ovate to ovate, up to 4 x 1.7 cm, acute to rounded. Pedicels 1–4(–5.5) cm, articulated above middle. Epicalyx bracts 6–8, 3–7 mm long, subulate to linear. Calyx 4–6 mm long; lobes triangular, 1-veined. Petals 13–20 mm long, deep red, spreading at anthesis; column 4–8 mm, curved, with sessile stamens almost to base or in upper half only. Capsule *c* 1 cm long, retuse to acute, conspicuously reticulately veined.

*Acacia* – *Sterculia* woodland and bushland; 900–1900 m. EE EW WU; Arabia. *Mercier* 2371; *Stuedner* 1133; *Terracciano & Pappi* 754.

*Cufodontis* separated *H. hansalii* as having the epicalyx bracts shorter than the calyx, while they were longer or of the same length in *H. deflersii*. But numerous recent collections from Arabia show a gradual transition, and there is obviously no reason to recognise more than one species. *Cufodontis* gives the petal length as 11 mm, but the specimens cited by him and seen by the author invariably have them longer.

37. *H. somalensis* *Franch.* (1882).

*H. cernuus* *Terrac.* (1892), non *O. Ktze.* (1891) – type: BA, Ger Amaden, *Baudi & Candeo* s.n. (FT holo.).

Shrubby herb or shrub to 1.25 m (usually less than 0.5 m); stems, pedicels and calyx whitish to yellowish strigose. Leaves whitish pubescent; petiole 1–10 mm; lamina narrowly ovate or narrowly elliptic (rarely shallowly 3-lobed), up to 3.8 x 1.8 cm, truncate. Pedicels (0.3–)0.7–5 cm, sharply bent apically, articulated near apex. Epicalyx bracts *c* 8, 3–5(–7) mm long, subulate to linear. Calyx 7–10(–15 in fruit) mm long; lobes narrowly triangular, 1(–3)-veined. Petals 10–15 mm long, scarlet, erect at anthesis; column 5–7 mm, stamens in apical part only, filaments *c* 0.5 mm. Capsule 5–7 mm long, central part of valves impressed near apex and edges raised.

Open to dense *Acacia* – *Commiphora* bushland on red sandy to stony soil overlying limestone; 400–1400 m. BA HA; Somalia, NE Kenya, Socotra, Arabia. *Gilbert* 2112; *Ellis* 185; *IECAMA* I–72.

38. *H. boranensis* *Cufod.* (1948)

– type: SD; Neghelle, *Cufodontis* 187 (W holo., FT iso.).

Shrubby herb or shrub to 1 m; branchlets and pedicels hispid-pubescent to tomentose (smaller hairs white, larger brownish). Leaves whitish to yellowish tomentellous; petiole 2–20(–35) mm; lamina ovate or elliptic to orbicular, up to 3.5 x 3(–4) cm, subacute to rounded. Pedicels 0.5–4.5 cm, articulated near apex. Epicalyx bracts 8–10, 1–4 mm long, subulate. Calyx 3–6 mm long, pubescent; lobes broadly triangular, 1-veined. Petals 8–12 mm long, deep red, spreading at anthesis; column 5–8 mm, sharply bent near base, with stamens to base, filaments 0.5–1 mm. Capsule *c* 10 mm long.

Dry *Juniperus* forest, *Juniperus* – *Barbeya* – *Pistacia* and *Acacia* – *Commiphora* bushland on limestone ridges; 1200–1750 m. SD; not known elsewhere. *Gilbert* et al. 8223, 8244; *Thulin* et al. 3533.

39. *H. sp.* = *Burger* 3095.

Slender shrubby herb to 2 m; stems, leaves and pedicels finely pale yellowish hispid-pubescent. Petiole *c* 5 mm; lamina narrowly ovate, up to 4 x 1.7 cm, truncate with 3–5 large apical teeth. Pedicels 1.5–2 cm, articulated at or slightly above middle. Epicalyx bracts 6, *c* 1 mm long, subulate. Calyx *c* 4 mm long, tomentose; lobes triangular, 1-veined. Petals 15–17 mm long, deep red, spreading at anthesis; column *c* 8 mm, curved, with subsessile stamens almost to base. Capsule *c* 8 mm long, subacute.

*Acacia* – *Commiphora* bushland on rocky limestone slopes; *c* 1400 m. HA; not known elsewhere. *Burger* 3095.

A very distinct species which is only known from this collection. The very short epicalyx bracts and short calyx combined with a large corolla is not seen elsewhere.

40. *H. sp.* = *Gillett* 14256.

Shrubby herb or shrub to 1.5 m; all parts pale brownish to brownish hispid-pubescent. Petiole 3–30 mm; lamina ovate or elliptic to suborbicular (rarely indistinctly 3-lobed), up to 5.2 x 4.5 cm, acute to rounded. Pedicels 0.5–5 cm, articulated above middle. Epicalyx bracts 8–10, 2–5 mm long, filiform. Calyx 5–8 mm long; lobes triangular, 1-veined. Petals 7–10 mm long, white, erect at anthesis; column 3–6 mm, with subsessile stamens to base or in apical half only. Capsule 8–10 mm long.

Margins of dry *Juniperus* forest; *c* 2100 m. SD (Mt. Mega); NE Uganda, Kenya, N Tanzania. *Gillett* 14256.

Apart from its white flowers with subsessile stamens, this species is superficially very close to *H. crassinervius*.

41. *H. aponeurus* *Sprague & Hutch.* (1908).

Shrubby herb or shrub to 1 m; branchlets and pedicels brownish hispid-tomentellous. Leaves densely pale yellowish hispid-pubescent; petiole 5–20(–35) mm; lamina broadly ovate to orbicular, up to 7.5 x 5 cm, broadly rounded. Pedicels 0.5–4(–5) cm, articulated above middle. Epicalyx bracts 9–10, 4–7 mm long, subulate to linear. Calyx 8–10 mm long, densely yellowish hispid, hairs bulbous-based; lobes triangular (or indistinctly ovate), 3-veined. Petals 12–18 mm long, scarlet, spreading at

anthesis; column *c* 1 cm, strongly curved, with stamens to base, filaments *c* 2 mm. Capsule *c* 1 cm long.

Dry *Juniperus* forest, mostly at edges, secondary *Juniperus* scrub, grassland; 1500–2300 m. GG SD; Uganda, Kenya, Tanzania, NE & E Zaire, Rwanda, Burundi, N Mozambique. *Gillett* 14220; *Mooney* 7323; *Sebsebe Demissew* 1230.

42. *H. crassinervius* *Hochst. ex A. Rich.* (1847)

– type: TU, near Adua, Mt. Scholoda, *Schimper* II:646 (FI(Webb) K iso.).

*H. wellbyi* *Sprague* (1908) – type: SU/HA, Harar to Addis Abeba, *Wellby* s.n. (K holo.).

*H. chiovendae* *Cufod.* (1939) – type: SD, Arero, *Cufodontis* 332 (W holo., FT iso.).

*H. crassinervius* var. *flammeus* (*Schweinf. ex Spreng.*) *Schweinf. ex N. E. Br.* in *Bull. Misc. Inf.* 1894, *App.*: 41 (1894) – type: Cult. in Naples from material collected by *Schweinfurth* (not seen).

*H. crassinervius* var. *minor* *Sprague* in *Bull. Misc. Inf.* 1908: 54 (1908) – type: EW, Mt. Bizen, *Schweinfurth & Riva* 2053 (K holo.).

*H. erianthus* *R. Br.* in *Salt* (1814), *nom. nud.*

Shrubby herb or shrub to 2 m; branchlets and pedicels hispid-pubescent to tomentose with large dark brown and smaller pale hairs. Leaves yellowish hispid-pubescent to tomentose (often with scattered dark brown hairs on veins); petiole 3–35(–50) mm; lamina ovate or elliptic to orbicular, up to 6(–7) x 5 cm, acute to rounded. Pedicels 0.3–5(–6) cm, articulated above middle. Epicalyx bracts 8–11, (1.5–)3–8 mm long, linear to oblanceolate. Calyx 4–8 mm long, yellowish hispid, often also with dark brown hairs, hairs not bulbous-based; lobes triangular, often with a wide sinus, 1(–3)-veined. Petals 10–18 mm long, bright red to scarlet, erect to spreading at anthesis; column 3–5 (–7) mm, strongly curved, with stamens to base, filaments 2–4 mm. Capsule 8–12 mm long. Fig. 82.8.1–6.

In a wide variety of woodland, bushland and scrub on a just as wide variety of soils; (500–)1300–2650 m. FE EW TU GD WU SU AR KF GG SD BA HA; Sudan (Red Sea Hills and SE), N Somalia. *Burger* 833; *Chojnacki* in *Mooney* 9294; *Mooney* 5446.

This species replaces *H. aponeurus* in most of Ethiopia. The two are indeed very closely related and possibly only worthy of subspecific treatment. In that case *H. crassinervius* is by far the oldest name.

43. *H. eriospermus* *Hochst. ex Cufod.* (1948)

– type: TU, Mt. Scholoda, *Schimper* I:130 (P holo., FI(Webb) K iso.).

*H. brevitybus* *Cufod.* (1948) – type: TU, Dschadscha and GD, Agrima, *Schimper* 524 (WU holo., P iso.).

*H. rupestris* *Hochst. ex Cufod.* (1948) – type: TU, Dschadscha, *Schimper* 301 (W holo., FT K P iso.).

Shrubby herb to 1 m; branchlets, pedicels and calyx densely yellowish hispid-pubescent to tomentose, hairs up to 1 mm across. Leaves pubescent to tomentose; petiole 3–25(–40) mm; lamina ovate, sometimes slightly 3-lobed,

up to 4(-7) x 3.5(-5.5) cm, subacute to rounded. Pedicels 0.3-4.5 cm, articulated below middle (more rarely at or above). Epicalyx bracts 7-9, 3-7 mm long, subulate, exceeding sinuses between calyx-lobes. Calyx 5-7 mm long, glandular pubescent; lobes triangular, 1-veined. Petals 8-14 mm long, pink, spreading or reflexed at anthesis; column 2-4 mm long, straight or curved, with subsessile stamens to base. Capsule 8-10 mm long.

Upland bushland on rocky hills and slopes, volcanic outcrops; (900-)1500-2400 m. EW TU GD; Sudan (Red Sea Hills). *Pappi* 3373, 8405; *Robertson* 1207.

44. *H. pycnostemon* *Hochr.* (1947).

*H. pospischilii* *Cufod.* (1948).

Shrubby herb or shrub to 1.5(-2.5) m; all parts whitish hispid-pubescent. Petiole 2-12 mm; lamina ovate to elliptic, up to 3.5(-4.5) x 2.5 cm, subacuminate to rounded. Pedicels (0.3-)0.7-3 cm, articulated near middle. Epicalyx bracts 7-9, (2-)3-4 mm long, subulate, exceeding sinuses between calyx-lobes. Calyx 5-8 mm long, conspicuously ciliate along edges; lobes triangular, 1-veined. Petals 10-15 mm long, pink to lilac or purple, reflexed at anthesis; column 7-13 mm, straight or slightly curved, at least basal 3 mm without stamens (very rarely with stamens to base but then recognisable by the long column), stamens subsessile. Capsule *c* 8 mm long.

*Acacia* and *Acacia* - *Euphorbia* woodland and bushland, alluvial *Acacia* grassland; 1000-1800 m. EW TU WU SU GG SD BA HA; NE Zaire, Uganda, Kenya, S Somalia, N Tanzania, Burundi. *Burger* 1628; *Gilbert* et al. 4560; *W. de Wilde* et al. 7317.

45. *H. sp.* = *Carr* 945.

Shrubby herb or shrub to 1.5 m; all parts whitish to pale yellowish hispid-pubescent. Leaves: petiole 1-5 mm; lamina ovate or elliptic to suborbicular, up to 2.5 x 1.8 cm, acute to rounded. Pedicels 2-15(-20) mm, articulated near base (rarely higher up but always below middle). Epicalyx bracts 6-8, 0.25-1.5 mm long, subulate, not reaching sinuses between calyx lobes. Calyx 2-3(-4) mm long; lobes triangular or broadly so, 1-veined, not ciliate. Petals 8-12 mm long, pink to mauve, reflexed at anthesis; column 5-10 mm, straight or slightly curved, at least basal 2 mm without stamens, stamens subsessile. Capsule 5-7 mm long.

*Acacia* - *Commiphora* bushland on red sandy or stony soil or on alluvium; 400-1150 m. GG SD HA; Somalia, N & E Kenya. *Carr* 945; *Ellis* 309; *Simmons* 38.

46. *H. sp.* = *Beals* 951.

Shrubby herb or shrub to 1.5 m; all parts whitish hispid-puberulous to tomentellous, hairs less than 0.5 mm across. Leaves: petiole 2-12 mm; lamina ovate or elliptic to suborbicular, up to 2 x 1.5 cm, subacute to rounded. Pedicels (0.5-)1-2 cm, articulated near base (rarely higher up but always below middle). Epicalyx bracts 7-8, 0.5-2 mm long, subulate, not or just reaching sinuses between calyx lobes. Calyx 3-5 mm long; lobes triangular, 1-

veined. Petals 4-8 mm long, white to pale pink (turning purplish), reflexed at anthesis; column (1-)2-4 mm, sharply bent, with subsessile stamens to base. Capsule *c* 8 mm long.

*Acacia* and *Acacia* - *Terminalia* woodland and bushland on rocky granitic slopes, also in cultivated areas; (75-)1000-2000 m. EE AF EW SU (Awash Valley) SD HA; N Somalia. *Bally* 7053; *Beals* 951; *Burger* 3734.

47. *H. micranthus* *L. f.* (1781).

*H. micranthus* var. *grandifolius* *Fiori* in *Agric. Colon.* 5, *App.*: 258 (1912) - types: EW, Mensa, Messeb River, *Fiori* 643 (FT syn.); EW, Hamasen, Embatcalla, *Fiori* 644 (FT syn.).

*H. micranthus* var. *hermanniaefolius* (*Hochst. ex Hochr.*) *Cufod.* in *Ann. Naturh. Mus. Wien* 56: 50 (1948) - type: TU, Dschadscha, *Schimper* in *Hohenacker* 2351a (M holo., not seen).

*H. micranthus* var. *parvifolius* (*Hochst. ex Anders.*) *Cufod.*, l.c. : 49 (1948) - type: TU, Gageros, *Schimper* in *Hohenacker* 2275 (M holo., BM K P iso.).

Perennial herb or subshrub to 1.5(-2) m; all parts pale yellowish hispid-pubescent or sparsely so, hairs coarse, up to 1 mm across, with less than 6 rays. Leaves: petiole 1-2.3 mm; lamina narrowly ovate to ovate or elliptic, rarely slightly 3-lobed, up to 3.5(-6) x 2(-5) cm, acute to rounded. Pedicels 0.3-4(-5.5) cm, articulated above middle (rarely at or below). Epicalyx bracts 7-8, (1.5-) 2-6 (-7) mm long, subulate, slightly shorter to slightly longer than sinuses between calyx-lobes. Calyx 3-5(-6) mm long; lobes triangular, 1-veined. Petals 5-9(-12) mm long, white to pink, reflexed at anthesis; column 2-4 mm, straight or curved, with subsessile stamens to base. Capsule 5-10 mm long. Fig. 82.8.7-9.

*Acacia* bushland, stream banks and beds, weed, on a multitude of different soils; near sea-level to 2000 m. EE AF EW TU GD WU SU AR GG SD BA HA; widespread in tropical Africa and eastwards to India. *Burger* 873; *Getachew Aweke & Gilbert* 808; *W. de Wilde* et al. 7316.

In view of the large variation shown even by the Ethiopian material, there is hardly any justification for attempting a subdivision into numerous infraspecific taxa as suggested by *Cufodontis* (1948).

48. *H. hochstetteri* *Cufod.* (1948)

- type: TU, Gageros, *Schimper* in *Hohenacker* 2211 (W holo., BM K P iso.).

*H. intermedius* *Hochst.* (1844), *nom. nud., non A. Rich.* (1847).

Annual or perennial herb or shrub to 1.5 m; all parts whitish hispid-puberulous or densely so, hairs fine, less than 0.5 mm across, some or all with more than 6 rays. Leaves: petiole 2-12 mm; lamina narrowly ovate to ovate or elliptic, up to 4.3 x 2 cm, acute to rounded. Pedicels 0.7-2.5 cm, articulated below (rarely at) middle. Epicalyx bracts 5-7, 0.5-3 mm long, subulate, shorter to slightly longer than sinuses between calyx-lobes. Calyx 2.5-4(-5) mm long; lobes triangular, 1-veined. Petals 4-5 mm long,

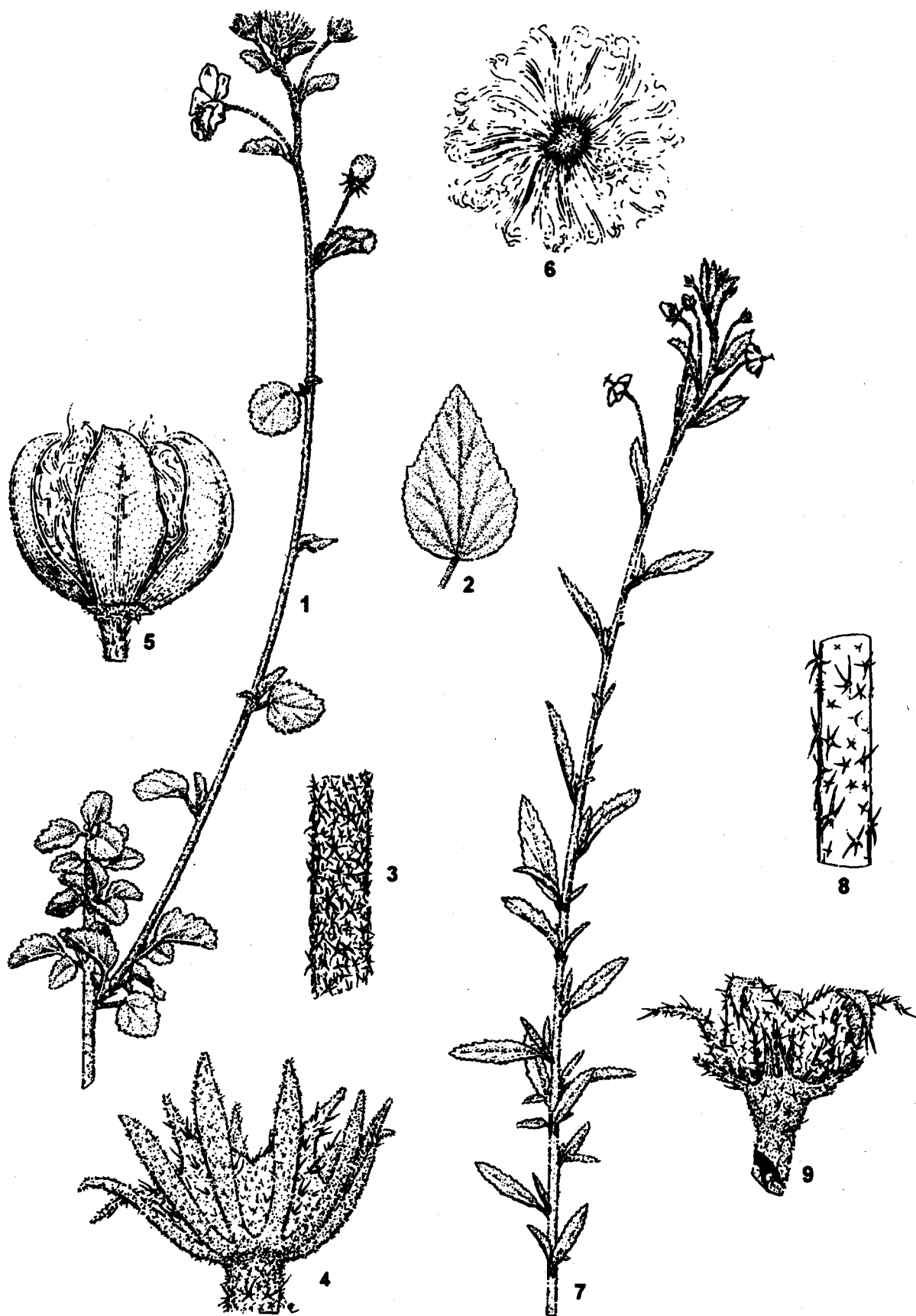


Figure 82.8 *HIBISCUS CRASSINERVIUS*: 1 - flowering stem  $\times \frac{1}{2}$ ; 2 - leaf  $\times \frac{3}{4}$ ; 3 - detail of stem-indumentum  $\times 8$ ; 4 - epicalyx and calyx  $\times 6$ ; 5 - capsule  $\times 3$ ; 6 - seed  $\times 3$ . *H. MICRANTHUS*: 7 - flowering stem  $\times \frac{1}{2}$ ; 8 - detail of stem-indumentum  $\times 8$ ; 9 - epicalyx and calyx  $\times 6$ . 1, 3 & 4 from *W. de Wilde et al.* 8344; 2, 5 & 6 from *Mooney* 5446; 7-9 from *Ash* 1606. Drawn by Eleanor Catherine.

pink, reflexed at anthesis; column 1–1.5 mm, straight, with subsessile stamens to base. Capsule 6–7 mm long.

Upland bushland; 1000–1800 m. EW TU GD; not known elsewhere. *Pappi* 53; *Schimper* 100, 118.

The group of species around *H. micranthus* (43–48 in this account) is a difficult one, and the differences between the species seem small when put into a key. They are, however, constant enough, and it seems more reasonable to operate with a group of closely related species than to lump them all into one very variable species.

#### *Doubtful species.*

*H. gallaënsis* Ulbr. (1920) – types: HA, Belana, *Ellenbeck* 335 (B holo., destr.); HA, no loc. *Ellenbeck* 656a (B holo., destr.).

Ulbricht compared this with *H. crassinervius* and said that it differed in its smaller (8–10 mm long) corolla and subglabrous leaves. In the diagnosis it is said to have 9–11 epicalyx bracts up to 8 mm long, which are much longer than the calyx, dark red corolla and *c* 6 mm long column.

Apart from the small flowers and sparse indumentum, there is nothing to exclude this from *H. crassinervius* to which it most likely belongs. But without extant material the exact identity cannot be ascertained.

## 2. ABELMOSCHUS *Medic.* (1787)

Annual or perennial herbs. Leaves lobed or divided; stipules subulate to filiform. Flowers solitary, axillary or in terminal racemes by reduction of the upper leaves. Epicalyx of 5–many linear or filiform bracts, usually falling quickly. Calyx splitting laterally, circumscissile at base, dehiscing with the corolla. Ovary 5-locular, locules with many ovules, style not or indistinctly branched. Fruit an elongated loculicidal capsule, not separating from the receptacle; seeds many per locule, reniform.

About 5 species in tropical Asia one of which extends to tropical Africa. Three of the species are also widely cultivated in tropical Africa and America for their edible fruits.

1. Petals 2–3.5 cm long, uniformly white; epicalyx absent at time of flowering; capsule 3–4 cm long; native species. 2. *A. ficulneus*

– Petals up to 8 cm long, yellow with purple centre; epicalyx present at time of flowering; capsule up to 14 cm long; cultivated species. 1. *A. esculentus*

1. *A. esculentus* (L.) Moench. (1794).

Coarse annual herb to 2 m; stems setulose. Leaves up to 25 x 25 cm, palmatifid, -lobed or -sect, setulose or pilose; petiole up to 30 cm. Epicalyx bracts 10–12, up to 2.5 cm long, linear to triangular, present at time of flowering, falling off later. Calyx 3–4 cm long, with 5 short linear teeth. Petals yellow with dark purple centre, up to 8 cm long. Capsule narrowly ellipsoid, up to 14 cm long; seed *c* 5 mm long, with concentric lines, sometimes pilose.

Native of India, now widely cultivated throughout the tropics for its edible fruits, occasionally naturalized. In

Ethiopia, only grown in western Eritrea and on some State Farms. *Bally* 7055; *Fiori* 1418; *Schimper* 241.

2. *A. ficulneus* (L.) Wight & Arn. (1834).

Coarse annual herb to 1.5 m; stems and pedicels glabrous to densely glandular pubescent. Leaves stellate hispidulous; petiole 2.5–21 cm; lamina cordiform to reniform in outline, deeply (rarely shallowly) 3–5-lobed, up to 16 x 15 cm; lobes elliptic or broadly so, distinctly narrowed at base, subacute to broadly rounded. Flowers in a leafless raceme; pedicels 0.7–1.8(–2.5 in fruit) cm, expanded and cup-shaped apically. Epicalyx bracts *c* 5, only present on very young buds, linear to lanceolate, up to 8 x 2 mm. Calyx 17–23 mm long, 5-toothed, tomentellous. Petals 2–3.5 cm long, uniformly white, turning pink; column 1–1.5 cm. Capsule 3–4 cm long, ellipsoid, puberulous to pubescent; valves acute to aristate with up to 3 mm long awns; seed 3–4 mm long, with concentric lines and long crisped hairs. Fig. 82.9.1–5.

Grassland on black seasonally water-logged cotton soil, weed in crops on black cotton soil; near sea level to 600 m. EE GG; NE Nigeria, Tchad, Sudan, S Tanzania, N Mozambique, E Zambia, India, Indonesia. *Corradi* 3456, 3461; *Terraciano* 38.

Apart from being common in the Nile Valley in the Sudan, this species has a very scattered distribution in Africa. It is probably undercollected because of confusion with the cultivated *A. esculentus*.

## 3. SYMPHYOCHLAMYS *Gürke* (1903)

Shrub; indumentum stellate. Leaves unlobed, entire or indistinctly denticulate; stipules subulate. Flowers solitary, axillary. Epicalyx campanulate, 9–11-toothed, united at least  $\frac{1}{2}$  up, persistent and reflexed in fruit. Calyx divided almost to base in two lobes (or irregularly in three), falling off in fruit. Ovary 5-locular, locules with several ovules; style divided into 5 short broad branches, hairy near apex. Fruit a woody loculicidal capsule, not separating from receptacle at maturity; seed reniform.

One species in NE Africa.

*S. erlangeri* *Gürke* (1903).

Shrub to 4 m; branchlets tomentellous, soon glabrescent. Leaves pubescent; petiole 0.2–3 cm; lamina suborbicular to reniform, 1–5 x 1–7 cm, rounded. Pedicels 0.5–4 cm, tomentellous, articulated near apex. Epicalyx 8–18 mm long, pubescent, teeth 2–10 mm long, broadly triangular, acute to rounded or apiculate. Calyx 10–13 mm long; lobes ovate to triangular, acute, pubescent to tomentellous, indistinctly veined. Petals 2.5–3.5 cm long, uniformly yellow; column 1–1.5 cm. Capsule *c* 1 cm long, globose, glabrous, valves reticulately veined; seed densely comose, *c* 3 mm long with *c* 0.5 mm long hairs. Fig. 82.9.6–12.

Dry *Acacia* – *Commiphora* bushland; *c* 300 m. HA (fide Cufodontis, *l.c.*); S Somalia. No Ethiopian collections seen.

The type of this species (*Ellenbeck* 2227) was for a

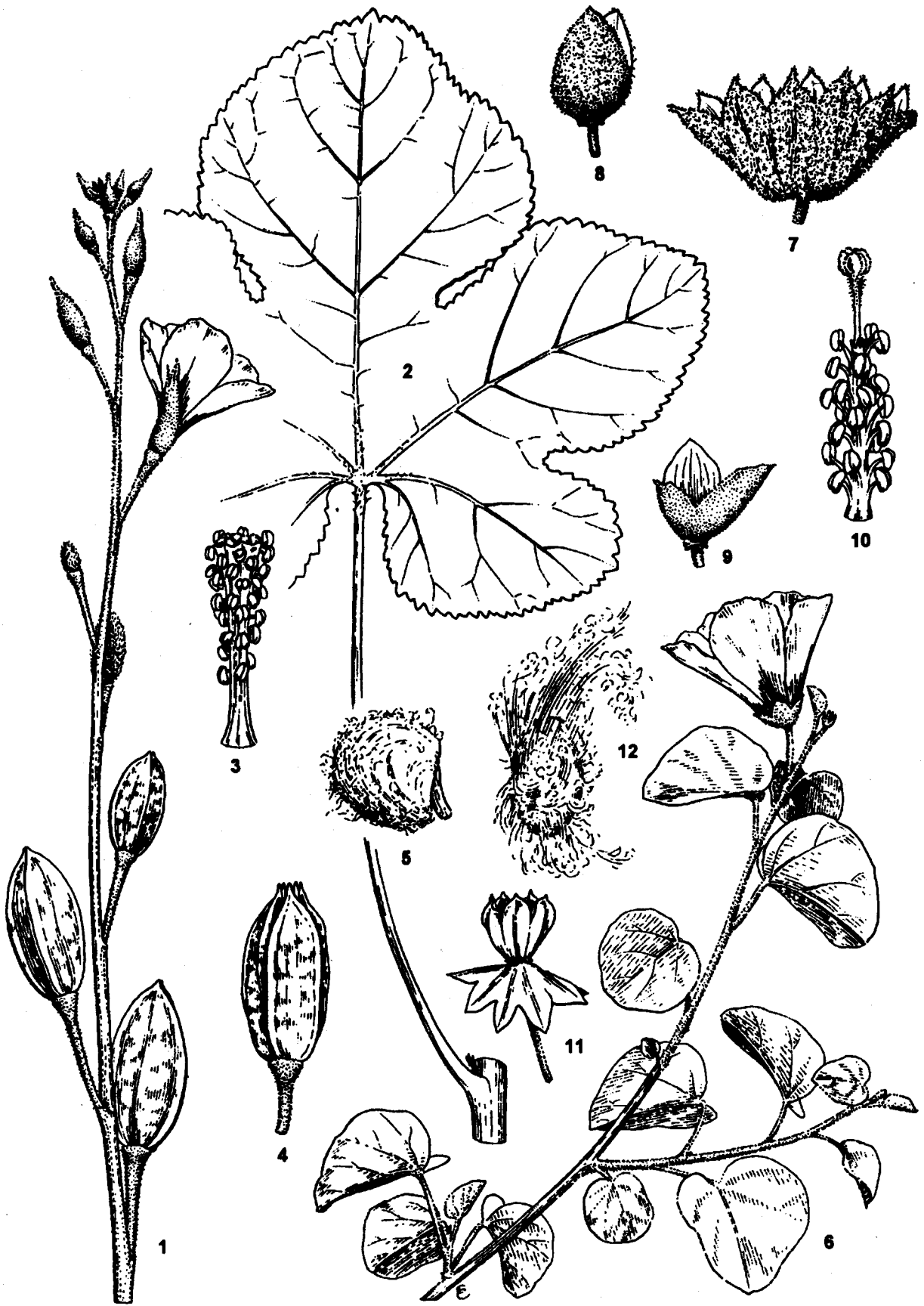


Figure 82.9 *ABELMOSCHUS FICULNEUS*: 1 - inflorescence  $\times \frac{3}{4}$ ; 2 - leaf  $\times 3$ ; 3 - staminal column  $\times 3$ ; 4 - capsule  $\times \frac{3}{4}$ ; 5 - seed  $\times 6$ . *SYMPHYOCHLAMYS ERLANGERI*: 6 - flowering stem  $\times \frac{3}{4}$ ; 7 - epicalyx  $\times 2$ ; 8 - 2-lobed calyx  $\times 2$ ; 9 - 3-lobed calyx  $\times 2$ ; 10 - staminal column  $\times 3$ ; 11 - capsule  $\times \frac{3}{4}$ ; 12 - seed  $\times 6$ . 1 & 2, 4 & 5 from Andrews s.n.; 3 from Imperial Institute 5; 6 from Gillett & Hemming 24851; 7-9 & 11 & 12 from Gillett & Hemming 24735; 10 from Hemming 83/164. Drawn by Eleanor Catherine.

long time thought to be from Ethiopia. But closer examination of the itinerary of the Ellenbeck expedition shows that it was actually collected in the border area between Kenya and Somalia. It is not clear whether Cufodontis's record of the species from Ethiopia comes from this confusion over the type locality. But even if this is the case, the species most likely occurs in SE Ethiopia.

A very rare species which – apart from the now destroyed type – is only known from a handful of recent collections from much the same area as the type where it is locally common and dominant.

*Symphochlamys* has no obvious close relatives. The epicalyx and calyx structures are unique in African Malvaceae. The comose seeds point to a position near *Gossypium* and *Cienfugosia*, but this is contradicted by the absence of oil glands on flowers and fruits.

#### 4. LAGUNARIA G. Don (1831)

##### *L. patersonii* (Andr.) G. Don (1831).

Small evergreen tree to 10 m. Leaves ovate to elliptic, entire, leathery, densely covered beneath with small whitish scales (lepidote). Flowers solitary, axillary. Epicalyx absent. Calyx densely covered with small scales, toothed or lobed  $\frac{1}{4}$ – $\frac{1}{2}$  down. Corolla pink to mauve, densely covered with small scales. Fruit a scaly-tomentellous 5-locular woody capsule with large orange seeds.

Native in Australia, now widely cultivated as an ornamental in Asia and to a lesser degree in Africa. Often seen as a street tree. In Ethiopia recorded from Addis Ababa and Mega. Mooney 7395, 9837.

#### 5. FIORIA Mattei (1917)

Mattei in *Boll. R. Orto Bot. Palermo (n.s.)* 2: 68–74 (1917).

Perennial herb or subshrub; indumentum simple. Leaves shallowly to deeply 3–5-lobed, grossly dentate with large widely spaced teeth; stipules subulate. Flowers solitary, axillary. Epicalyx of 8–10 free bracts. Calyx 5-lobed to below middle. Ovary 5-locular, locules with 2 ovules; style with 5 distinct branches. Fruit a loculicidal schizocarpaceous capsule with 5 wings along sutures from base to top, at maturity separating from the receptacle and dividing into 3 parts, 2–3-winged consisting of one whole carpel which stays closed, and two halves and one 2-winged consisting of two halves which opens up; seeds 1–2 per locule, reniform.

One species in NE Africa and Arabia.

This genus – which the author considers should be recognised – has since its creation mostly been ignored or sunk into *Hibiscus*, the main reason probably being that Mattei erroneously included *Hibiscus vitifolius* in it. *H. vitifolius* – like *Fioria* – has a winged capsule which disintegrates at maturity. But in *H. vitifolius* the mature capsule separates into 5 parts each comprising 2 halves of carpels which all shed their seeds. The development of wings on the capsule of *H. vitifolius* seems to be a homology and not to reflect any very close relations between the

two species. Winged capsules also occur in two other Ethiopian genera (*Kosteletzkya* and *Senra*).

#### *F. dictyocarpa* (Webb) Mattei (1917).

*Hibiscus dictyocarpus* Webb (1854).

*H. pavonioides* Fiori (1913).

*Fioria pavonioides* (Fiori) Mattei (1917).

Erect perennial herb or subshrub to 1 m; vegetative parts pubescent or pilose. Leaves: petiole 0.5–8 cm; lamina broadly ovate or broadly elliptic to suborbicular in outline, 1–8.5 x 1–9 cm; lobes triangular, acute to rounded. Pedicels 1.5–6.5 cm, articulated above or below middle. Epicalyx bracts (3–)7–15(–20) mm long, linear to slightly spatulate. Calyx 10–18 mm long, tube and basal part of lobes with multibranched bulbous-based yellow stellate hairs, apical part of lobes stellate pubescent to pilose; lobes triangular, with central and two submarginal veins. Petals 1–2.5 cm long, yellow with purple centre; column 5–8 mm. Capsule 7–12 mm long, ellipsoid to subglobose, obtuse, glabrous, distinctly reticulately veined; seed 2.5–3.5 mm long, tomentellous. Fig. 82.10.1–8.

*Acacia* – *Commiphora* bushland on greyish to brownish seasonally waterlogged alluvial soil; 300–600 m. GG HA; Sudan, N & NE Kenya, S Somalia, Saudi Arabia. Ash 1210; *Corradi* 3518, 3863.

#### 6. KOSTELETZKYA Presl (1835)

Annual or perennial herbs or subshrubs. Leaves unlobed to deeply lobed, crenate, dentate or serrate; stipules filiform. Flowers solitary or in few-flowered axillary cymes or racemes or merging into terminal racemes or panicles. Epicalyx of 7–10(–12) free filiform to linear bracts. Calyx 5-lobed or -toothed. Ovary 5-locular, locules with 1 ovule; style with 5 distinct branches. Fruit a prominently 5-angled loculicidal capsule, at maturity separating from the receptacle and disintegrating into 5 equal parts; seeds 1 per locule, reniform.

About 25 species, mostly in tropical and S Africa and from S America north to southern USA, also two species in Indonesia and one from S Europe to Iran.

Closely related to *Hibiscus* from which it differs mainly in having a single ovule per locule. Connected to *Hibiscus* through some intermediate species, e.g. *H. vitifolius* which has the same fruit type but several ovules per locule.

1. Upper leaves linear to lanceolate or oblong; petals white. (see note after key) *K. buettneri*
- Upper leaves ovate to orbicular, petals pink to purple. 2
2. Flowers subsessile, in dense axillary and terminal racemes. (see note after key) *K. grantii*
- Flowers clearly pedicellate, solitary or in few-flowered axillary cymes or merging into a weakly defined terminal raceme. 3
3. Stems with spreading irritating yellow setose hairs; petals 1.5–2.5 cm long; calyx 7–12 mm long; capsule c 1 cm long. 1. *K. begoniifolia*

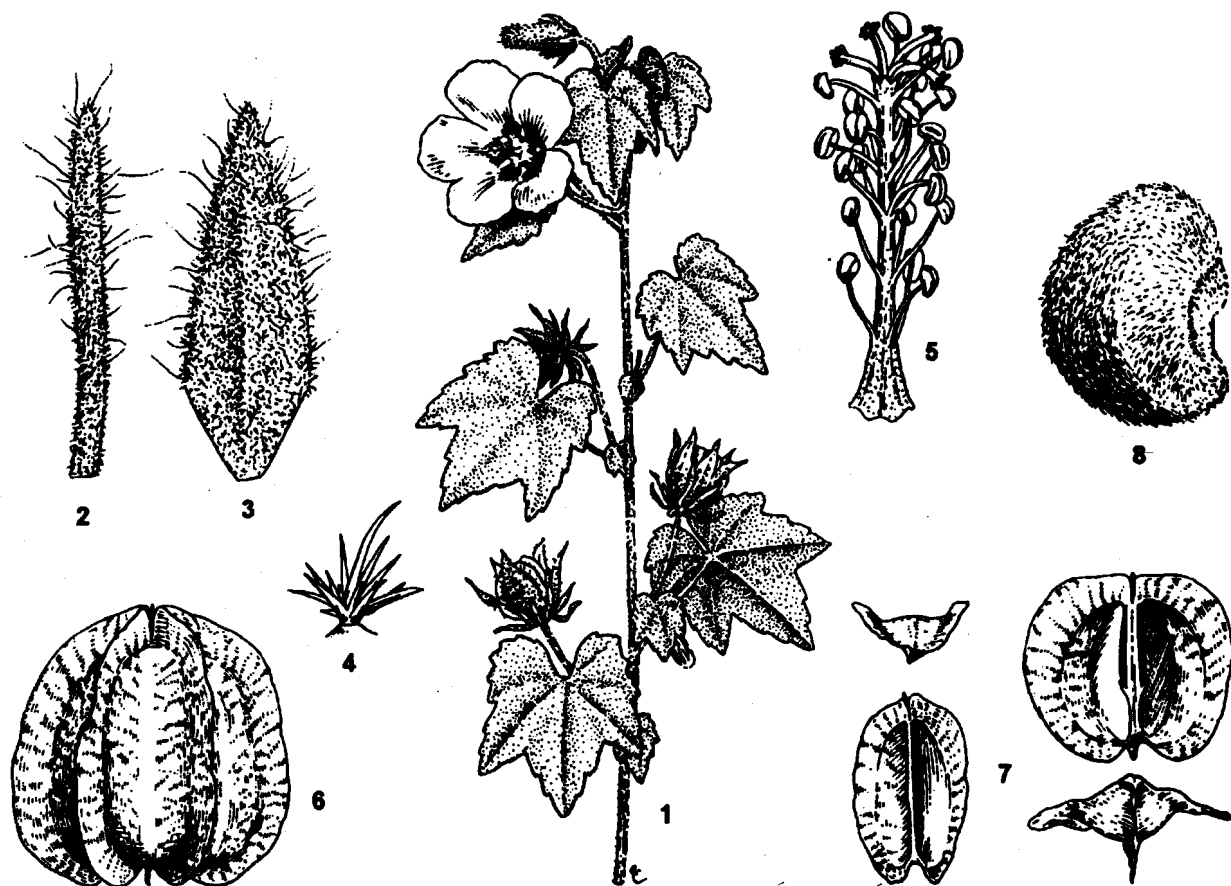


Figure 82.10 *FIORIA DICTYOCARPA*: 1 – apical part of branch  $\times \frac{3}{4}$ ; 2 – epicalyx-bract  $\times 4$ ; 3 – calyx-lobe  $\times 4$ ; 4 – detail of calyx-indumentum  $\times 30$ ; 5 – staminal column  $\times 4$ ; 6 – fruit  $\times 4$ ; 7 – dehiscent fruit (2-winged part on the left, 3-winged part on the right)  $\times 3$ ; 8 – seed  $\times 10$ . 1 from *Adamson* 617; 2–5 from *Ash* 1210; 4 & 6–8 from *Gillett et al.* 25208. Drawn by Eleanor Catherine.

– Stems without irritating hairs; petals 0.7–1.5(–2) cm long; calyx 4–7 mm long; capsule  $c$  5 mm long.

2. *K. adoensis*

*K. buettneri* Gürke and *K. grantii* (Mast.) Garcke both occur in SE Sudan and NE Uganda and can be expected to turn up in W & SW Ethiopia.

1. *K. begoniifolia* (Ulbr.) Ulbr. (1923).

Spreading or ascending to erect perennial or shrubby herb to 2 m; stems, leaves and pedicels yellowish setose (hairs irritating) and puberulous. Leaves: petiole 0.5–6 cm; lamina ovate to orbicular, unlobed to shallowly 3-lobed, 2.5–9  $\times$  1.5–7.5 cm, acute. Flowers solitary or in axillary racemes or merging into terminal racemes; pedicels 1–3.5 (–6.5 in fruit) cm, articulated near apex. Epicalyx bracts 8–10(–12), 4–10 mm long. Calyx 7–12 mm long, violet tinged, setose along edges, otherwise puberulous to tomentellous and with long glandular hairs; lobes triangular, veins indistinct. Petals 1.5–2.5 cm long, pale pink to mauve with reddish violet to crimson centre; column 1–1.8 cm. Capsule  $c$  1 cm long, subglobose, strigose on angles, otherwise pubescent to tomentose; seed  $c$  4 mm long, with concentric lines. Fig. 82.11.1–6.

Edges and clearings of upland forest, secondary forest and scrub, coffee plantations, upland bushland and grass-

land (secondary); 1500–2600 m. GD GJ WG IL KF SD BA; Cameroun, NE Zaire, Uganda, Kenya, Tanzania, Zambia. *Friis et al.* 1768; *Mooney* 6053, 8408.

2. *K. adoensis* (Hochst. ex A. Rich.) Mast. (1868)

– types: TU, Memsa to Adua, *Quartin-Dillon & Petit* s.n. (P syn.); TU, near Adua, *Schimper* I:341 (P syn., BM K isosyn.); TU, near Adua, *Schimper* III: 1863 (P syn., FT K isosyn.).

Prostrate to ascending perennial herb, stems up to 1 m long, pilose and with a denser band of pubescence. Leaves sparsely pubescent to pilose; petiole 1–6.5 cm; lamina ovate to cordiform or orbicular, unlobed to shallowly 3-lobed, 2–7(–9)  $\times$  1.5–6.5(–8.5) cm, acute to acuminate. Flowers solitary, in clusters or in few-flowered axillary racemes; pedicels 0.5–3 cm, usually thin and almost filiform, subglabrous to puberulous, sometimes with scattered pilose hairs, articulated near apex. Epicalyx bracts 6–7(–9), 2–6 mm long. Calyx 4–7 mm long, sparsely setose on edges, otherwise subglabrous to puberulous; lobes triangular, veins indistinct. Petals 0.7–1.5(–2) cm long, white to pink or purple with darker centre; column 4–10 mm. Capsule 3–5 mm long, globose or depressed globose, strigose on angles, otherwise glandular pubescent; seed  $c$  3 mm long, with concentric lines and sparsely puberulous. Fig. 82.11.7–10.



Upland forest, mainly in clearings and edges, secondary forest and scrub, secondary upland bushland and grassland, coffee plantations, lakeshores, roadsides, weed; 1200–2750 m. EW TU GD GJ WU SU AR WG IL KF GG SD BA HA; widespread from Cameroun to Ethiopia and south to Zimbabwe and Angola, also in Madagascar. *Friis* et al. 591; *Gilbert* et al. 2520; *Mooney* 5744.

### 7. *SENRA* Cav. (1786)

Perennial herbs or shrubs; indumentum stellate. Leaves shallowly 3-lobed; stipules filiform to linear. Flowers solitary or in short axillary racemes or clusters or merging into narrow terminal panicles. Epicalyx of 3 ovate to broadly ovate entire bracts with deeply cordate base, scarious in fruit. Calyx 5-lobed to below middle. Ovary 5-locular, locules with 2 ovules; style with 5 distinct branches. Fruit a loculicidal capsule with 5 prominent wings from base to top, at maturity separating from the receptacle and dividing into 5 equal parts; seeds 1 per locule, reniform.

Only 2 species: 1 from the Sudan through Arabia to India and 1 in the Ogaden.

Cavanilles (1786) first spelt the name as *Serra* but corrected it later in the same paper. The alternative spelling is often used but is incorrect, even though the genus honours an early spanish botanist with the name *Serra*.

1. Stems densely stellate pubescent to tomentellous, without long pilose hairs and not glandular.

1. *S. incana*

– Stems with indumentum of long spreading pilose hairs and sparsely glandular.

2. *S. zoë*

#### 1. *S. incana* Cav. (1786).

Annual or perennial herb or shrub to 1.5 m; vegetative parts and epicalyx densely pubescent to tomentellous. Leaves: petiole 2–8(–9) cm; lamina cordiform to reniform, 2.5–8.5 x 2.2–9 cm, subentire to dentate; lobes triangular, acute to rounded. Flowers solitary or in short axillary racemes or clusters or merging into narrow terminal pseudopanicles; pedicels 0.3–2 cm, articulated at or below middle. Epicalyx bracts 1.5–3 x (0.8–)1.3–2.3 cm, subacute to rounded. Calyx 9–14 mm long, scarious, pubescent to pilose with long rayed white hairs; lobes ovate-triangular, with 3 distinct veins. Petals 2–3 cm long, deep bluish purple to almost blackish; column *c* 1 cm. Capsule 5–8 mm long, subglobose, sparsely pubescent; seed 3–4 mm long, densely sericeous. Fig. 82.12.1–7.

Alluvial *Acacia* bushland and grassland, *Acacia*, and *Acacia* – *Commiphora* bushland on rocky slopes, roadsides; 150–975 m. EE AF SU(Awash Valley) GG BA-HA HA; Sudan (Nile Valley), Somalia, NE Kenya, Arabia to India. *Ash* 2316; *Burger* 1059; *Hemming* 1212.

The flowers are only open early in the morning and wilt before noon.

#### 2. *S. zoë* *Volkens & Schweinf.* (1897)

– type: HA, Faf, *Ghika-Comanesti* s.n. (not seen).

Differs from *S. incana* in having a stem indumentum of long spreading simple hairs (apart from that only a sparse

glandular indumentum), a calyx indumentum of short many-rayed yellowish hairs (and ciliate from long white hairs) and seeds with more crisped and spreading indumentum. Fig. 82.12.8.

Alluvial plains and riverbanks; no altitude given (800–1400 m in Somalia). HA; N Somalia. No Ethiopian collections seen.

This is very closely related to and possibly only an extreme variant of *S. incana*. But especially the differences in stem and calyx indumentum are very conspicuous, and the author has not seen any intermediate collections.

### 8. *CIENFUGOSIA* Cav. (1787)

Fryxell in *Ann. Miss. Bot. Gard.* 56: 179–251 (1969); Fryxell (1980): *The natural history of the cotton tribe*: 1–245.

Perennial herbs with woody rootstocks, subshrubs or shrubs, usually conspicuously gland-dotted. Leaves unlobed to lobed; stipules minute and subulate to large and foliaceous. Flowers axillary, solitary or in 2-flowered cymes. Epicalyx of (3–)9–12 bracts, minute and subulate to spatulate and equalling calyx (rarely absent). Calyx 5-lobed or splitting into 2 lobes only, with black glands in two rows along the veins. Petals glandular punctate. Ovary 3–4(–5)-locular, locules with 3–many ovules; style divided or not. Fruit a glandular punctate loculicidal woody capsule, not separating from the receptacle; seeds 3–8 per locule, densely comose with up to 1 cm long appressed or spreading brownish hairs.

About 25 species of which about 10 in tropical and S Africa extending to Arabia and Madagascar, the rest from S America north to southern USA.

1. Pedicels glabrous, usually articulated near middle; young stems glabrous; style puberulous, with free branches; epicalyx bracts 1–3 mm long.

1. *C. welshii*

– Pedicels puberulous, usually articulated near base; young stems puberulous (rarely glabrous); style glabrous, with connate branches; epicalyx bracts 2–5 mm long.

2. *C. somaliana*

#### 1. *C. welshii* (*T. Anders.*) *Garcke* (1883).

Perennial herb or subshrub from woody rootstock; stems to 0.5 m, glabrous. Leaves glaucous, sparsely scabrid on veins, otherwise glabrous; petiole 1.5–7(–9.5) cm; lamina reniform, unlobed to shallowly 3-lobed, 1–5 x 1.7–6 cm, crenulate, denticulate or sharply dentate, broadly rounded; median and two nearest lateral veins with conspicuous glands. Flowers in 1(–2)-flowered axillary cymes; pedicels (1–)2.5–4(–6) cm, glabrous, usually articulated and with a small bract near middle. Epicalyx bracts *c* 9, 1–3 mm long, subulate. Calyx 6–10 mm long, glabrous to puberulous; lobes ovate. Petals 2–3 cm long, cream or pale yellow with dark maroon centre; column *c* 1 cm. Capsule 3–4-locular, 1.5–2.7 cm long, narrowly ellipsoid, acute, sericeous; seed *c* 4 mm long. Fig. 82.14.9.

Dry *Acacia* – *Commiphora* bushland on rocky slopes; *c* 750 m. AF; N Somalia, Arabia. *Godding* 207.

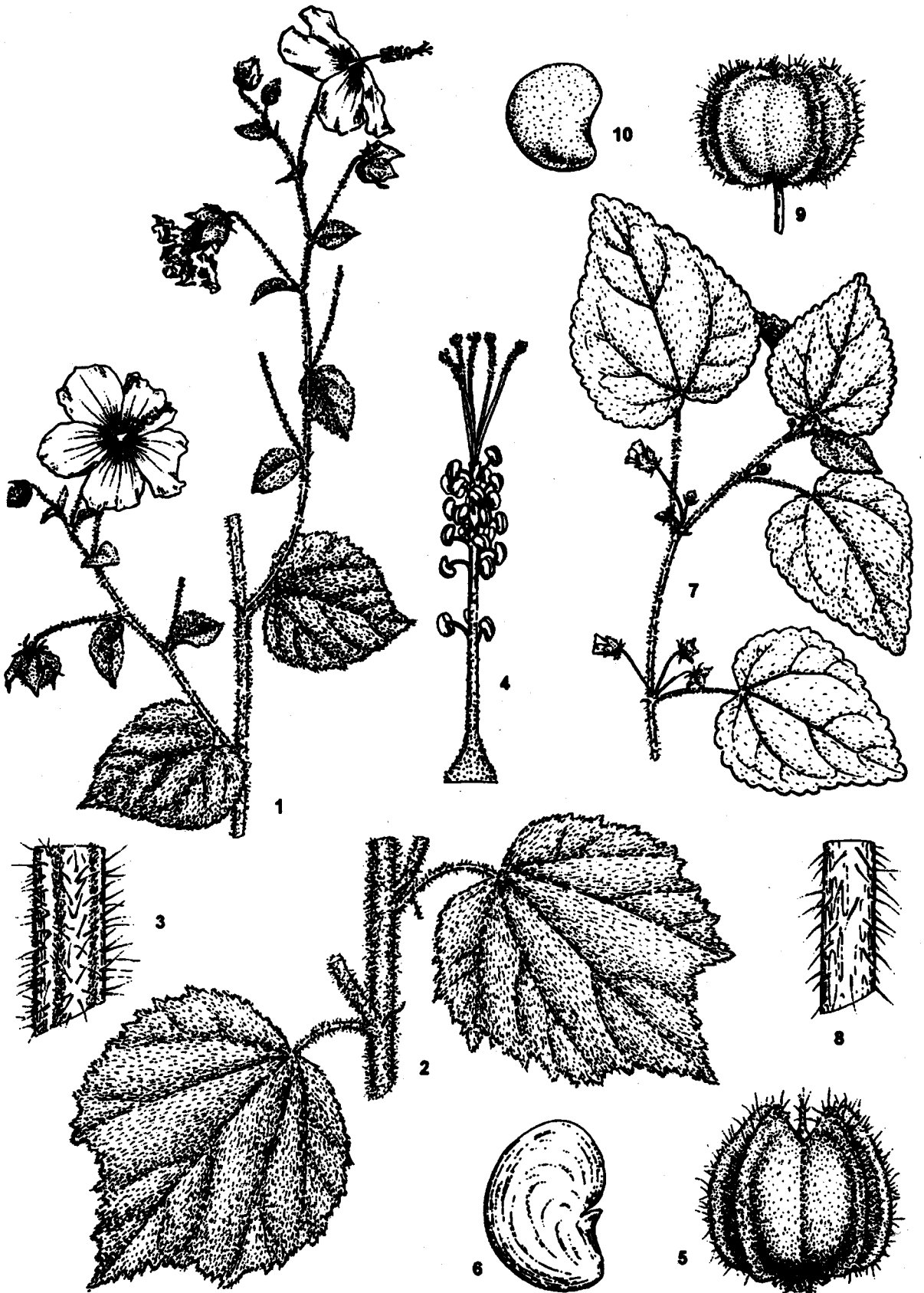


Figure 82.11 *KOSTELETZKYA BEGONIIFOLIA*: 1 – apical part of branch  $\times \frac{3}{4}$ ; 2 – basal leaves  $\times \frac{3}{4}$ ; 3 – detail of stem-indumentum  $\times 3$ ; 4 – staminal column  $\times 4$ ; 5 – fruit  $\times 4$ ; 6 – seed  $\times 8$ . *K. ADOENSIS*: 7 – apical part of branch  $\times \frac{3}{4}$ ; 8 – detail of stem-indumentum  $\times 3$ ; 9 – fruit  $\times 4$ ; 10 – seed  $\times 8$ . 1 from Friis et al. 1768; 2 from Mooney 6053; 3–5 from Ash 1840; 6 from Mooney 8408; 7 & 8 from Friis et al. 1655; 9 & 10 from Gillett 14669. Drawn by Eleanor Catherine.

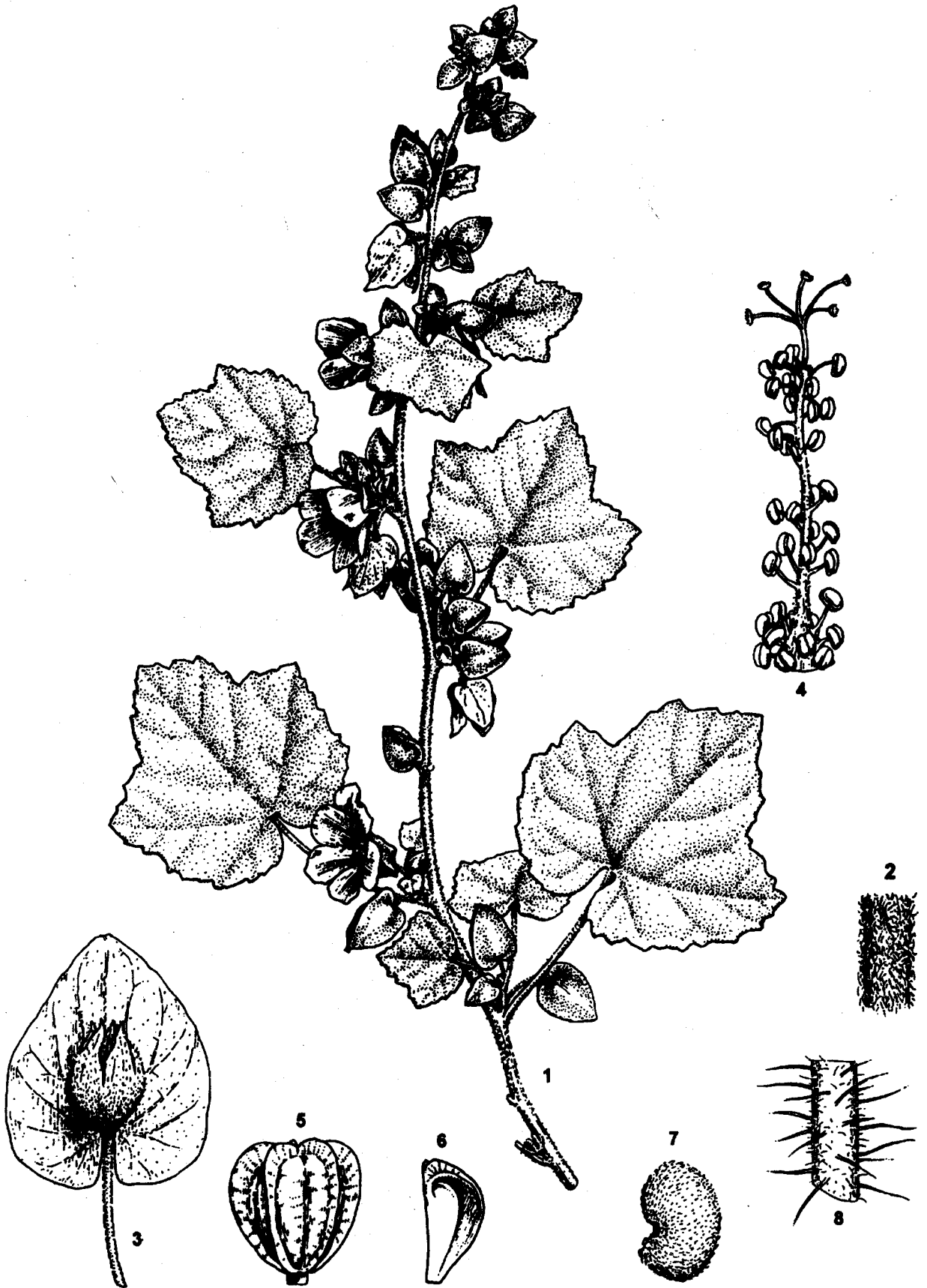


Figure 82.12 *SENRA INCANA*: 1 – flowering and fruiting stem  $\times \frac{3}{4}$ ; 2 – detail of stem-indumentum  $\times 3$ ; 3 – epicalyx (partly removed) and calyx  $\times 2$ ; 4 – staminal column  $\times 4$ ; 5 – capsule  $\times 3$ ; 6 – segment of dehiscent capsule  $\times 3$ ; 7 – seed  $\times 6$ . *S. ZOES*: 8 – detail of stem-indumentum  $\times 3$ . 1 from *Ellis* 235; 2 & 5 from *Ash* 2316; 3 from *McKinnon* S/185; 4 & 6 from *W. de Wilde et al.* 10557; 7 & 8 from *IECAMA* BH-43. Drawn by Eleanor Catherine.

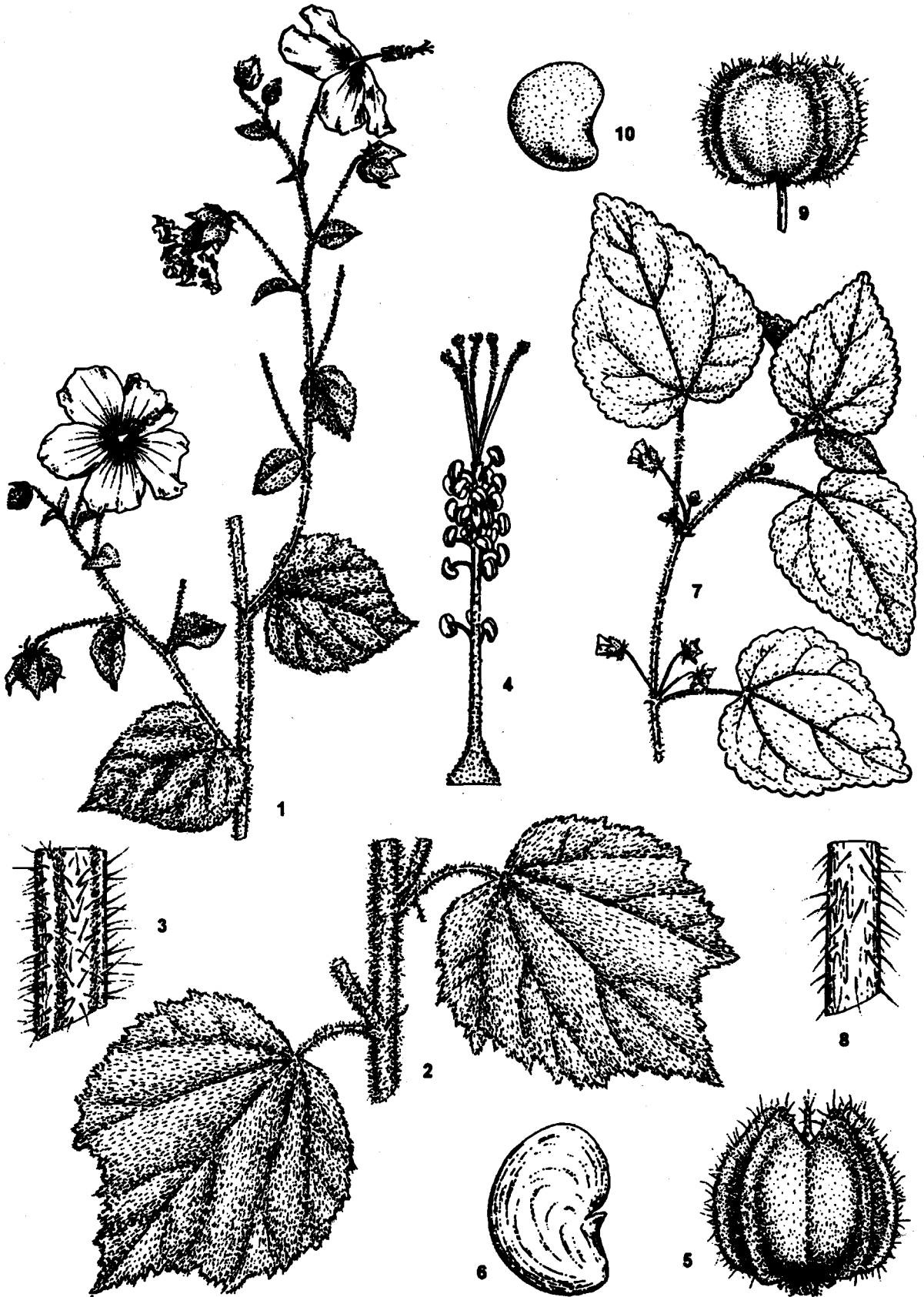


Figure 82.11 *KOSTELETZKYA BEGONIIFOLIA*: 1 – apical part of branch  $\times \frac{3}{4}$ ; 2 – basal leaves  $\times \frac{3}{4}$ ; 3 – detail of stem-indumentum  $\times 3$ ; 4 – staminal column  $\times 4$ ; 5 – fruit  $\times 4$ ; 6 – seed  $\times 8$ . *K. ADOENSIS*: 7 – apical part of branch  $\times \frac{3}{4}$ ; 8 – detail of stem-indumentum  $\times 3$ ; 9 – fruit  $\times 4$ ; 10 – seed  $\times 8$ . 1 from Friis et al. 1768; 2 from Mooney 6053; 3–5 from Ash 1840; 6 from Mooney 8408; 7 & 8 from Friis et al. 1655; 9 & 10 from Gillett 14669. Drawn by Eleanor Catherine.

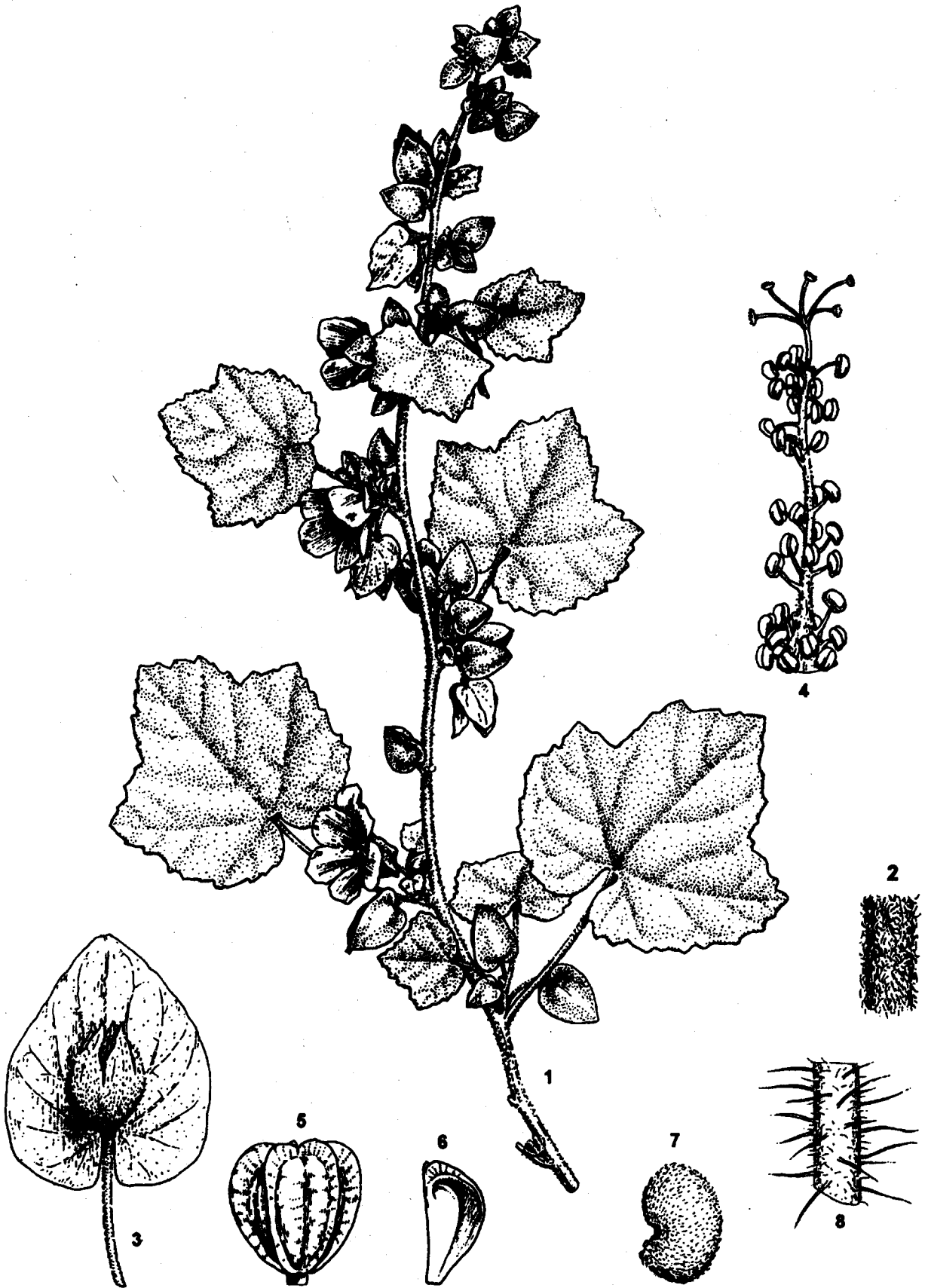


Figure 82.12 *SENRA INCANA*: 1 – flowering and fruiting stem  $\times \frac{3}{4}$ ; 2 – detail of stem-indumentum  $\times 3$ ; 3 – epicalyx (partly removed) and calyx  $\times 2$ ; 4 – staminal column  $\times 4$ ; 5 – capsule  $\times 3$ ; 6 – segment of dehiscent capsule  $\times 3$ ; 7 – seed  $\times 6$ . *S. ZOES*: 8 – detail of stem-indumentum  $\times 3$ . 1 from *Ellis* 235; 2 & 5 from *Ash* 2316; 3 from *McKinnon* S/185; 4 & 6 from *W. de Wilde* et al. 10557; 7 & 8 from *IECAMA* BH-43. Drawn by Eleanor Catherine.

2. *C. somaliana* Fryx. (1967).

Subshrub to 0.5 m with several unbranched stems from woody rootstock; young stems puberulous (rarely glabrous), all parts strongly aromatic. Leaves glaucous, glabrous to finely puberulous, not scabrid; petiole 0.5–2.7 cm; lamina reniform, shallowly to deeply 3-lobed to dissected (the lobes then divided with linear segments), 0.5–3 x 0.7–4 cm; lobes denticulate to sharply dentate, broadly rounded; glands as in *C. welshii*. Flowers solitary, axillary; pedicels 0.3–3 cm, puberulous, usually articulated and with bract near base but sometimes higher up. Epicalyx bracts c 9, 2–5 mm long, subulate. Calyx 9–12 mm long, as in *C. welshii*. Petals 2–3 cm long, pale to bright yellow with maroon centre; column c 1 cm. Capsule 3–4-locular, 1.5–3 cm long, narrowly ellipsoid, acute, subglabrous to sparsely sericeous pilose; seed as in *C. welshii*. Fig. 82.14.1–8.

*Acacia* – *Commiphora* bushland on rocky or stony limestone slopes; 1100–1350 m. SD HA; N Somalia. Burger 3806; Gilbert et al. 8113.

These two species are obviously closely related and may eventually have to be united when a wider range of material becomes available.

## 9. GOSSYPIUM L. (1753)

Hutchinson et al. (1947): *The evolution of Gossypium*: 1–160; Fryxell (1980): *The natural history of the cotton tribe*: 1–245; Seegeler (1983): *Oil plants in Ethiopia, their taxonomy and agricultural significance*: 1–368; Vollesen in *Kew Bull.* 42: 337–349 (1987).

Perennial herbs, subshrubs, shrubs or small trees, usually conspicuously gland dotted. Leaves unlobed to deeply lobed (rarely divided); stipules filiform to ovate or falcate. Flowers in axillary 1–few-flowered cymes. Epicalyx of 3 subulate to broadly cordiform entire to dentate or laciniate bracts. Calyx truncate to 5-lobed, with irregularly scattered black glands. Ovary 3–5-locular, locules with 2–many ovules; style clavate (branches coherent). Fruit a woody loculicidal capsule, not separating from the receptacle; seed glabrous, with a short brownish fuzz or with white cottony floss (lint).

About 40 species. Indigenous species are widely scattered in the drier parts of the tropics and subtropics with a few species in each continent. Several species are widely cultivated for their lint which is the raw material for cotton and for their seed oils, and have been secondarily distributed all over the tropics and subtropics.

1. Seeds glabrous or with brownish fuzz; native species from dry bushland. 2
- Seeds with white cottony lint; cultivated species (but sometimes escaped), usually on black clay soil. 5
2. Epicalyx bracts linear to lanceolate, soon reflexed; calyx teeth 2–4 mm long; capsule 1.2–2 cm long. 1. *G. anomalum*
- Epicalyx bracts ovate to reniform, clasping flowers; calyx teeth up to 1(–1.5) mm long; capsule 0.8–1.5 cm long. 3
3. Capsule 3–4-valved, glabrous to sparsely strigose,

acute or apiculate; calyx and epicalyx gland dotted; major epicalyx veins all running straight into the margin. 2. *G. somalense*

- Capsule 5-valved, densely strigose, cuspidate to aristate; calyx and epicalyx not gland dotted; some or all epicalyx veins anastomising. 4

4. Epicalyx bracts laciniate towards apex, lower veins anastomising, upper running into the margin.

- Epicalyx bracts entire or subentire with all the veins anastomising. 4. *G. benadireense*

5. Epicalyx bracts entire, dentate or serrate, teeth usually less than twice as long as wide; leaf lobes usually narrowed at base; seed difficult to separate from lint. 6

- Epicalyx bracts coarsely dentate to laciniate, teeth usually more than thrice as long as wide; leaf lobes usually broadest at base; seed easily separated from lint. 7

6. Epicalyx bracts longer than wide, entire or with 1–3 teeth per side; capsule gradually tapering to apex, opening widely, densely pitted with conspicuous glands. 5. *G. arboreum*

- Epicalyx bracts usually wider than long, with 4–6 teeth per side; capsule rounded or with distinct shoulders, not opening widely, almost smooth. 6. *G. herbaceum*

7. Calyx tube c 6 mm long; seeds with fuzz all over (after removal of lint); middle leaf lobe about as long as wide; filaments longer towards apex of column. 7. *G. hirsutum*

- Calyx tube c 10 mm long; seeds without fuzz except for a tuft at one end; middle leaf lobe longer than wide; all filaments equally long. 8. *G. barbadense*

1. *G. anomalum* Wawra & Peyr. (1860).

*G. herbaceum* L. (1753) var. *steudneri* Schweinf. ex Gürke in *Bot. Jahrb. Syst.* 19, Beibl. 48: 2 (1894), nom. nud.

Perennial herb or shrub to 2 m, conspicuously glandular punctate; vegetative parts and epicalyx subglabrous to densely stellate pubescent; stems and petioles also often with long simple hairs. Leaves: petiole 1.5–4.5 cm; lamina broadly cordiform in outline, deeply 3–5-lobed, 2.5–6 x 2.5–8 cm; lobes ovate, deeply constricted at base, subacuminate to rounded, central vein with conspicuous gland. Flowers in 1–2-flowered cymes; peduncle 1–5.5 cm; pedicels 3–8 mm; bracts leafy, unlobed to 3-lobed, 1.5–2.5 cm long. Epicalyx bracts linear to lanceolate, 8–18 x 2–4 mm, entire or with 1–3 teeth or laciniate at apex. Calyx 7–9 mm long, puberulous to tomentellous; teeth 2–4 mm long, triangular. Petals 2–4 cm long, yellow with dark purple centre; column 1–1.5 cm. Capsule 1.2–2 cm long, ovoid, glabrous, with prominent glandular pustules, valves with a 3–7 mm long beak; seed c 6 mm long, with a dense coat of curled brownish up to 1 cm long hairs. Fig. 82.13.8–10.

subsp. *senarense* (Fenzl ex Wawra & Peyr.) Vollesen in *Kew Bull.* 42: 339 (1987).

Young branches and petioles with long simple hairs.

(subsp. *anomalum* from Angola and Namibia lacks long spreading hairs).

Alluvial *Acacia* bushland and grassland; 600–1000 m. EW; Cape Verde Islands, Niger, Chad, the Sudan and Ethiopia. *O. Beccari* 215; *Pappi* 6065, 7734.

2. *G. somalense* (Gürke) Hutch. (1947).

*G. ellenbeckii* (Gürke) Mauer (1950) – types: SD; Tarro Gumbi, *Ellenbeck* 2069 & 2082 (both B syn, destroyed).

Shrub to 2 m, conspicuously glandular punctate; vegetative parts stellate pubescent. Leaves: petiole 1–3(–4.5) cm; lamina broadly ovate to cordiform in outline, unlobed to 3-lobed, 2.5–6 x 2.5–6.5 cm, lobes triangular, not constricted at base, acute to rounded, central vein not or indistinctly glanded. Flowers in 1(–2)-flowered cymes; peduncle 0.5–3 cm; pedicels 1–2 cm; bracts suborbicular, up to 9 x 8 mm, falling quickly. Epicalyx bracts cordiform, 1.7–4 x 1.4–3.7 cm, deeply cordate, grossly dentate (sometimes shallowly), puberulous, all major veins reaching margin. Calyx 4–5 mm long, puberulous, teeth up to 1(–1.5) mm long. Petals 2–3.5 cm long, yellow to orange with dark red centre; column *c* 1 cm. Capsule 3–4-valved, *c* 1 cm long, ovoid, glabrous to sparsely strigose, distinctly glandular, valves acute or apiculate, with 1–2 mm long awns; seed *c* 5 mm long, indumentum as in *G. anomalum*. Fig. 82.13.1–5.

*Acacia* and *Acacia* – *Commiphora* bushland on coarse gravelly granitic, volcanic or limestone soils; 450–1275 m. SU(Awash Valley) SD HA; Chad, Niger, SE Sudan, NE Uganda, N & NE Kenya, Somalia. *Friis* et al. 2840; *Gilbert* et al. 7414, 7648.

3. *G. bricchettii* (Ulbr.) Vollesen (1987).

Shrub to 2 m, glands absent or inconspicuous (or present on leaves); branchlets, leaves and pedicels stellate puberulous to tomentellous. Leaves: petiole 1–3.5 cm; lamina cordiform to reniform, unlobed to 3-lobed, 2–7 x 1.5–7.8 cm, lobes triangular, acute to rounded, central vein with distinct gland. Flowers in 1–3-flowered cymes; peduncle 0.5–2 cm; pedicels 5–13 mm; bracts ovate, up to 5 x 2 mm. Epicalyx bracts cordiform, 1.5–4 x 1–3.2 cm, subcordate to deeply cordate, subentire or grossly dentate in upper part, puberulous, veins anastomosing in basal part, running into the margin in apical part. Calyx 4–5 mm long, puberulous, subentire or with broad rounded lobes. Petals 2–2.5 cm long, bright yellow with dark red centre; column *c* 1 cm. Capsule 5-valved, 12–15 mm long, ovoid, densely strigose, distinctly glandular, the valves cuspidate to aristate with 3–5 mm long awns; seed as in *G. anomalum*. Fig. 82.13.6 & 7.

Open *Acacia* – *Commiphora* bushland on gypsum hills; *c* 300 m. BA; S Somalia. *Gilbert* et al. 8173.

4. *G. benadirensis* Mattei (1916).

Shrub to 2 m, glands absent or inconspicuous; vegetative parts stellate pubescent to tomentellous. Leaves: petiole 1–4.5 cm; lamina suborbicular to cordiform, unlobed to

shallowly 3-lobed, 1.5–7 x 1.5–7.5 cm, acute to rounded, central vein not or indistinctly glanded. Flowers in 1–3-flowered cymes; peduncle 0.5–2.5 cm; pedicels 5–10 mm; bracts suborbicular, up to 7 x 6 mm. Epicalyx bracts cordiform to reniform, 1.3–3 x 1.3–2.7 cm, subcordate to cordate, entire or with a few indistinct apical teeth, puberulous, veins conspicuously raised, all anastomosing. Calyx *c* 4 mm long, puberulous, subentire. Petals 1.5–2 cm long, pale yellow with dark red centre; column *c* 1 cm. Immature capsule *c* 8 mm long, densely strigose, cuspidate, distinctly glandular. Fig. 82.13.11.

Open *Acacia* – *Commiphora* bushland on scree slopes of low flat topped limestone and gypsum hills, edges of rocky river-beds; 300–400 m. SD (Dolo area); NE Kenya, S Somalia. *Gilbert* et al. 7597, 8194.

Hutchinson (l.c.) and Fryxell (l.c.) both consider these two species conspecific with *G. somalense*, but in the author's opinion they are clearly distinct – more so than many other species in this notoriously difficult genus. They are easily separated by the characters given in the key, and the author has not seen any intermediates.

*Note on the cultivated species*

According to Seeger (l.c.), the following four species of *Gossypium* are (or have been) cultivated in Ethiopia. Of these the first two (*G. arboreum* and *G. herbaceum*) are diploids (2n = 26) of Old World origin. They probably originated in Africa, and are obviously not too distantly related to *G. somalense*. They have in recent years been more or less replaced by *G. hirsutum* and *G. barbadense*, tetraploids (2n = 52) of American origin. These have higher yields and the seeds are easier to separate from the lint.

*G. arboreum* now seems to have disappeared totally from cultivation although it still survives locally as an escape. It is last known to have been cultivated along the lower parts of Webi Shebele up to around 1960.

*G. herbaceum* is still cultivated to a lesser extent in the Konso area together with *G. hirsutum*. It used to be widely cultivated in the north but no recent material or records have been seen from there. It does not seem to have become established as an escape.

Of the two American species *G. hirsutum* used to be the most commonly cultivated (records from Ethiopia date back to Schimper's time), and it is still fairly common over most of the country. In recent years it has increasingly been replaced by *G. barbadense* which was introduced at about the same time but didn't become popular until after it was introduced on a larger scale by the Italians around 1910.

Numerous subspecies, varieties, forms and races have been described for all the cultivated species, but it is clearly beyond the scope of this flora to deal with them in detail. Indeed it is often difficult enough to identify the species! Here only the main varieties of interest for the Flora area have been indicated.

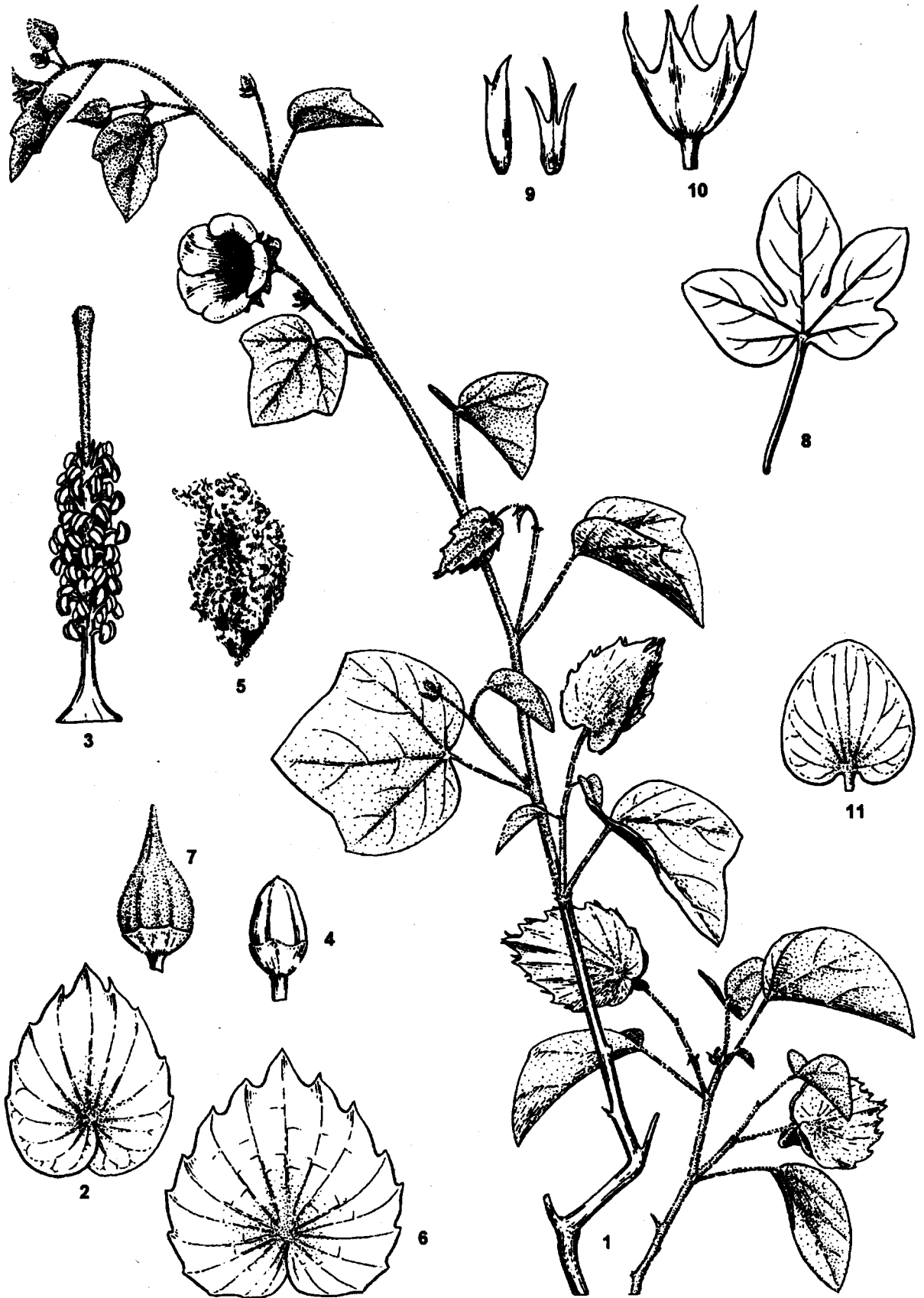


Figure 82. 13 *GOSSYPIMUM SOMALENSE*: 1 - habit  $\times \frac{3}{4}$ ; 2 - epicalyx-bract  $\times 1$ ; 3 - staminal column  $\times 4$ ; 4 - calyx and capsule  $\times 2$ ; 5 - seed  $\times 4$ . *G. BRICHETTII*: 6 - epicalyx-bract  $\times 1$ ; 7 - calyx and capsule  $\times 2$ . *G. ANOMALUM*: 8 - leaf  $\times \frac{3}{4}$ ; 9 - epicalyx-bracts  $\times 1$ ; 10 - calyx  $\times 2$ . *G. BENADIRENSIS*: 11 - epicalyx-bract  $\times 1$ . 1 from Gilbert et al. 8125; 2 & 7 from Bally 9592; 3 from Gillett 4507; 4-6 from Gilbert et al. 7414; 8-10 from Aglen 56; 11 from Gilbert et al. 7597. Drawn by Eleanor Catherine.



5. *G. arboreum* L. (1753).

Shrub to 3 m, sometimes straggling; branchlets pubescent and without or only a few long simple hairs. Leaves 3–5-lobed, lobes ovate, narrowed at base. Epicalyx bracts longer than wide, entire or with 1–3 teeth per side, with rounded sinuses. Capsule gradually tapering to apex, densely pitted with conspicuous glands, opening widely and easily releasing seeds.

Earlier widely cultivated in the Old World tropics, now more rarely. In Ethiopia from the Webi Schebele Valley (Hemming 1546), occasionally established as an escape (Ash 1768 from Awash National Park).

6. *G. herbaceum* L. (1753).

*G. abyssinicum* Watt (1926). – type: Abyssinia, no loc., *Quartin-Dillon & Petit* 267 (K holo, P iso).

*G. herbaceum* var. *acerifolium* (Guill. & Perr.) A. Chev. in *Rev. Bot. Appl. Agric. Trop.* 19: 540 (1939).

Similar to *G. arboreum* except in the following features. Stems usually densely covered with long spreading simple hairs. Epicalyx bracts usually wider than long, with 4–6 teeth per side and acute sinuses. Capsule rounded or with distinct shoulders, not opening widely, almost smooth.

Earlier widely cultivated in the Old World tropics, now more rarely. *Kuls* 346.

7. *G. hirsutum* L. (1763).

*G. hirsutum* var. *punctatum* (Schumach. & Thonn.) Roberty in *Ann. Inst. Bot.-Geol. Colon. Marseille*, ser. 6, 3: 42 (1945).

Shrub to 3 m; branchlets subglabrous to pilose. Leaves unlobed or shallowly 3–5-lobed, middle lobe about as long as wide. Calyx usually with distinct subacute to rounded lobes, the tube *c* 6 mm long. Corolla usually shorter than epicalyx.

Originally from America, now widely cultivated in all tropics and subtropics. In Ethiopia widespread from sea level to 2000 m, sometimes escaped or in abandoned cultivations. *Sue Edwards* et al. 2339; *W. de Wilde* et al. 9756.

8. *G. barbadense* L. (1753).

Closely resembling *G. hirsutum*, but the leaves are more deeply 3–5-lobed, middle lobe distinctly longer than wide. Calyx subentire or toothed, the tube *c* 1 cm long. Corolla longer than epicalyx.

Originally from America, now widely cultivated in all tropics and subtropics. *Burger* 1635, *IECAMA* C–8.

10. *THESPESIA Solander ex Correa* (1807),  
*nom. cons.*

Fryxell (1980): *The natural history of the cotton tribe*: 1–245.

Shrubs or small trees. Leaves unlobed or shallowly lobed, entire, glabrous or lepidote, base truncate to cordate; stipules subulate or filiform. Flowers solitary or in terminal racemes. Epicalyx of 3–many bracts, whorled at base of or

irregularly inserted on calyx. Calyx truncate or 5-toothed, not glandular. Ovary (3–)5-locular, locules with 3–4 ovules; style clavate (branches coherent). Fruit a fleshy or somewhat woody berry (rarely a tardily dehiscent woody capsule); seeds glabrous or pubescent.

Genus of 17 species in all tropical regions. Some are very widespread littoral shrubs on sandy foreshores.

1. Epicalyx bracts inserted on calyx, persistent in fruit, petiole 0.5–4.5 cm long; lamina subacute to rounded; petals 2–3.5 cm long; plant not littoral.

1. *T. danis*

– Epicalyx bracts inserted at base of calyx, falling quickly; petiole 4–11 cm long; lamina acuminate; petals 5.5–8 cm long; plant strictly littoral.

2. *T. populnea*1. *T. danis* Oliv. (1881).

Shrub or tree to 5 m; all parts lepidote or densely so. Petiole 0.5–4.5 cm; lamina reniform, unlobed, 2–6 x 2–7 cm, subacute to broadly rounded. Flowers solitary, pendulous; pedicels 0.5–2 cm, gradually thickening into the calyx. Epicalyx bracts 3, 4–9 x 2–4 mm, ovate, inserted on calyx. Calyx 5–10 mm long, truncate or with up to 1 mm long widely spaced teeth. Petals 2–3.5 cm long, yellow with carmine centre, conspicuously gland dotted; column *c* 1 cm. Fruit a subglobose yellowish leathery berry, *c* 1 cm in diameter, acute to apiculate, glabrous. Fig. 82.14.10–12.

Riverine forest and scrub, river-banks, on sandy to silty soil in areas subjected to seasonal flooding; 250–400 m. SD HA: coastal areas of S Somalia, Kenya and Tanzania. *Sue Edwards* 630; *Gilbert* et al. 7614; *Tadesse Ebba* 801.

2. *T. populnea* (L.) *Solander ex Correa* (1807).

Shrub or tree to 10 m; all parts lepidote. Petiole 4–11 cm; lamina cordiform to broadly so, up to 12 x 12 cm, acuminate. Flowers solitary; pedicels 2.5–10 cm, gradually thickening into the calyx. Epicalyx bracts 3, 2–12 mm long, lanceolate to broadly triangular, falling quickly, inserted at base of calyx. Calyx 7–15 mm long, truncate or with up to 1 mm long widely spaced teeth. Petals 5.5–8 cm long, yellow with carmine centre, not or inconspicuously gland dotted; column 2.5–3.5 cm. Fruit a subglobose leathery berry, up to 3 cm in diameter. Fig. 82.14.13 & 14.

Upper edge of mangroves, tidal flats; near sea level. EE; along all tropical beaches. *Baldrati* 184; *Buscalioni* 501; *Mesfin Tadesse* 3947.

Also planted as an ornamental in Mitsawa.

11. *URENA* L. (1753)

Perennial herbs or subshrubs; indumentum stellate. Leaves unlobed to deeply lobed, with a gland on midrib beneath, denticulate to grossly dentate; stipules linear to setaceous. Flowers solitary or in axillary clusters or merging into terminal racemes. Epicalyx bracts 5, narrowly triangular, united at base. Calyx deeply 5-lobed. Ovary of 5 free 1-ovulate carpels around a central torus; style branches 10. Fruit a subglobose schizocarp, mericarps segmentiform, indehiscent, back convex and with numerous glochidiate

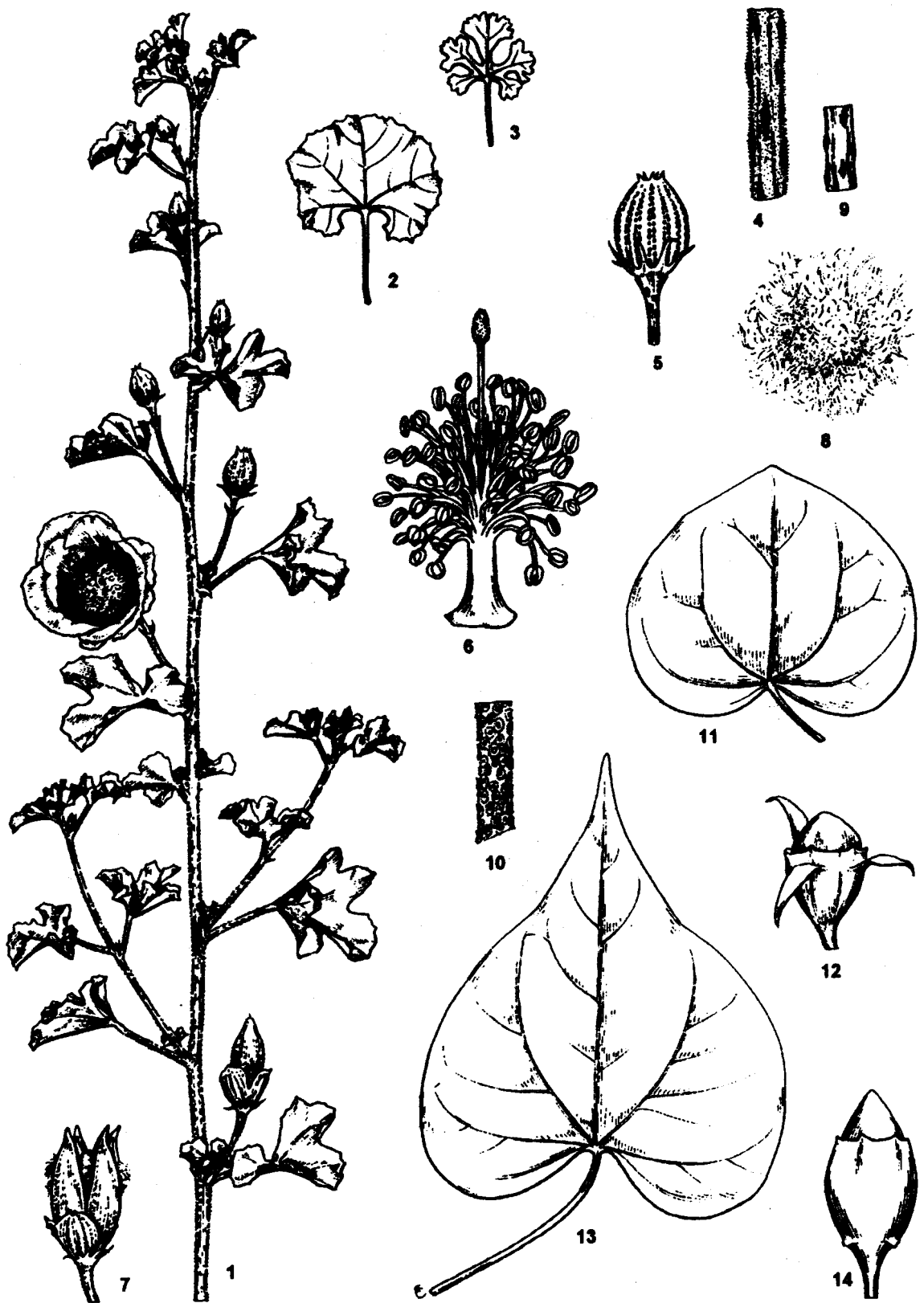


Figure 82. 14 *CIENFUGOSIA SOMALIANA*: 1 – flowering and fruiting stem  $\times \frac{3}{4}$ ; 2 & 3 – variation in leaf-shape  $\times \frac{3}{4}$ ; 4 – detail of pedicel-indumentum  $\times 8$ ; 5 – epicalyx and calyx  $\times 2$ ; 6 – staminal column  $\times 3$ ; 7 – capsule  $\times 1$ ; 8 – seed  $\times 2$ . *C. WELSHII*: 9 – detail of pedicel  $\times 8$ . *THESPESIA DANIS*: 10 – detail of stem-indumentum  $\times 8$ ; 11 – leaf  $\times \frac{3}{4}$ ; 12 – epicalyx and calyx  $\times 2$ . *T. POPULNEA*: 13 – leaf  $\times \frac{3}{4}$ ; 14 – epicalyx and calyx  $\times 2$ . 1, 2, & 4–8 from Gilbert et al. 8113; 3 from Gillett 4030; 9 from Collenette 195; 10–12 from Ash 1928; 13 from Toms 151; 14 from Thomas s.n. Drawn by Eleanor Catherine.

(with a number of recurved barbs at apex) awns on upper part.

According to some authors only a single very variable pantropical species, according to others between 5 and 10 species. Useful fibre plants in parts of Asia.

*U. lobata* L. (1753).

Subshrub to 1 m, usually with unbranched stems from woody rootstock; stems puberulous to pubescent. Leaves greyish tomentellous beneath, puberulous above; petiole 1–6 cm; lamina elliptic or obovate to orbicular, unlobed to shallowly 3-lobed, up to 10 x 10 cm, acute to broadly rounded. Flowers solitary or in axillary clusters or merging into narrow racemes; pedicels up to 7 mm, puberulous. Epicalyx bracts 6–10 mm long, united for 2–3 mm. Calyx 5–10 mm long, puberulous on edges and veins, glabrous towards base; lobes triangular, with strong central vein. Petals 1.5–2 cm long, pink with purple centre; column 1–1.5 cm, slightly curved. Mericarps c 5 mm long, back hirsute, sides glabrous, reticulate. Fig. 82.16.10.

Seepage areas, river-banks, roadsides; 700–1600 m. IL KF GG SD; pantropic. Friis et al. 3869; Gereau 1332; Mesfin Tadesse 219.

12. **PAVONIA** Cav. (1786), *nom. cons.*

Ulbrich in *Bot. Jahrb. Syst.* 57: 54–184 (1920–21).

Annual or perennial herbs, subshrubs or shrubs; indumentum usually stellate. Leaves unlobed to deeply lobed or divided; stipules filiform to lanceolate. Flowers axillary, solitary or in clusters, occasionally merging into terminal racemes or narrow panicles. Epicalyx bracts 5–19, linear to ovate, free (rarely united at base). Calyx 5-lobed. Ovary of 5 free 1-ovulate carpels around a short conical torus; style branches 10. Fruit a subglobose schizocarp; mericarps segmentiform or almost isodiametric, indehiscent, sometimes ribbed, winged, spiny or with 3 retrorsely barbed awns.

About 200 species. Widespread in all tropical and subtropical regions.

1. Epicalyx bracts ovate or elliptic to orbicular, distinctly widened above base; mericarps obovoid, nearly isodiametric, with basal attachment.

(Sect. **AFROLEBRETANIA**) 2

- Epicalyx bracts filiform to linear (rarely lanceolate or narrowly ovate), usually not widened above base; mericarps segmentiform (with two flat lateral sides and convex back). 6

2. Mericarps with spiny dorsal keel and spiny lateral ridges. 4

- Neither dorsal keel nor lateral ridges spiny. 3

3. Petals 12–27 mm long, bright yellow to orange; epicalyx puberulous or sparsely so; calyx pubescent and conspicuously ciliate; lamina up to 14 x 10 cm. 1. *P. burchellii*

- Petals 8–12 mm long, lemon yellow; epicalyx densely pubescent to tomentellous; calyx tomentellous, not or indistinctly ciliate; lamina up to 5 x 5 cm. 2. *P. gallaënsis*

4. Branchlets and pedicels finely puberulous to tomentellous, without long simple hairs; calyx lobes 9–11 mm long; petals 25–35 mm long, lemon yellow. 3. *P. sp.* = Friis et al. 2801

- Branchlets and pedicels either with long simple hairs or with large stellate hairs; calyx lobes 3–5 mm long; petals 8–25 mm long, bright yellow to orange. 5

5. Branchlets and pedicels without long simple hairs, usually densely glandular, petals usually more than 15 mm long; column 4–15 mm long.

4. *P. glechomifolia*

- Branchlets and pedicels with long simple hairs, without or with a few scattered glands; petals up to 13 mm long; column 3–5 mm long.

5. *P. procumbens*

6. Mericarps with 3 apical retrorsely barbed awns. (Sect. **AFROTYPHALAEA**) 7

- Mericarps spiny or not but not with barbed awns. 9

7. Stem leaves shallowly to deeply 3–7-lobed, with cordate base; epicalyx bracts 8–10, united for c 1 mm at base. 8

- Stem leaves unlobed, with cuneate base; epicalyx bracts 6–7, united for 2–3 mm at base.

8. *P. kilimandscharica*

8. Petals pink to red or purple, with or without darker centre; branchlets with large irritating stellate hairs; flowers in dense sessile clusters or some solitary and pedicellate. 6. *P. urens*

- Petals white with dark purple centre; branchlets not with irritating hairs; all flowers clearly pedicellate.

7. *P. schimperiana*

9. Mericarps with 3 conical dorsal spines and/or longitudinal rows of curved or hooked prickles. (Sect. **CALLICARPIDIUM**) 10

- Mericarps not spiny, sometimes with membranaceous wings. (Sect. **CRASPEDOCARPIDIUM**) 13

10. Mericarps without longitudinal rows of curved or hooked prickles; calyx 6–8 mm long.

9. *P. propinqua*

- Mericarps with longitudinal rows of curved or hooked prickles. 11

11. Leafbase cordate; epicalyx bracts 1.5–4 mm wide, lanceolate to narrowly ovate; mericarps with raised spiny central band and 4 rows of prickles, large lateral spines with small apical prickles.

12. *P. elegans*

- Leaf-base truncate to subcordate; epicalyx bracts up to 1.5 mm wide, linear; mericarps without raised central band, with central and 2 lateral rows of prickles, large lateral spines without apical prickles. 12

12. Epicalyx bracts 6–8; calyx 5–8 mm long; petals 10–15 mm long; mericarps dorsally with transverse ridges; leaves broadly elliptic to orbicular, up to 2.8 x 2.7 cm. 11. *P. cristata*

- Epicalyx bracts 9–12; calyx 10–15 mm long; petals 15–22 mm long; mericarps without transverse ridges; leaves ovate to elliptic or oblong, up to 9 x 5 cm. 10. *P. melhanioides*

13. Petals pink to purple. 14

- Petals white to yellow. 19
  - 14. Epicalyx bracts 5-6; petals 17-20 mm long; mericarps 10-14 mm long, with 3-4 mm wide wings. 18. *P. eremogiton*
  - Epicalyx bracts (7-)8-14; petals 5-15 mm long; mericarps 2.5-5 mm long, without or with up to 1 mm wide wings. 15
  - 15. Some or all leaves deeply 3-lobed, or unlobed and grossly dentate to near base. 13. *P. triloba*
  - Leaves unlobed, entire or with a few teeth near apex. 16
  - 16. Epicalyx bracts 4-5 mm long, about as long as calyx. 17. *P. studneri*
  - Epicalyx bracts 5-15 mm long, distinctly longer than calyx. 17
  - 17. Epicalyx bracts 11-14, 12-15 mm long; petals 12-15 mm long; mericarps rugose on lateral sides. 15. *P. erlangeri*
  - Epicalyx bracts (7-)9-12, 5-10 mm long; petals 5-12 mm long. 18
  - 18. Erect perennial herb or shrublet; calyx 3-5(-6) mm long; petals 7-12 mm long; column 4-7 mm long with 3-7 mm long stamens; mericarps tomentose to lanate. 14. *P. arabica*
  - Procumbent or ascending annual or perennial herb; calyx 2-3 mm long; petals 5-8 mm long; column c 3 mm long with 2-3 mm long stamens; mericarps puberulous. 16. *P. sp.* = Friis et al. 2798
  - 19. Leaves 3-5-lobed or divided. 20
  - Leaves unlobed. 21
  - 20. Annual or perennial herb, 20-75 cm tall; leaves above with long simple hairs, central lobe with more than 3 teeth; mericarps 3-4 mm long, with up to 0.5 mm wide wings. 19. *P. zeylanica*
  - Dwarf shrub or shrubby herb to 25 cm tall; leaves glabrous above, central lobe with 3 apical teeth; mericarps 4.5-6 mm long, with 1.5-3 mm wide wings. 20. *P. pirottae*
  - 21. Leaves entire or with a few irregular teeth near apex. 22
  - Leaves regularly dentate to near base; mericarps winged. 24
  - 22. Mericarps with 1-2 mm wide ciliate wings, back glabrous, conspicuously transversely ribbed. 23. *P. sp.* = Corradi 3527
  - Mericarps not winged, back puberulous to pilose. 23
  - 23. Stems rough, stellate pubescent to tomentose; calyx glabrous apart from ciliate margin; mericarps with concave transversely ribbed back; petals 7-12 mm long. 21. *P. ellenbeckii*
  - Stems smooth, glandular pubescent; calyx uniformly puberulous; mericarps with flat back, not ribbed; petals 10-18 mm long. 22. *P. schweinfurthii*
  - 24. Mericarp wing triangular in outline, widest near middle; petals 13-22 mm long, white to pale yellow. 24. *P. hildebrandtii*
  - Mericarp wing semicircular in outline, equally wide from top to bottom; petals bright or lemon yellow or less than 10 mm long. 25
  - 25. Pedicels stellate puberulous to pubescent or densely so, not sticky, no glandular hairs. 26
  - Pedicels glandular puberulous from simple sticky hairs, no stellate hairs. 27
  - 26. Mericarps 7-9 mm long, with 3-5 mm wide wings; petals 9-16 mm long, bright or lemon yellow. 26. *P. kotschyi*
  - Mericarps 4.5-6 mm long, with 1-2 mm wide wings; petals 7-12 mm long, white to pale yellow. 25. *P. sp.* = Gilbert et al. 7523
  - 27. Epicalyx bracts 13-19; branchlets with stellate hairs; leaves broadly elliptic to orbicular, pedicels 1-1.5(-4.5 in fruit) cm long. 27. *P. sp.* = Gilbert 2074
  - Epicalyx bracts 7-9; branchlets glandular puberulous; leaves oblong to elliptic or narrowly so; pedicels 0.5-1(-1.5 in fruit) cm long. 28. *P. sp.* = Simmons 65
1. Sect. AFROLEBRETONIA Ulbr. (1920).
- Flowers solitary in leaf axils. Epicalyx bracts narrowly to broadly ovate or elliptic to orbicular, distinctly widened above base, united for 1-3 mm at base, accrescent in fruit. Calyx scarious, enclosing fruit, lobes ovate, acute, indistinctly veined. Stamens uniformly scattered on upper half of column. Mericarps obovoid, nearly isodiametric but slightly curved with basal or slightly lateral attachment, with a dorsal keel and ridges on lateral sides.
1. *P. burchellii* (DC.) Dyer (1932).
- Lebretonia acuminata* A. Rich. (1847) - types: TU; Mt. Scholoda, Schimper I:364 (P syn, BM FI(Webb) K isosyn); TU; near Axum, Schimper III:1498 (FI(Webb) FT, K isosyn); TU; Djeladjeranne, Schimper III:1910 (K isosyn).
- P. kraussiana* Hochst. (1844) subsp. *dictyocarpa* Ulbr. in *Bot. Jahrb. Syst.* 57: 126 (1920) var. *genuina* Ulbr. in *Bot. Jahrb. Syst.* 51: 58 (1913).
- P. burchellii* var. *glandulosa* (Ulbr.) Heine in *Mitt. Bot. München* 2: 177 (1956).
- P. burchellii* var. *tomentosa* (Ulbr.) Heine in *Mitt. Bot. München* 2: 177 (1956).
- Urena mollis* R. Br. in Salt (1814), nom. nud.
- P. patens* sensu auct. mult. Afr., non (Andr.) Chiov. (1915).
- Shrubby herb or shrub to 2 m, sometimes scrambling; all parts puberulous to pubescent and with long simple hairs (rarely without). Petiole 0.5-8(-10.5) cm; lamina cordiform to broadly so, unlobed to shallowly 3-lobed, up to 14 x 10 cm, grossly dentate, acute to acuminate. Pedicels 1-7(-8.5 in fruit) cm. Epicalyx bracts 5-6(-7), 5-12 x 2-8 mm in flower, elliptic to broadly so, subacuminate to rounded. Calyx lobes 4-7 mm long in flower, pubescent, glandular and ciliate. Petals bright yellow to orange, with or without a purple centre, 12-27 mm long; column 5-15 mm, filaments 3-7 mm. Mericarps 4-5 mm long, sparsely puberulous, dorsal keel smooth or slightly jagged, lateral ridges with 1-2 rounded protuberances in upper part. Fig. 82.15.7 & 8.
- Acacia* woodland and bushland, often on rocky slopes and disturbed, river banks, riverine forest, secondary forest and scrub, roadsides; (400-)950-2500 m. EE EW TU GD

GJ WU SU WG IL GG SD HA; Cameroon and from Sudan and Ethiopia through eastern Africa to S Africa. *Friis* et al. 563; *Gilbert & Thulin* 639; *Mooney* 6289.

2. *P. gallaënsis* Ulbr. (1920)

— type: BA; near Ginir, *Ellenbeck* 1961 (B holo, destroyed).

Shrubby herb or shrub to 0.5(–1.5) m, sometimes scrambling; all parts densely pubescent to tomentellous and (except leaves) with long simple hairs (rarely also glandular). Leaves without long simple hairs; petiole 0.5–3.5 cm; lamina cordiform to broadly so, unlobed, up to 5 x 5 cm, crenate to grossly dentate, acute to rounded. Pedicels 0.5–2.5(–4 in fruit) cm. Epicalyx bracts 5–7(–9), 4–8 x 2–4 mm in flower, elliptic to broadly so, acute, usually with a conspicuous tuft of long hairs at base. Calyx lobes 4–5 mm long in flower, densely pubescent to tomentellous, not ciliate. Petals lemon yellow, with or without a purple centre, 8–12 mm long; column c 6 mm, filaments 2–3 mm. Mericarps as in *P. burchellii*, densely puberulous. Fig. 82.15.9 & 10.

*Acacia* – *Commiphora* woodland and bushland on red sandy to loamy or black cotton soil, *Acacia* – *Combretum* bushland on rocky ridges; 1300–1900 m. EW SD BA HA; NE Uganda, Kenya, N Tanzania. *Friis* et al. 2644A; *Gilbert* et al. 8013; *Mooney* 5534.

The type is no longer extant, but there is a good figure in Ulbrich (l.c.) which leaves little doubt as to its identity.

3. *P. sp.* = *Friis* et al. 2801

Shrub to 1.5(–2.5) m; all parts finely puberulous to tomentellous, without long simple hairs. Petiole 1.5–5.5 cm; lamina cordiform, unlobed to very shallowly 3-lobed, up to 7 x 5 cm, grossly dentate, acute to subacute. Pedicels 2–5.5 cm. Epicalyx bracts 5–6, 7–13 x 3–7 mm in flower, ovate to elliptic or broadly so, acute to acuminate, ciliate from long simple hairs. Calyx lobes 9–11 mm long in flower, not ciliate. Petals lemon yellow, without purple centre, 25–35 mm long; column 6–8 mm, filaments 5–8 mm. Mericarps 4–6 mm long, densely puberulous, dorsal keel spiny, lateral ridges 3–4, prominent, some or all with a spine in upper part.

*Acacia* – *Commiphora* – *Boswellia* woodland and bushland on rocky limestone ridges; 1000–1450 m. SD; S Somalia. *Ash* 794; *Friis* et al. 2801; *Gilbert* et al. 7479.

It seems odd that this very conspicuous species – which is common along the Neghelle-Filtu road – was never collected by the Italians. The large flowers make it most conspicuous.

4. *P. glechomifolia* (A. Rich.) Garcke (1867)

— type: EE; Choho, *Quartin-Dillon & Petit* s.n. (P holo).

*P. glechomifolia* var. *glabrescens* Ulbr. in *Bot. Jahrb. Syst.* 57: 120 (1920) – types (p.p.): EE; Togo, *Ehrenberg* s.n. (not seen). TU; Gageros, *Schimper* 169 (FT isosyn). EE; Saati to Sabarguma, *Schweinfurth & Riva* 113 (not seen). EE; Saati, *Schweinfurth & Riva* 334 (P isosyn). EE; Ailet, *Schweinfurth*

& *Riva* 430 (not seen). EE; near Saati, Mt. Zibo, *Schweinfurth & Riva* 520 (not seen). EE; near Saati, Mt. Bosco, 573 (FT K isosyn).

*P. glechomifolia* var. *tomentosa* Ulbr. in *Bot. Jahrb. Syst.* 57: 121 (1920).

*Urena glabra* R. Br. in Salt (1814), nom. nud.

Erect or spreading shrubby herb or shrub to 1.5 m; vegetative parts pubescent and glandular (rarely not), long simple hairs usually absent. Petiole 0.5–4.5(–7.5) cm (rarely with long simple hairs); lamina cordiform to reniform, unlobed to shallowly 3-lobed, up to 8 x 7.5 cm, crenate to grossly dentate, acute to rounded. Pedicels 1–5(–7 in fruit) cm. Epicalyx bracts 5–7, 6–17 x 1.5–6 mm in flower, narrowly ovate or narrowly elliptic (rarely ovate or elliptic), acuminate to obtuse, glandular (rarely not), ciliate. Calyx lobes 3–5 mm long in flower, densely glandular (rarely not), usually ciliate. Petals bright yellow to orange, with red to crimson centre, 8–25 mm long; column 4–15 mm, filaments 1.5–5 mm. Mericarps 4–5 mm long, puberulous, dorsal keel with a single or double row of spines, lateral ridges with long spines in the upper part. Fig. 82.15.1–4.

*Acacia* – *Commiphora* woodland and bushland on sandy to gravelly soil and rocky slopes with basement rocks; near sea level to 1400 m. EE AF EW TU (Tekezze Valley) WU SU (Awash Valley) GG SD HA; Sudan, Somalia, NE Uganda, Kenya, NE Tanzania, Arabia, Pakistan, NW India. *Burger* 1601; *Friis* et al. 2910; *Gilbert* et al. 7654.

5. *P. procumbens* (Wight & Arn.) Walp. (1842).

*P. ctenophora* Ulbr. (1920).

*P. ukambanica* Ulbr. (1920).

Perennial herb or shrub to 0.75 m, often trailing or scrambling; branchlets, petioles and pedicels pubescent from simple downwardly directed hairs and with scattered long simple hairs. Leaves pubescent (sometimes with long pilose hairs); petiole 0.5–5 cm; lamina cordiform or broadly so, unlobed or shallowly 3-lobed, up to 8 x 6 cm, grossly crenate to dentate, acute. Pedicels 1–4.5(–6 in fruit) cm. Epicalyx bracts 5–6, (4–)6–11 x 2–6 mm in flower, narrowly ovate or elliptic to broadly so (rarely orbicular), acuminate to obtuse, pubescent, ciliate. Calyx lobes 3–4 mm long in flower, pubescent to tomentose, ciliate, sparsely glandular. Petals bright yellow to orange, with or without a dark red centre, 8–13 mm long; column 3–5 mm, filaments 1–4 mm. Mericarps as in *P. glechomifolia*. Fig. 82.15.5 & 6.

*Acacia* – *Commiphora* woodland and bushland on rocky limestone slopes and alluvial soil; 600–1200(–1800) m. EW AF WU GG SD BA HA; Somalia, NE Uganda, Kenya, N Tanzania, Arabia, Pakistan, NW India. *Burger* 244; *Friis* et al. 2832, 3230.

These five species have in most newer floras (e.g. *Fl. Zamb.*) been considered as one polymorphic species. But there seems to be enough characters to support the recognition of five distinct species in the Flora area. All but one of these are widespread in NE Africa and two stretch eastwards to India.

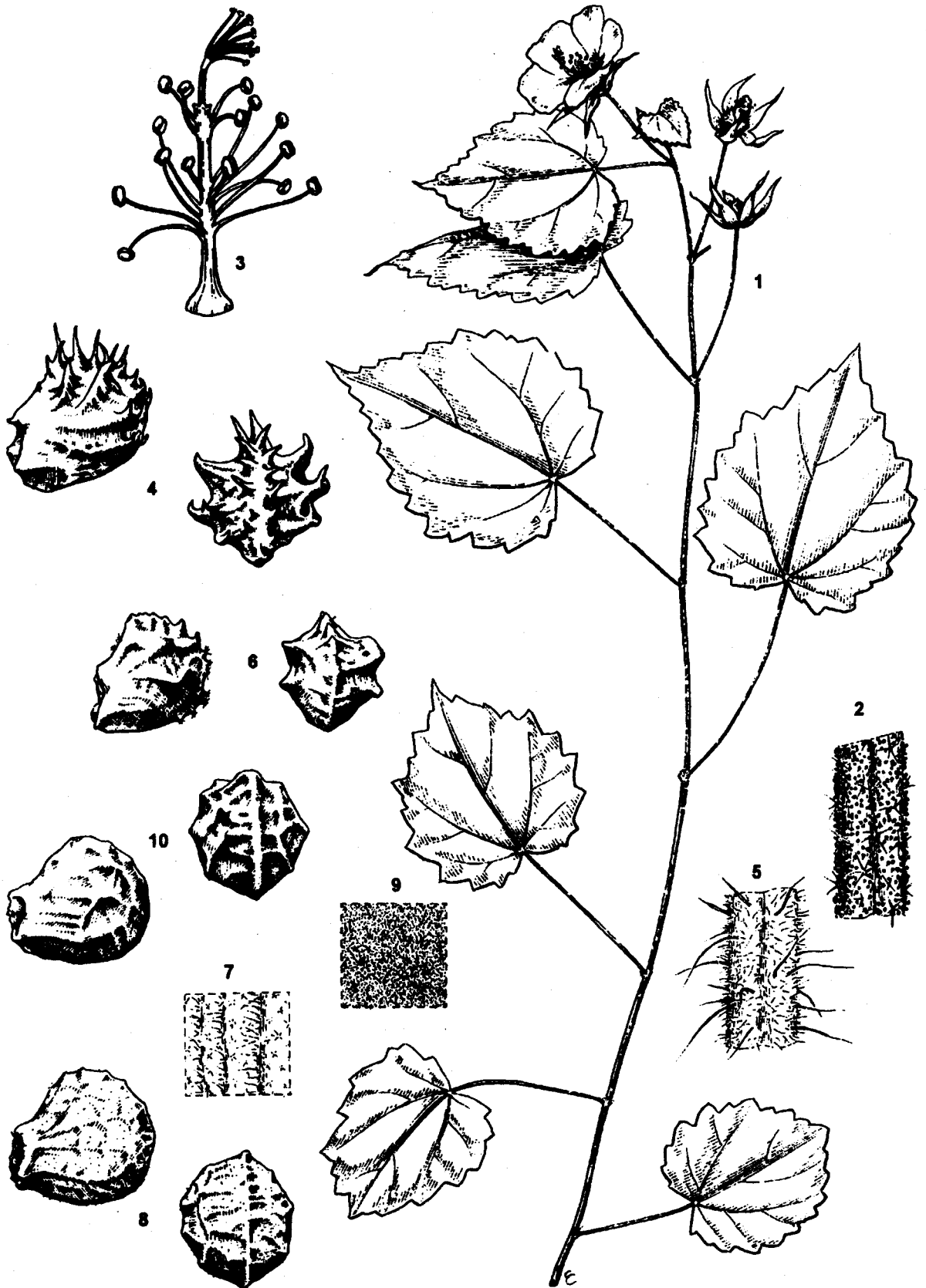


Figure 82.15 *PAVONIA GLECHOMIFOLIA*: 1 – flowering stem  $\times \frac{3}{4}$ ; 2 – detail of stem-indumentum  $\times 12$ ; 3 – staminal column  $\times 4$ ; 4 – mericarp from side (left) and back  $\times 6$ . *P. PROCUMBENS*: 5 – detail of stem-indumentum  $\times 12$ ; 6 – mericarp from side (left) and back  $\times 6$ . *P. BURCHELLII*: 7 – detail of epicalyx-indumentum  $\times 9$ ; 8 – mericarp from side (left) and back  $\times 6$ . *P. GALLAËNSIS*: 9 – detail of epicalyx-indumentum  $\times 9$ ; 10 – mericarp from side (left) and back  $\times 6$ . 1–2 from Wickens 270; 3 from Gillett et al. 22672; 4 from Friis et al. 2910; 5 & 6 from Burger 3761; 7 & 8 from Mooney 6289; 9 & 10 from Mooney 5534. Drawn by Eleanor Catherine.

The name used for this 'species' is usually *P. patens* (Andr.) Chiov., but the type of this name is clearly an *Abutilon*. See also notes at end of this genus (p. 236) and under *Abutilon mauritanium* (p. 245).

## 2. Sect. AFROTYPHALAEA Ulbr. (1920).

Flowers solitary or in axillary clusters or cymes. Epicalyx bracts linear to lanceolate, not widened above base, not with long strigose hairs, united for 1–3 mm at base. Calyx not scarious, not enclosing fruit, lobes triangular, distinctly 3-veined (one central and two lateral branching off from commissural). Stamens in apical half of column, densest towards apex, short. Mericarps segmentiform, with three apical retrorsely barbed awns.

### 6. *P. urens* Cav. (1787).

*P. neumannii* Ulbr. (1920) – type: GG; Gardulla (Gidole), Neumann 117 (B holo. destr.).

*P. urens* var. *hirsuta* (Hochst. ex Ulbr.) Brenan in *Mem. N.Y. Bot. Gard.* 8, 3: 223 (1953) – type GD; Mt. Aber, Dschenausa, Schimper II:1405 (P holo, FI(Webb) iso).

*P. urens* var. *tomentosa* (Hochst.) Brenan in *Mem. N.Y. Bot. Gard.* 8, 3: 223 (1953) – type: TU; Adua, Schimper II:926 (P holo, BM FI(Webb) iso).

Shrubby herb or shrub to 2(–3) m; branchlets and petioles with large stellate and/or simple easily detached irritating hairs (rarely absent). Leaves pilose to tomentose, hairs stellate and/or simple; petiole 4–23 cm; lamina cordiform or reniform in outline, shallowly (rarely deeply) 3–7-lobed, up to 23 x 22 cm, grossly crenate to dentate, lobes triangular, acute to acuminate. Flowers solitary or in dense clusters, usually in clearly delimited spike-like panicles, supported by reduced unlobed sometimes subtire leaves; pedicels 0–8 mm, pilose (hairs simple). Epicalyx bracts 8–10, 5–11 mm long, appressed to calyx. Calyx 6–8 mm long, pilose, densest on veins (hairs simple). Petals pink to red or purple, usually with darker centre, 15–35 mm long; column 1–2 cm. Mericarps 5–6 mm long, subglabrous to puberulous, reticulate on back, awns 3–8 mm long. Fig. 82.16.1–5.

Along edges, paths and clearings in upland forest and riverine forest, secondary forest and scrub, abandoned cultivations, weed, ruderal; 1500–3000(–3500) m. EW TU GD GJ WU SU AR WG IL KF GG SD BA HA; widespread in tropical Africa, Madagascar, Réunion. *Friis* et al. 368; *Mooney* 6006, 6266.

Apart from keeping *P. schimperiana* separate (see note below), the author fully agrees with the view expressed in *Fl. Zamb.*: the variation in this species is so complex that a much more thorough study through-out the distribution area is needed before a possible division into infraspecific taxa is attempted.

### 7. *P. schimperiana* Hochst. ex A. Rich. (1847)

– types: TU; Aderbati, *Quartin-Dillon & Petit* s.n. (P syn); TU; Mt. Scholoda, *Schimper* I.53 (P syn, BM FI(Webb) K isosyn).

*P. urens* Cav. (1787) var. *schimperiana* (Hochst. ex A. Rich.) Brenan in *Mem. N.Y. Bot. Gard.* 8, 3: 223 (1953).

*P. urens* var. *glabrescens* (Ulbr.) Brenan in *Mem. N.Y. Bot. Gard.* 8, 3: 223 (1953).

Shrubby herb or shrub to 3(–5) m; branchlets, petioles and pedicels glabrous to puberulous, without large stellate irritating hairs. Leaves glabrous to pubescent or pilose, hairs simple; petiole 2.5–15(–20) cm; lamina cordiform to reniform in outline, shallowly to deeply 3–5-lobed, up to 19 x 21 cm, grossly dentate to serrate; lobes triangular, acute to acuminate. Flowers all solitary or in 2–4-flowered clearly pedunculate cymes merging into clearly delimited narrow panicles or racemes, supported by reduced unlobed leaves; pedicels 4–13(–20 in fruit) mm. Epicalyx bracts 8–10, 6–12 mm long, spreading from calyx. Calyx 5–8 mm long, glabrous to puberulous, densest on veins, often with scattered long simple hairs on edges. Petals white with dark red or dark purple centre, 15–27 mm long; column 15–25 mm. Mericarps 5–6 mm long, only tardily separating, puberulous and reticulate on back, awns (2–)3–5 mm long. Fig. 82.16.6–8.

Forest floor, forest edges and paths, riverine forest, always in rather deep shade; 1300–2200(–2500) m. EW TU GD GJ SU AR WG IL KF SD BA; Ivory Coast to Cameroon, S Sudan, NE Zaire, Rwanda, Burundi, Uganda, Kenya, N Tanzania. *Friis* et al. 270, 1994; *Mooney* 8805.

In recent floras (e.g. *Fl. Zamb.* and *Fl. Congo*), this is usually considered a synonym of the widespread and variable *P. urens*. The two species are, however, clearly distinct and can always be easily separated by indumentum, inflorescence and flower characters. The most easily observable being the colour of the petals.

### 8. *P. kilimandscharica* Gürke (1894).

Shrub to 1.5(–2.5) m; branchlets, petioles and pedicels glabrous or with a few stellate hairs. Leaves subglabrous to sparsely pubescent or pilose, hairs simple; petiole 0.5–2(–5) cm; lamina ovate to elliptic, unlobed, up to 8.5 x 4.5 (–6) cm, grossly dentate, acute to acuminate. Flowers solitary, supported by ordinary leaves; pedicels 3–10(–15 in fruit) mm. Epicalyx bracts 6–7, 4–6(–10) mm long, spreading from calyx. Calyx 7–8 mm long, pubescent, densest on veins, ciliate. Petals pink with dark red centre, 15–25 mm long; column 10–17 mm. Mericarps 5–6 mm long, back reticulate and sparsely puberulous, awns 4–6 mm long. Fig. 82.16.9.

Undergrowth in upland forest, often on edges and along paths, in rather moist places; 2000–2800 m. SU AR WG KF SD BA HA; Cameroon, NE & E Zaire, Uganda, W Kenya, N Tanzania, Burundi. *Friis* et al. 225; *IECAMA* J-57; *Mooney* 8194.

## 3. Sect. CALLICARPIDIUM Ulbr. (1920).

Flowers solitary in leaf axils. Epicalyx bracts usually linear, usually not widened above base, united for up to 1 mm at base. Calyx not scarious, enclosing fruit, lobed ½ down or less, lobes ovate to triangular, indistinctly veined. Column usually with long stamens from the expanded base and

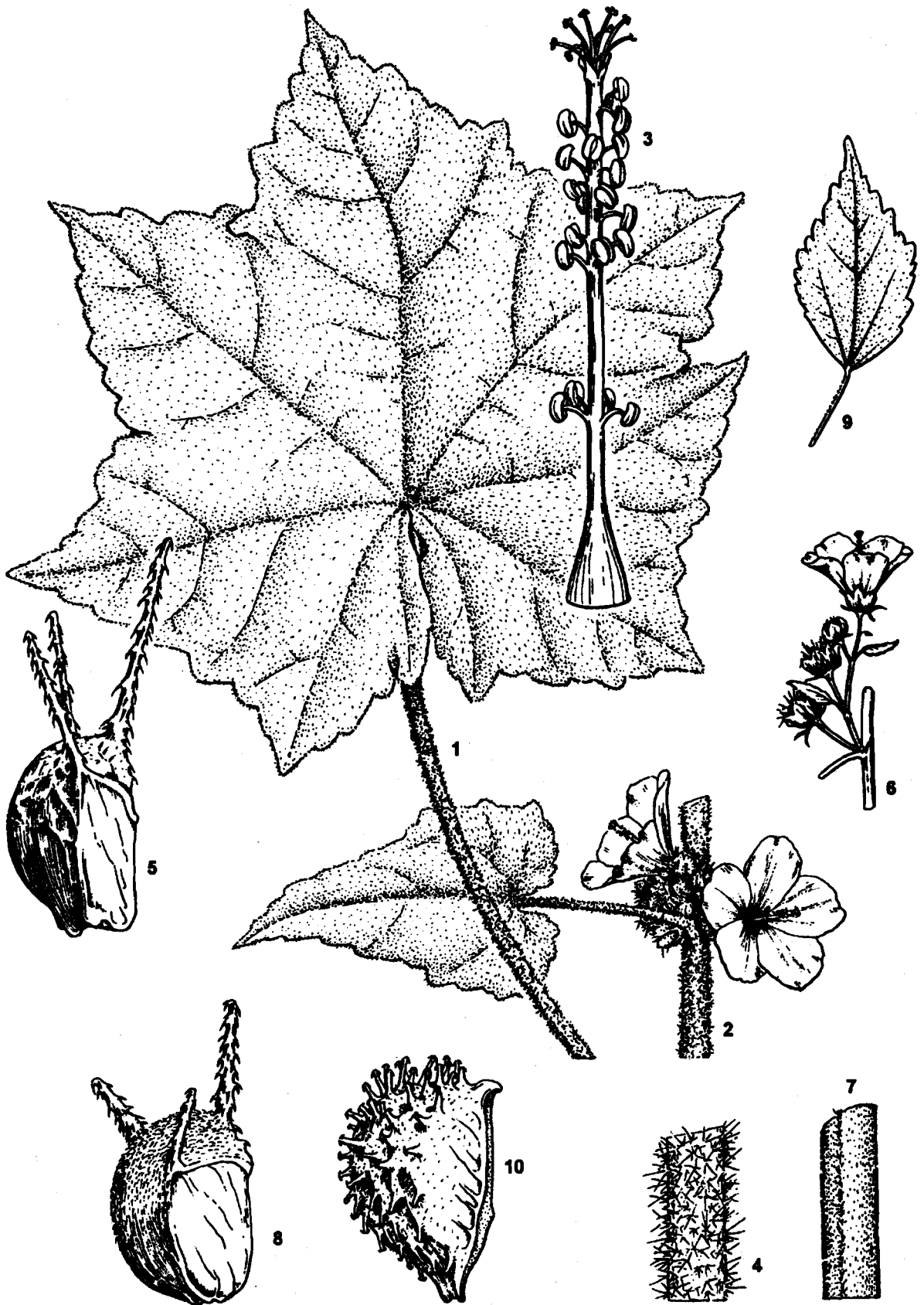


Figure 82.16 *PAVONIA URENS*: 1 – leaf  $\times \frac{1}{2}$ ; 2 – part of inflorescence  $\times \frac{1}{4}$ ; 3 – staminal column  $\times 6$ ; 4 – detail of stem-indumentum  $\times 5$ ; 5 – mericarp  $\times 6$ . *P. SCHIMPERIANA*: 6 – part of inflorescence  $\times \frac{1}{4}$ ; 7 – detail of stem-indumentum  $\times 5$ ; 8 – mericarp  $\times 6$ . *P. KILIMANDSCHARICA*: 9 – leaf  $\times \frac{1}{2}$ . *URENA LOBATA*: 10 – mericarp  $\times 6$ . 1–3 from Burger 744; 4 from Mooney 7202; 5 from J. de Wilde 4381; 6 & 7 from Friis et al. 1994; 8 from Mooney 5403; 9 from Mooney 8194; 10 from Jackson 1648. Drawn by Eleanor Catherine.



short from apical part. Mericarps segmentiform, dorsally usually with 2 lateral and 1 apical conical spines and usually with additional rows of curved or hooked prickles, basally with three tongue like apically directed appressed appendages.

9. *P. propinqua* Garcke (1867)

– type: TU; Goelleb, *Schimper* 134 (P holo, FT K iso) or as Schimper in *Hohenacker* 2137 (BM K P iso).  
*P. grewioides* Hochst. ex Boiss. (1867).

Shrub to 1 m; vegetative parts pubescent. Leaves: petiole 0.5–4 cm; lamina narrowly ovate to ovate or elliptic, unlobed, up to 7(–9.5) x 4(–6.5) cm, grossly dentate, subacute to rounded. Pedicels 3–15(–30 in fruit) mm. Epicalyx bracts 7–12, (8–)10–15 mm long, with long strigose bulbous-based hairs. Calyx 6–8 mm long, densely pubescent to tomentose-strigose and with simple hairs on edges. Petals 15–25 mm long, white to pale yellow inside, reddish outside; column 6–9 mm, basal filaments 7–10 mm, apical 2–3 mm. Mericarps 5–6 mm long, glabrous to sparsely puberulous, with two lateral and one apical conical spines and reticulate on back. Fig. 82.17.1–3.

*Acacia* – *Commiphora* bushland on rocky granitic slopes, on black cotton soil or grey alluvial soils, *Acacia* – *Grewia* bushland, *Acacia* wooded grassland and bushland; 900–1600 m. AF TU & GD (Tekezze Valley) SU (Awash Valley) GG SD BA HA; E Sudan, NE Uganda, Somalia, Kenya, NE Tanzania, NW India. *Friis* et al. 3327; *Gilbert* et al. 7376, 7812.

It is almost certain that the two numbers cited as the type are part of the same collection. The date and locality are identical as are the plants. It is not clear which of the two names is the oldest. *P. propinqua* was published in May 1867 and *P. grewioides* between April and June 1867. *P. propinqua* has been most commonly used in African botany, and the author prefers to use it until the question is finally settled.

10. *P. melhanioides* Thulin (1985)

– type: SD, 20 km NW of Neghele Thulin et al. 3488 (UPS holo, ETH FT K iso).

Perennial herb to 0.5 m with erect to procumbent annual stems from woody rootstock; vegetative parts tomentose. Leaves: petiole 0.5–3.5 cm; lamina ovate to elliptic or oblong, unlobed, up to 9 x 5 cm, grossly dentate, rounded to retuse. Pedicels 5–28(–35 in fruit) mm. Epicalyx bracts 9–12, (6–)9–15 mm long, with long strigose bulbous-based hairs. Calyx 10–15 mm long, tomentose-strigose, with simple hairs on edges. Petals 15–22 mm long, lemon yellow, fading to reddish; column 5–7 mm, basal filaments 5–7 mm, apical 2–4 mm. Mericarps 7–8 mm long, sparsely puberulous, with three conical spines and with three rows of curved to hooked prickles, no transverse ribs. Fig. 82.17.4.

*Acacia* – *Commiphora* and *Combretum* – *Terminalia* woodland and bushland on reddish to brownish loamy soil overlying granitic rocks; 1200–1650(–2000) m. SD; NE Kenya (Moyale area). *Friis* et al. 2630, 3268; *Westphal* et al. 2744.

Superficially this species is close to *P. propinqua*, but closer examination reveals a number of differences, especially in the mericarps.

11. *P. cristata* Schinz ex Gürke (1895)

– type: HA, Warandab, Keller 68 (Z not seen).

Shrubby herb or shrub to 0.75 m; vegetative parts pubescent to tomentellous. Leaves: petiole 0.3–2 cm; lamina broadly elliptic to orbicular, unlobed, up to 2.8 x 2.7 cm, subentire to grossly dentate, truncate to retuse. Pedicels 3–15(–20 in fruit) mm. Epicalyx bracts 6–8, 6–10 mm long, without long strigose hairs. Calyx 5–8 mm long, tomentellous, with or without simple hairs on edges. Petals 10–15 mm long, light to sulphur yellow; column 4–6 mm, basal stamens absent, apical 2–4 mm. Mericarps c 6 mm long, sparsely puberulous, with three conical spines, with three rows of curved to hooked prickles and with transverse ribs between the rows of prickles. Fig. 82.17.5.

*Acacia* – *Commiphora* woodland and bushland on red sandy soil overlying limestone and on greyish granitic sand; 600–1000 m. SD HA; Somalia, NE Kenya. *Ellis* 140; *Friis* et al. 2846.

A rare species which has only been collected 5 times over a quite large area.

12. *P. elegans* Garcke (1883).

Shrubby herb or shrub to 1 m; stems, petioles and pedicels yellowish glandular pubescent or densely so (hairs simple) and with scattered long spreading hairs. Leaves tomentellous; petiole 1–8 cm; lamina cordiform or broadly so, unlobed, up to 7 x 7 cm, grossly dentate, subacute to rounded. Pedicels 5–20(–35 in fruit) mm. Epicalyx bracts 5–7, lanceolate to narrowly ovate, 6–10 x 1.5–4 mm, pubescent to tomentellous and with long simple marginal hairs (not strigose and bulbous-based). Calyx 6–10 mm long, tomentose and yellowish glandular, with simple marginal hairs. Petals 12–20 mm long, lemon yellow; column 7–12 mm, basal filaments 5–10 mm, apical 3–5 mm. Mericarps c 6 mm long, sparsely puberulous, with a central raised prickly band and 2 rows of hooked prickles each side of it, lateral spines bulbous, with several small spines apically. Fig. 82.17.6.

*Acacia* – *Commiphora* – *Terminalia* woodland and bushland on red sandy soil; c 1300 m. BA; E Kenya, S Somalia, NE Tanzania. *Mesfin Tadesse*. 4758.

4. Sect. CRASPEDOCARPIDIUM Ulbr. (1920).

Sect. *Pterocarpiidium* Ulbr. (1921).

Flowers usually solitary in leaf axils. Epicalyx bracts filiform to linear, with long simple strigose hairs, usually enclosing fruit like a bird cage. Calyx not scarious, not enclosing fruit, lobed nearly to base, lobes triangular or narrowly so, 3-veined. Column with long stamens from the expanded base (rarely without) and shorter from apical part. Mericarps segmentiform, without bristles or spines on back, sometimes with membranous wings.



Figure 82.17 *PAVONIA PROPINQUA*: 1 - habit  $\times \frac{3}{4}$ ; 2 - staminal column  $\times 4$ . Mericarps side and back views ( $\times 6$ ) of *P. PROPINQUA* (3); *P. MELHANIOIDES* (4); *P. CRISTATA* (5); *P. ELEGANS* (6). 1 & 3 from Friis et al. 3327; 2 from Gillett 14145; 4 from Friis et al. 3268; 5 from Friis et al. 2846; 6 from Drummond & Hemsley 4080. Drawn by Eleanor Catherine.

13. *P. triloba* Guill. & Perr. (1831).

Annual or biennial herb to 0.7 m, but usually less; vegetative parts glandular pubescent (hairs simple) and with long simple hairs, sometimes with scattered stellate hairs. Leaves: petiole 1–3(–5) cm; lamina ovate or elliptic to orbicular in outline, shallowly to deeply 3-lobed (or unlobed and grossly toothed), up to 3(–4.5) x 3.5(–5.5) cm, lobes ovate to elliptic or narrowly so, with large triangular teeth. Pedicels 1–3.5(–5.5) cm, articulated above middle. Epicalyx bracts 8–11, 6–9 mm long in flower. Calyx 3–5 mm long, puberulous to pubescent. Petals 8–15 mm long, pink; column 5–9 mm, basal stamens 3–6 mm, apical 1–3 mm. Mericarps 4–5 mm long, with 0.5–1 mm wide wings, back slightly reticulate, pubescent to pilose and conspicuously ciliate, sides puberulous and with scattered pilose hairs. Fig. 82.18.7 & 8.

Alluvial grassland, *Acacia* bushland on alluvial clay; 200–1150(–1400) m. EE AF EW TU (Tekeze Valley) SU (Awash Valley); W Africa to Sudan and N Ethiopia, Arabia, NW India. *Bally* 6711; *Gilbert* 1232; *Schweinfurth* & *Riva* 297.

Superficially this is close to *P. zeylanica*, and the two are often united. But *P. zeylanica* has yellow flowers and different mericarps.

14. *P. arabica* Hochst. & Steud. ex Boiss. (1867).

*P. erythraeae* Chiov. (1915) – types: EE; Eilet, *Ehrenberg* s.n. (not seen); TU; Goelleb, *Schimper* in *Hohenacker* 2139 (BM K isosyn). EE; Assaorta, Mte. Ghedem, *Tellini* 252 (FT syn). EE; Assaorta, Embereki, *Tellini* 534 (FT syn). EE; Assaorta, Ingal to Ras Koral, *Terracciano* 14 (FT syn). EE; Assaorta, Ras Amas to Ras Tucul, *Terracciano* 57 (FT syn). EE; Anfilha Bay, *Terracciano* 174 (FT syn). EE; Dahlak Islands, *Terracciano* 303 (FT syn). EE; Dahlak Islands, *Terracciano* 434 (FT syn).

*P. arabica* var. *flavovelutina* Ulbr. in *Bot. Jahrb. Syst.* 57: 161 (1921) – types: EE; Eilet, *Ehrenberg* s.n. (not seen).

*P. arabica* var. *glanduligera* Ulbr. in *Bot. Jahrb. Syst.* 57: 162 (1921) – type: HA; Ogaden, Laku, *Keller* 61a (not seen).

*P. arabica* var. *procumbens* Terrac. in *Ann. R. Ist. Bot. Roma* 5: 112 (1894) – type: EE; Anfilha Bay, *Terracciano* 174 (FT holo).

Perennial (rarely annual) herb or subshrub to 1 m; vegetative parts pubescent to tomentose from long simple and/or stellate hairs. Leaves: petiole 0.5–5 cm; lamina ovate to elliptic, up to 6 x 3.7 cm, entire or toothed near apex, subacute to truncate. Flowers solitary, or a solitary and a small cyme per axil; pedicels 2–30(–45) mm, articulated above middle, glandular pubescent (rarely not) and with long simple hairs (rarely not). Epicalyx bracts (7–)9–11, 5–8(–10) mm long in flower. Calyx 3–5(–6) mm long, puberulous to pubescent or tomentose. Petals 7–12 mm long, pink; column 4–7 mm, basal stamens 3–7 mm, apical 1–2 mm. Mericarps 3–4.5 mm long, not winged or with less than 0.5 mm wide wings, back tomentose to lanate, sides densely puberulous. Fig. 82.18.5 & 6.

*Acacia* and *Acacia* – *Commiphora* woodland and bushland on limestone, volcanic and basement soils; near sea level to 1600 m. EE AF TU (Tekeze Valley) WU SU (Awash Valley) SD BA HA; Sudan, Somalia, NE Kenya, E Tanzania, Arabia, Pakistan, NW India. *Burger* 3292; *Gilbert* et al. 7560; *Gilbert* & *Thulin* 137.

A very variable species, but for the moment there seems no way of making a reasonable subdivision.

15. *P. erlangeri* Ulbr. (1921)

– type: SD; Tarro Gumbi, *Ellenbeck* 2094 (B holo destroyed, K photo).

Shrubby herb or shrub to 1 m; hairs on all parts fine white and shiny; vegetative parts pubescent to tomentose and glandular, no long simple hairs. Leaves: petiole 0.5–2.2 cm; lamina ovate to elliptic, up to 2.2 x 1.5 cm, entire, rounded to emarginate. Pedicels 5–20 mm, articulated above middle, with a few long simple hairs near apex. Epicalyx bracts 11–14, 12–15 mm long in flower. Calyx 4–5 mm long, puberulous and glandular. Petals pink, 12–15 mm long; column 5–7 mm, basal stamens 5–7 mm, apical 1–2 mm. Mericarps c 4 mm long, not winged, back tomentose, sides subglabrous, rugose. Fig. 82.18.1–4.

*Acacia* – *Commiphora* and *Combretum* – *Terminalia* woodland and bushland on reddish loamy soil; (700–) 1200–1650(–2000) m. SD BA; NE Uganda, N & NE Kenya. *Friis* et al. 2671; *Gilbert* et al. 7785; *Thulin* et al. 3478.

The extant Ethiopian material deviates considerably from the original description (and from the photo of the type at Kew). But numerous collections from N Kenya show clearly that the type was a very luxuriant specimen from one end of a continuous variation.

16. *P.* sp. = *Friis* et al. 2798.

Procumbent to ascending annual or perennial herb, stems up to 30 cm long; hairs on all parts fine white and shiny; vegetative parts pubescent to tomentellous, not glandular, stems with long simple hairs. Leaves: petiole 1–4 cm; lamina ovate to reniform, up to 2.7 x 2.7 cm, entire or toothed near apex, rounded to retuse. Pedicels 15–35 mm, articulated near apex. Epicalyx bracts 9–12, 6–10 mm long in flower. Calyx 2–3 mm long, puberulous. Petals purple outside, pink inside, 5–8 mm long; column c 3 mm, basal stamens 2–3 mm, apical absent or up to 1 mm. Mericarps c 2.5 mm long, not winged, back puberulous, with a central ridge and transversely ribbed, sides glabrous, rugose.

*Acacia* – *Commiphora* – *Barbeya* bushland on rocky limestone and basement ridges; 1300–1800 m. SD; not known elsewhere. *Friis* et al. 2798, 3128; *Mesfin Tadesse* et al. 4242.

Differs from *P. arabica* and *P. erlangeri* in its habit, very small purple flowers and smaller differently shaped mericarps.

17. *P. steudneri* Ulbr. (1921)

– type: EW; Bogos, *Steudner* 1122 (not seen).

Suffrutex to 25 cm; branchlets, petioles and pedicels hispid-tomentose and glandular. Leaves beneath velutinous, above subglabrous; petiole as long as lamina or longer; lamina ovate to suborbicular, up to 22 x 15 mm, entire or with a few apical teeth, obtuse. Pedicels up to 2 cm, articulated near apex. Epicalyx bracts 8–11, 4–5 mm long in flower. Calyx 4–5 mm long, hirsute. Petals up to 1 cm long, red; column *c* 5 mm. Mericarps *c* 4 mm long, with less than 0.5 mm wide wings, back pilose, sides glabrous.

Probably upland bushland; altitude not recorded. EW; not known elsewhere. Only known from the type.

The above description has been copied from the diagnosis. The author has not seen any material of the *P. arabica*-complex from anywhere near the type locality of this species. It is characterised by its very short epicalyx bracts. Further collections may eventually show that it is but a form of one of the four preceding species.

18. *P. eremogiton* Ulbr. (1921).

Subshrub or shrub to 20 cm; branchlets, petioles, pedicels and epicalyx glandular puberulous (no stellate hairs). Leaves pubescent and with simple glandular hairs; petiole 1–2.5 cm; lamina cordiform to orbicular, up to 1.5 x 1.5 cm, dentate, rounded. Pedicels 1.5–2.5 cm, articulated above middle. Epicalyx-bracts 5–6, 7–12 mm long in flower, without long simple hairs. Calyx 6–7 mm long, puberulous and with simple glandular hairs. Petals 17–20 mm long, pink; column *c* 13 mm. Mericarps 10–14 mm long, papery when mature, with 3–4 mm wide wings, puberulous to pubescent.

*Acacia* – *Commiphora* bushland on red sandy soil overlying limestone; *c* 600 m. HA-Som.; Somalia. *Robecchi-Bricchetti* 452, 460 (fide Ulbrich, l.c.).

A very rare species of which the author has only seen two recent rather incomplete collections. Hence the incomplete description of the flower.

19. *P. zeylanica* Cav. (1787),

*P. digitata* Hochst. ex Chiov. (1915) –type: without locality *Schimper* s.n. (not seen).

*P. zeylanica* subsp. *afro-arabica* Cufod., *Enum.*: 554 (1958) –type: TU; Gageros and Goelleb, *Schimper* 1255 (FT P iso).

*P. zeylanica* var. *microphylla* Ulbr. in *Bot. Jahrb. Syst.* 58: 154 (1920) – types (in part): HA; Djebel Haquim, *Ellenbeck* 944 (B destr.); HA; Merehan, *Robecchi-Bricchetti* 456 (not seen).

*P. zeylanica* var. *subquineloba* Ulbr. in *Bot. Jahrb. Syst.* 58: 154 (1920) – types (in part): BA; Web Valley, *Ellenbeck* 1144 (B destr.); TU; Gageros and Goelleb, *Schimper* 1255 (FT P isosyn).

not *Hibiscus zeylanicus* L. (1753).

Annual or perennial herb to 75 cm; vegetative parts puberulous to pubescent (hairs simple or stellate, glandular or not) and with long simple hairs. Leaves with simple strigose hairs above; petiole 0.5–4 cm; lamina broadly ovate to orbicular or reniform in outline, deeply (rarely shallowly) 3-lobed to divided, up to 2.7 x 3.2 cm, the lobes lanceolate to elliptic or obovate, the outer often with an abaxial lobe making the leaf appear 5-lobed, grossly dentate in upper

half, acute to rounded. Pedicels 1.5–4(–5) cm, articulated near apex. Epicalyx bracts 9–11, 6–8 mm long in flower. Calyx 3–4 mm long, puberulous to pubescent from simple hairs, densest along veins. Petals 7–11 mm long, yellow; column 3–5 mm, basal stamens absent or up to 4 mm, apical 1–2 mm. Mericarps 3–4 mm long, with up to 0.5 mm wide wings, puberulous, back with central ridge and transversely reticulate. Fig. 82.18.9 & 10.

*Acacia* – *Commiphora* woodland and bushland on limestone slopes, on red sandy soil overlying limestone and on grey sandy granitic soil, river-banks; (400–) 800–1700 m. AF TU (Tekezze Valley) WU SU (Awash Valley) GG SD BA HA; W Africa to Ethiopia, NE Uganda, N & E Kenya, Somalia, NE Tanzania, India and Ceylon. *Burger* 2873; *Friis* et al. 2829; *Gilbert* et al. 7882.

20. *P. pirottae* (Terrac.) Chiov. (1915)

–type: BA; Rer Amaden, *Baudi & Candeo* s.n. (FT holo).

Shrublet or shrubby herb to 25 cm; vegetative parts subglabrous to glandular pubescent and with scattered long simple hairs (rarely without). Leaves glabrous above (or with a few stellate hairs); petiole 1–4 cm; lamina orbicular to reniform in outline, digitately 3-foliolate (rarely only deeply lobed), up to 1.5 x 2.7 cm, lobes narrowly oblong to obovate or spatulate, outer usually with an abaxial lobe making the leaf look 5-lobed, central lobe with 3 large apical teeth, otherwise entire, rounded to truncate. Pedicels 0.5–4 cm, articulated near apex. Epicalyx bracts 9–12, 5–10 mm long in flower. Calyx 2–3.5 mm long, sparsely puberulous to pubescent along veins, ciliate towards apex. Petals 7–11 mm long, pale yellow; column 3–4 mm, basal stamens absent or up to 4 mm, apical 1–2 mm. Mericarps 4.5–6 mm long, with 1.5–3 mm wide wings, back with central ridge and transversely reticulate, glabrous to sparsely pilose, sides glabrous to puberulous and then with scattered pilose hairs. Fig. 82.18.11 & 12.

*Acacia* – *Commiphora* bushland on red sandy or stony soil overlying limestone; 300–1125 m. SD BA HA; Somalia, Arabia. *Gilbert* 2073; *Gilbert* et al. 8184; *Gilbert & Thulin* 143.

Closely related to *P. zeylanica*, but the differences in habit, leaf dentation, indumentum of the leaf and in mericarps seem sufficient to recognise it as a distinct species.

21. *P. ellenbeckii* Gürke (1904)

–type (in part): HA; Gabelle River, *Ellenbeck* 1031 (B destr.).

Annual or perennial herb to 1 m; vegetative parts pubescent to tomentose, stems rough to the touch, sometimes glandular. Leaves: petiole 0.5–4 cm; lamina ovate to oblong or narrowly so, up to 4.5(–6) x 2(–3.5) cm, entire (rarely with a few teeth near apex), subacute to truncate, apiculate. Flowers solitary or paired or one and a small cyme per axil; pedicels 0.5–3 cm, articulated up to 6 mm below calyx. Epicalyx-bracts 10–13, 8–12 mm long in flower. Calyx 3–4 mm long, glabrous with ciliate margin. Petals 7–12 mm long, white; column 2–5 mm, basal stamens 3–7 mm, apical absent or 2–3 mm. Mericarps 3–4 mm long, not

winged, back concave, spongy, with a longitudinal ridge and transversely reticulate, densely puberulous, sides finely puberulous. Fig. 82.18.19 & 20.

*Acacia* - *Commiphora*, *Acacia* - *Barbeya* - *Pistacia* and *Acacia* - *Anogeissus* woodland and bushland on grey to black alluvial soils; 1150-1525 m. SU (Blue Nile Gorge) SD BA HA; Somalia, NE Uganda, N & E Kenya, E Tanzania. Friis et al. 3351; Getachew Aweke & Gilbert 1044; Gilbert et al. 7894.

22. *P. schweinfurthii* Ulbr. (1921)

- type: EW; Lava Valley, Schweinfurth 1685 (not seen).

*P. lavae* Engl. (1910), *nom. nud.*

Perennial or shrubby herb to 0.6 m; stems, petioles and pedicels glandular pubescent, and with simple curled hairs, stems sticky, smooth to the touch. Leaves pubescent to tomentose; petiole 0.5-5 cm; lamina narrowly ovate to ovate or elliptic, up to 4(-5) x 2.5 cm, entire, acute to rounded. Pedicels 1-5 cm, articulated (2-)5-15 mm below calyx. Epicalyx-bracts 8-12, 6-13 mm long in flower. Calyx 3-4(-5) mm long, puberulous and glandular. Petals 10-18 mm long, white to pale yellow; column 7-12 mm, basal stamens 4-10 mm, apical 1-3 mm. Mericarps 3-4 mm long, not winged, back flat, densely pilose, reticulate, sides with scattered hairs, rugose. Fig. 82.18.17 & 18.

*Acacia* - *Commiphora* woodland and bushland, often in rocky or eroded places; 800-1350(-1900) m. EE EW TU SD HA; NE Kenya. Friis et al. 2933; Gilbert et al. 7437; J. de Wilde 7080.

This species has a rather disjunct distribution, but the collections from the north and south are fairly constant, especially in indumentum characters.

23. *P. sp.* = *Corradi* 3527.

Annual or perennial often densely caespitose herb to 30 cm; stems, petioles and pedicels glandular puberulous to pubescent and with long simple hairs. Leaves pubescent; petiole 1-4.5 cm; lamina broadly ovate to elliptic or orbicular, up to 3.7 x 3.5 cm, entire or with a few large teeth near apex, rounded to emarginate. Pedicels 1-3(-4) cm, articulated above middle. Epicalyx-bracts 9-13, 8-15 mm long in flower. Calyx 3-5 mm long, subglabrous to pubescent, ciliate. Petals 8-15 mm long, white or very pale yellow, fading to pink; column 4-7 mm, basal stamens 4-6 mm, apical absent or 1-2 mm. Mericarps 5-6.5 mm long, with 1-2 mm wide ciliate wings, back glabrous, strongly transversely ribbed, sides pilose or sparsely so.

*Acacia* - *Commiphora* bushland on red to grey sandy to gravelly granitic sand; c 500 m. GG; NE Uganda, N & NE Kenya (south to Tana River). *Corradi* 3527, 3541, 3860.

A very distinctive species immediately recognisable by the combination of winged transversely ribbed mericarps and entire leaves. Judged by the indumentum, it is probably closest to *P. schweinfurthii*. It seems to avoid completely the limestone area of SE Ethiopian where so many other species of this genus occur.

24. *P. hildebrandtii* Gürke ex Ulbr. (1912)

- type: HA; Milmil, Ruspoli & Riva 1067 (not seen).

Perennial (rarely annual) herb, shrubby herb or shrub to 1.5 m; vegetative parts pubescent to tomentose, branchlets rough, sometimes glandular. Leaves: petiole 0.3-3(-5) cm; lamina ovate to elliptic or narrowly so, up to 4.5 x 2.5 cm, dentate, acute to rounded. Pedicels 1-3 cm, articulated above middle. Epicalyx-bracts (8-)10-12, 10-18 mm long in flower. Calyx 3.5-4.5 mm long, puberulous to pubescent, glabrous towards base, sometimes glandular, ciliate. Petals 13-22 mm long, white to pale yellow; column 6-10 mm, basal stamens 3-8 mm, apical absent or c 1 mm. Mericarps 6-7 mm long, with wings about 0.5 mm wide at base and top but up to 2 mm in middle giving mericarps a triangular look when seen from the side, back slightly reticulate, pubescent to pilose, sides finely puberulous. Fig. 82.18.13 & 14.

*Acacia* - *Commiphora* woodland and bushland on rocky limestone slopes, sandy to loamy soil overlying limestone and on basalt and sandstone, *Acacia* - *Combretum* - *Pappea* wooded grassland; 800-1600 m. SU (Awash Valley) SD BA HA; Somalia, NE Kenya, the Yemen. Burger 2809; Friis et al. 2796; Gilbert et al. 7478.

Closely related to *P. serrata* Franch. from NE Somalia which has longer epicalyx-bracts and longer calyx.

25. *P. sp.* = *Gilbert* et al. 7523.

Shrubby herb or shrublet to 0.5 m; vegetative parts pubescent to tomentose, stems also with long simple and minute glandular hairs. Leaves: petiole 0.3-3 cm; lamina broadly ovate or broadly elliptic to orbicular, often some indistinctly 3-lobed, up to 2.5 x 2.5 cm, grossly dentate, subacute to rounded. Pedicels 0.5-1(-2.2 in fruit) cm, articulated 3-8 mm below calyx (in shorter pedicels at or below middle). Epicalyx-bracts (7-)9-11, 5-8 mm long in flower. Calyx 4-5 mm long, pubescent and with simple strigose hairs along edges. Petals 7-12 mm long, white to pale yellow; column 4-6 mm, basal stamens 2-4 mm, apical 0.5-2 mm. Mericarps 4.5-6 mm long, with 1-2 mm wide wings, back pubescent to pilose, sides sparsely puberulous and usually with scattered long pilose hairs.

*Acacia* - *Commiphora* bushland and grassland on yellow gypsaceous alluvium, river banks, grassy coastal plains with *Panicum turgidum*; 50-250 m. EE SD; Somalia. Gilbert et al. 7523; Hemming 1068.

This species is probably best placed next to the *P. kotschyi* complex, but it differs in its small white flowers, small non-papery mericarps with narrow wings and deeply articulated pedicels. It also grows at very low altitudes. Only known from a handful of collections.

26. *P. kotschyi* Hochst. ex Webb (1854).

Woody herb or shrublet to 0.5 m; vegetative parts pubescent to tomentose. Leaves: petiole 0.1-3 cm; lamina ovate or elliptic to orbicular, up to 3 x 2.5 cm, grossly dentate, subacute to truncate. Pedicels 0.5-1.5(-2.5 in fruit) cm, articulated above middle. Epicalyx-bracts 9-11, (6-)8-14(-18 in fruit) mm long. Calyx 4-6(-8 in fruit) mm long,

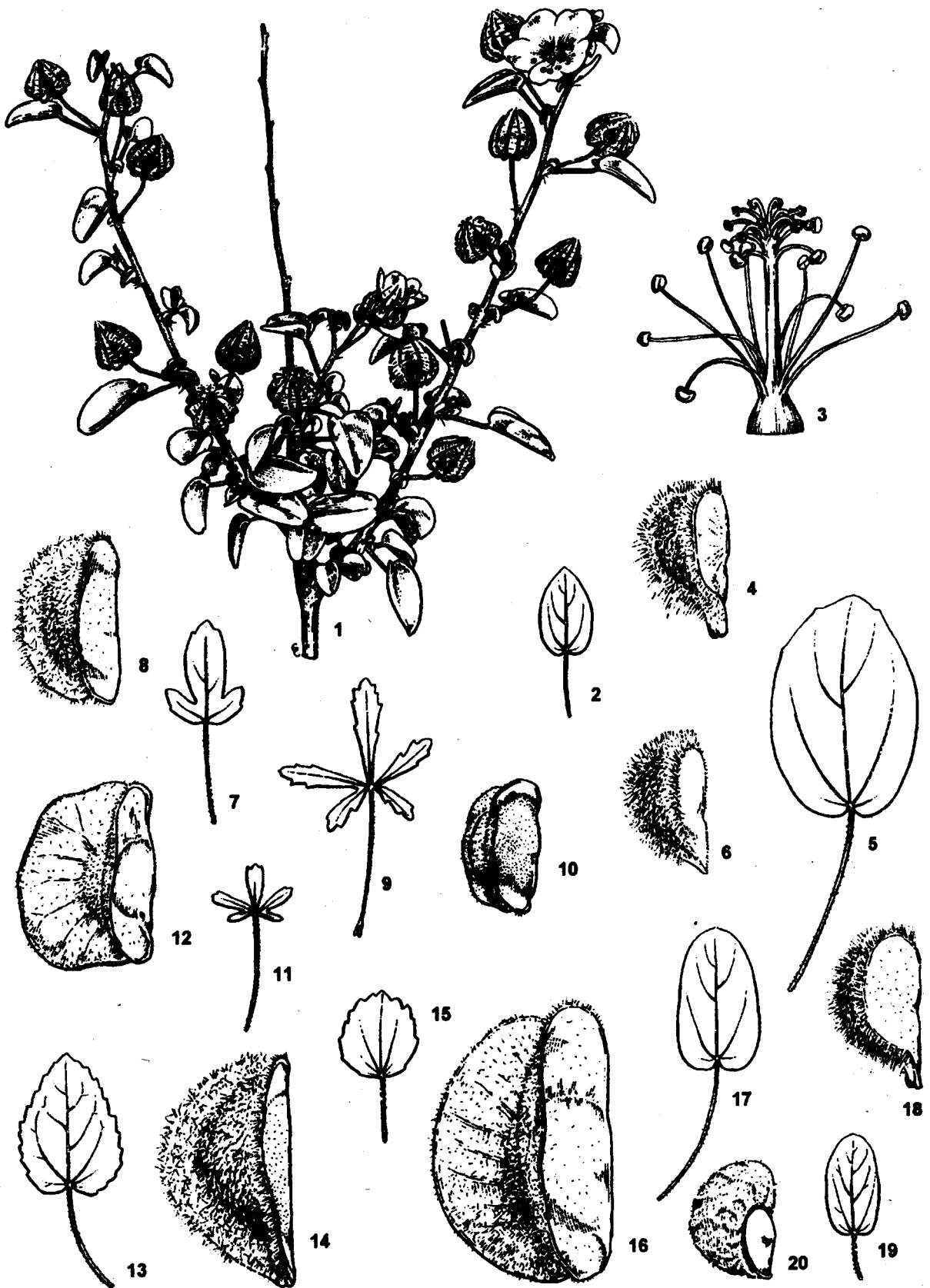


Figure 82.18 *PAVONIA ERLANGERI*: 1 - habit  $\times \frac{1}{4}$ ; 2 - leaf  $\times \frac{1}{4}$ ; 3 - staminal column  $\times 6$ ; 4 - mericarp  $\times 6$ . Leaves ( $\times \frac{1}{4}$ ) and mericarps ( $\times 6$ ) of *P. ARABICA* (5 & 6); *P. TRILOBA* (7 & 8); *P. ZEYLANICA* (9 & 10); *P. PITOTTAE* (11 & 12); *P. HILDEBRANDTII* (13 & 14); *P. KOTSCHYI* (15 & 16); *P. SCHWEINFURTHII* (17 & 18); *P. ELLENBECKII* (19 & 20). 1-3 from Gilbert & Jones 4464; 4 from Gilbert et al. 7785; 5 from Gilbert & Thulin 137; 6 from Smeds 1289; 7 & 8 from Wickens 262; 9 from Friis et al. 2829; 10 from Popov 1097; 11 & 12 from Gilbert & Thulin 143; 13 & 14 from Burger 2809; 15 from Shabetai 214; 16 from Ellis 51; 17 from Friis et al. 2933; 18 from Gillett 13455; 19 from Gilbert et al. 7826; 20 from Wilson 613. Drawn by Eleanor Catherine.

puberulous to pubescent. Petals 9–16 mm long, lemon yellow or bright yellow; column 4–10 mm, basal stamens absent or up to 4 mm, apical 2–3 mm. Mericarps 7–9 mm long, papery when mature, with 3–5 mm wide wings, back puberulous to pubescent, sides glabrous or with long curled hairs. Fig. 82.18.15 & 16.

*Acacia* – *Commiphora* bushland on sandy to stony soil, coastal plains with *Panicum turgidum*; (0–)450–1125 m. EE TU (Tekezze Valley) HA; W Africa to Ethiopia, Somalia, NE Kenya, Arabia. Bally 9615, 12985; Ellis 183.

27. *P. sp.* = Gilbert 2074.

Perennial herb or shrub to 0.5 m; branchlets and petioles pubescent, sometimes glandular. Leaves densely puberulous to tomentellous; petiole 0.1–2 cm; lamina broadly elliptic to orbicular, up to 2 x 2 cm, dentate, truncate to retuse. Pedicels 1–1.5 (–4.5 in fruit) cm, articulated above middle, glandular pubescent, sticky. Epicalyx-bracts 13–19, 7–10 (–18 in fruit) mm long. Calyx 2–3 mm long, glandular ciliate and glandular pubescent on veins, otherwise glabrous. Petals 9–15 mm long, bright yellow; column 4–7 mm, basal stamens 3–4 mm, apical 1–2 mm. Mericarps 7–9 mm long, papery when mature, with 3–4 mm wide wings, indumentum as in *P. kotschy*.

Open *Acacia* – *Commiphora* bushland on deep red sandy soil overlying limestone; c 600 m. HA; Somalia. Bally 9627; Gilbert 2074; Glover & Gilliland 364.

Only known from 5 collections from the flat plains of the eastern Ogaden and just into neighbouring Somalia. One of the true narrow Ogaden endemics. It is related to *P. kotschy*, but with a different indumentum and more numerous epicalyx-bracts.

28. *P. sp.* = Simmons 65.

Shrublet to 0.2 m; branchlets, petioles and pedicels glandular puberulous, sometimes with scattered stellate hairs. Leaves pubescent and glandular; petiole 0.3–2 cm; lamina oblong to elliptic or narrowly so, up to 1.8 x 1 cm, dentate, rounded to truncate. Pedicels 0.5–1 (–1.5 in fruit) cm, articulated above middle. Epicalyx-bracts 7–9, 5–10 (–15 in fruit) mm long. Calyx 2.5–4.5 mm long, puberulous. Petals 8–11 mm long, bright or lemon yellow; column 4–5 mm, basal stamens absent or up to 2 mm, apical 1–2 mm. Mericarps 6–7 mm long, papery when mature, with c 3 mm wide wings, indumentum as in *P. kotschy*.

Open *Acacia* – *Commiphora* bushland on red sandy soil overlying limestone; 400–600 m. HA; not known elsewhere. Peck 62; Simmons 65.

Only known from these two collections. Shows the same distribution as the preceding species. Also related to *P. kotschy*, but with different indumentum, narrower leaves, shorter pedicels and smaller mericarps.

*Excluded species.*

*P. patens* (Andr.) Chiov. (1915)

– type: plate 571 in Andr., *Bot. Repos.* (1809).

No herbarium specimens were ever made of the plants drawn in *Bot. Repos.*, but this drawing is clearly stated to have been made from a plant grown from seeds sent by Salt from Ethiopia.

This plant is clearly not a *Pavonia*: the flowers have no epicalyx, the stamens are all situated apically on the column, the styles are free, the fruit is said to consist of ‘capsules’, i.e. the carpels are opening up, and are several seeded.

It is clearly an *Abutilon*, and – judging by the combination of long spreading hairs and long-beaked mericarps – most likely a specimen of *Abutilon mauritanum* (Jacq.) Medic. to which species it is being referred in this account.

13. MALVA L. (1753)

I. Riedl (1976) in K. H. Rechinger (Ed.), *Flora Iranica No. 120* (Malvaceae): 1–86.

Annual or perennial herbs; indumentum usually stellate. Leaves unlobed to deeply lobed or divided; stipules triangular to falcate. Flowers in axillary clusters or fascicles. Epicalyx-bracts 3, linear to ovate, free or adnate to calyx. Calyx 5-lobed. Ovary of 8–15 free 1-ovulate carpels around a central torus; style branches as many as carpels. Fruit a discoid schizocarp, mericarps segmentiform, indehiscent, smooth or variously sculptured, glabrous or hairy.

About 30 species in the Old World, mainly in the temperate and Mediterranean regions extending into Central Asia. A number of species are now widespread cosmopolitan weeds. The genus is probably not native in Africa south of the Sahara.

1. Mericarps 7–9, reticulately sculptured on back; petals more than twice as long as sepals. 2  
– Mericarps 10–13, sculptured or not; petals about the same length as sepals (more rarely up to twice as long). 3
2. Erect perennial herb; indumentum mostly of stellate not bulbous-based hairs; petals 3 or more times longer than sepals. 3. *M. sylvestris*  
– Trailing or ascending annual herb; indumentum usually of stiff spreading bulbous-based simple hairs; petals 2–3 times as long as sepals. 4. *M. nicaeensis*
3. Mericarps with back smooth or weakly ribbed near edges, sides weakly ribbed, edges rounded; leaves up to 24(–30) x 24(–30) cm. 1. *M. verticillata*  
– Mericarps with sharp transverse dorsal ridges meeting the strongly ribbed sides in sharp jagged edges; leaves up to 7(–9) x 7(–10) cm. 2. *M. parviflora*

1. *M. verticillata* L. (1753).

*M. abyssinica* A. Braun (1841) – type: cultivated in Carlsruhe from seeds sent by Schimper from Ethiopia (BM iso).

*M. parviflora* Höjer var. *microcarpa* (Desf. ex Pers). Fiori & Paol., *Fl. Anal. d'Ital.* 2: 268 (1900–1902).

Erect to decumbent or ascending annual or biennial herb to 2(–3) m; all parts pubescent or pilose. Leaves: petiole 3–20 cm; lamina cordiform to reniform in outline, shallowly 5(–7)-lobed, up to 24(–30) x 24(–30) cm, crenate to dentate; lobes triangular, acute to rounded. Flowers in dense axillary clusters, merging into interrupted spike-like panicles; pedicels 0–7(–18 in fruit) mm. Epicalyx-bracts up to 5 x 2 mm, lanceolate to narrowly ovate, free from calyx. Calyx 4–5 mm long, accrescent, scarious and up to 1 cm in fruit; lobes triangular, acute. Petals 6–10 mm long, white to bluish violet; column 4–5 mm. Mericarps 10–13, 1.5–2 mm long, glabrous (rarely puberulous), back smooth or slightly ribbed near edges, sides with stronger ridges; torus *c* 1 mm across apically, with a *c* 1 mm long conical projection. Fig. 82.19.1–4.

Paths and clearings in upland forest, upland grassland, cultivated areas (often near houses in villages), weed; (1600–)2000–3700(–4000) m. EW TU GD GJ WU SU AR WGKF SD BA HA; widespread in the tropical, subtropical and warm temperate regions of the Old World. *Burger* 2419; *E. F. Gilbert* 122; *Mooney* 5218.

In more undisturbed habitats (forest paths and clearings) normally a strictly erect plant with a distinct inflorescence of sessile flowers in dense clusters. In more disturbed areas (or where subject to trampling) often decumbent to ascending and with a tendency to fewer flowers per cluster and the flowers often tending to have longer pedicels. Long pedicels seems especially to be characteristic of purely ruderal plants.

A collection at Kew from 'Jardin de Mr. Webb, 28.8.1841' is almost certainly grown from the same seed collection as the type.

2. *M. parviflora* Höjer (1753).

*M. parviflora* var. *crinata* Boiss. (1867).

Decumbent or ascending annual herb, stems up to 50 cm long; all parts subglabrous to pubescent. Leaves: petiole 2–11 cm; lamina reniform in outline, angular to very shallowly 5–7-lobed, up to 7(–9) x 7(–10) cm, crenate, broadly rounded. Flowers in few-flowered axillary clusters; pedicels up to 7(–18 in fruit) mm, usually some more than 1 cm. Epicalyx-bracts up to 4 x 0.5 mm, linear, basal part united with calyx. Calyx *c* 4 mm long, accrescent in fruit; lobes ovate (narrowed at base), acute. Petals *c* 4 mm long, white to pink; column *c* 2 mm. Mericarps 10–11, *c* 3 mm long, glabrous, back with sharp transverse ridges, strongly ribbed sides and sharply jagged edges; torus *c* 2 mm across apically, without conical projection. Fig. 82.19.7.

Degraded and overgrazed montane bushland, lakeshores, roadsides, weed, ruderal; (900–)1500–2500 m. EE EW TU WU SU AR SD; native of Europe and Asia, now an

almost cosmopolitan weed. *Gilbert* 1083; *Mooney* 8090; *J. de Wilde* 4528.

3. *M. sylvestris* L. (1753).

Erect perennial herb; vegetatively much like *M. verticillata*; indumentum finely pubescent with long pilose hairs on petioles, pedicels and basal part of calyx. Flowers mostly paired in leaf axils; pedicels up to 15 mm. Petals 15–20 mm long, at least 3 times longer than calyx. Mericarps 7–9, glabrous to densely hairy, strongly reticulately sculptured on back, with distinct slightly raised lateral edges. Fig. 82.19.5.

Probably an introduced weed; altitude not indicated. EW; widespread in Europe and into west and central Asia, introduced in southern Africa. *Pappi* 4587.

Material from Europe and Asia usually has 9–14 mericarps while the single Ethiopian collection has 7–9. But otherwise it is completely typical.

4. *M. nicaeensis* All. (1785).

Vegetatively like *M. parviflora*, but with indumentum mostly of stiff, spreading bulbous-based simple hairs; epicalyx-bracts ovate; petals purple, up to twice as long as calyx; mericarps 8–9, glabrous to densely hairy, transversely ribbed and reticulate on back and with sharp slightly raised lateral edges. Fig. 82.19.6.

Weed in tef on black cotton soil; *c* 2150 m. TU; widespread from the Mediterranean into Central Asia. *Parker* E.74.

14. *LAVATERA* L. (1753).

Shrubby herbs, shrubs or small trees; indumentum stellate. Leaves unlobed and angular to deeply lobed; stipules mostly foliaceous. Flowers solitary, axillary or merging into racemoid panicles. Epicalyx-bracts 3–6, united in basal part. Calyx 5-lobed. Ovary of numerous free 1-ovulate carpels around a central torus; style branches as many as carpels. Fruit a discoid schizocarp, mericarps segmentiform, indehiscent, smooth or variously sculptured.

About 25 species. Mostly in the Mediterranean region stretching into Central Asia. Also in Australia, western N America to northern S America, S Africa and the present species in Ethiopia.

*Lavatera* is very closely related to *Malva*, and the only reliable separating character seems to be whether the epicalyx-bracts are free (*Malva*) or fused at base. However, the habit is also a useful character: the species of *Lavatera* are all woody.

*L. abyssinica* Hutch. & Bruce (1941)

– type: HA; Mt. Sanerta, *Gillett* 5195 (K holo, FT P iso).

Much branched or virgate shrubby herb to 2 m; all parts densely pubescent to tomentellous. Petiole 4–10 cm; lamina cordiform to reniform in outline, shallowly (3–)5–7-lobed, 4–13 x 3–14 cm, finely to grossly crenate to dentate; lobes triangular, acute to rounded. Flowers in axillary clusters, merging into well defined racemoid panicles; pedicels 0.5–3 cm. Epicalyx-bracts 3, 5–10 x 3–6 mm,



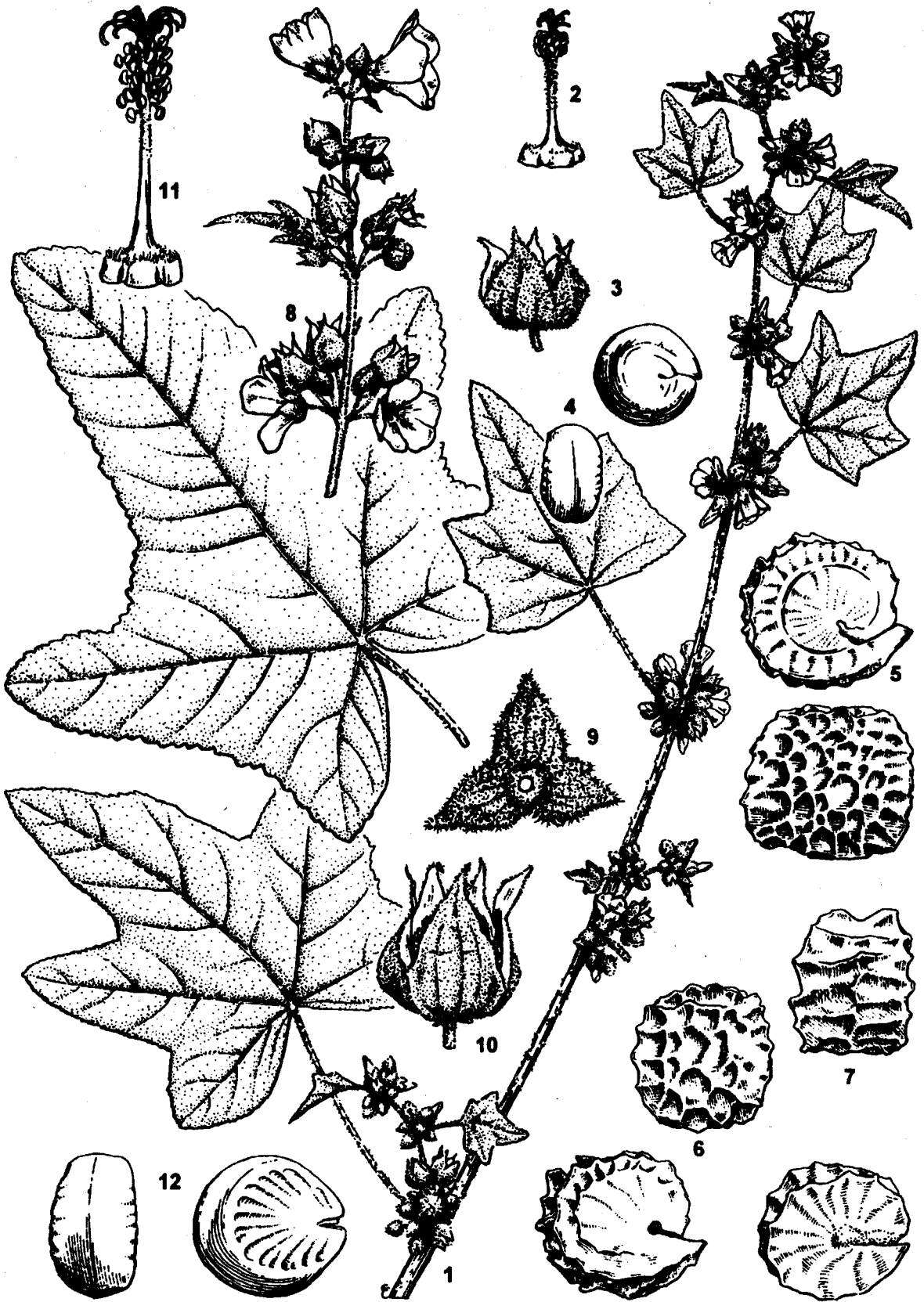


Figure 82.19 *MALVA VERTICILLATA*: 1 – flowering and fruiting stem  $\times \frac{1}{4}$ ; 2 – staminal column  $\times 4$ ; 3 – calyx  $\times 2$ . Mericarps, side and back view ( $\times 9$ ) of *M. VERTICILLATA* (4), *M. SYLVESTRIS* (5), *M. NICAEËNSIS* (6) and *M. PARVIFLORA* (7). *LAVATERA ABYSSINICA*: 8 – leaf and part of inflorescence  $\times \frac{1}{4}$ ; 9 – base of calyx  $\times 3$ ; 10 – calyx  $\times 2$ ; 11 – staminal column  $\times 4$ ; 12 – mericarp, lateral and dorsal view  $\times 9$ . 1 from Burger 3131; 2 from Gilbert & Thulin 122; 3 from Burger 2419; 4 from Mooney 5218; 5 from Pappi 4587; 6 from Helbaeck 983; 7 from Mooney 8090; 8–12 from Burger 3318. Drawn by Eleanor Catherine.

ovate, acute to rounded, united in basal 1–3 mm, free from calyx. Calyx 6–11(–15 in fruit) mm long, accrescent and scarious in fruit; lobes triangular-ovate, acute. Petals 1.5–2.5 cm long, pale pink to violet with darker lines; column 5–10 mm. Mericarps 12–15, *c* 3 mm long, glabrous, back smooth, sides striate, edges slightly raised. Fig. 82.19.8–12.

Edges of montane forest, montane bushland and scrub (secondary), roadsides; 2600–3050 m. KF BA HA; not known elsewhere. *Burger* 1207, 3318; *Friis* et al. 1449.

### 15. ALCEA L. (1753)

#### *A. rosea* L. (1753).

*Althaea rosea* (L.) Cav. (1786).

Coarse annual herb to 2(–3) m. Leaves cordiform, shallowly 3–5-lobed. Flowers subsessile, in axillary clusters merging into spike-like panicles. Epicalyx-bracts 6, united at base. Petals 3–5 cm long, white to pink or violet. Carpels 18–40. Fruit a discoid schizocarp, mericarps indehiscent, each divided by an internal septum into an upper empty cell and a lower with a single seed, back with a central furrow, sides appressed setose, lateral angles winged.

Origin unknown but possibly originally a hybrid, widely cultivated in Europe and often naturalized. In Ethiopia seen in flowerbeds in and around Addis Ababa.

### 16. MALVASTRUM A. Gray (1849)

S.R. Hill (1982): A monograph of the genus *Malvastrum*. Part II & III. *Rhodora* 84: 159–264 & 317–410.

Cufodontis (l.c.) records *M. americanum* (L.) Torrey (1859) and *M. coromandelianum* (L.) Garcke (1857) as occurring in NW Ethiopia. Hill (l.c.) does not record *M. americanum* as occurring in Africa at all, and he only records *M. coromandelianum* from W Africa, Kenya and Tanzania. The only other species recorded by him from Africa is *M. corchorifolium* (Desr.) Small (1913) from W Africa. The genus is not native in Africa and these two species only occur as occasional ruderals and might possibly also occur as such in Ethiopia.

The author has not been able to trace the origin of Cufodontis's records, but as there is a possibility that the genus might occur in Ethiopia, it has been included in the key without listing any species.

### 17. WISSADULA Medic. (1787)

Perennial herbs or shrubs; indumentum stellate. Leaves unlobed; stipules setaceous. Flowers in lax terminal panicles. Epicalyx absent. Calyx 5-lobed. Ovary of 3–5 free 3-ovulate carpels around a central torus; style-branches 3–5. Fruit a schizocarp with stellately spreading mericarps; mericarps transversely divided by a septum formed by a constriction of the lateral walls, ultimately dehiscing and releasing the seeds; seeds 1–3 per mericarp, globose to reniform.

About 40 species. Mostly in tropical America with a few widespread in Africa and Asia.

#### *W. rostrata* (Schumach. & Thonn.) Hook. f. (1849).

*W. periplocifolia* sensu Cufod. (1959), quoad distrib. Afric., non (L.) Presl. ex Thw. (1858).

Erect usually much branched perennial herb to 1.5 m; stems, inflorescences and calyx puberulous and usually with large floccose white hairs. Leaves beneath whitish puberulous to tomentellous and with large floccose hairs, above subglabrous; petiole up to 12 cm (uppermost usually subsessile); lamina cordiform, 4–17 x 3–12(–14.5) cm, entire or indistinctly crenulate, acuminate to cuspidate. Flowers in large lax terminal panicles; pedicels 1–3.5(–7 in fruit) cm. Calyx 3–4 mm long; lobes triangular, acute. Petals 5–7 mm long, yellow to orange; column *c* 1 mm, filaments 4–5 mm. Mericarps 8–10 mm long (including a *c* 1 mm long beak), obconic, stellately spreading in upper half, puberulent; seed *c* 3 mm long, pubescent. Fig. 82.20.

Lowland rain forest, riverine forest and scrub, groundwater forest; 500–1900 m. EE AF EW TU GD SU (Awash Valley) IL KF GG SD; widespread in tropical Africa and S Africa, also in the Yemen. *Ash* 1614; *Gilbert* 1243; *Gilbert & Thulin* 290.

In most recent Asian floras (e.g. Borssum Waalkes, l.c.) there is a tendency to consider this species a synonym of *W. periplocifolia*, a species widespread in tropical Asia and supposedly also in S America. The author agrees with Exell (l.c.) and Hauman (l.c.) that there are sufficient differences between the African and Asian plants to recognise two species. In contrast to the above description, *W. periplocifolia* has a fawn indumentum on stems, narrower leaves and shorter (*c* 2 mm) filaments.

Exell in *Bull. I.F.A.N.* 21: 452 (1959) discusses the differences between *W. rostrata*, *W. amplissima* (L.) R. E. Fries and *W. hernandioides* (L'Herit.) Garcke (two other widespread Old World species). Unfortunately he does not consider *W. periplocifolia*.

### 18. ABUTILON Mill. (1754)

Perennial (rarely annual) herbs, subshrubs or shrubs; indumentum stellate. Leaves unlobed (rarely shallowly 3-lobed); stipules usually filiform to linear. Flowers solitary or in fascicles, sometimes on short axillary branches, often merging to terminal and lateral panicles, rarely 2–6 on a common axillary peduncle. Epicalyx absent. Calyx 5-lobed. Ovary of (5–)10–40 free 3–9-ovulate carpels around a central torus; style-branches as many as carpels. Fruit a subglobose schizocarp of follicle-like 1–3(–9)-seeded mericarps, often only tardily separating, dehiscing apically along the ventral suture; seeds reniform to globose, glabrous to tomentose, smooth or papillose.

100–150 species. Widespread in all tropical and subtropical regions and occasional ruderals elsewhere. Many species are very widespread ruderals.

1. Petals white to pink or lilac with purple centre and veins or uniformly reddish purple, never with any yellow. 2
- Petals yellow to orange, sometimes with reddish centre. 5

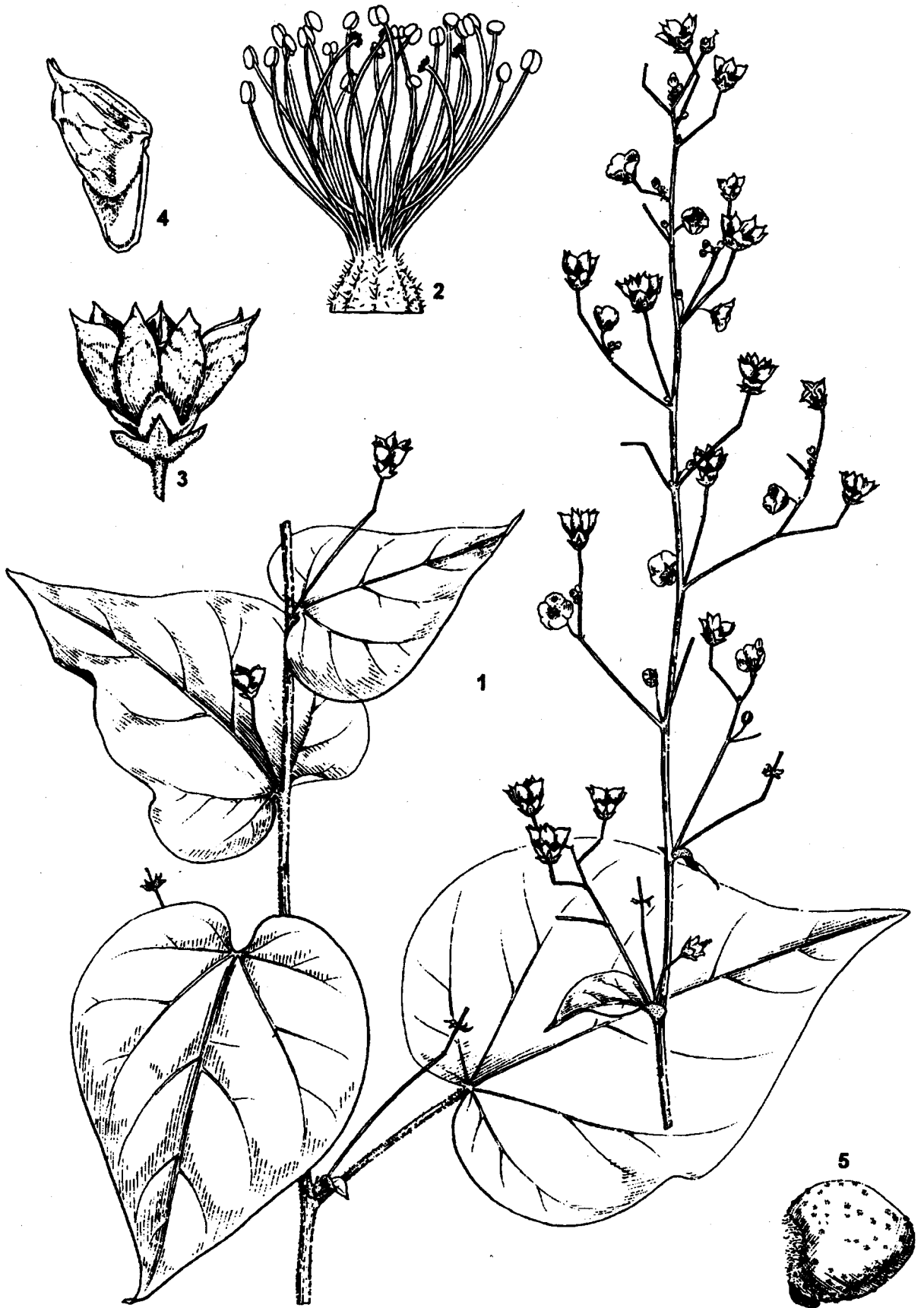


Figure 82.20 *WISSADULA ROSTRATA*: 1 – basal leaves and part of inflorescence  $\times \frac{3}{4}$ ; 2 – staminal column  $\times 5$ ; 3 – fruit  $\times 4$ ; 4 – mericarp, side view  $\times 4$ ; 5 – seed  $\times 10$ . 1 & 3–5 from *W. de Wilde* 10619; 2 from *Wickens* 2743. Drawn by Eleanor Catherine.

2. Petals uniformly reddish purple; mericarps 2–3-seeded, 10–16 mm long; seed glandular puberulous. 4. *A. somalense*  
 – Petals with centre darker than distal parts; mericarps 1-seeded; seed glabrous. 3
3. Petals with broad band of hairs at transition to column; mericarps *c* 15 mm long, with *c* 2 mm long awns; leaves 3-lobed; pedicels 3–9.5 cm long. 3. *A. sp.* = Meyer 8848  
 – Petals at most ciliate or slightly hairy along edges of claw; mericarps 6–10 mm long, not awned; leaves not lobed; pedicels 0.5–4.5 cm. 4
4. Leaves tomentellous beneath, not with long simple hairs above; mericarps with outer and dorsal edges rounded, not forming an angle. 1. *A. longicuspe*  
 – Leaves puberulous beneath or with long simple hairs above; mericarps with outer and dorsal edges meeting in a short point or an angle. 2. *A. cecilia*
5. Mericarps 6–8; flowers in 2–6-flowered axillary umbels; petals 4–7 mm long. 5. *A. ramosum*  
 – Mericarps 10 or more (rarely 8–9); flowers solitary or in fascicles, often merging into large terminal inflorescences; petals (5–)7–27 mm long. 6
6. Older stems markedly angular with longitudinal ridges. 6. *A. angulatum*  
 – Older stems rounded, not with longitudinal ridges. 7
7. Mericarps (8–)9–11(–12). 8  
 – Mericarps always 12 or more. 11
8. Mericarps 10–13 mm long; petals *c* 2 cm long; pedicels and calyx with glandular hairs; pedicels articulated 7–10 mm below calyx. 9  
 – Mericarps 5–9 mm long; petals (5–)7–17 mm long; pedicels and calyx without glandular hairs; pedicels articulated up to 5 mm below calyx. 10
9. Plant erect; stems and leaves puberulous, without larger stellate hairs; inflorescence up to 15 cm long, narrow. 9. *A. sp.* = Glover & Gilliland 395  
 – Plant scrambling or procumbent; stems and leaves puberulous and with larger stellate hairs; inflorescence up to 75 cm long, lax and divaricately branched. 10. *A. sp.* = Gilbert et al. 8226
10. Calyx 4–6(–7) mm long, shorter than mature mericarps, lobed less than  $\frac{1}{2}$  down; petals (5–) 7–12 mm long. 7. *A. fruticosum*  
 – Calyx 8–12 mm long, longer than mature mericarps, lobed more than  $\frac{1}{2}$  down; petals 10–17 mm long. 8. *A. sp.* = Gilbert 2100
11. Mericarps with a 1–7 mm long dorsal awn, black when ripe. 12  
 – Mericarps not awned or with an up to 0.5(–1) mm long awn, usually grey to brownish when ripe. 15
12. Petals with dark red centre; stems, petioles and leaves without long simple hairs; calyx (12–) 14–22 mm long; mericarps 13–20 mm long. 11. *A. sp.* = Burger 2946  
 – Petals without dark red centre; stems, petioles and leaves with long simple hairs. 13
13. Mericarps more than 20, with 3–5 mm long awns. 12. *A. mauritanium*  
 – Mericarps 12–20, with 1–2 mm long awns. 14
14. Mericarps 15–17 mm long; petals *c* 15 mm long; calyx 8–15 mm long. 13. *A. erythraeum*  
 – Mericarps 8–10 mm long; petals 7–11(–13) mm long; calyx 6–10 mm long. 14. *A. bidentatum*
15. Calyx and/or leaves and/or young stems with basally swollen yellowish glandular hairs making whole plant sticky; petals with dark red centre. 18. *A. hirtum*  
 – Glands if present not basally swollen and yellowish, whole plant not sticky; petals usually without dark centre. 16
16. Mericarps 13–16, 10–13 x 5–6 mm (more than twice as long as wide); inflorescence leafless, densely glandular; calyx 5–9 mm long, lobed less than  $\frac{1}{2}$  down. 17. *A. anglosomaliae*  
 – Mericarps 16–30, 6–12 x 4–7 mm (less than twice as long as wide); at least basal part of inflorescence leafy; calyx 6–15 mm long, lobed  $\frac{1}{2}$ – $\frac{2}{3}$  down. 17
17. Calyx with long spreading simple hairs. 19. *A. graveolens*  
 – Calyx without long spreading simple hairs. 18
18. Petals with dark red centre, 14–25 mm long; stipules up to 1 mm wide; calyx 10–15 mm long; mericarps 1–2-seeded; seeds with long simple hairs. 16. *A. pannosum*  
 – Petals without red centre, 8–17 mm long; stipules 1.5–3 mm wide; calyx 6–12 mm long; mericarps (2–)3-seeded; seeds with stellate hairs. 15. *A. figarianum*
1. *A. longicuspe* Hochst. ex A. Rich. (1847)  
 – types: TU; Memsach, Genniam, Schimper I:258 (P syn, BM FI(Webb) K isosyn); TU; near Adua, Mt Scholoda, Schimper III:1511 (P syn, BM FI(Webb) FT K iso).  
*A. crassinervium* Hochst. ex Mattei (1915) – type: Ethiopia, no loc., Schimper in Hohenacker 169 (PAL not seen).  
*Sida acuminata* R. Br. in Salt (1814), nom. nud.
- Shrubby herb or shrub to 3 m; all parts tomentellous, with or without long simple hairs. Lower leaf surface not visible, upper without long simple hairs; petiole 2–19 cm; lamina cordiform to broadly so, up to 22 x 15.5 cm, crenate to dentate, acuminate to cuspidate. Flowers in often large terminal and lateral panicles; pedicels 0.5–3(–4) cm. Calyx 6–12 mm long, lobed  $\frac{1}{3}$ – $\frac{1}{2}$  down. Petals 8–20 mm long, white to pink or lilac with purplish centre; column 2–7 mm, purple, expanded part glabrous, cylindrical with inflated shiny simple or 2–3-furcate hairs, filaments 4–12 mm. Mericarps 13–23, 6–10 x 4–7 mm, 1-seeded, reniform in outline, outer and dorsal edge both rounded, no dorsal angle, papery and brittle, floccose-tomentose; seed *c* 2 mm long, glabrous. Fig. 82.21.1–5.
- Edges and clearings of upland forest, secondary forest and scrub, coffee-plantations, edges of riverine forest, rocky outcrops in grazed areas; (1275–)1500–2800 m. EW TU GD GJ SU AR WG IL SD BA HA; from Sudan and Ethiopia through eastern Africa to E Zimbabwe, also in the Yemen. Friis et al. 1704; Roberts on 1463; Thulin 1559.

The material from N Ethiopia (including the types) tends to have considerably larger flowers than that from S Ethiopia, with petals (10–)15–20 (not 8–14) mm long, column 3–7 (not 2–3) mm long, stamens 7–12 (not 4–7) mm long and calyx 8–12 (not 6–9) mm long. A rather good case could be put forward for recognising two subspecies. But the author hesitates to do so without a study of the species in the rest of its area as there is considerable variation here as well, partly of other characters.

2. *A. cecillii* N. E. Br. (1906).

*A. smenospermum* Pichi-Serm. (1951) – type: GD; Gumbat Uddus Michael, *Pichi-Sermolli* 2323 (FT holo).

Differs from *A. longicuspe* as follows: all parts puberulous, with or without long simple hairs. Lower leaf surface clearly visible (rarely not), upper with long simple hairs (rarely without but then lower surface puberulous). Panicle narrower, pedicels up to 4.5 cm. Calyx 6–9 mm long. Petals 7–10(–13) mm long, white to pink with dark violet centre and column, often hairy along edges of claw; column 2–3 mm, filaments 3–5 mm. Mericarps 14–16, 8–10 x 5–6 mm, 1-seeded, outer and dorsal edges both straight, meeting in a dorsal angle or short point. Fig. 82.21.6 & 7.

Along margins, paths and in clearings of *Podocarpus* – *Aningeria* – *Ocotea* forest, secondary growth after cultivation; 1500–2650 m. GD GJ SU (Wondo Genet area) KF GG SD (NW only) BA HA; Kenya, Tanzania, Zimbabwe. Friis et al. 2219; Mooney 8388, 8395.

The main differences from *A. longicuspe* are in the leaf indumentum and the differently shaped mericarps. The species has a rather disjunct distribution: the type is the only collection south of central Tanzania.

3. *A. sp.* = Meyer 8848.

Shrubby herb to 4 m; all parts glandular pubescent and with long simple hairs. Leaves: petiole up to 26 cm; lamina cordiform, shallowly 3 lobed, up to 23 x 14 cm, dentate, cuspidate. Flowers in large terminal and lateral panicles, and in upper leaf axils; pedicels 3–9.5 cm. Calyx 10–15 mm long, lobed  $\frac{3}{4}$ – $\frac{3}{4}$  down; lobes acuminate, 3-veined. Petals 12–24 mm long, pink with purple centre, with a dense band of inflated shiny hairs at transition to column; column 5–7 mm, glabrous, filaments 3–5 mm. Mericarps 13–16, *c* 15 x 8 mm, 1-seeded, outer and dorsal edges straight, meeting in a *c* 2 mm long awn, tomentose and glandular pubescent on sides; seed *c* 3 mm long, glabrous and smooth.

Secondary scrub after former montane forest; *c* 1900 m. KF; NE Uganda. Meyer 8848.

Only known from this collection and one from Uganda. Immediately recognisable by the peculiar indumentum on the petal-claw.

4. *A. somalense* Mattei (1915).

Shrubby herb to 1.25 m; all parts finely tomentellous, no long simple hairs. Leaves: petiole 1.5–4 cm; lamina broadly cordiform, up to 3.5 x 3 cm, grossly dentate, acute to rounded. Flowers in large narrow terminal panicles or in leaf axils;

pedicels 1.5–5 cm, glandular. Calyx 7–10 mm long, lobed *c*  $\frac{3}{4}$  down, glandular. Petals 10–13 mm long, uniformly reddish purple; column 3–4 mm, with appressed stellate hairs all over (densest at base), filaments 2–3 mm. Mericarps *c* 15, 10–16 x 6–8 mm, 2–3-seeded, outer edge slightly rounded meeting the rounded upper edge in a *c* 1 mm long awn, pubescent, papery and brittle; seed *c* 2.5 mm long, sparsely glandular puberulous. Fig. 82.21.8 & 9.

Open *Acacia* – *Commiphora* bushland on red sandy soil overlying limestone; *c* 550 m. HA; Somalia. Popov 1134.

A not very well known species with only a few collections from the Ogaden. It is immediately recognisable by the flower colour and the long narrow mericarps.

5. *A. ramosum* Guill. & Perr. (1831).

*A. elaeocarpoides* Webb (1854).

Perennial herb or shrub to 1 m; all parts puberulous to densely pubescent, with or without long simple hairs. Leaves: petiole 2–11 cm; lamina cordiform to broadly so, some usually shallowly 3-lobed, up to 19 x 17 cm, crenate to dentate, acuminate to acute. Flowers in 2–6-flowered axillary umbels or some solitary, sometimes merging to a terminal panicle; peduncle 0.5–5 cm; pedicels 0.2–1.5 (–2.5 in fruit) cm. Calyx 4–7 mm long, glandular. Petals 4–7 mm long, yellow; column 1.5–2.5 mm, with sparse simple or 2-furcate hairs all over, filaments *c* 1 mm. Mericarps 6–8, 6–7 x *c* 3 mm, 2–3-seeded, with 2–3 mm long awns on dorsal corner, pubescent and glandular, only tardily separating; seed *c* 2.5 mm long, papillose-echinulate. Fig. 82.21.10–12.

Riverine forest and alluvial *Acacia* woodland on black cotton soil; 500–1500 m. EE AF EW TU SU; widespread but scattered in the drier parts of tropical Africa and S Africa, the Yemen and NW India. Schimper III:1679; Smeds 1288.

6. *A. angulatum* (Guill. & Perr.) Mast. (1868).

*A. intermedium* Hochst. ex Garcke (1867) – type: TU; Gurrusarfa, Schimper in Hohenacker 2330 (BM K iso).

Shrubby herb or shrub to 2 m; all parts greyish puberulous to tomentellous, no long simple hairs; older stems angular with longitudinal ridges. Leaves: petiole 3–12 cm; lamina cordiform or broadly so, up to 23 x 16 cm, crenate or crenulate, acuminate to acute. Flowers in large terminal and lateral panicles; pedicels 1–2.5 (–3.5) cm. Calyx 6–9 mm long. Petals 10–22 mm long, yellow to orange; column 5–8 mm, densely stellate hairy all over (or sparser above), filaments 2–4 mm. Mericarps *c* 20–30, 7–9 x 5–6 mm, 1-seeded, outer and dorsal edges both rounded, floccose-tomentose, remaining attached to the receptacle by the funiculus; seed *c* 2.5 mm long, smooth to finely echinulate-papillose. Fig. 82.22.5–7.

Riverine forest, river-banks, alluvial *Acacia* wooded grassland and grassland on black clay, *Anogeissus* – *Boswellia* woodland on sand, roadsides; 900–1700 m. EW TU GD GJ SU SD HA; widespread in the drier parts of

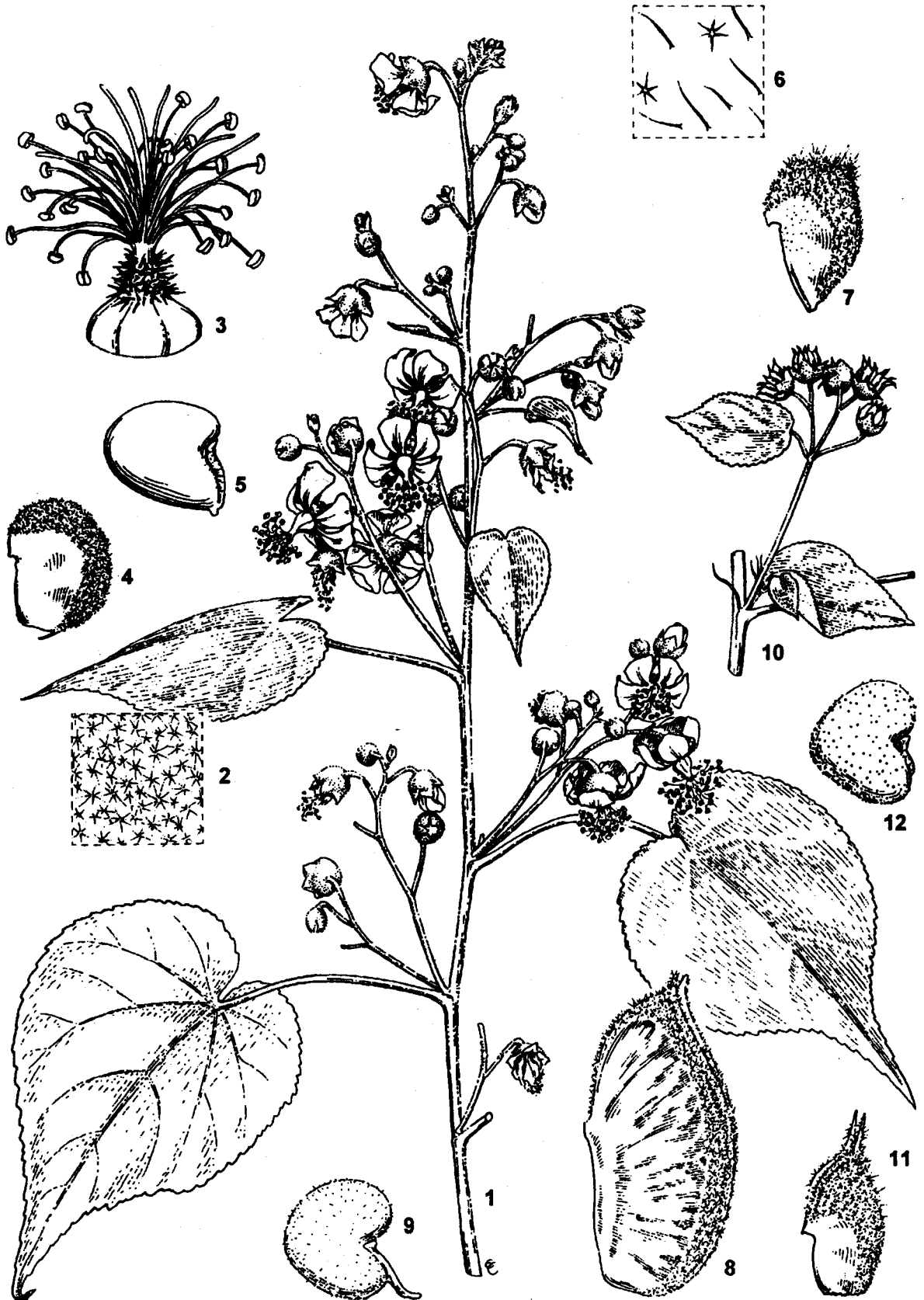


Figure 82.21 *ABUTILON LONGICUSPE*: 1 – flowering and fruiting stem  $\times \frac{1}{4}$ ; 2 – detail of indumentum on upper leaf surface  $\times 20$ ; 3 – staminal column  $\times 3$ ; 4 – mericarp  $\times 3$ ; 5 – seed  $\times 8$ . *A. CECILII*: 6 – detail of indumentum on upper leaf-surface  $\times 20$ ; 7 – mericarp  $\times 3$ . *A. SOMALENSE*: 8 – mericarp  $\times 3$ ; 9 – seed  $\times 8$ . *A. RAMOSUM*: 10 – inflorescence  $\times \frac{1}{4}$ ; 11 – mericarp  $\times 3$ ; 12 – seed  $\times 8$ . 1–3 from Thulin 1559; 4 & 5 from Ash 2777; 6 & 7 from Mooney 8395; 8 & 9 from Popov 1134; 10 from Lock 81/163; 11 from Smeds 1288; 12 from Andrews 178. Drawn by Eleanor Catherine.

tropical and S Africa, Madagascar. *Burger* 963A; *Stuedner* 993; *Tewolde Berhan* 2425.

7. *A. fruticosum* Guill. & Perr. (1831).

*A. microphyllum* A. Rich. (1847) – type: EE, Choho, *Quartin-Dillon & Petit* s.n. (P holo).

*A. denticulatum* (Fres.) Webb (1854).

*A. kotschy* Hochst. ex Webb (1854).

*A. dubium* Mattei (1915) – type: TU, no. location, *Figari* s.n. (not seen).

*Sida gracilis* R. Br. in Salt (1814), nom. nud., non L.C. Rich. (1792).

Perennial herb or shrub to 1 m; all parts greyish puberulous to tomentellous (rarely with long simple hairs). Leaves: petiole 0.5–8.5 cm; lamina cordiform to broadly so, up to 11 x 8 cm, crenulate, denticulate or dentate, acute to rounded. Flowers in leaf axils or on short lateral branches, never in large inflorescences; pedicels 1–4(–7) cm, sometimes almost filiform. Calyx 4–6(–7) mm long, lobed  $\frac{1}{3}$ – $\frac{1}{2}$  down, distinctly shorter than mericarps. Petals (5–)7–12 mm long, yellow to orange; column 1–3 mm, expanded and base of cylindrical part with appressed stellate hairs, filaments 1–3 mm. Mericarps (8–)10(–12), 5–9 x 3–4 mm, 2–3-seeded, outer and dorsal edge almost straight meeting in a subacute to mucronate point, not awned, tomentose; seed *c* 2 mm long, echinulate-papillose. Fig. 82.22.1–4.

*Acacia* – *Commiphora* woodland and bushland on red to grey gravelly to sandy soil, rocky slopes, lava flows; near sea level to 1750 m. EE AF EW TU (Tekezze Valley) WU SU/AR (Awash Valley) GG SD BA HA; Senegal, Niger, Upper Volta, Sudan, Somalia, Kenya, N Tanzania, Zimbabwe, Botswana, Angola, Namibia, Arabia to India. *Bally* 6718; *Friis* et al. 2948; *IECAMA* 1–29.

8. *A. sp.* = *Gilbert* 2100.

Differs from *A. fruticosum* in the following characters: calyx 8–12 mm long, lobed  $\frac{1}{2}$ – $\frac{2}{3}$  down, distinctly longer than ripe mericarps. Petals 10–17 mm long; column 3–4 (–5) mm, filaments 3–4 mm. Mericarps 10, *c* 6 x 3 mm.

Open *Acacia* – *Commiphora* bushland on red sandy to stony soil overlying limestone; 500–800 m. HA; Somalia. *Ellis* 228; *Gilbert* 2100.

This is possibly only a very well marked variety of *A. fruticosum*, but the separating characters are constant and it has a much more restricted area.

9. *A. sp.* = *Glover & Gilliland* 395.

Differs from *A. fruticosum* in the following characters: flowers in a short but distinct terminal glandular panicle; pedicels densely glandular. Calyx 8–9 mm long, shorter than ripe mericarps. Petals *c* 2 cm long; column *c* 5 mm, stellate hairy all over. Mericarps 9–11, *c* 10 x 5 mm, glandular tomentose.

*Acacia* – *Commiphora* bushland; *c* 550 m. HA; not known elsewhere. *Glover & Gilliland* 395.

Only known from this collection which differs from *A. fruticosum* in the distinct glandular inflorescence, larger flowers and larger mericarps. It also shows some superficial similarity with *A. anglosomaliae* Cufod.

10. *A. sp.* = *Gilbert* et al. 8226.

Scrambling or trailing shrubby herb; stems up to 1.5 m long, tomentellous and with large long-rayed stellate hairs. Leaves pubescent; petiole 1.5–5 cm; lamina cordiform, up to 10 x 7.5 cm, apiculate-dentate, acute. Flowers in large lax leafless divaricately branched panicles, indumentum of main branches as on stems, on distal branches and pedicels glandular puberulous and with long simple hairs; pedicels 1–3 cm. Calyx 6–9 mm long, glandular puberulous. Petals *c* 2 cm long, bright yellow; column *c* 5 mm, stellate pubescent all over; filaments *c* 3 mm. Mericarps *c* 10, 2-seeded, 11–13 x 5–6 mm, outer edge slightly rounded, inner straight and very sloping, meeting in a *c* 1 mm long point, stellate and glandular pubescent; seed *c* 2 mm long, glabrous, finely papillose.

Old termite mounds in *Acacia* – *Commiphora* bushland on limestone; *c* 1350 m. SD; not known elsewhere. *Gilbert* et al. 8226.

Only known from this collection, but immediately distinct with its scrambling or trailing habit, large lax inflorescence and few mericarps. It has been placed close to the group of species around *A. fruticosum*, mainly because of the few inflated mericarps; but on account of habit and inflorescence, it might equally well be placed near *A. anglosomaliae*.

The species is quite common in the Filu area where it is strictly confined to old weathering termite mounds.

11. *A. sp.* = *Burger* 2946.

Shrubby herb or shrub to 2 m; all parts greyish tomentellous, long simple hairs present on pedicels otherwise absent. Leaves: petiole 2–12 cm; lamina cordiform or broadly so, up to 15 x 12 cm, crenate, denticulate or dentate, acuminate. Flowers in leaf axils; pedicels 4–10 cm. Calyx (12–)14–22 mm long. Petals 17–25 mm long, yellow to orange with purple centre; column 8–10 mm, expanded part glabrous to stellate pubescent, cylindrical part glabrous, filaments 4–6 mm. Mericarps *c* 20–30, 13–20 x 5–7 mm of which the awn 3–7 mm, 2–3-seeded, outer edge rounded to straight, tomentose, black and stellately spreading when ripe; seed *c* 2.5 mm long, glabrous or papillose.

Alluvial *Acacia* wooded grassland and grassland on black or dark brown clay, *Combretum*-woodland on rocky slopes, old cultivations, weed; 2000–2300 m. SU HA; NE Zaire, Uganda, Kenya, N Tanzania, Rwanda, Burundi. *Mercier* 125F; *Burger* 1156, 2946.

The Ethiopian collections all come from extensively cultivated areas, and the species was first thought to be a recent introduction. But much material from E Africa – which is clearly the same species – is without doubt indigenous.

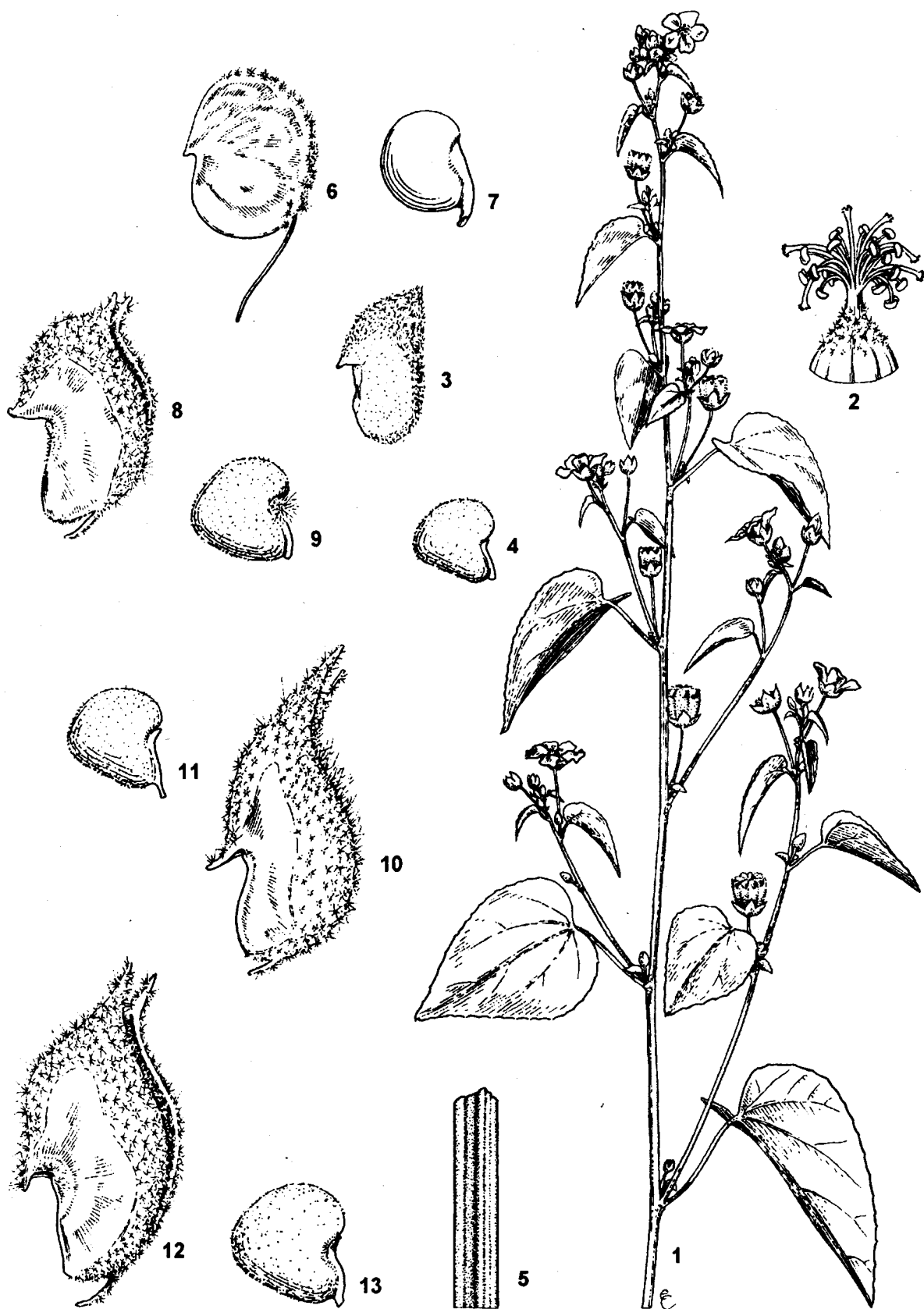


Figure 82.22 *ABUTILON FRUTICOSUM*: 1 – flowering and fruiting stem  $\times \frac{3}{4}$ ; 2 – staminal column  $\times 6$ ; 3 – mericarp  $\times 4$ ; 4 – seed  $\times 8$ . *A. ANGULATUM*: 5 – section of stem  $\times 2$ . Mericarps ( $\times 4$ ) and seeds ( $\times 8$ ) of *A. ANGULATUM* (6 & 7); *A. BIDENTATUM* (8 & 9); *A. MAURITIANUM* (10 & 11) and *A. ERITHRAEUM* (12 & 13). 1 from Friis et al. 2948; 2 from Gillett 14173; 3 & 4 from Ashall EAH11901; 5 from Steudner 993; 6 & 7 from Burger 963; 8 & 9 from Gilbert 1062; 10 & 11 from Pichi-Sermolli 221; 12 & 13 from Terraciano 306. Drawn by Eleanor Catherine.



12. *A. mauritianum* (Jacq.) Medic. (1787).

*A. longipes* Mattei (1915) – type: EE/EW; Filfil, Senni 67 (PAL, not seen).

*A. indicum* sensu Cufod. (1959) for Eth. distrib., not (L.) Sweet (1826), incl. var. *microphyllum* Hochr. and var. *populifolium* (Lam.) Wight & Arn.

*Pavonia patens* (Andr.) Chiov. (1915) – type: plate 571 in Andr., *Bot. Repos.* (1809), made from a cultivated plant grown from seeds sent by Salt from Ethiopia. No herbarium material preserved.

Shrubby herb or shrub to 2(–3.5) m; all parts pubescent to tomentose and with long simple hairs, stems also glandular. Leaves: petiole 1–8 cm; lamina cordiform to broadly so, up to 12 x 9 cm, denticulate to dentate, acuminate. Flowers in leaf axils or on short axillary branches; pedicels 1.5–8(–12) cm. Calyx 9–13 mm long. Petals (12–)15–25 mm long, yellow to orange; column 5–7 mm, expanded part stellate pubescent, cylindrical part glabrous, filaments 3–5 mm. Mericarps *c* 20–27, 11–16 x 4–6 mm of which the awn 3–5 mm, 2–3-seeded, outer edge rounded, tomentose and glandular, stellately spreading and black when ripe; seed *c* 2.5 mm long, papillose and spiny-papillose towards hilum. Fig. 82.22.10 & 11.

Riverine forest and river-banks, ruderal; 1200–2200 (–2500) m. EW GD GJ WU SU AR KF GG SD HA; widespread in the drier parts of tropical and S Africa, Comoros Islands, ?Mauritius. *Gilbert* 1529; *Mooney* 9865; *W. de Wilde* et al. 9164.

The type collection was said to come from Mauritius, but it has never been recollected there. At Kew there is an old collection from the Comoros Islands.

See also note on p. 236 about the identity of *Pavonia patens*.

13. *A. erythraeum* Mattei (1915)

– type (partly): EE, *Terracciano* s.n. (PAL syn., not seen).

Annual herb to 0.5 m; vegetative parts pubescent to tomentose and with long spreading simple hairs, stems also glandular. Leaves: petiole 6–15 cm; lamina cordiform or broadly so, up to 10.5 x 8.5 cm, grossly dentate, acuminate. Flowers in leaf axils; pedicels 1–4 cm. Calyx 8–15 mm long, tomentellous, no long simple hairs. Petals *c* 15 mm long, yellow; column *c* 4 mm long, glabrous or with a few hairs on expanded part; filaments *c* 3 mm. Mericarps *c* 15–20, 15–17 x 5–6 mm of which the awn 1–2 mm, 3-seeded, outer edge rounded to straight, tomentose, black and stellately spreading when ripe; seed *c* 2.5 mm long papillose. Fig. 82.22.12 & 13.

Coastal bushland; near sea level. EE; Sudan. *Pappi* 1212; *Terracciano* 306.

It is quite possible that the un-numbered *Terracciano* collection at PAL is the same collection as *Terracciano* 306. The identification of this material as *A. erythraeum* is not quite certain, but it fits the description well and is quite unlike any other *Abutilon* from coastal Eritrea.

14. *A. bidentatum* (Hochst.) A. Rich. (1847)

– type: TU; Agau, *Schimper* II:1003 (FI(Webb) K iso).

*A. microcarpum* Mattei (1915) – type: EW; Adi Ugri, *Cufino* 11 (PAL, not seen).

Differs from *A. mauritianum* as follows: petiole 1–10(–13) cm; lamina broadly cordiform, up to 12(–15) x 10(–14) cm, crenate to sharply dentate. Flowers in leaf axils or on axillary branches, sometimes merging into distinct panicles; pedicels 1.5–7(–9) cm. Calyx 6–10 mm long. Petals 7–11(–13) mm long; column 2–3 (–5) mm, usually stellate hairy all over, filaments 2–4 mm. Mericarps 12–17, 8–10 x 3–5 mm, 2-seeded, outer edge rounded, dorsal corner with a 1–2 mm long awn, pubescent to tomentose, ultimately stellately spreading and black, sometimes staying attached to the receptacle by the funiculus; seed *c* 2.5 mm long, papillose, not spiny-papillose towards hilum. Fig. 82.22.8 & 9.

Riverine forest, river-banks, alluvial *Acacia* wooded grassland and bushland; 400–2100(–2400) m. EE EW TU GD WU SU AR GJ GG SD BA HA; Sudan, Somalia, Uganda, Kenya, Tanzania, Rwanda, Burundi, NE Zaire, Arabia to NW India. *Friis* et al. 3687; *Gilbert* 1062; *Mesfin Tadesse* 1577.

Differs from *A. mauritianum* in the smaller flowers, fewer, smaller shortly awned mericarps and seeds with a different indumentum. *Gilbert* 1062 has larger flowers than normal but has typical mericarps and seeds.

15. *A. figarianum* Webb (1854).

*A. impressum* Hochst. ex Mattei (1915) – type: TU; Gurrarfa, *Schimper* 200 (not seen) or as *Schimper* in *Hohenacker* 2333 (P iso).

Annual or perennial herb to 2(–3) m; all parts tomentose to velutinous, with or without long simple hairs, not glandular. Leaves: petiole 1–14(–17) cm; stipules up to 10 x 3 mm; lamina cordiform to reniform, up to 14.5(–18) x 11.5(–15) cm, denticulate to sharply dentate, acuminate to rounded. Flowers in narrow panicles; pedicels 0.5–4(–5) cm. Calyx 6–12 mm long, without long simple hairs. Petals 8–17 mm long, bright yellow to orange; column 3–6 mm, cylindrical and apical expanded part stellate pubescent, base glabrous, filaments 3–4 mm. Mericarps 16–30, 6–9 x 4–7 mm, (2–)3-seeded, outer edge rounded, dorsal corner rounded or very slightly angled, tomentellous; seed *c* 2.5 mm long, stellate hairy. Fig. 82.23.1–5.

Edges of riverine forest, river-banks, alluvial clay plains, *Acacia* bushland, *Acacia* – *Commiphora* – *Combretum* woodland, roadsides, weed; near sea level to 1600 (–1900) m. EE AF EW TU GD GJ WU SU AR (Awash Valley) WG GG SD HA; W Africa to Sudan, Uganda, Kenya. *Burger* 961; *Mooney* 6313, 8126.

16. *A. pannosum* (Forst. f.) Schlechtend. (1851).

Perennial or shrubby herb to 2 m; all parts pubescent to tomentose or lanate, long simple hairs absent (rarely present on stems). Leaves: petiole 1.5–7.5(–9) cm; stipules up to 1 mm wide; lamina cordiform or broadly so, up to 13 x

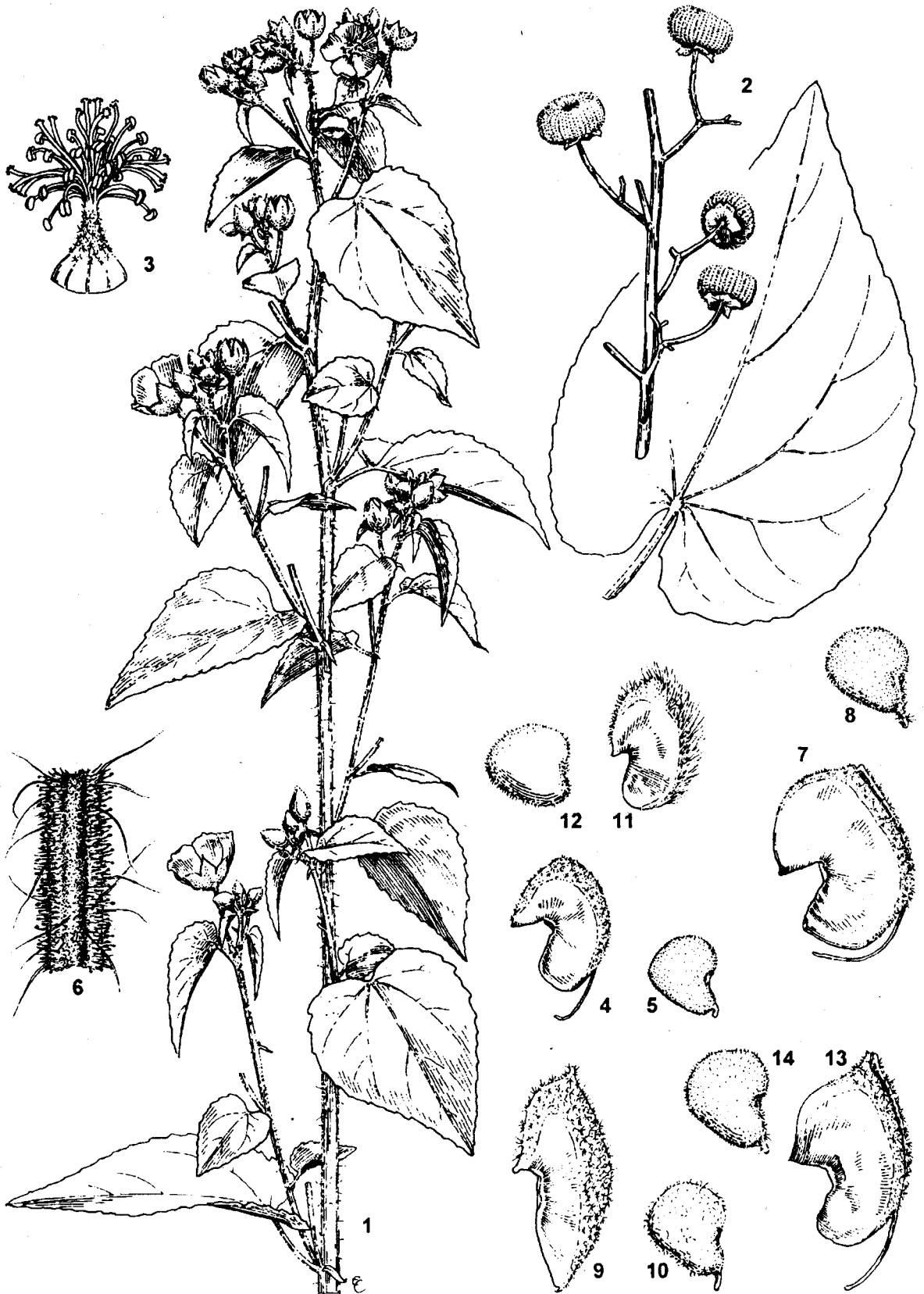


Figure 82.23 *ABUTILON FIGARIANUM*. 1 – flowering branch  $\times \frac{1}{4}$ , 2 – leaf and part of infructescence  $\times \frac{1}{4}$ , 3 – staminal column  $\times 3$ . *A. HIRTUM*: 6 – detail of stem-indumentum  $\times 6$ . Mericarps ( $\times 3$ ) and seeds ( $\times 6$ ) of *A. FIGARIANUM* (4 & 5), *A. HIRTUM* (7 & 8), *A. ANGLOSOMALIAE* (9 & 10), *A. PANNOSUM* (11 & 12) and *A. GRAVEOLENS* (13 & 14). 1 from Schimper 421; 2, 4 & 5 from Ash 1573; 3 from Burger 3235; 6 from Headley 193; 7 & 8 from Burger 2484; 9 & 10 from Glover & Gilliland 294; 11 & 12 from Burger 3037. Drawn by Eleanor Catherine.

11 cm, dentate, subacuminate to rounded. Flowers in leaf axils or on short lateral branches or congested into panicles; pedicels 1–6 cm. Calyx 10–15 mm long. Petals 14–25 mm long, yellow to orange, with dark red to purple centre; column *c* 4 mm, indumentum as in *A. figarianum*, filaments 2–3 mm. Mericarps *c* 20–30, 8–9 x 5–6 mm, 1–2-seeded, outer edge rounded, dorsal corner slightly angled, tomentose; seed *c* 2.5 mm long, with long simple hairs. Fig. 82.23.11 & 12.

Silty and often saline flood-plains, wet depressions in *Acacia* bushland, cultivations; near sea level to 900 (?–1900) m. EE AF EW; Cape Verde Islands and W Africa to the Sudan, Somalia, Egypt and Middle East, Arabia to India. *Bally* 6950; *Greathead* 61; *Hemming* 1061.

17. *A. anglosomaliae* Cufod. (1959).

*A. molle* Bak. (1895), non (Ort.) Sweet (1800).

Shrubby herb or shrub to 2 m, sometimes scrambling; branchlets and leaves pubescent to tomentose. Leaves often held like a V (folded when dried); petiole 1.5–10 cm; lamina circular to reniform, up to 10.5 x 12 cm, sharply dentate, acuminate to emarginate. Flowers in leafless, densely glandular pubescent sticky panicles (also with long simple hairs); pedicels 1–4.5 cm. Calyx 5–9 mm long, densely glandular pubescent. Petals 15–25 mm long, yellow to orange; column 3–6 mm, with scattered stellate hairs all over, filaments 2–4 mm. Mericarps 13–16, 10–13 x 5–6 mm, 3-seeded, outer edge slightly rounded, dorsal corner angled or with an up to 0.5 mm long awn, floccose-pubescent; seed *c* 2.5 mm long, with simple curled hairs. Fig. 82.23.9 & 10.

*Acacia* – *Commiphora* bushland on silty alluvial or on red sandy soil; 350–1200 m. SD HA; Somalia, NE Kenya. *Bally* 10117; *Burger* 2297; *Gilbert* et al. 8136.

18. *A. hirtum* (Lam.) Sweet (1826).

*A. hirtum* var. *heterotrichum* (Hochst. ex Mattei) Cufod. in *Bull. Jard. Bot. Brux.* 29, *Suppl.*: 536 (1959) – type: TU; Dschadscha, *Schimper* in *Hohenacker* 2306 (K P iso).

Shrubby herb or shrub to 2 m; all parts with sticky yellow to orange basally swollen glandular hairs (or missing on some organs), also puberulous to tomentellous, with or without long simple hairs. Leaves: petiole 2–12 cm; lamina cordiform or suborbicular, up to 17 x 13 cm, dentate with large triangular teeth (rarely denticulate), acuminate to rounded. Flowers in leaf axils or in narrow panicles; pedicels 1.5–7 cm. Calyx 9–18 mm long. Petals 15–27 mm long, yellow to orange with dark red to purple centre; column 5–7 mm, with stellate hairs apically on expanded part and at sinuses between petals, otherwise glabrous, filaments 3–5 mm. Mericarps 16–24, 8–11 x 5–7 mm, (1–)3-seeded, outer edge rounded, dorsal corner angled or with a minute tooth, pubescent and glandular; seed *c* 2.5 mm long, glabrous and papillose or with simple or stellate hairs on papillae. Fig. 82.23.6–8.

*Acacia* – *Commiphora* woodland and bushland on stony slopes, black cotton soil, overgrazed grassland, hedges and fences, roadsides; 275–1800(?–2250) m. EE

AF EW TU SU GG SD BA HA; pantropic. *Burger* 290; *Gilbert* 1551; *Mesfin Tadesse* 2786.

19. *A. graveolens* (Roxb. ex Hornem.) Wight & Arn. (1834).

Perennial herb to 1 m; all parts densely pubescent to tomentellous, also with short curled glandular hairs and numerous long simple hairs. Leaves: petiole 1–6.5 cm; lamina cordiform to orbicular, up to 8(–10) x 6(–9) cm, sharply dentate, acuminate to acute. Flowers in leaf-axils; pedicels 1.5–4.5 cm. Calyx 8–12(–15) mm long, with dense pilose hairs. Petals 1–2 cm long, yellow to orange; column 5–7 mm, with stellate hairs apically on expanded part and with bands running down to sinuses between petals, otherwise glabrous, filaments 3–5 mm. Mericarps *c* 20–25, 7–12 x 4–7 mm, (1–)3-seeded, outer edge rounded, dorsal corner with a small tooth or an up to 1 mm long awn, pubescent, often remaining attached to the receptacle; seed *c* 2.5 mm long, with straight simple hairs on distinct papillae. Fig. 82.23.13 & 14.

Open *Acacia* – *Commiphora* bushland on sandy or stony soil, alluvial *Acacia* bushland, moist depressions; 300–1600 m. EE AF SU (Awash Valley) HA; Somalia, Arabia to India. *Burger* 3037; *Gillett* 4131; *Handlos* 38.

This is closely related to *A. hirtum* and is often considered a synonym of it. But the conspicuously long-haired calyx, smaller uniformly coloured petals and different column indumentum separate it satisfactorily. It also lacks the basally swollen yellowish glands.

*Ellis* 227 probably belongs here but deviates in having only a few scattered long hairs on the calyx and 1-seeded mericarps.

19. *SIDA* L. (1753)

Annual or perennial herbs or subshrubs, indumentum usually stellate. Leaves unlobed (rarely 3-lobed); stipules filiform to lanceolate. Flowers solitary in leaf-axils or in clusters, heads, racemes or spikes (rarely in lax panicles). Epicalyx absent. Calyx 5-lobed, lobes triangular, usually 1-veined. Ovary of 5–13(–15) 1-ovulate free carpels around a central torus; style-branches as many as carpels. Fruit a discoid to globose schizocarp; mericarps segmentiform, indehiscent or irregularly dehiscing, very diversely sculptured.

About 200 species in all tropical and subtropical regions, many species are widespread weeds and some occur as ruderals in temperate regions.

1. Mericarps with 3–6 mm long retrorsely barbed awns.
  4. *S. cordifolia*
    - Mericarps not awned or with up to 2(–3) mm long glabrous or puberulous but not barbed awns. 2
2. Leaves with cordate base. 3
  - Leaves with cuneate to rounded (rarely subcordate) base. 5
3. Mericarps 5; petals yellow to orange; leaves unlobed (rarely shallowly 3-lobed). 4
  - Mericarps 8–11; petals white; some or all leaves 3(–5)-lobed; plant trailing or scrambling.
    1. *S. ternata*

4. Erect or decumbent, not rooting at nodes; leaves and calyx pilose; mericarps rounded or shortly beaked.  
2. *S. urens*  
– Trailing, rooting at nodes; leaves and calyx pubescent; mericarps with birostrate awns. 3. *S. javensis*
5. Leaves entire except for apical notch (sometimes a single tooth per side below notch). 6  
– Leaves crenate, dentate or serrate at least  $\frac{1}{2}$  way down, not notched apically. 7
6. Mericarps smooth, with thin disintegrating lateral walls; petals 8–10 mm; column 2.5–3.5 mm long; pedicels 1–3 mm; leaves 5–17(–25) mm long.  
6. *S. tenuicarpa*  
– Mericarps reticulately sculptured, lateral walls not disintegrating; petals 5–7 mm; column 1–2 mm long; pedicels 0–1 mm; leaves 3–8 mm long.  
5. *S. schimperiana*
7. Mericarps 5, with lower part of back thin and breaking irregularly to release the seed. 7. *S. alba*  
– Mericarps 6–13, not breaking irregularly, usually not releasing seed (rarely 5 but then not breaking at all). 8
8. Leaves distichous; stipules of each pair unequal, larger 2–5-veined; plant subglabrous or with indumentum of simple hairs (*S. acuta*-group). 9  
– Leaves not distichous; stipules all similar and 1-veined; indumentum usually dense and mostly stellate. 10
9. Stems pilose, with long simple hairs; lamina up to 11 x 6.5 cm; mericarps 2–2.5 mm long, rounded or with less than 0.5 mm long awns. 8. *S. collina*  
– Stems puberulous, without long simple hairs; lamina up to 6 x 2 cm; mericarps 3–3.5 mm long, conspicuously beaked and with *c* 1 mm long awns.  
9. *S. acuta*
10. Base of calyx yellow or pale yellow, distinctly 10-ribbed, lobes glabrous inside; column with stalked glands and simple hairs. (*S. rhombifolia*-group) 11  
– Base of calyx of same colour as rest, 10-ribbed or not, lobes hairy inside; column without stalked glands, with dense stellate hairs (*ovata*-group). 13
11. Leaves glabrous above or with appressed hairs near edges; mericarps 7–8, reticulately sculptured; stipules 7–12 mm long.  
10. *S. sp.* = Gilbert & Getachew Aweke 2984  
– Leaves uniformly hairy above; mericarps 7–13, not reticulately sculptured; stipules 3–8 mm long. 12
12. Mericarps not awned, circular in outline, opening along ventral suture to release seed; flowers solitary, usually on long pedicels; petals 9–12 mm long.  
11. *S. serratifolia*  
– Mericarps awned, distinctly longer than wide, not releasing seed; some flowers clustered, usually on short pedicels; petals 6–10 mm long.  
12. *S. rhombifolia*
13. Mericarps 5–6, glabrous; calyx inside puberulous all over, spreading from ripe mericarps; pedicels articulated below middle; petals 10–17 mm long.  
15. *S. sp.* = Bally 9622
- Mericarps 7–8(–9), puberulous or pubescent; calyx inside only hairy on lobes, enclosing ripe mericarps; pedicels articulated above middle; petals (5–)8–11 mm long. 14
14. Mericarps with up to 1 mm long awns; leaves sparsely puberulous to densely pubescent, not floccose; column densely hairy all over.  
13. *S. ovata*  
– Mericarps with 2–3 mm long awns; leaves floccose tomentose; column sparsely hairy towards base, glabrous above. 14. *S. sp.* = Ellis 177
1. *S. ternata* L. f. (1781).  
*S. permutata* Hochst. ex A. Rich. (1847) – type: TU; Mt Scholoda, Schimper III:1911 (P holo, FI(Webb) FT K iso).
- Trailing or scrambling herb from woody rootstock, stems up to 2 m long, rooting in basal part; all parts subglabrous to sparsely pubescent, hairs simple and/or stellate. Leaves: petiole 1.5–12 cm; lamina cordiform in outline, lower usually unlobed, upper deeply 3(–5)-lobed, up to 10 x 7.5 cm, lobes triangular to elliptic, dentate, acuminate. Flowers solitary or paired (rarely in 2-flowered cymes) in leaf axils; pedicels 1–5(–7.5) cm. Calyx 5–6 mm long, spreading from ripe mericarps, with numerous pale veins from base. Petals 6–10 mm long, white; column 2–3 mm, basal part glandular hairy. Mericarps 8–11, *c* 3.5 mm long with *c* 1 mm long unirostrate beaks, glabrous, back slightly warty, sides smooth, lateral edges rounded. Fig. 82.24.1–4.
- Moist places in *Juniperus* – *Podocarpus* forest, secondary *Juniperus* scrub, along streams in upland grassland; 1900–2800(–3350) m. EW TU GD GJ WU SU WG KF SD HA; south through eastern Africa to S Africa. Mooney 6391, 6681, 7008.
2. *S. urens* L. (1759).  
*S. densiflora* A. Rich. (1847), not Hook. & Arn. (1833) – type: TU; Chire, Quartin-Dillon & Petit s.n. (P holo).
- Erect or decumbent perennial or shrubby herb to 1 m; all parts glandular pubescent and with usually dense long simple hairs. Leaves: petiole 1–5 cm; lamina cordiform, up to 10(–12) x 5(–7) cm, dentate to serrate, acuminate to acute. Flowers solitary or in axillary clusters, often merging into short lateral and larger terminal racemoid or subcapitate inflorescences; pedicels 1–10 mm. Calyx 5–8 mm long, enclosing ripe mericarps, lobes 3–5-veined. Petals 5–8 mm long, pale yellow to orange with pink to maroon centre; column *c* 1 mm, hairy. Mericarps 5, *c* 2.5 mm long, with *c* 0.5 mm long unirostrate beaks, glabrous or with a few hairs on back, back with central rib, sides weakly sculptured, lateral edges rounded. Fig. 82.24.5.
- Riverine forest, river-banks, grassland, *Combretum* – *Terminalia* wooded grassland, old fields, roadsides; 500–1850 m. EE EW TU SU IL KF GG BA; widespread in tropical Africa, Madagascar and tropical America. Friis et al. 3463, 3933; W. de Wilde et al. 7127.

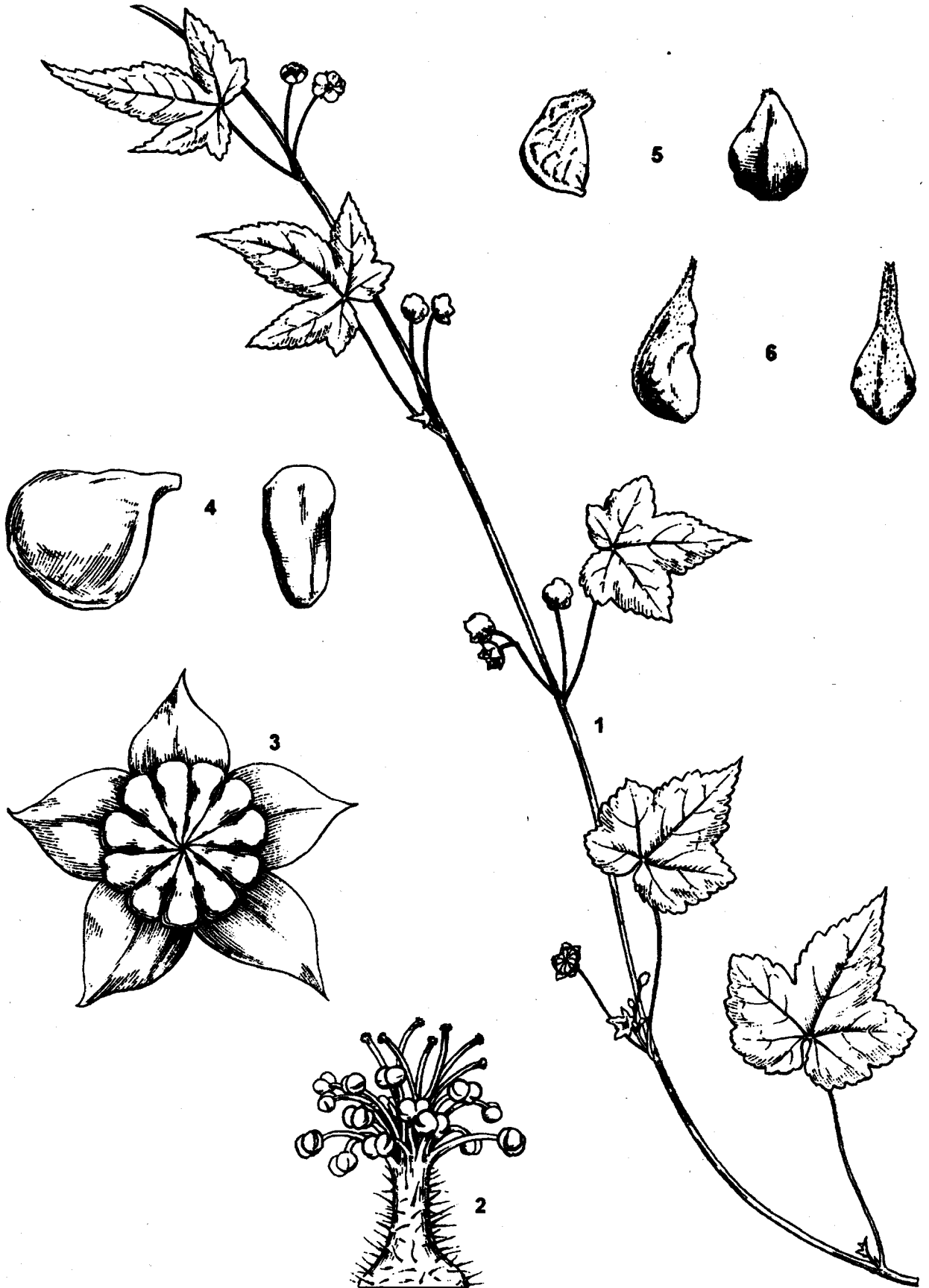


Figure 82.24 *SIDA TERNATA*: 1 – fruiting stem  $\times \frac{3}{4}$ ; 2 – staminal column  $\times 12$ ; 3 – calyx and mericarps  $\times 5$ . Mericarps ( $\times 8$ ), lateral (left) and dorsal view of *S. TERNATA* (4), *S. URENS* (5) and *S. JAVENSIS* (6). 1 from Gilbert 4085; 2–4 from Gillett 14452; 5 from Schweinfurth & Riva 2132; 6 from Schweinfurth 4281. Drawn by Eleanor Catherine.

3. *S. javensis* Cav. (1785).

*S. veronicifolia* sensu all African authors, non Lam. (1783).

*S. humilis* sensu African authors, non Cav. (1788).

Prostrate perennial herb, stems up to 0.5 m long, rooting at nodes; all parts subglabrous to pubescent (stems rarely pilose). Leaves: petiole 0.5–5 cm; lamina broadly cordiform to reniform, unlobed to very shallowly 3-lobed, up to 5 x 5.5 cm, crenate to dentate, shortly acuminate to subacute. Flowers solitary; pedicels 5–25 mm. Calyx 5–7 mm long, enclosing ripe mericarps, lobes 3-veined. Petals 6–8 mm long, yellow; column 1.5–2 mm, hairy. Mericarps 5, c 2.5 mm long, with 0.5–1.5 mm long birostrate awns, strigose, back with central ribs, sides thin-walled, partly disintegrating, lateral edges prominent. Fig. 82.24.6.

Forest floor in lowland forest; c 1450 m. IL; widespread in tropical Africa and Asia. Friis et al. 1982.

Borssum Waalkes (*l.c.*) has shown conclusively that *S. javensis* is the correct name for what has usually in Africa been called *S. humilis* and more recently *S. veronicifolia*. The true *S. veronicifolia* does not occur in Africa.

4. *S. cordifolia* L. (1753).

Erect annual or perennial herb to 1 m; all parts densely and softly pubescent to tomentose. Leaves: petiole 1–5.5 cm; lamina ovate to suborbicular, up to 8 x 8 cm, dentate, acute to rounded. Flowers in fascicles, mostly towards end of lateral branches or forming terminal panicles; pedicels up to 15 mm. Calyx 5–8 mm long, enclosing ripe mericarps. Petals 8–12 mm long, yellow; column c 3 mm, hairy. Mericarps 8–10, 3–5 mm long and with 3–6 mm long retrorsely barbed birostrate awns, lower part of back and sides reticulately sculptured. Fig. 82.26.7.

Roadside in *Combretum* woodland; c 1600 m. SU; pantropic. Boulos 9289.

5. *S. schimperiana* Hochst. ex A. Rich. (1847)

– type: Schimper I:305 (not seen).

*S. cuneifolia* sensu Cufod. (1959), p.p., and all recent African authors, not Roxb. (1832).

Intricately branched spreading to prostrate dwarf shrub to 0.5 m; all parts with dense (rarely sparse) appressed multi-rayed hairs. Leaves: petiole 1–2(–3) mm; lamina narrowly cuneate with an apical notch with a central tooth, 3–8 x 1.5–4 mm, entire. Flowers solitary or 2–3 congested terminally; pedicels 0–1 mm. Calyx 2.5–3.5 mm long, indumentum densest on lobes and base often subglabrous. Petals 5–7 mm long, yellow to orange, sometimes reddish veined; column 1–2 mm, glabrous or sparsely hairy. Mericarps 5, c 2.5 mm long, birostrate with c 0.5 mm long connivent awns, with sparse appressed stellate hairs, back and sides reticulately sculptured, sides disintegrating between reticulations, lateral edges indistinct. Fig. 82.25.1–5.

*Acacia* bushland on dry rocky slopes, dry overgrazed and degraded grassland and rocky outcrops, cultivated areas, *Eucalyptus* plantations, seems to favour areas influenced by man; 1500–2600 m. EW TU GD GJ SU WG SD

BA HA; E Uganda, Kenya, N Tanzania. Friis et al. 712; Gilbert 2782; Mooney 4727.

For the last 25 years, it has been general practice to consider this species conspecific with the Indian *S. cuneifolia* Roxb., but this is quite erroneous. *S. cuneifolia* has larger leaves and flowers, the flowers congested apically on the branches, and larger more strongly reticulate subglabrous mericarps with thicker lateral walls.

6. *S. tenuicarpa* Vollesen (1986)

– type: GJ; Bahar Dar to Debre Marcos, Getachew Aweke & Gilbert 998 (K holo, ETH iso).

*S. cuneifolia* sensu Cufod. (1959) and all newer African authors in part, not Roxb. (1832).

Much branched shrubby herb or shrub to 1 m; all parts with sparse (on stems sometimes dense) appressed multi-rayed hairs. Leaves: petiole 1.5–5 mm; lamina narrowly cuneate, notched, 5–17(–25) x 1.5–8(–10) mm, larger sometimes with a single tooth per side. Flowers solitary and in up to 6-flowered heads at branch ends; pedicels 1–3 mm. Calyx 3–4.5 mm long. Petals 8–10 mm long, yellow to orange, sometimes reddish veined; column 2.5–3.5 mm, sparsely hairy. Mericarps 5, c 2.5 mm long, birostrate with 0.5–1 mm long connivent awns, apical part hairy, back smooth without sculpturing, sides thin and papery, soon completely disintegrating and releasing seed. Fig. 82.25.6–11.

Woodland and grassland, often on steep slopes and more or less overgrazed and denuded, old cultivations, roadsides; 1550–2300 m. GD GJ WU SU AR WG IL KF SDHA; E Zaire, Uganda, Kenya, N Tanzania. Chaffey 451; Mooney 9145; W. de Wilde et al. 6722.

This species has been completely mixed up with *S. schimperiana*, but is without any doubt a good distinct species. The very different mericarps immediately separate the two, and also separate *S. tenuicarpa* from *S. cuneifolia* which habitually looks much the same.

7. *S. alba* L. (1763).

*S. spinosa* sensu Cufod. (1959), not L. (1753).

*S. spinosa* var. *sennaarensis* Visiani in *Pl. Aeg. et Nub.*: 27 (1836).

Erect annual herb to 1 m; all parts greyish puberulous to pubescent. Leaves: petiole 5–25(–40) mm; lamina ovate to elliptic or narrowly so, up to 5 x 3.3 cm, dentate, acute to rounded. Flowers solitary or in axillary clusters; pedicels 3–22 mm. Calyx 4–6 mm long. Petals 4–6 mm long, creamy yellow; column c 2 mm, glabrous. Mericarps 5, c 2 mm long and with c 2 mm long birostrate awns, puberulous, basal part of back thin and papery, breaking up to release seed, sides thin-walled, striate, lateral edges distinct, straight. Fig. 82.26.6.

Under trees in *Acacia* – *Terminalia* woodland and wooded grassland, edges of pools, wet depressions, rocky slopes, weed, roadsides; near sea level to 1700(–2400) m. EE EW TU WU SU GG SD BA HA; widespread in tropical and S Africa and in tropical America. Gilbert & Thulin 192, 526; Lemma Selassie 368.

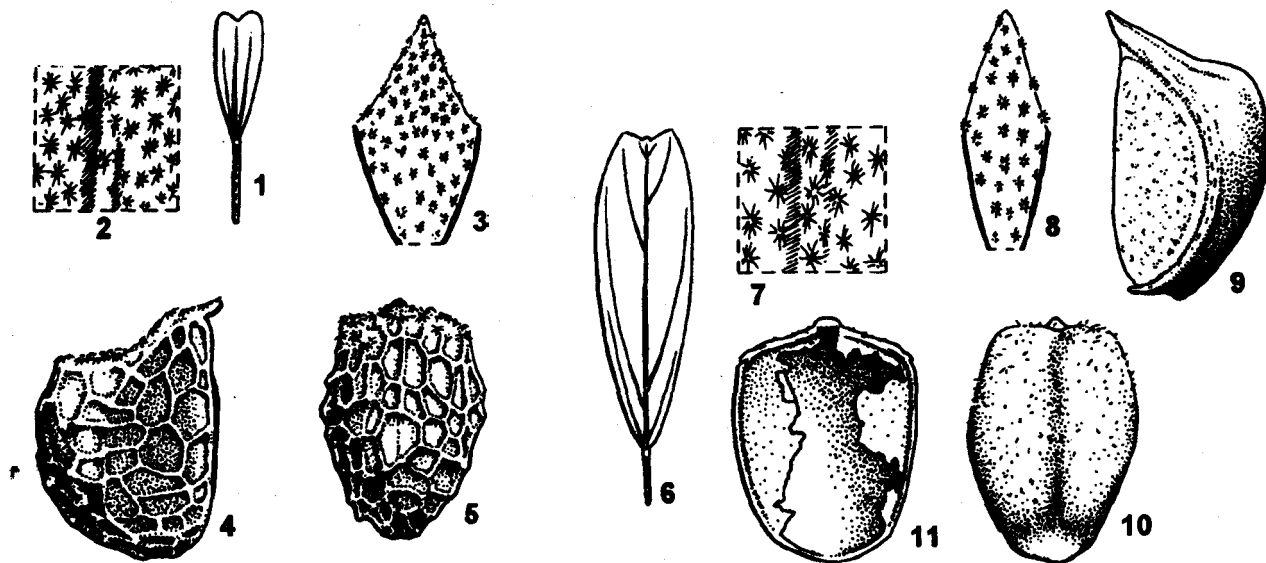


Figure 82.25 *SIDA SCHIMPERIANA*: 1 – leaf x 2; 2 – detail of leaf-indumentum x 4; 3 – calyx-lobe x 6; 4 – mericarp, lateral view x 10; 5 – mericarp, dorsal view x 10. *S. TENUICARPA*: 6 – leaf x 2; 7 – detail of leaf-indumentum x 4; 8 – calyx-lobe x 6; 9 – mericarp, lateral view x 10; 10 – mericarp, dorsal view x 10; 11 – mericarp, ventral view x 10. 1 & 2 from Richards 23366; 3 from Glover et al. 448; 4 & 5 from Glover et al. 160; 6–8 from Mooney 9145; 9–11 from Meyer 7933. Drawn by Eleanor Catherine. (Reproduced with permission from *Kew Bull.* 41: 93, fig. 1, 1986.)

There has been widespread confusion as to the correct application of the names *S. spinosa* and *S. alba*, probably because the Linnaean material under the former name is a mixture of both species. After recent lecto-typification (Borssum Waalkes, l.c.) it is now clear that all Ethiopian material is *S. alba*.

8. *S. collina* Schlechtend. (1834).

*S. corymbosa* R. E. Fries (1907).

Shrubby herb to 1 m; stems pilose. Leaves subglabrous or with long simple appressed hairs; petiole 3–12 mm; stipules linear to lanceolate, larger up to 20 x 2 mm; lamina narrowly ovate to ovate or elliptic, up to 11 x 6.5 cm, dentate to serrate, subacuminate to acute. Axils with a solitary flower and usually also a cluster or short raceme; pedicels 1–8(–13) mm, glabrous or nearly so. Calyx 4–7 mm long, with long simple hairs on veins and edges, otherwise glabrous. Petals 6–9 mm long, bright yellow; column 1–2 mm, hairy and sometimes glandular. Mericarps 6–8, 2–2.5 mm long, rounded or with less than 0.5 mm long widely spreading awns, glabrous, back and sides reticulately sculptured, sides thin and breaking between reticulations, lateral edges sharp and mucate. Fig. 82.26.1–4.

Paths and clearings in lowland rain forest, undergrowth in coffee plantations, roadsides; 1050–1250 m. IL KF; W Africa to Cameroon, Zaire, Burundi, also in Central America. Chaffey 1278; Friis et al. 3863, 4095.

9. *S. acuta* Burm. f. (1768).

*S. acuta* var. *carpinifolia* sensu Cufod. (1959), for African distribution, not (L. f.) K. Schum. in *Fl. Bras.* 12, 3: 326 (1891).

Perennial or shrubby herb to 1 m; stems puberulous. Leaves subglabrous or with scattered simple or stellate hairs; petiole 3–6 mm; stipules linear to lanceolate, larger up to 10 x 1.5 mm; lamina narrowly ovate or narrowly elliptic, up to 6 x 2 cm, dentate, acute. Flowers solitary (rarely also a short raceme); pedicels 2–11 mm, puberulous. Calyx 6–7 mm long, glabrous or with scattered hairs on veins and edges. Petals 6–9 mm long, pale yellow to yellow; column 1–2 mm, hairy and sometimes glandular. Mericarps 6–8, 3–3.5 mm long, with *c* 1 mm long widely spreading awns, sparsely puberulous, back and sides breaking between ridges, lateral edges sharp and mucate. Fig. 82.26.5.

Probably riverine forest or river-banks, roadsides or old cultivations; no altitude recorded. HA (fide Cufod., l.c.); pantropic. No Ethiopian collections seen.

This species is largely coastal in its East African distribution, and Cufodontis' record possibly refers to another species.

10. *S. sp.* = Gilbert & Getachew Aweke 2984.

Procumbent, ascending or erect perennial herb; stems pubescent. Leaves beneath whitish pubescent to tomentelous, above glabrous or with appressed simple hairs along edges; petiole 2–5 mm; lamina narrowly elliptic, elliptic or obovate, up to 5 x 2.3 cm, serrate, acute to rounded. Flowers solitary (rarely one pedicellate and one sessile per axil); pedicels 5–25(–30) mm, puberulous. Calyx 5–7 mm long, puberulous and with long simple hairs on veins and edges. Petals 7–9 mm long, white with a pink tinge or cream with yellow to orange centre; column 2–3 mm. Mericarps 7–8, 2–2.5 mm long, with *c* 0.5 mm long widely spreading beaks, glabrous, back and sides reticulately sculptured, sides thin and breaking between ridges, lateral edges distinct, slightly mucate, with a knob at transition to beak.

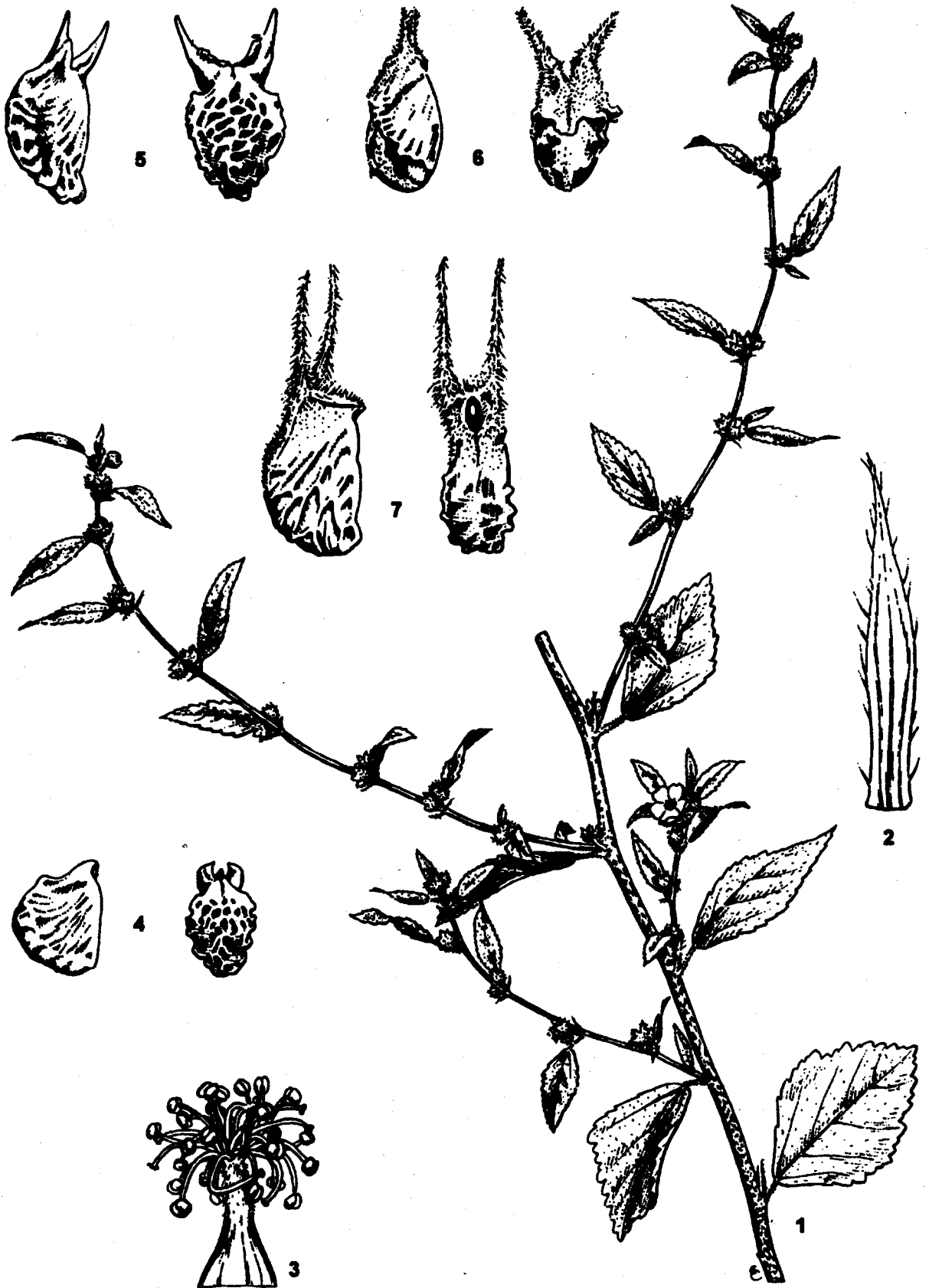


Figure 82.26 *SIDA COLLINA*: 1 – flowering stem  $\times \frac{3}{4}$ ; 2 – stipule  $\times 5$ ; 3 – staminal column  $\times 12$ . Mericarps ( $\times 8$ ), lateral (left) and dorsal view of *S. COLLINA* (4), *S. ACUTA* (5), *S. ALBA* (6) and *S. CORDIFOLIA* (7). 1 & 2 from Friis et al. 3863; 3 & 4 from Friis et al. 4095; 5 from Tweedie 1044; 6 from Gilbert & Thulin 526; 7 from Schweinfurth 1372. Drawn by Eleanor Catherine.



*Combretum* – *Terminalia* – *Boswellia* woodland, old cultivations; c 1300 m. GD; common from W Africa to the Sudan and scattered through Uganda and Tanzania to Zambia. Gilbert & Getachew Aweke 2984.

The author has not been able to find a name for this very distinctive species which clearly belongs in the *S. rhombifolia* group but differs here in its reticulately sculptured mericarps. In the herbaria it has been mixed up with *S. rhombifolia*, and this is also the case in *Fl. Zamb.*

11. *S. serratifolia* Wilczek & Steyaert (1952).

Unbranched or sparsely branched perennial herb from woody rootstock, stems to 1 m, pubescent to tomentellous. Leaves uniformly pubescent on both sides, sometimes with appressed simple hairs along edges; petiole 3–7 mm; lamina ovate to elliptic or narrowly so, up to 7 x 3 cm, dentate to serrate, acute to rounded. Flowers solitary; pedicels (1–)1.5–5 cm, puberulous to pubescent. Calyx 6–8 mm long, pubescent, no long simple hairs. Petals 9–12 mm long, pale yellow to yellow; column 2–3 mm. Mericarps 8–9, c 3 mm long, rounded, circular in outline, opening along ventral suture and releasing seed, glabrous or puberulous, back and sides smooth without sculpturing (or back lumpy), lateral edges distinct, straight. Fig. 82.27.8.

*Combretum* – *Terminalia* woodland and wooded grassland with tall grass cover and subject to burning; 1400–2300 m. WG GG SD BA; E Zaire, Uganda, W Kenya, W Tanzania, Malawi, Zambia, Zimbabwe, Transvaal. Burger 1866; Friis et al. 3445; W. de Wilde et al. 7264.

12. *S. rhombifolia* L. (1753).

*S. scabrifolia* Wight & Arn. (1834).

*S. ostryaefolia* Webb (1854).

*S. riparia* Hochst. (1842), nom. nud.

Perennial or shrubby herb to 2 m; vegetative parts puberulous to tomentellous. Leaves: petiole 3–15 mm; lamina ovate to elliptic or narrowly so, up to 13 x 6 cm, dentate to serrate, acuminate to rounded. Flowers solitary and/or in short axillary cymes; pedicels 2–25 mm. Calyx 5–8 mm long, puberulous to pubescent, no long simple hairs. Petals 6–10 mm long, pale yellow to orange; column 1–3 mm, glandular. Mericarps (7–)8–13, 3–3.5 mm long, with 0.5–1.5 mm long birostrate awns, opening or not along ventral suture, sides sometimes breaking irregularly, back puberulous, sides densely glandular, back and sides smooth without sculpturing or faintly reticulate on sides, lateral edges distinct, straight. Fig. 82.27.1–3.

Edges, paths and clearings in forest, riverine forest and river-banks, upland grassland and bushland (mostly secondary and overgrazed), roadsides, weed; (400–)1000–2300(–2800) m. EE EW TU GD GJ SU AR WG IL KF GG SD BA HA; pantropic. Friis et al. 2145; Mooney 5952; W. de Wilde et al. 9389.

Plants from open habitats are much more densely hairy and have smaller leaves than plants from shaded places, often giving the impression of quite a different species.

13. *S. ovata* Forssk. (1775).

*S. abyssinica* Hochst. ex D. Dietr. (1847) – type: TU; Djeladjeranne, Schimper III:1453 (K P iso).

*S. subrotunda* Hochst. (1856), nom. nud.

Erect to procumbent perennial herb or shrub to 0.75 m; all parts puberulous to densely pubescent or tomentellous (stems), sometimes with scattered long simple hairs. Leaves: petiole 3–12 mm; lamina narrowly ovate to suborbicular, up to 5.5(–7.5) x 3.7(–5) cm (usually less than 3 x 2 cm), dentate or serrate, subacute to retuse. Flowers solitary (sometimes paired in a few axils); pedicels 2–25 (–30) mm. Calyx 5–9 mm long, 10–ribbed at base. Petals (5–)8–11 mm long, white or pale yellow to orange, erect when open; column 2–3 mm, densely hairy all over. Mericarps 7–8(–9), 3–3.5 mm long, with up to 1 mm long birostrate awns, puberulous to pubescent and glandular, back rugose to reticulately sculptured, sides weakly to distinctly sculptured, lateral edges distinct, muricate. Fig. 82.27.4–7.

*Acacia*, *Acacia* – *Balanites* and *Acacia* – *Commiphora* woodland and bushland on a wide variety of soil types, alluvial plains, roadsides; near sea level to 2300(–2500) m. EE ?AF EW TU WU SU AR GG SD BA HA; widespread in the drier parts of tropical and S Africa, Arabia to India. Burger 1109; Friis et al. 2668; Gilbert 2866a.

An extremely variable species, but – as opposed to the preceding species groups – it has not been possible to divide the material into satisfactory species. A number of collections from Sidamo have procumbent branches and white petals which are distinctly shorter than the sepals. Friis et al. 3056, Gilbert 4392 and Thulin et al. 3431 are typical of this form. These may eventually prove to be a separate taxon, but at present the author prefers to keep them in *S. ovata*.

14. *S. sp.* = *Ellis* 177.

Spreading woody herb to 30 cm; branchlets tomentose. Leaves floccose tomentose beneath; petiole 5–10 mm; lamina elliptic or broadly so, up to 3.5 x 2.2 cm, dentate, subacute to truncate. Flowers solitary; pedicels 2–12 mm, pubescent to tomentose. Calyx 8–10 mm long, 10–ribbed at base, floccose tomentose, with or without long simple hairs on edges. Petals 9–11 mm long, pale orange, erect when open; column c 2 mm, expanded part densely hairy and a few hairs towards base of cylindrical part. Mericarps 7, 3–3.5 mm long, with 2–3 mm long birostrate awns, pubescent and glandular, back and sides deeply reticulately sculptured, sides thin-walled between ridges, lateral edges distinct, muricate.

*Acacia* – *Commiphora* bushland on stony soil or rocky slopes; c 800 m. HA; Somalia. Ellis 177.

A very distinct species related to *S. ovata* easily recognisable by the floccose indumentum and long-awned mericarps. Only known from two collections.

15. *S. sp.* = *Bally* 9622.

Subshrub or shrub to 2 m; all parts yellowish tomentellous. Leaves: petiole 5–15 mm; lamina ovate to elliptic, up to 5.2 x 3 cm (usually less than 3 x 2 cm), dentate, rounded to truncate. Flowers solitary; pedicels 1–3 cm. Calyx 9–12



Figure 82.27 *SIDA RHOMBIFOLIA*: 1 - flowering stem  $\times \frac{1}{4}$ ; 2 - staminal column  $\times 8$ ; 3 - mericarp, ventral (left) and dorsal view  $\times 8$ . *S. OVATA*: 4 - flowering branch  $\times \frac{1}{4}$ ; 5 - staminal column  $\times 8$ ; 6 - fruiting calyx  $\times 3$ ; 7 - mericarp, ventral (left) and dorsal view  $\times 8$ . *S. SERRATIFOLIA*: 8 - mericarp, ventral (left) and dorsal view  $\times 8$ . 1 from Friis et al. 2145; 2 from Mooney 5947; 3 from Friis et al. 1989; 4 & 5 from Friis et al. 2668; 6 & 7 from Mooney 6336; 8 from Burger 1866. Drawn by Eleanor Catherine.

mm long, 5-ribbed at base, spreading from mature mericarps. Petals 10-17 mm long, creamy white to pale yellow, spreading widely when open; column 3-4 mm, glabrous apically, sparsely hairy towards base, expanded part densely hairy. Mericarps 5-6, 3.5-4 mm long, with up to 0.5 mm long awns, glabrous but glandular on sides, back and sides deeply reticulately sculptured, lateral edges distinct, sharply muricate.

*Acacia - Commiphora* bushland on red sandy soil overlying limestone; 500-800 m. HA; Somalia. *Bally* 9622; *Ellis* 233; *Popov* 1132.

A very distinct species easily recognisable by its large flowers. Only known from a handful of collections from the flat sandy Ogaden plains.

## 83. MALPIGHIACEAE

by E. Launert\*

Niendenzu in *Pflanzenr.* IV:141 (1928); Cufodontis, *Enum.*: 402–405 (1956); Launert, 35. *Malpighiaceae* in *Fl. Zamb.*, 2(1): 109–125 (1961) & *Malpighiaceae* in *Fl. Trop. E. Afr.*: 27 pp. (1968); Thulin, 66. *Malpighiaceae* in *Fl. Somalia* 1: 260–264 (1993).

Mostly woody climbers, sometimes shrubs or small trees, with unicellular appressed (sometimes forked) medifixed ± stiff hairs. Leaves opposite, in whorls of three or alternate, simple and entire, often with glands near the base of the blade or the petiole; stipules present or absent. Inflorescence terminal or axillary, usually many-flowered and racemose (more rarely flowers solitary); bracts and bracteoles present. Flowers regular or irregular, bisexual in African genera. Sepals 5, free or united at the base, persistent, often with glands outside. Petals 5, frequently clawed, free, imbricate, entire, or with fringed or dentate margins. Stamens 10, in two series with those of the outer series opposite the petals; filaments often united at the base; anthers dehiscing longitudinally, introrse, basifixed or dorsifixed, 2-theous. Ovary superior, carpels united, 3 (rarely 2, 4, or 5)-locular and -lobed, with 1 pendulous axile ovule in each locule; styles as many as the carpels with usually entire stigmas. Fruit a schizocarp, usually winged forming a samara<sup>1</sup>, rarely a fleshy drupe.

A large family of about 60 genera and 800 species, with a mainly pantropical distribution, but extending into the subtropics, most abundant in the New World: 3 genera and 9 species, 2 poorly known, in the Flora area.

## Key to genera

1. Leaves spirally arranged. 2
  - Leaves opposite. 3
2. Mericarps with a pronounced dorsal wing, lateral wing entirely reduced; calyx sometimes with 2 circular glands. 1. *Acridocarpus*
  - Mericarps with a shield-like circular lateral wing; dorsal wing much reduced, crest-like. 4. *Caucanthus*
3. Styles shorter than or as long as ovary and shorter than, as long as or only slightly exceeding the stamens. 4. *Caucanthus*
  - Styles always longer than ovary and distinctly exceeding the stamens. 4
4. Sepals not enclosing petals in bud; petals clawed; fruits up to 3 cm diameter, growing in deciduous bushland and woodland. 2. *Triaspis*
  - Sepals clearly enclosing petals in bud; petals not clawed; fruits 3–4 cm diameter, growing in wet evergreen forest. 3. *Flabellaria*

1. *ACRIDOCARPUS* Guill. & Perr. (Sept. 1831)

Erect, suberect, trailing or climbing shrubs, rarely small trees. Leaves alternate, petiolate, entire, usually with glands on under surface at base, and sometimes with 2 rows of smaller glands parallel to the margins, without stipules. Inflorescences few to many-flowered corymbs, racemes or panicles, axillary or terminating leafy branches; bracts present and persistent, small; bracteoles at base of pedicels, sometimes with a circular gland at base. Flowers regular or nearly so. Calyx leathery, with 1 or more subcircular sessile or sunken glands; lobes 5, equal or subequal, obtuse. Petals 5, white or yellow, usually clawed, longer than the sepals, entire, fimbriate or lacerate. Stamens 10; anthers basifixed, glabrous; filaments usually thick, somewhat broadened and united at base, glabrous. Ovary 3-locular, but usually

with 1 locule abortive, usually densely silky or tomentose-silky; styles 2, curved inwards. Samara with a straight or oblique dorsal wing.

A genus of about 30 species, mainly occurring in tropical Africa; one species in Madagascar, one in New Caledonia; 2, possibly 3, taxa in Ethiopia.

1. Leaf-blade 0.5–1.25(–1.5) cm broad, not longer than 6 cm, usually densely ferruginous-villous or subtomentose or greyish pubescent.
  1. *A. glaucescens* var. *ferrugineus*
  - Leaf-blade 3.3–6.5(–8) cm broad, 8–24 cm long.
    2. *A. ugandensis*

1. *A. glaucescens* Engl. (1902)

– type: Somalia, *Ruspoli & Riva* 200 (FT holo.).

Launert, in *Kew Bull.* 19: 351–352 (1965).

Upright, sparingly branched shrub, up to 2.5 m high. Younger branches densely rusty-red- or greyish-silky, older ones usually glabrous, with conspicuous lenticels. Leaf-blade linear, linear-lanceolate, oblanceolate, oblong-lanceolate to narrowly elliptic, 1.5–6 x 0.5–1.25(–1.5) cm, glabrous to densely hairy, rigidly leathery, with rolled margins; apex acute to obtuse, sometimes finely apiculate; base cuneate or attenuate, mostly without, rarely with a pair of small glands beneath near insertion of petiole; petiole 1–3 mm long, channeled above, glabrous or somewhat silky. Inflorescences on leafy shoots terminating in few- to many-flowered pyramidal racemes, 3–8(–12) cm long; rachis robust, usually densely rusty-red-silky; bracts and bracteoles narrow-pointed, bracts 2–2.5 mm long, persistent; bracteoles up to 1.5 mm long, without glands. Flowers 12.5–17.5 mm in diameter. Sepals broadly ovate to ovate-circular, rarely oblong-ovate, 2.5–4 mm long, rusty-red-silky or glabrescent outside, with a pair of circular glands at the very base or with glands on the commissures (altogether 3–5). Petals yellow, broadly clawed. Stamens with

\* formerly, Department of Botany, The British Museum (Natural History), Cromwell Road, London SW7 5BD, England.

1. samara: single-seeded, dry dehiscent fruit, having a wing-like extension of the pericarp.

ovate-oblong 4–5 mm long anthers; filaments rather thick, *c* 1 mm long, glabrous. Ovary densely silky; styles 2, 7.5–10 mm long. Wing of samara obliquely ovate, obovate-oblong, or elliptic, 15–20(–25) x 12–14 (–17) mm, sometimes extending around nut to the base.

1. Leaf-blade densely rusty-red villous to subtomentose on both surfaces, older ones rusty-red- or greyish-silky pubescent, mainly beneath, rarely glabrescent; calyx-lobes distinctly biglandular at the very base; samara-wing ovate, extending nearly to the base of the nut. var. *ferrugineus*

– Leaf-blade usually quite glabrous, only when young sometimes slightly rusty-red-silky; calyx-lobes with 3–5 usually small and differently-sized glands on the commissures between the lobes. 2

2. Leaf-blade linear or linear-lanceolate, 1.5 x 0.5 cm; samara-wing obliquely obovate or obovate-oblong, not extending to the base of the nut. var. *glaucescens*

– Leaf-blade oblanceolate, oblong-lanceolate or elliptic-lanceolate, 2–6 x 0.5–1.5 cm; samara-wing broadly obliquely ovate to elliptic, sometimes extending to the base of the nut. var. *graniticus*

var. *ferrugineus* (Engl.) Launert

in *Kew Bull.* 19: 352 (1965); *A. ferrugineus* Engl. (1905) – type: Somalia/Kenya border area, *Ellenbeck* 2207 (B holo. destr.); Kenya, *J. Adamson* 96 (EA neo., K isoneo.).

Fig. 83.1.

Semi-desert scrub, growing among rocks; *c* 500 m. HA; Kenya, and Somali Republic. *Ellis* 354.

The other 2 taxa, var. *glaucescens* and var. *graniticus* are so far only known from Somalia. Much of the Ogaden area (HA BA and SD) is still poorly known botanically and either of these varieties may turn up in the future [ed.].

2. *A. ugandensis* Sprague (1906)

?*A. scheffleri* Engl. (1905)

A strong woody climber, very young shoots brownish-red and silky, older ones glabrous, lenticellate. Leaf-blade oblong to oblong-elliptic, (8–)12–20(–28) x 3.3–6.5(–8) cm, membranous, rusty-red-silky on both surfaces when young, very soon glabrescent, only the midrib beneath remaining with hairs; apex acuminate, usually not apiculate; base commonly rounded, with or without glands; petiole robust, 5–7 mm long, grooved, brownish-red silky to glabrescent. Inflorescence loose, forming axillary few-to many-flowered racemes, up to 10 cm long; axis densely rusty-red-silky; bracts lanceolate, 1.5–2 mm long, acute, persistent; bracteoles very small, lanceolate, without glands. Flowers 25–30 mm in diameter. Calyx with 2 or 3 very small circular glands; lobes ovate to subcircular, 3–4 mm long, somewhat silky outside, glabrescent. Petals yellow, obovate to subcircular, 8–12 x 10 mm, distinctly clawed, lacerate at margins. Stamens with lanceolate or oblong anthers 4–5 mm long; filaments thick, *c* 3 mm long, glabrous. Ovary densely silky; styles *c* 1 mm long. Wing of samara obliquely ovate-elliptic *c* 5 x 1.5(–2.5) cm. Fig. 83.1.6.

In riverine forest climbing on *Zanthoxylum* sp.; 400–

500 m. IL; ?Sudan, Tanzania. *Friis* et al. 2575; *Pavlov* 246.

The description is based on material from Sudan and Tanzania. The Ethiopian material consists of 2 sterile collections in ETH, but *Pavlov* 264 has the note that the plant had yellow flowers. The whereabouts of the fertile duplicate is not known [ed.]. For a more detailed discussion of *A. ugandensis* and its taxonomic status see Launert, *loc. cit.*: 9 (1968).

## 2. *TRIASPIS* Burch. (1824)

Small trees, scandent or semiscandent shrubs to woody climbers. Leaves opposite, subopposite, rarely in whorls of 3, usually with 2–4 glands on the under-surface near the base, petiolate or sessile, with or without interpetiolar stipules. Inflorescence terminal or axillary, usually forming many-flowered corymbs, umbels or panicles; bracts and bracteoles usually present and deciduous; pedicels as long as or longer than the peduncle and articulated with it. Flowers regular or irregular. Sepals 5, almost always without glands. Petals 5, clawed, usually with fringed or denticulate margins. Stamens 10; anthers basifixed, usually glabrous; filaments glabrous or farinose-pubescent. Ovary hairy or glabrous, 3-locular (or sometimes 2-locular outside East Africa); styles (2–)3, somewhat curved, with incurving stigmas. Samara with a circular or ovate membranous or leathery lateral wing; dorsal wing shorter and narrower or absent.

An African genus of 15 species, 2 in the Flora area.

1. Leaves usually glabrous on both surfaces; secondary nerves usually prominent beneath. 1. *T. erlangeri*  
– Leaves densely pubescent, more so beneath, older ones rarely glabrescent; secondary nerves usually indistinct. 2. *T. niedenzuiana*

1. *T. erlangeri* Engl. (1905)

– types: HA, between Dagege and Gabelle river, *Ellenbeck* 998 & 1034 (B syn. destr.); GG, road to Hamer Koka (Gondaraba), *Corradi* 6975 (FT neo.).

Woody climber with twining branches, elsewhere a small much-branched erect shrub, up to 3 m high, with branchlets twining; younger stems grey from appressed or somewhat spreading hairs, very soon glabrescent. Leaf-blade elliptic, elliptic-oblong, rarely ovate-oblong, (2.5–)3–4.5 (–6) x (1.3–)1.8–2.5(–3.5) cm, obtuse or subobtuse, cuneate, somewhat leathery, pale green to yellowish when dried up; petiole 3–9 mm long, pubescent or glabrous, slightly grooved. Flowers in 4–8-flowered loose corymbs terminating annual branches, 12.5–15 mm in diameter; bracts linear, 3–5 mm long. Sepals ovate or oblong-ovate, *c* 2 mm long. Petals white, pinkish, or white and tinged with pink, broadly elliptic or elliptic-oblong, 4–5 mm long, shortly clawed. Anthers broadly elliptic, 0.8–1 mm long; filaments thread-like, 3.5–4.2 mm long. Styles *c* 5 mm long, glabrous. Samara elliptic or elliptic-oblong, 1.5–3 x 1.1–2 cm, entire or slightly retuse at apex; dorsal wing reduced to a tiny crest or absent. Fig. 83.2.7 & 8.

In *Acacia*–*Commiphora* woodland or bushland on gravelly limestone soil; (600–)850–1650 m. GG SD BA HA; Kenya, and Somalia. *Burger* 3363; *Friis* et al. 2936; *Vollesen* 86/17.

## 83. MALPIGHIACEAE

by E. Launert\*

Niendenzu in *Pflanzenr.* IV:141 (1928); Cufodontis, *Enum.*: 402–405 (1956); Launert, 35. *Malpighiaceae* in *Fl. Zamb.*, 2(1): 109–125 (1961) & *Malpighiaceae* in *Fl. Trop. E. Afr.*: 27 pp. (1968); Thulin, 66. *Malpighiaceae* in *Fl. Somalia* 1: 260–264 (1993).

Mostly woody climbers, sometimes shrubs or small trees, with unicellular appressed (sometimes forked) medifixed ± stiff hairs. Leaves opposite, in whorls of three or alternate, simple and entire, often with glands near the base of the blade or the petiole; stipules present or absent. Inflorescence terminal or axillary, usually many-flowered and racemose (more rarely flowers solitary); bracts and bracteoles present. Flowers regular or irregular, bisexual in African genera. Sepals 5, free or united at the base, persistent, often with glands outside. Petals 5, frequently clawed, free, imbricate, entire, or with fringed or dentate margins. Stamens 10, in two series with those of the outer series opposite the petals; filaments often united at the base; anthers dehiscing longitudinally, introrse, basifixed or dorsifixed, 2-theous. Ovary superior, carpels united, 3 (rarely 2, 4, or 5)-locular and -lobed, with 1 pendulous axile ovule in each locule; styles as many as the carpels with usually entire stigmas. Fruit a schizocarp, usually winged forming a samara<sup>1</sup>, rarely a fleshy drupe.

A large family of about 60 genera and 800 species, with a mainly pantropical distribution, but extending into the subtropics, most abundant in the New World: 3 genera and 9 species, 2 poorly known, in the Flora area.

## Key to genera

1. Leaves spirally arranged. 2
  - Leaves opposite. 3
2. Mericarps with a pronounced dorsal wing, lateral wing entirely reduced; calyx sometimes with 2 circular glands. 1. *Acridocarpus*
  - Mericarps with a shield-like circular lateral wing; dorsal wing much reduced, crest-like. 4. *Caucanthus*
3. Styles shorter than or as long as ovary and shorter than, as long as or only slightly exceeding the stamens. 4. *Caucanthus*
  - Styles always longer than ovary and distinctly exceeding the stamens. 4
4. Sepals not enclosing petals in bud; petals clawed; fruits up to 3 cm diameter, growing in deciduous bushland and woodland. 2. *Triaspis*
  - Sepals clearly enclosing petals in bud; petals not clawed; fruits 3–4 cm diameter, growing in wet evergreen forest. 3. *Flabellaria*

1. *ACRIDOCARPUS* Guill. & Perr. (Sept. 1831)

Erect, suberect, trailing or climbing shrubs, rarely small trees. Leaves alternate, petiolate, entire, usually with glands on under surface at base, and sometimes with 2 rows of smaller glands parallel to the margins, without stipules. Inflorescences few to many-flowered corymbs, racemes or panicles, axillary or terminating leafy branches; bracts present and persistent, small; bracteoles at base of pedicels, sometimes with a circular gland at base. Flowers regular or nearly so. Calyx leathery, with 1 or more subcircular sessile or sunken glands; lobes 5, equal or subequal, obtuse. Petals 5, white or yellow, usually clawed, longer than the sepals, entire, fimbriate or lacerate. Stamens 10; anthers basifixed, glabrous; filaments usually thick, somewhat broadened and united at base, glabrous. Ovary 3-locular, but usually

with 1 locule abortive, usually densely silky or tomentose-silky; styles 2, curved inwards. Samara with a straight or oblique dorsal wing.

A genus of about 30 species, mainly occurring in tropical Africa; one species in Madagascar, one in New Caledonia; 2, possibly 3, taxa in Ethiopia.

1. Leaf-blade 0.5–1.25(–1.5) cm broad, not longer than 6 cm, usually densely ferruginous-villous or subtomentose or greyish pubescent.
  1. *A. glaucescens* var. *ferrugineus*
  - Leaf-blade 3.3–6.5(–8) cm broad, 8–24 cm long.
    2. *A. ugandensis*

1. *A. glaucescens* Engl. (1902)

– type: Somalia, *Ruspoli & Riva* 200 (FT hol.).

Launert, in *Kew Bull.* 19: 351–352 (1965).

Upright, sparingly branched shrub, up to 2.5 m high. Younger branches densely rusty-red- or greyish-silky, older ones usually glabrous, with conspicuous lenticels. Leaf-blade linear, linear-lanceolate, oblanceolate, oblong-lanceolate to narrowly elliptic, 1.5–6 x 0.5–1.25(–1.5) cm, glabrous to densely hairy, rigidly leathery, with rolled margins; apex acute to obtuse, sometimes finely apiculate; base cuneate or attenuate, mostly without, rarely with a pair of small glands beneath near insertion of petiole; petiole 1–3 mm long, channeled above, glabrous or somewhat silky. Inflorescences on leafy shoots terminating in few- to many-flowered pyramidal racemes, 3–8(–12) cm long; rachis robust, usually densely rusty-red-silky; bracts and bracteoles narrow-pointed, bracts 2–2.5 mm long, persistent; bracteoles up to 1.5 mm long, without glands. Flowers 12.5–17.5 mm in diameter. Sepals broadly ovate to ovate-circular, rarely oblong-ovate, 2.5–4 mm long, rusty-red-silky or glabrescent outside, with a pair of circular glands at the very base or with glands on the commissures (altogether 3–5). Petals yellow, broadly clawed. Stamens with

\* formerly, Department of Botany, The British Museum (Natural History), Cromwell Road, London SW7 5BD, England.

1. samara: single-seeded, dry dehiscent fruit, having a wing-like extension of the pericarp.

ovate-oblong 4–5 mm long anthers; filaments rather thick, *c* 1 mm long, glabrous. Ovary densely silky; styles 2, 7.5–10 mm long. Wing of samara obliquely ovate, obovate-oblong, or elliptic, 15–20(–25) x 12–14 (–17) mm, sometimes extending around nut to the base.

1. Leaf-blade densely rusty-red villous to subtomentose on both surfaces, older ones rusty-red- or greyish-silky pubescent, mainly beneath, rarely glabrescent; calyx-lobes distinctly biglandular at the very base; samara-wing ovate, extending nearly to the base of the nut. var. *ferrugineus*  
– Leaf-blade usually quite glabrous, only when young sometimes slightly rusty-red-silky; calyx-lobes with 3–5 usually small and differently-sized glands on the commissures between the lobes. 2
2. Leaf-blade linear or linear-lanceolate, 1.5 x 0.5 cm; samara-wing obliquely obovate or obovate-oblong, not extending to the base of the nut. var. *glaucescens*  
– Leaf-blade oblanceolate, oblong-lanceolate or elliptic-lanceolate, 2–6 x 0.5–1.5 cm; samara-wing broadly obliquely ovate to elliptic, sometimes extending to the base of the nut. var. *graniticus*

var. *ferrugineus* (Engl.) Launert

in *Kew Bull.* 19: 352 (1965); *A. ferrugineus* Engl. (1905) – type: Somalia/Kenya border area, *Ellenbeck* 2207 (B holo. destr.); Kenya, *J. Adamson* 96 (EA neo., K isoneo.).

Fig. 83.1.

Semi-desert scrub, growing among rocks; *c* 500 m. HA, Kenya, and Somali Republic. *Ellis* 354.

The other 2 taxa, var. *glaucescens* and var. *graniticus* are so far only known from Somalia. Much of the Ogaden area (HA BA and SD) is still poorly known botanically and either of these varieties may turn up in the future [ed.].

2. *A. ugandensis* Sprague (1906)

?*A. scheffleri* Engl. (1905)

A strong woody climber, very young shoots brownish-red and silky, older ones glabrous, lenticellate. Leaf-blade oblong to oblong-elliptic, (8–)12–20(–28) x 3.3–6.5(–8) cm, membranous, rusty-red-silky on both surfaces when young, very soon glabrescent, only the midrib beneath remaining with hairs; apex acuminate, usually not apiculate; base commonly rounded, with or without glands; petiole robust, 5–7 mm long, grooved, brownish-red silky to glabrescent. Inflorescence loose, forming axillary few-to many-flowered racemes, up to 10 cm long; axis densely rusty-red-silky; bracts lanceolate, 1.5–2 mm long, acute, persistent; bracteoles very small, lanceolate, without glands. Flowers 25–30 mm in diameter. Calyx with 2 or 3 very small circular glands; lobes ovate to subcircular, 3–4 mm long, somewhat silky outside, glabrescent. Petals yellow, obovate to subcircular, 8–12 x 10 mm, distinctly clawed, lacerate at margins. Stamens with lanceolate or oblong anthers 4–5 mm long; filaments thick, *c* 3 mm long, glabrous. Ovary densely silky; styles *c* 1 mm long. Wing of samara obliquely ovate-elliptic *c* 5 x 1.5(–2.5) cm. Fig. 83.1.6.

In riverine forest climbing on *Zanthoxylum* sp.; 400–

500 m. IL; ?Sudan, Tanzania. *Friis* et al. 2575; *Pavlov* 246.

The description is based on material from Sudan and Tanzania. The Ethiopian material consists of 2 sterile collections in ETH, but *Pavlov* 264 has the note that the plant had yellow flowers. The whereabouts of the fertile duplicate is not known [ed.]. For a more detailed discussion of *A. ugandensis* and its taxonomic status see Launert, *loc. cit.*: 9 (1968).

2. *TRIASPIS* Burch. (1824)

Small trees, scandent or semiscandent shrubs to woody climbers. Leaves opposite, subopposite, rarely in whorls of 3, usually with 2–4 glands on the under-surface near the base, petiolate or sessile, with or without interpetiolar stipules. Inflorescence terminal or axillary, usually forming many-flowered corymbs, umbels or panicles; bracts and bracteoles usually present and deciduous; pedicels as long as or longer than the peduncle and articulated with it. Flowers regular or irregular. Sepals 5, almost always without glands. Petals 5, clawed, usually with fringed or denticulate margins. Stamens 10; anthers basifixed, usually glabrous; filaments glabrous or farinose-pubescent. Ovary hairy or glabrous, 3-locular (or sometimes 2-locular outside East Africa); styles (2–)3, somewhat curved, with incurving stigmas. Samara with a circular or ovate membranous or leathery lateral wing; dorsal wing shorter and narrower or absent.

An African genus of 15 species, 2 in the Flora area.

1. Leaves usually glabrous on both surfaces; secondary nerves usually prominent beneath. 1. *T. erlangeri*  
– Leaves densely pubescent, more so beneath, older ones rarely glabrescent; secondary nerves usually indistinct. 2. *T. niedenzuiana*

1. *T. erlangeri* Engl. (1905)

– types: HA, between Dagage and Gabelle river, *Ellenbeck* 998 & 1034 (B syn. destr.); GG, road to Hamer Koka (Gondaraba), *Corradi* 6975 (FT neo.).

Woody climber with twining branches, elsewhere a small much-branched erect shrub, up to 3 m high, with branchlet-tips twining; younger stems grey from appressed or somewhat spreading hairs, very soon glabrescent. Leaf-blade elliptic, elliptic-oblong, rarely ovate-oblong, (2.5–)3–4.5 (–6) x (1.3–)1.8–2.5(–3.5) cm, obtuse or subobtuse, cuneate, somewhat leathery, pale green to yellowish when dried up; petiole 3–9 mm long, pubescent or glabrous, slightly grooved. Flowers in 4–8-flowered loose corymbs terminating annual branches, 12.5–15 mm in diameter; bracts linear, 3–5 mm long. Sepals ovate or oblong-ovate, *c* 2 mm long. Petals white, pinkish, or white and tinged with pink, broadly elliptic or elliptic-oblong, 4–5 mm long, shortly clawed. Anthers broadly elliptic, 0.8–1 mm long; filaments thread-like, 3.5–4.2 mm long. Styles *c* 5 mm long, glabrous. Samara elliptic or elliptic oblong, 1.5–3 x 1.1–2 cm, entire or slightly retuse at apex; dorsal wing reduced to a tiny crest or absent. Fig. 83.2.7 & 8.

In *Acacia*–*Commiphora* woodland or bushland on gravelly limestone soil; (600–)850–1650 m. GG SD BA HA; Kenya, and Somalia. *Burger* 3363; *Friis* et al. 2936; *Vollesen* 86/17.

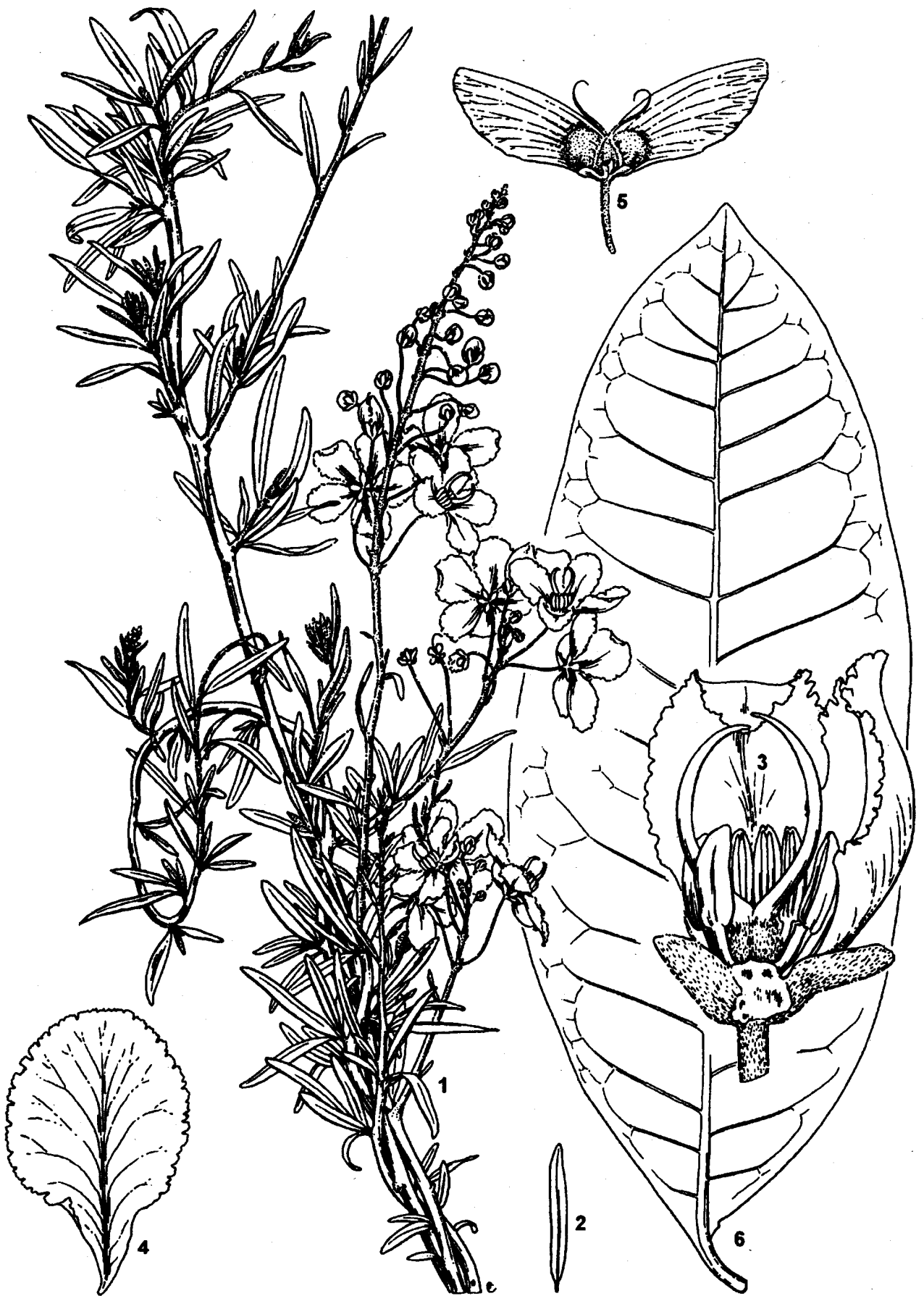


Figure 83.1 *ACRIDOCARPUS GLAUDESCENS* var. *FERRUGINEUS*: 1 – flowering branch  $\times \frac{3}{4}$ ; 2 – leaf  $\times \frac{3}{4}$ ; 3 – half flower  $\times 5$ ; 4 – petal  $\times 3\frac{1}{2}$ ; 5 – fruit  $\times 1\frac{1}{2}$ . *A. UGANDENSIS*: 6 – leaf  $\times \frac{3}{5}$ . 1–4 from Ellis 345; 5 from Gilbert & Thulin 1312; 6 from Friis et al. 2575. Drawn by Eleanor Catherine.



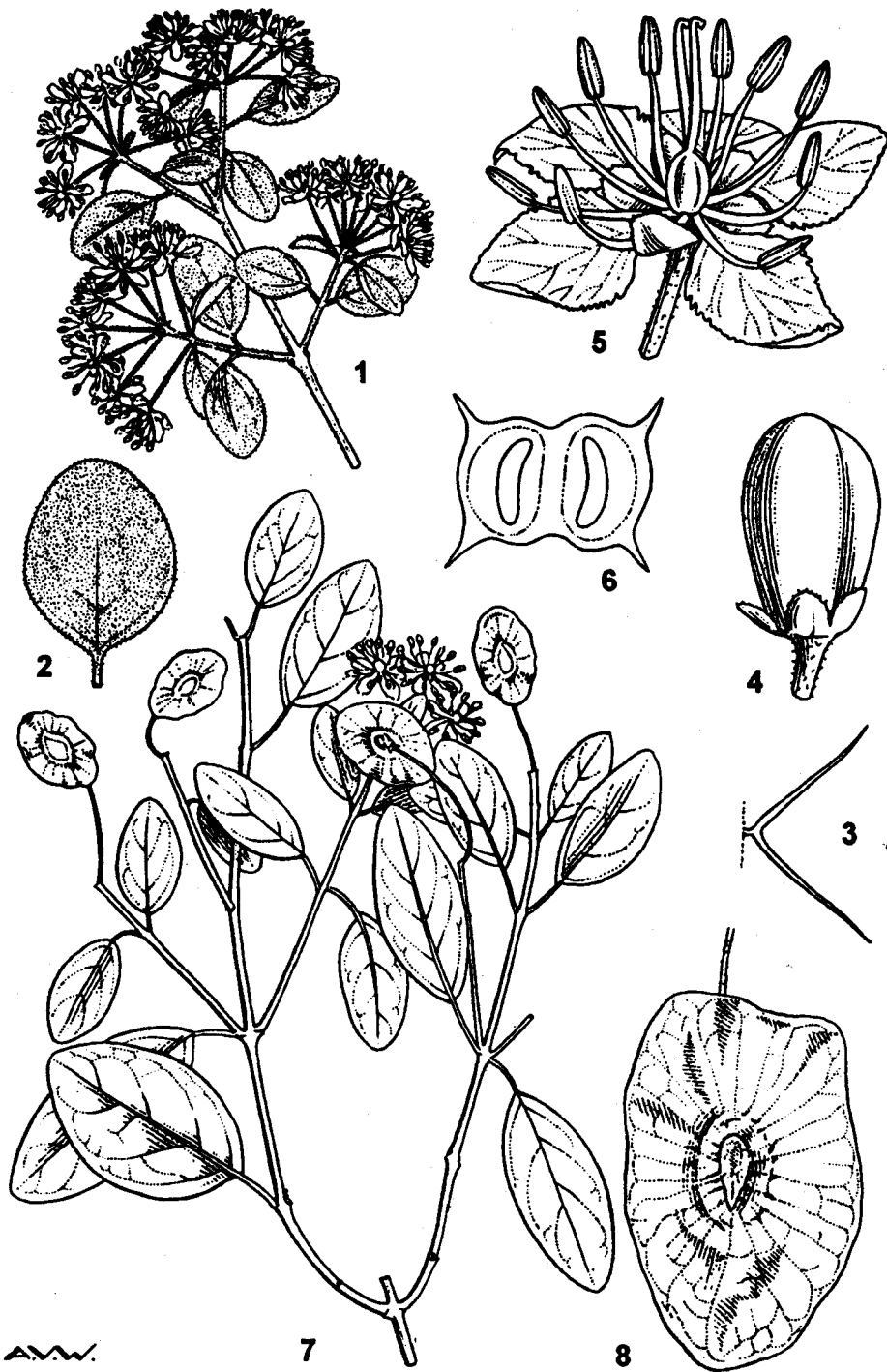


Figure 83.2  
***TRIASPIS NIEDENZUIANA***: 1 – flowering branch x 1; 2 – leaf x 1; 3 – hair x 40; 4 – bud x 8; 5 – flower x 6; 6 – ovary in transverse section x 20. ***T. ERLANGERI***: 7 – fertile branch x 1; 8 – fruit x 2. 1–3, 5 & 6 from Gillett 12711; 4 from Dummer 5018; 7 from Napier 1036; 8 from Corradi 6975. Drawn by Ann Webster. (Reproduced with permission from *Fl. Trop. E. Afr. Malpighiaceae*: fig. 4.)

2. *T. niedenzuiana* Engl. (1905)

– type: Tanzania, Uhlig 863.

*Tristellateia cynanchoides* Chiov. (1932).

A small attractive semi-erect or scandent shrub, sometimes the ends of branches twining, up to 3 m or more high; younger stems and inflorescences densely covered with somewhat stiff short hairs, older ones glabrescent. Leaf-blade ovate or broadly elliptic, rarely ovate-lanceolate, 1.5–2.5(–7) x 0.9–1.8(–3) cm, older ones densely pubescent (more so beneath); secondary nerves usually indistinct; apex obtuse or subacute; base usually rounded, rarely cuneate; petiole 2–4(–6) mm long, densely pubescent. Inflorescence loose, few-flowered corymbs terminating leafy

annual branches. Flowers 10–12.5 mm in diameter; bracts linear, 2–4 mm long. Sepals ovate, c 2 mm long. Petals pure white, lilac or pinkish, oblong or oblong-ovate, spoon-shaped, 3.5–4 mm long, shortly fimbriate at edges near base, clawed. Stamens with anthers 1–1.3 mm long; filaments 3–5 mm long. Samara elliptic or ovate-elliptic, 1.8–2 x 0.9–1.1 cm (in available material, but no fruits were fully developed); lateral wing distinctly retuse at apex; dorsal wing reduced. Fig. 83.2.1–6.

*Acacia* scrub and woodland, on red silty soil; 850–1350 m. SD BA; Tanzania, Kenya, and Somalia. Corradi 8568, Cufodontis 96, Thulin et al. 3542.



Figure 83.3

**FLABELLARIA PANICULATA:** 1 – flowering branch x 1; 2 – bud x 6; 3 – flower x 6; 4 – fruit x 1. 1–3 from Gillman 463; 4 from Sillitoe 339. Drawn by Ann Webster (Reproduced with permission from *Fl. Trop. E. Afr. Malpighiaceae*: fig. 7.)

### 3. FLABELLARIA Cavan. (1790)

Woody climbers. Leaves opposite, petiolate, without stipules. Flowers regular, white or cream, in many-flowered terminal or axillary paniced racemes, pedicellate. Sepals 5, valvate, closed over petals in bud, without glands. Petals 5, not clawed, entire, glabrous, oblong-lanceolate to sometimes oblanceolate. Stamens 10, all bearing anthers; filaments free or somewhat united at the very base; anthers elliptic or oblong, basifixed. Ovary 3-locular, densely pilose; styles 3, much longer than the stamens. Samara with 2 lateral wings which are united at the base and distinct at the top.

A genus with 1 species confined to tropical Africa.

### *F. paniculata* Cavan. (1790)

– type: Sierra Leone, *Smeathman* in *Herb. Thouin.* (BM).

A tall climber up to 15 m; stems up to 10 cm or slightly more in diameter, lenticellate, younger ones with a dense grey or yellowish silky indumentum. Leaf-blade broadly elliptic, ovate, ovate-subcircular, or rarely lanceolate, 5–15 x 4–10 cm, somewhat leathery, upper surface usually glabrous, lower surface appressed silky-tomentose; apex obtuse, subacute or apiculate; base rounded or subcordate; petiole 1–2.5 cm long, grooved, tomentose. Inflorescences up to 20 cm long, lax; bracts oblanceolate, 3–7 mm long, deciduous or persistent; bracteoles very small, elliptic,

persistent; pedicels up to 5 mm long. Flowers  $c$  10 mm in diameter. Sepals oblong-lanceolate, 5–6.5 mm long, usually reflexed, tomentose outside. Petals oblanceolate, up to 7 mm long, entire, glabrous, rounded at the apex. Anthers elliptic to oblong-elliptic, 1.25–1.75 mm long; filaments 2–3 mm long, glabrous. Styles 3–4 mm long. Samara 3–4 cm in diameter, usually green. Fig. 83.3.

Rain-forest, often at edges, riverine forest, in thickets or secondary growth; 1150(–1650) m. KF; Uganda, Kenya, and Tanzania. *Friis* et. al. 4035.

The Ethiopian record is based on a single fallen fruit.

#### 4. CAUCANTHUS *Forssk.* (1775)

*DIASPIS* Niedenzu (1892).

Launert in *Bol. Soc. Brot.* ser. 2, 35: 48 (1961)

Woody climbers or upright semi-scandent shrubs; stems with younger parts usually densely appressed pubescent or silky. Leaves spirally arranged or opposite, with 2 glands on margin near base or without such glands; stipules very small, deciduous. Inflorescence racemose or corymbose-paniculate, axillary or terminal. Flowers regular. Sepals without glands. Petals clawed (sometimes very shortly), sometimes auriculate or hastate at base, glabrous, margins wholly or partially fimbriate. Stamens glabrous with dorsifixed anthers. Ovary densely silky; styles truncate, shorter than to slightly exceeding stamens. Fruit with a lateral wing completely surrounding the nut, circular or broadly elliptic; dorsal wing small, obliquely lanceolate or absent.

A genus of 3 species confined to Yemen and eastern Africa south to Mozambique and Malawi.

1. Leaves opposite; blade large 6–12 x 4–9.5 cm; petals auriculate near the base. 1. *C. auriculatus*  
– Leaves spirally arranged or rarely opposite; blade 5–30 x 4–20 mm; petals entire or fimbriate but never auriculate. 2
2. Ovary 2-locular; styles 2; blade densely silky. 2. *C. albidus*  
– Ovary 3-locular; styles 3; blade sparsely pubescent. 3. *C. edulis*

1. *C. auriculatus* (*Radlk.*) Niedenzu (1915);  
*Triaspis auriculata* Radlk. (1883) – type: Kenya, *Hildebrandt* 2821 (M holo., BM K iso.).  
*C. argenteus* Niedenzu (1904).  
*C. cinereus* Niedenzu (1904).

Climber up to 5 m in length; younger stems densely covered with short soft white silky hairs, older stems very finely pubescent or glabrescent. Leaf-blade ovate-cordate, 6–12 x 4–9.5 cm, membranous, pubescent above, grey-tomentose beneath, with 2 large glands near base (usually concealed by the indumentum); apex acute to shortly acuminate; petiole 1–3 cm long, densely silky with usually 2 small glands above the middle. Inflorescence dense axillary and terminal corymbs; peduncles and rhachis silky; pedicels 1–1.5 cm long, silky; bracts ovate; bracteoles lanceolate or linear-subulate. Flowers 15 mm in diameter,

with unpleasant smell. Sepals broadly ovate from a narrowed base, 2–2.5 mm long, silky outside. Petals pale yellow, ovate, 6–7 mm long, shortly clawed, keeled, subhastate at the base, usually reflexed. Stamens with subversatile oblong anthers 2.3–2.5 mm long; filaments somewhat fleshy. Ovary densely silky; styles 2.5–3 mm long, fairly stout, silky. Lateral wing of samara oblong-elliptic or oblong-obovate, 1–2 cm in diameter, with entire margins; dorsal wing absent. Fig. 83.4.

Deciduous *Acacia* – *Balanites* – *Zizyphus* woodland, bushland and thicket, often riparian or in rocky places, also extending into upland dry evergreen forest and bushland; 1200–2000 m. WU SU AR GG SD BA HA; Mozambique, Malawi, Zimbabwe, Uganda, and Tanzania. *Burger* 2097; *Mooney* 7976; *Thulin* 1311.

#### 2. *C. albidus* (*Niedenzu*) Niedenzu (1928);

*Diaspis albida* Niedenzu (1892) – type: *Hildebrandt* 2585 (B holo. destr.).

*D. albida* var. *fimbripetala* Niedenz. in *Verz. Vorl. Akad. Braunsberg S.-Sem.* 1924: 2 (1924); *C. albidus* var. *fimbripetalus* (Niedenzu) Niedenzu, *loc. cit.*: 36 (1928) – types: HA, between Dagage and Gabelle river, *Ellenbeck* 1037 (B syn. destr.); Kenya, *Scott-Elliot* 6253 (BM K isosyn.).

*D. albida* var. *fimbripetala* forma *trystyla* Niedenzu in *Verz. Vorl. Akad. Braunsberg S.-Sem.* 1924: 2 (1924); *C. albidus* var. *fimbripetalus* forma *trystylus* (Niedenzu) Niedenzu, *loc. cit.*: 36 (1928) – type: Somalia, *Ellenbeck* 2146a (B holo. destr.).

*C. argenteus* Chiov. (1932), non Niedenzu (1904), nom illegit.; *C. chiovendae* Cufod., E.P.A.: 403 (1956) – type: Somalia, *Senni* 341 (FI lecto.).

An upright or semi-scandent many-branched shrub; younger stems densely covered by a silvery or whitish silky indumentum, older stems less hairy or glabrescent. Leaf-blade ovate, ovate-lanceolate or nearly circular, 5–30 x 4–20 mm, papery, densely silky on both surfaces, sometimes glabrescent on upper surface when older, usually without glands; apex somewhat acute or usually finely cuspidate, sometimes emarginate; base usually rounded; petiole 1–6 mm long, silky. Inflorescences many-flowered, dense, raceme-like; peduncles densely silky; pedicels 5–10 mm long, appressed silky; bracts and bracteoles subulate, usually provided with 2 small glands at the very base, deciduous. Flowers 10 mm in diameter, whitish or cream-coloured, sweetly scented. Sepals ovate,  $c$  1 mm long, silky. Petals ovate, 3.5–5 mm long, somewhat keeled and hooded at the top, shortly clawed, entire or fimbriate (usually only along one side), usually reflexed. Anthers elliptic or oblong, 1–1.3 mm long; filaments filiform, 2.5–3.2 mm long. Ovary densely hairy; styles usually 2, 1.5–2 mm long, thick, pubescent. Lateral wing of samara circular, 1–1.5 cm in diameter, often with margins crenulate; dorsal crest semi-lanceolate,  $c$  6 x 1.5–2 mm.

*Acacia* – *Commiphora* and *Acacia* – *Jatropha* – *Boswellia* woodland and bushland, on sandy soil, also with marble and gypsum; 400–1200 m. SU SD HA; Kenya, Somalia. *Friis* et al. 2827; *Gilbert* et al. 7576; *Thulin* et al. 3549.

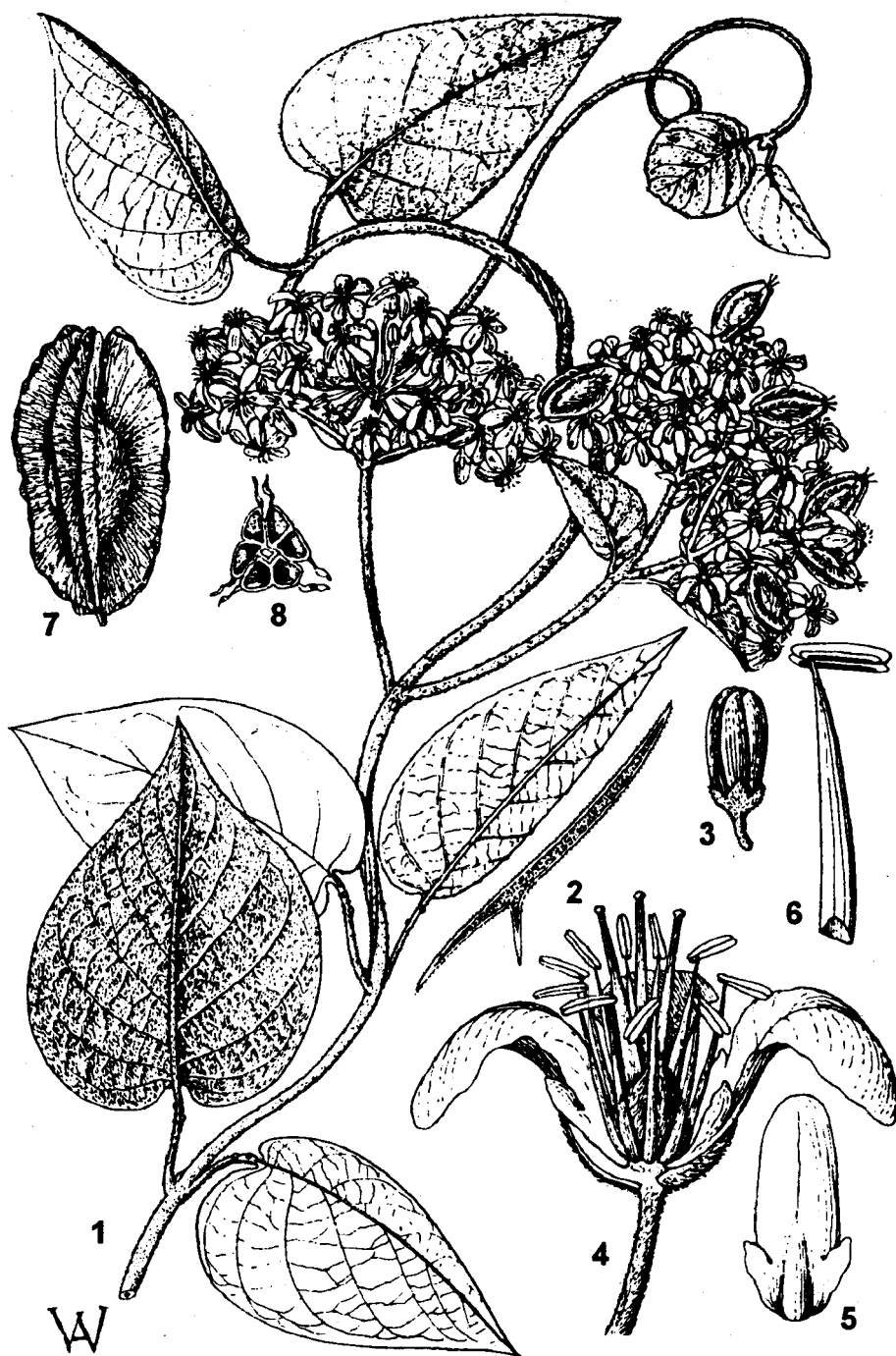


Figure 83.4

**CAUCANTHUS AURICULATUS:**

1 - branch with flowers and fruits  $\times \frac{1}{3}$ ; 2 - hair (taken from leaf)  $\times 30$ ; 3 - flower bud  $\times 2$ ; 4 - flower, with sepals partly removed to show stamens and pistil  $\times 4$ ; 5 - petal showing basal auricles  $\times 3$ ; 6 - stamen  $\times 6$ ; 7 - fruit  $\times \frac{1}{3}$ ; 8 - fruit in transverse section  $\times \frac{1}{3}$ . 1 from *Barbosa & Carvalho* 3108; 2-6 from *Anderson* 345; 7 & 8 from *Dale* in *F. D.* 3854. Drawn by Ann Webster. (Reproduced with permission from *Fl. Zamb. Malpighiaceae*: Tab. 16.)

**3. *C. edulis* Forssk. (1775).**

- types: Yemen, *Forsskål* 477 & 1068 (C syn.)

*Tristellateia somalensis* Chiov. (1916); *T. africana* var. *somalensis* (Chiov.) (1956).

An upright or semi-scandent, much-branched shrub, younger stems bearing a sparse whitish indumentum, older stems glabrous. Leaf-blade circular to lanceolate, 1.7 x 0.9 mm, sparsely pubescent on both surfaces, usually glabrescent when older, usually without glands; apex acute, sometimes mucronate, emarginate; base usually rounded; petiole 2.5-7 mm long, pubescent. Inflorescence an umbel; peduncles minutely pubescent; pedicels 1-1.5 cm long; bracts and bracteoles subulate, without glands. Flowers whitish

cream-coloured, 15 mm in diameter, strongly sweet-scented. Sepals ovate, 2 mm long, petals ovate 7-8.5 mm long, somewhat keeled and hooded at the top, shortly clawed, entire or fimbriate (usually just along one side), usually reflexed. Anthers elliptic or oblong 1-1.4 mm long; filaments filiform 3-4.4 mm long. Ovary densely hairy; styles usually 3, 2.5-3 mm long, thick, glabrous (or minutely pubescent). Lateral wing of samara circular, 2-3 cm in diameter, often with margins crenulate, dorsal crest lanceolate-circular 2 x 1.8-2 cm.

Dense bushland and semi-desert scrub; 350-1200 m. HA; Somalia. *Gillett* 4150; *Bally* 12995; *Ellis* 154.

## 84. ERYTHROXYLACEAE

by B. Verdcourt\*

Chaffey, South-west Ethiopia forest inventory project: p. 56 (1978); Verdcourt, *Erythroxylaceae* in *Fl. Trop. E. Afr.*: 11 pp. (1984); Thulin, 67. *Erythroxylaceae* in *Fl. Somalia*: 264–265 (1993).

Trees, shrubs or subshrubs, glabrous. Leaves alternate or rarely opposite, simple, entire, pinnately nerved; stipules  $\pm$  united, intrapetiolar or rarely interpetiolar. Flowers axillary, solitary, in fascicles or rarely in pedunculate inflorescences, regular, hermaphrodite or unisexual, heterostylous. Sepals (4–)5, valvate, united. Petals (4–)5, contorted in bud, free, clawed, soon falling, usually with a ligulate nectariferous appendage inside. Stamens 10, all fertile, the filaments united at the base to form a shallow or urn-shaped cup, sometimes glandular. Ovary superior, 2–3(–4)-locular, the locules with 1 or rarely 2 pendulous ovules; styles 2–3(–4), free or  $\pm$  united, with club-shaped, capitate or rarely acute stigmas. Fruit a 1-seeded fleshy drupe or rarely a 3(–4)-locular, 3(–4)-seeded capsule dehiscing longitudinally. Seeds without an aril.

A family of 4 genera in tropical and warm-temperate regions of both hemispheres; 1 species occurring in the Flora area. The rare exceptions in the above family description relate to the west tropical African genus *Aneulophus* Benth.

**ERYTHROXYLUM** P. Browne (1756)

Trees, shrubs or shrublets, the young shoots often markedly compressed. Leaves petiolate, alternate, with  $\pm$  united stipules, persistent or partially to completely deciduous. Flowers axillary, in fascicles or solitary, heterostylous. Sepals 5, triangular, united and broadened at the base,  $\pm$  leathery. Petals white to yellowish cream, free, clawed; nectary appendage large, usually exceeding the calyx, entire or 2–3-lobed. Stamens with the filaments equal or unequal and then those opposite the sepals shorter, united at the base to form a deep  $\pm$  persistent cup with entire or  $\pm$  toothed margin. Ovary (2–)3-locular, each with 1 ovule; styles free or partially united, spreading; stigmas obliquely capitate or rarely acute. Fruit a 1-seeded drupe. Seed oblong-ellipsoid.

A large genus, estimated at about 200 species, distributed throughout the tropics and in warm temperate areas; particularly abundant in America and Madagascar. *E. coca* Lam. and *E. novagranatensis* (Morris) Hieron., sources of cocaine, have been grown in East Africa.

***E. fischeri* Engl. (1895)**

– type: Kenya, Fischer 478.

Evergreen much-branched shrub, undershrub or small tree 0.9–9 m tall, with straight bole and regular conical crown or sometimes up to 18 m tall, with spreading crown and trunk to 60 cm in diameter at the base; branches pendulous; young twigs compressed; bark grey or brown, soft and flaky or scaly, warted; slash red or pale pink, vertically streaked, turning darker later. Leaves elliptic to oblong-elliptic, 5–18 x 2.5–7.7 cm, acute to shortly acuminate at the apex, the tip obtuse, cuneate at the base, dark green and shining above, often drying brownish beneath, somewhat leathery; lateral nerves 12–15, the venation reticulate and prominent on both surfaces; petiole 0.5–1.3 cm long, channelled above; stipules triangular, keeled 2–5 mm long. Flowers fragrant, 1–4 in the axils of leaves or stipule-like bracts, often aggregated into an apparently terminal leafless

inflorescence up to 3 cm long below the terminal bud which develops later; pedicels (0.3–)0.6–1.3 cm long. Calyx 2–3 mm long, lobed for half its length, the lobes triangular. Petals white or pinkish-white, oblong, (4–)5–7 mm long, clawed, soon falling, the nectary one third the length of the petals. Short-styled flowers; stamens equal, 3–6 mm long, the staminal cup 1.5 mm long, with 1–2 teeth between each pair of filaments; ovary 2 mm long, not or scarcely over-topping, the staminal cup; styles 2–3, 1.5–2.5 mm long. Long-styled flowers: stamens equal, 3 mm long; styles 5 mm long. Drupes red or orange-red, oblong to oblong ovoid, 1.5–1.9 cm long; pedicels 1–2.5 cm long. Fig. 84.1.

Evergreen forest, stream-banks; 500–600 m. IL; Uganda, Kenya, Tanzania, Sudan. *Ash* 564; *Chaffey & Thomerson* 618; *Friis et al.* 2436.



Figure 84.1 *ERYTHROXYLUM FISCHERI*: 1 – leafy branch x  $\frac{1}{2}$ ; 2 – flower x 6; 3 – nectary x 6; 4 – fruit x 1. 1–3 from *Friis et al.* 2436; 4 from *Pavlov* 230. Drawn by Damtew Teferra.

\* The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK.

## 85. EUPHORBIACEAE

by M. G. Gilbert\*

Pax & K. Hoffmann in Engler & Harms, *Nat. Pflanzenfam.* 19c (1931); Cufodontis, *Enum.*: 412–465 (1956–58); Radcliffe-Smith, *Euphorbiaceae* part 1 in *Fl. Trop. E. Afr.*: 408 pp. (1987); S. Carter & Radcliffe-Smith, *Euphorbiaceae* part 2 in *Fl. Trop. E. Afr.*: 189 pp. (1988); Webster, *Taxon* 24: 593–601 (1975) & *Ann. Missouri Bot.* 81 (1994); Gilbert, Holmes & Thulin, *Euphorbiaceae* in Thulin (ed.) *Fl. Somalia* 1: 267–339 (1993).

Trees, shrubs or herbs, sometimes succulent or climbing; sometimes spiny, sometimes with stellate hairs and/or peltate scales or stinging hairs; sometimes with latex. Leaves mostly alternate, occasionally opposite or whorled, usually simple, entire or palmately lobed, occasionally reduced to scales, rarely palmate; stipules usually present. Monoecious or dioecious. Inflorescences axillary, leaf-opposed or terminal, mostly raceme-like, rarely cymose, or flowers very reduced and contained within flower-like 'cyathia'. Flowers small to minute, (2–)3–6(or more)-merous, sometimes reduced to a single naked stamen or a naked ovary; petals often absent; annular disc or disc-glands often present. Male flowers: stamens 1 to c 1000, pistillode present or not. Female flowers: staminodes usually absent, very rarely present and apparently functional; ovary 1–4(–20)-locular, mostly 3-locular, locules each with 1 or 2 ovules and 1 style, styles free or joined, often divided. Fruit mostly a regma, which is a capsule-like schizocarp which breaks up, often explosively, into 2-valved cocci leaving a central columella, occasionally forming a drupe or, rarely, a berry. Seeds often with a caruncle<sup>1</sup>.

A very large family with about 300 genera and 8,000–10,000 species, most numerous in the Tropics: 30 genera and 200 indigenous species so far recorded from the Flora area plus a further 4 genera and 9 species fairly widely cultivated. Over 70 genera are recorded from East Africa so it is likely that there will be further additions to the Ethiopian flora, particularly from the southwest forests.

In most genera the fruit, a 3-loculed regma, is diagnostic but the family as a whole is ill-defined with exceptions to all the diagnostic characters. Links to a diversity of families have been suggested, most notably Thymelaeaceae, Sterculiaceae and Flacourtiaceae but also, though less convincingly, to Celastraceae, Rhamnaceae, Anacardiaceae, Ulmaceae, etc. Some authorities have suggested that the family might be polyphyletic, in some cases transferring the more anomalous genera to separate families. This view does not seem to be currently in favour. *Buxus*, (see volume 3), at one time included here, is now generally agreed to have no true affinity with the Euphorbiaceae.

The generic sequence follows Webster's 1994 classification. Four of the five subfamilies recognized by Webster are represented in the Flora area: genera 1–9 belong to the PHYLLANTHOIDEAE, 10–23 to the ACALYPHOIDEAE, 24–30 to the CROTONOIDEAE and 31–33 to the EUPHORBIOIDEAE. Subfamily OLDFIELDIOIDEAE is not represented.

## Key to genera

1. Male and female flowers not enclosed within a common involucre; male flowers with a perianth and usually more than 1 stamen; milky latex usually absent, (present only in *Sapium*, *Manihot* and *Hevea*). 2
  - Male and female flowers enclosed within a common involucre with marginal glands and lobes and resembling a single flower (a 'cyathium'); male flowers reduced to a single articulated stamen; milky latex always present, usually copious. 34
2. Stellate hairs and/or peltate scales present. 3
  - Hairs simple, sometimes stinging, never branched, or plant glabrous. 7
3. Stipules entire; female sepals entire. 4
  - Stipules laciniate with gland-tipped segments; female sepals deeply bipinnatifid with linear, usually gland-tipped segments. 14. *Cephalocroton*

4. Leaves alternate; petals usually present. 5
  - Leaves opposite; petals absent. 22. *Mallotus*
5. Herbs or slender-stemmed trees or shrubs; mostly monoecious, flowers always in raceme-like inflorescences; fruit a 3-seeded capsule, rarely poorly dehiscent and drupe-like. 6
  - Thick-stemmed *Sterculia*- or *Lannea*-like low tree or shrub; dioecious; male flowers in subterminal panicles, female flowers terminal, solitary or paired; fruit a single-seeded subglobose drupe. 30. *Givotia*
6. Trees or shrubs, rarely an erect herb; leaves not plicate or bullate; stamens inflexed (bent in towards centre of flower bud); seeds with distinct caruncle. 29. *Croton*
  - Sprawling woody-based herbs; leaves often plicate or bullate, at least when young; stamens erect; seeds at least partially enclosed by pale shiny papery outer layer. 12. *Chrozophora*
7. Stinging hairs usually present at least on female calyx; stems usually twining or like a woody climber, female sepals pinnatifid. 8

\* formerly: Ethiopian Flora Project, c/o The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK.

now: Department of Botany, The Natural History Museum, Cromwell Road, London, SW7 5BD, UK.

1. caruncle: a conspicuous outgrowth from the integuments near the hilum, often looking like an aril.

- Stinging hairs absent; stems never twining, rarely scrambling; female sepals entire. 9
- 8. Inflorescences raceme-like, bracts inconspicuous; styles joined at base only. 23. *Tragia*
- Inflorescences condensed, subtended by 2 large bracts; styles joined completely into single column. 24. *Dalechampia*
- 9. Flowers axillary, solitary or in sessile clusters, rarely on specialised branches with reduced leaves. 10
- Flowers in racemes, panicles or cymes, terminal, leaf-opposed or axillary, never in axillary clusters. 19
- 10. Male calyx 3-lobed, valvate; seeds globose, testa ± fleshy and wrinkled when dried, often red or orange, or seeds ovoid with small caruncle. 11
- Male calyx 5-6-lobed, ± imbricate; seeds mostly 3-sided, often pitted or tuberculate, occasionally ± ovoid, smooth, rarely hemispherical with metallic blue testa, never red nor wrinkled; caruncle absent. 12
- 11. Annual herb; leaves opposite; capsule 2-lobed; testa rugose. 17. *Mercurialis*
- Shrubs or small trees; leaves alternate; capsule 3-lobed; testa wrinkled when dried, often red or orange. 19. *Erythrococca*
- 12. Tertiary veins of leaves not parallel; male sepals imbricate; fruit a capsule with 3 or more cells, occasionally becoming fleshy and berry-like, with 3 or more seeds. 13
- Tertiary veins of leaves often parallel; male sepals valvate; fruit a 1-2-celled drupe, 1-2-seeded. 1. *Bridelia*
- 13. Sepals without glands; seeds variously sculptured or if smooth, not glossy black, without caruncle; old leaves not orange or red. 14
- Sepals with conspicuous glands at base; seeds glossy black, with small caruncle; old leaves often turning bright orange or red. 10. *Clusia*
- 14. Habit variable; leaves never variegated though sometimes uniformly suffused red or purple; male sepals gently incurved to spreading; flowers with disc. 15
- Cultivated shrub, most leaves conspicuously variegated pink and white; male sepals sharply inflexed; flowers without disc. 8. *Breynia*
- 15. Hairs, if present, soft, never glandular; petals absent; seeds smooth, ridged or pitted. 16
- Indumentum short and stiff, hairs often gland-tipped; petals usually present; seeds tuberculate or pustulate. 4. *Andrachne*
- 16. Male flowers with pistillodes, plants always monoecious. 17
- Male flowers without pistillodes, plants sometimes dioecious with female flowers only. 18
- 17. Woody-based herb (in Flora area); capsule green, breaking up at maturity; seeds conspicuously pitted on sides, dull. 3. *Meineckia*
- Shrub; capsule becoming white and fleshy, ± indehiscent; seeds smooth, shining. 5. *Flueggea*
- 18. Herbs or shrubs, rarely trees; male flowers with separate disc-glands; seeds ovoid or 3-sided, pale brown to ± black; main shoots often with scale leaves subtending leafy shoots that look like pinnate leaves. 6. *Phyllanthus*
- Large shrub or tree; male flowers with annular disc; seeds hemispherical, metallic blue when mature; scale leaves absent. 7. *Margaritaria*
- 19. Leaves simple, entire to deeply palmately-lobed but not compound; white latex absent except in *Sapium* and *Manihot*. 20
- Leaves compound, palmately 3-foliolate; white latex present. 25. *Hevea*
- 20. Inflorescence clearly cymose; female flowers often with staminodes. 21
- Inflorescence raceme-like, sometimes branched to form a panicle; flowers never with staminodes. 22
- 21. Leaves pustulate below, never lobed; stipules falling to leave conspicuous scars; inflorescence a reduced glutinous unisexual leaf-opposed cyme. 27. *Suregada*
- Leaves often palmately lobed, never pustulate below; stipules persistent, gland-tipped or forming spines, often conspicuously branched; inflorescence a terminal, mostly dichasial cyme, primary axes terminated by female flowers, upper axes bearing male flowers. 28. *Jatropha*
- 22. Leaves palmately lobed, often peltate, not gland-dotted below; plants always monoecious; male flowers 5-12 mm long. 23
- Leaves entire, if peltate then gland-dotted below; plants sometimes dioecious; male flowers up to 3 mm long. 24
- 23. Leaves (5-)-7-9(-12)-lobed; latex absent; male flowers 5-8 mm long with very many (c 1000) stamens. 16. *Ricinus*
- Leaves (1-)-3-7-lobed; white latex present; male flowers c 12 mm long with 10 stamens. 26. *Manihot*
- 24. Anther-cells short, straight; bracts not enlarging in fruit. 25
- Anther-cells becoming elongated and contorted; female flowers often sessile in the axil of a broad enlarging bract, rarely pedicellate with a non-enlarging bract. 21. *Acalypha*
- 25. Leaves gland-dotted below. 26
- Leaves not gland-dotted below. 27
- 26. Leaves never peltate; inflorescence an axillary spike; fruit very compressed, breaking up into 2 conspicuously winged indehiscent cocci. 9. *Hymenocardia*
- Leaves often peltate; inflorescence a terminal panicle; fruit subglobose, splitting to reveal black seeds. 18. *Macaranga*
- 27. Inflorescences terminal; fruit a ± indehiscent drupe. 28
- Inflorescences axillary, rarely female only terminal. 29
- 28. Latex absent; plants dioecious; filaments inserted at top of anthers ('apicifixed'), basally dehiscent; fruit compressed, not lobed, with small pits or reticulations when dried. 2. *Antidesma*

## 85. EUPHORBIACEAE

by M. G. Gilbert\*

Pax & K. Hoffmann in Engler & Harms, *Nat. Pflanzenfam.* 19c (1931); Cufodontis, *Enum.*: 412–465 (1956–58); Radcliffe-Smith, *Euphorbiaceae* part 1 in *Fl. Trop. E. Afr.*: 408 pp. (1987); S. Carter & Radcliffe-Smith, *Euphorbiaceae* part 2 in *Fl. Trop. E. Afr.*: 189 pp. (1988); Webster, *Taxon* 24: 593–601 (1975) & *Ann. Missouri Bot.* 81 (1994); Gilbert, Holmes & Thulin, *Euphorbiaceae* in Thulin (ed.) *Fl. Somalia* 1: 267–339 (1993).

Trees, shrubs or herbs, sometimes succulent or climbing; sometimes spiny, sometimes with stellate hairs and/or peltate scales or stinging hairs; sometimes with latex. Leaves mostly alternate, occasionally opposite or whorled, usually simple, entire or palmately lobed, occasionally reduced to scales, rarely palmate; stipules usually present. Monoecious or dioecious. Inflorescences axillary, leaf-opposed or terminal, mostly raceme-like, rarely cymose, or flowers very reduced and contained within flower-like 'cyathia'. Flowers small to minute, (2–)3–6(or more)-merous, sometimes reduced to a single naked stamen or a naked ovary; petals often absent; annular disc or disc-glands often present. Male flowers: stamens 1 to c 1000, pistillode present or not. Female flowers: staminodes usually absent, very rarely present and apparently functional; ovary 1–4(–20)-locular, mostly 3-locular, locules each with 1 or 2 ovules and 1 style, styles free or joined, often divided. Fruit mostly a regma, which is a capsule-like schizocarp which breaks up, often explosively, into 2-valved cocci leaving a central columella, occasionally forming a drupe or, rarely, a berry. Seeds often with a caruncle<sup>1</sup>.

A very large family with about 300 genera and 8,000–10,000 species, most numerous in the Tropics: 30 genera and 200 indigenous species so far recorded from the Flora area plus a further 4 genera and 9 species fairly widely cultivated. Over 70 genera are recorded from East Africa so it is likely that there will be further additions to the Ethiopian flora, particularly from the southwest forests.

In most genera the fruit, a 3-loculed regma, is diagnostic but the family as a whole is ill-defined with exceptions to all the diagnostic characters. Links to a diversity of families have been suggested, most notably Thymelaeaceae, Sterculiaceae and Flacourtiaceae but also, though less convincingly, to Celastraceae, Rhamnaceae, Anacardiaceae, Ulmaceae, etc. Some authorities have suggested that the family might be polyphyletic, in some cases transferring the more anomalous genera to separate families. This view does not seem to be currently in favour. *Buxus*, (see volume 3), at one time included here, is now generally agreed to have no true affinity with the Euphorbiaceae.

The generic sequence follows Webster's 1994 classification. Four of the five subfamilies recognized by Webster are represented in the Flora area: genera 1–9 belong to the PHYLLANTHOIDEAE, 10–23 to the ACALYPHOIDEAE, 24–30 to the CROTONOIDEAE and 31–33 to the EUPHORBIOIDEAE. Subfamily OLDFIELDIOIDEAE is not represented.

## Key to genera

- |  |                          |  |                        |
|--|--------------------------|--|------------------------|
| 1. Male and female flowers not enclosed within a common involucre; male flowers with a perianth and usually more than 1 stamen; milky latex usually absent, (present only in <i>Sapium</i> , <i>Manihot</i> and <i>Hevea</i> ).              | 2                        | 4. Leaves alternate; petals usually present.   | 5                      |
| – Male and female flowers enclosed within a common involucre with marginal glands and lobes and resembling a single flower (a 'cyathium'); male flowers reduced to a single articulated stamen; milky latex always present, usually copious. | 34                       | – Leaves opposite; petals absent.  | 22. <i>Mallotus</i>    |
| 2. Stellate hairs and/or peltate scales present.   | 3                        | 5. Herbs or slender-stemmed trees or shrubs; mostly monoecious, flowers always in raceme-like inflorescences; fruit a 3-seeded capsule, rarely poorly dehiscent and drupe-like.                                    | 6                      |
| – Hairs simple, sometimes stinging, never branched, or plant glabrous.   | 7                        | – Thick-stemmed <i>Sterculia</i> - or <i>Lannea</i> -like low tree or shrub; dioecious; male flowers in subterminal panicles, female flowers terminal, solitary or paired; fruit a single-seeded subglobose drupe. | 30. <i>Givotia</i>     |
| 3. Stipules entire; female sepals entire.  | 4                        | 6. Trees or shrubs, rarely an erect herb; leaves not plicate or bullate; stamens inflexed (bent in towards centre of flower bud); seeds with distinct caruncle.  | 29. <i>Croton</i>      |
| – Stipules laciniate with gland-tipped segments; female sepals deeply bipinnatifid with linear, usually gland-tipped segments.   | 14. <i>Cephalocroton</i> | – Sprawling woody-based herbs; leaves often plicate or bullate, at least when young; stamens erect; seeds at least partially enclosed by pale shiny papery outer layer.  | 12. <i>Chrozophora</i> |
|  |                          | 7. Stinging hairs usually present at least on female calyx; stems usually twining or like a woody climber, female sepals pinnatifid.   | 8                      |

\* formerly: Ethiopian Flora Project, c/o The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, UK.

now: Department of Botany, The Natural History Museum, Cromwell Road, London, SW7 5BD, UK.

1. caruncle: a conspicuous outgrowth from the integuments near the hilum, often looking like an aril.



- Stinging hairs absent; stems never twining, rarely scrambling; female sepals entire. 9
- 8. Inflorescences raceme-like, bracts inconspicuous; styles joined at base only. 23. *Tragia*
- Inflorescences condensed, subtended by 2 large bracts; styles joined completely into single column. 24. *Dalechampia*
- 9. Flowers axillary, solitary or in sessile clusters, rarely on specialised branches with reduced leaves. 10
- Flowers in racemes, panicles or cymes, terminal, leaf-opposed or axillary, never in axillary clusters. 19
- 10. Male calyx 3-lobed, valvate; seeds globose, testa ± fleshy and wrinkled when dried, often red or orange, or seeds ovoid with small caruncle. 11
- Male calyx 5-6-lobed, ± imbricate; seeds mostly 3-sided, often pitted or tuberculate, occasionally ± ovoid, smooth, rarely hemispherical with metallic blue testa, never red nor wrinkled; caruncle absent. 12
- 11. Annual herb; leaves opposite; capsule 2-lobed; testa rugose. 17. *Mercurialis*
- Shrubs or small trees; leaves alternate; capsule 3-lobed; testa wrinkled when dried, often red or orange. 19. *Erythrococca*
- 12. Tertiary veins of leaves not parallel; male sepals imbricate; fruit a capsule with 3 or more cells, occasionally becoming fleshy and berry-like, with 3 or more seeds. 13
- Tertiary veins of leaves often parallel; male sepals valvate; fruit a 1-2-celled drupe, 1-2-seeded. 1. *Bridelia*
- 13. Sepals without glands; seeds variously sculptured or if smooth, not glossy black, without caruncle; old leaves not orange or red. 14
- Sepals with conspicuous glands at base; seeds glossy black, with small caruncle; old leaves often turning bright orange or red. 10. *Clusia*
- 14. Habit variable; leaves never variegated though sometimes uniformly suffused red or purple; male sepals gently incurved to spreading; flowers with disc. 15
- Cultivated shrub, most leaves conspicuously variegated pink and white; male sepals sharply inflexed; flowers without disc. 8. *Breynia*
- 15. Hairs, if present, soft, never glandular; petals absent; seeds smooth, ridged or pitted. 16
- Indumentum short and stiff, hairs often gland-tipped; petals usually present; seeds tuberculate or pustulate. 4. *Andrachne*
- 16. Male flowers with pistillodes, plants always monoecious. 17
- Male flowers without pistillodes, plants sometimes dioecious with female flowers only. 18
- 17. Woody-based herb (in Flora area); capsule green, breaking up at maturity; seeds conspicuously pitted on sides, dull. 3. *Meineckia*
- Shrub; capsule becoming white and fleshy, ± indehiscent; seeds smooth, shining. 5. *Flueggea*
- 18. Herbs or shrubs, rarely trees; male flowers with separate disc-glands; seeds ovoid or 3-sided, pale brown to ± black; main shoots often with scale leaves subtending leafy shoots that look like pinnate leaves. 6. *Phyllanthus*
- Large shrub or tree; male flowers with annular disc; seeds hemispherical, metallic blue when mature; scale leaves absent. 7. *Margaritaria*
- 19. Leaves simple, entire to deeply palmately-lobed but not compound; white latex absent except in *Sapium* and *Manihot*. 20
- Leaves compound, palmately 3-foliolate; white latex present. 25. *Hevea*
- 20. Inflorescence clearly cymose; female flowers often with staminodes. 21
- Inflorescence raceme-like, sometimes branched to form a panicle; flowers never with staminodes. 22
- 21. Leaves pustulate below, never lobed; stipules falling to leave conspicuous scars; inflorescence a reduced glutinous unisexual leaf-opposed cyme. 27. *Suregada*
- Leaves often palmately lobed, never pustulate below; stipules persistent, gland-tipped or forming spines, often conspicuously branched; inflorescence a terminal, mostly dichasial cyme, primary axes terminated by female flowers, upper axes bearing male flowers. 28. *Jatropha*
- 22. Leaves palmately lobed, often peltate, not gland-dotted below; plants always monoecious; male flowers 5-12 mm long. 23
- Leaves entire, if peltate then gland-dotted below; plants sometimes dioecious; male flowers up to 3 mm long. 24
- 23. Leaves (5-)-7-9(-12)-lobed; latex absent; male flowers 5-8 mm long with very many (*c* 1000) stamens. 16. *Ricinus*
- Leaves (1-)-3-7-lobed; white latex present; male flowers *c* 12 mm long with 10 stamens. 26. *Manihot*
- 24. Anther-cells short, straight; bracts not enlarging in fruit. 25
- Anther-cells becoming elongated and contorted; female flowers often sessile in the axil of a broad enlarging bract, rarely pedicellate with a non-enlarging bract. 21. *Acalypha*
- 25. Leaves gland-dotted below. 26
- Leaves not gland-dotted below. 27
- 26. Leaves never peltate; inflorescence an axillary spike; fruit very compressed, breaking up into 2 conspicuously winged indehiscent cocci. 9. *Hymenocardia*
- Leaves often peltate; inflorescence a terminal panicle; fruit subglobose, splitting to reveal black seeds. 18. *Macaranga*
- 27. Inflorescences terminal; fruit a ± indehiscent drupe. 28
- Inflorescences axillary, rarely female only terminal. 29
- 28. Latex absent; plants dioecious; filaments inserted at top of anthers ('apicifixed'), basally dehiscent; fruit compressed, not lobed, with small pits or reticulations when dried. 2. *Antidesma*

- Latex present; plants monoecious; filaments inserted at base of anthers, longitudinally dehiscent; fruit 2-lobed, ± smooth when dried. 31. *Sapium*
- 29. Trees or shrubs. 30
- Ephemeral herbs. 32
- 30. Bud-scales absent; styles undivided. 31
- Dormant buds protected by persistent bud-scales (look at bases of young lateral shoots); styles firm-riate. 19. *Erythrococca*
- 31. Evergreen shrub or tree, usually little-branched; leaves (10-)25-40 cm long, base tapered, stipels absent; plants usually monoecious, male and female flowers in the same axils; stamens 30-120. 13. *Argomuelleria*
- Deciduous shrub or tree; leaves 7-18 cm long, base rounded with thread-like stipels at junction with petiole; plants usually dioecious; stamens 8-9. 15. *Alchornea*
- 32. Plants always monoecious with both male and female flowers within each inflorescence. 33
- Plants dioecious: male flowers in racemes, female flowers in subsessile clusters (introduced weed). 17. *Mercurialis*
- 33. Leaves serrate; inflorescences with female flowers in lower axils and male flowers towards tip, male flowers with conspicuous unequal white petals; plant of water-logged sites. 11. *Caperonia*
- Leaves crenate; male and female flowers in the same axils, male flowers without petals; plant of well-drained sites. 20. *Micrococca*
- 34. Cyathial-glands (1-)2-8, distinct, round to oblong or crescent-shaped. 32. *Euphorbia*
- Cyathial-gland forming a narrow continuous rim around the margin of the cyathium. 35
- 35. Cyathia radially symmetrical, gland forming continuous rim (cultivated semi-succulent shrub). 33. *Synadenium*
- Cyathia bilaterally symmetrical, gland forming an inverted U with the gap at the bottom. 34. *Monadenium*

1. **BRIDELIA** Willd. (1805)  
*Tzellemtinia* Chiov. (1911)

Jablonszky, *Pflanzenreich* IV(147.8): 54-88 (1915);  
Leonard, *Fl. Congo Belg.* 8.1: 27-46 (1962).

Shrubs or trees; branches sometimes with blunt thorns; indumentum simple. Leaves alternate, shortly petiolate, usually entire, pinnately veined, tertiary veins often ± parallel. Usually monoecious, flowers very small, axillary, usually in dense clusters, sometimes forming terminal panicles. Male flowers numerous, sometimes in the same axil with 1-2 female flowers, sessile or subsessile, 5-merous; sepals valvate; petals small, bent over disc or imbricate; disc annular or cupular; stamens 5, filaments joined into a short column with pistillode at tip. Female flowers 1-few together; perianth as in male; disc double, outer annular, inner lobed or cupular, surrounding ovary; ovary 2(-3)-locular, ovules 2 per cell, styles bifid or subentire. Fruit a

small ovoid or globose drupe, sometimes dehiscent, endocarp forming 2 or (by abortion) 1 stone, seeds often solitary.

About 60 species in the Old World tropics, with 20 in Africa of which 5 are found in the Flora area.

Plants in this genus look like species of *Rhamnaceae*. In most species the pattern of leaf-venation is prominent and consistent but in species 2 and 3 of this account the venation is very variable. Specimens lacking fruits should be keyed out using both leads in the first couplet of the key.

1. Fruit with 2 stones; leaves retuse to subacute, often less than 7 cm long. 2
- Fruit with 1 stone; leaves subacute to, usually, acuminate; often more than 7 cm long. 4
2. Lateral veins of leaves often looping and/or branching before reaching margin (see Fig. 85.1.2&3); smallest veins not or only slightly raised. 3
- Lateral veins of leaves always running directly to and along margin (see Fig. 85.1.1); smallest veins prominently raised to form dense reticulate network in all but very young leaves. 1. *B. scleroneura*
3. Leaf-apex usually truncate to retuse; leaf drying grey-green, brownish or blackish; smallest leaf-veins often slightly raised. 2. *B. taitensis*
- Leaf-apex rounded to subacute; leaf drying green to yellow-green; smallest leaf-veins not raised. 3. *B. cathartica*
4. Lateral veins of leaves directly running to and along margin (see Fig. 85.1.5); leaves not blackening when dried; petals yellowish. 5
- Lateral veins of leaves branching before reaching margin (see Fig. 85.1.4); leaves drying blackish; petals pinkish or reddish. 4. *B. atroviridis*
5. Leaf-blade very finely puberulous or subglabrous beneath. 5. *B. micrantha*
- Leaf-blade reddish-brown pubescent beneath. *B. ndellensis*

*B. ndellensis* Beille (1908) is common in southern Sudan and could well occur within Ethiopia.

1. *B. scleroneura* Muell. Arg. (1864)  
- types: Nigeria, *Barter* 577, 908.  
*B. scleroneuroides* Pax (1893).  
*Tzellemtinia nervosa* Chiov. (1911) - types: GD,  
Mai Aini, *Chioventa* 633, Mai Taclit, *Chioventa* 3187  
& above River Giamma, *Chioventa* 3227 (all FT syn.).  
Friis & Vollesen, *Bot. Not.* 133: 347-349 (1980).

Shrub or tree 1.5-5(-10) m high, bark fissured; twigs ± pendant, densely hairy when young. Leaf-blade oblanceolate to -oblanceolate, (1.5-)3-11(-15) x (0.5-)2-4(-7) cm, tip subacute to obtuse, shallowly crenate to subentire with lateral veins running into marginal vein, tertiary and quaternary veins very prominent below, sparsely pubescent to subglabrous above, puberulous below, sometimes glabrescent; stipules 6-7 mm long, hairy. Flowers densely clustered. Male: sepals ovate, 1.5 x 1 mm, whitish, rarely reddish; petals fan-shaped, 1 x 1 mm, 3-toothed; disc shallowly cup-shaped. Female: sepals 2 x 1 mm; petals elliptic, c 1 mm long, tip slightly toothed; outer disc entire, inner disc 2-3-lobed, sometimes lacinate;

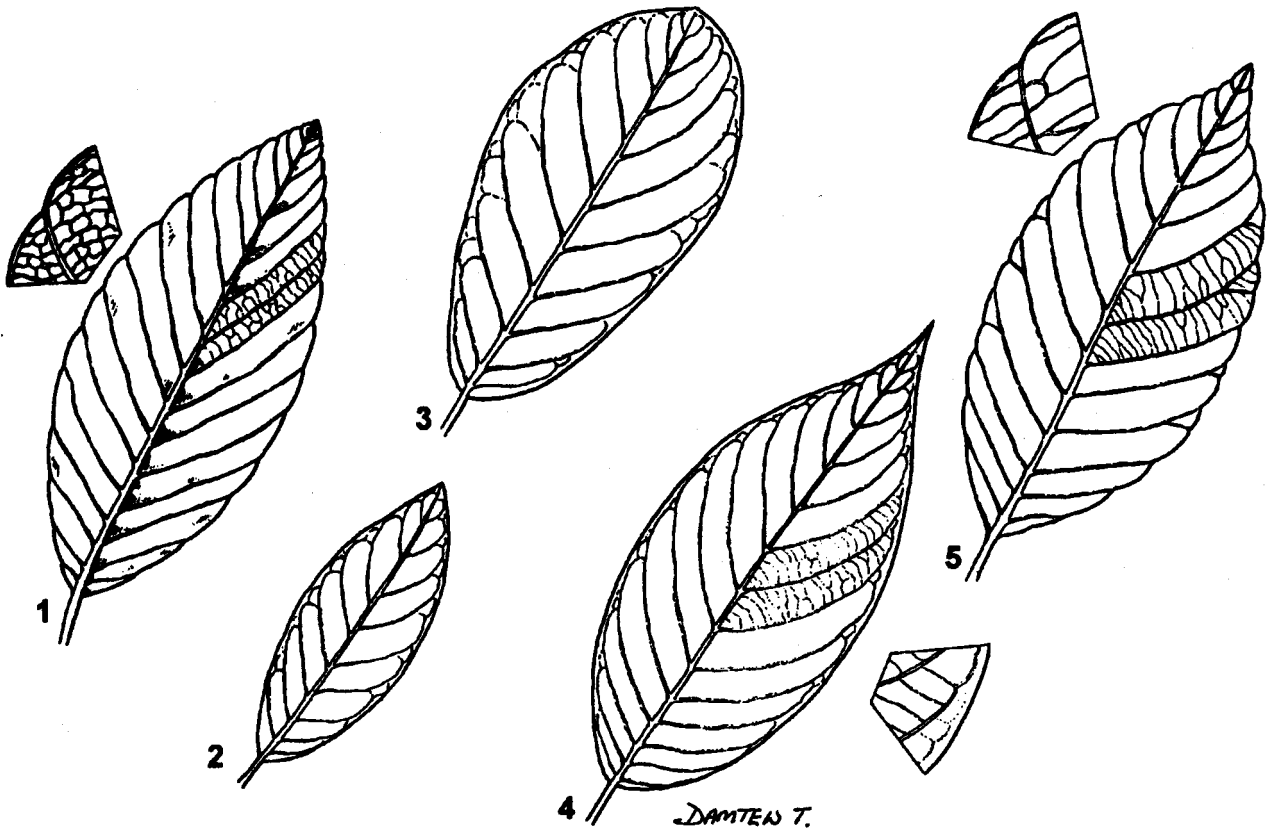


Figure 85.1 Leaves of *BRIDELIA* spp.: *B. SCLERONEURA*: 1 - with details of veins near the margin; *B. CATHARTICA* 2 & 3; *B. ATROVIRIDIS*: 4 - with details of veins near margin; *B. MICRANTHA*: 5 - with details of veins near the margin. All  $\times \frac{2}{3}$ . 1 from Mesfin T. 4574; 2 from Gilbert et al. 7840; 3 from Mooney 9902; 4 from Friis et al. 4056; 5 from E. F. Gilbert 535. Drawn by Damtew Teferra.

styles bifid. Drupe subglobose, 6–7 x 7–8 mm, 2-celled, becoming reddish purple or blackish. Fig. 85.1.1.

Open woodland or wooded grassland, dry riverine forest; 440–1800 m. GD WG IL KF GG BA; west to Ghana, south to Angola, Zimbabwe and Tanzania; N Yemen. *Ash* 534; *Chaffey* 495; *Gilbert & Thulin* 382.

## 2. *B. taitensis* Vatke & Pax (1893)

– type: Kenya, *Hildebrandt* 2415.

Many-stemmed shrub or small tree 1.5–4.5 m high, rarely more; bark grey; twigs pale greyish brown, pubescent. Leaf: petiole 2–4(–5) mm long; leaf-blade obovate to suborbicular, (2–)3–7(–10) x (1–)2–5(–7) cm, base cuneate to rounded-cuneate, tip retuse to truncate or rounded, rarely subacute, entire, lateral veins running directly to margin and/or branching or looping before reaching margin, smallest veins slightly prominent below, glabrous to sparsely hairy above, pubescent on larger veins below; stipules 4–6 mm long, hairy. Flowers similar to those of *B. scleroneura*. Drupe subglobose-ellipsoidal, 2-locular, 7–8 x 6–7 mm, ripening through reddish or purplish to black when fully mature or dried.

No data for Flora area, in Kenya in deciduous or evergreen bushland, often along streams or in rocky places; c 1000 m (440–1200 m in Kenya). GG SD; Kenya. *Corradi* s.n.; *Ruspoli & Riva* 373(988)236.

## 3. *B. cathartica* Bertol. f. (1854)

– type: Mozambique, *Fornasini* s.n.

*B. melanthesioides* (Baill.) Klotzsch (1861).

Subscandent shrub to small tree, 1–9 m high; bark reticulate, fissured or stringy; twigs pendant, sparsely hairy to glabrous. Leaf-blade obovate to elliptic, (1–)3–12(–18) x (0.5–)1–5(–8) cm, tip rounded to subacute, subentire, lateral veins usually branched before margin, occasionally some running into margin, tertiary and quaternary veins few, only obscurely prominent below, glabrous above and below (rarely pubescent below outside Flora area); stipules 3–4 mm long. Flowers as in *B. scleroneura*. Drupe subglobose, with 2 stones, 6–10 x 7–9 mm, becoming reddish-brown or black. Fig. 85.1.2 & 3.

Riverine *Commiphora* woodland on steep limestone slopes; 800–1300 m. SD BA; southwest to Zaire (Shaba), south to South Africa (Natal), absent from Uganda and inland Kenya. *Friis* et al. 3634; *Gilbert* et al. 7840; *Mooney* 9759.

## 4. *B. atroviridis* Muell. Arg. (1864)

– type: Angola, *Welwitsch* 370.

Shrub or small tree, 2–12 m high; bark reticulate; twigs stiff, sparingly pubescent, later glabrescent. Leaf-blade elliptic to elliptic-oblong or oblanceolate, (2–)6–11(–22) x (1.5–)3–7(–10) cm, tip acuminate, entire, lateral veins looping round to join up before reaching margin, tertiary

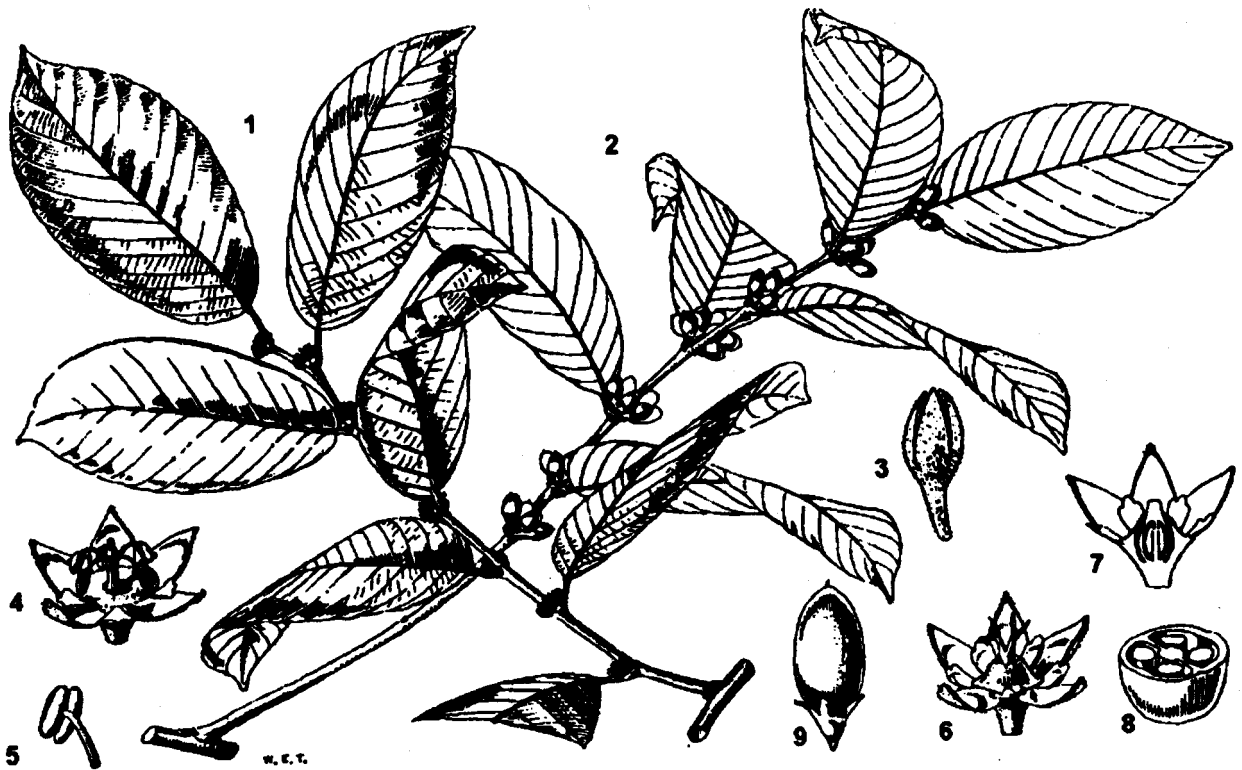


Figure 85.2 *BRIDELIA MICRANTHA*: 1 - leafy shoot with male inflorescence; 2 - leafy shoot with fruits; 3 - flower-bud; 4 - male flower; 5 - anther; 6 - female flower; 7 - longitudinal section through female flower; 8 - cross section of ovary; 9 - fruit. Drawn by W.E. Trevithick. (Reproduced with permission from *Fl. W. Trop. Afr.* vol. 1 part 2, fig. 131. Scale of drawings and specimens not given in original illustration.)

veins slightly raised, quaternary veins much less prominent,  $\pm$  glabrous except for midrib, usually turning black when dried; stipules narrow, 5–8 mm long. Male flowers: sepals 2–2.5 x 1–1.5 mm, acuminate, often reddish; petals obtriangular, 0.5 mm long, irregularly toothed; disc flat. Female: sepals 2 x 1 mm, greenish or reddish-green; petals 0.75 x 0.5, subentire; outer disc crenulate, inner disc with 3 lacinate lobes; styles united at base, bifid. Drupe obovoid to ellipsoidal, 1-celled, 6–8 x 5–6 mm, blackish when ripe. Fig. 85.1.4.

Understorey of riverine forest; 1000–1150 m. IL KF; west to Sierra Leone, south to Tanzania, Zimbabwe and Angola. Friis et al. 3859, 4056; Meyer 8933.

5. *B. micrantha* (Hochst.) Baill. (1862–3);

*Candelabria micrantha* Hochst. (1843) - type: South Africa, Natal, Krauss 133.

*B. abyssinica* Pax (1907) - type: GJ, Abai Valley, Jegind, Rosen s.n. (B holo. destr.).

?*B. abyssinica* var. *rosenii* Gehrm., in Engl., *Bot. Jahrb.* 41 Beibl. 95: 40 (1908) - type: Ethiopia, Rosen s.n., no further details given (B holo. destr.).

Shrub, sometimes scandent, or tree, 2–12(–27) m high; bark smooth or reticulately fissured, trunk sometimes producing blunt thorns; twigs spreading or pendant, pubescent to subglabrous. Leaves distichous, blades oblong-elliptic to broadly oblanceolate, (3)–6–15(–25) x (1.5)–3–8(–12) cm, tip obtuse or shortly bluntly acuminate, entire to shallowly crenate, lateral veins running into thick marginal vein, tertiary veins slightly raised or not, quaternary veins

often obscure, pubescent to subglabrous above, puberulous to sparsely, minutely, pubescent below; stipules 5–10 mm long. Male flowers: sepals 2 x 1 mm, acute, pale greenish yellow; petals obtriangular, 0.5 mm long, 3-toothed, white; disc flat. Female: sepals 1.5 x 1 mm; petals elliptic, 1 x 0.5 mm, subentire; outer disc 5-sided, inner disc of 2–3 lacinate lobes; ovary 2–3-locular, styles bifid, green. Drupe obovoid to ellipsoidal, 1-celled, 8–10 x 5–6 mm, becoming purple to almost black. Fig. 85.1.5 and 85.2.

Usually in forest fringing lakes and rivers, less often away from water in higher rainfall areas; (1050–)1250–2200 m. GD GJ SU AR WG IL KF GG SD BA; west to Senegal, south to Angola and South Africa (Transkei); Réunion. Ash 440; Mooney 6803, 9010.

2. *ANTIDESMA* L. (1753)

Pax & K. Hoffmann, *Pflanzenreich* IV (147.15): 107–167 (1922).

Shrubs or small trees, indumentum simple. Leaves alternate, simple, entire, with acrodomatia<sup>1</sup>, glands absent. Dioecious. Inflorescences axillary or terminal, raceme-like, bracts 1-flowered. Male flowers: calyx 3–5(–8) lobed, imbricate; petals absent; disc glands present; stamens (2)–3–5(–10), episealous, free, anthers apicifixed (attached to the filament by their top), basally dehiscent, pistillode present. Female flower: calyx as in male; disc annular; ovary 1(–2)-locular with 2 ovules, styles 2–3(–5), very

1. acrodomatia: small cavities, possibly occupied by mites, found on the underside of the leaf in the axils of the main veins.



Figure 85.3 *ANTIDESMA VENOSUM*: 1 – leafy branch with female inflorescence  $\times \frac{1}{2}$ ; 2 – female flower  $\times 15$ ; 3 – fruit  $\times 3\frac{1}{2}$ . 1 & 2 from Friis et al. 2438; 3 from Gilbert & Kuchar 5857. Drawn by Damtew Teferra.

short. Fruit a small compressed drupe with laxly reticulate-pitted endocarp showing when dried. Seed solitary by abortion.

About 170 species in the Old World tropics and subtropics only 7 of which occur in Africa with 1 in the Flora area.

Airy-Shaw (in Willis, *Dict. of Flowering Plants & Ferns*, ed. 8: 1105, 1973) claims that this genus shows similarities, most notably in fruit structure, to the Icacinaceae and places it in a separate monogeneric family, the Stilaginaceae Agardh (1825). This view has not been

widely taken up and it seems to be generally accepted that *Antidesma* is correctly placed within the Euphorbiaceae.

*A. venosum* Tul. (1851)

– types: South Africa, Natal, Drège & Krauss 138.

Evergreen shrub or tree, sometimes straggling, 1–9(–15) m high; most parts pubescent to tomentose. Leaf: petiole 3–7(–10) mm long; leaf-blade elliptic-obovate to oblong-lanceolate, (1.5–)3–10(–17)  $\times$  (1–)2–5(–9) cm, base rounded to sometimes cuneate, tip rounded to shortly obtusely acuminate. Male inflorescences spicate, often pendant, (4–)7–10(–12) cm long, often with 1–4 basal branches; flowers (3–)4(–5)-merous; calyx 0.5–1 mm long, greenish or yellowish, sometimes darker tinged; stamens alternating with and  $\pm$  enveloped by contiguous disc glands. Female inflorescence similar to male but sometimes paniculate due to gallmite attack; pedicel 0.5–0.8 mm long; calyx 1 mm long, urceolate; ovary glabrous, styles 2. Fruits 5–7(–8) mm, irregularly coarsely reticulate-rugose, reddish to almost black when ripe. Fig. 85.3.

Riparian forest with *Kigelia africana*; c 600 m. IL; west to Gambia, south to South Africa (Natal) and Namibia; ?Madagascar. Friis et al. 2438.

3. *MEINECKIA* Baill. (1858)

*Cluytiandra* Muell. Arg. (1864)

Webster, *Act. Bot. Nederland* 14: 323–365 (1965).

Shrubs or somewhat herbaceous undershrubs; hairs simple or absent. Shoots all similar. Leaves alternate, distichous, shortly petiolate, entire. Flowers axillary, male in clusters, female usually solitary; pedicels very long, articulated near the base in female. Sepals 5. Petals absent. Disc annular. Male flowers: stamens 5, filaments united into column; rudimentary pistillode at apex of staminal-column. Fruit a capsule. Seeds usually 1 per locule by abortion of second ovule, reniform, with distinct pits in sides; caruncle absent.

Some 20 species with a discontinuous distribution from Central and South America east to S India, Sri Lanka and Assam. 10 species in eastern Africa and Madagascar with 1 in the Flora area.

*M. phyllanthoides* Baill. (1858)

– type: Yemen, Botta s.n.

Shrub or woody-based herb to 1.5 m high, sometimes annual, glabrous throughout; stems whitish streaked with brown, twigs angular. Leaf: petiole 1–10(–13) mm long; leaf-blade ovate or elliptic, (0.6–)1–4  $\times$  0.4–2.5(–3.5) cm, base subcuneate to rounded, tip acute to obtuse; stipules 1.5–3.3 mm long, fimbriate towards base. Monoecious, male and female flowers together in same axils. Male flowers: pedicels (3–)6–8(–13) mm long; sepals 5, suborbicular, 1–1.5 mm long; disc c 1.2 mm diameter; stamens 5, filaments joined for  $\frac{2}{3}$  of length; pistillode entire or 3-lobed. Female flowers: pedicels 7 (up to 28) mm in fruit, articulated c 3 mm from base; sepals 5, triangular-ovate, 1.3–1.8  $\times$  1 mm, acute; ovary smooth, styles short, 2-fid. Capsule 3-lobed, 2  $\times$  3.5–4 mm diameter. Seeds 1.5–1.7 mm long, yellowish brown, sides deeply pitted.

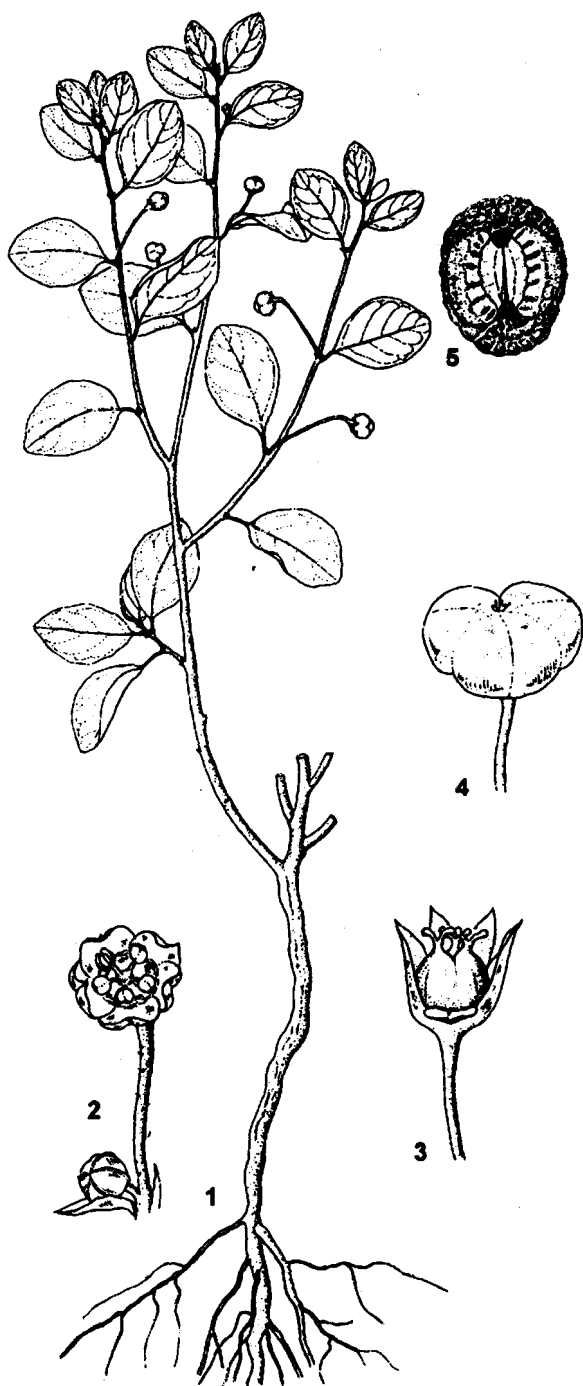


Figure 85.4 *MEINECKIA PHYLLANTHOIDES* subsp. *SOMALENSIS*: 1 – plant with most branches removed  $\times \frac{1}{2}$ ; 2 – male flower  $\times 12$ ; 3 – female flower  $\times 12$ ; 4 – fruit  $\times 7$ ; 5 – seed  $\times 16$ . All from Gilbert et al. 7448. Drawn by Dantew Teferra.

subsp. *somalensis* (Pax) Webster, loc. cit.: 340 (1965)  
*Cluytiandra somalensis* Pax (1903) – type: HA,  
 Dagaga, Ellenbeck 1026A (B lecto. destr.).

Frequently  $\pm$  annual. Stipules 1.5–3.3 mm long. Leaves usually obtuse, not mucronulate, uniformly green. Female sepals 1.7–1.8 mm long. Fruiting pedicels (7–)12–21 mm long. Fig. 85.4.

Disturbed bushland, often with *Acacia mellifera* on black soil; 1200–1450 m. GGSD BA HA; Somalia, Kenya,

Uganda. Friis et al. 3335; Gilbert & Thulin 377; Gilbert et al. 7448.

Webster recognized a further 3 subspecies: subsp. *phyllanthoides* from tropical Arabia is particularly closely related, differing only by the rather shorter male sepals and fruiting pedicels; subsp. *capillariformis* (Vatke & Pax) Webster, found in Kenya, Tanzania and Zaire, is normally easily separated by the acute to subacute mucronulate leaves which, when alive, have a distinct pale zone along the midrib; subsp. *trichopoda* (Muell. Arg.) Webster is restricted to Angola.

#### 4. ANDRACHNE L. (1753)

Pax & K. Hoffmann in *Pflanzenreich* IV (147.15): 9–179 (1922).

Shrubs and herbs; indumentum present in taxa from the Flora area, often glandular. Shoots all similar. Leaves alternate, petiolate, stipulate, simple, entire. Flowers axillary, 5(–6)-merous. Male flowers in clusters; sepals free, imbricate; petals usually present; disc glands opposite petals; stamens 5(–6), filaments free (or partly joined), anthers longitudinally dehiscent; pistillode present. Female flowers solitary; sepals larger than in male; petals small or absent, disc glands free or united, styles 2-fid, stigmas capitate. Fruit a 3-lobed capsule. Seeds 3-sided, smooth or pustulate.

About 25 species in the tropics and subtropics of both hemispheres, extending into the Mediterranean region and temperate Asia; 6 species in NE Africa and Socotra plus 1 in southern Africa; 3 species in the Flora area.

The species found in the Flora area are further distinguished from *Phyllanthus* and allied genera by their distinctive leaf-shape and indumentum.

1. Leaves and stems hairy/glandular hairy; leaves sub-orbicular to reniform. 2  
 – Plants glabrous; leaves oblanceolate. 2
3. *A. sp.* = Terracciano 728
2. Woody-based perennial, rarely flowering in first year, male flowers with petals only slightly shorter than sepals; glandular hairs on ovary and fruit uniformly pale. 1. *A. aspera*  
 – Ephemeral, never perennating; male flowers with petals less than half as long as sepals or absent; glandular hairs on ovary and fruits conspicuously black-tipped. 2. *A. ephemera*

1. *A. aspera* Spreng. (1826)  
 – type: Egypt, Lippi s. n.

Usually a woody-based perennial with sprawling branches, in first year erect and rarely flowering; all parts with stiff, often gland-tipped, hairs. Stems to 60 cm long, leaves lax, smaller towards tip. Leaf: petiole 1–10(–15) mm long; leaf-blade ovate to reniform, (2–)5–15(–25) mm long and broad, base subtruncate to cordate, tip rounded or emarginate; stipules ovate, *c* 1 mm long, margins denticulate-ciliate. Flowers greenish. Male: pedicels 1.5–2 mm long, sepals oblong-oblanceolate, *c* 1.3 mm long, denticulate, petals about as long as sepals, acute, disc-glands rough, yellowish. Female: pedicels 2 mm long extending up to 8

mm in fruit, sepals lanceolate, 1.3–2 mm long, ciliate, petals linear-lanceolate, shorter than sepals, disc-glands free, oblong. Capsule 2–2.5 x 3.5 mm, sparsely hairy, gland tips pale. Seeds 2 mm long, greyish brown with whitish pustules.

1. Indumentum not glandular, sometimes rather sparse; Fig. 85.5.11. var. *aspera*  
– Indumentum of gland-tipped hairs, usually rather dense; Fig. 85.5.10. var. *glandulosa*

var. *aspera*

*A. aspera* var. *maritima* A. Terrac., *Ann. Ist. Bot. Roma* 5: 98 (1894) – types: EE (Dahlak Is.), Midir Island, 22.3.1892, *Terracciano* s.n., and Anto-Kebir, 24.3.1893, *Terracciano* s.n. (both FT holo.).

Ecology probably similar to that of var. *glandulosa* but apparently extending into drier areas; about sea level to 2250 m. EE EW TU GJ WU; Cape Verde Islands east to NW India and south to Cameroon, Sudan & Yemen. *Schweinfurth & Riva* 1531; *Sue Edwards & Tewolde* 3754; *Ehrenberg* s.n.

*J. de Wilde* 4653 and *Sue Edwards & Tewolde* 3689, both from the escarpment below Ghinda (EE), consist of ephemerals similar in habit to *A. ephemera* but in all other respects resembling var. *aspera*. Typical *A. aspera* var. *aspera* was found with the former collection (*J. de Wilde* 4653) suggesting that, unlike the next species, these were merely flowering precociously.

- var. *glandulosa* *A. Rich.*, *Tent. Fl. Abyss.* 2: 254 (1851)  
– type: TU, near Adwa, *Schimper* II:1112 (P holo.; K MO iso.; G iso. not seen).

Fig. 85.8–10. Open deciduous woodland or bushland, often growing in rock crevices; 1000–1900(–2400) m. EW TU SU GG; west to Morocco, otherwise as in var. *aspera*. *Gilbert & Getachew* 2957; *Gilbert & Thulin* 427; *Gilbert et al.* 7395.

*Gilbert & Thulin* 205 is apparently an erect annual but it is already distinctly woody and is presumably flowering precociously.

2. *A. ephemera* *M. Gilbert* (1987)  
– type: Sidamo, 33 km from Negele on road to Filtu, *Friis et al.* 3157 (K holo.; C ETH UPS iso.).

Superficially very similar to *A. aspera* but always an erect, little branched ephemeral to 20 cm high; flowers about half as big; male with petals up to half as long as petals, sometimes apparently absent; ovary and capsule with conspicuously black-tipped hairs. Fig. 85.5.1–7.

Under bushes in *Acacia* – *Commiphora* bushland overlying limestone; 1000–1600(–1900) m. SD BA HA; not known elsewhere. *Burger* 2871; *Gilbert* 3355, 4013.

3. *A. sp.* = *Terracciano* 728 (647)  
– EE, Dahalac ('Dahalak') Island.

Ephemeral or short-lived perennial herb, stems to 15 cm long, slender, possibly trailing; all parts glabrous. Leaf: stipules lanceolate, white with subfimbriate margin; leaf-blade oblanceolate, up to 14 x 2 mm, base attenuate into ill defined petiole, tip rounded. Flowers from most axils, male

and female in the same axil. Male flowers: pedicel less than 1 mm long; sepals elliptic, *c* 0.6 mm long, sometimes toothed near base; petals linear, about half as long as sepals; androgynophore poorly developed, pistillode minute. Female flowers: pedicel *c* 1 mm long, recurved; sepals elliptic, up to 1 mm in fruit; petals ± subulate, slightly shorter than disc glands, often absent; disc-glands fleshy but narrow, whitish, truncate or emarginate; styles bifid to base. Capsule *c* 2 mm diameter, with slightly raised veins. Seeds not seen.

Presumably on coral rag near sea level. EE; not known elsewhere. Known only from the one plant.

The only plant seen seems to represent an undescribed taxon perhaps most closely related to *A. somalensis*, a perennial with narrow-elliptic to oblanceolate leaves 4–6 mm wide, rarely less and endemic to northern Somalia at altitudes of 900–2000 m. The other related species is *A. telephioides*, recorded from the coastal plain of Somalia but with obovate to ± orbicular leaves only (2–)2.5–6.5(–12) mm long. However, the Eritrean specimen lacks well-preserved flowers and there are no seeds so it seems best to leave it unnamed until better material is obtained.

## 5. FLUEGGEA Willd. (1805)

*Securinega* Juss. (1789) *p.p.*, *non sens. str.*

Webster in *Allertonia* 3: 287 (1984).

Trees or shrubs, usually glabrous. Shoots all similar. Leaves shortly petiolate, stipulate, simple, entire. Usually dioecious. Flowers in axillary clusters; 5-merous, petals absent. Male flowers: disc-glands between stamens; stamens free; pistillode well-developed. Female flowers: disc annular; ovary (2–)3(–4)-locular, 2 ovules per locule. Fruit often rather fleshy, dehiscent slowly. Seeds 2 per locule, 3-sided, smooth.

About 14 species widespread through the tropics and subtropics and with extensions into temperate regions, but only the following 2 taxa are found in tropical Africa, including the Flora area.

Until very recently *Flueggea* was included within *Securinega* but Webster has demonstrated that the two differ fundamentally in several details and that *Securinega* should be restricted to a small group of species from Madagascar and the associated islands.

1. Lateral branches of unlimited growth, not spine-tipped; leaves rounded to acute. 1. *F. virosa*  
– Lateral branches mostly short, often spine-tipped; leaves mostly truncate to emarginate. 2. *F. leucopyrus*

1. *F. virosa* (Willd.) Voigt. (1845);  
*Phyllanthus virosus* Willd. (1805); *Securinega virosa* (Willd.) Baill. (1866) – type: India, Klein in *Hb. Willd.* 17964.

*Flueggea microcarpa* Bl. (1825).

*Securinega abyssinica* A. Rich. (1851) – types: TU, Djeladjeranne, towards Takaze River, *Schimper* II:877 (P syn.; K MO isosyn.; G isosyn. not seen) & near Djeladjeranne, *Schimper* III:1698 (P syn.; K isosyn.; G isosyn. not seen).

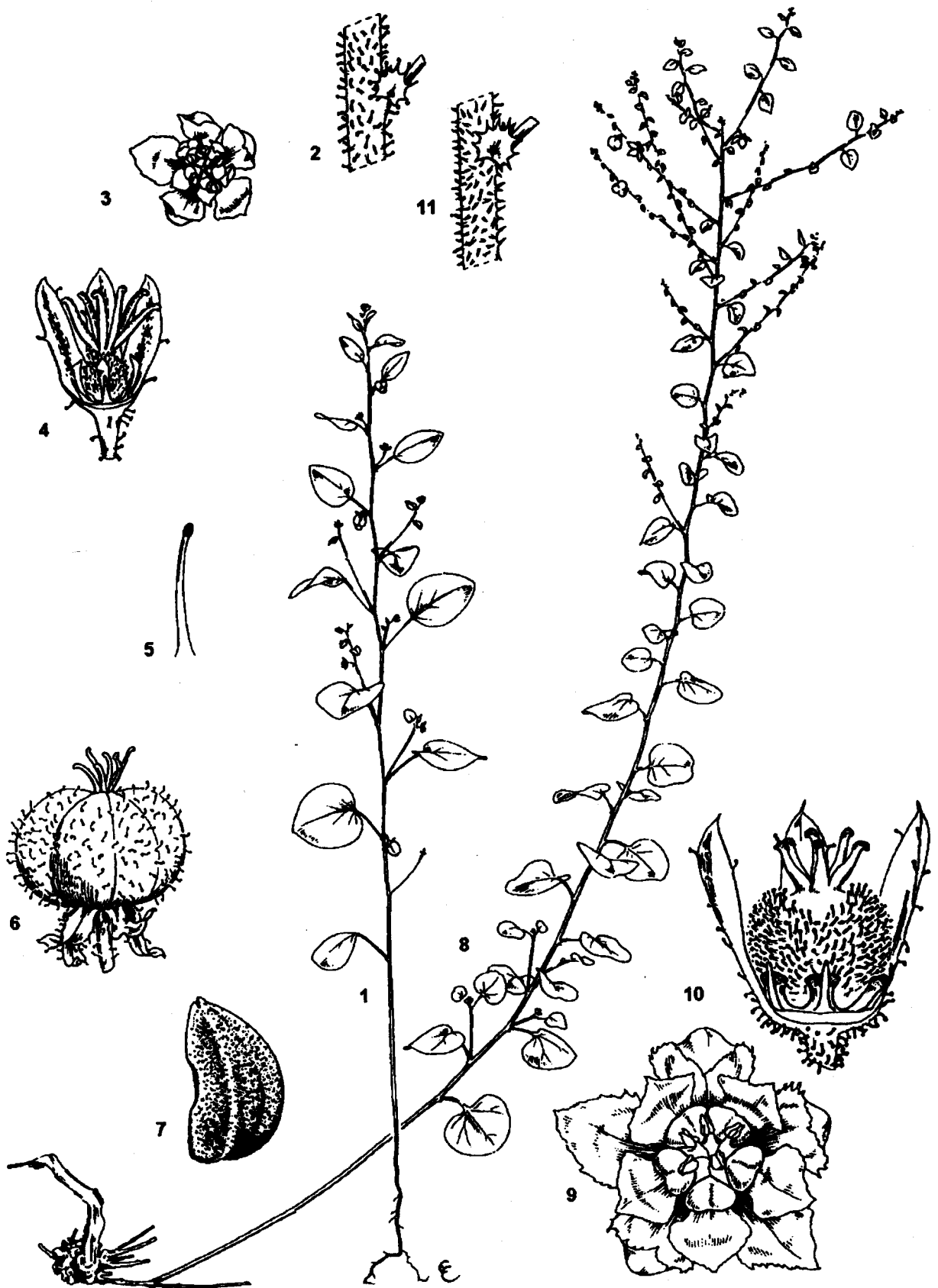


Figure 85.5 *ANDRACHNE EPHEMERA*: 1 – complete plant  $\times \frac{1}{2}$ ; 2 – detail of stem showing glandular hairs and stipule  $\times 5$ ; 3 – flower  $\times 15$ ; 4 – female flower  $\times 15$ ; 5 – glandular hair from fruit  $\times 75$ ; 6 – fruit  $\times 10$ ; 7 – seed  $\times 12$ . *A. ASPERA* var. *GLANDULOSA*: 8 – herbaceous leafy stem from a woody base  $\times \frac{1}{2}$ ; 9 – male flower  $\times 15$ ; 10 – female flower  $\times 15$ . *A. ASPERA* var. *ASPERA*: 11 – detail of stem  $\times 6$ . 1–5 from Gilbert et al. 7424; 6 & 7 from Friis et al. 3157; 8–10 from Burger 2971; 11 from Ehrenberg s.n. Drawn by Eleanor Catherine.





Figure 85.6 *FLUEGGIA VIROSA* subsp. *VIROSA*: 1 – leafy branch with fruits  $\times \frac{1}{3}$ ; 2 – an emarginate leaf  $\times \frac{1}{3}$ ; 3 – male flower  $\times 5$ ; 4 – female flower  $\times 5$ ; 5 – hanging fruit  $\times 5$ ; 6 & 7 – seed, front and side view  $\times 6$ . 1 & 5–7 from Mooney 9030; 2 from Sue Edwards et al. 2344; 3 from Thulin et al. 3428; 4 from Tewolde Berhan G. E. 45. Drawn by Damtew Teferra.

Deciduous shrub or small tree, 1–4.5(–6) m high; trunk grey-brown, smooth, rough or fissured. Twigs virgate, slender. Leaf: petiole narrowly winged, 3–6 mm long; venation distinctly reticulate; stipules 1.5–2 mm long, fimbriate, soon falling. Male flowers in dense clusters; pedicels to 9 mm long; outer sepals 1.5 mm long, acute, entire, inner sepals 2 mm long, obtuse, fimbriate towards tip; disc glands subtuberculate; stamens longer than sepals; pistillode with styles (appendages) as long as sepals. Female flowers (1–)few together; pedicels up to 6 mm long; sepals as in male but smaller, disc shallowly 5-lobed; styles as long as ovary, recurved. Fruit 2–3  $\times$  4–5 mm, white, rather fleshy when ripe. Seeds 2 mm long, shining yellowish-brown.

subsp. *virosa*

Leaf-blades elliptic to obovate or suborbicular, (1–)2–4

(–6)  $\times$  (0.5–)1–2(–3) cm, base rounded to cuneate, tip rounded to shortly acuminate, rarely occasionally emarginate, not bullate, veins relatively fine. Fig. 85.6.

Mostly in open *Acacia* – *Combretum* woodland or riverine forest on alluvial flats, black cotton soil and well-drained rocky slopes, often locally abundant; 400–2050 m. EE EW TU GD GJ WU SU WG IL KF GG SD BA HA; throughout tropical Africa; Madagascar, Arabia and from India east to Japan and Indonesia. *Getachew Aweke & Gilbert* 929; *W. de Wilde* 7876; *Mooney* 6908.

The other subsp. *melanthesoides* (F. Muell.) Webster is found only in Australia and New Guinea. It differs by the larger, often acute and bullate leaves with a coarser and more prominent venation.

2. *F. leucopyrus* Willd. (1805)

— types: South India, Klein 64, 401 & 576.

Closely related to *F. virosa* but a more densely branched shrub, bark often whitish, side branches short, often spine-tipped, leaves smaller, 1–1.5(–2.5) cm long, obovate, tips mostly truncate to emarginate.

Open deciduous woodland/bushland on limestone or granite, rare; 1600–1800 m. SD BA HA; Somalia, Socotra, tropical Arabia, S India and Sri Lanka. *Amare Getahun* E-18; *Burger* 2720; *Thulin* et al. 3814.

The separation between *F. leucopyrus* and *F. virosa* is not clear cut but reports indicate that the two are ecologically distinct in areas of apparent overlap. It is possible that some reports of *F. leucopyrus* refer to heavily browsed plants of *F. virosa* growing in exposed situations and this has been used to dismiss all records of *F. leucopyrus* from Africa. However recent collections from Ethiopia, Socotra and Somalia strongly suggest that a second species of *Flueggea*, corresponding rather closely with *F. leucopyrus*, does occur in NE Africa.

## 6. PHYLLANTHUS L. (1753)

Brunel, J.F., *Sur le genre Phyllanthus L.*, Thesis presented to the L. Pasteur University, Strasburg, Oct. 1987.<sup>1</sup>

Trees, shrubs (sometimes ± scandent) or herbs; hairs, when present, simple. Stems usually differentiated into up to 4 types: 1 - main (orthotropic) shoots of unlimited growth, often with scale-leaves (cataphylls), usually erect; 2 - short-shoots (brachyblasts) with very short internodes and scale-leaves; 3 - lateral (plagiotropic) leafy shoots of limited growth, the leaves often strictly in one plane so that they resemble pinnate leaves; 4 - (rare) specialised flowering shoots with reduced leaves. Leaves alternate, entire; petiole short, rarely exceeding 2 mm; stipules usually scarious, sometimes hardened and spine-like. Dioecious or monoecious, flowers axillary, minute, pendant; male 2-several per axil, female usually solitary, occasionally together with male. Male flowers: sepals (4–)5–6, overlapping; petals absent; disc of free glands alternating with sepals, rarely annular; stamens 2–6, filaments often united into column; pistillode absent. Female flowers usually larger; perianth as in male; disc usually annular, rarely of free glands; ovary 3(–8) locular, ovules 2 per locule, styles bifid usually with recurved stigmas. Capsule usually dry and breaking up, occasionally berry-like with juicy outer layer. Seeds 2 per locule, usually 3-sided and the shape of a segment of a citrus fruit, less often subovoid, caruncle absent.

A large pantropical genus of 750–800 species with c 100 species in Africa (170 according to Brunel, *loc. cit.*): 22 species so far recorded from the Flora area.

Not an easy genus to name! Some species, particularly numbers 11–15 in this account, which are mostly small ephemerals, can only be reliably distinguished by very

careful examination of the minute flowers. The sepal number is very constant except in *P. boehmii* and *P. oblongiglans* which are keyed out twice.

1. Sepals 5. 2
- Sepals 6. 10
2. Woody shrubs, sometimes scandent, or small trees, 1.5–5(–9) m high; distinct short-shoots often present; flowers sometimes on slender shoots with few or no normal leaves. 3
- Erect, often ephemeral, herbs, woody at base only; short-shoots absent or obscure; flowers on normal leafy shoots. 5
3. Scale leaves and their stipules thickened and often spine-like; stamens (2–)4–5, usually some free; ripe fruit a juicy purple-black berry. 4
- Scale-leaves and their stipules scarious; stamens 3, filaments joined into column; fruit a dry capsule. 6. *P. limmuensis*
4. Plant glabrous (sometimes hairy outside Flora area); female disc annular; styles 3, with filiform stigmas; fruit 3-locular, 3–4 mm diameter 2. *P. ovalifolius*
- Plant hairy (sometimes glabrous outside Flora area); female disc of free glands; styles very short, usually more than 3; fruit commonly 4–8-locular, 4–7 mm diameter 3. *P. reticulatus*
5. Female pedicels not exceeding 3 mm long, usually less. 6
- Female pedicels accrescent to 10 mm or more long, stiffly pendant. 5. *P. nummulariifolius*
6. Capsule smooth or very obscurely reticulate. 7
- Capsule densely covered with rounded tubercles. 22. *P. niruroides*
7. Stems straight; leaves oblong to obovate or oblanceolate; anthers 3, filaments united into column. 8
- Stems usually zigzag; leaves linear to lanceolate; anthers 4–5, free. 4. *P. pentandrus*
8. Male disc-glands tuberculate; sepals c 1 mm long, shorter than capsule. 9
- Male disc-glands smooth; fruiting sepals to 3 mm long, incurved to enclose capsule. 19. *P. boehmii*
9. Male flowers in clusters at bases of leafy shoots, not in the same axil with female flowers; female disc of separate narrowly oblong glands; seeds dark brown when old. 20. *P. oblongiglans*
- Male and female flowers in the same axil towards tips of leafy shoots; female disc irregularly pentagonal or star-shaped; seeds pale brown. 21. *P. amarus*
10. Stems all similar, scale-like leaves absent. 11
- Stems differentiated into 2 or more types: main stems usually erect with spirally arranged, often scale-like leaves, and short lateral leafy stems resembling pinnate leaves, sometimes also short shoots covered with scale-leaves. 12
11. Stems with spirally arranged leaves, usually much branched; female disc of separate glands. 1. *P. maderaspatensis*

<sup>1</sup> – It has not been possible to establish the date of effective publication of this thesis which describes over 50 new species of *Phyllanthus* from Africa. It was defended in October 1987 and a copy was received in Kew in October 1989.

- Stems flattened with leaves strictly in 2 ranks in 1 plane, often unbranched; female disc annular, thin. 18. *P. glaucophyllus*
  - 12. Lateral branches subtended by persistent scale-leaves. 13
  - Lateral branches subtended by normal, deciduous, foliage leaves. 24
  - 13. Plant glabrous or minutely rough; male sepals spreading or incurved. 14
  - Plant puberulous; male sepals erect with recurved tips. 11. *P. dewildiorum*
  - 14. Female disc flat or undulate, margin lobed or annular, entire or irregularly divided or crenulate. 15
  - Female disc cupular, margin  $\pm$  pectinate with 28-32 regular obtuse teeth (usually a plant of moist upland forest margins). 10. *P. fischeri*
  - 15. Woody perennial shrubs; distinct short-shoots present; usually dioecious. 16
  - Annual herbs or, if perennial, woody at base only; short-shoots absent or obscure; monoecious. 18
  - 16. Female disc with 6 lobes; sepals small,  $\pm$  reflexed; fruit usually shallowly reticulate-rugulose. 17
  - Female disc 6-sided, sides concave; sepals enlarging, incurved to conceal smooth fruit. 9. *P. borensis*
  - 17. Flowering shoots (3-)5-11 cm long; margin of female disc minutely crenulate; seeds marked with lines of distinct dots. 7. *P. sepialis*
  - Flowering shoots 1.5-2(-4) cm long, usually shorter, margin of female disc entire; seeds obscurely lineate, almost smooth. 8. *P. hildebrandtii*
  - 18. Seeds (when fully ripe!) dark brown. 19
  - Seeds pale brown. 20
  - 19. Leaves 6-12 mm long, rarely less, suborbicular to obovate; flowers always 6-merous; female disc annular or obscurely 6-sided, sometimes irregularly divided. 12. *P. rotundifolius*
  - Leaves up to 6 mm long, mostly less, elliptic to elliptic-oblong; flowers often 5-merous; female disc of separate oblong, glands. 20. *P. oblongiglans*
  - 20. Flowers always 6-merous; male disc glands tuberculate; female disc regularly 6-lobed or irregularly divided into 6-10 lacerate lobes. 21
  - Flowers often 5-merous; male disc glands smooth; female disc entire or irregularly split into truncate lobes. 19. *P. boehmii*
  - 21. Outer sepals oblanceolate to oblong-elliptic, bases cuneate to minutely rounded, not overlapping. 22
  - Outer sepals ovate, bases cordate, overlapping. 16. *P. leucanthus*
  - 22. Ephemeral or short-lived perennial; stems erect, not rooting adventitiously. 23
  - Perennial; stems creeping, rooting adventitiously at base, often regularly rhizomatous. 14. *P. mooneyi*
  - 23. Female disc irregularly divided into 6-10 unequal, lacerate, lobes; ovary shortly stipitate. 15. *P. fraternus*
  - Female disc regularly 6-lobed, lobes entire; ovary sessile. 13. *P. pseudoniruri*
  - 24. Annual or short-lived perennial; leaves suborbicular to obovate, often uniformly tinged pink; seeds dark brown, almost black. 12. *P. rotundifolius*
  - Perennial with many stems arising from woody rootstock; leaves narrowly elliptic to lanceolate, any colouring restricted to veins and margins; seeds greyish-brown. 17. *P. suffrutescens*
1. *P. maderaspatensis* L. (1753)  
 - type: India, *van Royen* 200.  
*P. venosus* A.Rich. (1851) - type: TU, near Gapdia, *Schimper* II:814 (P holo.; K iso.).  
*P. magudensis* Brunel, *loc. cit.*: 323 (1987).
- Woody-based herb, sometimes flowering as an ephemeral, 15-90(-120) cm high; glabrous throughout; stems all similar, scale-leaves absent. Leaves spirally arranged, blade linear-lanceolate to obovate, (7-)10-30(-60) x (1-)2-7 (-17) mm,  $\pm$  leathery; stipules ovate, 1.5-2(-4) mm long, acuminate. Monoecious, all axils with female flowers, upper also with 1-4 male flowers. Flowers 6-merous. Male: pedicel *c* 1 mm; sepals suborbicular, *c* 1 x 0.8 mm; disc glands small,  $\pm$  smooth; stamens 3, filaments partly united, anthers longitudinally dehiscent. Female: pedicel 1.5-2 mm long; sepals suborbicular to subspathulate, *c* 2 x 1.5 mm; disc glands  $\pm$  square, flat, thin; ovary sessile, styles  $\pm$  free. Capsule 1.2-2 x 3 mm, smooth, olive green. Seeds 3-sided, 1.3 mm long, light brown with rows of minute tubercles on back and sides.
- Deciduous bushland and woodland on wide variety of soils, frequently a weed, particularly of cotton; near s.l.-1900 m. EE AF EW TU GD GJ WU SU GG SD BA HA; common and widespread throughout the Old World tropics and subtropics. *Burger* 3202; *Gilbert* 2167; *Gilbert et al.* 7388.
- Extremely variable in habit and leaf-shape but always with all stems with normal spirally arranged leaves.
2. *P. ovalifolius* Forssk. (1775)  
 - type: Yemen, *Forsskål.*  
*P. guineensis* Pax (1898).  
*P. lalambensis* Schweinf. (1899) - type: EW, Lalamba, near Keren, *Schweinfurth* 881 (B holo. destr.; K iso.).
- Shrub, often scandent, or small tree, 1.5-5(-9) m high; glabrous throughout; bark papery, peeling. Stems of 3 types: main shoots with triangular scale-leaves and stipules to 2 mm long becoming dark brown, hardened and spine-like; short-shoots and leafy-shoots 12(-15) cm long. Leaves oblong to oblong-oblanceolate or obovate, 7-23 (-28) x 4-10(-13) mm, tip obtuse to truncate, sometimes mucronulate; stipules  $\pm$  linear, 1 mm long, ciliate or fimbriate, brown. Usually monoecious, flowers usually pinkish, on leafy or specialised flowering shoots with scale-leaves, usually in groups of (1-)2-4(-5) male flowers and 1 female. Male flowers: pedicels 2-3 mm long; sepals 4(-5), outer 1 mm long, subacute, inner 1.3 mm

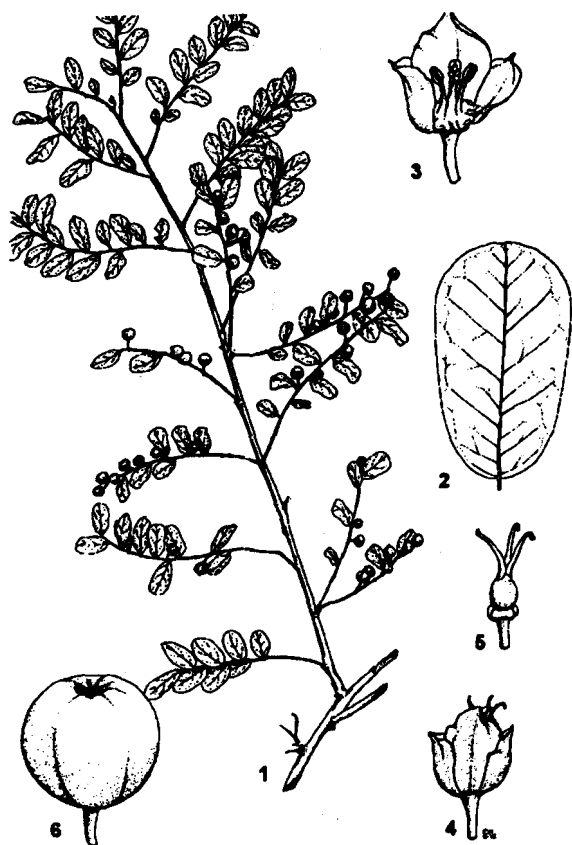


Figure 85.7 *PHYLLANTHUS OVALIFOLIUS*. 1 – fruiting branch  $\times \frac{1}{2}$ ; 2 – leaf  $\times 3$ ; 3 – male flower, inner sepal removed  $\times 9$ ; 4 – female flower  $\times 9$ ; 5 – pistil  $\times 9$ ; 6 – fruit  $\times 4\frac{1}{2}$ . 1 & 2 from Milne-Redhead & Taylor 7046; 3–5 from Richards & Arasululu 28975; 6 from Dawkins 381. Drawn by Christine Grey-Wilson. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: part 1: fig. 4.)

long, obtuse; disc glands smooth; stamens: (1–)2(–3) inner with filaments joined plus (0–)2 free outer, anthers longitudinally dehiscent. Female flowers: pedicels 2–2.5 mm long; sepals 4, 1.3–1.5 mm long, obtuse or rounded; disc cupular, 4–5-lobed,  $\pm$  thickened; ovary sessile, styles erect,  $c$  1 mm long. Fruit a berry, 2–3.5  $\times$  3–4 mm, becoming juicy dark purple, almost black. Seed 3-sided, 1.7–1.8 mm long, shiny bright reddish brown. Fig. 85.7.

Dense evergreen bushland or riverine forest; 900–2750 m. GD GJ WU WG SU AR IL KF GG SD BA HA; west to Nigeria, south to Mozambique and Angola; Yemen. *Ash* 1550; *Gilbert & Getachew* 3013; *Mesfin & Kagnew* 2345.

3. *P. reticulatus* Poir. (1804)  
– type: ‘Indies’.

Densely branched shrub or small tree, 1.5–3(–4.5) m high, rarely tree to 18 m outside Flora area, like a robust form of *P. ovalifolius* in most features. Leaves elliptic to ovate or obovate, often rather oblong, (5–)10–30(–65)  $\times$  (5–)10–20(–27) mm, rarely retuse, dark and shiny above. Male flowers: pedicels 2–4 mm long; sepals 5(–6), 1–1.3  $\times$  0.7–1 mm, acute to rounded, with darker central zone; disc glands irregularly knobby; stamens (2–)3 inner joined at least at base plus 2(–4) outer free, very short. Female flowers:

pedicels shorter than in male; sepals similar, disc glands free,  $\pm$  triangular; ovary (3–)4–8-locular, styles very short, incurved or suberect. Fruit as in *P. ovalifolius*, 2.4–4  $\times$  4–7 mm. Seeds obscurely 3-sided, ovoid,  $c$  2 mm long, shiny bright reddish brown.

var. *reticulatus*

Most parts pubescent, especially pedicels and outer calyx lobes.

Along river banks and lake shores; 375–1300(–1700) m. AF GJ SU AR WG IL KF GG HA; throughout the Old World tropics. *Ash* 149; *Friis et al.* 2465; *Thulin et al.* 4055.

Var. *glaber* (Thw.) Muell. Arg., glabrous throughout and largely sympatric with var. *reticulatus*, has not been seen in the Flora area.

4. *P. pentandrus* Schum. & Thonn. (1827)  
– type: Ghana, *Thonning* 34.

Erect annual herb to 50 cm high, becoming woody at base; glabrous throughout; stems zigzag, of 2 types: main stems with stipule-like scale-leaves; leafy lateral stems up to 10 cm long. Leaves linear to lanceolate, (5–)10–27  $\times$  1–8 mm, tip acute to obtuse, membranous; stipules lanceolate, 1 mm long. Monoecious, lower axils of leafy shoots with 2–3 male flowers, upper axils with female flowers, sometimes also with 1–2 male flowers. Male flowers: pedicels  $c$  0.25 mm long; sepals 5, suborbicular, 0.75 mm long, pinkish; disc glands obovate-rhombic, flat, smooth; stamens 4–5, free, anthers minute. Female flowers: pedicels up to 2 mm long in fruit; sepals as in male, 1 mm long; disc annular, smooth; ovary sessile; styles free, minute, spreading. Capsule 1  $\times$  2 mm, very minutely rough towards tip, olive green. Seeds 3-sided, 0.8 mm long, brownish with 8–10 lines of dark tubercles on back and 7–8 lines on side.

Usually in well drained soil in grassland, bushland or woodland;  $c$  550 m. IL; west to Senegal, Tanzania, South Africa (Natal) & Namibia. *Getachew Aweke* 2575; *Gilbert & Friis* 8400.

A record of this species from the HA/northern Somali border was based on a misidentified specimen of *P. maderaspatensis*.

5. *P. nummularifolius* Poir. (1804)  
– type: from Madagascar.  
*P. tenellus* Roxb. (1832).  
*P. capillaris* Schumach. & Thonn. (1827).  
*P. tanzaniensis* Brunel (1987?).

Erect ephemeral to 20 cm high, mostly smaller (elsewhere a woody-based herb or shrub 0.5–4.5 m high). Stems of 3 kinds: main stems glabrous to sparsely minutely papillate (to densely pubescent), green, with stipule-like scale-leaves, brown-tipped when old; obscure short-shoots; leafy-shoots to 6(–20) cm long, rough at base in most vigorous plants. Leaves broadly elliptic (to obovate), 6–12(–20)  $\times$  4–8(–11) mm, tip rounded to subacute, pale bright green (or darker with pale undersides); stipule triangular-lanceolate,  $c$  1 mm long. Flowers 5-merous, monoecious (or dioecious), most axils with up to 3 male flowers and 1 female flower. Male: pedicels 0.5–1(–5) mm

obscure midrib; disc-glands separate, smooth; stamens 5, free, anthers subglobose, horizontally dehiscent. Female: pedicels rapidly accrescent to 10(–25) mm long, stiffly pendant; sepals as in male, 1–1.3 mm long, reflexed in fruit; disc annular, thin; ovary sessile, styles bifid to base, recurved. Capsule  $c$  1 x 2 mm, green, smooth or obscurely veined. Seeds sharply 3-angled,  $c$  0.8 mm long, pale brown with rows of prominent, almost spine-like, dark-tipped tubercles (more obscure elsewhere).

In shallow soil pocket on granite inselberg within *Acacia* – *Commiphora* bushland; 1200–1400 m. EW SD; Sierra Leone east to Sudan, and south to South Africa (Natal); Madagascar, Mascarenes, Seychelles; India. *O. Beccari* s.n.; *Gilbert & Sebsebe* 8733; *Pappi* s.n.

The description is based on the material from the Flora area with information on the total range given in brackets.

Brunel (*loc. cit.*) recognised 4 species within this complex as listed in the synonymy. The differences between these do not seem to merit their recognition as full species. In most of mainland Africa the species is represented by woody-based, usually hairy, shrubs. The Eritrean and Ethiopian collections are of consistently glabrous ephemerals and come closest to the primarily Asiatic *P. tenellus* and may merit some kind of recognition. However many, perhaps all, of the differences from typical *P. nummularifolius* could be the result of the drier habitats in which the populations in the Flora area were growing - the species usually occurs in distinctly moister habitats.

#### 6. *P. limmuensis* Cufod. (1947)

– type: KF, Sadetsha, *Bieber* (WU holo. not seen).

Scandent shrub 3–4(–5) m high; glabrous throughout. Branches of up to 4 types in male plants: main stems with non-spiny scale-leaves; leafy-shoots up to 30 cm long and, often, short shoots bearing flowering shoots without foliage leaves; female plants with leafy shoots only. Leaves elliptical, (1–)2–5.5 x (0.5–)1.2–2.7 cm, acute, pale green; stipules 2–3 mm long, pale brown. Subdioecious, male plants with occasional female flowers near tips of flowering shoots. Male flowers in clusters of 3–5; pedicels 1.5–2 mm long; sepals 5 (rarely 6),  $c$  1.5 x 0.8 mm, pale with narrow midrib; disc glands round, smooth or obscurely tuberculate; stamens 3, filaments joined, anthers horizontally dehiscent. Female flowers in axils of normal leaves; pedicels 2.5–3.5 mm long; sepals as in male; disc annular, undulate with obscurely crenulate margin; ovary sessile, styles bifid to base, spreading. Capsule 1.4 x 2.2–2.8 mm, smooth, pale brown. Seeds ovoid to 3-sided,  $c$  1.1 mm long, pale brown.

Higher rainfall forests, often near streams; 1050–2200 m. GD GJ WG IL KF; not known elsewhere. *Friis* et al. 1675, 1991; *W. de Wilde* 6253.

The variation in shoot types between male and female plants needs investigation, well correlated material is scarce: *Friis* et al. 3836 & 3856 from the lower altitudinal limit do not show the sexual dimorphism suggested by collections from higher altitudes. The type is a male plant.

Brunel (*loc. cit.*: append.: 59) recorded this species

from Zaire, Uganda and Tanzania. These records appear to be based at least in part on misidentifications of *P. sepialis*.

#### 7. *P. sepialis* Muell. Arg. (1880)

– type: Kenya, *Hildebrandt* 2695.

*P. meruensis* Pax (1893).

Shrub 1–3(–5) m high; glabrous throughout; bark of old stems peeling or flaking. Main stems angular, scale-leaves  $c$  3 mm long, entire; short-shoots present; leafy-shoots (3–)5–11 cm long, bearing flowers. Leaves elliptic or elliptic-obovate, (0.5–)1–1.9(–2.5) x (0.2–) 0.5–1.1(–1.5) cm, tip rounded to subacute; stipules 2 mm long. Usually dioecious, rarely with occasional flowers of the other sex. Male flowers 1–4 together; pedicel  $c$  1.6 mm; sepals 6, obtuse,  $c$  1 x 0.75 mm, greenish with hyaline margin; disc glands circular, warty; stamens 3, filaments united for  $\frac{1}{4}$ ths of length, anthers longitudinally dehiscent. Female flowers: pedicels extending to 3–4 mm long in fruit; sepals as male but subacute, reflexed in fruit; disc flat, 6-lobed, lobes rounded with crenulate-papillose margin; ovary sessile, styles free, spreading, bifid to halfway. Capsule 1.5 x 2–2.3 mm, shallowly reticulate-rugulose. Seeds 3-sided,  $c$  1 mm long, greyish brown with 8–9 lines of dark dots on back and 6–7 on sides. Fig. 85.8.6–8.

Deciduous woodland, usually with *Acacia*, less often in riverine vegetation, in well drained soils; 1100–1950 m. SU KF GG SD BA; Sudan, Kenya, Uganda, Tanzania. *Friis* et al. 846; *M. & S. Gilbert* 1568; *Thulin* et al. 3392.

#### 8. *P. hildebrandtii* Pax (1893)

– type: Somalia, *J. Hildebrandt* 1537.

Shrub 2 m high; old stems terete with smooth greyish bark, young shoots reddish-brown; all parts glabrous. Leafy shoots produced from very well-defined short shoots, up to 16(–20) mm long. Leaves oblong-elliptic, up to 7 x 4.5 mm, base and tip rounded, rather grey when dried; stipules broadly lanceolate,  $c$  0.8 mm long, margin fimbriate, brown with pale margin. Apparently dioecious. Male flowers apparently solitary in leaf-axils; 6-merous. Sepals oblong-lanceolate, 2 x 0.7 mm, tip subacute, with well-defined slender dark median band. Disc glands small, round, obscurely warted. Stamens 3; filaments almost completely fused into relatively stout column; anthers dehiscent horizontally. Female flower: pedicels accrescent to 6 mm long in fruit; sepals spreading,  $c$  2.5 mm in fruit; disc annular, thin, shallowly 6-lobed with entire margin. Capsule  $c$  1.7 x 2.5 mm. Seeds 3-sided;  $c$  1.3 mm long, very pale brown or straw-coloured, with obscure lines, almost smooth

No information for Flora area, general area with *Acacia* – *Commiphora* bushland, on rocky slope in Somalia;  $c$  1200 m. SD; Somalia. *Corradi* 5605.

The type is the only other collections seen so far and the determination of the above female Ethiopian specimen as this species is open to question until female material can be obtained from the Ahl Mountains in Somalia.

#### 9. *P. borensensis* *M. Gilbert* (1987)

– type: SD, 37 km SE of Filtu on road to Bogol

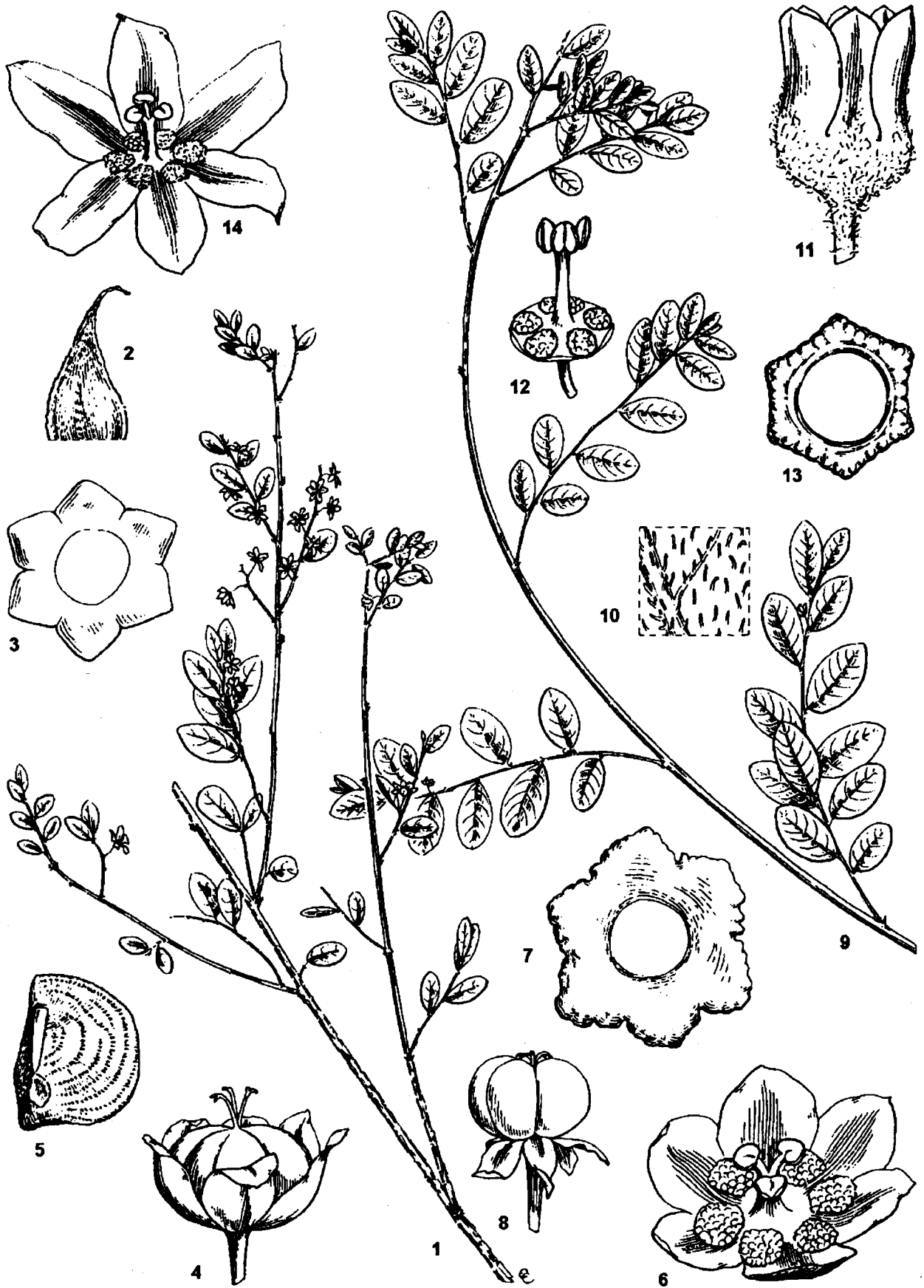


Figure 85.3 *PHYLLANTHUS BORENENSIS*: 1 – flowering branch  $\times \frac{1}{2}$ ; 2 – scale-leaf  $\times 20$ ; 3 – disc of female flower  $\times 25$ ; 4 – fruit  $\times 9$ ; 5 – seed  $\times 20$ ; *P. SEPIALIS*: 6 – male flower  $\times 15$ ; 7 – disc of female flower  $\times 20$ ; 8 – fruit  $\times 6$ . *P. DEWILDIORUM*: 9 – leafy branches with a few flowers  $\times \frac{1}{2}$ ; 10 – detail of leaf-surface  $\times 15$ ; 11 – male flower  $\times 15$ ; 12 – male flower with sepals removed  $\times 15$ ; 13 – disc of female flower  $\times 25$ . *P. FISCHERI*: 14 – male flower  $\times 15$ . 1–5 from Gilbert et al. 7714; 6 from Thulin et al. 3392; 7 & 8 from Friis et al. 846; 9 & 10 from W. de Wilde 10794; 11–13 from Mesfin & Kagnev 2267; 14 from Burger 2004. Drawn by Eleanor Catherine.

Manyo and Dolo, *Gilbert et al.* 7714 (K holo.; C ETH UPS iso.).

Closely related to *P. sepialis*, differing by the female flowers: sepals larger, 2.5–3 x 1.5–1.7 mm; disc hexagonal, entire with concave sides. Capsule smooth, enclosed by incurved sepals. Seeds with *c* 10 lines of dots on back and *c* 8 on sides. Male flowers not seen. Fig. 85.8.1–5.

Bushland/woodland with *Acacia*, *Commiphora* & *Euphorbia scheffleri* in an area with apparently impeded drainage; 1100 m. SD; known only from the type.

10. *P. fischeri* Pax (1894)

– type: Tanzania, *Fischer* 24.

*P. callidiscus* Brunel, *loc. cit.*: 338 (1987?) – type: SU, Addis Abeba, Italian Embassy, *W. de Wilde* 11002 (WAG holo. not seen; BR iso. not seen)

*P. punctulatus* Brunel, *loc. cit.*: 337 (1987?) – type: KF, Bellela ('Bellate') Forest, 40 km W of Jimma, *W. de Wilde* 6994 (WAG holo. not seen; C iso. not seen).

Shrubby herb to 1 m (rarely scandent to 3 m), rarely annual, usually many-stemmed from base; glabrous throughout. Main stems reddish brown, scale leaves lanceolate, 1.5 mm long, subtending nonfunctional short-shoots and leafy-shoots 5–10(–23) cm long bearing flowers. Leaves elliptic to elliptic-obovate or -oblong, (0.5–)1–2(–3.5) x (0.4–)0.7–1(–2) cm, tip obtuse or rounded. Usually monoecious, lower axils with clusters of 3–4 male flowers, upper 1/3rd with female flowers. Male flowers: pedicels 1–1.5 mm long; sepals 6, ovate, 1.5–2 x 1–1.2, obtuse, margins paler; disc glands circular, tuberculate; stamens 3, filaments joined for half their length, anthers horizontally dehiscent. Female flowers: pedicels 2–4 mm long; sepals as in male except outer oblong; disc cupular, thick with 28–32 blunt, pectinate marginal teeth; ovary sessile, smooth, styles later spreading, bifid to almost halfway. Capsule 1.8 x 2.5 mm, smooth. Seeds 3-sided, 1.5 mm long, ± shiny, pale brown. Fig. 85.8.14.

Montane forest margins or evergreen bushland; 1600–2600 m. EE SU KF GG SD HA; Kenya, Uganda, Tanzania. *Burger* 2004; *E. Gilbert* 351; *Gilbert & Jefford* 4313.

A collection from the escarpment below Asmera (800 m; EE. *Sue Edwards & Tewolde Berhan* 3668) is ecologically and geographically very isolated but has been placed here as it does have a very similar, very characteristic, female disc.

The characters used to distinguish *P. callidiscus* and *P. punctulatus* fall well within the range of variation observed for this species within the Flora area. It does not seem likely that they merit recognition as distinct species.

11. *P. dewildiorum* M. *Gilbert* (1987)

– type: WG, 30 km N from Nekempte ('Lekemti') on road to Angar River. *W. de Wilde* 10794 (K holo.; ETH iso.; WAG iso. not seen).

*P. trichotepalus* ('trichopetalus') *sensu* Brunel *p.p. quoad tab. et spec. Ethiop., non* Brenan (1953).

Similar to *P. fischeri* but uniformly puberulous; male flowers with sepals not opening widely but recurving towards tip to give characteristic shape, flushed reddish; female

flowers larger, sepals *c* 3 x 2 mm, disc 6-sided, shallowly cupular, margins crenate/bluntly dentate. Fig. 85.9–13.

Open woodland or wooded grassland; 1400–1800 m. WG KF; not known elsewhere. *W. de Wilde* 7815; *Mesfin & Kagnev* 2267.

Most closely related to *P. trichotepalus* Brenan, known from western Uganda, Rwanda, Burundi and Zaire.

12. *P. rotundifolius* Willd. (1805)

– type: India, *Klein*. s.n.

*P. dinteri* Pax (1909).

*P. aspericaulis* Pax (1909).

Erect annual herb, sometimes forming woody-based shrublet, to 45 cm high; glabrous or minutely asperulous throughout. Main stems erect, scale leaves linear-lanceolate, 1.5 mm long, often replaced by normal foliage leaves in young plants; leafy shoots up to 8 cm long. Leaves suborbicular to obovate-spathulate, 4–12 x 3–7 mm, tip obtuse or rounded, often uniformly tinged reddish. Monoecious; axils of leaves with 2–3 male and 1 female flower, male flowers sometimes absent near shoot tip. Male flowers: pedicels *c* 0.5 mm long; sepals 6, *c* 0.7 mm long, inner broader, with coloured median stripe; disc glands lobed and tuberculate; stamens 3, filaments united, anthers laterally dehiscent. Female flowers: pedicels 1 mm long; sepals 6, 1 x 0.8 mm, outer ovate, inner obovate, obtuse, with broad median band; disc annular or obscurely 6-sided, sometimes irregularly divided; ovary sessile, smooth, styles ± free, later spreading. Capsule 1 x 2 mm, smooth. Seeds 1 mm long, 3-sided, usually dark brown with 6–7 (–9) ridges on back and 5–6 on sides.

Open *Acacia* – *Commiphora* bushland; weed in cultivated areas; 50–1500 m. EE AF SU SD BA HA; Cape Verde Is., Mauritania, Senegal, Egypt, E Sudan east to Pakistan, S India & Sri Lanka; East Africa, Rwanda, Malawi. *Friis et al.* 1004; *Gilbert* 2404; *Gilbert & Jefford* 4530.

*Parker* E106 is atypical because of the lobed female disc and pale brown seeds, both usually reliable spot characters for this species.

13. *P. pseudoniruri* Muell. *Arg.* (1864)

– type: Uganda, *Speke & Grant*.

Usually ephemeral to 60 cm high, rarely to 2 m and ± woody at base; glabrous or minutely asperulous throughout. Main stems erect, scale-leaves linear, 3 mm long; leafy shoots horizontal, 2-winged, up to 17 cm long. Leaves (5–)10–20 x (2–)5–9 mm, oblong to oblanceolate-oblong, tip subacute to almost truncate, mucronulate; stipules filiform, 1.2–2 mm long, pale with pinkish midrib. Normally monoecious; lower axils of leafy shoot with 2–several male flowers, upper axils with female flowers. Male flowers as in *P. rotundifolius* except 1.2 mm long, anthers longitudinally dehiscent. Female flowers: pedicel *c* 1 mm, extending to 2 mm in fruit; sepals 1.5 mm long, oblong elliptic with cuneate base; disc thick, obscurely 6-lobed; ovary sessile, styles free, later recurving. Capsule enclosed by accrescent sepals to 2.5–3 mm long, 1.2 x 2 mm, smooth. Seeds

3-sided, 1 mm long, pale brown with 6–7 darker ridges on back and 5–6 on side. Fig. 85.9.10–12.

Wet or disturbed sites in or near moist forest; 500–2200 m. GJ WG IL KF GG BA; Cameroon east to Somalia and south to Zambia, Zimbabwe and Botswana. *Friis* et al. 2195; *E. Gilbert* 386, 537.

Some specimens here included within *P. pseudoniruri* have obscurely stipitate ovaries and thus approach *P. odontadenius* Muell. Arg., a widely distributed weed not so far recorded for the Flora area. These and the 3 following species are closely interrelated and very easily confused. They can only be reliably separated by microscopic examination of female flowers.

14. *P. mooneyi* *M. Gilbert* (1987)

– type: KF, Telek Gesha, *Mooney* 8730 (K. holo.; ETH iso.).

Closely related to *P. pseudoniruri* but apparently always a perennial with a semi-woody creeping base, stems trailing, to 1.5 m long; female disc with entire lobes; ovary shortly stipitate. Fig. 85.9.1–4.

Seasonally wet, often disturbed area at margins of moister montane forests; 525–2100 m. SU AR IL KF GG SD; not known elsewhere. *M. & S. Gilbert* 1332; *Mooney* 6776; *Stewart* C–28.

Combining floral characters of *P. leucanthus* and *P. odontadenius* but differing from both by the habit.

15. *P. fraternus* *Webster* (1955)

– type: India, *Thomson*. s.n.

*P. fraternus* subsp. *togoensis* *Brunel & Roux*, *Bull. Soc. Bot. Fr.* 122: 153 (1975).

Closely related to *P. pseudoniruri* but always annual, to 45 cm high; leaves rather narrower, 5–13 x 1.5–5(–7) mm; male flowers *c* 0.5 mm long; female flowers 1–1.3 mm long, sepals not enlarging in fruit, disc irregularly split into 6–10 very variable lobes. Fig. 85.9.5–9.

Broadleaved deciduous woodland with *Adansonia*, *Anogeissus* and *Boswellia papyrifera*; *c* 900 m. TU (Tekeze Valley); west to Senegal, south to Botswana & Namibia; India & Pakistan; West Indies. *Gilbert & Getachew* 2952.

Only one record from the Flora area. Though reputedly native only in Asia, the occurrence of this species in Kenya and Ethiopia is within little-disturbed natural vegetation.

16. *P. leucanthus* *Pax* (1893)

– type: Tanzania, *Boehm* 83.

*P. rivae* *Pax* (1897) – type: GG, Hamara-Burgi, near Sagan River, *Ruspoli & Riva* 1758 (1671) 1590 (FT holo.).

Usually an erect ephemeral, less often a ± shrubby perennial closely related to *P. pseudoniruri* but sepals of female flowers ovate with overlapping subcordate bases, white except for sharply defined midribs; disc with entire lobes; ovary shortly stipitate.

Damper shaded sites within deciduous woodland with *Acacia*, *Commiphora*, *Adansonia*, *Sclerocarya*, *Cussonia*,

etc; (600–)900–1600(–1950) m. EE EW TU GG SD BA; south to Zaire, Zambia, Zimbabwe, Malawi, Mozambique. *Friis* et al. 854; *Gilbert & Getachew* 2907; *Gilbert & Thulin* 298.

Some collections from the escarpment below Asmera (EE EW; 900–1300 m: *Sue Edwards & Tewolde Berhan* 3881; *Mesfin & Sebsebe* 3831) are subshrubby perennials easily confused with *P. suffrutescens* below or even *P. sepialis*. Similar collections from northern Kenya have been seen.

17. *P. suffrutescens* *Pax* (1893)

– type: Kenya, *Hildebrandt* 2692.

*P. myrtilloides* *Chiov.* (1912) – type: SU/AR, Dacardine Hill in Suksuki Valley, near Lake Zwai, *Negri* 869 (FT holo.).

Woody-based perennial 20(–40) cm high, many stemmed from base; glabrous throughout. Main stems erect, with normal foliage leaves; leafy-shoots 2.5–10 (–30) cm long. Leaves elliptic-obovate to narrowly lanceolate-oblong, 2–9 x 1–6 mm, tip obtuse-mucronulate, often with reddish margins. Dioecious. Male flowers 2–3 per axil; pedicel *c* 1 mm long; sepals 6, outer ovate, 1 x 1 mm, base cordate, inner obovate, 1 x 0.75 mm, greenish with white margins; disc glands shallowly warty; stamens 3, filaments joined, anthers longitudinally dehiscent. Female flowers: pedicels 1–1.5 mm long; sepals similar to male, *c* 2 x 1 mm, with dull reddish median stripe; disc fleshy and undulate, obscurely 6-lobed; ovary sessile, smooth, styles shortly connate, suberect. Capsule 1.5 x 2 mm smooth, often reddish. Seeds 3-sided, 1 mm long, greyish-brown, back with 8 lines of tubercles, sides with *c* 6 lines.

All records from newly burnt grassland; 1800–2000 m. SU/AR SD; Kenya, Uganda, Tanzania. *Gilbert & Jefford* 4273, 4354; *Mooney* 5630.

18. *P. glaucophyllus* *Sond.* (1850)

– type: South Africa (Transvaal), *Zeyher* 1509.

Perennial herb with several stems from woody rootstock; glabrous throughout. Stems all similar, sprawling, often unbranched, flattened with distichous leaves. Leaves usually ovate, 5–20 x 3–13 mm, base rounded or subcordate, tip obtuse or rounded, margins revolute, rather stiff with prominent lateral veins; stipules lanceolate, *c* 2 mm long, denticulate near base. Monoecious, male flowers 1–2 together in lower axils, female in middle and upper axils. Male flowers: pedicels *c* 5 mm long; sepals obovate, 1.5 mm long, rounded, with reddish median line; disc glands smooth; stamens 3, free, minute. Female flowers: pedicel (5–)7–10(–12) mm long, extending to 15 mm in fruit; sepals as in male; disc shallowly cupular, thin; ovary sessile, styles free, spreading. Capsule 2 x 3–4 mm, smooth, reddish. Seeds ± 3-sided, 1.8 mm long, brown with *c* 40 lines of tubercles on back and *c* 30 on sides.

Short grassland within *Terminalia*–*Combretum* woodland/grassland mosaic; 1400–1900 m. SD BA; Central Kenya, S Uganda, Tanzania, south tropical Africa from Angola to Mozambique, northern South Africa. *Friis* et al. 3465; *Gilbert* et al. 8052; *Gilbert & Sebsebe* 8531.



19. *P. boehmii* Pax (1893)

— type: Tanzania, *Boehm* 149.

Glabrous throughout. Main stem erect or trailing, scale leaves 1 mm long, strongly reflexed; leafy-shoots up to 8 cm long. Leaves oblong-elliptic to -obovate, tip rounded or obtuse, often with reddish margins. Usually monoecious, male flowers in lower axils, female in upper axils. Male flowers: pedicel *c* 0.5 mm; sepals 5(-6), outer 3 ovate-suborbicular, 0.8 mm long, inner 2(-3) similar but smaller, with broad yellowish median stripe; disc-glands smooth; stamens 3, filaments united into very short column, anthers transversely dehiscent. Female flowers: pedicel 1 mm extending to 2 mm in fruit; sepals 5(-6), elliptic, 1.5–2 x 1 mm growing to 3 x 1.5 mm in fruit, brownish with narrow white margins; disc annular, flat, sometimes irregularly divided into truncate lobes; ovary sessile, styles  $\pm$  free. Capsule 2 x 3 mm, smooth. Seeds 3-sided, 1.5 mm long, yellowish brown with *c* 20 longitudinal ridges on back and *c* 15 on sides.

var. *boehmii*

Erect annual to 75 cm high, occasionally woody at base, stem greenish, often white and spongy when grown in water. Leaves 6–10(-18) x 3–4.5(-7) mm.

Marshes or swampy grassland, occasionally on wet banks or as a weed; 1650–1900 m. GD GJ SU WG IL KF BA; Kenya, Uganda, Tanzania, ?Malawi, ?Zambia. *W. de Wilde* 8842; *Gilbert & Thulin* 898; *Mesfin & Kagnev* 2447.

Var. *humilis* A. Radcliffe-Smith is a procumbent perennial with reddish stems and smaller leaves (1.5–)2–5 (-6.5) x 1–2(-3.5) mm restricted to Kenya and N Tanzania. Some collections from Bale (e.g. *Friis* et al. 3514, 3555) are somewhat intermediate between the 2 varieties.

20. *P. oblongiglans* M. Gilbert (1987)

— type: BA, Robe, *Friis* et al 3714 (K holo.; C ETH UPS iso.).

*P. dewildeanus* Brunel, *loc. cit.*: 398 (not earlier than Oct. 1987) — type: SD, Hagere Selam, SW of Wondo, *W. de Wilde* 8385 (WAG holo. not seen; ETH K iso.).

Ephemeral to 20 cm high, glabrous throughout. Main stem often branched, scale-leaves *c* 1 mm long, reddish with narrow pale margin; leafy-shoots up to 3 cm long. Leaves obovate-elliptic to oblanceolate, up to 3.5–6 x 2.5–2.7 mm, tip rounded, often suffused red below; stipules  $\pm$  linear, 0.7–1 mm long. Monoecious, male flowers in clusters near shoot bases, female flowers above. Male flowers: pedicel *c* 0.8 mm long; sepals 5, elliptic, *c* 0.5 mm long, tip obtuse, red; disc-glands obscurely tuberculate; stamens 3, filaments joined  $\pm$  completely, anthers 4-lobed, transversely or diagonally dehiscent. Female flowers: pedicel to 1.5 mm in fruit; sepals 5(-6), obovate, *c* 0.7 x 0.4 mm, tip subacute, pink with obscure pink central stripe; disc of free oblong glands alternating with sepals; ovary sessile; styles short, spreading. Capsule 1.2 x 2 mm, smooth, pale. Seeds sharply 3-sided, 1 mm long, 0.8 mm wide, dark brown with *c* 10 lines of dots on back and 6–7 on sides. Fig. 85.9.13–17.

Shallow pool in grassland, in disturbed areas such as

rodent diggings and as a weed; 2400–2900 m. SD BA; Kenya, ?Zaire (fide Brunel). *W. de Wilde* 8385; *Gilbert* et al. 8276.

This seems to be a high-altitude vicariad of *P. amarus*.

21. *P. amarus* Schum. & Thonn. (1827)

— type: *Thonning* 4.

*P. niruri* auct. non L.

Easily confused with *P. boehmii* var. *boehmii*, differing by often having male and female flowers together in upper axils of shoots and female flowers only in lower axils; flowers always 5-merous; male disc-glands tuberculate; anthers reniform,  $\pm$  diagonally dehiscent; female disc with 5 obtusely triangular lobes; seeds 1 mm long, dull greenish brown, with 5–8 lines of dots on back and *c* 7 obscure lines on sides. Fig. 85.9.18.

Seasonally flooded grassland or river margins; 400–1600 m. SU IL GG; Webster (*J. Arn. Arb.* 38: 314, 1957) believes it to be a native of America that is now a pantropical weed. *Friis* et al. 2468; *Gilbert* 3497; *Sebsebe & Ensermu* 255.

The Ethiopian collections are widely scattered in apparently natural sites. True *P. niruri* L. is a narrow endemic of the Caribbean.

22. *P. niruroides* Muell. Arg. (1864)

— type: Sierra Leone, *Welwitsch* 316.

Erect ephemeral herb up to 25 cm high, all parts glabrous. Main shoots reddish, with purplish stipule-like scale-leaves; leafy shoots to 8 cm long. Leaves elliptic to oblong-lanceolate, 3–9 x 1–3 mm, tip usually acute or subacute, margins often reddish; stipules very narrow, to 1 mm long. Flowers monoecious, 5-merous; male 2–3 together in lower axils of leafy shoots, female solitary in upper axils of same shoots. Male flowers: pedicels less than 1 mm long; sepals suborbicular-obovate, *c* 0.6 mm long, rounded, very pale green; disc glands free, minute, tuberculate; stamens (2–)3, filaments joined into short column, anthers transversely ovate, 2-lobed, laterally dehiscent. Female flowers: pedicels accrescent to 2 mm long; sepals ovate-rhombic, *c* 0.7 mm long, acute or subacute, whitish; disc  $\pm$  flat, 5-lobed, lobes subacute, entire or with 1–2 teeth at base; ovary subsessile, densely minutely tuberculate, styles minute, bifid. Capsule 1 x 1.5 mm, tuberculate except for grooves between lobes. Seeds 0.8–0.9 mm long, 3-angled, uniformly greyish-brown or olive green, with obscure lines on faces.

Locally frequent weed of *Sorghum* on dark brown clay soil; 1200 m. GJ; Guinea Bissau east to western Kenya and Tanzania, south to Zimbabwe. *Parker* 4598.

Only known from one locality in Ethiopia.

## 7. MARGARITARIA L.f. (1781)

Webster, *J. Arn. Arb.* 60: 403–444 (1979).

Closely related to *Phyllanthus* but always trees or shrubs; shoots all similar, scale-leaves only subtending flowers at bases of new shoots; male flowers 4-merous with annular

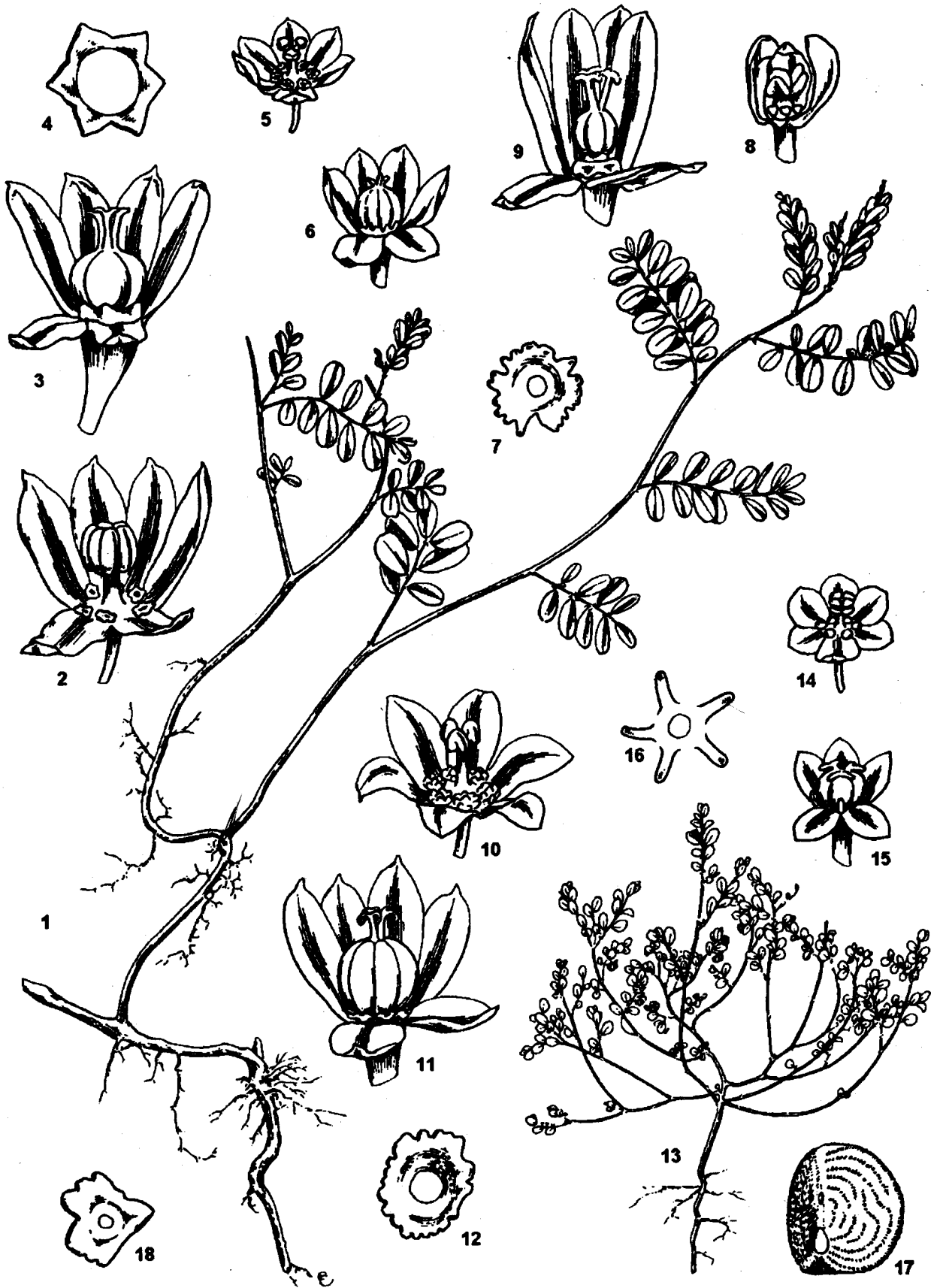


Figure 85.9 *PHYLLANTHUS MOONEYI*: 1 - part of plant showing creeping stems and leafy branches  $\times \frac{3}{8}$ ; 2 - male flower  $\times 15$ ; 3 - female flower  $\times 15$ ; 4 - disc of female flower  $\times 25$ . *P. FRATERNUS*: 5 - male flower  $\times 15$ ; 6 - female flower  $\times 15$ ; 7 - disc of female flower  $\times 25$ . *P. LEUCANTHUS*: 8 - male flower with 2 sepals removed  $\times 15$ ; 9 - female flower  $\times 15$ . *P. PSEUDONIRURI*: 10 - male flower  $\times 15$ ; 11 - female flower  $\times 15$ ; 12 - disc of female flower  $\times 25$ . *P. OBLONGIGLANS*: 13 - complete plants  $\times \frac{3}{8}$ ; 14 - male flower  $\times 15$ ; 15 - female flower  $\times 15$ ; 16 - disc of female flower  $\times 25$ ; 17 - seed  $\times 20$ . *P. AMARUS*: 18 - disc of female flower  $\times 25$ . 1-4 from Mooney 8730; 5-7 from Gilbert & Getachew 2952; 8 & 9 from Friis et al. 3286; 10-12 from E. Gilbert 386; 13-17 from Friis et al. 3714; 18 from Friis et al. 2468. Drawn by Eleanor Catherine.

disc, stamens free; female calyx and disc as in male; seeds hemispherical, outer coat fleshy, often metallic blue, inner coat bony.

Pantropical genus of 13 species with 1 very polymorphic species in Africa including the Flora area and 4 species in Madagascar.

*M. discoidea* (Baill.) Webster (1967);

*Cicca discoidea* Baill. (1860); *Phyllanthus discoideus* (Baill.) Muell. Arg. (1863) – type: 'Senegambia', Heudelot 102.

Shrub or tree (1–)3–8(–25) m high; bark soft, thick, flaking off in long irregular strips; stems glabrous to brownish-pubescent, glabrescent. Leaf: petiole 1–5(–9) mm long; leaf blade elliptic-lanceolate to suborbicular-obovate, (1–)2–8(–17) x (0.5–)1–4(–9.5) cm, base rounded to cuneate, tip rounded to acuminate, glabrous to puberulous below; stipules soon falling. Dioecious, flowers towards bases of new shoots; bracts 2–3 mm long, drying blackish, soon falling. Male flowers in clusters; pedicels to 10 mm long; sepals obovate-oblong, reflexed; disc 4-lobed. Female flowers 1–3 together; pedicels (1.5–)4–10(–18) mm long, sometimes extending in fruit; sepals ovate to suborbicular, 3 mm long; disc ± entire; ovary 2–4-locular, styles erect. Capsule subglobose to very deeply 2–4-lobed, 5–7 x 10–13 mm diameter, smooth or reticulately veined, golden brown when mature. Seeds (2.5–)4–5 x (2–)3–4 mm, smooth, metallic blue.

1. Stipules near stem-tip usually 5–10 mm long; male sepals 1–1.5 mm long; anthers usually under 0.7 mm long; fruiting pedicels usually up to 6 mm long; dry seed usually not more than 3.5 mm diameter. var. *fagifolia*

– Stipules near stem-tip usually 2–5 mm long; male sepals 1.5–3 mm long; anthers usually over 0.8 mm long; fruiting pedicels 5–20 mm long; dry seeds usually 3.5–5 mm diameter. var. *nitida*

var. *fagifolia* (Pax) A. Radcl.-Smith, *Kew Bull.* 36: 221 (1981);

*Flueggea fagifolia* Pax (1895) – type: Tanzania, Volkens 1737.

Shoots robust; petioles narrowly winged and/or adaxially grooved, glabrous or nearly so; leaf blades slightly leathery, elliptic-lanceolate, usually acuminate, often dark green. Fruit shallowly lobed.

Open secondary woodland or edge of *Celtis*, *Aningeria altissima*, *Trilepisium* forest; 1050–1320(–1750) m. IL KF SD BA; west to Guinea Bissau, south to Angola and South Africa (Natal). Friis et al. 3957; Meyer 8892.

var. *nitida* (Pax) A. Radcl.-Smith, loc. cit.: 221 (1981);

*Flueggea nitida* Pax (1894) – neotype: Mozambique, Barbosa & Carvalho 2950.

Shoots slender, petioles as in var. *fagifolia*, glabrous; leaf-blade membranous, obovate-elliptic to suborbicular, sub-acute to rounded, often rather pale green. Fruit shallowly lobed. Fig. 85.10.

In under storey of montane forest with *Podocarpus*,

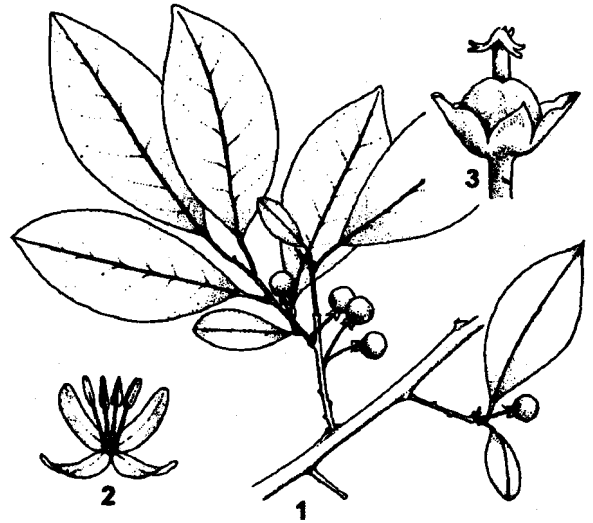


Figure 85.10 *MARGARITARIA DISCOIDEA* var. *NITIDA*: 1 – fruiting branchlet (leaves approaching form of var. *FAGIFOLIA*) x  $\frac{3}{4}$ ; 2 – male flower x 4; 3 – female x 4. 1 from *Shabani* 313; 2 from *Semsei* 2966; 3 from *Semsei* 3190. Drawn by G. Papadopoulos. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 6.)

*Polyscias*, etc; 1600–2200 m. SD BA; S and W to Uganda, Burundi, Tanzania, Zambia, Botswana, S Africa (Natal). Chaffey 132, 311; Thulin et al. 3366.

Two further varieties have been recognized. Var. *discoidea* would key out as var. *fagifolia* but has leaves as in var. *nitida* with hairy petioles. It is found from Senegal east to Uganda and south to Angola and may be found also in SW Ethiopia. Var. *triplosphaera* A. Radcl.-Smith does not come closer than coastal Kenya. It has hairy subterete petioles and very deeply 2–3-lobed fruits.

## 8. BREYNIA J. R. & G. Forst. (1776) nom. cons.

Similar to *Phyllanthus*. Scale-leaves absent. Monoecious: Male flowers flat-topped with sepals sharply inflexed to conceal anthers; disc and pistillode absent. Female flowers

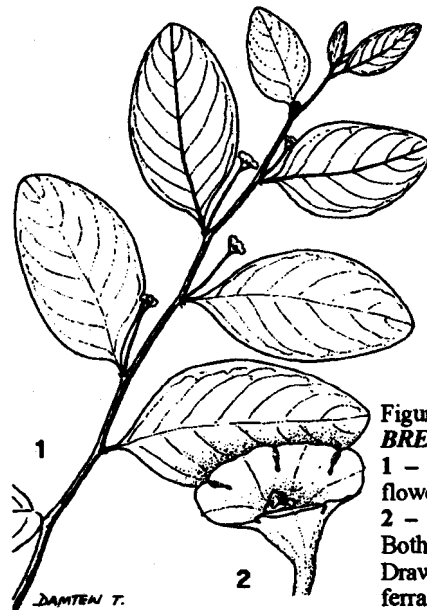


Figure 85.11 *BREYNIA DISTICHA*: 1 – leafy branch with flowers in the axils x  $\frac{3}{4}$ ; 2 – female flower x 6; Both from *Haugen* 1467. Drawn by Dantew Teferra.

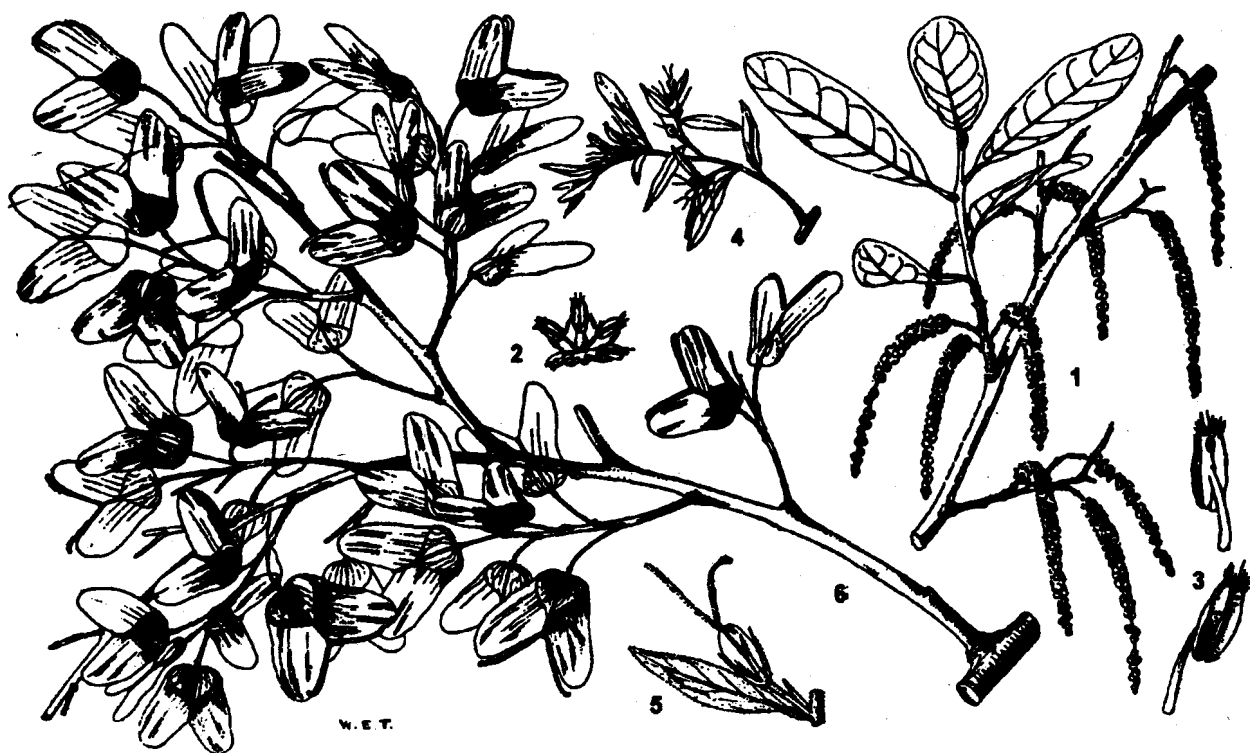


Figure 85.12 *HYMENOCARDIA ACIDA*: 1 - male shoot; 2 - male flower with rudimentary ovary; 3 - stamen back and front; 4 - female shoot; 5 - female flower; 6 - fruiting branch. Drawn by W.T. Trevithick. (Reproduced with permission from *Fl. W. Trop. Afr.* vol 1, part 2: fig. 132.) Scales and specimen citations not given in original.

nearer to stem tip; receptacle enlarged; sepals accrescent, not inflexed; disc and staminodes absent.

1 ornamental species in the Flora area.

**B. disticha** J. R. & G. Forst. (1776)

var. *nivosa* (Bull.) A. Radcl.-Smith, *Kew Bull.* 35: 498 (1980).

Shrub up to 2 m high. Leaves ovate, to 5 x 4 cm, reddish, variably streaked and blotched with pale pink or white. Fig. 85.11.

Ornamental hedge plant. SD; originally from New Caledonia, now very widely grown throughout the tropics. Haugen 1467.

Immediately recognisable by the multicoloured leaves; non-variegated plants (var. *disticha*) do not appear to be in cultivation.

**9. HYMENOCARDIA** Wall. ex Lindl. (1836)

Pax & K. Hoffmann, *Pflanzenreich* IV (147.15): 72-78 (1922); Leonard & Mosango, *Hymenocardiaceae* in *Fl. Afr. Cent.* (1985); Dechamps et al. in *Bull. Jard. Bot. Brux.* 55: 473-485 (1985).

Deciduous trees or shrubs. Leaves usually alternate, simple, entire. Dioecious, flowering before leaves develop. Male flowers in axillary spikes; female flowers solitary, axillary or in terminal racemes. Male flowers: calyx cupular, lobes 4-6, imbricate; petals and disc absent; stamens 4-6, opposite sepals, anthers large, often with dorsal gland, pistillode minute. Female flowers: sepals 4-8, linear, falling off quickly; petals and disc absent; ovary 2-locular, compressed, with 2 apical ovules, styles long, simple, free.

Fruit with 2 flat, usually winged, cocci, breaking up at maturity. Seeds 1 per coccus, flat, without caruncle.

An isolated genus with 6-7 African species, 1 occurring in the Flora area, and 1 Asian species.

Inclusion within the Euphorbiaceae has been questioned because of apparent similarities in wood anatomy and pollen morphology to the Ulmaceae which, coupled with the unusual fruits, caused some botanists to place it in a monogeneric family, the Hymenocardiaceae. Closer examination has shown that most of the similarities are superficial and probably the result of convergence.

**H. acida** Tulasne (1851)

-types: Guinea, Heudelot 779 & Gambia, Leprieur.

Shrub or small tree to 10 m; bark yellowish-grey, smooth or flaking; twigs pubescent to almost glabrous, gland-dotted. Leaf: petiole 3-10 mm; leaf-blade oblong to obovate or oblanceolate, (3-)5-7(-9) x 1.5-4 cm, rounded or cuneate, obtuse, sparingly puberulous to glabrous above, puberulous at least on main veins and densely gland-dotted below; stipules linear, 2-3 mm long, falling soon. Male spikes 3-7 cm long, dense, often clustered on old wood; flowers 5-merous; calyx 1 mm long, dark red; anthers 1.5 mm long with prominent golden apical glands. Female flowers solitary, axillary or in 5-6-flowered racemes on lateral branches; pedicels c 1 mm extending to 10(-20) mm in fruit; sepals 5-8, 2.5-3 mm long, pinkish; ovary 3 mm long, styles 3 mm extending to 12 mm, crimson. Fruit V-shaped, 20-25 x 25-45 mm, wings rounded-rhomboid, membranous. Seeds semicircular, 10 x 5 mm, smooth, shiny, purplish brown streaked black. Fig. 85.12.

var. *acida*

Fruit glabrous.

*Combretum* – *Terminalia* – *Protea* woodland; c 1500 m. WG (Gambella Escarpment); west to Senegal, south to Angola & Mozambique. Mooney 6843 (only collection seen).

var. *mollis* (Pax) Radcliffe-Smith, with pubescent fruits, does not occur north of Rwanda.

10. *CLUSTIA* L. (1753)*Cluytia* Ait. (1789)

Pax, *Pflanzenreich* IV (147.3): 50–83 (1911); Gilbert, *Nord. J. Bot.* 12(4):400–401 (1992).

Small trees, shrubs or woody herbs; indumentum simple. Leaves alternate; stipules small or absent. Usually dioecious; flowers in axillary clusters. Male flowers: pedicels articulated; sepals 5, imbricate, each with 2–7 glands at base on inside; petals 5, imbricate; stamens 5, inserted on column; disc of 5-many free glands; pistillode present. Female flowers: pedicels not articulated; petals and sepals as in male but accrescent in fruit; disc-glands 1-seriate at base of sepals; ovary 3-locular, ovules solitary; styles bifid. Fruit a spherical capsule. Seeds ovoid, glossy black; caruncle present.

An African genus of about 70 species, mostly in S Africa, 1 species extending into tropical Arabia, 2 in the Flora area.

These plants are highly poisonous to livestock.

1. Male flowers with 5 disc-glands; fruiting pedicels (8–)10 mm or more long. 1. *C. abyssinica*
- Male flowers with 20–30 disc-glands; fruiting pedicels up to 7 mm long, usually less. 2. *C. lanceolata*

1. *C. abyssinica* Jaub. & Spach. (1855)

– type: GD, Simien, *Schimper* (1853) 1329 (P hol.).

Herb or shrub 1–2(–4) m high (or tree to 8 m). Leaf: petiole 5–23 mm long; leaf-blade lanceolate, elliptic (or ovate), 2–17(–20) x 1–5.5(–6) cm, base tapered to rounded, tip subacute or obtuse. Male flowers: pedicels 2–8(–10) mm long, usually hairy above articulation; sepals obovate, 2–2.5 x 1–1.5 mm, pale green, each with 3 slender, hooked, pale glands at base; petals with claw 0.5–1 mm, limb 1.5 x 1–1.5 mm, pale greenish yellow or white; disc glands 5, opposite petals; column c 1.5 mm long, filaments c 1 mm long; pistillode as long as column. Female flowers: pedicels c 5 mm extending to (8–)10–20 mm in fruit; sepals as in male, accrescent to 3 mm; petals spatulate 2 x 1 mm, yellowish; disc glands absent; ovary usually glabrous; styles free. Fruit 4.5–5.5 mm diameter, shallowly pustulate, usually glabrous. Seeds 3 x 2.5 mm.

var. *abyssinica*;

*C. lanceolata* Forssk. var. *glabra* A. Rich., *Tent. Fl. Abyss.*, 2: 253 (1851) – type: TU, Djelladjeranne ('Tchelatchekanné'), *Quartin-Dillon & Petit* (P hol.).

*C. abyssinica* var. *glabra* Pax, loc. cit.: 56 (1911) –

types: SU, Akaki, 8 Feb. 1905, *Rosen* (B syn. destr.); GD, Gena (Gara) Abuna Tekle Haimanot, *Schimper* (1836) 96 (B syn. destr.; K isosyn.); (Pax also listed, without details, *Schimper* 38 & 481 and *Ellenbeck* 411 & 1268, all B syn. destr.).

*C. abyssinica* var. *calvescens* Pax, loc. cit.: 57 (1911) – types include BA, near Ghinir, *Ellenbeck* 1942 & without data, *Schimper* 465 (both B syn. destr.).

*C. abyssinica* var. *firma* Pax, loc. cit.: 57 (1911) – types include HA, Harar, *Ellenbeck* 783 & 785 (both B syn. destr.) & SD, near Bidduma (Biduara), *Ruspoli & Riva* '1391 (1245) 1262' (FT isosyn.).

All parts glabrous or rapidly glabrescent. Fig. 85.13.6&7.

Evergreen bushland or margins of *Juniperus* and *Podocarpus* forest, mostly in disturbed sites; 1450–2950 m. TU GD WU GJ SU AR KF SD BA HA; Sudan, Somalia, south to Angola and South Africa (Natal). *W. de Wilde* 8592–3; *Gilbert & Jefford* 4674–5; *Mooney* 5244.

Two further varieties are recognized from south of the Flora area, var. *usambarica* Pax & K. Hoffm., a distinctive taxon with a very dense indumentum, ovate leaves and short male pedicels, and var. *pedicellaris* (Pax) Pax which resembles var. *abyssinica* more closely, differing only by the persistent pubescence of stems and leaves. The boundary between these 2 seems arbitrary and certain collections from the Flora area could be placed in var. *pedicellaris*, e.g. *M. & S. Gilbert* 1331 (SD) & *Mooney* 7004 (SU).

Collections from the Mega Plateau, SD (*Bally* 9143; *Gillett* 14205, 14216) have distinctively densely hairy stems and sparsely pubescent elliptical leaves with shiny upper sides. Technically they belong with var. *pedicellaris* but they seem to represent an independent local variant rather than true var. *pedicellaris* as found in East Africa.

Cufodontis (loc. cit.: 439) suggests that this species is very similar to the South African species *C. pulchella* L. (1753), and has so named some collections from the Flora area.

2. *C. lanceolata* Forssk. (1775)

– type: Yemen, *Forsskål*

Very similar to *C. abyssinica* but often persistently hairy, stems more robust, leaves often narrower, male flowers with (19–)20–33 disc-glands, fruiting pedicels not over 7 mm long, fruits sometimes densely hairy.

subsp. *lanceolata*

*C. lanceolata* var. *pubescens* A. Rich., *Tent. Fl. Abyss.* 2: 253 (1851); *C. richardiana* Muell. Arg. (1866) – types: TU, Mt. Selleuda (Scholloda), *Schimper* I:199, III:1536 (both P syn.; K isosyn.); *Schimper* III:2040 (P syn.).

*C. lanceolata* var. *angustifolia* A. Rich., loc. cit.: 253 (1851) – types: Ethiopia, *Quartin-Dillon & Petit* s.n. and *Schimper* s.n. (both P syn.).

*C. myricoides* Jaub. & Spach. (1855).

*C. richardiana* Muell. Arg. (1866) – type: TU, Mt. Selleuda (Scholloda) *Schimper* I:199 (P lecto., K isolecto.).

*C. richardiana* var. *trichophora* Muell. Arg. in DC, *Prodr.*, 15.2: 1044 (1866) – type: Ethiopia, *Schimper* (1853) 1056 (P hol., K iso.).

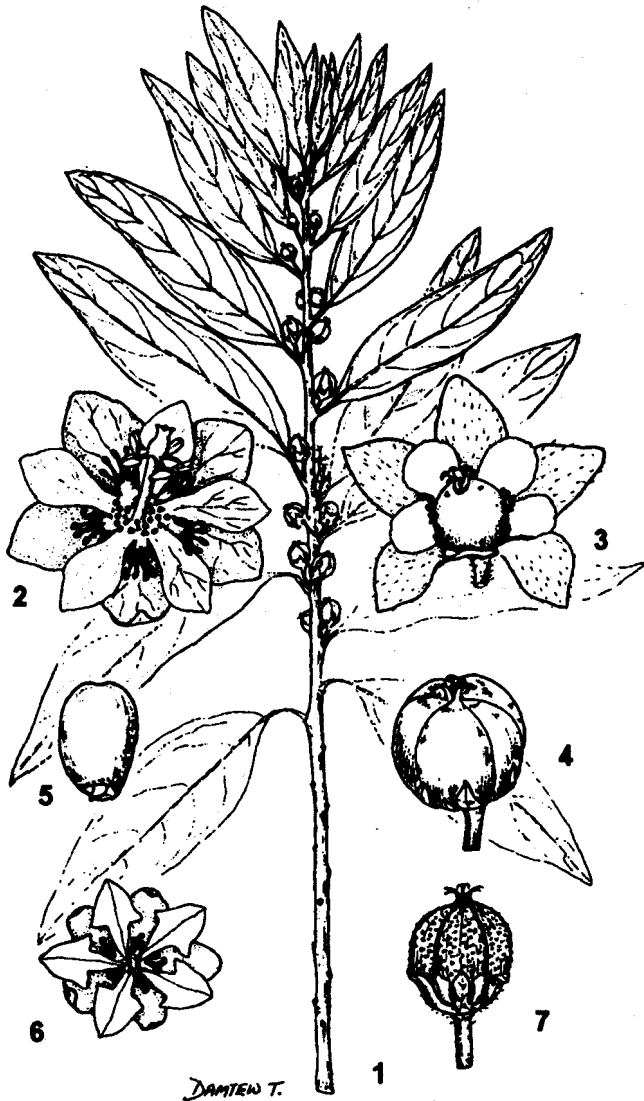


Figure 85.13 *CLUTIA LANCEOLATA* subsp. *LANCEOLATA*: 1 – leafy stem with fruits in the leaf axils x 1; 2 – male flower x 9; 3 – female flower x 9; 4 – fruit x 4; 5 – seed x 8. *C. ABYSSINICA* var. *ABYSSINICA*: 6 – young male flower from above, stamens removed x 7½; 7 – fruit x 3. 1, 3–5 from *Sebsebe D. & Erich W.* 544; 2 from *Gilbert & Getachew A.* 2617; 6 from *Milne-Redhead & Taylor* 10209; 7 from *Milne-Redhead & Taylor* 10210. Drawn by Damtew Teferra (1–5) with 6 & 7 redrawn from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 63.

Fig. 85.13.1–5.

Evergreen bushland, open deciduous woodland, margins of *Juniperus* forest, often along streams or in disturbed areas; (1270–)2000–3250 m. EW TU GD GJ WU SU WG KF GG SD BA HA; Arabia. *Burger* 687; *Gilbert & Getachew* 2617; *Mooney* 6051.

The view has been taken that there is only a single polymorphic species rather than about 3 separate species differing by single characters. Collections from the north with hairy fruits were placed in *C. richardiana* but *Schimper* (1853) 1056 includes both hairy and glabrous fruited specimens. There is some suggestion of a discontinuity in gland number in the male flowers: collections from western Ethiopia have (29–)30–33 disc glands whilst those from

the east have only (19–) 20–22 glands. There is, however, an overlap in distribution in Tigray where intermediates with 24–26 glands have been seen. In all other features the material is rather uniform. More detailed investigation could justify infraspecific taxa but the lack of correlation between the male and female plants argues against this, especially as a rather similar mixture of plants seems to occur in Arabia.

Subsp. *robusta* (Pax) Gilbert from south of the Flora area differs mainly by the male flower normally having only 10 disc glands, but the number does range up to 20 and there is considerable overlap in the variation of other characters making the taxon conspecific with *C. lanceolata*.

#### 11. *CAPERONIA* St.-Hil. (1824)

Pax, *Pflanzenreich* IV (147.6): 27–49 (p.39) (1912).

Erect herbs of wet situations; indumentum of simple, sometimes glandular, hairs. Leaves alternate, shortly petiole, serrate. Nearly always monoecious; inflorescences racemose, axillary, male with 1–few female flowers at base, flowers solitary. Male flowers: 5-merous; calyx valvate, closed in bud; petals conspicuous, imbricate, often unequal, inserted on staminal column; disc absent; stamens 10, rarely fewer, in 2 whorls, tips of filaments free; pistillode present. Female flowers subsessile; sepals 5–7(–10), imbricate, accrescent; petals 5(–6), imbricate, often very small; disc absent; ovary 3-loculed, ovules solitary; styles much divided. Fruit a hispid or spiny 3-lobed capsule; seeds globose to ovoid-oblong, ± smooth, with very thin, closely adhering skin which forms false raphe.

About 40 species mostly tropical American; c 6 poorly differentiated species in Africa and Madagascar, 1 in the Flora area.

*C. serrata* (Turcz.) Presl. (1849);

*Lepidococca serrata* Turcz. (1848) – types: Sudan, *Kotschy* 69 & 113.

*Caperonia gallabatensis* Pax & K. Hoffm. (1912) – types: Sudan/GD, Gallabat & Matamma, *Schweinfurth* 870 & 871 (both B holo. destr; K iso.).

Annual (20–)75–90(–150) cm high; stem hispid, hairs often with swollen tips. Leaves elliptic-lanceolate, (2.5–) 4–10(–15) x 0.2–2.5 cm, tip acute or subacute, sharply serrate, glabrous except for margins and main veins; stipules 2–4(–5) mm long. Racemes 4.5–9(–15) cm long including 1.5–5.5(–7) cm peduncle, 1–2 female flowers near base. Male flowers: pedicels c 1 mm; calyx-lobes 1.5–2 mm long, sparsely hairy; petals unequal, pure white, 3 reaching 1.5–2.5 mm long, 2 only 1–1.5 mm long; staminal column 2 mm high. Female flowers: pedicels 0.5–1 mm long; sepals (5–)6–7(–10), ± lanceolate, outer 1–1.5 mm long, inner 2–3 mm long, elongating slightly in fruit, yellowish; petals c 1.5 mm long, white, soon falling; ovary subglobose, hispid with fusiform processes. Fruit 4–5(–6) x 5–7(–8) mm, spiny. Seeds ovoid-oblong, (2.5–)3(–4) x 2(–3) mm, smooth or minutely foveolate, pale brown becoming blackish as outer skin is lost. Fig. 85.14.

In and around standing water in areas of seasonal

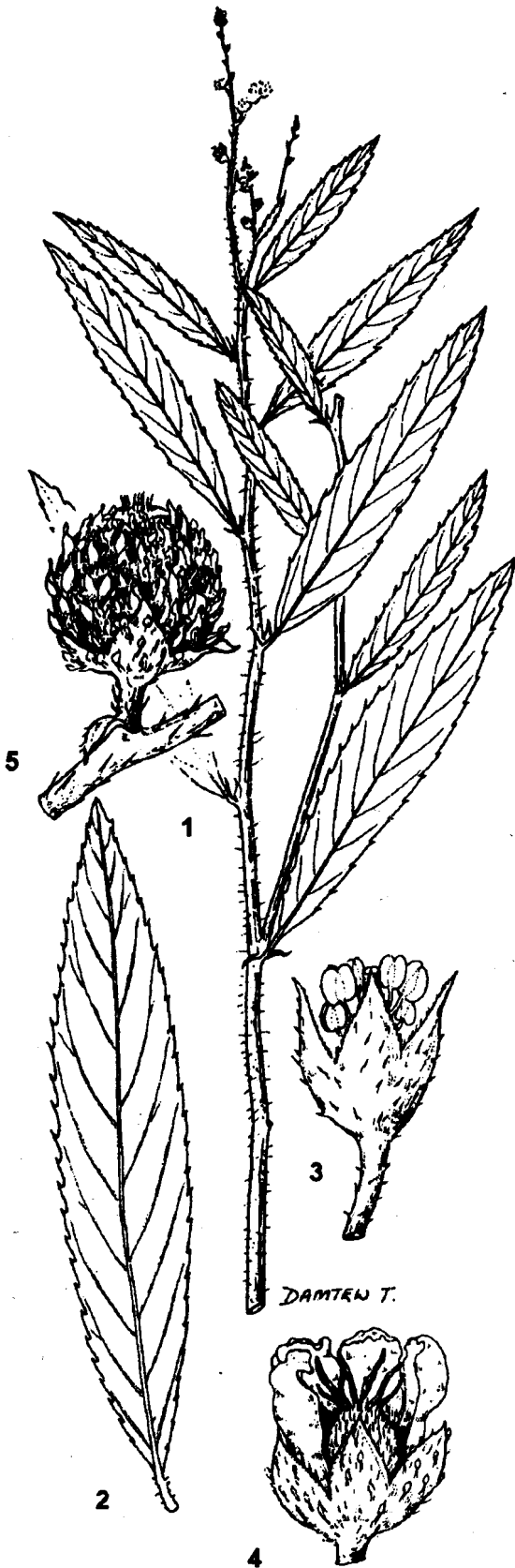


Figure 85.14 *CAPERONIA SERRATA*: 1 - leafy branch with terminal inflorescence  $\times \frac{3}{4}$ ; 2 - single leaf  $\times \frac{3}{4}$ ; 3 - male flower  $\times 10$ ; 4 - female flower with front petal removed  $\times 5$ ; 5 - fruit  $\times 7$ . 1 & 2 from Gilbert & Friis 8361; 3-5 from Gilbert & Ermias Dagne 3854B. Drawn by Damtew Teferra.

flooding or on very heavy black cotton soil; 550-1600 m. ?GD GJ SU IL KF; west to Senegal, south to Uganda and Zaire (Shaba). *J. de Wilde* 5789; *Gilbert & Ermias* 8336; *Gilbert & Friis* 8361.

12. **CHROZOPHORA** *A. Juss.* (1824) *nom. cons.*

*Pax, Pflanzenreich IV* (147.6): 17-27 (1912); *Prain in Kew Bull.* 1918: 49-120 (1918).

Annual or perennial herbs or shrubs; indumentum of stellate hairs and/or peltate scales. Leaves alternate, petiolate, often plicate or bullate at least when young, with 2 glands at base of leaf-blade. Monoecious. Inflorescences lateral or leaf-opposed, racemose or subpaniculate; female flowers near base, male flowers near tip. Male flowers 1 per bract, 5-merous; calyx valvate, closed in bud; petals imbricate; disc lobed; stamens 3-15, 1-3-seriate with filaments joined into column, anthers erect; pistillode absent. Female flowers on 1-4-flowered peduncles; pedicels elongating and reflexed in fruit; sepals open in bud; petals small or absent; disc as in male; ovary 3-loculed, ovules solitary; styles united at base, bifid,  $\pm$  erect. Fruit a 3-lobed capsule. Seeds ovoid or subglobose, usually smooth, enclosed in pale, shiny, papery skin.

Old World genus with around 12 (6-16) often ill defined species ranging from Portugal and Senegal to E Kazakhstan and Thailand. 3 or 4 species in tropical Africa, 2 of which are found in the Flora area.

The leaves and fruits stain the skin blue when crushed and are used as a dye.

1. Leaves ovate, rounded, woolly-tomentose, markedly bullate at least when young; ovary and capsule stellate-tomentose, smooth. 1. *C. plicata*  
- Leaves lanceolate, often  $\pm$  3-lobed, subacute, sometimes densely pubescent when young but not woolly, only slightly bullate and soon flat; ovary and capsules densely scaly, muricate.

2. *C. oblongifolia*

*Cufodontis* (loc. cit.: 421, 1956) records *Chrozophora brocchiana* *Vis.* (1836) from western GD or GJ, but no material has been seen from there nor from adjacent areas of Sudan. It resembles *C. plicata* in most features but has peltate scales on the ovary and fruits as in *C. oblongifolia*.

1. *C. plicata* (*Vahl*) *A. Juss.* (1826);  
*Croton plicatus* *Vahl* (1790); *Croton obliquifolius* *Vis.* (1836) - type: Egypt, *Forsskål*  
*Croton tinctorius* sensu *Burm.f.* (1768) and *Forssk.* (1775), non *L.* (1753).

Prostrate or ascending short-lived subshrub, to 50 cm high, 1.5 m across. Leaves ovate, sometimes shallowly 3-lobed, 1.5-5  $\times$  1-4(-4.5) cm, base  $\pm$  asymmetrically subcuneate to subcordate, tip rounded, plicate, undulate and bullate when young, later flat and irregularly repand-dentate to subentire, stellate-tomentose; stipules 2 mm. Raceme 1.5-4 cm long. Male flowers: pedicel  $c$  1 mm; sepals 3 mm long; petals elliptic-oblong, 3  $\times$  1 mm, pink or yellow; anthers 15. Female flowers: pedicels 3-7 mm extending to 25-30 mm; sepals 1.5-2 mm; petals minute or absent;



Figure 85.15 *CHROZOPHORA PLICATA*: 1 – leafy stem with flowers and fruits  $\times \frac{3}{4}$ ; 2 – leaf surface  $\times 6$ ; 3 – male flower  $\times 6$ ; 4 – male flower opened to show stamens  $\times 6$ ; 5 – young fruit  $\times 6$ . All from *B. D. Burt* 4790. Drawn by *G. Papadopoulos* (1) and *Christine Grey-Wilson* (2–5). (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 28.)

styles red. Capsule 4–5  $\times$  8–9 mm, smooth, stellate-pubescent, turning purplish. Seeds ovoid-subglobose, 3.5  $\times$  3 mm, minutely rugulose to  $\pm$  smooth, dark grey, usually partly covered by brown skin. Fig. 85.15.

Mostly in areas subjected to seasonal flooding, along rivers and run-off channels; 700–2200 m. EW TU GD GJ SU GG HA; Senegal east to Palestine and Arabia; NW Kenya, S & W Tanzania, Mozambique, Zambia, Zimbabwe & South Africa (Transvaal). *Lemma* G-S. 916; *Mesfin & Zerihun* 2863; *Schimper* (1863) 1355.

2. *C. oblongifolia* (Del.) A. Juss. (1824);

*Croton oblongifolius* Del. (1812) – type: Egypt, *Delile*.

*Chrozophora obliqua* auct. non (Vahl) A. Juss.

Subshrub to 50 cm high, all parts except ovary stellate-hairy. Leaves lanceolate, often obscurely 3-lobed, 4–8  $\times$  1.5–5 cm, subacute to obtuse, obtuse-dentate to subentire, slightly plicate when young, soon flat. Inflorescence up to 2.5 cm long with 1–few female branches at base. Male flowers dense, subsessile; sepals  $c$  3 mm long; petals shorter, yellowish; anthers 5–10. Female flower on 1–3

flowered peduncles, reflexed and up to 4 cm long in fruit; pedicels 6–20 mm; sepals linear,  $c$  3 mm long; petals resembling sepals; ovary covered with peltate scales. Capsule  $c$  6  $\times$  9 mm, muricate, sparsely scaly, turning purplish. Seeds oblong-ovoid, 6  $\times$  4 mm, rugose, dark brown under persistent shiny brown skin.

Habitat similar to *C. plicata*, e.g. in detritus at edge of dry water course in semidesert; 10–1200 m. EE EW HA; Red Sea coast, Somalia, Socotra, east to NW India. *Bally* 6829; *Gilbert* 2456; *IECAMA* 1–67.

13. *ARGOMUELLERA* Pax (1894)

Shrubs or small trees; indumentum simple. Leaves alternate, very short-petiolate, eglandular. Monoecious or dioecious. Inflorescences racemose, axillary; flowers in unisexual clusters or 1 female together with a group of male flowers. Male flowers: calyx valvately (2–)3–4 (–5)-lobed; petals absent; disc-glands many, between stamens; stamens 15–120,  $\pm$  erect in bud, free, anthers small, basifixed with broad connective. Female flowers: sepals 5–6(–9), imbricate; petals absent; disc annular; ovary 3-locular, ovules solitary; styles undivided, slightly joined at base. Fruit a



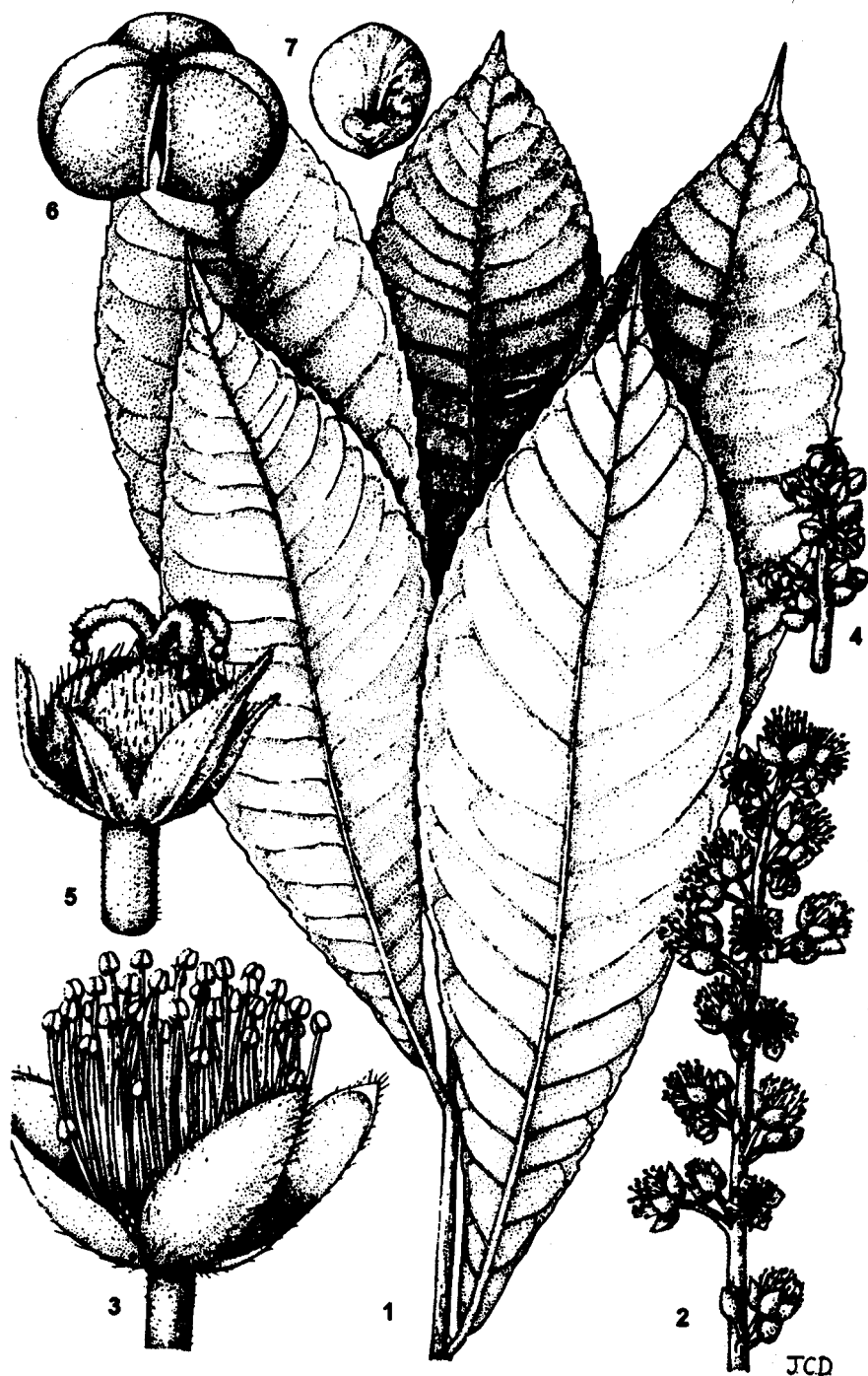


Figure 85.16

**ARGOMUELLERA MACROPHYLLA:** 1 - leafy branch  $\times \frac{3}{4}$ ; 2 - bisexual inflorescence  $\times 1\frac{1}{2}$ ; 3 - male flower  $\times 6$ ; 4 - part of female inflorescence  $\times 1\frac{1}{2}$ ; 5 - female flower  $\times 6$ ; 6 - mature fruit  $\times 4$ ; 7 - seed  $\times 4$ . 1-3 from Lewis 234; 4 from Drummond & Hemsely 1304; 5 & 6 from Ford 321; 7 from Gillman 444. Drawn by Judy Dunkley. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 45.)

3-lobed capsule. Seeds subglobose; caruncle absent.

Genus with 4 species in tropical Africa plus 6 species from Madagascar and the Comoros; only 1 in the Flora area.

**A. macrophylla Pax (1894)**

- types: Zaire, Pogge 1376, 1393 & Stuhlmann 2962; Uganda, Stuhlmann 1313.

One to a few erect stems 0.6-4(-8) m high; stems brown pubescent. Leaf: petiole thick, 5-10 mm long; leaf-blade elliptic-oblanceolate, (10-)25-40  $\times$  5-12 cm, base attenuate, tip acuminate, serrate, hirsute-pubescent

becoming glabrous above; stipules 3-17 mm long, sometimes 3-lobed at base. Racemes solitary, to 25 cm long, hairy throughout, clusters of male + 1 female flower well separated; bracts 2 mm. Flowers strongly scented. Male: pedicel 3-4(-6) mm long; calyx-lobes 2-4, 4-5 mm long; disc-glands orange; stamens 30-120, 5-7 mm long, white. Female pedicels 5-6 mm, jointed near tip; sepals 5-9, 3-4 mm long; ovary densely brown-hairy; styles 2 mm long, recurved. Capsule shallowly lobed,  $c$  7  $\times$  13 mm, smooth, hairy. Seeds 4  $\times$  3.5 mm, smooth, marbled. Fig. 85.16.

Common in under storey of wet lowland forest, often near rivers; 450-1450(-2000) m. WG IL KF; west to

Guinea, south to Angola & Zimbabwe. Friis et al. 4032; E. Gilbert 551; Mooney 6909.

#### 14. CEPHALOCROTON Hochst. (1841)

Radcliffe-Smith, *Kew Bull.* 28: 123–132 (1973).

Shrubs or subshrubs; indumentum stellate. Leaves usually alternate. Monoecious. Inflorescence terminal, usually with pedunculate dense terminal head of male flowers and 1–6 female flowers at base. Male flowers: calyx valvately 3–4-lobed; petals and disc absent; stamens (4)–6–8(–10), sometimes inflexed, anthers longitudinally dehiscent; pistillode present. Female flowers: sepals 4–6, entire or pinnately/bipinnately divided; petals absent; disc annular, subentire; ovary 3-locular, ovules solitary; styles much divided. Fruit a deeply 3-lobed capsule. Seeds ovoid-subglobose, smooth; caruncle absent.

Genus with 6 species, 2 occurring in the Flora area and the other 4 from Socotra, Tanzania southwards to Madagascar & Comoros, and Sri Lanka.

1. Leaves green, sparsely stellate pubescent, margin usually conspicuously crenate to serrate.

1. *C. cordofanus*

– Leaves grey, densely stellate velvety-tomentose, margin entire or nearly so.

2. *C. incanum*

#### 1. *C. cordofanus* Hochst. (1841)

– type: Sudan, Kotschy 118.

*C. nudus* Pax & K. Hoffm. (1910).

*C. polygynus* Pax & K. Hoffm. (1910) – type: ?SD, Wai-Wai in Boran, *Ellenbeck* 2137 (B holo. destr.).

*C. velutinus* Pax & K. Hoffm. (1910).

Shrub 0.3–3 m high; young parts often viscid, twigs and leaves stellate-pubescent, sometimes with glandular hairs. Leaf: petiole (0.5–)1–2.5(–4) cm long; leaf-blade ovate to elliptic, (0.7–)5–4(–6) x (0.5–)1–2.5(–4) cm, base cuneate to shallowly cordate, tip acute or subacute, slightly acuminate, subentire to crenate-serrate sometimes subglabrous; stipules lacinate, up to 2 mm long, segments gland-tipped. Male peduncle 2–6 cm long. Male flowers: pedicels to 5 mm long; sepals 4, 2 mm long, whitish; stamens 6–8, filaments 5 mm long, bright yellow; pistillode 1 mm long. Female flowers (0–) 1–4(–6) at peduncle base; pedicels 1–1.5 cm extending to 2.5 cm; sepals 6, bipinnatipartite with linear, sometimes gland-tipped, segments, accrescent to 15 x 10 mm; ovary stellate-pubescent; styles 7 mm long, united for ¼ length, yellowish. Fruits 8 x 12.5 mm, pubescent. Seeds 5.5–6 mm diameter, marbled or evenly greyish, shiny. Fig. 85.17.10–13.

'Haud' vegetation, *Acacia* – *Commiphora* bushland on deep red sands, also along banks of water course in *Boswellia* – *Commiphora* – *Acacia* bushland; 300–750(–1600) m. SD HA; Sudan (Cordofan), Somalia, Kenya, N Tanzania. *Ellis* 173; *Gilbert* et al. 8193; *IECAMA* (*Amare Getahun*) I-76.

#### 2. *C. incanum* M. Gilbert (1987)

– type: Nigeria, *Daramola*, *Okoro* & *Akin* DOA 5 in FHI 99594.

Shrub to 1 m high; all parts densely grey-white stellate-velvety. Leaf: petiole up to 9–23 mm long; leaf-blade lanceolate to oblong-lanceolate, up to 6.8–7.5 x 2.8–3.4 cm, base cordate, apex acute to slightly acuminate, margin entire; stipules reduced to a few thread-like segments 2–2.5 mm long, not glandular. Male peduncle up to 15 mm long. Open male flowers not seen; old pedicels c 1 mm long; sepals 5–6; stamens 8, filaments lanceolate when young; pistillode columnar. Female flowers not seen; fruiting sepals similar to those of *C. cordofanus* but with broader segments without obvious glands at tips. Fruit larger than that of *C. cordofanus*, dehiscent cocci c 12 mm long. Seeds up to 8.5 x 7 mm, pale brown sometimes flaking to show grey under layer. Fig. 85.17.1–9.

Open bushland with *Anogeissus leiocarpa*, *Grewia*, *Euclea schimperi* and *Combretum*, found near edge of road; 1400 m. SU(Blue Nile Gorge); Nigeria. *Mercier* 2717.

Known only from the two collections which are about three thousand kilometres apart!

#### 15. ALCHORNEA Swartz (1788)

Trees and shrubs, rarely subsucculent; indumentum simple or stellate. Leaves alternate, usually petiolate, simple, base of leaf blade sometimes with glands on underside, sometimes stipellate. Usually dioecious. Inflorescences racemose, often branched, usually lax. Male flowers clustered; calyx valvately 2–5-lobed; petals and disc absent; stamens usually 8, anthers oblong, longitudinally dehiscent. Female flowers usually 1 per bract; sepals (3–)4–6, imbricate; petals and disc absent; ovary (1–)2–3(–4) locular, ovules solitary; styles usually simple, linear. Capsules 1–3(–4)-lobed. Seeds subglobose; caruncle ± absent.

Pantropical genus of about 50 species, 6 of which occur in Africa: only 1 species in the Flora area.

#### A. laxiflora (Benth.) Pax & K. Hoffm. (1914);

*Lepidoturus laxiflora* Benth. (1879) – types: Sudan, *Schweinfurth* 2843, 2956 & 3072.

Under storey shrub or tree up to 12 m high, usually less; indumentum simple. Leaves deciduous, buds protected by scales; petiole 1–7(–9) cm long, often pulvinate at both ends; leaf-blade oblong-ovate or elliptic, 7–18 x 3–8 cm, base rounded with a pair of thread-like stipels 1–3 mm long, tip acuminate, crenate to subentire, glabrescent except for axils of main veins beneath, sometimes with gland patches at base, rarely also elsewhere; stipules 2–7 mm long. Male racemes axillary, produced before or with new leaves, unbranched, to 9 cm long; bracts up to 5 x 2 mm, brown, papery; buds 0.7 mm long, white; stamens 8–9, joined at base; pistillode present or not. Female racemes terminal, unbranched, to 10 (–15) cm long; bracts 2–3 mm long with pair of sessile glands at base; flowers sessile; sepals 5–6, 0.5–0.7 mm long; ovary puberulent; styles (2–)3, joined at base, (3–) 5–15 mm long, red or pinkish. Fruit 3-lobed, 5–7 x 7–8 mm, ± smooth, puberulent. Seeds subglobose, 4 x 3 mm, smooth or slightly rugulose, pale yellowish-brown. Fig. 85.18.

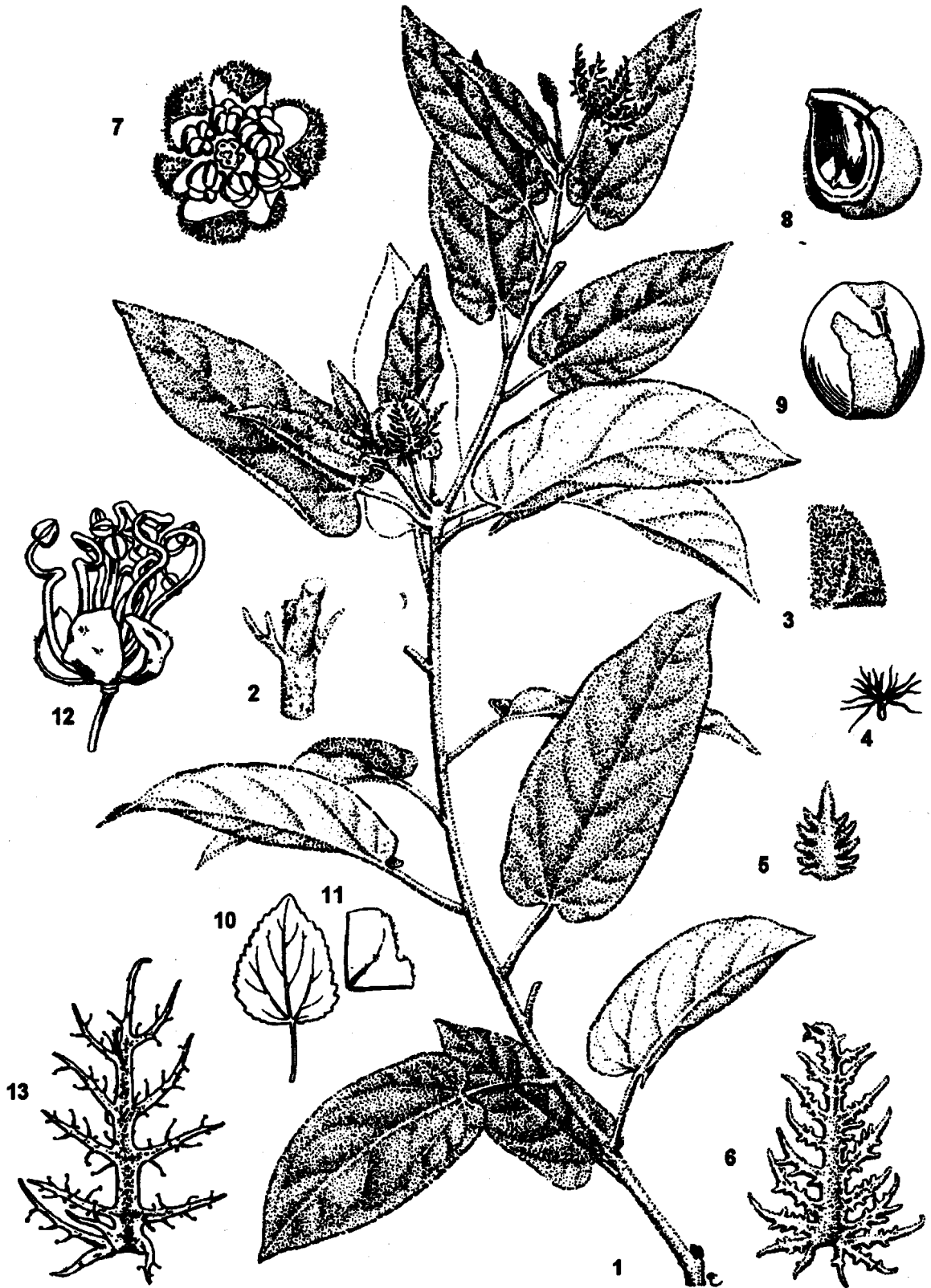


Figure 85.17 *CEPHALOCROTON INCANUS*: 1 – leafy branch with flowers and fruit  $\times \frac{1}{2}$ ; 2 – stipules  $\times 3$ ; 3 – detail of leaf tomentum  $\times 2$ ; 4 – single hair, side view  $\times 20$ ; 5 – immature female sepal  $\times 2$ ; 6 – mature female sepal  $\times 2$ ; 7 – male bud, opened up by artist  $\times 6$ ; 8 – segment of fruit  $\times 1$ ; 9 – seed  $\times 2$ . *C. CORDOFANUS*: 10 – leaf  $\times \frac{1}{2}$ ; 11 – detail of leaf tomentum  $\times 2$ ; 12 – male flower  $\times 6$ ; 13 – mature female sepal  $\times 2$ . 1–4, 6 from Mercier 2717; 5, 7–9 from Darumola et al. 5; 10–12 from Ellis 173; 13 from IECAMA I-76. Drawn by Eleanor Catherine.

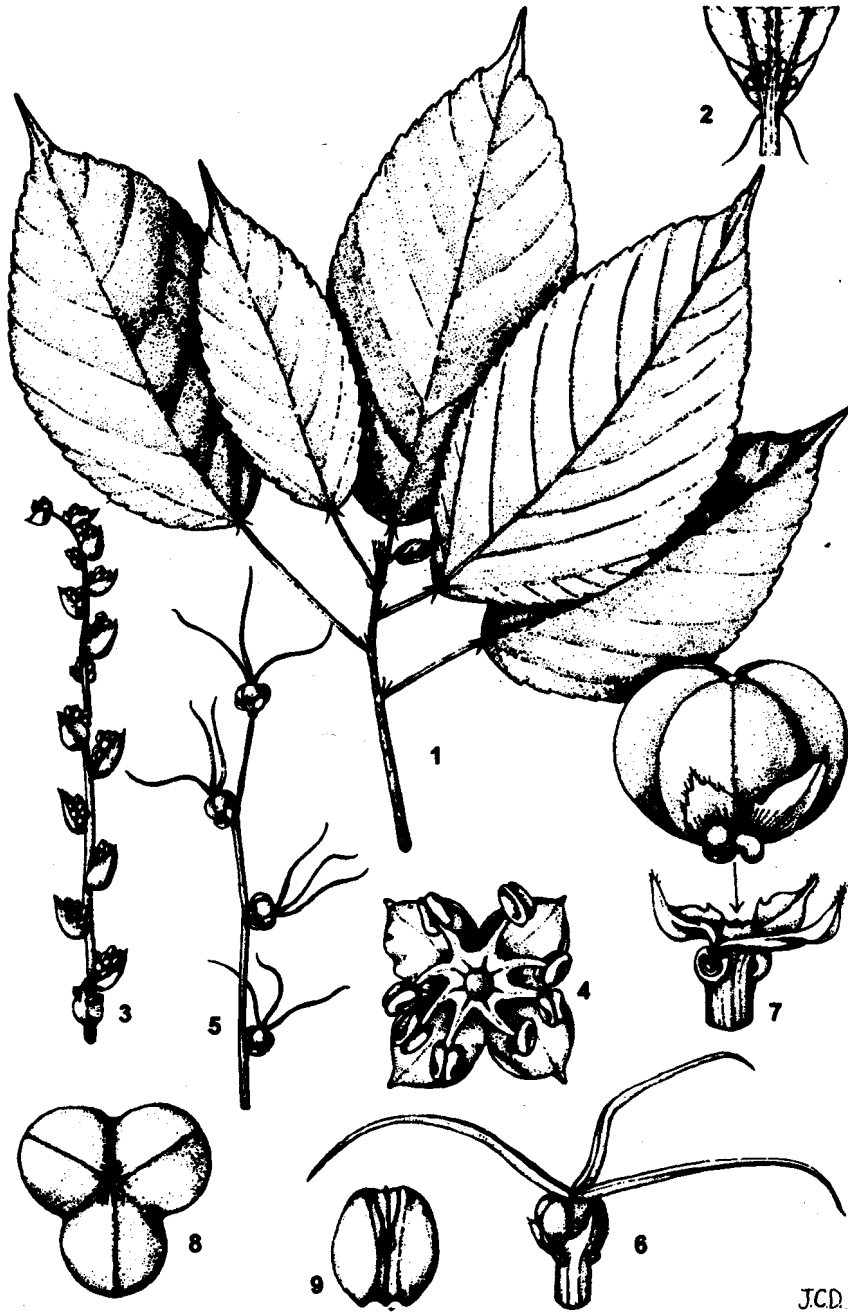


Figure 85.18

**ALCHORNEA LAXIFLORA:** 1 – branchlet  $\times \frac{2}{3}$ ; 2 – lower surface of base of leaf showing glands and stipels  $\times 3$ ; 3 – male inflorescence showing buds  $\times 1\frac{1}{2}$ ; 4 – male flower  $\times 10$ ; 5 – part of female inflorescence  $\times 1\frac{1}{2}$ ; 6 – female flower  $\times 3$ ; 7 – older female flower dissected  $\times 6$ ; 8 – fruit  $\times 3$ ; 9 – seed  $\times 4$ ; 1 from *Faden* 69/2032; 2 & 5–7 from *Bally* 8855; 3 & 4 from *Eggeling* 2516; 8 & 9 from *Dawkins* 558. Drawn by Judy Dunkley. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig.51.)

Under storey of lowland *Celtis* – *Aningeria altissima* forest, often very common; 900–1360 m. IL KF; Kenya, west to Nigeria, south to South Africa (Transvaal). *Chaffey* 1238; *Friis* et al. 2444, 3833.

### 16. RICINUS L. (1753)

Herb to soft-wooded tree; glabrous throughout. Leaves alternate; petiole glandular at base; leaf-blade peltate, palmately lobed, with 2 glands at petiole insertion; stipules united to form a sheath which falls off quickly as in *Ficus*. Monoecious; flowers in leaf-opposed or subterminal racemes with clusters of male flowers below and laxer clusters of female flowers towards tip; flowers with 2 basal bracteoles, pedicels articulated. Male: calyx valvately 3–5-lobed; petals and disc absent; stamens up to 1000, filaments irregularly joined into bundles; pistillode absent. Female: buds conical; sepals 5, valvate, soon falling; petals and disc

absent; ovary 3-locular, ovules solitary; styles free, 2-fid, papillose-plumose. Fruit a 3-lobed capsule, oblong, usually spiny. Seeds  $\pm$  compressed-ovoid, smooth; caruncle present.

A single species which fossil evidence has shown to be native in NE Africa but now cultivated and/or escaped throughout the tropics and warm temperate regions.

#### *R. communis* L. (1753)

– type: specimen in *Hort. Cliff.* p.450.

Varying from ephemeral less than 1 m high to tree-like herb 5(–10) m high with trunk to 15 cm thick; stems hollow; young shoots often pruinose, purplish. Leaf: petiole (4–) 10–30 cm; leaf-blade up to 1 m across, (5–) 7–9(–12)-lobed, usually divided more than halfway, middle lobe 7–30(–75)  $\times$  2–8(–20) cm, tip acuminate, glandular-serrate, lateral lobes progressively smaller; stipule sheath

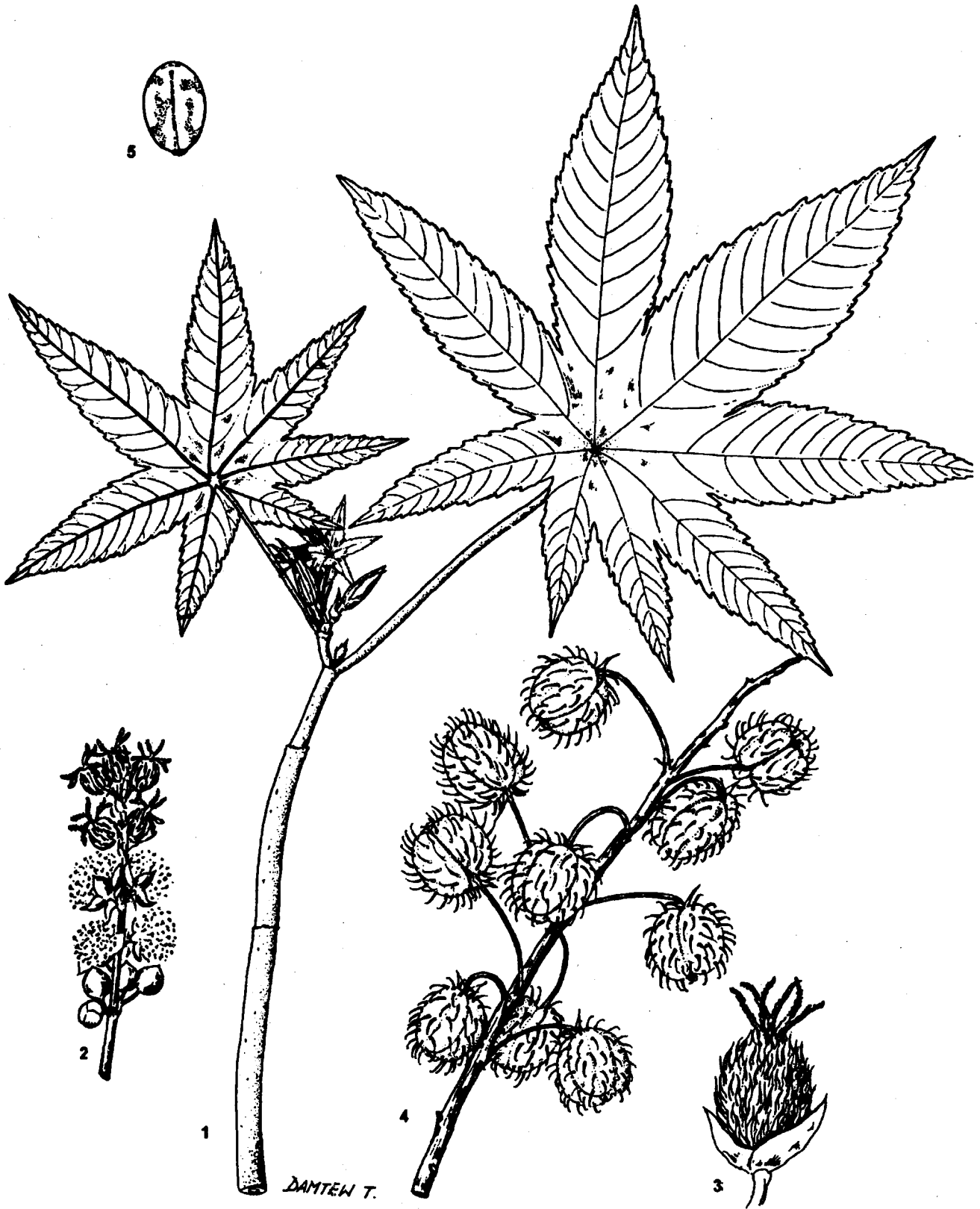


Figure 85.19 *RICINUS COMMUNIS*: 1 - leafy branch  $\times \frac{1}{2}$ ; 2 - part of inflorescence with lower male flowers and upper female flowers  $\times \frac{1}{2}$ ; 3 - female flower  $\times \frac{1}{4}$ ; 4 - fruiting branch  $\times \frac{1}{2}$ ; 5 - seed  $\times \frac{1}{2}$ . 1 from *Yeneneh Taye* 31; 2 & 3 from *Albers* 62007; 5 from *Ashebir Aselas*. Drawn by *Dantew Teferra*.

1.3–2.7 cm long. Raceme 10–30 cm long. Male flowers: pedicels 5–17 mm; calyx-lobes 5–8 x (2–)3–5 mm, acute; stamens 7–8 mm long. Female flowers: pedicels to 2–4.5 cm in fruit; sepals lanceolate, 5 mm long, acuminate; styles 2–5 mm long, usually red. Fruit 10–18 x 10–15 mm, usually with softly spiny processes 3–5 mm long. Seeds 7–12 x 5–8 x 4–6 mm, shiny silvery grey or beige marked with brown; caruncle 1–2 x 2–3 mm. Fig. 85.19.

A widespread plant of home gardens in both rural and urban areas, also common along seasonally dry rivers; 400–2500 m. EW TU GD WU SU WG IL KF GG SD BA HA; pantropical. *Burger* 3238; *Mesfin & Tewolde* 2789; *Lundstrom* 153.

Some authorities have recognized many infraspecific taxa, based mainly on fruit and seed characters, as many as 100 in one case (Tavares de Carvalho, *Anais min. do Ultramar* 11, 4, 1: 9–81, 1956), but these seem too ill-defined to be useful and are perhaps better regarded as cultivars. Material from eastern Africa mostly falls between var. *communis* and var. *africanus* (Willd.) Muell. Arg.

The oil from the seeds has many recorded medicinal and industrial uses and is produced commercially. The plant itself contains a very dangerous toxin, a few molecules of which are capable of killing any cell into which they are introduced.

### 17. MERCURIALIS L. (1753)

Herbs; indumentum simple or absent. Leaves opposite, ± gland-dotted. Usually dioecious; inflorescences axillary, the male spike-like with bracts subtending clusters of flowers, the female subsessile or pedunculate with 1–few flowers. Calyx 3-lobed. Petals and disc absent. Male: calyx valvate; stamens 8–15(–20), free; pistil absent. Female: calyx imbricate; staminodes usually 2, elongated; ovary 2(–3)-locular, styles free, undivided, ovules 1 per locule. Fruit a 2-lobed capsule. Seed ovoid, rugose, with small caruncle.

Genus with 7 species native to Europe and Mediterranean Africa of which 1 has been recorded from Eritrea, plus 1 species in east temperate Asia.

#### *M. annua* L. (1753)

– type: 'from Europe'.

Annual 10–30(–50) cm high, often branching from base; indumentum sparse or absent. Leaf: petiole 2–15 mm; blade 15–50 mm long, ovate to elliptic-lanceolate, margin crenate-serrate. Rarely monoecious; male spikes longer than leaves; female flowers few together, subsessile. Calyx-lobes triangular-ovate, tip acute. Capsule 2–3 x (2–)3–4 mm, hispid, rarely subglabrous. Seed c 2 mm long.

No details recorded but elsewhere an invasive weed; c 2350 m. EW (Asmera); Europe, elsewhere as an introduced weed. *Baldrati* 1882, 2289.

The lack of records since 1916 suggests that this species did not establish itself permanently in Eritrea. It has not been recorded from Ethiopia.

### 18. MACARANGA Thou. (1806)

Shrubs and trees; indumentum usually simple. Leaves alternate, petiolate, simple or palmately lobed, often peltate, gland-dotted below. Usually dioecious; inflorescences racemose, often branched, axillary; bracts entire or divided, glandular. Male flowers in clusters; pedicel short; calyx valvately 2–4-lobed; petals and disc absent; stamens 1–5 or 10–30, free, anthers small. Female flowers usually solitary; pedicel short; calyx truncate or shallowly toothed, later cupular, splitting irregularly; petals and disc absent; ovary 1–4(–6)-locular, ovules solitary; styles simple. Fruit a 1–3(–6)-lobed capsule, occasionally ± indehiscent. Seeds globose or almost so, outer layer fleshy; caruncle absent.

Some 280 species in the Old World Tropics, especially well represented in New Guinea; 40 species in tropical Africa, only 1 in the Flora area.

#### *M. capensis* (Baill.) Sim (1907);

*Mappa capensis* Baill. (1863) – type: South Africa, Drège 4162.

Tree (3.5–)4.5–15(–30) m high, crown often broad; bark smooth, thin, grey, often spiny in saplings; young shoots and petioles brown-haired, glabrescent. Leaf: petiole (1–)5–20(–30) cm long, pulvinate at base; leaf-blade rhombic-lanceolate to broadly ovate, (3–)5–30(–40) x (1.5–)3–20(–30) cm, usually peltate, base rounded-cuneate to cordate, tip acuminate, entire or gland-toothed when juvenile, tertiary veins prominently subparallel, glabrescent above, hairy-veined and gland-dotted below. Male panicles 3–10(–14) cm long, axes zigzag towards tips; bracts ovate, (2–)3–5(–8) mm long, 20–30-flowered. Male flowers: calyx 2–3-lobed, 1 mm long; stamens 2–3, joined at base, anthers obscurely 4-celled. Female panicles less branched, not zigzag, bracts 1–5-flowered. Female flowers: calyx as in male; ovary 1(–2)-lobed, styles densely papillose. Capsule subglobose, 4–6 mm diameter (less often 2-lobed, up to 11 mm across), granular-glandular, green. Seeds subglobose, 2.5–4.5 mm diameter, smooth or rugulose, black or dark brown, often shiny.

#### var. *kilimandscharica* (Pax) Friis & Gilbert in *Kew*

*Bull.* 41: 68 (1986);

*M. kilimandscharica* Pax (1912) – type: Tanzania, Volkens 1271.

*M. lophostigma* Chiov. (1940); *M. kilimandscharica* var. *giordanoi* ['giordanii'] Cufod. in *Senkenb. biol.* 39: 308–9, t.8 (1958) – type: WG, Saio (Uaba) Forest between Mugi & Tabor, *Giordano* 2471 (FT holo.).

Crown leaves rhombic-ovoid, up to 17 x 10, usually less, base rounded-cuneate to truncate, glabrescent with few persistent hairs on undersides of main veins, often glaucous below; distal male bracts entire. Fig. 85.20.

Under canopy of wet submontane forest, becoming common at margins and in secondary or disturbed forest; 1500–2400 m. WG IL KF GG SD BA; Sudan, Kenya, Uganda, south to Malawi. *Gilbert & Thulin* 836; *Mooney* 8403, 8755.

Var. *capensis* has larger broadly ovate leaves, base



Figure 85.20 *MACARANGA CAPENSIS* var. *KILIMANDSCHARICA*: 1 - male inflorescence; 2 - cluster of male flowers with bract swollen at the tip to form a nectary; 3 - male flower opened to show stamens; 4 - leafy branches with cluster of female inflorescences; 5 - female flower; 6 - fruit. (Reproduced from *Fl. Sudan* vol. II: fig 33, 1952. Scales and specimens not given in printed copy.)

usually truncate to rounded, veins persistently pilose below, never glaucous; distal male bracts sinuate-dentate. Juvenile growth of var. *kilimandscharica* looks like this variety and has been so named. It occurs from SE Kenya south to South Africa (Transkei).

#### 19. *ERYTHROCCCA* Benth. (1849)

Shrubs and small trees; deciduous, dormant buds protected by 'bud-scales' which often persist at bases of new shoots; indumentum simple. Leaves alternate, shortly petiolate, simple; stipules sometimes forming spines. Dioecious. Inflorescences axillary, racemose or condensed into dense clusters. Flowers minute, greenish, often smelling like boiled potatoes; pedicels often jointed. Male flowers usually in clusters; buds apiculate; calyx valvately 3-4(-5) lobed; petals absent; disc-glands extrastaminal and/or interstaminal; stamens (2-)5-40(-60), free; pistillode absent. Female flowers: calyx 2(-4)-lobed, imbricate; petals absent; disc-glands usually 2-3, free; ovary 2-3-locular, ovules solitary; styles spreading, often fimbriate. Capsule with (1-)2-3(-4) subglobose lobes. Seeds  $\pm$  spherical, outer testa fleshy, often red or yellow, inner testa smooth or pitted.

About 50 species restricted to Tropical and S Africa apart from 1 species which extends into Arabia; 4 species recorded from the Flora area.

Taxonomy in this genus is sometimes complicated by sexual dimorphism.

1. Flowers on distinctly racemose inflorescences. 2

- Flowers solitary or in subsessile clusters. 3
- 2. Stipules often forming short spines; male flowers in clusters, with 5-8 stamens partly hidden by hairy interstaminal-glands; female flowers with sub-petaloid disc-glands  $\pm$  as long as sepals; fruit 3-locular. 1. *E. abyssinica*
- Stipules not forming spines; male flowers solitary, with 9-24 stamens; female flowers with thick disc-glands less than half as long as sepals; fruit 2-locular. 2. *E. trichogyne*
- 3. Leaves well spaced, irregularly crenate-serrate; flowers in dense clusters; male flowers with 9-15 stamens; seeds red when fresh. 3. *E. bongensis*
- Leaves mostly clustered on short-shoots, entire; flowers inserted directly on short shoots; male flowers with  $c$  35 stamens; seeds pale brown when fresh. 4. *E. uniflora*

#### 1. *E. abyssinica* Pax (1894)

- types: EW, Rora, *Hildebrandt* 509; EE/EW, Ghinda, *Schweinfurth* 327 & EW, Gheleb, *Schweinfurth & Riva* 1132 (all B syn. destr.); Acur, *Schweinfurth & Riva* 1037 (B syn. destr. K isosyn.).

*E. parvifolia* Chiov. (1939) - type: SD, Arero, *Cufodontis* 283 (FT hol. & iso.).

Erect shrub 1-3 m high; most parts adpressed-pubescent, glabrescent. Leaf: petiole 3-9 mm; leaf-blade lanceolate to elliptic, 2.5-8(-13.5) x 1-3.5(-5.5) cm, base cuneate, tip subacute to bluntly acuminate, glandular-serrate; stipules indurate, forming spines up to 1.5 mm long. Flowers in



Figure 85.21 *ERYTHROCCCA ABYSSINICA*: 1 - leafy branch with inflorescence in the leaf axils  $\times 1$ ; 2 - male flower  $\times 12$ ; 3 - female flower  $\times 12$ ; 4 - female flower with calyx removed  $\times 12$ ; 5 - fruit  $\times 3$ ; 6 - seed  $\times 3$ . *E. TRICHOGYNE*: 7 - part of fruiting branch  $\times 1$ ; 8 - fruit  $\times 3$ ; 9 - seed  $\times 3$ ; 10 - leaves to show variation in serration  $\times 1$ . *E. UNIFLORA*: 11 - leafy branches  $\times \frac{3}{4}$ ; 12 - stipules  $\times 1$ ; 13 - male flower  $\times 10$ ; 14 - detail of stamens and interstaminal discs  $\times 20$ ; 15 - fruit  $\times 5$ ; 16 - fruit after dehiscence showing columella and disc glands  $\times 5$ ; 17 - seed  $\times 5$ . 1 & 2 from *de Wilde* 6531; 3 & 4 from *de Wilde* 6532; 5 & 6 from *Haugen* 222; 7 from *Mesfin Tadesse* 4682; 8-10 from *Lisanework Nigatu & Mesfin Tadesse* 106; 11-17 from *Gilbert et al.* 7688. Drawn by *Damtew Teferra* (1-10) and *Eleanor Catherine* (11-17).



racemes up to 9 cm long. Male flowers clustered, glabrous except for interstaminal glands; sepals 3, *c* 1 mm long; disc-glands 5, scale-like; interstaminal-glands clavate, hairy, as long as stamens; stamens 5–8. Female flowers 1–2 per axil; pedicels to 3 mm long; sepals as in male; disc-glands 3, subpetaloid,  $\pm$  as long as sepals; ovary 3-locular, glabrous. Capsule (2–)3(–4)-lobed, lobes *c* 4 mm diameter. Seed 3 mm diameter, red, orange or yellow, inner testa shallowly pitted. Fig. 85.21.1–6.

Understorey of forest or dense woodland, mostly along rivers, less often in more open *Acacia* woodland; 1250–2000 m. EW WU SU AR GG SD HA; Yemen. *Burger* 1756; *W. de Wilde* 6531, 6532; *Gilbert et al.* 7339, 7340.

2. *E. trichogyne* (*Muell. Arg.*) *Prain* (1911);  
*Claoxylon trichogyne* *Muell. Arg.* (1864) – type:  
Angola, *Wehwitsch* 396.

Shrub or small tree 2–6 m high; most parts pubescent. Bud-scales prominent and persistent. Leaf: petiole 3–10 (–15) mm long; leaf-blades (1–)2–10(–14)  $\times$  (0.5–)1–5(–7) cm, base rounded to cuneate, tip bluntly acuminate, shallowly glandular-crenate or -serrate; stipules to 0.7 mm, not forming spines. Flowers in racemes 1–4 cm long, bracts 1-flowered. Male flowers: pedicels 1–3 mm long; calyx-lobes 3–4, 1.5–2 mm long; disc-glands absent; interstaminal-glands minute, rarely absent; stamens 9–24. Female flowers to 4 per raceme; pedicels 1–2 mm long; sepals 2 or 4, 1 mm long; disc-glands 2,  $\pm$  half as long as sepals; ovary 2-locular, hairy. Capsule 1–2-lobed, lobes 3–4.5 mm diameter. Seeds as in *E. abyssinica*, 2.5–4 mm diameter. Fig. 85.21.7–10.

Moist evergreen forest, sometimes persisting in more open degraded forest; 1400–2200 m. GJ SU WG IL KF BA; W Kenya, Uganda, W Tanzania, Rwanda, Burundi, Zaire (Kivu), Angola, N Zambia, Zimbabwe, Mozambique. *W. de Wilde* 6902, 10140; *Friis et al.* 1649.

3. *E. bongensis* *Pax* (1894)  
– type: Sudan, *Schweinfurth* 2226.

Shrub or small tree up to 5(–6) m high; shoots and petioles pubescent, glabrescent. Leaf: petiole (2–)3–9 mm long; leaf-blades ovate to elliptic-lanceolate, (1–)3–7.5 (–12)  $\times$  (0.5–)1–3(–5) cm, base cuneate, tip obtuse or subacute, irregularly crenate-serrate, hairy on veins, later glabrous; stipules forming spines up to 2 mm long. Flowers in dense clusters, sometimes on peduncles up to 4 mm long. Male flowers: pedicels thread-like up to 12 mm long; calyx-lobes 3(–4), 1.5 mm long, glabrous; disc-glands 7, distinct, glabrous; interstaminal-glands numerous, erect, glabrous; stamens 9–15. Female flowers: pedicels 2–4 mm; calyx similar to that of male but ciliolate; disc-glands 3, scale-like; ovary 3-locular, adpressed-pubescent. Capsules 3-lobed, lobes 3.5–4 mm diameter, sparingly hairy. Seeds 3–3.5 mm diameter, as in *E. abyssinica*.

In shade of riverine *Acacia* forest; 1300 m. SD; S Sudan, Kenya, Uganda, central Tanzania, Rwanda, Zaire. *Gillett* 14755.

4. *E. uniflora* *M. Gilbert* (1987)

– type: SD, 83 km SE of Filtu on road to Bogol Mayo, *Gilbert et al.* 7688 (K. holo.; C ETH UPS iso.).

Dense shrub to 1.5 m high; most parts adpressed puberulent, leaves soon glabrous. Leaves mostly clustered on contracted short-shoots; petiole up to 2.5 mm long; leaf-blade oblanceolate, up to 21  $\times$  10 mm, base cuneate, tip emarginate or rounded, entire; stipules forming slender spines up to 5 mm long. Flowers on short shoots. Male flowers: pedicels 8–15 mm long; calyx-lobes 3, 2.3  $\times$  1.7–1.9 mm; disc-glands absent; interstaminal-glands numerous, erect, hairy; stamens *c* 35. Female flowers: pedicels 13–18 mm long; calyx similar to male; disc-glands 3, semicircular, *c* 1 mm wide; ovary 3-lobed. Capsule 3-lobed, lobes *c* 5 mm diameter. Seeds *c* 3–4 mm diameter, pale greyish-brown, inner testa densely pitted. Fig. 85.21.11–17.

*Acacia* – *Commiphora* bushland and woodland overlying limestone, mostly on slopes, locally abundant and forming under storey layer. 950–1325 m. SD; not known elsewhere. *Gilbert et al.* 8110, 8239.

Later collections show that the choice of epithet was not always appropriate and that there are, sometimes, many flowers clustered together on a short-shoot.

20. *MICROCOCCA* *Benth.* (1849)

Closely related to *Erythrococca*. Annual or perennial herbs or shrub, without spinescent stipules or bud-scales. Monoecious or dioecious. Male flowers without glands or with interstaminal-glands only. Seeds subglobose, with thin dry aril.

Genus with 12 species from Old World Tropics, east to Australia; 4 other species in Africa, all shrubby.

*M. mercurialis* (*L.*) *Benth.* (1849);

*Tragia mercurialis* *L.* (1753) – type: figure in *Plukenet, Phytographia*, 248, t.205, f.4 (1696) based on specimen from India.

Erect annual, 10–40(–60) cm high; shoots and petioles crisped-pubescent. Leaf: petiole 0.5–3.5 cm long; leaf-blade  $\pm$  ovate, 1.8–6.5  $\times$  1.2–3.5 cm, base rounded or cuneate, usually minutely stipellate, tip bluntly acuminate, crenate, glabrescent; stipules 0.5 mm long. Racemes 3–8(–12.5) cm long, bracts minute, usually subtending 1 female plus several male flowers. Male flowers: pedicels *c* 2 mm long, jointed; calyx-lobes 3, 0.75 mm long, rounded; interstaminal-glands clavate, purple; stamens (3–)6–10 (–20), filaments purple. Female flowers: pedicels stouter than male; calyx-lobes 3–5, 2 mm long, acute, hairy; disc-glands linear, 1 mm long; ovary strigose; styles lacinate, brown. Capsule deeply (2–)3(–4)-lobed, lobes *c* 2.5 mm diameter. Seeds 1.5–2 mm diameter, pitted muricate, brown or black, at first enclosed in pale, fragile skin. Fig. 85. 22.

Under bushes in deciduous bushland, occasionally a weed in irrigated cotton; 1200–1600 m. SU GG SD; west to Guinea Bissau, south to Angola, Botswana and Zimbabwe; Madagascar; India, Sri Lanka, Malaysia, N



Figure 85.21 *ERYTHROCCA ABYSSINICA*: 1 - leafy branch with inflorescence in the leaf axils x 1; 2 - male flower x 12; 3 - female flower x 12; 4 - female flower with calyx removed x 12; 5 - fruit x 3; 6 - seed x 3. *E. TRICHOGYNE*: 7 - part of fruiting branch x 1; 8 - fruit x 3; 9 - seed x 3; 10 - leaves to show variation in serration x 1. *E. UNIFLORA*: 11 - leafy branches x  $\frac{1}{2}$ ; 12 - stipules x 1; 13 - male flower x 10; 14 - detail of stamens and interstaminal discs x 20; 15 - fruit x 5; 16 - fruit after dehiscence showing columella and disc glands x 5; 17 - seed x 5. 1 & 2 from *de Wilde* 6531; 3 & 4 from *de Wilde* 6532; 5 & 6 from *Haugen* 222; 7 from *Mesfin Tadesse* 4682; 8-10 from *Lisanework Nigatu & Mesfin Tadesse* 106; 11-17 from *Gilbert et al.* 7688. Drawn by *Damtew Teferra* (1-10) and *Eleanor Catherine* (11-17).

racemes up to 9 cm long. Male flowers clustered, glabrous except for interstaminal glands; sepals 3, *c* 1 mm long; disc-glands 5, scale-like; interstaminal-glands clavate, hairy, as long as stamens; stamens 5–8. Female flowers 1–2 per axil; pedicels to 3 mm long; sepals as in male; disc-glands 3, subpetaloid,  $\pm$  as long as sepals; ovary 3-locular, glabrous. Capsule (2–)3(–4)-lobed, lobes *c* 4 mm diameter. Seed 3 mm diameter, red, orange or yellow, inner testa shallowly pitted. Fig. 85.21.1–6.

Understorey of forest or dense woodland, mostly along rivers, less often in more open *Acacia* woodland; 1250–2000 m. EW WU SU AR GG SD HA; Yemen. *Burger* 1756; *W. de Wilde* 6531, 6532; *Gilbert et al.* 7339, 7340.

2. *E. trichogyne* (*Muell. Arg.*) *Prain* (1911);  
*Claoxylon trichogyne* *Muell. Arg.* (1864) – type:  
Angola, *Wetwitsch* 396.

Shrub or small tree 2–6 m high; most parts pubescent. Bud-scales prominent and persistent. Leaf: petiole 3–10 (–15) mm long; leaf-blades (1–)2–10(–14)  $\times$  (0.5–)1–5(–7) cm, base rounded to cuneate, tip bluntly acuminate, shallowly glandular-crenate or -serrate; stipules to 0.7 mm, not forming spines. Flowers in racemes 1–4 cm long, bracts 1-flowered. Male flowers: pedicels 1–3 mm long; calyx-lobes 3–4, 1.5–2 mm long; disc-glands absent; interstaminal-glands minute, rarely absent; stamens 9–24. Female flowers to 4 per raceme; pedicels 1–2 mm long; sepals 2 or 4, 1 mm long; disc-glands 2,  $\pm$  half as long as sepals; ovary 2-locular, hairy. Capsule 1–2-lobed, lobes 3–4.5 mm diameter. Seeds as in *E. abyssinica*, 2.5–4 mm diameter. Fig. 85.21.7–10.

Moist evergreen forest, sometimes persisting in more open degraded forest; 1400–2200 m. GJ SU WG IL KF BA; W Kenya, Uganda, W Tanzania, Rwanda, Burundi, Zaire (Kivu), Angola, N Zambia, Zimbabwe, Mozambique. *W. de Wilde* 6902, 10140; *Friis et al.* 1649.

3. *E. bongensis* *Pax* (1894)  
– type: Sudan, *Schweinfurth* 2226.

Shrub or small tree up to 5(–6) m high; shoots and petioles pubescent, glabrescent. Leaf: petiole (2–)3–9 mm long; leaf-blades ovate to elliptic-lanceolate, (1–)3–7.5 (–12)  $\times$  (0.5–)1–3(–5) cm, base cuneate, tip obtuse or subacute, irregularly crenate-serrate, hairy on veins, later glabrous; stipules forming spines up to 2 mm long. Flowers in dense clusters, sometimes on peduncles up to 4 mm long. Male flowers: pedicels thread-like up to 12 mm long; calyx-lobes 3(–4), 1.5 mm long, glabrous; disc-glands 7, distinct, glabrous; interstaminal-glands numerous, erect, glabrous; stamens 9–15. Female flowers: pedicels 2–4 mm; calyx similar to that of male but ciliolate; disc-glands 3, scale-like; ovary 3-locular, adpressed-pubescent. Capsules 3-lobed, lobes 3.5–4 mm diameter, sparingly hairy. Seeds 3–3.5 mm diameter, as in *E. abyssinica*.

In shade of riverine *Acacia* forest; 1300 m. SD; S Sudan, Kenya, Uganda, central Tanzania, Rwanda, Zaire. *Gillett* 14755.

4. *E. uniflora* *M. Gilbert* (1987)

– type: SD, 83 km SE of Filtu on road to Bogol Mayo, *Gilbert et al.* 7688 (K holo.; C ETH UPS iso.).

Dense shrub to 1.5 m high; most parts adpressed puberulent, leaves soon glabrous. Leaves mostly clustered on contracted short-shoots; petiole up to 2.5 mm long; leaf-blade oblanceolate, up to 21  $\times$  10 mm, base cuneate, tip emarginate or rounded, entire; stipules forming slender spines up to 5 mm long. Flowers on short shoots. Male flowers: pedicels 8–15 mm long; calyx-lobes 3, 2.3  $\times$  1.7–1.9 mm; disc-glands absent; interstaminal-glands numerous, erect, hairy; stamens *c* 35. Female flowers: pedicels 13–18 mm long; calyx similar to male; disc-glands 3, semicircular, *c* 1 mm wide; ovary 3-lobed. Capsule 3-lobed, lobes *c* 5 mm diameter. Seeds *c* 3–4 mm diameter, pale greyish-brown, inner testa densely pitted. Fig. 85.21.11–17.

*Acacia* – *Commiphora* bushland and woodland overlying limestone, mostly on slopes, locally abundant and forming under storey layer. 950–1325 m. SD; not known elsewhere. *Gilbert et al.* 8110, 8239.

Later collections show that the choice of epithet was not always appropriate and that there are, sometimes, many flowers clustered together on a short-shoot.

20. *MICROCOCCA* *Benth.* (1849)

Closely related to *Erythrococca*. Annual or perennial herbs or shrub, without spinescent stipules or bud-scales. Monoecious or dioecious. Male flowers without glands or with interstaminal-glands only. Seeds subglobose, with thin dry aril.

Genus with 12 species from Old World Tropics, east to Australia; 4 other species in Africa, all shrubby.

*M. mercurialis* (*L.*) *Benth.* (1849);

*Tragia mercurialis* *L.* (1753) – type: figure in *Plukenet, Phytographia*, 248, t.205, f.4 (1696) based on specimen from India.

Erect annual, 10–40(–60) cm high; shoots and petioles crisped-pubescent. Leaf: petiole 0.5–3.5 cm long; leaf-blade  $\pm$  ovate, 1.8–6.5  $\times$  1.2–3.5 cm, base rounded or cuneate, usually minutely stipellate, tip bluntly acuminate, crenate, glabrescent; stipules 0.5 mm long. Racemes 3–8(–12.5) cm long, bracts minute, usually subtending 1 female plus several male flowers. Male flowers: pedicels *c* 2 mm long, jointed; calyx-lobes 3, 0.75 mm long, rounded; interstaminal-glands clavate, purple; stamens (3–)6–10 (–20), filaments purple. Female flowers: pedicels stouter than male; calyx-lobes 3–5, 2 mm long, acute, hairy; disc-glands linear, 1 mm long; ovary strigose; styles lacinate, brown. Capsule deeply (2–)3(–4)-lobed, lobes *c* 2.5 mm diameter. Seeds 1.5–2 mm diameter, pitted muricate, brown or black, at first enclosed in pale, fragile skin. Fig. 85. 22.

Under bushes in deciduous bushland, occasionally a weed in irrigated cotton; 1200–1600 m. SU GG SD; west to Guinea Bissao, south to Angola, Botswana and Zimbabwe; Madagascar; India, Sri Lanka, Malaysia, N

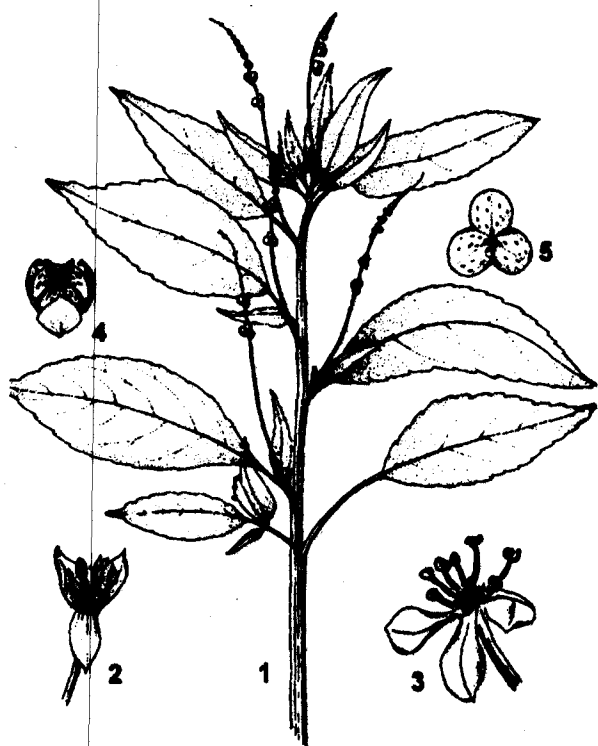


Figure 85.22 *MICROCOCCA MERCURIALIS*: 1 – habit x  $\frac{1}{2}$ ; 2 – young male flower x 8; 3 – mature male flower x 10; 4 – female flower x 8; 5 – fruit x 4. 1, 4 & 5 from Richards 10895; 2 & 3 from Greenway & Kanuri 14204. 1, 4 & 5 drawn by G. Papadopoulos; 2 & 3 drawn by Christine Grey-Wilson. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 52.)

Australia. Gilbert & Getachew 3083; Gilbert et al. 7430; Parker E321.

## 21. ACALYPHA L. (1753)

Pax & K. Hoffmann, *Pflanzenreich* IV (147.16): 1–177 (1923).

Herbs, shrubs or trees; indumentum usually simple, often glandular. Leaves alternate, often ovate, toothed. Mostly monoecious; inflorescences raceme-like, axillary and/or terminal, rarely branched. Male flowers minute, in clusters along catkin-like inflorescence. Calyx valvately 4-lobed, closed in bud. Petals and disc absent. Stamens usually 8, free, anthers 'wormlike' (elongated and contorted). Female flowers mostly sessile, 1–3(–5) together in the axil of an accrescent leafy bract, sometimes pedicellate with a non-acrescent bract; calyx imbricately 3–5-lobed; petals and disc absent; ovary (2–)3-locular, ovules solitary; styles usually lacinate, often reddish and showy. 'Allomorphic' (distinctive modified female) flowers sometimes within or terminating male racemes or in the same axil with normal inflorescences. Fruit a small deeply-lobed capsule, soon dehiscent. Seeds ellipsoidal or subglobose, smooth, carunculate or not.

A large pantropical genus of about 450 species, a few extending into temperate areas of the New World. About 50 species in Africa plus some introducedamentals grown for their foliage and striking pendant inflorescences. 14 species recorded for the Flora area.

Plants in this genus are sometimes mistaken for Urticaceae, but *Acalypha* lacks stinging hairs.

1. Female flowers in terminal inflorescences separate from axillary male racemes. 2
- Female flowers in axillary racemes, usually together with male flowers. 4
2. Female inflorescence a dense spike with overlapping accrescent bracts. 3
- Female inflorescence an open panicle with non-acrescent bracts. 1. *A. racemosa*
3. Shrub; styles up to 3 mm long; fruiting female bracts up to 15 mm long. 3. *A. ornata*
- Herb; styles up to 16 mm long; fruiting female bracts up to 5 mm long. 4. *A. villicaulis*
4. Tree, shrub or scrambling perennial herb. 5
- Erect annual, often weedy. 9
5. Inflorescences with male flowers towards tip; female bracts accrescent, much larger than male bracts. 6
- Inflorescences with female flowers towards tip; female bracts not accrescent, similar to male bracts. 2. *A. acrogyna*
6. Inflorescences unbranched. 7
- Male inflorescences much branched, forming conical panicle. 7. *A. marissima*
7. Female bracts crenate or dentate but not lobed. 8
- Female bracts deeply 5–7-lobed. 8. *A. psilostachya*
8. Sprawling or subscandent woody-based herb; male inflorescences pedunculate, to 11 cm long, usually deep red; leaves always eglandular. 6. *A. volkensii*
- Erect shrub or small tree; male inflorescence subsessile, up to 5.5 cm long, usually pale coloured; undersides of leaves often with golden sessile glands. 5. *A. fruticosa*
9. Female bracts entire with fimbriate, crenate or dentate margin. 10
- Female bracts deeply 5–7-lobed. 9. *A. brachystachya*
10. Female bracts crenate or dentate. 11
- Female bracts fimbriate with subulate teeth. 10. *A. ciliata*
11. Female bracts 5–14 mm long, at least some over 6 mm long; allomorphic flowers long-pedicellate. 12
- Female bracts 2–6 mm long; allomorphic flowers subsessile. 13
12. Inflorescences up to 9 cm long with many female bracts; bracts repand-dentate, not glandular; allomorphic flowers usually terminal with a pair of fimbriate whorls near tip, pubescent. 11. *A. indica*
- Inflorescences up to 2.5 cm long with up to 3 female bracts; female bracts crenate, sometimes with a few long gland-tipped hairs; allomorphic flowers often at base of inflorescence, muricate, uniformly puberulous. 13. *A. segetalis*
13. Female bracts eglandular; allomorphic flowers glabrous except for hairs at tips of tubercles. 12. *A. crenata*
- Female bracts covered with gland-tipped hairs; allomorphic flowers with conspicuous lateral fimbriate whorls, puberulous. 14. *A. lanceolata*

1. *A. racemosa* Baill. (1858)– type: S India, *Heyne**A. paniculata* Miq. (1859).

Perennial herb or subshrub 0.5–2(–3) m high; stems densely hairy when young. Leaf: petiole (3–)6–13 cm long; leaf-blade ovate, (3–)6–9(–13) x (2–)4–8(–9) cm, rounded, truncate or subcordate, tip abruptly acuminate, coarsely serrate or crenate, sparsely setose above and below; stipules 2 mm long. Male racemes axillary, up to 20 cm long; buds glabrous. Female inflorescence a conspicuous terminal panicle, sometimes also axillary, racemose, rarely with occasional male flowers near base; bracts minute. Female flowers: sepals 5, 0.5 mm long; ovary with stalked glands; styles *c* 2 mm long, deeply 4–6-lobed, red. Capsule 1.5 x 2 mm, sparingly glandular. Seeds ovoid, 1.2 x 0.8 mm, purplish-grey, caruncle absent.

In under storey of riverine or secondary forest, elsewhere in more open, dry habitats; 550–1250 m. WG IL KF GG BA; west to Côte d'Ivoire, south to Angola, Zimbabwe and Mozambique; S India, Sri Lanka, Java. *W. de Wilde* 8895; *Friis* et al. 3840; *Gilbert & Thulin* 257.

In the vast majority of material, the terminal female panicle is immediately diagnostic but one collection from the Harena Forest (BA) – *Mesfin* et al. 4654, has the female flowers in axillary racemes. Other specimens from the same area are more typical.

2. *A. acrogyna* Pax (1909)– type: Zaire, *Mildbraed* 2334, 2341 & 2455.

Shrub or small tree to 5 m high; bark smooth; short-shoots present; stems crisped-puberulous when young. Leaf: petiole 3–4(–20) mm long; leaf-blades obovate to elliptic-lanceolate, (2–)4–9(–11) x (1–)2–5 cm, ± attenuate into rounded or subcordate base; tip obtuse to sometimes acuminate, sparingly hairy above and below, tufts of hairs in main vein axils below; stipules 3–4 mm long. Racemes on short shoots, unisexual or male with 1–few female flowers near tip, (3–)7–8.5(–12) cm long; bracts 1 mm long, not accrescent. Male buds sparsely pubescent. Female flowers subsessile, sepals 5, 1–2 mm long; ovary pubescent; style 3–4 mm long. Fruit 2.5 x 4 mm, softly spiny, sparingly hairy. Seed subglobose, 2 x 1.75 mm, smooth, brown; caruncle absent.

Lowland forest, sometimes dominating the shrub layer; 500–1200 m. IL KF; Sudan, Uganda, NW Tanzania, Zaire (Kivu), Zambia & Zimbabwe. *Chaffey* 1255; *Friis* et al. 2484, 4136.

Possibly not specifically distinct from *A. sonderiana* Muell. Arg. from S Mozambique and S Africa (Natal) which has spinescent branches and rounded-obtuse leaves. Some Ethiopian collections had been incorrectly named as *A. neptunica* Muell. Arg. which is of a similar habit but which differs by having the female flowers below the male flowers and subtended by accrescent bracts.

3. *A. ornata* A. Rich. (1851)– type: TU, Djeladjeranne, *Schimper* III:1647 (P holo.; K iso.).*A. adenotricha* A. Rich. (1851) – type: TU, Chire(Shire), *Quartin-Dillon* (P holo.).

Shrub 1.5–2.5(–3.5) m high; stems and leaves subglabrous to densely tomentose. Leaf: petiole (2–)3–10(–13) cm long; leaf-blade ovate, 5–16 x 3–10 cm, base rounded to subcordate, tip acuminate, coarsely serrate; stipules 4–10 mm long, margins glandular. Male racemes axillary, up to 15 cm long, shortly pedunculate; bracts hairy; buds almost glabrous. Female spike terminal, up to 17 x 3 cm when mature, shortly pedunculate, rarely a few male flowers at tip; bracts accrescent to 15 x 25 mm, tip cordate, dentate, conspicuous red glandular hairs on margin and upper side. Female flower: sepals 3, 1 mm long, ciliate; styles lacinate, 3 mm long. Capsule 3 x 4 mm, ± pubescent. Seeds ovoid, 1.8 x 1.5 mm, purplish grey, caruncle pale brown. Fig. 85.23.

Riverine forest, more open rocky slopes, wooded grassland, etc.; 550–1800 m. EE EW TU GD GJ SU WG IL KF GG SD; west to Nigeria, south to Angola, Botswana & Mozambique. *Gilbert* 1994; *Gilbert & Thulin* 744; *Thulin & Hunde* 3981.

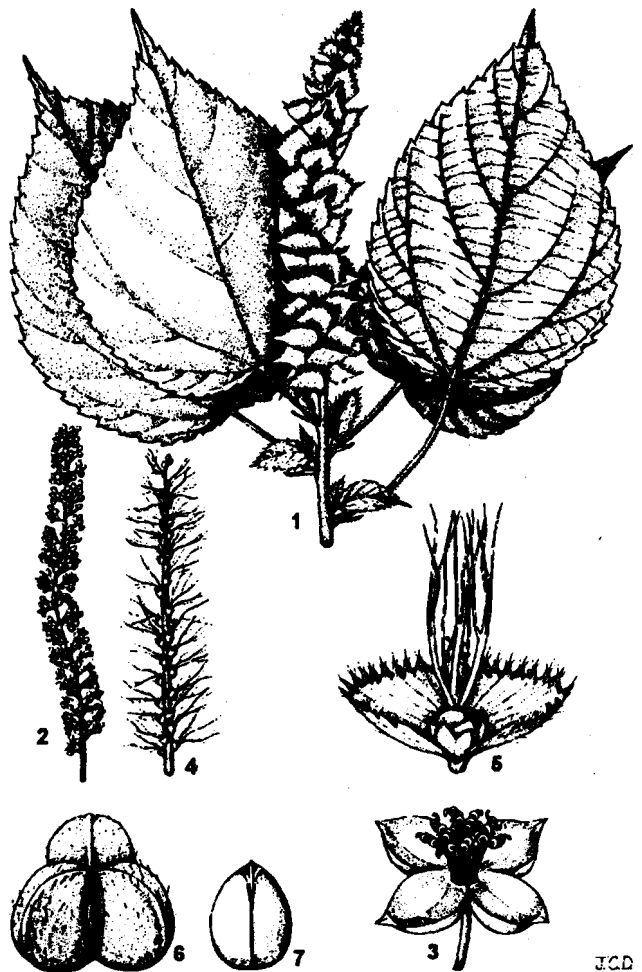


Figure 85.23 *ACALYPHA ORNATA*: 1 – flowering branch with mature female inflorescence x 2/3; 2 – male inflorescence x 1 1/4; 3 – male flower x 28; 4 – immature female inflorescence with male portion at apex x 1 1/4; 5 – female flower x 9; 6 – fruit x 10; 7 – seed x 10. 1 from *Richards* 21033; 2 & 3 from *Boaler* 348; 4 & 5 from *Richards* 7916; 6 & 7 from *Drummond & Hemsley* 1808. Drawn by Judy Dunkley. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig 37.)

4. *A. villicaulis* A. Rich. (1851)

—types: TU, Djeladjeranne, *Quartin-Dillon & Petit* (P syn.; K ?isotyp.) & *Ferrifera*, *Schimper* II:737 (P syn.; K isotyp.).

*A. sidaefolia* A. Rich. (1851) —type: TU, Chire (Shire), *Quartin-Dillon* (P holo.).

Perennial herb or subshrub to 2 m high; indumentum a mixture of crisped-puberulous and long patent hairs. Leaf: petiole (0.3–)1–3(–5) cm long; leaf-blade ± ovate (to linear-lanceolate), (2–)5–14 x (0.5–)1–4 cm, base usually cordate, tip ± acuminate, serrate or crenate-serrate. Male racemes axillary, long-pedunculate, up to 11 cm long, buds sparsely pubescent. Female spike terminal, usually solitary, sometimes numerous, to 3 x 1.3 cm when mature, shortly pedunculate; bracts accrescent to 5 x 10 mm, dentate, glandular-hairy. Female flowers: sepals 3(–4), 1 mm long, ciliate; ovary pubescent, styles lacinate, up to 16 mm long, red, very conspicuous. Fruit 4 x 5 mm, sparingly pubescent with some glandular hairs. Seeds ovoid, 2.5 x 2, dark grey; caruncle c 1 mm across.

Deciduous woodland/wooded grassland with *Combretum*, *Protea*, *Piliostigma* etc., less often in bushland or mixed forest; 1300–2050 m. TU GD GJ SU WG KF GG SD BA; west to Senegal, south to Namibia, Botswana, South Africa (Transvaal) and Swaziland. *Gilbert & Thulin* 608; *Mooney* 6082; *Thulin & Hunde* 3993.

5. *A. fruticosa* Forssk. (1775)

—type: Yemen, *Forsskål*.

Shrub or tree to 4 m, densely branched; stems ± glabrescent. Leaf: petiole 0.2–4.5(–7) cm long, glabrescent; leaf-blade triangular-ovate to elliptic-ovate, (1–)3–7(–9) x (0.7–)1–4.5(–5.5) cm, tip obtuse or obtusely acuminate, coarsely crenate or crenate-serrate; stipules 2–5 mm long. Racemes axillary, up to 5.5 cm long, with 1–7 female bracts at or near base, rarely unisexual. Male buds pubescent. Female bracts accrescent, 2–12 x 3–17 mm, dentate or crenate-dentate, glabrous or hairy on veins below. Female flowers sessile, solitary, sepals 3, 1 mm long; ovary hairy; styles 4 mm long, white to red. Fruit 2 x 3 mm, hairy. Seeds ellipsoid-ovoid, 1.5–2 x 1–1.3 mm, brown; caruncle elliptic.

1. Stems becoming reddish-brown; undersides of leaves, inflorescences and fruits with sessile yellow glands, plant unpleasantly aromatic; leaf-base cuneate to rounded. var. *fruticosa*

– Stems becoming greyish- to purplish-brown; sessile yellow glands not present, plant not aromatic; leaf-base rounded to subcordate. var. *eglandulosa*

var. *fruticosa*

*A. betulina* Retz. (1789).

Fig. 85.24.

*Acacia* woodland; along water courses, probably favoured by overgrazing and becoming locally dominant; 435–1800 m. EE EW WU SU GG SD HA; Sudan, Somalia, south to Tanzania, Burundi, Malawi, Namibia; tropical Arabia, India, Sri Lanka, Burma. *Burger* 1629; *Jackson* 736; *Mooney* 7047.

var. *eglandulosa* A. Radcl.-Smith in *Kew Bull.* 28: 288 (1973)

—type: Kenya, *Gillett* 13530.

*A. kilimandscharica* Pax & K. Hoffm. (1924).

Habitat similar to that of var. *fruticosa*; 1150–1700 m. GG SD BA HA; Sudan, Kenya, Uganda, Tanzania, Burundi. *Friis* et al. 2736; *M. & S. Gilbert* 1476; *Thulin* et al. 3508.

The 2 varieties sometimes occur together within the Flora area but seem to maintain rather different facies. Further field studies could show the differences to justify higher status.

Var. *villosa* Hutch. resembles var. *fruticosa* except for the undersides of the leaves which are densely pilose or villous on the midrib and main veins; *Mesfin* et al. 4078 from GG could be placed here. This variety is also recorded from East Africa, Sudan and Yemen but may not deserve

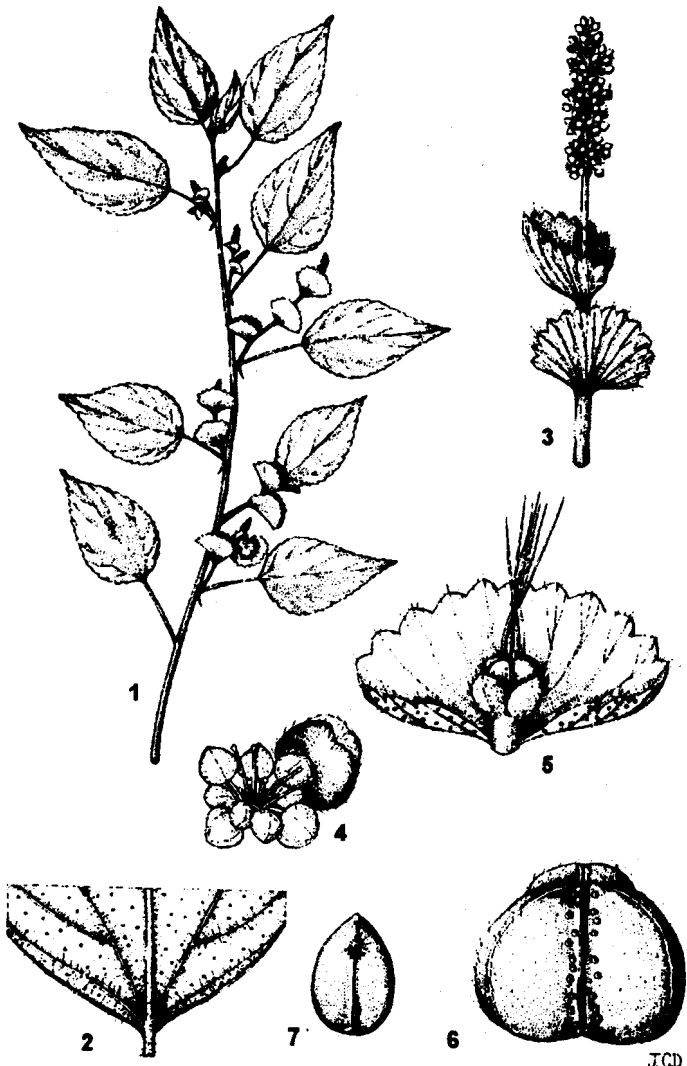


Figure 85.24 *ACALYPHA FRUTICOSA* var. *FRUTICOSA*: 1 – flowering branch x 2/3; 2 – portion of leaf lower surface showing glands x 3; 3 – inflorescence x 3; 4 – male bract and flower buds x 4; 5 – female flower x 6; 6 – fruit x 10; 7 – seed x 10. 1–5 from *Richards* 25544; 6 & 7 from *Tanner* 941. Drawn by Judy Dunkley. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 39.)

formal recognition as it is not clearly delimited from var. *fruticosa*.

6. *A. volkensii* Pax (1895)

— type: Tanzania, *Volkens* 419.

Sprawling woody-based herb, occasionally scandent to 3 m; stems often red. Leaf: petiole (0.2–)1–5(–8) cm long; leaf-blade ± ovate, 1–9.5 x 0.5–6 cm, base rounded to cordate, tip subacute to acuminate, subglabrous to hairy; stipules 2–4 mm long. Racemes axillary, rarely terminal on lateral shoots, to 11 cm long, with 1(–3) basal female bracts, peduncle up to 4.5 cm long, terminal part male, occasionally also with allomorphic flower at base on slender pedicel up to 3 cm long. Male buds 4-angled, glabrous, red. Female bracts accrescent to 5–15 x 7–20 mm, crenate-serrate, subglabrous. Female flower: sepals 3, 0.3 mm long; ovary tuberculate, hairy; styles 4–5 mm long red. Capsule 1.5–2 x 2.5–3 mm, slightly tuberculate, sparingly hairy. Seeds ovoid, 1.3 x 1 mm, brown; caruncle small, narrow.

Sheltered sites in woodland or bushland, both evergreen and deciduous, often in rock crevices; (1200–) 1600–2100 m. WU KF GG SD BA; Sudan, Somalia, Kenya, Uganda, N Tanzania. *Friis* et al. 1667; *Gilbert & Jefford* 4405; *Gilbert & Thulin* 404.

*E. Gilbert* 355, from Magi (KF) has gland-tipped hairs on the stems plus a tendency towards terminal unisexual inflorescences. It possibly represents an undescribed taxon.

7. *A. marissima* M. Gilbert (1987)

— type: WG, Ghimbi, *Meyer* 8164 (K holo.).

Slender shrub or shrubby herb 1–1.5 m high; stems and petioles adpressed-puberulent. Leaf: petiole up to 6–7 cm long; leaf-blade ovate, 8–10 x 4–7 cm, base cordate, tip acuminate, crenate-serrate, sparsely hairy; stipules 5–8 mm. Inflorescences axillary, sometimes with glandular axes, mostly a long pedunculate panicle of male flowers up to 12 cm long, sometimes with 1–3 female bracts at base or along peduncle, or occasionally in the same axil with raceme of up to 11 female bracts. Male flowers in separated clusters, buds glabrous, red. Female bracts accrescent, up to 7 x 18 mm, serrate, hairy, with some hairs gland-tipped. Female flowers: sepals 3, c 0.7 mm long; ovary hairy; styles 2.5–3 mm long, red. Fruit c 2 mm long, adpressed pubescent. Seeds ovoid, 1.4 x 1.1 mm, grey brown; caruncle obscure. Fig. 85.25.

Open or forested slopes; 1900–2050 m. WG; not known elsewhere. *Gilbert & Thulin* 810.

8. *A. psilostachya* Hochst. (1842–3),

in *schaed. Schimperii Iter Abyss. Sectio secunda*: 560 — type: GD, between Enschedcap and Schoata, *Schimper* II:560 (TUB holo. not seen; K P iso.).

Perennial herb or subshrub, erect or scandent to 3 m; stems and petioles tomentose to subglabrous. Leaf: petiole up to 11 cm; leaf-blade ± ovate, (3–)5–12(–16) x (1.5–)3–9 cm, base rounded to cordate, tip caudate-acuminate, coarsely serrate or crenate-serrate, sparingly hairy; stipules 2 mm long. Racemes axillary, 1–3 together, 5–12 cm long, (1–)3–

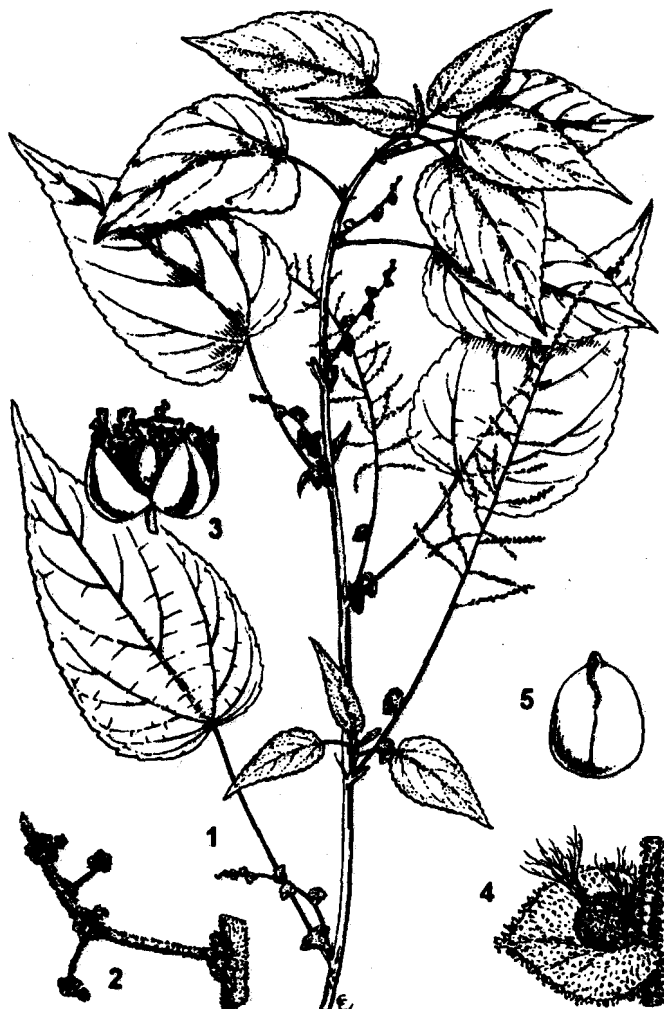


Figure 85.25 *ACALYPHA MARISSIMA*: 1 — leafy branch with inflorescence in the axils x ½; 2 — part of male inflorescence x 4; 3 — male flower x 32; 4 — female bract with flowers x 5; 5 — seed x 15. 1, 4 & 5 from *Meyer* 8164; 2 & 3 from *Gilbert & Thulin* 810. Drawn by Eleanor Catherine.

4(–8) female bracts near base, rest male, sometimes terminated by sessile modified female flower. Male buds 4-angled, pubescent. Female bracts deeply digitately 5–7-lobed, middle lobe accrescent to 5(–8) x 2–2.5 mm, laterals progressively smaller. Female flowers: sepals 3, 0.5 mm long; ovary hairy; styles (2–)5–7 mm long, white. Fruit 1.5 x 2.3 mm, pubescent above, tomentose below. Seeds subglobose, 1 mm diameter, smooth, brown; caruncle small.

var. *psilostachya*

Glandular hairs not present.

Moist montane forest, along valley bottoms and margins, rarely a weed of cultivation; (1300–)1700–2650 m. TU GD GJ SU WG IL KF SD BA HA; Sudan, south to Angola and Mozambique. *Friis* et al. 594; *Mooney* 6028, 8715.

Var. *glandulosa* Hutch. always has sessile or stalked glands. It is sympatric with the type variety south of the Flora area.

9. *A. brachystachya* Hornem. (1815)

– type: ex China, cult. Copenhagen.

*A. elegantulus* Hochst. (1844) – type: TU, Mezano Valley, near Djeladjeranna, *Schimper* III:1708 (TUB holo.; K P iso.).

Erect annual herb up to 45 cm high, closely resembling *A. indica* and *A. crenata* but racemes only up to 3.5 cm long, usually less than 1 cm. Female bracts very similar to those of *A. psilostachya*, 3–5-lobed, middle lobe accrescent to 10 x 1 mm.

Riverine and montane forests, in deep shade often under other herbs; 1300–2100 m. TU SU WG KF BA; widespread in Old World Tropics and Subtropics. *W. de Wilde* 8454; *Gilbert & Thulin* 628; *Mooney* 9156.

10. *A. ciliata* Forssk. (1775)

– type: Yemen, *Forsskål*.

Erect annual herb 15–50(–100) cm high; stems crisped-puberulous, sometimes also pilose. Leaf: petiole up to 7.5 cm long; leaf-blade ovate to broadly lanceolate, 4–10 x 1.5–5 cm, base cuneate to rounded, tip acuminate, hairy becoming glabrous below; stipules 2 mm long. Racemes axillary, up to 5 cm long, densely flowered, lower  $\frac{1}{2}$ – $\frac{2}{3}$  female, rest male, sometimes with terminal modified female flower on pedicel up to 5 mm long. Male buds 4-angular, granular tuberculate. Female bracts accrescent to 6 x 12 mm, margin finely divided into numerous straight linear filiform teeth 1.5–3 mm long, sometimes glandular. Female flowers: sepals 3, 1 mm long; ovary hairy; styles 2 mm long, white. Fruit 1.5 x 2.5 mm, subglabrous. Seeds ovoid, 1.3 x 1 mm, brown; caruncle  $\pm$  flat.

Disturbed areas in deciduous woodland and riverine forest, often in shade, sometimes weed of cultivation; near sea level – 1700 m. EE EW TU ?GD GJ/SU IL SD BA; west to Burkino Fasso and Togo, south to S Mozambique and N Namibia, avoiding higher rainfall areas; tropical Arabia, Pakistan, India, Sri Lanka. *Gilbert & Getachew* A. 2753, 2909; *Gilbert* 3454.

*A. fimbriata* Schum. & Thonn. (1827) has been confused with this species but Radcliffe-Smith, *Kew Bull.* 44: 439–442 1989 has shown that it can be distinguished by the curved lanceolate teeth of the female bracts which often  $\pm$  overlap. It is a Guinean-Congolan species that could possibly occur in SW Ethiopia.

11. *A. indica* L. (1753)

– type: figure in Hermann, Hort. acad. Lugd.-Bat. Catalogus t.687

*A. bailloniana* Muell.Arg. (1865).

Usually an erect annual to 60 cm (very rarely a robust subshrub to 2.5 m); stems and petioles hairy. Leaves clustered at stem tip; petiole up to 12 cm; blades ovate to rhomboid or lanceolate, 2–9 x 1–5 cm, base cuneate, tip acute or subacute, serrate, hairy to subglabrous except for veins; stipules 2 mm long. Racemes up to 6(–10) cm long, lower  $\frac{3}{4}$  female, lax-flowered, rest male, often with terminal long-pedicellate pubescent allomorphic flower, or entirely female. Male flowers 4-angular, slightly granular. Female bracts 5–12 x 10–14 mm, repand-dentate, ribbed.

Female flowers: sepals 3, 1 mm long; ovary pubescent; styles 2 mm long, white. Capsule 1.5 x 2 mm, tuberculate, pubescent. Seeds ovoid, 1.3 x 1 mm, grey; caruncle flattened, linear.

Disturbed sites in drier areas such as *Acacia* bushland, *Acacia* – *Balanites* woodland or wooded grassland with *Terminalia* on wide variety of soils, frequent in urban wasteland; near sea level – 1300 m. EE AF EW SU GG SD HA;  $\pm$  throughout drier Old World Tropics, introduced into New World. *Burger* 3243; *Friis* et al. 965; *Gilbert* 2357.

12. *A. crenata* A. Rich. (1851)

– type: TU, Guendepa (Gapta, near Adwa), *Schimper* II:1200 (P holo., K iso.).

Similar to *A. indica* but rarely exceeding 40 cm high and leaves more uniformly distributed along stem; leaf-blade with rounded base, crenate or crenate-serrate; racemes up to 4 cm long, all female or with short terminal male section often with sessile allomorphic flowers which are glabrous except for hair-tipped tubercles; female bracts 2–6 x 4–12 mm, dentate, not ribbed. Fig. 85.26.

Weed of cultivation; 1600–1900 m. TU ?GD ?GJ SU

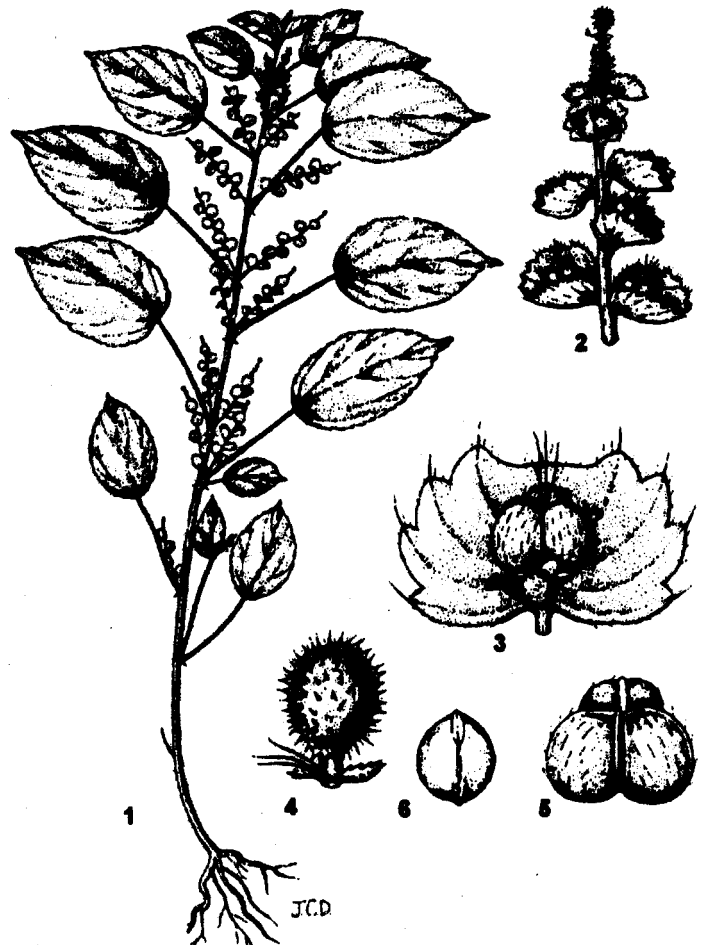


Figure 85.26 *ACALYPHA CRENATA*: 1 – whole plant x  $\frac{3}{4}$ ; 2 – inflorescence x 4; 3 – female flower with subtending bract x 10; 4 – allomorphic female flower x 14; 5 – fruit x 14; 6 – seed x 14. 1 & 2, 4 & 5 from *Michelmores* 1458; 3 from *Richards* 21062; 6 from *Greenway* 6866. Drawn by Judy Dunkley. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig 38.)



AF EW GG SD HA; ± throughout drier Old World Tropics, introduced into the New World. *Burger* 3243; *Friis* et al. 965; *Gilbert* 2357.

13. *A. segetalis* Muell. Arg. (1864)

– types: Angola, *Welwitsch* 389, 416, 416a & 440.

Very similar to *A. indica* but usually more branched from the base, rarely over 50 cm high, usually with shorter inflorescences, to 2.5 cm long, with only 1–3 female bracts each separated from the few male flowers by a peduncle; female bracts crenate, reaching 9–14 mm long, sometimes with some long gland-tipped hairs; allomorphic flowers usually long-pedicellate, often arising from base of inflorescence, muricate and whitish-puberulous.

In black soil along roadside ditch, general area *Commiphora* woodland; 1450 m. BA (Sof Omar); west to Sierra Leone, south to South Africa (Natal) and Namibia. *Gilbert* et al. 8318.

Known in Ethiopia from a single plant growing with *Acalypha ciliata* and *A. crenata*.

14. *A. lanceolata* Willd. (1805)

– type: figure in Burman, *Thes. Zeyl.* 205 (1.93 f.2).

Erect annual very similar to *A. crenata* but inflorescences often crowded towards stem-tip, sometimes terminal; female bracts up to 1.5 x 4 mm with gland-tipped hairs; allomorphic flowers sometimes scattered among male flowers, with conspicuous lateral fimbriate whorls, rugulose and puberulous but not muricate.

var. *glandulosa* (Muell. Arg.) A. Radcl.-Smith in *Kew Bull.* 44: 444 (1989).

*A. crenata* var. *glandulosa* Muell. Arg. in *Linnaea* 34: 43 (1865); *A. boehmerioides* Miq. var. *glandulosa* (Muell. Arg.) Pax & K. Hoffm. loc. cit.: 97 (1924) – type: Zanzibar, *Boivin* s.n.

*A. glomerata* Hutch. (1912).

Female bracts with numerous gland-tipped hairs up to 1.5 mm long.

Disturbed sites under riverine trees or degraded *Terminalia* woodland; 530 & 1700 m. HA IL; widespread in Africa, Yemen. *Ash* 521 p.p.; *Gilbert & Friis* 8358; *Gilbert & Thulin* 16.

Known within the Flora area only from around Gambella and near Harer, presumably more widely distributed.

Var. *lanceolata*, found in Asia has a sparser, less obviously glandular indumentum. Collections from Yemen are somewhat intermediate between the two varieties.

22. *MALLOTUS* Lour. (1790)

Trees and shrubs; indumentum stellate, simple or mixed. Leaves alternate or opposite, sometimes anisophyllous, petiolate, blade with 2 or more basal glands, surface often gland-dotted. Mostly dioecious. Inflorescence racemose, often branched, terminal or axillary. Male flowers in clusters; calyx valvately (2–)3–4(–5)-lobed; petals absent; disc-glands absent or numerous, interstaminal; stamens numerous, free, anthers longitudinally dehiscent; pistillode

usually absent. Female flowers 1–2 per bract; calyx valvately or imbricately 3–5(–10)-lobed; petals and disc absent; ovary (2–)3(–4)-locular, ovules solitary; styles simple, papillose or plumose. Fruit a capsule. Seed globose or ovoid, outer layer soft; caruncle absent.

Old World genus of some 140 species, mostly Indo-Pacific, 2 species in tropical Africa with the following 1 found in the Flora area.

*M. oppositifolius* (Geisel) Muell. Arg. (1865);

*Croton oppositifolius* Geisel (1807) – type: Dahomey, *Isert*.

Tree up to 5(–10) m high; indumentum of both stellate and simple hairs. Leaves opposite, anisophyllous with unequal petioles, long petioles 2.5–11 cm long, short 0.5–2 cm, obscurely pulvinate at both ends, pubescent; blade ovate, 3–18(–21) x 2–13 cm, base truncate to cordate, tip obtusely acuminate, subentire or repand-denticulate (to sinuate or lobed), upper side with glands on 2 basal pairs of veins, underside yellow gland dotted, axils of veins with persistent tufts of simple hairs; stipules 1–1.5 mm. Dioecious, flowers in axillary panicles up to 10(–18.5) cm long. Male flowers: 3–5 together; pedicels 3–7 mm long, jointed; sepals 2 x 1 mm, reflexed, pale yellowish; disc absent; stamens crowded, 2 mm long. Female flowers: pedicels 2–3 mm extending to 2(–5) cm in fruit; calyx-lobes 3–5(–6), united for half length, 2 x 0.5–1 mm; ovary stellate-pubescent, glandular, styles 1.5 mm long, plumose. Capsule deeply 3(–4)-lobed, 5–7 x 7–9 mm. Seeds subglobose, 3.5–4 x 3 mm, smooth, shiny, brownish.

var. *oppositifolius*

Leaves subentire to repand-dentate or sinuate. Fig. 85.27.

Along river banks and streams in lowland forest; 600–1800 m. WG IL KF; west to Gambia, south to Tanzania, Angola, Madagascar. *W. de Wilde* 6982; *Friis* et al. 2555, 4105.

Pax separated forma *oppositifolius*, with leaves hairy ± all over, and forma *glabratus* (Muell. Arg.) Pax, with the leaves glabrous except for the veins. Both forms occur in Ethiopia and formal recognition does not seem worthwhile.

Var. *lindicus* (Radcl.-Smith) Radcl.-Smith has irregularly lobed leaves and is confined to S Tanzania and Mozambique.

23. *TRAGIA* L. (1753)

Pax, *Pflanzenreich* IV (147, 9): 32 (1919); *Gilbert, Nord. J. Bot.* 12 (4): 389–400 (1992).

Herbs or subshrubs, usually perennial, often twining, less often erect; indumentum of simple hairs plus stout stinging ('urticating') hairs at least on female calyx. Leaves alternate, mostly petiolate, simple or palmately-lobed; stipules lanceolate to ovate, reflexed. Monoecious or dioecious. Inflorescence usually terminal or leaf-opposed, raceme-like, pedunculate, unisexual or with male flowers towards tip and female flowers towards base, often with male flowers in cymes, female flowers inserted individually along main axis (inserted on basal branch of inflorescence

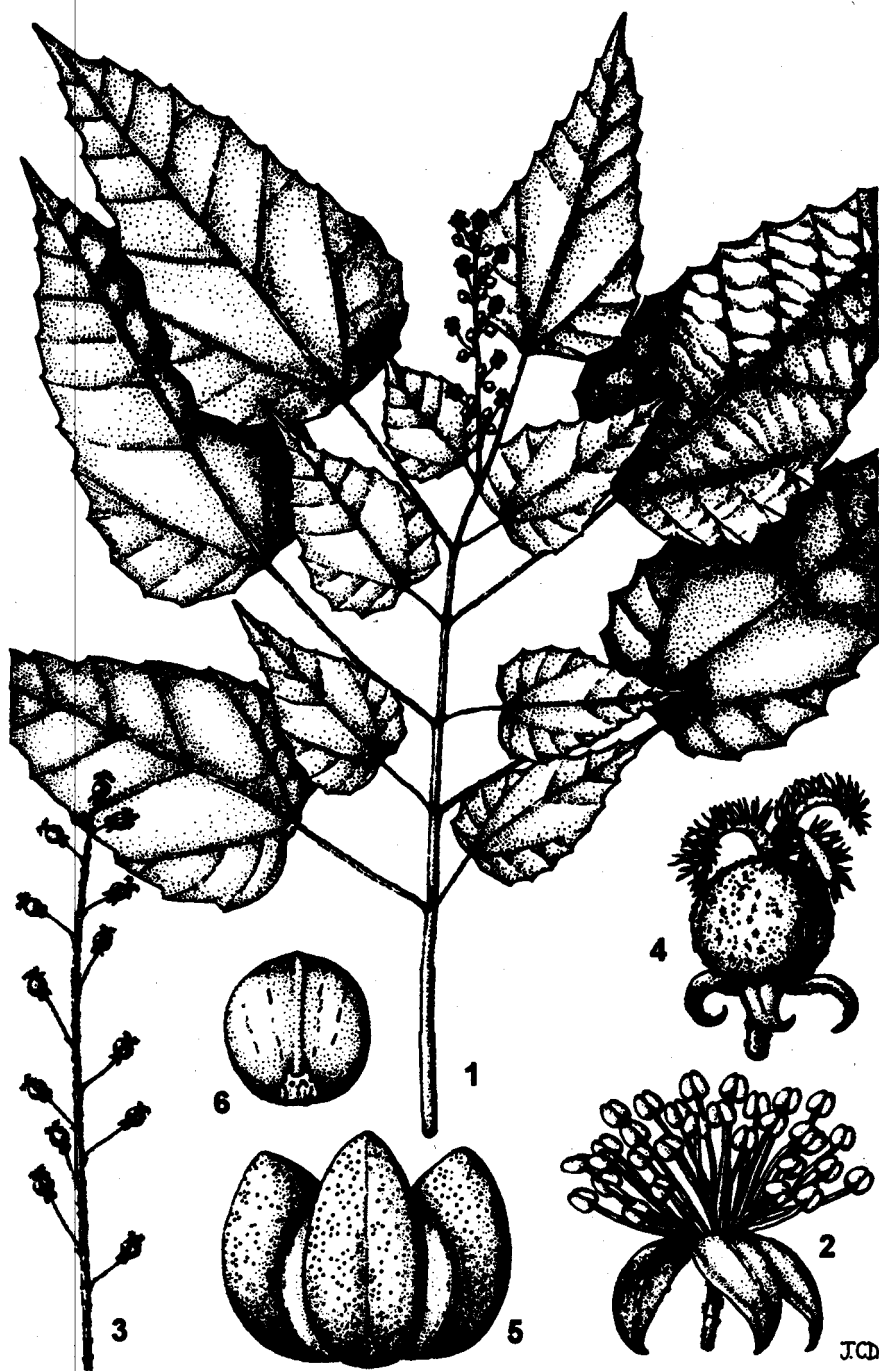


Figure 85.27

**MALLOTUS OPPOSITIFOLIUS** var. **OPPOSITIFOLIUS**: 1 - male flowering branch x  $\frac{3}{4}$ ; 2 - male flower x 10; 3 - female inflorescence x  $1\frac{1}{2}$ ; 4 - female flower x 10; 5 - fruit x 6; 6 - seed x 6. 1 from Drummond & Hemsley 3140; 2 from Tanner 3400; 3 & 4 from Faulkner 551; 5 from Tanner 3543; 6 from Tanner 3471. Drawn by Judy Dunkley. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 48.)

in some New World species). Pedicels articulated, with 2 basal bracteoles. Male flowers: calyx valvately 3(-5)-lobed, 1-2 mm long; petals absent; disc absent or obscure; stamens (1-)3(-5)-many, filaments usually short, thick, bent inwards; pistillode sometimes present. Female flowers: sepals (3 or)(5-6), imbricate, (entire or) pinnatifid (or subpalmatifid), accrescent, midrib becoming indurated, lobes often reflexed with age, usually with prominent stinging hairs; petals and disc absent; ovary 3-locular, ovules solitary. Seeds globose with pale subcircular marks; caruncle absent.

About 125 species throughout the tropics and subtropics, best represented in the New World and Africa. 14 species in the Flora area.

The majority of African species, including all the Ethiopian taxa, belong to sect. *Tragia* which is very easily recognized by the raceme-like inflorescences, male flowers with 3 incurved stamens and the pinnately divided female sepals.

Plants in this genus are under-collected because of the often very painful stinging hairs and their difficulty in getting named. There appear to be several groups separated by rather minor differences in indumentum, leaf shape, and the form and size of the female sepals. These correlate to some extent with geography and/or ecology and a decision has been made to treat them as species. Studies in greater depth, particularly to determine ranges of population variation, may require a reassessment of the status of some of these.

Vernacular names often apply to more than one species and need to be supported by voucher specimens.

1. Plants monoecious, racemes always bisexual. 2  
- Plants dioecious, racemes unisexual. 12
2. Leaves narrowly lanceolate or distinctly narrowly 3-lobed, entire or very coarsely and irregularly serrate with triangular teeth up to 5 mm long, base cuneate, rarely somewhat rounded. 3  
- Leaves triangular-lanceolate to ovate, crenate to finely serrate, base truncate to, usually, deeply cordate. 4
3. At least some leaves distinctly 3-lobed, margins usually coarsely serrate. 1. *T. plukenetii*  
- All leaves linear-lanceolate, entire or nearly so. 2. *T. hildebrandtii*
4. Leaves subtomentose beneath and/or with conspicuous stinging hairs; female sepals clearly pinnately divided, lobes straight to gently curved or flexuous but never hooked at tip. 5  
- Leaves very sparsely pubescent, stinging hairs small, on leaves restricted to veins on undersides; female sepals subpalmately divided, lobes very slender with hooked to almost circinate tips. 7. *T. uncinata*
5. Leaf-tips long-acuminate, margins finely serrate with triangular-acuminate teeth. 6  
- Leaf-tips acute to rounded, margins coarsely crenate or crenate-serrate with  $\pm$  rounded cuspidate teeth. 9
6. Leaves with many conspicuous stinging hairs; male flowers in  $\pm$  sessile clusters. 7  
- Leaves with very few stinging hairs restricted to the upper surface near the base; male inflorescences often with 1-2 additional branches at or near base and flowers in cymules. 11. *T. doryodes*
7. Leaves triangular-lanceolate to subhastate, widest at or below petiole insertion, (1.8-)-1.95-3.1 times longer than broad, basal lobes often enlarged. 8  
- Leaves ovate, widest above petiole insertion, 1.1-1.9 times longer than broad, basal lobes never enlarged. 3. *T. brevipes*
8. Basal lobes of leaves enlarged; male pedicels up to 1.5(-2) mm long; stigma lobes joined for *c* half length. 9. *T. cinerea*  
- Basal lobes of leaves not enlarged; male pedicels 2.5-3 mm long; stigma lobes free to base. 10. *T. sp.* = *Pappi* 6086
9. Petioles to 3(-6) cm long; leaf base shallowly cordate to  $\pm$  truncate, basal lobes widely separated, margins crenate-serrate. 10  
- Petioles to 12.5 cm long; leaf base deeply cordate, basal lobes auriculate and overlapping or nearly so; margins coarsely crenate. 5. *T. crenata*
10. Leaves with numerous prominent fiercely stinging hairs; female sepals accrescent to 7-10 mm. 11  
- Leaves with few inconspicuous mildly stinging hairs; female sepals to *c* 6 mm long. 6. *T. negeliensis*
11. Leaf-blade up to 3.5-5.5 cm long, up to 1.6 times as long as broad; stems always soon twining. 4. *T. mixta*
- Leaf-blade up to 2.3-3.5(-4) cm long, over 1.7 times as long as broad; stems often not twining. 8. *T. pungens*
12. Leaves densely pubescent to tomentose, usually with stinging hairs, at least on main veins near base (rarely ! absent and then leaf-blade (1.5-)1.7-2.75 times longer than broad. 13  
- Leaves sparsely pubescent, always without stinging hairs, 1.5-1.65(-1.95) times longer than broad. 13. *T. mitis*
13. Leaves 2-9 cm wide, underside densely pubescent to subtomentose, if subtomentose then less than 1.6 times as long as broad; female inflorescences with 3 or more flowers uniformly distributed along rachis. 14  
- Leaves up to 1.6 cm wide, underside white-tomentose, 2.5-4 times as long as broad; female inflorescences with 1(-3) flower at base and close-spaced sterile bracts at tip. 12. *T. abortiva*
14. Stems self-supporting, often erect and only the more vigorous starting to twine, to 0.6 m high; leaf-blades 1.3-1.6 times longer than broad, stinging hairs relatively numerous and widely distributed; racemes terminal or leaf-opposed. 15  
- Stems twining vigorously; leaf-blades (1.5-)1.7-2.75 times longer than broad; racemes often apparently axillary. 16
15. Leaves ovate, without enlarged basal lobes, undersides sparsely puberulous; mature female sepals pinnatifid, lobes only occasionally redividing, into narrowly oblong segments. 15. *T. ashiae*  
- Leaves broadly subhastate with enlarged rounded basal lobes, undersides subtomentose; mature female sepals bipinnatifid into very slender flexuous segments. 16. *T. triumfettoides*
16. Leaves usually subhastate with enlarged basal lobes, stinging hairs few, often  $\pm$  restricted to upper side; male flowers on distinctly elongated cymules. 11. *T. doryodes*  
- Leaves lanceolate without enlarged basal lobes; stinging hairs numerous, often conspicuous; male flowers in  $\pm$  sessile clusters. 14. *T. sp.* = *Fiori* 1393

1. *T. plukenetii* A. Radcl.-Smith (1983);  
*Croton hastatus* L. (1753) (non *Tragia hastatus* Hassk, 1848); *C. urens* L. (1753) (non *T. urens* L., 1763); *T. cannabina* L.f. (1781) *nom. illegit. superfl.* - type: India, *Sambach* 113 (the 2 Linnean taxa are based on different sheets of the same collection).  
*T. gallabatensis* Prain (1909); *T. tripartita* Prain (1913) *nom. illegit. superfl.* - type: GD, Metemma, *Schweinfurth* 923 (K. holo.).

Erect, suberect or prostrate herb, sometimes annual, up to 90 cm, rarely more and twining; indumentum sparse, mostly of painful stinging hairs. Leaves: petioles (2-)5-20 (-35) mm long; leaf-blades often 3-lobed, middle lobe linear to oblong-lanceolate, 3-11 x 0.3-2 cm, lateral lobes up to 5 x 1 cm, base cuneate or rounded, tips acute or obtuse, coarsely serrate, teeth triangular, rarely rounded. Racemes leaf-opposed, (4-)6-8(-11) cm long including a 2-7 cm peduncle; bracts 1-flowered. Female flowers: se-

pals 6, elliptic-ovate in outline, 2–3 mm long accrescent to 6–7 mm with 3–5 lobes each side; styles to 2 mm long, joined halfway. Capsule 4–5 x 7–8 mm, smooth, adpressed setose. Seeds 2.5–3 mm diameter, orange to reddish-brown mottled buff or grey, mottling sometimes largely covering seed.

Open situations, often on black soils, in bushland or woodland; 250–1250 m. EE AF GD SU KF GG BA HA; west to Nigeria, Somalia, Kenya, Uganda, Tanzania; India & Sri Lanka. *Burger* 3768; *Friis et al.* 2595; *Mooney* 9027.

*T. gallabatensis* is here treated as an extreme variant not adequately distinguished by the broader less deeply divided fruiting sepals.

2. *T. hildebrandtii* Muell. Arg. (1880)  
– type: Kenya, *Hildebrandt* 2041.

Closely related to *T. plukenetii* but with all leaves linear to linear lanceolate, entire except for occasional marginal teeth towards base and less painful stinging hairs.

Open sites in *Acacia* bushland on black cotton soil; 1150–1300 m. BA SD; Kenya, Tanzania, Malawi, Zambia, Zimbabwe. *Friis et al.* 3345, 3740; *Gilbert* 3373.

3. *T. brevipes* Pax (1894)  
– types: Tanzania, *Stuhlmann* 1718 & Zaire, *Stuhlmann* 3044.  
*T. benthami* auct. non Bak.

Twining herb or subshrub to 1 m high, rarely to 4.5 m, sparsely puberulent to subtomentose, with stinging hairs, especially on undersides of leaves. Leaves: petioles (0.5–)1–6(–10) cm long, occasionally twining; leaf-blade ± ovate, (2–)4.5–11(–14) x (1–)2.5–7(–8.5) cm, 1–2 times longer than broad, widest above petiole insertion, base deeply cordate, tip acuminate, margin serrate; stipules narrowly lanceolate, (3–)4–6.5 mm long, acute, somewhat reflexed. Monoecious: inflorescences similar to those of *T. cinerea* in most features, (1.5–)4–10(–14) cm long, peduncles up to 4 cm long, base with (1–)2(–4) female flowers. Male sepals broadly ovate-suborbicular, 1.3 x 1.3 mm; stamens 0.5 mm long, filaments wide and flat. Female sepals accrescent to (7–)8–10(–14) mm long with 2–5 very slender lobes each side, stinging hairs not as dense as in *T. cinerea*. Seeds 3.5–4 mm in diameter, pale grey, flecked and mottled with dark reddish brown. Fig. 85.28.13 & 14.

Forest and thicket margins and along paths, often in rather humid sites; 700–1900(–2200) m. EW TU? GD GJ WG SU KF GG BA; Somalia, west to Cameroon, south to Zimbabwe. *W. de Wilde* 8348; *M. & S. Gilbert* 1525; *Mooney* 5965.

Most Ethiopian material has a thinner indumentum, leaf blades with a broader and shallower basal sinus and smaller sepals than typical *T. brevipes* from Kenya southwards. It approaches *T. benthami* but that species has very shallowly cordate to ± truncate leaf-bases. Typical *T. benthami* is found in West Africa east to Uganda and could turn up in SW Ethiopia.

4. *T. mixta* M. Gilbert (1992)  
– type: SD, Bitata rocks, c 20 km N of Negele, *Gilbert et al.* 7769 (K holo., C ETH UPS iso.).

Twining subshrub 0.7–1 m high; most parts densely but finely puberulent, stinging hairs common and painful. Leaves: petioles 2–5.5 cm long; leaf-blade ovate, 3.5–7.5 x 2.2–5 cm, 1.4–1.6 times as long as broad, base shallowly cordate with rounded sinus, tip acute, margins coarsely serrate to subcrenate with ± rounded teeth with acute to subacuminate tips; stipules ovate, 2.5–3 x 1–1.5 mm. Inflorescences leaf-opposed or terminal on short axillary branches, up to 11 cm long in fruit, male part less than 2 cm long. Male bracts up to 4 x 0.6 mm. Female sepals accrescent to 7–14 x 5–11 mm with 4–6 lobes each side, rachis 2–5(–5) mm wide, densely covered with pale to dark brown stinging hairs. Seeds globose, 3.5 mm in diameter, dark brown to black between the paler blotches. Fig. 85.28.15 & 16.

Dense *Acacia* – *Commiphora* bushland on limestone, less often deciduous woodland with *Lannea rivae* on basement rocks; 900–1450 m. GG SD; Somalia, Kenya. *Corradi* 5647; *Gilbert et al.* 8129, 8232.

This material has been confused with other species: the leaf shape approaches that of *T. benthami*, indumentum that of *T. brevipes* but with less deeply divided fruiting sepals which are similar to those of the East African species *T. impedita* Prain and *T. insuavis* Prain. There seems to be a case for regarding *T. mixta* as separate from all of these.

5. *T. crenata* M. Gilbert (1992)  
– type: BA, SW outskirts of Delo Mena, *Gilbert & Sebsebe* 8542 (K holo., ETH UPS iso.).

Herb with stems twining to 0.8 m high; finely puberulent except for upper sides of leaves, stinging hairs fierce, restricted to leaves and sepals. Leaves: petioles mostly longer than leaf-blades, up to 12.5 cm long; leaf-blade ovate, up to 9.5 x 7.5 cm, base cordate-subauriculate with rounded sinus and lobes overlapping or nearly so, tip acute or subacute, margins coarsely and irregularly crenate; prominent stinging hairs on petiole and veins. Monoecious; racemes leaf-opposed or terminal on short lateral branches, up to 8 cm long. Male flowers mostly solitary; pedicels c 2 mm; sepals ± orbicular, c 1.3 x 1.3 mm; filaments shorter than anthers. Female sepals accrescent to 10 x 7 mm, lobes 6–7 each side, about as long as midrib is wide, rachis and tips of lobes dark green, rest yellow-green, with numerous pale straw coloured stinging hairs. Seeds c 3.2 mm in diameter, grey with chestnut brown marbling and pale blotches. Fig. 85.28.11 & 12.

Disturbed area of *Combretum* – *Terminalia* woodland on sticky brown soil; 1300 m. Known only from the type.

6. *T. negellensis* M. Gilbert (1992)  
– type: SD, 20 km from Negele on road to Melca Guba, *Friis et al.* 3085 (K holo., C ETH UPS iso.).

Densely branched twining subshrub to 1.5 m high, sometimes ± free standing, all parts densely puberulous to subtomentose, stinging hairs inconspicuous and mild,

sometimes almost absent, when present mostly on petioles and at base of leaf-blade. Leaves: petioles 2–3 cm long; leaf-blade ovate, 3.7–5.5 x 2.5–3.9 cm, 1.2–1.5 times as long as broad, base shallowly cordate with rounded sinus, tip acute, margin serrate-crenate with  $\pm$  triangular to rounded subacute teeth, stipules ovate to lanceolate, up to 4 x 0.8 mm. Monoecious: inflorescences leaf-opposed and terminal, up to 10 cm long, often less, with 2–3 female flowers and a short dense male portion, often lost in fruit. Male flowers 1–3 together, bracts 1.5–2 mm long; sepals almost orbicular,  $c$  1 x 1.2 mm, apex obscurely cuspidate; filaments  $c$  0.5 mm long. Female sepals accrescent to 6–7 x 3.5 mm, not concealing the capsule, midrib up to 1.2 mm wide, often less, with 5–6 lobes on each side, these slightly longer than wide at the midrib, stinging hairs very few; stigma lobes joined into a column  $c$  1 high, lobes free for slightly over 2 mm, recurved. Seeds 3.3–3.5 mm diameter, dark chestnut brown between pale grey blotches. Fig. 85.28.5 & 6.

Grassland on dark brown to black clay soils with *Acacia drepanolobium* or scattered thickets with *Juniperus*, *Olea*, *Cussonia*, *Pistacia* etc.; 1300–1600. SD BA; not known elsewhere. Friis et al. 3680; Gilbert et al. 8269; Gilbert & Sebsebe D. 8672.

7. *T. uncinata* M. Gilbert (1992)

– type: WG, Ghidami, *Benedetto* 574 (FT holo.).

Slender climber of unknown stature; stems and petioles densely adpressed puberulent, later glabrescent, drying pale brown. Leaves: petioles up to 8.5 cm long, adpressed pubescent; leaf-blade ovate, up to 8.5 x 5–5.5 cm, base cordate to deeply cordate with cuneate sinus, apex acuminate, margins sharply serrate, teeth acuminate, upper surface very sparsely minutely pubescent, stinging hairs absent, veins on lower side sparsely pubescent with a few small stinging hairs; stipules oblong-lanceolate, up to 4 x 1 mm. Monoecious; racemes leaf-opposed, unbranched, peduncle 1.5–8 cm long, rachis up to 5 cm long with 2–3 female flowers at base and otherwise with closely spaced bracts subtending small sessile clusters of male flowers. Male bracts oblong-lanceolate, up to 3 mm long, at first erect, then reflexed, bracteoles similar but smaller; pedicel  $c$  2 mm long; sepals elliptic,  $c$  1.3 x 1 mm, pubescent, apex acute; filaments shorter than anthers, flattened, anthers  $c$  0.3 mm long. Female bracts very similar to stipules; pedicels short, recurved; sepals rapidly accrescent to  $c$  17 x 25 mm, deeply divided to be almost palmatisect with a rachis  $c$  4 mm long and  $c$  4–6 lobes each side, the lobes up to 1 mm wide at base with a markedly hooked or almost circinate apex, densely pilose with pale straw-coloured hairs; stigma lobes  $c$  1.5 mm long, free, circinate. Seed 3.5 mm in diameter, pale straw coloured with extensive marbling and minutely spotted with dark brown. Fig. 85.28.9 & 10.

No information on ecology. WG; known only from the type collection.

The peculiar female sepal lobes would seem to be immediately diagnostic.

8. *T. pungens* (Forssk.) Muell. Arg. (1866);

*Jatropha pungens* Forssk. (1775); *T. cordifolia* Vahl (1790) *nom. illegit. superfl.*; *T. cordata* Willd. (1805) *nom. illegit. superfl.*; *T. arabica* Prain (1913)

– type: Yemen, Botta s.n.

*T. moamarensis* Baill. (1858).

*T. parvifolia* Pax (1894).

Gilbert & Radcliffe-Smith, *Kew Bull.* 40: 393–4, 1985.

Sprawling or twining subshrub to 2 m long, occasionally erect, puberulent to subtomentose with conspicuous stinging hairs, especially on leaves. Leaves: petioles 0.8–2 cm; leaf-blade triangular-ovate to -lanceolate, (1.5–)1.8–3.5 (–4) x (0.5–) 0.9–2.2 cm, base shallowly cordate to sub-truncate, tip rounded to acute, coarsely serrate to serrate-crenate. Monoecious, racemes terminal or leaf-opposed, to 6 cm long, unisexual or male with 1–2 female flowers near base. Male flowers in small clusters. Female sepals ovate in outline, accrescent to 9 mm long with 4–6 lobes each side,  $\pm$  hidden by stinging hairs. Fruit  $c$  4.5 x 8 mm. Seeds  $c$  3 mm diameter, pale reddish-brown with overlapping whitish spots. Fig. 85.28.3 & 4.

Among rocks in open deciduous woodland or bushland; 1350 m. SU HA; Somalia, tropical Arabia. Burger 3592; Gilbert & Thulin 204.

Some collections from Somalia appear to be dioecious, and the Somali material is consistently more narrow-leaved.

9. *T. cinerea* (Pax) Gilbert & Radcl.-Smith (1985);

*T. mitis* Muell. Arg. var. *cinerea* Pax, *Bot. Jahrb.*

19: 103 (1894); *T. cordifolia* Vahl var. *cinerea* (Pax)

Prain, *Fl. Trop. Afr.* (1913); *T. pungens* (Forssk.)

Muell. Arg. var. *cinerea* (Pax) Pax, *loc.cit.*: 79 (1919)

– types: Somalia, *Hildebrandt* 872a (B destr.); HA, 'Harar', *Robecchi-Bricchetti* 170 (FT neo.).

Gilbert & Radcliffe-Smith, *Kew Bull.* 40: 393–394 (1985); Gilbert, *Nord. J. Bot.* 12(4): 391 (1992).

Twining herb; pubescent to tomentose, with prominent stinging hairs especially on underside of the leaves. Leaves: petioles 1–4.5 cm long; leaf-blade triangular-lanceolate to subhastate, basal lobes rounded, 5–10(–13) x 1.8–5 cm, (1.8–)2–3.2 times longer than broad, base deeply and narrowly cordate, tip narrowly acuminate, serrate. Monoecious; racemes terminal, leaf-opposed and axillary, 5–12(–15) cm long including 2–5 cm peduncle, mostly male with 1–2 female flowers. Male flowers 2–3 together. Female flowers: sepals elliptic in outline, accrescent to 7–9 mm long, with 5–7 short lobes on each side largely concealed by straw-coloured stinging hairs; styles 1.5–2 mm long, joined halfway. Fruits 5–6 x 8–9 mm. Seeds 3.5 mm diameter, pale yellowish-grey or orange marked with reddish-brown. Fig. 85.28.7 & 8.

Rocky slopes with rough grassland, deciduous woodland, open *Juniperus* forest or riverine forest margins; 1350–2300 m. EW TU GD SD BA? HA; Somalia, Kenya, Sudan. Friis et al. 2268; Gilbert & Getachew A. 2871; Robertson 1200.

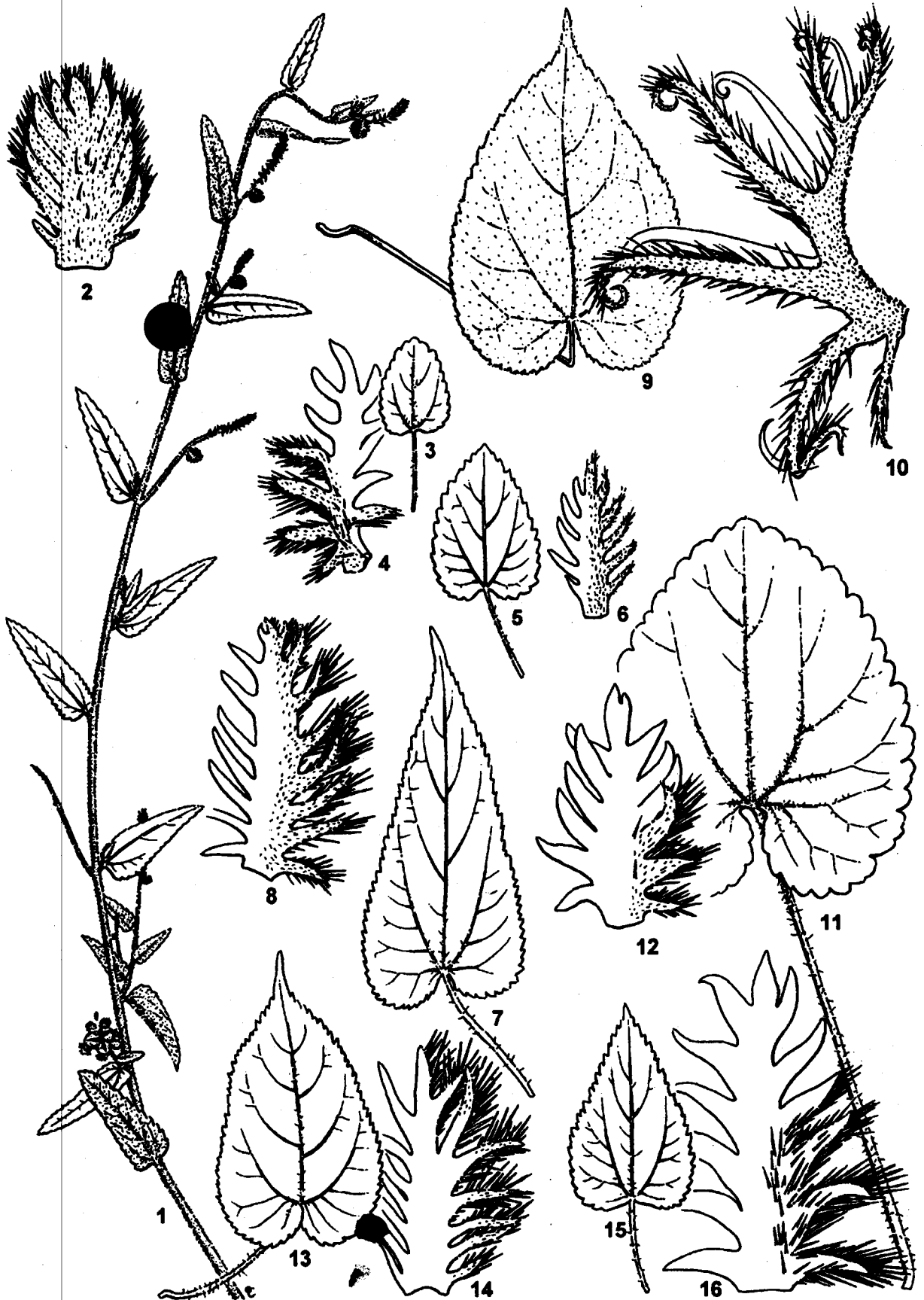


Figure 85.28 *TRAGIA*: predominantly monoecious species. Stems and leaves all  $\times \frac{1}{2}$ ; Female sepals all at fruiting stage  $\times 5$ . *T. ABORTIVA*: 1 - leafy branch with inflorescences and one fruit; 2 - female sepal. *T. PUNGENS*: 3 - leaf; 4 - female sepal. *T. NEGELIENSIS*: 5 - leaf; 6 - female sepal. *T. CINEREA*: 7 - leaf; 8 - female sepal. *T. UNCINATA*: 9 - leaf; 10 - female sepal. *T. CRENATA*: 11 - leaf; 12 - female sepal. *T. BREVIPES*: 13 - leaf; 14 - female sepal. *T. MIXTA*: 15 - leaf; 16 - female sepal. 1 & 2 from Gilbert & Phillips 9020; 3 from Gilbert & Thulin 204; 4 from Bally & Melville 16026 (Somalia); 5 & 6 from Gilbert et al. 8269; 7 & 8 from Gilbert & Getachew 2871; 9 & 10 from Benedetto 547; 11 & 12 from Gilbert & Sebsebe 8542; 13 & 14 from Pichi-Sermolli 1692; 15 & 16 from Gilbert et al. 8232. Drawn by Eleanor Catherine.

The material can be divided into 2 groups: one mostly from EW and TU in which the leaves are rather sparsely hairy and there is little or no suggestion of enlarged basal lobes, the other more widespread and, *ex desc.*, including the holotype, with the leaves  $\pm$  tomentose below and often with distinctly enlarged basal lobes so as to be subhastate.

Some monoecious collections of *T. doryodes* from W Ethiopia resemble this species closely but have only a few small stinging hairs restricted to near the base of the leaves.

Mooney 7969 (SU, 16 km N of Debra Sina) keys out here but is an erect annual with female sepals only 6 mm long and a sparser indumentum.

10. *T. sp.* = *Pappi* 6086

—EW, Dembalas, Mai Alb!

Twiner. Petiole up to 3.5 cm long; leaf-blade lanceolate-hastate, up to 10 x 3.5 cm, base cordate with cuneate sinus, tip long-acute, margins sharply serrate, underside sparsely puberulent, veins with stinging hairs, especially near leaf-base; stipules triangular, 2 x 0.8 mm. Inflorescence terminal or leaf-opposed, up to 18 cm long including 3 cm peduncle, with 2 female flowers and many sessile clusters of male flowers; bracts and bracteoles stipule-like. Male pedicels filiform, to 3.5 mm long; sepals 1.3 x 1 mm, puberulent; filaments  $c$  0.2 mm, thick and wrinkled when dry, anthers 0.2 mm long. Stigmas  $\pm$  fusiform, 0.7 mm, free to base. Fruiting pedicel  $c$  5 mm; sepals pinnatifid, ovate-elliptic in outline, to 11 x 5 mm, rachis 1.5–1.8 mm wide, pale, with 5 or 6 simple dark-green lobes each side, with many pale straw-coloured stinging hairs. Intact capsule not seen, dehiscent valves  $c$  5 mm long, densely pubescent with scattered stinging hairs. Seed 3.5 mm diameter, pale brown with reddish brown fine spots and irregular markings.

No information on ecology or altitude. EW; not known elsewhere. The single collection available looks distinctive and probably represents an undescribed taxon.

11. *T. doryodes* *M. Gilbert* (1992)

—type: WG, E slope of Didessa Valley on Nekemte–Gimbi road, *Gilbert & Thulin* 688 (K holo., ETH UPS iso.).

Vigorous twiner; stems densely pubescent to subtomentose. Leaves: petioles up to 4.5 cm long; leaf-blade subhastate with rounded basal lobes, 5.5–16 x 2–9 cm, (1.5–)2.2–2.8 times longer than broad, apex acute, base deeply cordate with a rounded sinus, margin serrate to subcrenate, often subtomentose below, occasionally hairy only on veins, stinging hairs sparse, mostly on upper side of main veins near base, stipules lanceolate, 5–10 x 1.5–2 mm. Mostly dioecious, sometimes monoecious. Racemes axillary or leaf-opposed, sometimes 2 per node; male up to 10(–20) cm long, occasionally producing female flowers in unusually robust specimens; female up to 4(–8) cm. Male bracts 3.5–6 x 0.9–1.5 mm; pedicels up to 1.5(–2) mm long; sepals suborbicular, 1.1 x 1 mm, apex shortly cuspidate; filaments  $c$  0.6 mm long. Female pedicel short and inconspicuous; sepals accrescent up to 14 mm long with 6–11 very slender flexuous lobes on each side, these

sometimes with subsidiary lobes, rachis over 1.2 mm wide; stigma lobes separate,  $\pm$  cylindrical,  $c$  2 mm long. Capsule lobes  $c$  5 mm in diameter, mature seeds not seen. Fig. 85.29.1–7.

Rough grassland, open bushland, along paths in areas of higher rainfall; 1300–2000 m. EW GD WG KF GG SD; not known elsewhere. *Gilbert & Thulin* 441, 584–5; *Mooney* 9261.

Monoecious forms such as *Gilbert & Thulin* 606 and *Mesfin & Kagnev* 2261 show a strong similarity to *T. cinerea*. They can be distinguished by the few inconspicuous stinging hairs and clearly paniculate inflorescences: the lowermost male flowers are on short lateral branches.

12. *T. abortiva* *M. Gilbert* (1992)

—type: GG, 34 km from Jinka on road to K'ey Afer, *Gilbert & Phillips* 9020 (K, holo., ETH, UPS, iso.).

Many-stemmed shrub to 1.2 m high; stems stiffly erect, usually twining only slightly at the tip (only with fully twining stems when growing in deep shade), base woody, to 1 cm thick, densely pubescent to tomentose, white. Leaves: petioles 5–7 mm long in male plants, only 4 mm long in female; leaf-blade hastate to narrowly lanceolate, 32–43 x 8–16 mm, base shallowly cordate to  $\pm$  rounded, apex subacute, margin  $\pm$  serrate, upper side green, pubescent, under side white-tomentose except on veins, stinging hairs many on veins, sting moderately painful. Male inflorescences leaf-opposed or terminal, 8–10 cm long, unbranched, flowers mostly solitary; bracts linear-lanceolate to 3 x 0.4 mm,  $\pm$  reflexed; bracteoles similar  $c$  2 mm long. Male flowers: pedicel 1.5–2 mm long; sepals 3 ovate, 1.5 mm long, pubescent, stamens 3; galled flowers, to 5 mm diameter, quite frequent. Female inflorescences similar but only to 4(–5) cm long, nearly always with 1 flower (rarely with 2, very rarely 3, flowers) 0.7–2 cm from base, upper part densely covered with sterile bracts and bracteoles very similar to those found in male racemes but apparently never producing any flowers. Female flower: pedicel to 4 mm long, recurved; sepals 6, deeply pinnatifid, rapidly accrescent to 8 mm long, rachis  $c$  1.2 mm wide with 6–8 oblique lobes each side up to 2.5 mm long, pubescent on outside, lobes with stinging hairs on inside. Intact ripe capsule not seen, cocci after dehiscence  $c$  5 mm in diameter, densely hairy with inconspicuous stinging hairs. Seeds globose, 3.5 x 3.5 mm, dark brown with numerous circular pale markings. Fig. 85.28.1 & 2.

Locally abundant on the tops of basement complex ridges with mostly broadleaved deciduous woodland with *Combretum molle*, *Bridelia scleroneura*, *Acacia hockii*, *Ozoroa insignis*, etc., open areas with low *Hyparrhenia* – *Enteropogon* grassland; 1550–1800 m. GG; not known elsewhere. *Gilbert & Phillips* 8945, 8947, 9021.

13. *T. mitis* *Muell. Arg.* (1866)

—type: TU, Shire, Adde Gedad, near Mariam, *Schimper* II:517 (K lecto., P isolecto.).

Vigorous twining herb, all parts densely pubescent, sting-

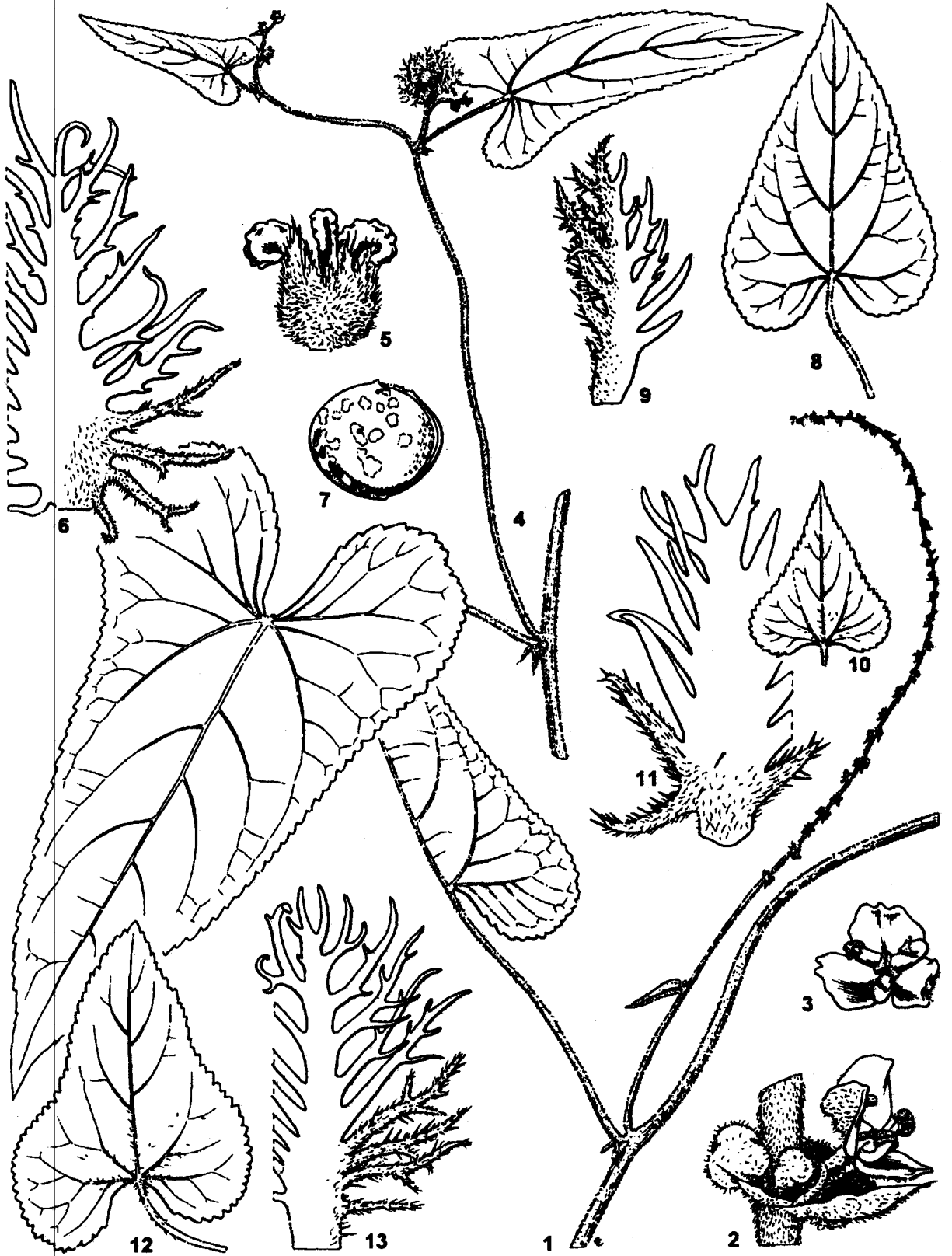


Figure 85.29 *TRAGIA*: dioecious species. *T. DORYODES*: 1 - part of stem with male inflorescence  $\times \frac{1}{2}$ ; 2 - group of male flowers with subtending bracts and bracteoles  $\times 9$ ; 3 - male flower, top view  $\times 9$ ; 4 - part of stem with female inflorescence  $\times \frac{1}{2}$ ; 5 - female flower  $\times 9$ ; 6 - female sepal  $\times 4$ ; 7 - seed  $\times 5$ . *T. MITIS*: 8 - leaf  $\times \frac{1}{2}$ ; 9 - female sepal  $\times 4$ . *T. ASHIAE*: 10 - leaf  $\times \frac{1}{2}$ ; 11 - female sepal  $\times 4$ . *T. TRIUMFETTOIDES*: 12 - leaf  $\times \frac{1}{2}$ ; 13 - female sepal  $\times 4$ . 1-3 from Gilbert & Thulin 689; 4-7 from Gilbert & Thulin 688; 8 from Gilbert & Getachew 2994; 9 from Schimper 1600; 10 & 11 from Ash 2378; 12 & 13 from Gilbert & Jefford 4328. Drawn by Eleanor Catherine.



ing hairs absent except on female calyx. Leaves: petioles 1.5–7 cm; leaf-blade ovate, 6–12 x 3.9–8 cm, 1.5–1.7(–2) times longer than broad; base deeply and broadly cordate, tip acute, serrate, uppermost leaves sometimes subhastate. Dioecious. Racemes mostly apparently axillary, often branched; male up to 15 cm long, flowers in sessile cymes; female up to 5 cm long, bracts sometimes intergrading with leaves. Female sepals broadly ovate in outline, up to 11 mm long, with 5–8 slender lobes each side, stinging hairs absent. Capsule up to 7 x 12 mm. Intact mature seeds not seen, others reddish-brown with overlapping grey spots. Fig. 85.29.8 & 9.

Evergreen bushland; 1500–1900 m. EW TU GD; Sudan (Gallabat). *Gilbert & Getachew A. 2994*; *Schimper III:1600*; *Schweinfurth 872–3*.

*Gelahun 173*, an unlocalised collection from GJ, differs from all other collections seen by the grossly dentate leaves.

14. *T. sp.* = *Fiori 1393*  
– EE, Ghinda.

Closely related to *T. mitis* but with numerous conspicuous stinging hairs on leaves and stems and with male flowers in ± sessile clusters.

No habitat information; 960–1350 m. EE EW; not known elsewhere. *Fiori 1391*; *Baldrati s.n.*

More information on variation within *T. mitis* is needed before it is possible to reliably assess the status of this group of plants from the escarpment between Asmera and Mitsuwa.

15. *T. ashiae* *M. Gilbert (1992)*  
– type: SU, Addis Abeba, Bole, *Sandford in Ash 2378* (K holo. & iso., EA MO ETH iso.).

Semi-erect or somewhat climbing herb to 60 cm; all parts finely puberulent, stinging hairs inconspicuous but widely distributed. Leaves: petioles 1.5–4 cm long; leaf-blade ovate, 4–7.5(–8.8) x 3.2–4.7 cm, 1.25–1.6(–2.2) times longer than broad, apex acute or slightly acuminate, base cordate with a rounded sinus, margins serrate to crenate; stipules lanceolate, 3–4 x 0.7–1.3 mm. Racemes mostly terminal on short axillary shoots. Male racemes up to 8 cm long, with sessile cymes; bracts up to 2(–5) x 0.7(–1.4) mm; sepals 1–1.5 x 0.8–0.9 mm; filaments *c* 0.6 mm long, strongly incurved, slightly laterally compressed, anthers *c* 0.3 mm long. Female racemes up to 20 cm long including a peduncle up to 7 cm long; sepals accrescent up to 12 x 8 mm, inner whorl smaller, with 4–10 lobes each side, lobes linear, undivided, rachis 1.5–2.5 mm wide; stigma lobes free, laterally compressed, to 2 mm long. Seed (perhaps not fully mature) 4–4.5 mm in diameter, ± smooth, dark red-brown with pale grey blotches. Fig. 85.29.10 & 11.

Rough grassland and thicket margins, often on black soils; 2200–2400 m. SU BA; not known elsewhere. *Ash 1049, 2941*; *Friis et al. 3628–9*.

The collections from BA have female racemes with more flowers; fully mature fruits have not been seen.

16. *T. triumfettoides* *M. Gilbert (1992)*  
– type: SD, 13 km S of Aghere Mariam, *Gilbert & Jefford 4328* (K holo., ETH iso.).

Erect or climbing herb to 60 cm high; most parts tomentose, stems sometimes brownish. Leaves appearing with or possibly slightly after the inflorescences: petiole up to 2.8 cm long; leaf-blade distinctly subhastate with enlarged rounded basal lobes, 6–7.5 x 4–6 cm, 1.15–1.5 times as long as broad, base cordate with a wide rounded sinus, apex rounded, tip subacute, margins ± crenate to dentate, teeth rounded to subacuminate, upper side densely puberulous, underside tomentose, stinging hairs obvious, widely distributed; stipules oblong-lanceolate, up to 8 x 1 mm. Dioecious. Inflorescences from near base of stem, possibly sometimes appearing with or before leaves, mostly leaf-opposed. Male racemes up to 10 cm long with lateral branches up to 1 cm long, bracts up to 2.5 x 0.5 mm, sepals 2 x 1.5 mm, elliptic, apex subacute; filaments *c* 1 mm long, looking similar to those of *T. ashiae*. Female racemes up to 12 cm long including a peduncle up to 7 cm long, sepals accrescent to 15 x 20 mm with *c* 7 primary lobes each side, lobes very slender and flexuous, mostly also bipinnatisect with lateral lobes, stigma lobes free, slightly laterally compressed, *c* 3.2 mm long. Mature fruits not seen. Fig. 85.29.12 & 13.

Rough grassland subject to burning; 1900–1950 m. SD; not known elsewhere. *Gilbert & Jefford 4281*; *Gillet 14726*.

24. DALECHAMPIA *L. (1753)*

*Pax, Pflanzenreich IV (147,12): 32–36 (1919).*

Similar in habit to *Tragia* but with very distinctive inflorescences. Monoecious. Inflorescences pedunculate, flowers subtended by 2, often conspicuous, bracts, with a stalked cluster of 5 male cymes surrounded by an involucre of 4 fused (or free) bracts plus a subsessile cluster of 1–5 female flowers and a mass of fused bracts and/or sterile flowers. Flowers as in *Tragia*, male: calyx 4–6-lobed; stamens (7–)9–30(–90); female: sepals 5–12, pinnatifid and hirsute in Africa (entire and glabrous elsewhere); styles joined into single column, often enlarged and hollowed at tip. Fruit as in *Tragia*.

About 110 species, mostly American but spreading throughout tropics. 7 species in Africa of which 3 occur in the Flora area.

1. Inflorescences with 1 female flower; leaves very deeply lobed, ± compound. 2
- Inflorescences with 3 female flowers; leaves deeply lobed but not ± compound. 1. *D. parvifolia*
2. Lobes of leaves with tips rounded; female sepal lobes gland-tipped. 2. *D. pavoniifolia*
- Lobes of leaves with tips acute; female sepal lobes not gland-tipped. 3. *D. trifoliata*

1. *D. parvifolia* *Lam. (1786)*;  
*D. scandens* *L. var. parvifolia* (*Lam.*) *Muell. Arg.*  
in *DC, Prodr. 15.2: 1245 (1866)* – type: specimen

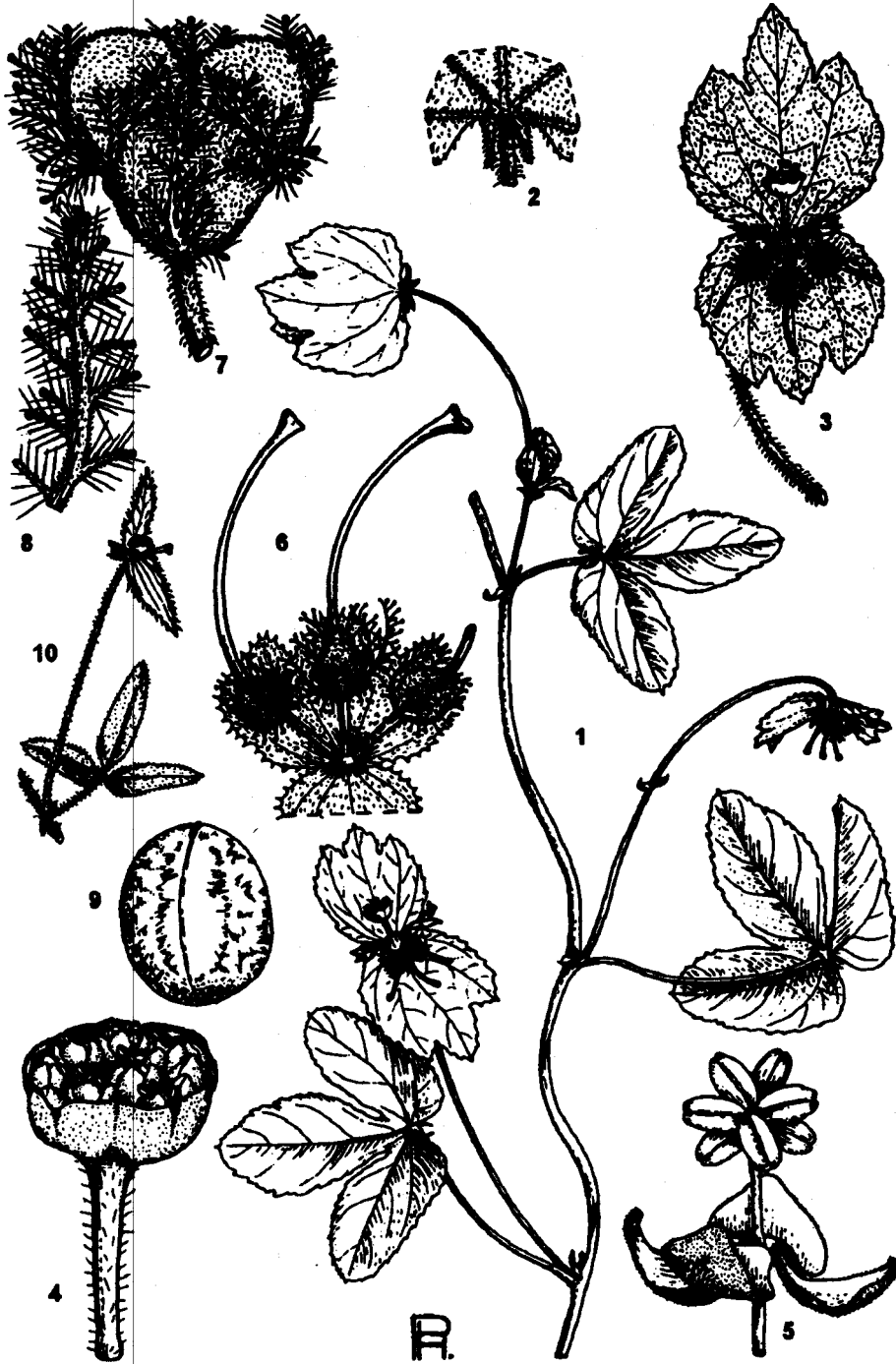


Figure 85.30

**DALECHAMPIA PARVIFOLIA:**

1 - flowering stem  $\times \frac{3}{4}$ ; 2 - detail of stipules  $\times 2$ ; 3 - inflorescence  $\times 1$ ; 4 - group of male flowers  $\times 4$ ; 5 - male flower opened  $\times 15$ ; 6 - group of female flowers  $\times 4\frac{1}{2}$ ; 7 - fruit  $\times 4$ ; 8 - accrescent female sepal  $\times 4$ ; 9 - seed  $\times 6$ . **D. TRI-FOLIATA:** 10 - leaf and inflorescence  $\times \frac{3}{4}$ . 1-3 from Richards 23387; 4-6 & 9 from Bally 8002; 7 & 8 from Newbould 7415; 10 from Drummond & Hemsley 4089. Drawn by Pat Haliday. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*, part 2: fig. 56.)

erroneously indicated by Lamarck as having been collected by *d'Incarville* in China.

*D. cordofana* ['cordafana'] Webb (1849); *D. scandens* L. var. *cordofana* (Webb) Muell. Arg. in DC, *Prodr.* 15.2: 1245 (1866).

*D. scandens* auct. Afric. non L.

*D. ipomoeifolia* sensu Agnew (1974), non Benth. (1849).

Woody-based twiner to 3 m, glabrous to densely pubescent throughout. Leaves: petioles 2.5-9 cm long; leaf-blade palmately 3-5-lobed or -foliolate, up to 14 x 14 cm, usually less, base cordate, middle lobe  $\pm$  lanceolate, 3-7.5 x 0.6-2.2 cm, tip usually acute, margin serrate, lateral lobes smaller, asymmetric. Peduncles up to 17 cm long; bracts

ovate, up to 3(-5) x 2.5(-5) cm, base rounded or shallowly cordate, tip often 3-toothed, whitish or yellowish, green in fruit; male peduncle 3-5 mm long, involucre 5-8 mm across,  $\pm$  glabrous, 13-flowered, sterile mass adaxial, flattened. Female flowers 3, bracts to 3 mm, ciliate, margins glandular; pedicels up to 1.5 cm long; sepals 6, accrescent to 1 cm, each side with 6 thread-like, gland-tipped lobes, margins with stinging hairs; style to 1 cm long. Fruit 5 x 8 mm, hairy. Seeds 3 mm diameter, grey with brown marks. Fig. 85.30.1-9.

Deciduous bushland or woodland on rocky or silty soils, sorghum cultivation on black soils, riverine forest, etc.; 550-1450 m. A FE WU SU GG SD BA HA; Cape Verde Islands east to Somalia and tropical Arabia, south to

Mozambique and Namibia; Pakistan, India (Gujerat). *Frits* et al. 1920; *M. & S. Gilbert* 1581, 2168.

This species has been included within the New World species *D. scandens* but botanists working on the genus (Armbruster, Webster pers. com.) do not accept African material within that species. Apart from var. *cordofana*, Pax recognized amongst the 'Old World *D. scandens*' one variety from Madagascar, one from India, one from South Africa and var. *hildebrandtii* (Pax) Pax from coastal East Africa and Somalia. The latter variety differs from *D. parvifolia* by the entire leaf-lobes and may be a distinct species.

2. *D. pavoniifolia* (Chiov.) *M. Gilbert* (1992);

*Tragiella pavoniifolia* Chiov. (1929) - type: Somalia, *Puccioni & Stefanini* 515 (569) (FT holo.).

*Gilbert, Nord. J. Bot.* 12(4): 391 (1992).

Twining herb, base not seen, most parts puberulous. Leaves: petioles up to 2.5 cm long; leaf-blade pedately 3-5-foliolate/partite, middle lobe oblanceolate, up to 4 x 1.5 cm, lateral lobes progressively smaller, tips rounded to retuse or minutely cuspidate, margins coarsely few lobed or toothed. Peduncles up to 4.5 cm long; bracts subequal, ± oblong, up to 2 x 1.5 cm, tip 3-lobed to *c* half length, pale. Male peduncle 2-3 mm long, involucre 4-5 mm across, *c* 8-flowered, sterile mass adaxial, 2(-3)-lobed. Female flower solitary; bracts ciliate; sepals similar to those of *D. trifoliata* but with gland-tipped lobes; style *c* 4 mm long. Fruits and seeds not seen.

Open wooded bushland on red sandy 'haud' soil; *c* 600 m. HA; Somalia. *Ellis* 155.

Only known from 2 collections. The type has very poorly preserved inflorescences and the details in the description are all based on *Ellis* 155 which is less woody and with larger leaves.

3. *D. trifoliata* *Verdc. & Greenway* (1952)

- type: Tanzania, *Verdcourt* 113.

Herb with many prostrate or twining stems from woody rootstock, ± glabrous to sparsely hairy. Leaves: petioles 1-3.5 cm long; leaf-blade 3-foliolate to 5-partite, middle leaflet lanceolate, up to 4.5 x 0.4-1 cm, lateral lobes shorter and broader, sometimes lobed, tips acute. Peduncles up to 11 cm long; bracts unequal, up to 2.3 x 1 cm. Male peduncle 3-4(-15) mm long; involucre 3-5 mm across, 12-flowered, sterile mass central, convoluted. Female flower solitary; bracts 4, to 2 mm long, ciliate; sepals accrescent to 6-9 mm, each side with 1-4(-5) non-glandular lobes, stinging hairs present; style 5.5 mm long. Fruit 4 x 7.5 mm, puberulous. Seed 2.5 mm diameter, grey finely spotted with brown. Fig. 85.30.10.

1. Most leaves 3-foliolate, lobes entire; involucre bracts entire to very shallowly 3-toothed. var. *trifoliata*  
- Most leaves 5-partite, margins of lobes toothed; involucre bracts deeply 3-fid. var. *trifida*

var. *trifoliata*

Recently cleared rocky hill top in *Commiphora* woodland; *c* 950 m. SD; Kenya, N Tanzania. *Gilbert* et al. 7667.

The only Ethiopian collection seen has unusually narrow, ± linear leaflets and bracts.

var. *trifida* *A. Radcl.-Smith*,

*Kew Bull.* 44: 450 (1989) - type: Somalia, *Kuchar* 16812.

Deciduous bushland on red sandy soil over limestone, and limestone outcrops; *c* 600 m. HA; Somalia, NE Kenya. *Glaver & Gilliland* 430.

The differences between these two varieties coupled with their clear cut geographical separation suggests that they could well be treated as at least subspecies.

25. HEVEA *Aubl.* (1775)

Trees, all parts producing copious white latex when cut. Leaves alternate, occasionally subopposite, palmately compound; stipules minute, falling soon. Monoecious; flowers in lax axillary panicles, terminal flowers female, the rest male. Male flowers: calyx lobes imbricate; disc annular, stamens 10; pistillode present. Female flowers: disc obscure; styles short. Fruit a woody capsule. Seeds cylindrical-ovoid.

*H. brasiliensis* (*Adr. Juss.*) *Muell. Arg.* (1865)

Tree to 20 m. Leaves palmately 3-foliolate; leaflets oblanceolate, tip acuminate. Male calyx *c* 2 mm long. Female calyx *c* 6 mm long. Capsule, *c* 4 cm long. Seeds 2.3 x 1.5 cm, grey with darker mottling and streaking. Fig. 85.31

Forestry station; 1250 m. IL (Gore); native of Brazil, now widely grown elsewhere in the humid tropics as the major source of natural rubber. *Jonas Zewdie* s.n.

The only collection seen was from a large tree reportedly seeding regularly.

26. MANIHOT *Mill.* (1754)

*Pax, Pflanzenreich* IV (147.2): 21-99 (1910).

Shrubs or trees, rarely herbs; producing latex when cut. Leaves alternate, sometimes peltate, often palmately lobed. Monoecious; flowers in terminal or subterminal-axillary racemes with 1-few long-pedicellate female flowers below several short-pedicellate male flowers. Male flowers: calyx campanulate or tubular, lobes 5, imbricate or contorted; petals absent; stamens 10, free, alternating with lobes of disc or glands; pistillode small or absent. Female flowers similar, staminodes absent; ovary 3-locular, ovules solitary; styles variously dilated or lobed. Fruit a capsule. Seeds with caruncle.

An American genus of about 100 species with 2 introduced species found in the Flora area.

The root-tubers of some species are very important as a staple food crop in many areas of the tropics; other species are grown as sources of rubber.

1. Capsule with 6 distinct wings or ridges; leaf-lobes oblanceolate, acuminate; grown for edible root-tubers, or for ornament. 1. *M. esculenta*  
- Capsule muricate-tuberculate when dried; leaf-lobes



Figure 85.31

*HEVEA BRASILIENSIS*: 1 – flowering branch  $\times \frac{1}{2}$ ; 2 – male flower  $\times 6$ ; 3 – stamens  $\times 12$ ; 4 – female flower  $\times 6$ ; 5 – pistil  $\times 6$ ; 6 – fruit  $\times \frac{1}{3}$ ; 7 – seed, front view  $\times \frac{1}{2}$ ; 8 – seed, side view  $\times \frac{1}{2}$ . 1–5 from *Verdcourt & Greenway 150*; 6–8 from *Melville s.n.* Drawn by Pat Halliday. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*, part 1: fig. 36.)

obovate or ovate, obtuse, subacute or apiculate; mostly grown as source of rubber. 2. *M. glaziovii*

1. *M. esculenta* Crantz. (1766)

– type: specimen in *Herb. Linn.*, no. 1141.11

*M. utilisissima* Pohl (1827).

Little-branched woody herb up to 5 m high; roots large, fusiform, starchy. Leaves 3–5(–7)-lobed, often not peltate, lobes oblanceolate, 6–14(–17)  $\times$  1–6 cm, tip acuminate, entire. Raceme branched, 8–11 cm long. Male flower: pedicel 5 mm long, bent downwards; calyx cylindrical-conic in bud, tube 6 mm long, lobes 6  $\times$  4 mm, greenish-orange and crimson, sometimes dark-veined. Female flower: pedicel 7 mm extending to 25 mm; sepals 10  $\times$  5 mm; styles

and stigmas looking like a bunch of grapes. Capsule ellipsoidal to subglobose, 15–17  $\times$  15 mm, rugulose, 6-winged, wings undulate-subcrenate. Seeds  $\pm$  5-sided. 11  $\times$  5.5  $\times$  3.5 mm, pale grey, sometimes mottled; caruncle 3 mm wide. Fig 85.32.

Increasingly cultivated in western and southern Ethiopia; 1300–1550 m. WG IL GG; native of eastern tropical South America now widely cultivated throughout the tropics and as a pot plant. *Mesfin & Kagnev 2370*; *Tewolde-Berhan 1606*.

Mainly grown for the edible roots which form a staple food in many tropical areas. Some cultivars are quite drought resistant, and the mature roots can stay long in the ground before being harvested. There are also forms which

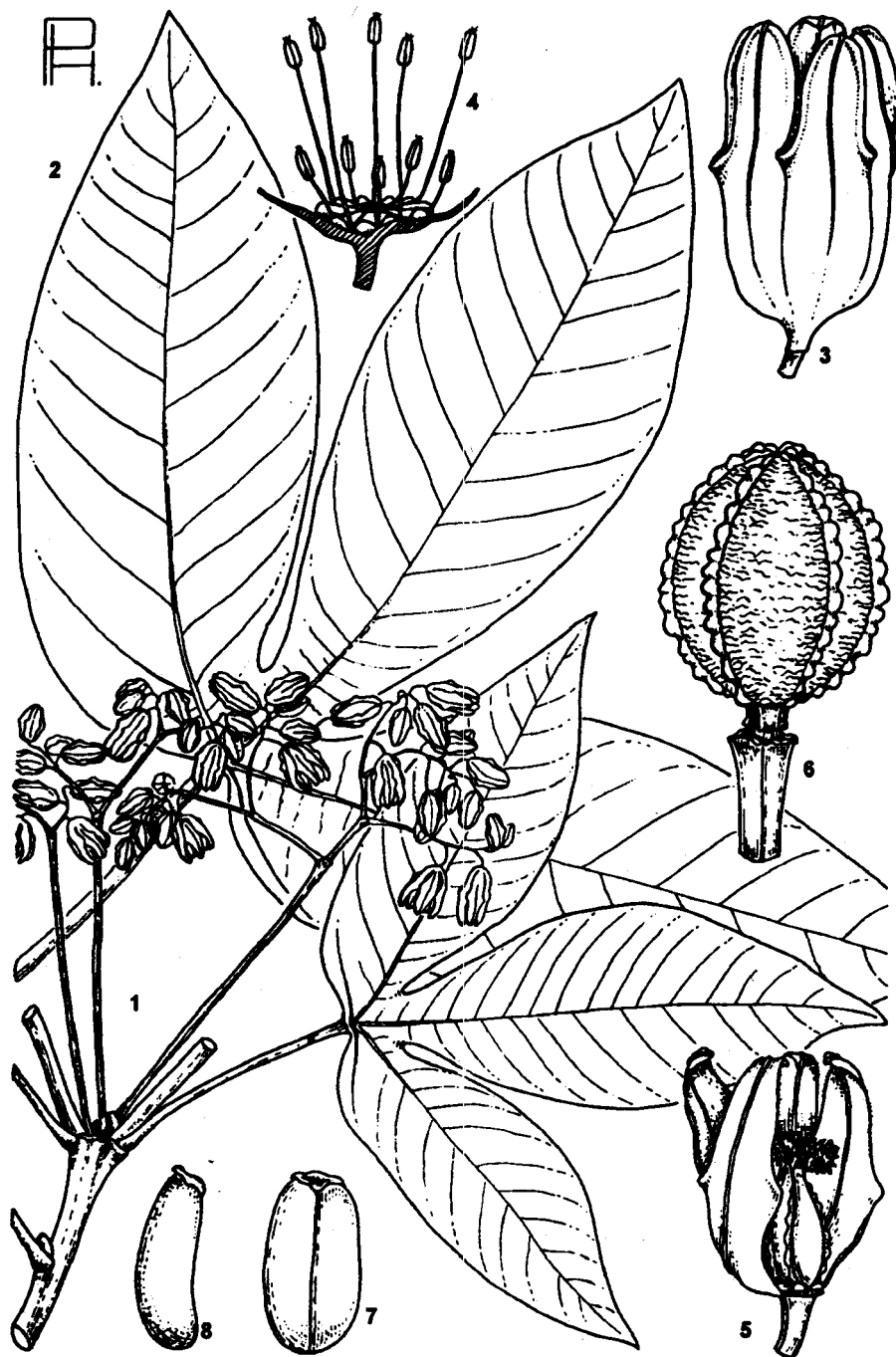


Figure 85.32

**MANIHOT ESCULENTA:** 1 – flowering branch x  $\frac{2}{3}$ ; 2 – leaf x  $\frac{2}{3}$ ; 3 – male flower x 3; 4 – stamens x 3; 5 – female flower, one sepal removed x 3; 6 – fruit x 2; 7 & 8 – seed, front and side view x 2. 1–4, 6–8 from Pirozynski 257; 5 from Last s.n. Drawn by Pat Halliday. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*, part 1: fig. 68.)

have been selected for their attractive foliage and their ability to withstand the dry atmosphere in buildings.

2. *M. glaziovii* Muell. Arg. (1874)  
– type: Brazil, Glaziou 1022.

Shrub or tree to 6 m high; bark dark reddish-brown, papery, peeling. Leaves similar to those of *M. esculenta*, always peltate, lobes broader, (2)–4–8(–9.5) cm wide, tip obtuse, subacute or apiculate. Raceme as in *M. esculenta*. Capsule 19–20 x 19–22 mm, smooth becoming muricate-tuberculate when dried. Seeds biconvex, 15 x 10 x 7 mm, orange-brown heavily mottled blackish.

Cultivated; 1000–2000 m (estimated). EW WG HA;  
Native of northern South America, formerly widely grown

as a source of rubber. Baldrati 1865; Benedetto 356; Robecchi-Bricchetti 165.

There are no recent collections of this species and it is probable that this species was introduced by the Italians but never taken up locally.

27. **SUREGADA** Rottl. (1803)  
*Gelonium* Willd. (1806) non Gaertn. (1791)

Trees or shrubs, usually glabrous. Leaves alternate, usually entire, areas between veins on upper side raised into distinctive swellings; stipules falling soon, leaving prominent scars. Usually dioecious; flowers in leaf-opposed cymes which are  $\pm$  glutinous when young. Male flowers: sepals (4)–5–6(–7), imbricate, innermost petaloid; petals absent;

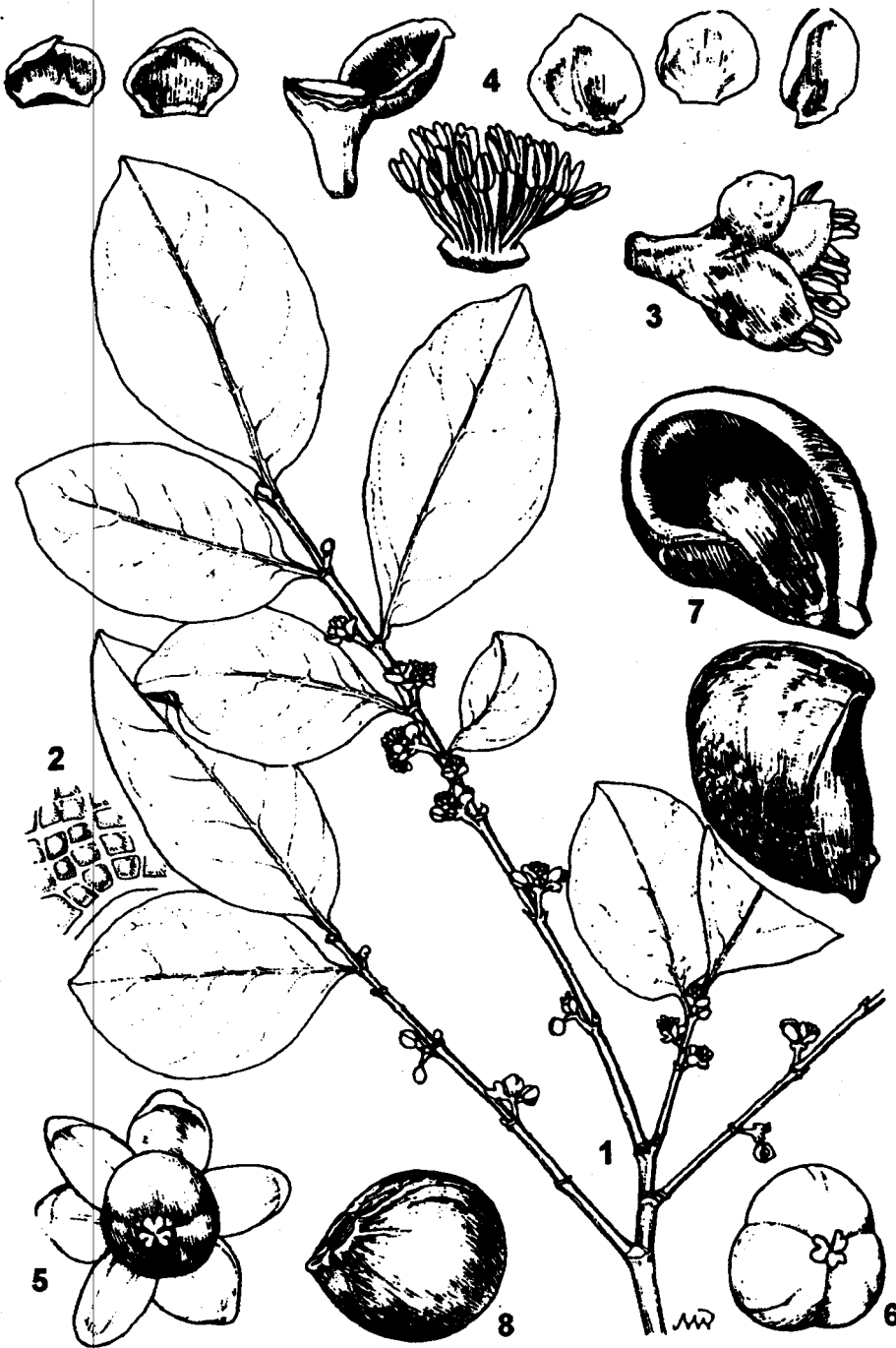


Figure 85.33  
**SUREGADA PROCERA**: 1 – male flowering branch  $\times \frac{1}{2}$ ; 2 – leaf surface pattern  $\times 8$ ; 3 – male flower  $\times 4\frac{1}{2}$ ; 4 – male flower dissected  $\times 4\frac{1}{2}$ ; 5 – female flower  $\times 4\frac{1}{2}$ ; 6 – young fruit  $\times 4\frac{1}{2}$ ; 7 – mericarp valves  $\times 4\frac{1}{2}$ ; 8 – seed  $\times 4\frac{1}{2}$ . 1, 7, 8 from Wye & Moon in Battiscombe 619; 2 from Moon 416; 3 & 4 from Gillett & White 20230; 5 from Perdue & Kibuwa 8112; 6 from Van Someren in Herb. Amani 9495. Drawn by Mary Millar Watt. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*, part 1: fig. 71.)

disc annular or of free glands; stamens (6–)10–25(–60), free; pistillode absent. Female flowers: sepals (4–)5–6(–8), imbricate, subequal; petals absent; disc annular, staminodes 5–10; ovary (2–)3(–4) locular, ovules solitary; styles with linear lobes, united at base. Fruit a capsule, sometimes indehiscent, or a drupe. Seeds ovoid, outer testa fleshy; caruncle absent.

About 40 species in the Old World Tropics, of which 8 are found in Africa with 1 in the Flora area.

*S. procera* (Prain) Croizat (1942);

*Gelonium procerum* Prain (1911) – type: Kenya, Elliot 178.

Evergreen shrub or small tree, 2–15(–24) m high; stems

angular, zigzag, green. Leaves  $\pm$  elliptic, (3–)5–12(–14)  $\times$  1.5–6.5 cm, base decurrent into petioles 3–5(–7) mm long, tip obtuse, entire or obscurely crenate, underside with each vein reticulation filled by a raised pustule; stipules triangular, 2  $\times$  1 mm, scars up to 2 mm long. Cymules up to 1.5 cm wide. Male flowers: pedicels 1–2(–3) mm; sepals (5–)6(–7), outer 3  $\times$  3 mm, greenish, inner smaller, whitish; stamens (16–)20–27, interspersed with disc glands. Female flowers: pedicels 2–3 mm accrescent to 5–6 mm; sepals 6, similar to outer male sepals; disc crenate; staminodes prominent; styles bifid. Capsule (2–)3-lobed, (6–)8–10 (–11)  $\times$  (9–)10–12(–15) mm, dehiscent, smooth drying reticulate. Seeds 5–7  $\times$  4–5 mm, pale brown or greyish. Fig. 85.33.

Understorey and margins of montane forest with *Podo-*

*carpus gracilior*, *Aningeria adolfi-friedericii* and *Warburgia*; 1500–1950 m. SD BA; Sudan, Kenya, Uganda, E Zaire, NW Tanzania, Mozambique, Malawi, Zambia, Zimbabwe, South Africa (Natal). *Chaffey* 438; *Friis* et al. 3482; *Mooney* 8411.

## 28. *JATROPHA* L. (1753)

*Pax, Pflanzenreich IV* (147): 21–113 (1910); *Dehgan & Webster, Univ. California Public. Bot.* 74: 73 pp. (1979); *Hemming & Radcliffe-Smith, Kew Bull.* 42: 103–122 (1987); *Gilbert & Thulin, Nordic J. Bot.* 11: 413–419 (1991).

Trees, shrubs or tuberous-rooted herbs; stems fleshy, with clear latex which turns red when exposed; indumentum simple, sometimes glandular. Leaves alternate, sometimes clustered on short-shoots, mostly palmately lobed, sometimes pinnatifid; stipules spinescent or divided into gland-tipped segments. Usually monoecious. Inflorescences terminal, leaf-opposed or axillary, usually cymose, female flowers terminating primary axes, male flowers in lateral cymules. Male flowers: sepals (4–)5(–6), imbricate; petals 5, imbricate or contorted, rarely absent; disc-glands annular or free; stamens (6–)8(–10), rarely more, often in 2 whorls of 5 + 3 with filaments fused into column; pistillode absent. Female flowers: sepals and petals as in male but larger; staminodes sometimes present; disc-glands free, 5-lobed or annular; ovary (1–)2–3(–5)-locular, ovules solitary; styles entire or bifid. Fruit a capsule, usually subcylindrical, 3-lobed, rarely ± indehiscent and somewhat fleshy. Seeds ovoid, slightly compressed or oblong; caruncle present, usually much divided.

About 175 species throughout the drier tropics and subtropics, extending into extratropical N America and S Africa. About 70 species in Africa with a notable centre of diversity within the Horn of Africa where some species are locally subdominant. 15 species are known from the Flora area with 3 more occurring in Kenya and Somalia near the border and which could be found in Ethiopia in the future.

The pattern of variation of some groups in this area is not clear and there could be cases for revising the number of taxa recognized upwards or downwards depending on the interpretation of local variation. All Ethiopian species except for *J. curcas* belong to subgen. *Jatropha*.

Some American species with bright red flowers are grown as ornamentals.

1. Most leaves borne on very short axillary shoots; stipules undivided except sometimes in seedlings, often forming spines; leaves entire or pinnately to very shallowly palmately lobed, never deeply palmately lobed. 2
  - Leaves spaced along normal shoots; stipules divided and/or gland-tipped, rarely spiny and then leaves deeply palmately lobed. 7
2. Leaves sessile with cuneate base, glabrous or sparsely puberulent; petals up to 3.5 mm long, greenish or pale reddish; fruit up to 9 mm long, glabrous, not ridged. 3
  - Leaves with long petiole and cordate base, tomen-

tose both sides; petals 9–11 mm long, pale yellow; fruit c 25 mm long, tomentose, conspicuously ridged towards tip. 1. *J. dichtar*

3. Leaf margins entire, sinuate or with rounded lobes, without glands. 4
  - Leaf margins with close-spaced gland-tipped teeth. *J. euarguta*
4. Leaves entire or obscurely sinuate. 5
  - Leaves clearly pinnately lobed. 6
5. Stipules distinctly spiny; leaves oblanceolate-spathulate; female sepals densely puberulent. 2. *J. rivae*
  - Stipules almost absent; leaves fan-shaped; female sepals glabrous. *J. robecchii*
6. Erect shrub 0.5–1.5(–2.5) m high. 2. *J. rivae*
  - Subprostrate shrublet up to 15 cm high. 3. *J. horizontalis*
7. Leaves up to 5-lobed, lobes broad, entire to serrate or crenate, never coarsely toothed; flowers yellow, dull green to pale red (wild). 8
  - Leaves deeply palmately (5–)7–13-lobed, lobes narrow, usually irregularly and coarsely toothed, almost pinnatifid; flowers brilliant red (grown as ornamental). 14. *J. multifida*
8. Herb or much-branched shrub to 2 m; stipules persistent, usually glandular; fruit dehiscent, up to 15 mm long or if longer with prominent wings, mesocarp thin. 9
  - Tree to 4.5(–8) m, often used as live fence; stipules very small, soon falling; fruit somewhat fleshy or very tardily dehiscent, to 25–30 x 20 mm. 15. *J. curcas*
9. Erect herb or shrublet with thickened base and few stems to 1 m high; stipules at least 3 mm long. 10
  - Densely branched shrub to 2 m high; stipules reduced to clusters of clavate glands less than 2 mm long. 4. *J. pelargonifolia*
10. Stipules divided into slender, soft, gland-tipped segments, rarely the base only becoming hard and persistent. 11
  - Stipules forming spines, usually branched. 5. *J. ellenbeckii*
11. Plants glabrous or very sparsely puberulent. 12
  - Plants distinctly hairy, often tomentose, throughout. 16
12. Leaf-margin entire except sometimes for 1–3(–5) prominent glandular mucros on each lobe. 13
  - Leaf-margin glandular-serrate. 15
13. Leaves without marginal glands; fruit subcylindrical, up to 15 mm long, lobes rounded. 14
  - Leaves with prominent glandular mucros, 3 on middle lobe, 1 on each lateral lobes; fruit obconical, c 30 mm long, prominently winged. 6. *J. tropaeolifolia*
14. Lobes of leaves with cuspidate tips, usually at least some with marginal teeth; stipules very fine and thread-like. 7. *J. aceroides*
  - Lobes of leaves with rounded to retuse tips, margins always entire; stipules relatively stout. 10. *J. sp.* = *Friis* et al. 1011

15. Leaves coarsely serrate-dentate; outer stamens free.  
8. *J. glauca*  
– Leaves finely serrate-crenate; outer stamens connate to inner.  
9. *J. spicata*
16. Leaves 5-lobed, base cordate (southern Ethiopia). 17  
– Leaves 3-lobed, base cuneate to rounded (western Ethiopia). 18
17. Leaf-blade 0.7–1.6(–2) cm long. 11. *J. mollis*  
– Leaf-blade 5–10 cm long. *J. stuhlmannii*
18. Leaves divided for more than 4/5ths of length, lobes up to 15 mm wide, marginal glands *c* 0.5 mm long; ovary glabrous. 12. *J. aethiopica*  
– Leaves divided for up to 3/5ths of length, lobes often over 20 mm wide, marginal glands over 1 mm long; ovary hairy. 13. *J. gallabatensis*

*J. euarguta* Gilbert & Thulin (1991) [*J. arguta* sensu Radcl.-Smith (1987) non Chiov. (1929)] has been collected on the Kenyan side of the Dawa river and must surely occur within the Flora area. It resembles *J. rivae* closely but the leaves have very distinctive glandular-dentate or denticulate margins.

*J. robecchii* Pax (1897) also occurs very close to the Ethiopian border in Somalia and should be found in the botanically  $\pm$  unknown areas of gypsum in the south of BA and HA regions. It is also close to *J. rivae* but has much broader, fan-shaped, leaves and stouter, spineless stems.

*J. stuhlmannii* Pax (1895) has been collected at Dandu in northern Kenya very close to the border with Sidamo. It is very closely related to *J. mollis* which may perhaps prove to be no more than a depauperate form of this species.

1. *J. dichter* Macbride (1934);  
*J. ferox* Pax (1894), non Muell. Arg. (1874) – types: Somalia, *Robecchi-Bricchetti* 59 (169) & BA, along Web Ruspoli (Weyb) River (fide date of collection, 28 Feb. 1892), *Ruspoli & Riva* '506 (599) 446' (both FT syn.).

Erect shrub 1–3 m high; bark dark reddish brown, conspicuously peeling. Leaves mostly on short-shoots, tomentose; petioles 0.4–2 cm long; leaf-blade suborbicular, obscurely 3–5-lobed, 1.5–5.5 x 1.5–6 cm, base cordate, lobes obtuse, entire or indistinctly toothed; stipules forming strong spines (0.2–)1–5 cm long, occasionally branched. Cymes on short-shoots, dense, flat-topped, to 6.5 cm long, tomentose except for inside of petals; bracts 3–9 mm long. Male flowers: sepals 7–12 x 1–1.5 mm; petals 17–19 mm, coherent into tube as long as sepals, yellow or cream; stamens 10, filaments joined. Female flowers: perianth similar, petals free, turning pink. Capsule 25 x 30 mm, lobes prominently ridged towards tip, densely tomentose. Seeds ovoid, 14–17 x 10–12 mm, dark brown; caruncle as wide as seed. Fig. 85.34.9.

Often subdominant in open *Acacia* – *Commiphora* bushland on deep red sandy 'haud' soil; 300–750 m. SD BA HA; Somalia, Kenya. *Ellis* 112; *Gilbert* 2094; *Gilbert* et al. 7507.

Hemming and Radcliffe-Smith (1987) recognise a

group of collections from Somalia with slender stems and spines and more densely tomentose leaves as var. *gracilis*.

2. *J. rivae* Pax (1897)  
– type: SD, Dawa River, near Dolo, *Ruspoli & Riva* '1218 (735) 1102' (FT holo.).

Densely branched shrub to 2 m high, shoots purplish;  $\pm$  puberulous throughout. Leaves mostly on short-shoots, subsessile, oblanceolate to sub-spathulate, 3–35 x 2–15 mm, base cuneate, tip rounded or emarginate, entire or sinuately lobed; stipules forming dark spines. Cymes axillary, often on short-shoots, up to 4.5 cm long. Male flowers: sepals *c* 1.5 mm long, glabrous; petals *c* 3.5 mm long, reddish turning yellow, glabrous; stamens 5 + 3. Female flowers: sepals accrescent to 8 x 2.5 mm, margin entire or gland-toothed, puberulous outside; petals as in male; ovary glabrous. Fruit 8–9 x 8 mm, glabrous, with prominent persistent style-base. Seeds 5–6 x 3.5 mm, yellowish brown; caruncle 2.5–3 mm wide. Fig. 85.34.1 & 2.

1. Stipular spines *c* 3 mm long; leaves  $\pm$  pinnately lobed. 2  
– At least some stipular spines more than 3 mm long; leaves entire to sinuately lobed. subsp. *quercifolia*
2. Leaves entire or almost so, 18–35 mm long; female sepals usually with glandular teeth. subsp. *rivae*  
– Leaves sinuately lobed at least towards tip, 3–15 (–25) mm long; female sepals usually entire. subsp. *parvifolia*

subsp. *rivae*

Locally codominant in open *Acacia* – *Commiphora* bushland on alluvial soils and deep sands; 300–450 m. SD BA; Kenya, Somalia. *Gilbert* et al. 7494, 7555; *Simmons* 204.

A very local endemic in the area where Ethiopia, Kenya and Somalia meet.

- subsp. *parvifolia* (Chiov.) Gilbert & Thulin, in *Nord. J. Bot.* 11: 414 (1991);  
*J. parvifolia* Chiov. (1934) – type: Somalia, *Suckert* 55.  
*J. arguta* Chiov. (1929).

Deciduous bushland, usually in stony places on limestone or gypsum; 400 m. HA; Somalia. *Glover & Gilliland* s.n.

Very common in the northern and central regions of Somalia but known only from a single collection within Ethiopia.

- subsp. *quercifolia* Gilbert & Thulin, in *Nord. J. Bot.* 11: 415 (1991)  
– type: Kenya, *Gilbert & Thulin* 1068.

Open deciduous bushland on a range of substrates, both basement complex and volcanic; altitude in Ethiopia not recorded, probably 600–800 m. GG; Kenya, Tanzania. *Corradi* 5564, 5610.

3. *J. horizontalis* M. Gilbert (1991)  
– type: SD, 40 km from Negele on road to Filtu, *Friis* et al. 3166 (K holo., ETH C UPS iso.).

Closely related to *J. rivae* but a semi-prostrate shrublet not more than 10 cm high and up to 100 cm wide. Leaves



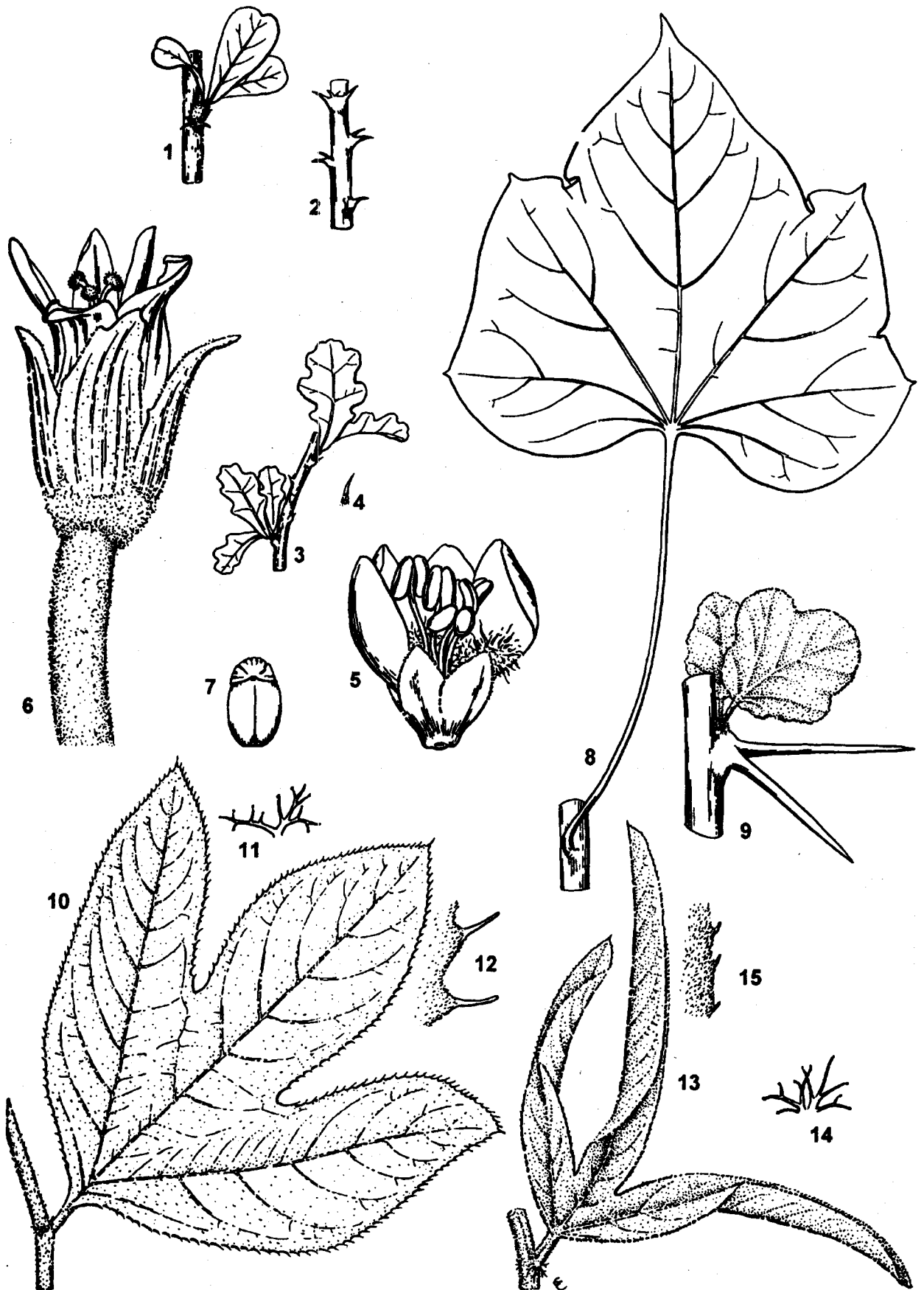


Figure 85.34 *JATROPHA RIVAE*: 1 – stem with leaf and young stipules  $\times \frac{2}{3}$ ; 2 – persistent stipules  $\times 1$ . *J. HORIZONTALIS*: 3 – leaf  $\times \frac{2}{3}$ ; 4 – stipule  $\times 1$ ; 5 – male flower  $\times 12$ ; 6 – female flower, one petal removed  $\times 12$ ; 7 – seed  $\times 3$ . *J. CURCAS*: 8 – leaf  $\times \frac{2}{3}$ . *J. DICCHAR*: 9 – leaf & spines  $\times \frac{2}{3}$ . *J. GALLABATENSIS*: 10 – leaf  $\times \frac{2}{3}$ ; 11 – stipule  $\times 1$ ; 12 – detail of leaf margin  $\times 6$ . *J. AETHIOPICA*: 13 – leaf  $\times \frac{2}{3}$ ; 14 – stipules  $\times 1$ ; 15 – detail of leaf margin  $\times 6$ . 1 from Gilbert et al. 7555; 2 from Gilbert et al. 8183; 3–7 from Friis et al. 3166; 8 from Ash 1077; 9 from Gilbert et al. 7507; 10–12 from Schweinfurth 932; 13–15 from Kotschy 398. Drawn by Eleanor Catherine.

elliptic-oblongate, 2–5 x 1–2 cm, tip rounded, distinctly pinnately lobed; stipules small, hardly spinescent. Petals yellowish or greenish-white. Seeds 6.5–7 x 4 mm, yellow-brown, caruncle as broad as seed, deep reddish. Fig. 85.34.3–7.

*Acacia* – *Commiphora* – *Harmsia* bushland on thin soil overlying limestone; 1250–1500 m. SD; not known elsewhere. Friis et al. 3166; Gilbert 3382; Gilbert et al. 7735.

4. *J. pelargoniifolia* Courb. (1862);

*J. villosa* (Forssk.) Muell. Arg. var. *pelargoniifolia* (Courb.) Chiov., *Fl. Somalia* 1: 306 (1929) – type: EE, Dissee (Dessei) Island, Courbon (P holo.).

Viscid shrub up to 1.5 m high; bark papery, brown, peeling. Leaves: petioles 0.4–2.8 cm long; leaf-blade palmately 3–5-lobed, base cordate, middle lobe 1–3 x 0.7–2 cm, tip rounded to emarginate, glandular-denticulate; stipules reduced to clusters of dark clavate glands up to 2 mm long. Cymes leaf-opposed, 2–12 cm long with peduncle to 7 cm long. Male flowers: sepals 2.5 mm long, glandular-denticulate; petals obovate, 4 mm long, connate at base, pink turning yellow, glabrous; anthers 5 + 3. Female flowers: sepals accrescent to 5 mm, gland-toothed; petals oblong, 4 x 2 mm, joined together at base, soon lost; ovary glabrous. Fruit 9 x 8 mm, lobes with apical tubercle or ridge, glabrous. Seeds 5.5–6.5 x 3 mm, greyish-brown, minutely spotted; caruncle 2.5 mm wide. Fig. 85.35.14–17.

var. *pelargoniifolia*;

*Croton villosus* Forssk. (1775); *J. glandulosa* Vahl (1790) *nom. illegit. superfl.*; *J. villosa* (Forssk.) Muell. Arg. (1866), *non* Wight (1848); *J. pelargoniifolia* var. *glandulosa* (Vahl) A. Radcl.-Smith, *Kew Bull.* 39: 788 (1987).

All parts pubescent; leaf-blade lobed for  $c \frac{1}{4}$  or more of overall length.

Very open deciduous bushland on sandy soils; sea level–750 m. EE HA; Sudan, Somalia, Kenya; Arabia. Bally 6769; Ellis 239; Hemming 1100.

Var. *glabra* (Muell. Arg.) Radcl.-Smith recorded from Somalia, Kenya and Arabia is closely related but glabrous. Var. *sublobata* (Schwartz) Radcl.-Smith recorded from Somalia and Arabia is hairy with subentire lobes.

5. *J. ellenbeckii* Pax (1903)

– type: HA, N of Wabe Shebele River, *Ellenbeck* 1135 (B holo. destroyed).  
*J. fissispina* Pax (1909).

Shrub to 2.5 m; young plants very thick-stemmed; bark smooth, pale; shoots and leaves densely pubescent. Leaves: petioles 3–12(–18) cm long; leaf-blade palmately 5–lobed, base truncate to shallowly cordate, middle lobe oblanceolate, (3–)5–7 x 1.5–3.3 cm, tip rounded, glandular dentate, lateral lobes progressively smaller; stipules with enlarged base, twice 2–3-partite into brown spines, gland-tipped when young, very prominent on young plants, rarely undivided. Cyme leaf-opposed, 10–20 cm long with peduncle up to 12 cm, lateral cymes to 4 cm long. Flowers as in *J. pelargoniifolia* but petals hairy within. Fruit 11–15 x 11–12

mm. Seeds 8–11 x 5 mm, pale brown or grey; caruncle 4 mm wide. Fig. 85.35.8 & 9.

In rock crevices, on lava or stoney or sandy soil in *Acacia* – *Commiphora* bushland; 750–1050 m. GG SD HA; Somalia, Kenya, Tanzania. *Getachew Aweke* 565; *Friis* et al. 2942; *Gilbert & Phillips* 9083.

6. *J. tropaeolifolia* Pax (1910)

– types: Somalia, *Robecchi-Bricchetti* 105 p.p. & 275.

Erect succulent subshrub, 0.6–0.9(–1.2) m high; roots tuberous; glabrous throughout. Leaves: petioles 4.5–10 cm long; leaf-blade palmately 3–5-lobed, base deeply cordate, middle lobe obovate, 3–7 x 1.8–6 cm, tip rounded with prominent glandular mucro usually plus 2–4 subapical mucros, otherwise entire, lateral lobes progressively smaller with solitary mucros; stipules not divided, 3 mm long with prominent gland-tip, becoming indurated, up to 9 mm long. Cyme terminal or leaf-opposed, up to 10 cm long with diffuse lateral branches up to 10 cm long; pedicels up to 10 mm long, articulated. Male flowers as in *J. pelargoniifolia* but petals free below, cohering above, disc-glands nearly as long as sepals. Female flowers much larger, petals 5–6 mm long, with 8 free stamens slightly shorter than petals, anthers apparently functional; ovary glabrous, winged. Capsule obconical, rather inflated, up to 29 x 37 mm, winged. Mature seeds not seen. Fig. 85.35.10 & 11.

Open *Acacia* – *Commiphora* bushland on gravelly soil;  $c$  750 m. HA; Somalia. *Ellis* 162.

7. *J. aceroides* (Pax & K. Hoffm.) Hutch.;

*J. lobata* Muell. Arg. subsp. *aceroides* Pax & K. Hoffm. in Pax, loc. cit.: 34 (1910) – types: Sudan, *Schweinfurth* 129, 842.

Shrub to 1 m high, glabrous throughout. Leaves shallowly palmately 3(–5)-lobed, up to 7 x 10 cm, base truncate to cordate, middle lobe 2.5–4 cm wide, outer smaller with outermost often reduced to large acute teeth, tip cuspidate to shortly acuminate, margin entire to sparsely acuminate-toothed; stipules divided, very fine and thread-like, up to 5 mm long. Cymes terminal or leaf-opposed, up to 6 cm long with peduncle 1.7 cm long; bracts to 3 mm long, mostly entire. Flowers as in *J. pelargoniifolia* but male sepals 3–4 mm long, joined at base, entire; petals  $c$  5 mm long, free. Female flowers: sepals  $c$  4 mm long, sometimes with 1–3 long teeth on each side near base; petals  $c$  6 mm long; ovary glabrous. Capsule  $c$  12 mm long, lobes rounded. Seeds  $c$  8 x 4 mm, pale brown/beige with darker blotches; caruncle 3.5 mm wide, reddish-brown with pale lacerate margin.

Barren rocky slopes and sandy wadis; up to 700 m. EE; Sudan (Red Sea Hills). *Pappi* s.n.

8. *J. glauca* Vahl (1790);

*Croton lobatus* Forssk. (1775) *non* L. (1753); *J. lobata* Muell. Arg. (1862) – type: Yemen, *Forsskål* s.n.  
*J. ricinifolia* Courb. (1862) – type: EE, Dissee (Dessei) Island, *Coubon* s.n. (P holo.).  
*J. lobata* Muell. Arg. var. *richardiana* Muell. Arg. in

DC., *Prodr.* 15.2: 1086 (1886) – type: TU, Goetleb on Tekaze River, *Schimper* (1853) 2311 (K iso.).

Shrublet 15–40(–100) cm tall, stem thick-based, little-branched, bark smooth, pale; glabrous to pubescent. Leaf: petiole 2.5–7 cm long; leaf-blade 3–5-lobed, base cuneate to truncate, middle lobe oblanceolate, 3.5–8 x 1.5–4 cm, tip acute or acuminate, coarsely and irregularly serrate, laterals progressively smaller, stipules with 4–6 subulate gland-tipped lobes up to 8 mm long. Cymes leaf-opposed, 2–11 cm long with peduncles up to 6.5 cm long. Flowers as in *J. pelargoniifolia* but petals light red, male flowers with outer stamens free. Capsule globose, 9 x 9 mm. Seeds 8 x 4.5 mm, pale grey; caruncle 3.5 mm, somewhat deeply fringed. Fig. 85.35.1–7.

Very open *Acacia* bushland, extending into semi-desert conditions, on lava and limestone; sea-level–1000 m. EE AF TU SU HA; Sudan, Djibouti, Yemen. *Hemming* 1178; *Bally* 6722; *Gilbert* 2347.

9. *J. spicata* Pax (1894)

– type: Kenya, *Hildebrandt* 2428.

*J. trifida* Chiov. (1932)

Slender shrublet up to 1 m high, with tuberous root; glabrous throughout. Leaves: petioles 2.5–6(–10.5) cm long; leaf-blade 3–5-lobed, base cuneate to slightly cordate, middle lobe oblanceolate, 7.5–10 x 2.5–4 cm, tip rounded or shortly acuminate, obscurely glandular-serrulate or serrate; stipules multifid, segments filiform, gland-tipped, to 13 mm long. Cyme leaf-opposed, up to 12 cm long with peduncle up to 8 cm, branches sometimes raceme-like. Flowers as in *J. pelargoniifolia* but sepals not gland-toothed. Fruit 10–12 x 10–11 mm. Seeds 7.5 x 4.5 mm, olive-brown; caruncle 3.5 mm wide.

In shade of bushes in *Acacia* – *Commiphora* bushland; c 700 m. ?HA (between Welwel in Ogaden & Las Anod in Somalia); Somalia, Kenya. *Glover & Gilliland* 993.

The species has not been recorded certainly from Ethiopia but, in addition to the collection cited above, there is a collection from Kenya very near the Ethiopian border so the occurrence does seem highly probable.

10. *J. sp.* = *Friis* et al. 1011

SD, 102 km from Negele on road to Filtu.

Similar to *J. spicata*; stem c 1 m high, unbranched; rootstock a large tuber; stems minutely pustulate. Leaves palmately 3-lobed, base cuneate, middle lobe up to 7.5 x 2.9 cm, lateral lobes much shorter, margin quite entire; stipules divided into linear gland-tipped lobes c 5 mm long. Cymes terminal on lateral branches, small. Flowers not seen. Young fruits with entire, glabrous sepals c 3 x 1 mm. Seeds 7 x 4 mm, fawn with darker markings; caruncle c 3.5 mm wide, red, closely adpressed.

*Acacia mellifera* – *Commiphora* bushland on limestone; 1250 m. SD; known only from one collection.

Most similar to *J. hildebrandtii* Pax from the East African coast but that species has smooth stems, enlarged stipule bases, cordate leaf-bases and glandular leaf and bract margins.

11. *J. mollis* Pax (1897)

– type: SD, Tombe (Tumpe), *Ruspolli & Riva* '511 (1111) 486' (B holo. destroyed; FT iso., K drawing of holo.).

Slender erect shrub to 1 m high; stems densely villous, glabrescent. Leaves crowded at stem tip; petioles 5–15 mm long; leaf-blade palmately deeply 5-lobed, base cordate, middle lobe oblanceolate-oblong, 7–16(–20) x 4–5 mm, tip acute, coarsely glandular dentate-denticulate, densely pubescent or tomentose; stipules with 2–3 subulate gland-tipped lobes 1–2(–3) mm long, hairy. Cyme terminal or subterminal, up to 5 cm long, axes pubescent. Flowers as in *J. pelargoniifolia* but sepals glabrous, male petals only 2 mm long, coherent at base. Capsule 10 x 10 mm. Mature seeds not seen.

Probably *Acacia* – *Commiphora* bushland on sandy soil. SD; Kenya. Known only from the type within Ethiopia.

Description based on *Gillett* 16430 from Tana River District, Kenya. It seems probable that this species could prove to be a depauperate form of the much more robust *J. stuhlmannii* Pax (1895) from Somalia, Kenya and Tanzania, which has leaves 5 cm or more long. It has been found at Dandu very close to the Ethiopia-Kenya border.

12. *J. aethiopica* Muell. Arg. (1864)

– type: Sudan, *Kotschy* 398 p.p.

Stems herbaceous, little-branched, up to 1 m high, all parts brownish-tomentose; roots tuberous. Lower leaves poorly developed; petioles up to 7 mm long, leaf-blade palmately deeply 3-lobed, base rounded, lobes subequal, oblong, up to 9.5 x 1.3 cm, tip acute, finely glandular-serrulate; stipules with subulate gland-tipped lobes up to 3 mm long. Cyme terminal or leaf-opposed, ± flat-topped, up to 20 cm long with peduncle 8 cm, 11 cm wide, bracts to 8 mm long, with conspicuous stipular glands. Flowers as in *J. pelargoniifolia* but stamens all free, female sepals conspicuously glandular-pectinate. Capsule c 12 mm long. Seeds 8 x 5 mm, pale grey; caruncle 3.3 mm wide, pale fawn. Fig. 85.34.13–15.

Deciduous woodland with *Pterocarpus*, *Terminalia*, *Borassus*, etc.; 900–1050 m. GJ; Sudan. *Thulin & Hunde* 4045, 4050.

13. *J. gallabatensis* Schweinf. (1868)

– types: GD, Metema, *Schweinfurth* 932 (B syn. destroyed; K isosyn.) & 933 (B syn. destr.) & *Steudner* 540 (B syn. destroyed).

Similar to *J. aethiopica*. Rootstock a branched tuber or thick rhizome. Stem erect, to 1 m high; densely pubescent throughout. Leaves not as deeply divided, base cuneate, lobes up to 11 x 4 cm, marginal glands 1 mm or more long. Bracts to 19 mm long. Flowers as in *J. pelargoniifolia* but male sepals subglabrous, female sepals conspicuously glandular-pectinate, ovary pubescent. Fruit 12 mm long. Seeds 9 x 5 mm, pale. Fig. 85.34.10–12.

Habitat not recorded; c 1000 m. GD; Sudan. Known only from the syntypes from within Ethiopia.

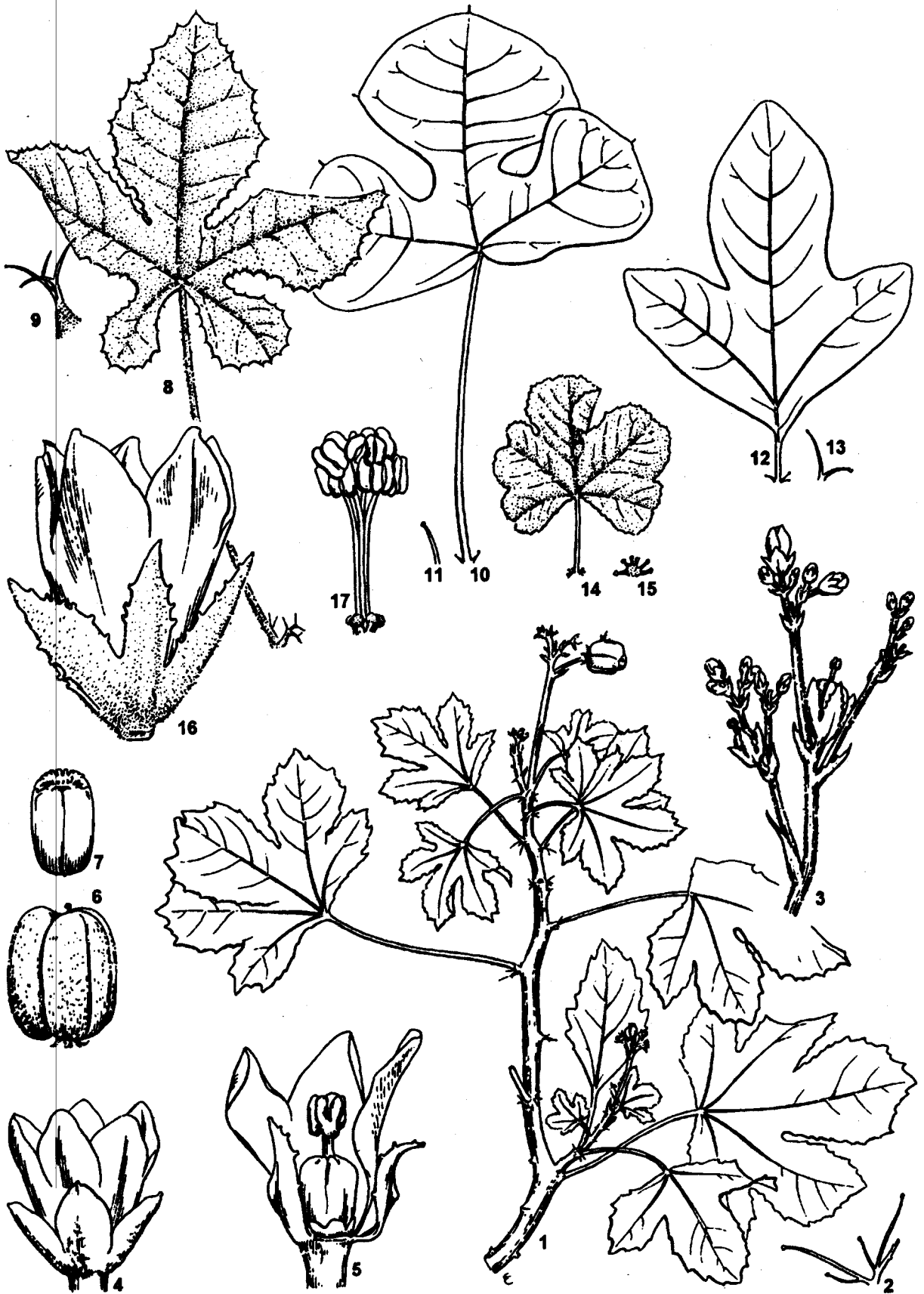


Figure 85.35 *JATROPHA GLAUCA*: 1 - flowering branch x 1; 2 - stipule x 3; 3 - part of young inflorescence x 4 1/2; 4 - male flower x 12; 5 - female flower x 12; 6 - fruit x 3; 7 - seed x 3. *J. ELLENBECKII*: 8 - leaf x 1; 9 - stipule x 3. *J. TROPAEOLIFOLIA*: 10 - leaf x 1; 11 - stipule x 3. *J. sp.*: 12 - leaf x 1; 13 - stipule x 3. *J. PELARGONIIFOLIA*: 14 - leaf x 1; 15 - stipule x 3; 16 - male flower x 12; 17 - stamen x 12. 1, 2, 4 & 7 from Gilbert 2347; 3, 5 & 6 from Papove 1400; 8 & 9 from Friis et al. 2942; 10 & 11 from Thulin & Warta 6492; 12 & 13 from Friis et al. 1011; 14-17 from Ellis 232. Drawn by Eleanor Catherine.

14. *J. multifida* L. (1753).

Shrub or small tree reaching 7 m high, glabrous throughout. Leaves deeply palmately (5-)7-13-lobed, lobes narrow, usually irregularly and coarsely toothed/ pinnately lobed, margins entire; stipules 1-2 cm long, very finely divided. Cymes long-pedunculate, flat-topped; petals c 8 mm long, brilliant red; stamens 5+3, anthers with sagittate bases. Capsule c 2.5 cm long.

A popular flowering shrub widely grown through the tropics, originating in tropical America. *Mesfin* et al. 3497.

*J. podagrica* Hook. is commonly grown in E Africa and may be met with in Ethiopia. It has similar brilliant red inflorescences but has a little branched swollen stem and distinctive clearly peltate shallowly 5-lobed leaves.

15. *J. curcas* L. (1753)

- type: 'from America'.

Shrub or small tree up to 4.5(-8) m high, ± glabrous throughout; bark smooth, pale, peeling off in translucent scales; latex ± milky. Leaves: petioles (3-)10-15(-20) cm long; leaf-blade broadly ovate, usually shallowly 5-lobed, 7-13(-18) x 7-14(-18) cm, base cordate, tip acuminate, lateral lobes acute to rounded, usually entire; stipules minute, soon lost. Cymes supra-axillary, often paired, ± flat-topped, up to 12 cm long in fruit, peduncle up to 5 cm, often pubescent. Male flowers: sepals 2 mm long; petals 3 mm long, forming tube, yellowish-green, hairy within, stamens 10. Female flowers: sepals 5 mm long, hairy; petals ± free, 6 mm long, hairy within; staminodes 10; ovary glabrous. Capsule ellipsoidal, 25-30 x 20 mm, mesocarp fibrous, tardily dehiscent or somewhat fleshy, yellowish becoming blackish. Seeds ellipsoidal, 17 x 10 mm, black, rough with minute paler pits; caruncle 4 mm wide, lobed, yellowish. Fig. 85.34.8.

Mostly cultivated as live fencing, apparently naturalized in riverine forest and deciduous woodland; 450-1300 m. SU IL KF SD BA; probably a native of tropical America but long introduced into the Old World tropics where it is now widely cultivated and naturalized. *Ash* 1077; *Friis* et al. 1927; *Thomerson* 601.

The seed provides a purgative ('physic nut') but it is so violent in its effects that its use is dangerous!

29. *CROTON* L. (1753)

Trees and shrubs, rarely herbs (or lianas), indumentum with stellate hairs and/or peltate scales. Leaves mostly alternate, entire or toothed, rarely lobed, petiolate, usually with 2 discoid glands at base of blade, often turning bright red or yellow prior to falling. Monoecious or dioecious. Inflorescence usually a terminal raceme, sometimes flowers in clusters, unisexual or with female flowers below male flowers. Male flowers (4-)5(-6)-merous; calyx-lobes valvate or imbricate; petals free, rarely absent; disc-glands small, free or laterally fused, rarely absent; stamens 5-many, inflexed in bud, inserted on usually pilose receptacles; pistillode absent. Female flowers: perianth as in male but petals often absent; staminodes sometimes present;

disc-glands free or annular; ovary (2-)3(-4)-locular, ovules solitary; styles 1-several times bifid, rarely lacinate. Fruit a capsule, sometimes rather fleshy and poorly dehiscent. Seeds usually smooth, carunculate.

A very large pantropical genus of about 800 species, mostly New World but with some 50 species in Africa, 8 of which occur in the Flora area.

1. Tree or shrub; leaves not lobed. 2
- Annual herb; leaves palmately 3-5-lobed. 8. *C. lobatus*
2. Undersides of leaves with overlapping silvery scales, veins strictly pinnate. 3
- Undersides of leaves with stellate hairs or deeply divided scales, sometimes whitish but never silvery, often palmately 3-5-veined at base. 6
3. Upper surface of leaf glabrous or with a few scales near margins. 4
- Upper surface of leaf uniformly stellate pubescent. 5
4. Upper surface of leaf with stellate hairs near margin; anther-filaments hairy. 1. *C. dichogamus*
- Upper surface of leaf glabrous, rarely with occasional scales; anther filaments glabrous. 2. *C. zambesicus*
5. Petiole 2-5(-9) mm long; capsule with a few conspicuous black scales. 3. *C. menyhartii*
- Petiole 10-27 mm long; capsule uniformly pale brown. 4. *C. somalense*
6. Leaf-blades up to 7.5 cm long; racemes 2.5-12 cm long, usually bisexual with up to 5 female flowers at base; shrub up to 3 m high. 7
- At least some leaf-blades over 10 cm long; racemes (7-)15-32 cm long, often unisexual; eventually forming a large tree. 8
7. Leaves pinnately veined, undersides when mature with dense, overlapping scales or hairs; racemes 1-3 cm long. 4. *C. somalense*
- Leaves with 3(-5) basal veins, undersides when mature with sparse scales and hairs often which do not overlap; racemes 2.5-12 cm long. 5. *C. schimperianus*
8. Glands on leaf-margins clavate, different from those at base of leaf-blade; leaf-blade persistently hairy above; fruits broader than long, brownish, not fleshy. 6. *C. macrostachyus*
- Glands on leaf-margins peltate, similar to those at base of leaf-blade; leaf-blade glabrescent above; fruits distinctly narrower than long, ripening orange-yellow, slightly fleshy. 7. *C. sylvaticus*

1. *C. dichogamus* Pax (1909)

- types: Kenya, *Scheffler* 1 & Tanzania, *Uhlig* 558.

Shrub or small tree 2-5(-7.5) m high, densely branched, most parts except upper leaf-surfaces with a dense cover of overlapping silvery and/or brown peltate scales. Leaves: petioles 0.5-2(-3) cm long; leaf-blade narrowly ovate to elliptic-lanceolate, 2-12(-16) x 1-5(-7.5) cm, base rounded to subcuneate or subcordate, tip usually acute, entire, basal glands subsessile or shortly stipitate, veins strictly pinnate, upper surface glabrous except for scattered stellate hairs near margin when young, underside silvery, sometimes dotted brown; stipules 1 mm long, falling soon.

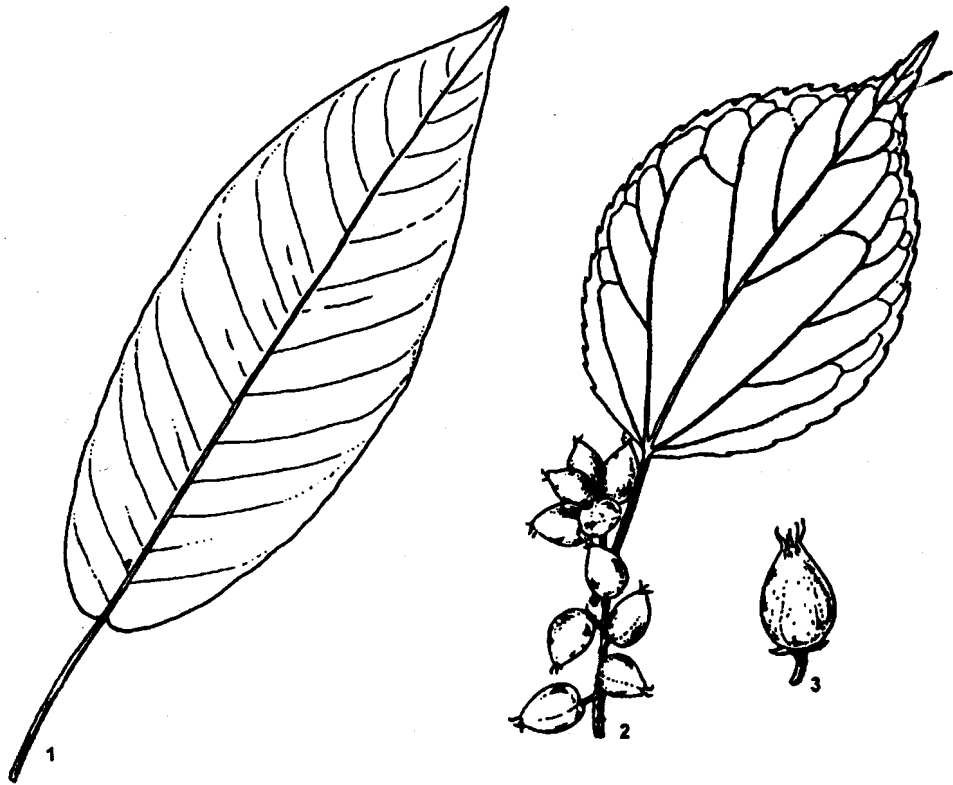


Figure 85.37 *CROTON ZAMBESICUS*: 1 – leaf. *C. SYLVATICUS*: 2 – fruiting branch x 2; 3 – fruit x 2. 1 from Mooney 8957; 2 & 3 from Friis et al. 3982. Drawn by Damtew Teferra.

Monoecious, racemes 2–4(–6) cm long, usually with lower third female, occasionally all male or mostly female. Male flowers: pedicels 3–5 mm long; perianth c 4 mm diameter at anthesis; stamens (13–)15(–20), filaments 2.5 mm long, pubescent below. Female flowers: pedicels 2–4 mm long, stout; sepals as in male; petals linear, up to 0.5 mm long, often absent; styles bifid, glabrous. Capsule oblong, 6–7 x 6–7 mm, brown-scaly. Seeds 5 x 3 mm, brown, caruncle convex, 1.5 mm wide.

Open *Acacia* woodland or bushland on lava or limestone, sometimes forming dense stands; 1350–1800(–2250) m. SU AR GG BA HA; Kenya, Uganda, Tanzania, Rwanda. *Burger* 2799; *Mooney* 9103; *Thulin* et al. 3810.

This species seems to be very unpalatable to most animals and dense stands are probably a good indicator of overgrazing.

2. *C. zambesicus* Muell. Arg. (1864)  
– type: Mozambique, *Kirk*.

Most like a robust form of *C. dichogamus*, forming a large tree 4–8(–12) m high. Leaves usually quite glabrous above, basal glands stalked, rarely sessile. Racemes (1.5–) 3–6(–9) cm long, usually lower quarter with female flowers, occasionally dioecious. Flowers rather larger, 5–6 mm diameter at anthesis; stamens (13–)17–20, filaments glabrous; styles 4–6–partite. Capsule 9 x 10 mm. Seeds 7 x 5 mm, pale greyish-brown, shiny; caruncle slightly convex, 1.5 mm wide. Fig. 85.37.1.

Stony stream beds; locally subdominant in damper hol-

lows within broad-leaved deciduous woodland; 650–1650 m. SU? GG; Sudan, Kenya, Uganda, Gambia east to Nigeria, S Angola east to Mozambique & South Africa (Natal). *Gilbert* 4167; *Gilbert & Phillips* 8996; *Turton* 108.

There are apparently 3 disjunct populations eastern, western and southern Africa.

3. *C. menyhartii* Pax (1898)  
– type: Mozambique, *Menyharth* 796, 797.

Closely related to *C. dichogamus*, differing mainly by the shorter petiole, 2–5(–9) mm long and the upper surface of the leaves uniformly covered with stellate hairs, male petals pubescent outside, fruit relatively broader, 6–7 x 7–9 mm, covered with a mixture of pale and almost black scales, seeds 4–6 x 2.5–4 mm, sometimes almost black.

*Acacia* – *Commiphora* woodland; 1125 m. BA; S Somalia, Kenya, south to South Africa (Natal) and Namibia. *Mesfin* et al. 4429.

Known in Ethiopia from one collection only.

4. *C. somalense* Vatke & Pax (1893)  
– type: Somalia, *Hildebrandt* 1530.

Shrub to 2.5 m; twigs ± straight and diverging at wide angles; indumentum of deeply divided peltate scales and stellate hairs, often red-brown when young. Leaves sometimes subopposite; petioles 1–2.7 cm long; leaf-blade ovate, (1–)1.5–7.5 x (0.9–)1.3–5 cm, base shallowly cordate to subcuneate, tip obtuse, margins entire, veins pinnate, upper surface uniformly stellate-hairy, underside usually silvery-scaly, sometimes brown-flecked, occasionally

with hairs more numerous than scales and then not silvery; stipules minute. Racemes terminal,  $c$  1(-3) cm long; bracts 1.5 mm long. Male flowers: pedicels up to 3.5 mm; sepals ovate,  $2 \times 1.3$  mm; petals oblong-ob lanceolate,  $2 \times 0.5$  mm, glabrous except for margins; disc-glands free; stamens  $c$  15, filaments pilose below. Female flowers: pedicels 2-4 mm, sometimes accrescent to 12 mm in fruit; calyx as in male, not accrescent in fruit; petals absent; disc 5-sided, pubescent; styles 3(-4), 2-lobed. Capsule subglobose,  $6 \times 7-8$  mm, with uniform adpressed pale brown scales. Seeds ellipsoid-ovoid, slightly compressed,  $4.5-5.5 \times 3-4$  mm, brown; caruncle  $c$  1 mm wide.

Locally common understory shrub in *Commiphora* dominated woodland; (400-)900-1200 m. SD; N & S Somalia, Kenya. *Gilbert et al.* 8118.

This species appears to replace *C. schimperianus* at lower altitudes where it is at least locally much more common than the single Ethiopian record suggests.

5. *C. schimperianus* Muell. Arg. (1865-6)

- type: TU, Goelleb on Takaze River, *Schimper* (1854) 2140 (K iso.).

*C. schimperianus* var. *acutissimus* Chiov., *Malpighia* 35: 61 (1939) - type: WU, between Baftie & M. Bifta, *Gortani & Jaboli* II/203 (FT holo.).

Shrub 1-3 m high; indumentum of stellate hairs and deeply divided peltate scales; stems flexuous, branching at  $\pm$  acute angles. Leaves: petioles 1-3 cm long; leaf-blade ovate,  $4.5-7 \times 3-5$  cm, base cuneate to subcordate, tip obtuse, often slightly acuminate, basal glands stalked, margin serrulate or crenulate with small dark marginal glands, occasionally entire, palmately 3(-5)-veined at base, densely stellate-pubescent above, underside with peltate scales and scale-like, often yellow-centred, hairs. Monoecious, racemes 2.5-12 cm long, mostly male with some female flowers at base, rarely unisexual. Male flowers as in *C. dichogamus* except filaments glabrous. Female flower: pedicel 10-15 mm long in fruit; sepals up to  $5 \times 3$  mm; styles stellate-hairy dorsally. Capsule 7-8  $\times$  8-9 mm, densely pale-buff scaly. Seeds  $3.3-4.5 \times 2.5-3$  mm, greyish-brown, shiny; caruncle  $c$  1 mm wide.

*Acacia* - *Commiphora* bushland and fringes of riverine woodland, often on limestone; 900-1450 m. TU WU SU SD BA; N Somalia, N Kenya. *Ash* 2464; *Friis et al.* 2653; *Gilbert et al.* 7456.

Material from the north, including the type, has narrower crenulate, rather than serrulate, leaves compared to the more abundant material from the south but the differences seem too slight for formal recognition. This species has been confused with the East African *C. scheffleri* Pax which has an indumentum with very few well developed scales, very accrescent fruiting sepals and larger seeds. *C. somalense* is superficially similar but is usually easily separated in the field by the distinctive branching pattern.

6. *C. macrostachyus* Del. (1848)

- type: TU, Djeladjerane, *Schimper* III:1665 (P holo., K iso.); *C. macrostachys* A. Rich. (1850).

*C. macrostachys* var. *mollissimus* Chiov., Miss.

*Biol. Borana* 98, t.21 (1939) - types: SD, Arero, *Cufodontis* 312 & Yavello, *Cufodontis* 432 (both FT holo.).

Shrub or tree, (2-)6-15(-25) m high, bark longitudinally fissured; indumentum of stellate hairs, some with long central ray. Leaves: petioles 1.5-11 cm long; leaf-blade ovate, 4-15(-20)  $\times$  2.5-10(-13) cm, base rounded to cordate, tip obtusely or subacutely acuminate, basal glands sessile or stalked, margin subentire to crenulate or serrulate with small clavate marginal glands, basal veins 3-5, palmate, upper side stellate-pubescent, densely stellate-pilose below; stipules 5-14 mm long. Mostly dioecious. Racemes (7-)15-32 cm long, mostly unisexual even on monoecious trees. Male flowers in clusters; pedicels 4-10(-14) mm long; sepals  $c$   $3 \times 2.5$  mm; petals  $c$   $3.5 \times 1.5-2$  mm; stamens 15-20, filaments 4 mm long, hairy below. Female flowers usually solitary; pedicels 2-5(-8) mm, hardly elongating in fruit; sepals  $3 \times 1.5$  mm; styles bifid, reflexed. Capsule oblong, 8-9  $\times$  8-10(-15) mm, evenly greyish stellate-pubescent, somewhat scaly. Seeds 7  $\times$  4 mm, longitudinally rugulose, grey; caruncle waxy, 4.5  $\times$  4 mm. Fig. 85. 38.

Forest margins and secondary woodlands, extending into disturbed areas and along edges of roads, mostly in soils of volcanic origin; (500-)1050-2350 m. EW TU GD GJ WU SU AR WG IL KF SD BA HA; west to Guinea, south to Angola, Zambia, Malawi & Mozambique. *Burger* 991; *M. & S. Gilbert* 1316; *Mooney* 5347.

7. *C. sylvaticus* Krauss (1845)

- type: S Africa (Natal), *Krauss* 142.

Similar to *C. macrostachyus* but indumentum much sparser and leaves greener, at least some marginal glands of leaf-blades distinctly peltate with sunken centre. Monoecious, racemes often bisexual. Male flowers with glabrous filaments. Capsule ellipsoidal, 7-11  $\times$  5-10 mm, becoming orange-yellow and slightly fleshy when ripe. Seeds 6  $\times$  4.5 mm, whitish, ventral face covered by white caruncle. Fig. 85.37.2 & 3.

*Celtis* - *Aningeria altissima* forest; 1050-1200 m. IL KF; west to Guinea, south to S Africa (Natal). *Chaffey* 1242; *Friis et al.* 3950, 3982.

8. *C. lobatus* L. (1753)

- type: 'from Mexico'.

Erect herb to 1 m high, slightly woody at base, branching after flowering from below racemes, often in whorls; indumentum of stellate and/or subsimple hairs, sometimes glabrescent. Leaves long-petiolate; leaf-blade palmately deeply 3-5-lobed, 2.5-10  $\times$  2.5-10 cm, middle lobe largest, elliptic, tip acuminate, margin crenate-serrate, very sparsely to moderately hairy. Monoecious, racemes erect, up to 15 cm long, lower half with solitary female flowers, upper half with clusters of male flowers. Male flowers very small, pedicel up to 2 mm long;  $c$  2 mm across at anthesis; stamens 10-13. Female flower: pedicel up to 2 mm in fruit; sepals linear-ob lanceolate, up to  $8 \times 1.5$  mm in fruit; styles free, 6-7-lobed to about middle. Capsule  $c$   $5.5 \times 5$  mm, pilose-glabrescent. Seeds  $c$   $4 \times 2.5$  mm, rugulose, dark brown with whitish coating; caruncle small, terminal.

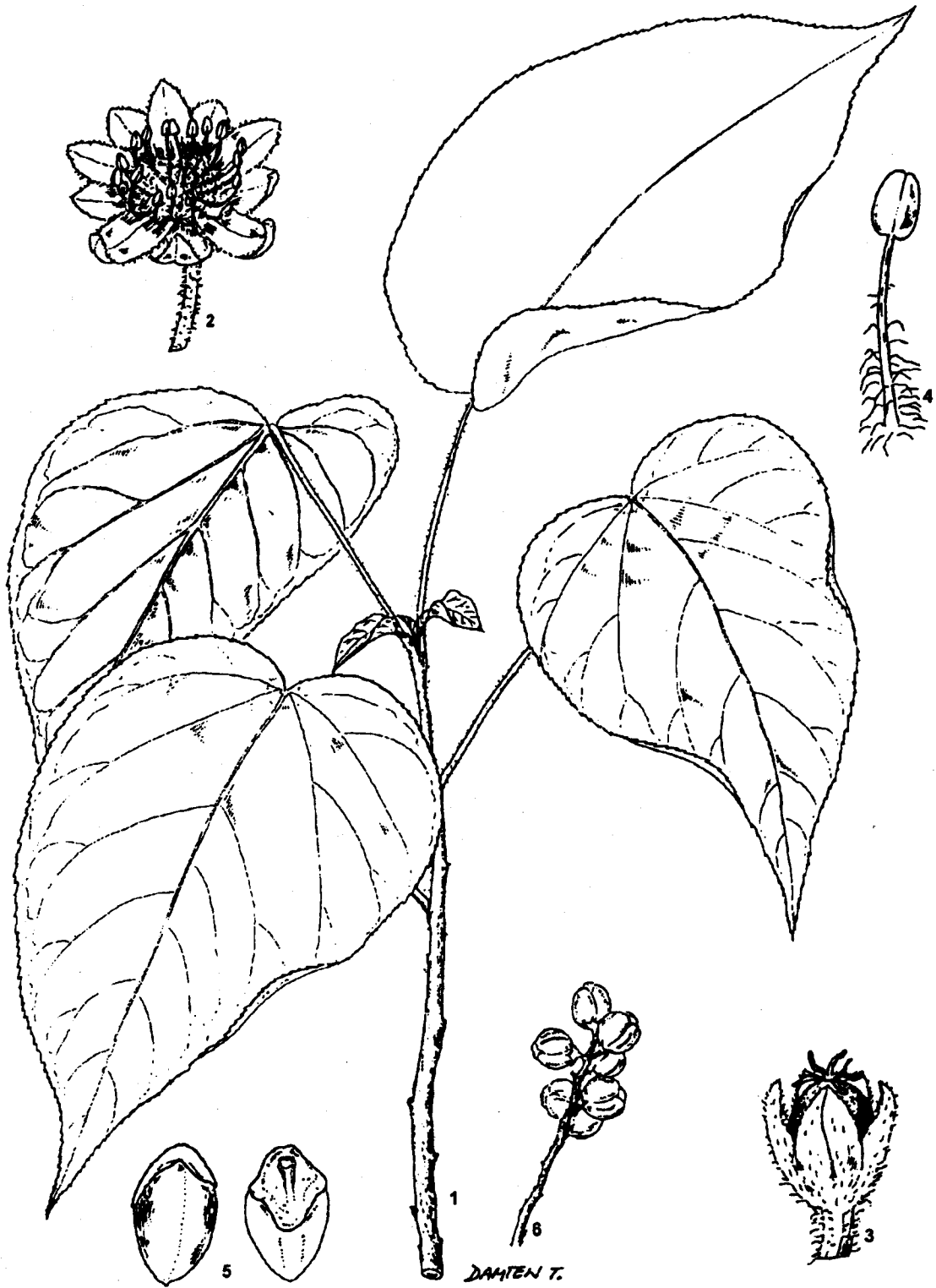


Figure 85.38 *CROTON MACROSTACHYUS*: 1 – leafy twig  $\times \frac{1}{3}$ ; 2 – male flower  $\times 6$ ; 3 – female flower  $\times 6$ ; 4 – stamen  $\times 10$ ; 5 – seed, back and front view  $\times 3$ ; 6 – infructescence  $\times \frac{1}{3}$ . 1 from *Mesfin T.* 4661; 2 & 4 from *Chaffey* 279; 3 from *Beals* B256; 5 from *Burger* 991; 6 from *de Wilde* 8466. Drawn by Damtew Teferra.



Weed of cultivation; 900–1200 m. EW TU; west to Guinea; Yemen, Pakistan; tropical America. *Beccari* 102; *Schimper* (1854) 2215.

Apparently an ancient introduction from the New World. No recent collections.

### 30. GIVOTIA *Griff.* (1844).

Tree or shrub; all parts stellate-pubescent. Leaves alternate, entire to palmately lobed; stipules sometimes absent. Male flowers in subapical panicles; calyx lobes 5, imbricate; petals usually 5, free at first, later joined laterally; disc of 5 lobes or separate glands; stamens 1–5 times as many as petals, joined at base; pistillode absent. Female flowers terminal, solitary or paniculate; calyx and corolla as in male; disc 5-lobed; ovary 1–3-locular, ovules solitary. Fruit a 1-seeded drupe. Seed smooth, without caruncle.

Genus of 4 species, 1 in India, 2 in Madagascar plus the following.

#### *G. gosai* *A. Radcl.-Smith* (1968)

– type: Kenya, *Moore & Napier-Bax* TNP/GS/3.

*Sterculia*- or *Lannea*-like low tree or shrub up to 5 x 7.7 m; bark smooth, grey; stems thick, axillary shoots often condensed, exuding clear latex when cut. Leaves mostly clustered on short shoots; petioles 0.5–2.5 cm with 0–3 discoid glands on upper side; leaf-blade suborbicular or reniform to triangular or shallowly (to deeply) 3–5-lobed, (1–)2–5 x (1–)7(–8) cm, base cuneate to shallowly cordate, tip obtuse, margin glandular, papery, glabrescent. Male panicle up to 4.5 cm long. Flowers subsessile; calyx-lobes oblong, 4.5–5.5 x 1.5–2.5 mm; petals oblanceolate-oblong, 5–8(–9) x 1.5–2.5 mm, glabrous except for large stellate hair on each side near base; stamens (3–)5(–7), 4–5 mm long, stellate pilose near junction. Female flower solitary (rarely paired); pedicel 4–5 mm long; ovary 1–2-locular, globose, style bifid, 6–7 mm long. Drupe subglobose, 27 x 26 mm when fresh, becoming yellow, glabrescent; endocarp thin, woody. Seed ovoid-subglobose, 14 x 12 mm, smooth, pale yellow mottled brown. Fig. 85. 39.

*Acacia* – *Commiphora* bushland on red sandy 'haud' soils; c 600 m. HA; Kenya, Somalia. *Hemming* 1488.

Seed reportedly edible.

### 31. SAPIUM *P. Browne* (1756)

*Pax, Pflanzenz. IV* (147.4): 199–258 (p. 253) (1912).

Trees, shrubs or subshrubs; usually glabrous and with milky latex from young shoots. Leaves alternate, usually glandular beneath and/or on margins; petiole with 2 glands at tip; stipules small. Usually monoecious with flowers in terminal or leaf-opposed racemes, mostly male with a few female flowers towards base. Male flowers in clusters; calyx open in bud, 2–3(–4)-lobed, membranous; petals and disc absent; stamens 2–3(–4), free or joined; pistillode absent. Female flowers: sepals 2–3(–4), ± imbricate or not overlapping; petals and disc absent; ovary 2–3(–4)-loculed, ovules solitary, styles linear, often strongly coiled.

Fruit a capsule or drupe. Seeds globose to oblong; caruncle present or not.

A pantropical genus of c 125 species, mostly American; 13 species in Africa plus 1 introduced ornamental.

1. Leaves elliptic, usually more than 2 times as long as broad; fruit 2-lobed, fleshy, indehiscent; indigenous tree. 1. *S. ellipticum*
- Leaves orbicular-rhomboid to transversely elliptical, about as long as broad; fruit 3-lobed, dry, dehiscent, seeds covered with thick layer of white wax; cultivated tree. 2. *S. sebiferum*

#### 1. *S. ellipticum* (*Krauss*) *Pax* (1912);

*Sclerocroton ellipticus* *Krauss* (1845) – type: South Africa (Natal), *Krauss* 269.

*Excoecaria manniana* *Muell. Arg.* (1864); *Sapium mannianum* (*Muell. Arg.*) *Benth.* (1880).

*Excoecaria abyssinica* *Muell. Arg.* (1864); *Sapium abyssinicum* (*Muell. Arg.*) *Benth.* (1880) – type: TU, Amba Sea, *Schimper* (1856) 565 (P holo., K iso.).

Evergreen shrub or tree up to 25(–30) m high, branches drooping, buds protected by scales. Leaves: petioles (2–)5–10(–15) mm; leaf blade usually elliptic, (2.5–)4–14(–18) x (1–)1.5–5(–7) cm, base cuneate or rounded, often minutely cordate, tip obtuse, acute or acuminate, shallowly crenate-serrate, rarely subentire, turning red or orange when old; stipules 2–2.5 mm long, hairy, soon falling. Raceme terminal, 4–12 cm long, all male or, usually, with 1–3(–4) female flowers. Male flowers 3–7 together; calyx 0.75 mm long; stamens 2(–3), exerted. Female flowers: pedicels 1.5–4 mm extending to 1–2 cm in fruit; ovary 2(–4)-locular; styles united below, up to 6 mm long, tightly coiled. Fruit a 2(–4)-lobed drupe, 6–8(–9) x 8–11(–14) x 5–6(–7) mm, smooth, ripening purple or black. Seeds subglobose, 5–5.5 mm long, yellowish brown. Fig. 85.40.

Along streams in areas of deciduous woodland, margins of moist montane forest or occasionally an important forest component; 1050–2100 m. TU GD GJ WG SU IL KF SD; west to Guinea, south to Angola and South Africa (Natal). *Friis* et al. 379; *Mooney* 8827, 9184.

#### 2. *S. sebiferum* (*L.*) *Roxb.* (1832);

*Croton sebiferus* *L.* (1753) – type: China, *Herb. Linn.* 1140

Broad-crowned tree to 18 m high; glabrous throughout. Leaves: petioles up to 5 cm long, slender, leaf-blade ± transversely elliptical, up to 5.5 x 5.5 cm, base cuneate, apex acuminate. Inflorescence a terminal raceme similar to that of *S. ellipticum*, flowers sweet scented. Fruit an acuminate 3-locular capsule c 1 cm long. Seed globose, c 5.5 mm diameter, covered in thick layer of whitish wax.

Cultivated tree, preferring relatively moist conditions, frost hardy. EE/EW; originally from China, now widely distributed. *Collector unknown* from Fil Fil, 1939 (in ETH).

Waxy seed covering removed to form a vegetable tallow used for candles, cosmetics and soaps; the seeds themselves yield 'Stillingia Oil' when crushed, a high quality drying oil used for paints and varnishes.

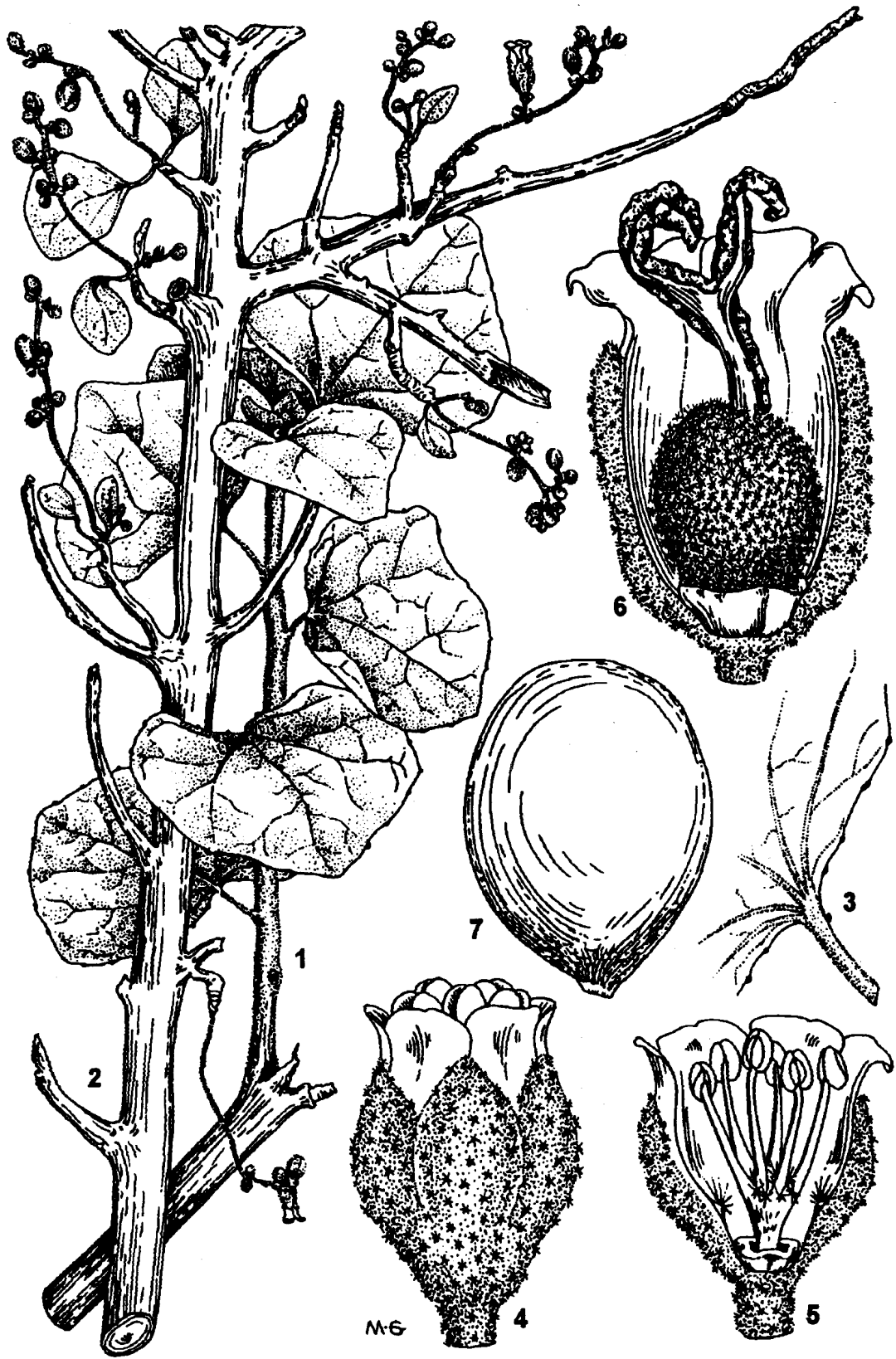


Figure 85.39 *GIVOTIA GOSAI*: 1 – young leafy shoot  $\times \frac{3}{4}$ ; 2 – male flowering branch  $\times 1\frac{1}{2}$ ; 3 – leaf edge, showing glands  $\times 3$ ; 4 – male flower  $\times 9$ ; 5 – male flower, opened out  $\times 9$ ; 6 – female flower, opened out  $\times 9$ ; 7 – fruit  $\times 3$ . All from Moore & Napier-Bax TNP/GS/3. Drawn by Mary Grierson. (Reproduced from *Fl. Trop. E. Afr. Euphorbiaceae*, part 1: fig. 62.)

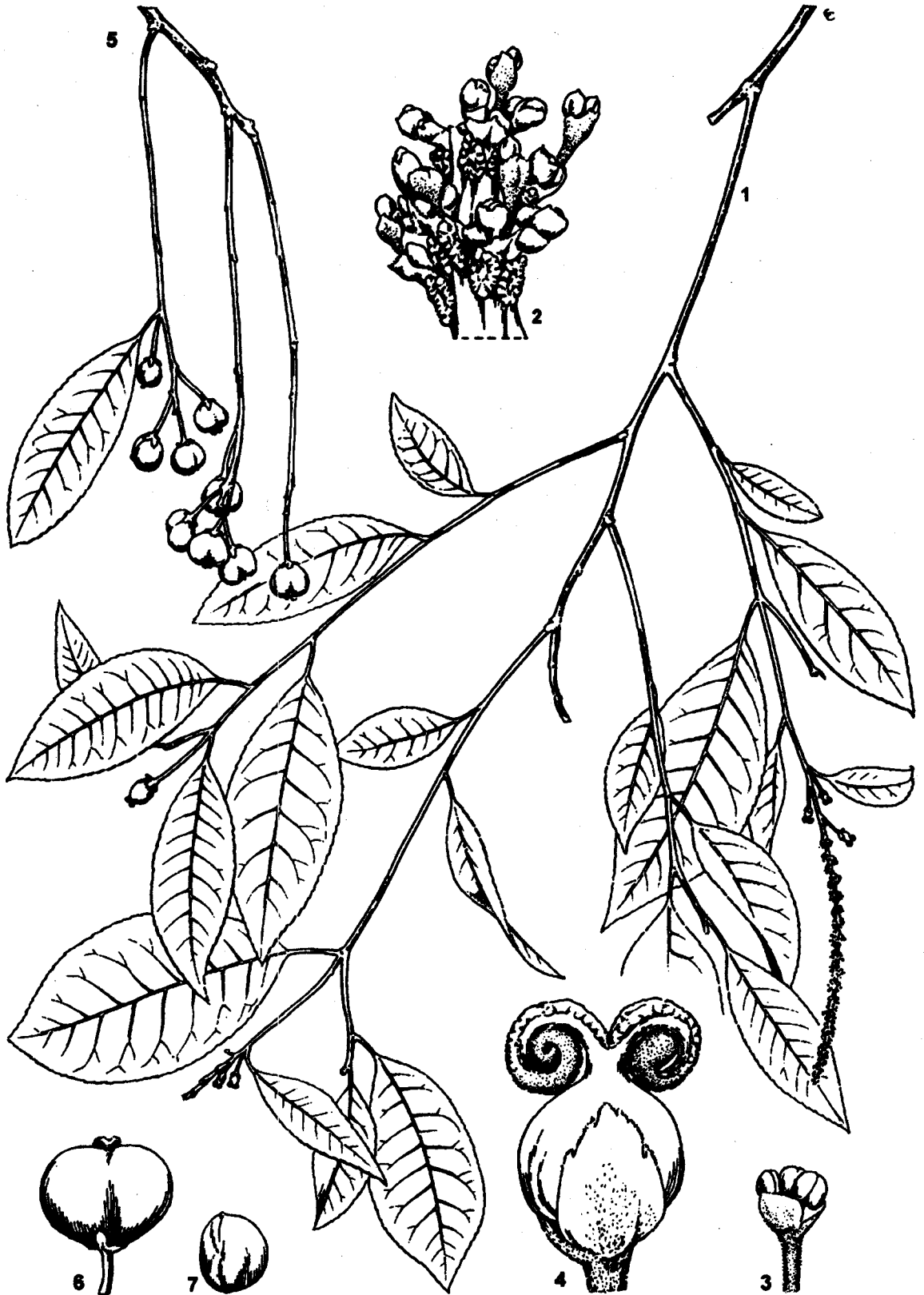


Figure 85.40 *SAPIUM ELLIPTICUM*: 1 - habit x 1; 2 - detail of male part of inflorescence showing extrafloral nectaries x 6; 3 - male flower x 12; 4 - female flower x 12; 5 - branch with fruit clusters x 1; 6 - fruit x 3; 7 - seed x 3. 1 & 4 from *de Wilde* 9304; 2 & 3 from *Friis et al.* 2244; 5-7 from *Mooney* 9184. Drawn by Eleoner Catherine.

## 32. EUPHORBIA L. (1753)

*Chamaesyce* Gray (1821); *Poinsettia* Graham (1836).

Pax in Engl. & Prantl, *Pflanzenfam.* ed. 2, 19c: 208 (1931); Gilbert, *Kew Bull.* 42: 231–244 (1987); Carter, *Euphorbiaeae in Euphorbiaceae (Part 2) Fl. Trop. E. Afr.*: 409–533 (1988).

Trees, shrubs (rarely scandent) or herbs, often succulent, all parts with copious white latex. Leaves alternate or opposite, sometimes reduced to scales or absent, sometimes inserted on horny 'spine-shields' (subgen. EUPHORBIA); stipules often present, mostly as glands or small spines – 'prickles' (subgen. EUPHORBIA), absent in sect. ESULA. Inflorescences compound with dichasial cymes of 'cyathia' or 'pseudumbellate' (with a terminal cyathium subtended by a whorl of 3 or more cymes). Cyathia flower-like, made up of an involucre subtended by a pair of bracts, the involucre with (1–)4–5 (or more) marginal glands alternating with short, often fimbriate, lobes and enclosing male flowers, bracteoles and, usually, a central female flower, occasionally unisexual, rarely dioecious. Male flowers reduced to a single naked stamen with an articulation at the junction of the pedicel and filament. Female flowers with a rudimentary perianth occasionally present, usually naked, disc and staminodes absent; ovary (2–)3-locular, 1 ovule per locule, styles bifid or capitate. Fruit a typical regma breaking up explosively when ripe. Seeds with a ventral line (raphe), caruncle present or not.

An extremely large genus variously estimated to include 1500–2000 species throughout the world but most diverse in the tropics, especially Africa.

Florally the genus is relatively uniform but the vegetative diversity is enormous. There have been attempts to split the genus into more manageable smaller genera in some local Floras but the inertia of such a large and widespread genus is such that these have not been taken up more generally. The case for recognizing *Chamaesyce* is particularly strong and allied genera within the EUPHORBIAEAE such as *Monadenium* in this account are no more distinctive than the subgenera recognized here. There is probably a good case for treating the latter as genera in their own right but this should not be done until the genus as a whole, particularly in the New World, has been reviewed.

## Key to subgenera and anomalous species

1. Geophytes (stems below ground with only leaves and inflorescences above ground); flowers and leaves often produced at different times ('hysteranthus'). 2
  - Herbs, shrubs or trees with aerial stems; flowers and leaves usually produced at the same time except sometimes in some succulent species with very reduced leaves. 3
2. Leaves not fleshy, usually uniformly purplish on underside; cyathia subtended by pink, white or buff petaloid bracts longer than involucre, glands usually 6, 4 large plus 2 small.
  - subgen. LACANTHIS (spp. 46–50)
  - Leaves fleshy, irregularly streaked with red; cyathia subtended by brownish scale-like bracts shorter

than involucre, glands 5, all similar.

45. *E. monadenioides* (subgen. EUPHORBIA)
  3. Stem globose or nearly so, branching only after injury; spines and leaves apparently absent (sometimes ± discernible on cultivated plants). 4
    - Stems elongated, branched; leaves and/or spines present, almost always obvious. 5
  4. Stem dark green with up to 18 vertical tuberculate ribs. 19. *E. gymnocalycioides* (subgen. EUPHORBIA)
    - Stem off-white to very pale buff, rarely greenish white, with overlapping spirally arranged scale-like tubercles. 20. *E. piscidermis* (subgen. EUPHORBIA)
  5. Stems without spine-shields though rarely with spinose stipules (cultivated ornamental) or with tips of branches modified into spines; leaves well developed but sometimes soon deciduous. 6
    - Stems with spine-shields (horny areas surrounding leaf insertion bearing 1–4 spines), these sometimes continuous along margin of stem rib; leaves usually scale-like and soon deciduous, rarely large and persistent and then on large tree with wing-like stem ribs. subgen. EUPHORBIA (spp. 1–45)
  6. Cyathial glands simple or with linear green or yellow appendages; foliage leaves usually alternate, very rarely opposite and then decussate (however the bracts are always opposite); stipules filiform, spinose, gland-like or absent. 7
    - Cyathial glands with pink or white petaloid appendages; leaves mostly opposite and distichous, whorled or alternate in certain introduced ornamentals (subgen. AGALOMA); stipules mostly scale-like (gland-like in subgen. AGALOMA). 9
  7. Stipules absent, filiform or glandular; inflorescence often a terminal pseudumbel, occasionally also with axillary cymes from upper axils, rarely axillary only and then cyathial glands hairy; bracts usually green, occasionally white or yellow. 8
    - Stipules forming well developed spines; inflorescence always an axillary cyme with glabrous cyathial glands; bracts petaloid, often bright red (small ornamental shrub). 46. *E. millii* (subgen. LACANTHIS)
  8. Cyathial glands (2–)4 or more, solid, often with 2 or more linear appendages; inflorescences regularly cymose with paired bracts equal. subgen. ESULA (spp. 51–90)
    - Cyathial gland solitary, usually cupular due to sunken upper surface, never with appendages; inflorescences with congested, ± 1-sided, almost scorpioid, branches with paired bracts often unequal. subgen. POINSETTIA (spp. 91–92)
  9. Leaves alternate or in whorls of 3 or 4, base symmetrical; stipules deciduous; inflorescence a terminal pseudumbel (ornamentals). subgen. AGALOMA (spp. 93–94)
    - Leaves opposite, distichous, bases asymmetrical; stipules persistent; inflorescence ± lateral. subgen. CHAMAESYCE (spp. 95–106)

## Subgenus EUPHORBIA

sect. *Diacanthium* Boiss. (1862) *p.p.*, non sensu str.

Carter, *Ann. Missouri Bot. Gard.* 81: 367–379 (1994);  
Gilbert, *Collect. Botan.* (Barcelona) 21: 68–77 (1992).

Succulent-stemmed perennial herbs, shrubs or trees, stems angled or tuberculate, glabrous. Leaves mostly scale-like and soon deciduous, rarely large and more persistent, inserted on a horny 'spine-shield' with, usually, a pair of small prickles representing the stipules plus a pair of larger spines below the leaves, these sometimes joined into a single spine which can be forked at tip. Cymes from flowering eye above spine-shield or occasionally included within the continuous horny margin of a rib, rarely more than 1-forked, usually with central cyathium all male and lateral cyathia bisexual; bracts usually shorter than involucre and scale like; ovary sessile or exserted, styles often free, usually not bifid. Seed ovoid or subglobose, without caruncle.

Most numerous in the drier areas of tropical Africa where new species are still being described; well represented in South Africa, and extending from the Canary Islands to the drier parts of SW Asia, east to Thailand.

A distinctive group lacking obvious relatives elsewhere in the genus and probably worthy of treatment as a genus in its own right. Many taxa in the Flora area are still incompletely known-fruiting material and good field notes on the habit, preferably with photographs, are particularly needed, especially for the larger shrubs and trees. Traditional groupings within the subgenus have been most unsatisfactory but a new scheme has recently been presented by Carter (*loc. cit.*).

1. Stems much longer than broad, mostly above ground; spines usually well developed. 2
  - Stems globose or nearly so, about as broad as long or completely hidden below ground level with only leaves or inflorescences visible above ground; spines absent except on seedlings or occasionally on cultivated plants. 47
2. Tree reaching at least 3 m high, often very much more; trunk well-defined, lower branches often falling off to leave clear bole. 3
  - Shrub or shrublet rarely more than 2 m high unless supported by surrounding bushes; main stem, if present, weak and scandent or hidden by persistent branches. 11
3. Stems cylindrical with spiral ranks of tubercles; spine-shield with a single very broad-based spine; branches few, suberect, persistent. 1. *E. venenifica*
  - Stems with well-defined wings or ribs, rarely upper branches of mature trees subcylindrical; spines paired, rarely obsolete; branches many, often dropping off when old. 4
4. Leaves soon falling, scale-like except in seedlings; stems more than 3-winged or, if 3-winged, wings undulate, not crenate; trees of dry woodland or bushland. 5
  - Leaves persistent, 6–20 cm long; stems (2–)3(–4)-winged, wings straight with crenate margins; large tree of moist montane forests. 2. *E. amphiphylla*
5. Lower branches persistent, ascending, crown of tree obconical, becoming massive with relatively short thick trunk. 6
  - Lower branches falling off, crown of tree globose, relatively small with tall slender trunk. 7
6. Dried capsule 9–13 x 14–22 mm, deeply lobed (globose when fresh); main stem often more than 5-ribbed. 3. *E. abyssinica*
  - Dried capsule c 5–7 x 10 mm, shallowly lobed; main stem 4–5-ribbed. 4. *E. candelabrum*
7. Branches deeply winged, sharply constricted into distinct segments often nearly as broad as long. 8
  - Branches 3–4-sided to almost terete, irregularly constricted into poorly-defined segments usually much longer than broad. 9
8. Branches (3–)4–6-ribbed, to 6 cm wide; spines not more than 1.5 cm long. 5. *E. adjurana*
  - Branches 3-winged, over 8 cm wide; at least some spines 5 cm or more long, very robust. 6. *E. breviararticulata*
9. Spine-shields contiguous along margins of ribs. 10
  - Spine-shields separate, mature plants with upper branches almost terete and spineless. 10. *E. robecchii*
10. Stems 3(–4)-winged, (25–)38–45 mm thick; capsule slightly exserted from cyathium. 8. *E. burgeri*
  - Stems (3–)4(–5)-angled, 12–20 mm thick; capsule partially included within cyathium. 23. *E. nigripinioides*
11. Spine-shields contiguous, forming broad longitudinal strips separated from each other by narrower grooves with normal epidermis; stems cylindrical; plants scandent when support is available. 12
  - Spine-shields separate or, if contiguous, forming narrow strip along margins of well defined ribs; stems clearly ribbed or tuberculate; habit various. 14
12. Spines obvious, short and curved. 13
  - Spines reduced to adpressed bristles so that at casual examination the stems look spineless. 36. *E. cryptospinosa*
13. Spines up to 3.5 mm long; stems 5 or more grooved/angled. 35. *E. erlangeri*
  - Spines up to 5 mm long; stems 4-angled or grooved. 34. *E. migiurtinorum*
14. Shrubs with many erect or ascending stems branching mainly at or near base, 75 cm or more high; spines always paired. 15
  - Succulent herbs or dwarf shrubs less than 75 cm high or, if over 75 cm, then with scandent main stem and irregular, spreading lateral branches; spines paired, solitary or forked. 24
15. Stems 3(–4)-angled or winged. 16
  - Stems 4 or more angled. 18
16. Stems up to 6 cm wide, almost triangular in cross section, uniformly green or with obscure dark blotches; spines up to 2 cm long. 17
  - Stems over 8 cm wide with very thin undulate ribs often narrowly banded with dark and yellow green; some spines 3–6 cm long. 6. *E. breviararticulata*
17. Stems 22–36 mm thick; peduncles up to 8 mm long;

- capsules widest near base, *c* 4.8 x 8 mm; seeds smooth. 7. *E. cactus*
- Stems (25-)38-45 mm thick; peduncles up to 2 mm long; capsules widest near middle, *c* 4 x 6 mm; seeds pustulate. 8. *E. burgeri*
18. Spine-shields contiguous or nearly so, forming ± continuous horny line along angles; stem angles not or only shallowly divided into triangular teeth. 19
- Spine-shields separated; stem angles divided into prominent triangular teeth up to 11 mm long. 21. *E. sp.* = *Burger* 3154
19. Stems up to 3 cm wide, irregularly segmented; cymes with peduncles longer than upper axes. 20
- Stems up to 6 cm wide, regularly segmented; cymes with peduncles shorter than upper axes. 9. *E. sp.* = *Burger* 2287
20. Capsule exerted from involucre; spines uniform in length, sometimes very short on flowering shoots. 21
- Capsule sessile, partially enclosed by involucre; spines regularly alternately long and short along stem. 23
21. Stems uniformly green; seeds verrucose. 22
- Stems strongly patterned with dark and yellow green; seeds smooth. 14. *E. dalettiensis*
22. Stems (4-)5-7-angled; flowering shoots nearly as spiny as basal shoots. 12. *E. tesorum*
- Stems 4-angled; flowering shoots with much shorter spines than basal shoots. 13. *E. borensis*
23. Stems 9-10(-14) mm thick; longest spines 13-15 mm long; cyathia shortly pedicellate. 24. *E. nigrispina*
- Stems (12-)14-30 mm thick; longest spines 4-8 mm long; cyathia sessile or nearly so. 25. *E. polyacantha*
24. Spines paired or forked. 25
- Spines solitary, not forked (ignore any paired prickles just above leaf scar). 40
25. Branching irregular or (rarely) with slender, ± decumbent main stem; spines paired, symmetrical, if apparently forked then stem distinctly angled with flat sides. 26
- Plant medusoid with thick, usually short, sometimes subterranean, main stem and regular, little branched, lateral stems not constricted at base; spines unequally forked at tip, stems terete or tuberculate. 44. *E. schizacantha*
26. All stems similar and branching irregularly. 27
- Main stem soon becoming ± terete, grey and decumbent; lateral branches soon rebranching. 22. *E. rubromarginata*
27. Spine-shields on straight ribs, usually elongated, often contiguous along margins of ribs. 28
- Spine-shields on spirally arranged tubercles. 38
28. Stems erect, branching mostly from base to form dense clumps. 29
- Stems spreading, branching irregularly. 31
29. Ribs divided into triangular teeth; spines reaching 8 mm or more long; spine-shields separate, grey or brownish. 30
- Ribs entire; spines up to 2.5 mm long, prickles rudimentary; spine shields always contiguous, white. 26. *E. makallensis*
30. Prickles well developed, reaching 6 mm long; spines up to 18 mm long. 30. *E. tetraacantha*
- Prickles minute, less than 1.5 mm long; spines up to 8 mm long. 21. *E. sp.* = *Burger* 3154
31. Prickles less than 1 mm long, often absent. 32
- At least some prickles 1.5 mm or more long. 34
32. At least some spines 12 mm or more long; cyathial glands ± contiguous, flat; mature capsule clearly exerted from involucre. 33
- Spines up to 12 mm long; cyathial glands separated, suberect; capsule partially enclosed within involucre. 27. *E. septentrionalis*
33. Stems spreading horizontally to form dense low mat, conspicuously longitudinally-stripped, grooved between ribs; spines up to 15 mm long; capsule *c* 2.5 mm wide. 15. *E. colubrina*
- Stems sprawling to form dense tangle up to 1.5 m high, uniformly coloured and flat between ribs; capsule *c* 11 mm wide. 11. *E. longispina*
34. Plant never rhizomatous, usually subscaudent when support available and not much branched from base; at least some spine-pairs on distinct stipe so as to look like a forked spine, length (including stipe) usually over 10 mm. 35
- Plant markedly rhizomatous, forming small clumps of stems branched mostly from base; spine pairs never stipitate, up to 10 mm long. 37
35. Spine-pairs with stipe up to half as long as spines, stipes often not developed on juvenile shoots, spines never recurved. 36
- Spine-pairs nearly always with stipes much longer than spines, giving the impression of forked spines, spines often recurved. 33. *E. glochidiata*
36. Stems few, branching irregularly, often scaudent through bushes; young spines reddish-brown. 31. *E. fissispina*
- Stems numerous from base, usually forming small clump, occasional longer stems arched over, sometimes forming stolons; young spines ± black. 32. *E. baleensis*
37. Stems up to 7 mm thick, very glaucous, ribs very obscurely toothed; spines very slender. 28. *E. sebsebei*
- Stems *c* 10 mm thick, not glaucous, ribs distinctly toothed; spines moderately stout. 29. *E. bittataensis*
38. Prickles very short or absent; spines pale when wet. 39
- Prickles about half as long as spines; spines blackish when wet. 18. *E. quadrispina*
39. Stems slender, *c* 7 mm thick, clustered into compact clumps; prickles always present though minute. 16. *E. ellenbeckii*
- Stems more robust, over 10 mm thick, few and sprawling; prickles not discernible. 17. *E. inaequispina*
40. Plants medusoid: with a short thick spirally-tuberculate main stem, sometimes hidden below ground level, which produces slender erect or spreading

lateral shoots from ± every axil, lateral shoots not constricted at junction with main stem, up to 0.5 m high. 41

- Plants forming irregular shrubs up to 1.5 m high; main stem ill-defined, similar to lateral branches, shoots constricted at junction with main stem. 41

37. *E. triaculeata*

- 41. Prickles present, at least some over 1.5 mm long. 42
- Prickles obsolete or nearly so, less than 1 mm long. 44

- 42. Main stem usually above ground level; lateral stems many, spreading-ascending, not glaucous; spines patent. 43

- Main stem below ground level; lateral stems few, erect, glaucous; spines reflexed. 39. *E. awashensis*

- 43. Spines 12–24 mm long; cyathia dull pinkish-red.

43. *E. actinoclada*

- Spines at least 30 mm long; cyathia yellow.

38. *E. kalisana*

- 44. Branches with 5 spiral ranks of obscure tubercles; cymes stout, peduncles to c 1.5 mm long, bracts scale-like; cyathial glands spreading, bright yellow. 45

- Mature branches with up to 12 ranks of well-defined laterally-compressed tubercles; cymes slender, peduncles c 3.5 mm long, bracts almost linear; cyathial glands suberect, dull dirty yellow (probably through to brownish). 42. *E. sp.* = *Gilbert* 2296

- 45. Spine-shields 3–6 mm long; cyathia (in spirit) c 3.5 mm wide. 40. *E. monacantha*

- Spine-shields 9–11 mm long; cyathia (in spirit) c 7 mm wide. 41. *E. sp.* = *Le Houérou* 051176/04–06

- 46. Stems above ground, very rarely branched, subglobose to shortly cylindrical; leaves absent or vestigial. 46

- Stems underground, forming rhizomes; large, slightly fleshy leaves present during growing season. 45. *E. monadenioides*

- 47. Stem dark green with up to 18 vertical tuberculate ribs. 19. *E. gymnocalycioides*

- Stem off-white to very pale buff, rarely greenish white, with overlapping spirally arranged scale-like tubercles. 20. *E. piscidermis*

1. *E. venenifera* Kotschy (1857)

- type: 'from Sudan'.

Erect shrub or small tree to 6 m high, with few erect main stems and irregularly placed branches. Stems cylindrical, up to 10 cm thick, pale grey, with spiral ranks of low tubercles, smooth when old. Leaves deciduous, forming conspicuous apical tuft during rains, sessile, mostly narrowly oblanceolate, 7.5–27 x 1–4.5 cm, base cuneate, tip acute to rounded or subtruncate, slightly fleshy; spine-shield forming single conical spine, prickles not discernible. Cymes up to 2 cm long, 1–2-forked; involucre campanulate, 2 x 3.5–5 mm; styles stout, united at base. Capsule shortly exserted, deeply 3-lobed, 4 x 6 mm. Seeds subglobose, 2.5 mm diameter, smooth, pale brown.

Habitat not recorded for Flora area, elsewhere recorded from open rocky hillsides with *Combretum*; below 1200

m. WG; Sudan, Uganda. *Ciencowsky* s.n.

Known from within the Flora area by only a single old collection from the Benishangul (Beni Sciangul) area, probably to the west of Asosa.

2. *E. ampliphylla* Pax (1895)

- type: SD, between Alge (Aghere Mariam) & Oi, *Ruspoli & Riva* '1636 (1337) 1481' (B holo. destr.; FT Z iso.).

*E. menelikii* Pax (1907) - type: SU, Genet, based on photo by Rosen.

*E. sancta* Pax (1907) - type: HA, Deru, based on photo by Rosen.

*E. obovalifolia sensu* N.E.Br. (1912) *et auct. pl. subseq.*, non A. Rich. (1851).

Tree to 30 m high, with a rounded, often rather open crown, at least some lower branches persistent; trunk with dark fissured bark. Stems broadly 3–4-winged, 10–15 cm wide, wings thin, crenate, constricted into segments. Leaves persistent, oblong-obovate to oblanceolate, 6–20 x 2–7 cm, cuneate into ill-defined petiole, tip rounded to shortly acuminate; spine-shields ovate, c 4 mm long, brown, prickles triangular, stipule-like, soon falling, spines paired, broad-based, up to 6 mm long. Cyme solitary; peduncle up to 5 mm long; bracts ovate-triangular, to 4.5 mm; involucre obconical, c 6 x 3 mm; glands separate; ovary with well developed calyx. Capsules shortly exserted, subglobose when fresh, 3-lobed when dried, c 9.5 x 11 mm, valve woody. Seeds subglobose, 5 x 4 mm, smooth, pale brown. Fig. 85.41.

Moister montane forests, often left after clearance; also extensively used in higher rainfall areas for live fencing; (1200–)1700–2700 m. TU GD GJ WU SU IL KF SD HA; Kenya, Uganda, Tanzania, Malawi. *Burger* 1850, 3317; *Friis et al.* 160.

This species is much more widely known as *E. obovalifolia* but unfortunately the name has long been used in such a way as to exclude the type material which is from juvenile *E. abyssinica* with well developed leaves. The epithet was misspelt as 'amplophylla' in the protologue.

*E. neglecta* N.E.Br. (1912), based on a cultivated plant possibly of Ethiopian origin, is similar to this species but has smaller leaves and 4–5-angled stems. It is possibly of hybrid origin.

3. *E. abyssinica* Gmel. (1791);

*E. officinarum* L. *B kolquall* Willd. (1799) - type: 'Kolqual' Bruce (1790), tab. ad p.41.

*E. obovalifolia* A. Rich. (1851) - type: TU, 'Prov. Choho & Chiré', *Quartin-Dillon* (P holo. + iso.) (*quoad typo, non sensu auct. plur.!*)

*E. grandis* Lem. (1857); *E. richardiana* Baill. (1860) - type: cultivated in Paris from Ethiopian material collected by *Quartin-Dillon & Petit* (P holo.).

*E. abyssinica* var. *tetragona* Schweinf., *Bull. Herb. Boiss.* 7, *append.* 2: 319 (1899) - type: EW, high plateau of Haigett, *Schweinfurth* 1351 (B holo.; K iso.).

?*E. hararensis* Pax (1907) - type: HA, Karssa, based on photo by Rosen (not seen).

*E. neutra* Berger (1907) - type: a cultivated plant,

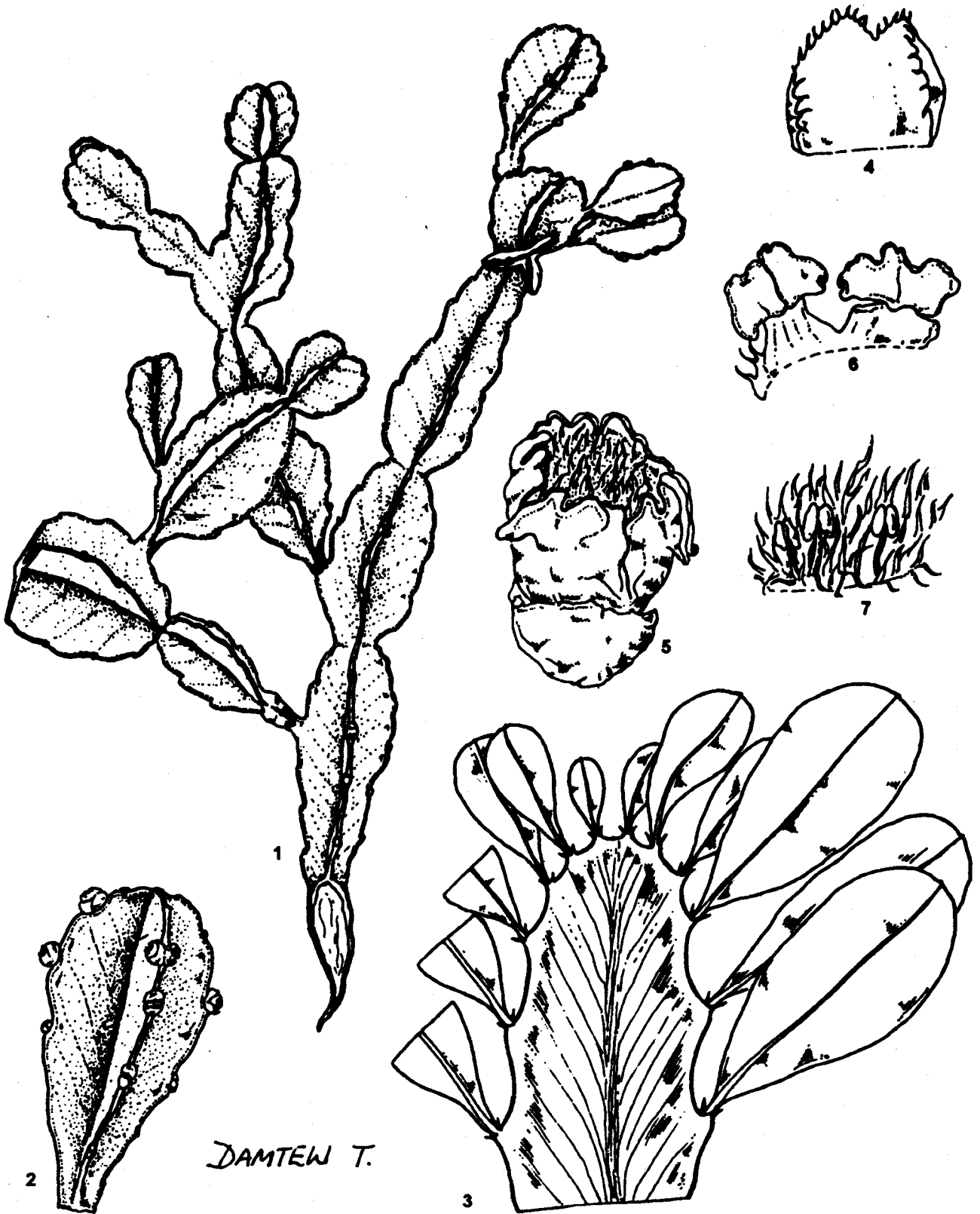


Figure 85.41 *EUPHORBIA AMPLIPHYLLA*: 1 - branch  $\times \frac{1}{4}$ ; 2 - branch with young inflorescence  $\times \frac{2}{3}$ ; 3 - young branch with leaves  $\times \frac{2}{3}$ ; 4 - bract  $\times 9$ ; 5 - young cyathium  $\times 7$ ; 6 - involuc. al bracts  $\times 10$ ; 7 - male flowers and bracteoles  $\times 16$ . All except 3 from Sue Edwards & Damtew Teferra 5006; 3 from Tewolde B.G.E. & Mesfin T. 2094. Drawn by Damtew Teferra.



possibly from Ethiopia (not preserved?).

*E. candelabrum* Kotschy var. *erythraeae* Berger, *Sukkulente Euphorbien*: 73 (1907); *E. erythraeae* (Berger) N.E.Br. (1912) *nom. illegit., non* Hemsley (1891); *E. aethiopicum* Croizat (1941) – type: cultivated in Italy from material collected in Eritrea or Sudan by Schweinfurth & Penzig (probably based entirely on living material, no permanent specimen preserved).

*E. acururensis* N. E. Br. (1912) – type: EW, near Aczur, Schweinfurth & Riva 1351 p.p. (K holo.; P iso.).

*E. controversa* N. E. Br. (1912) – types: TU, Mai Gouagoua, *Quartin-Dillon* (P syn.) & without locality (?near Adwa fide Gay), *Schimper* II:934 (K syn.; G P isosyn.).

*E. disclusa* N. E. Br. (1912) – type: cultivated, of unknown origin (K holo.).

Tree to 9 m high, eventually with thick, fissured trunk; branches usually erect, persistent, forming dense broadly obconical crown. Stems stout, 4–8-ribbed, usually slightly but regularly constricted into segments, ribs thick, undulate only in seedlings. Leaves well developed in seedlings but later scale-like and soon falling; spine shields 5–10 x 5–9 mm, separated at least by flowering eye, becoming corky and ill-defined on old shoots; prickles obsolete; spines paired, straight, conical, to 5(–8) mm long, often very small on flowering shoots. Cymes crowded, bright yellow, similar to those of *E. amphophylla*; female calyx large, deeply divided. Fruit subglobose, red, when fresh, becoming deeply 3-lobed when dried, thick-walled, up to 13 x 22 mm. Seeds compressed-globose, c 3.7 mm diameter, smooth, uniformly grey. Fig. 85.42.

Locally abundant on steep rocky hillsides, sometimes forming pure stands, often around churches; used for live fencing at higher altitudes. (1300 in EW)–1900–2400 m. EW TU GD GJ SU SD HA; Sudan, N Somalia. *Burger* 3595; *Mesfin & Sebsebe* 3784; *Meyer* 7460, 7678.

The large trees in this subgenus pose a problem because of the lack of even poorly collected herbarium material, let alone the well documented fruiting collections needed. There is some suggestion that the plants from N Ethiopia and Sudan, *E. abyssinica* sens. str., with robust many-ribbed stems are separable from the plants from SU, HA and Somalia, ?*E. hararensis*, which have more slender 4–5-sided stems. However 4-sided stems do occur in the north, e.g. 'var. *tetragona*', and the species almost certainly has a continuous distribution right through the critical intervening areas of TU and WU such that it is probable that there is a cline between the two extremes. The situation has probably been further complicated by the extensive use of these plants for live fences. The separation from the following species, *E. candelabrum* is also very poorly understood. The situation can only be clearly resolved by detailed field work.

The type of *E. obovalifolia* is this species (juvenile material with well developed leaves) but the name has otherwise always been applied to the plant that must now be known as *E. amphiphylla*.

#### 4. *E. candelabrum* Kotschy (1857)

– type: tt. 13 & 14 ('*E. canariensis*') in Trémaux, Voyage aux Soudan Oriental.

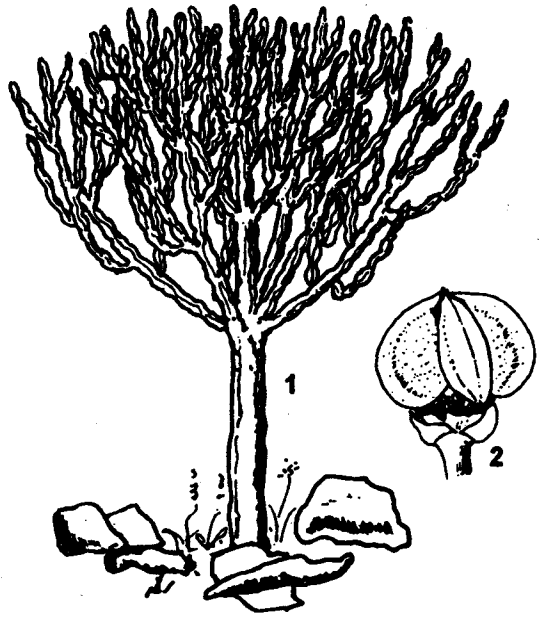


Figure 85.42 *EUPHORBIA ABYSSINICA*: 1 – habit; 2 – fruit. Drawn by Damtew Teferra from sketches made during field trips in Sidamo with the author.

#### *E. calycina* N. E. Br. (1912).

Closely related to *E. abyssinica*, reaching 12 m high, usually distinctly more slender, stems 3–5-sided; cyathia with slender peduncles up to 10 mm long; capsules smaller with shallower lobes and thinner walls, up to 9 x 14 mm; seeds c 3.7 mm diameter, grey densely spotted with dirty white. Fig. 85.43.1.

Deciduous woodland or bushland, often with *Combretum* or *Acacia tortilis* subsp. *spirocarpa*, frequently growing on termite mounds; 1200–1700 m. EW SU SD BA HA; ? to South Africa (Natal) and west to Cameroon. *Burger* 2490.

Fruiting material has only been seen from HA within the Flora area. Very closely related species, possibly conspecific, occur as far south as Natal (*E. ingens* E. Mey.). The separation from *E. abyssinica* also needs investigation.

Leach (*Taxon* 30: 483–5, 1981) has challenged the legitimacy of Kotschy's species, claiming that it is predated by *E. candelabrum* Welwitsch (1855 or 1856), a distinct species from Angola, but the relevant publications are in one case a personal letter, later translated and published, and in the other case notes that accompanied a consignment of living plants, neither of which were intended for publication and in both of which 'candelabrum' is clearly indicated to be a manuscript name and is placed in brackets. Thus *E. candelabrum* Welw. is contrary to article 34 of the ICBN (Carter, *Taxon* 34: 699–701, 1985).

#### 5. *E. adjurana* Bally & Carter (1983)

– type: Kenya, Gillett 13445 (K holo.).

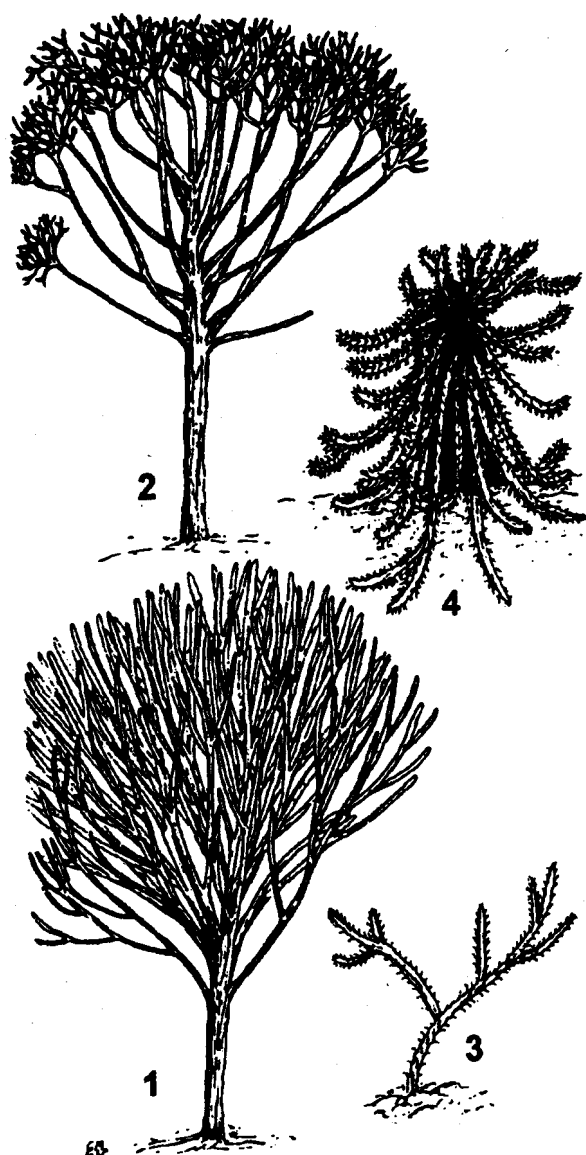


Figure 85.43 Habit diversity in *EUPHORBIA* subgen. *EUPHORBIA*: 1 – *EUPHORBIA CANDELABRUM*  $\times \frac{1}{150}$ ; 2 – *E. ROBECCHII*  $\times \frac{1}{150}$ ; 3 – *E. GLOCHIDIATA*  $\times \frac{1}{15}$ ; 4 – *E. SCHIZACANTHA*  $\times \frac{1}{10}$ . 1 from Greenway 6481; 2 from Bally 1949; 3 from Bally cc.xxx.v.6; 4 from Bally 9321. Drawn by Christine Grey-Wilson. (Selected and reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 90.)

Tree to 7 m high, crown rounded with old branches dropping off to leave clear trunk. Branches ascending, later drooping, 4–6-angled, constricted into regular joints 5–15 cm long, up to 6 cm wide. Spine-shields continuous along ribs, grey, prickles usually rudimentary, spines paired, near leaf-insertion, 5–15 mm apart, to 15 mm long. Cymes 1–3 together in horizontal row, peduncles short, stout; involucre cupular, 4 x 6.5 mm; glands separated; ovary sessile, calyx 1.5 mm long, deeply divided, styles 4 mm long, joined at base. Capsule deeply 3-lobed, 7–9 x 12–15 mm, dark crimson. Seed globose, 3–4 mm diameter, smooth, buff spotted with grey. Fig. 85.44.

On small basement complex and basalt hills in *Acacia* – *Commiphora* bushland; c 1800 m. GG SD; Kenya. Boudet 8258; Mesfin et al. 3523; Rippstein 1655.

#### 6. *E. breviarticulata* Pax (1904)

– type: Tanzania, Engler 1184.

Stems 3(–4)-winged, to over 8 cm wide, constricted into segments up to twice as long as broad, wings undulate, usually transversely striped with yellow-green. Spine-shields continuous along wings, buff when young, prickles 3–4 mm above leaf insertion, spines paired, those in middle of segments very robust, up to 6 cm long, those near constrictions much smaller. Cymes often more than 3 together, peduncles up to 7 mm long; involucre cup-shaped, c 3 x 5 mm; glands separate, yellow; ovary subsessile, calyx c 3 mm long, styles joined up to halfway. Capsule exserted, deeply 3-lobed, c 8 x 16 mm, yellowish flushed red. Seeds slightly compressed globose, 3.5 mm diameter, smooth, pale buff spotted brown.

1. Broad shrub to 3 m high without clearly defined central stem. var. *breviarticulata*  
– Tree to 6(?–10) m high with deciduous lower branches and clear trunk. var. *trunciformis*

#### var. *breviarticulata*

*E. grandicornis* auct. non N. E. Br. (1897).

*Acacia* – *Commiphora* bushland, ?sometimes on rock outcrops; c 1000 m. GG SD BA; Kenya, Somalia, N Tanzania. Gilbert s.n. (photos).

#### var. *trunciformis* S. Carter in *Kew Bull.* 42: 676 (1987)

– type: Kenya, Bally & Carter 16572.

Habitat similar to that of var. *breviarticulata*, perhaps more restricted to rock outcrops; 250–1000 m. GG ?SD; Kenya, ?Somalia. Ash 2278.

The status of these two varieties needs more detailed investigation in the field as the available data is insufficient to do more than guess at the relationship between the superficially very distinct shrubs and trees.

The arrangement of the cymes used by Leach (*J. S. Afr. Bot.* 36: 13–39, 1970) to separate this species from *E. grandicornis* N. E. Br. (1897), restricted to Natal in South Africa with an outlying subspecies in N Mozambique, do not seem reliable. It seems likely that *E. breviarticulata* will prove to be better treated as a subspecies of the Natal plant.

*Ruspoli & Riva* '983 (431) 903', cited by Cufodontis as *E. nyikae* Pax, appears to match *E. breviarticulata* in stem form but it is described as a tree and has much shorter spines, up to 15 mm long only. The sterile specimen was collected in the valley of the 'Ueb Karanle' and possibly represents an undescribed species near to *E. bussei* Pax or *E. nyikae* Pax, but nothing can be done until more material is available.

#### 7. *E. cactus* Boiss. (1862)

– type: Yemen, Ehrenberg.

Shrub to 1.8 m high, much broader than high, branches ascending. Stems 3(–4)-angled, up to 3.6 cm wide, irregularly segmented, patterned with bluish green. Spine-shields continuous along ribs, buff or reddish when young, prickles up to 5 mm above spines, spines paired, 10–18 mm apart, 8–12 mm long, relatively uniform in length. Cymes 1–2 together by prickles, up to 15 mm long overall; peduncle

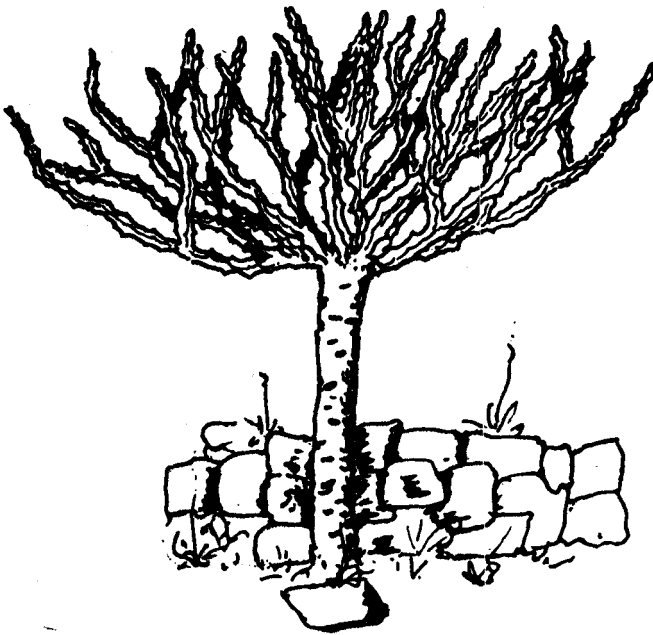


Figure 85.44 *EUPHORBIA ADJURANA*: habit. Drawn by Damtew Teferra from sketches made during field trips to Sidamo with the author.

up to 8 mm long, otherwise similar to those of *E. breviar-ticulata*. Capsule shortly exserted, 3-lobed, 4.6 x 8 mm, red, reticulate when dry. Seeds subglobose, 2.7 mm diameter, smooth, brownish-grey.

Sandy coastal plains; *Acacia oerfota* (*nubica*) bushland on light volcanic soils; c 5–1000 m. EE AF SU; Sudan, Arabia. *Ash* 1777, 2362; *Bally* 7040.

Typical Arabian material of the species is much more robust than that from Ethiopia, especially that from inland. It has broader spine-shields and occasional 5-angled stems. Collections from around Awash National Park have been named, incorrectly, as *E. thi*, an unrelated species here included within *E. polyacantha*.

8. *E. burgeri* M. Gilbert (1992)

– type: HA, S of Midaga, 70 km S of Harar, *Burger* 2481 (K holo.; ETH FT iso.)

Closely related to the preceding species but with a distinct main stem and spreading ascending branches. Stems slightly stouter, 3.8–4.5 cm wide; spines more variable in length, up to 13 mm long, prickles obsolete; cymes smaller, up to 7 mm long overall; peduncle up to 2 mm long; capsule only just exserted, c 4 x 6 mm, widest near middle; immature seeds pustulate.

Limestone slopes, probably with deciduous bushland. 1200–1550 m. HA; not known elsewhere. *Burger* 1567, 3403, 3353.

An *Euphorbia* observed around Sof Omar (BA), (*Thulin* et al. 3746) with a rather irregular, sometimes sub-arborescent habit and slender, segmented, 3-winged stems may belong here. The very young cymes are yellow.

9. *E. sp.* = *Burger* 2287.

HA, 20–30 km N of Fich.

Close to *E. cactus* and *E. breviar-ticulata*, to 2 m high, stems 4–5-winged, up to 8 cm wide; prickles to 0.5 mm long, spines 2.5–16 mm long; cymes solitary, c 15 mm long overall, peduncle only half as long as upper branches; involucre 3.5 x 7 mm; ovary exserted. Capsule not seen.

*Acacia* woodland; c 1200 m. HA; known from only 1 collection, described as very local.

More detailed information on the habit and the fruits is needed to assess the relationships of this plant. In some ways it could be considered a shrubby variant of the East African *E. bussei* Pax (syn. *E. kibwezensis*).

10. *E. robecchii* Pax (1897)

– types: HA, Ogaden, *Robecchi-Bricchetti* 332 (285) & 370 (287) (FT syn.; K photo.); Milmil, *Ruspoli* & *Riva* '1169 (-) 1061' (B syn. destr.; FT isosyn.; K photo.).

*E. ruspolii* Chiov. (1916) – type: HA, Milmil, *Ruspoli* & *Riva* '1169 (-) 1061' (FT holo.).

Tree to 10 m high, branches spreading horizontally, later dropping off to leave a clear trunk and hemispherical crown. Stems of seedling 4-ribbed, spine-shields up to 15 mm long, spines paired, up to 10 mm long; mature trees with stems subterete, spine-shields in 3 ranks, c 4 x 3 mm, without spines. Cymes: peduncles to 7 mm; involucre cupular, c 3 x 6 mm, filled with white bracteoles; glands separated; ovary exserted, calyx 3-lobed, c 1 mm long. Capsule on 10 mm pedicel, deeply 3-lobed, lobes keeled, c 7 x 15 mm, thin-walled. Seeds globose, 3.3 mm diameter, smooth, olive brown. Fig. 85.43.2 & Fig. 85.45.

*Acacia*–*Commiphora* bushland on sandy reddish soils, usually the largest tree present; 1000–1200 m. SD BA HA; Somalia, Kenya, N Tanzania. *Bally* 10193; *Burger* 3348; *Mesfin* & *Tewolde* 2626.

A significant timber tree in Somalia.

11. *E. longispina* Chiov. (1929)

– type: Somalia, *Stefanini* & *Puccioni* 442.

Untidy, sometimes sprawling shrub up to 1.5 m high, forming dense clumps. Stems 4-angled, up to 15 mm thick but usually less, angles shallowly toothed. Spine-shields continuous along angles, grey; prickles almost obsolete; spines close to prickles, paired, 45–55 mm, 14–35 mm apart, red when young. Flowering-eyes solitary; peduncles stout, 2–2.5 mm long; cyathia 2.5 x 5 mm, yellow; glands almost contiguous; ovary long exserted. Capsule on pedicel at least 5 mm long, very deeply 3-winged, wings reflexed, 3.5 x 11 mm, red. Seeds subglobose, 2.5 x 1.8 mm, papillose-rugose, grey.

Deciduous bushland with *Acacia* and/or *Commiphora* on sandy red soils; 420–700 m. HA; Somalia. *Bally* 10162; *Ellis* 197; *Gilbert* 2069.

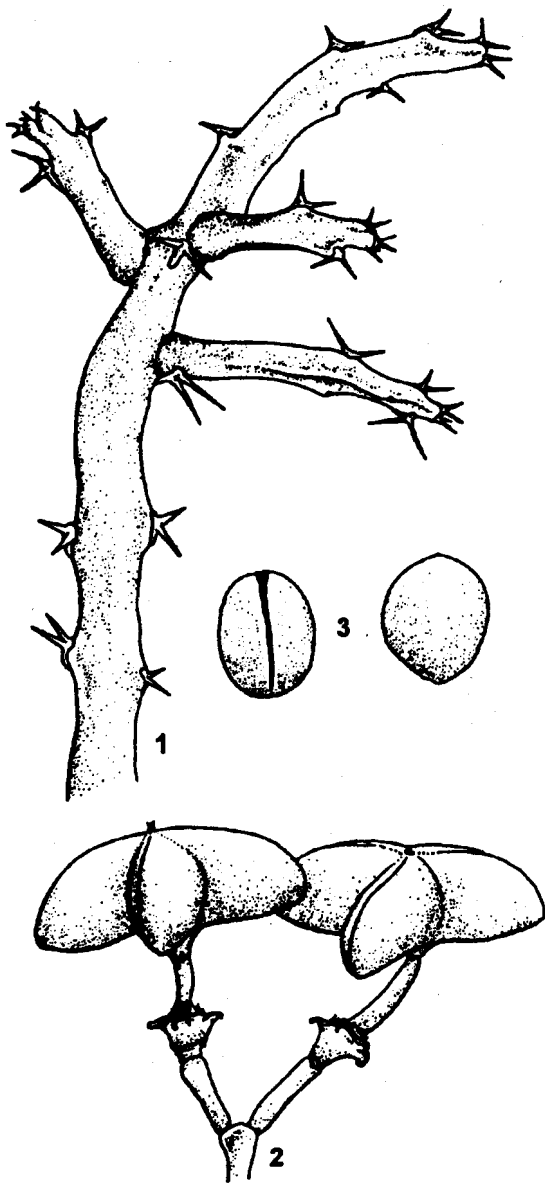


Figure 85.45 *EUPHORBIA ROBECCHII*: 1 – branch of young tree  $\times \frac{3}{4}$ ; 2 – capsules  $\times 2$ ; 3 – seeds  $\times 2$ . 1 from Greenway 6596; 2 from Carter 805; 3 from Verdcourt 3125. Drawn by Christine Grey-Wilson. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 93.)

12. *E. tescorum* Carter (1983)

– type: Kenya, Carter & Stannard 219.

Shrub to 1.8(–2) m high, stems erect, branching mainly from base, up to 4 cm thick, 4–6(–8)-angled, obscurely segmented. Spine-shields continuous along obscurely toothed ribs, prickles rudimentary, spines paired, up to 15 mm apart, 15 mm long, dark when young. Flowering eyes just above prickles; cymes solitary, up to 2.5 mm long; cyathia funnel-shaped, 2 x 4 mm, pale yellow; glands contiguous; ovary exserted. Capsule on 5 mm pedicel, 3-lobed, 3.5 x 5.5 mm, reddish. Seeds ovoid,  $c$  2.3 x 1.7 mm, minutely tuberculate, grey.

*Acacia* – *Commiphora* bushland/woodland on gentle rocky slopes; 850–1250 m. GG SD BA; Kenya. Friis et al. 2737, 2951; Streker 48.

Some herbarium material placed here may be better regarded as juvenile material of the following species flowering precociously on spiny branches: the mature plants are reasonably distinct.

*Corradi* 5579 (from Asile, GG) probably represents another species in the *E. heterochroma* – *E. stapfii* complex to which species 12–14 in this account belong (Carter & Gilbert, *Kew Bull.* 42: 385–394, 1987). The group is picked out by the clearly exserted fruits. Female flowers have not been seen but it would appear to key out in this account with *E. tescorum* on the basis of the spiny flowering shoots. It differs by the more slender stems with fine spines up to 6 mm long.

13. *E. borenensis* M. Gilbert (1987)

– type: SD, mountains W of Tertale, Rippstein 1978 (K holo.).

Irregularly branched shrub, sometimes subscaudent to 3 m; stems 4-angled, 15–17 mm wide, not prominently marked. Spine-shields continuous along ribs, prickles extremely small, spines usually paired, occasionally only 1 developing, up to 8 mm long, 11 mm apart, very poorly developed on fertile shoots. Cymes solitary, peduncle up to  $c$  1.5 mm, upper branches up to 2 mm long; involucre cupular, 2 x 3.5 mm, yellow; ovary exserted. Capsule on 4 mm pedicel, obtusely 3-lobed, 2.5 x 4.5 mm, pale. Seeds subglobose,  $c$  1.5 mm diameter, rugose, pale grey.

*Acacia* – *Commiphora* bushland on rocky outcrops or stony soils; 850–1550 m. GG SD; N Kenya. Friis et al. 2952, 3273; Gillett 14756.

14. *E. dalettensis* M. Gilbert (1987)

– type: SD, slopes W of Daletti above Gobelli River, Burger 3402 (K holo.).

*E. heterochroma* sensu Burger (1967) non Pax (1895).

Erect shrub up to 1.5(–2.8) m high; stems 4-angled, up to 15 mm wide, clearly patterned with dark-green and yellow-green, ribs shallowly crenate. Spine-shields continuous along ribs; prickles extremely small; spines paired but sometimes only 1 develops, to 11–15 mm apart, 7 mm long, slightly down-curved, very poorly developed on flowering shoots. Cymes as in the preceding species. Capsule on 5 mm pedicel, sharply 3-lobed, 3 x 5.5 mm, grey. Fully mature seeds not seen, apparently subglobose, at least 2 mm diameter, smooth.

Steep limestone slopes; 1200 m. HA; not known elsewhere. Burger 3071, 3367.

15. *E. colubrina* Bally & Carter (1983)

– type: Kenya, Bally & Carter 16587.

Densely branched shrublet less than 15 cm high with branches spreading horizontally to form interwoven mats to 50 cm wide. Stems with 4–5 rounded angles, up to 8 mm thick, grooved and with well-defined yellowish green lines between ribs. Spine-shields separate, oblong, up to 8 x 2.5 mm, separated by up to 3 mm; prickles rudimentary or absent; spines paired, 12–18 mm long, reddish when young, soon greyish-white. Cymes just above spine-shield, solitary; peduncles 1–2 mm long; cyathia cup-shaped, 2 x 2.5 mm;

glands contiguous, brownish; ovary exerted. Capsule on 4 mm pedicel, 3-lobed, 2 x 2.5 mm, sutures purplish. Seeds ovoid, 1.3 x 1 mm, closely papillate to areolate, brown.

*Commiphora* - *Boswellia* - *Acacia* bushland on limestone; 180-400 m. SD; Kenya. *Bally* 9316; *Gilbert* et al. 7561A.

16. *E. ellenbeckii* Pax (1903)

- type: BA/SD, 'Taro-Gumbi' (?between Fader Gumbi, and Taro on W bank of Ganale River), *Ellenbeck* 2099 (B holo. destr.; K drawing.).

Small shrublet, densely branched mainly from base; stems up to 15 cm long, 7 mm thick (4 mm when dried), with 5 spiral ranks of spine-shields borne on clearly differentiated tubercles. Spine-shields ovoid-triangular, up to 4 x 4 mm, pale fawn soon becoming greyish-white; prickles up to 1.5(-4) mm long; spines paired, close to prickles, very variable along stem, from shorter than prickles to 8-17 mm long, widely divergent. Cymes solitary, (from photo) slender with relatively long peduncles, pale cream or pinkish-yellow, glands contiguous, ovary not seen. Fruit not known.

*Commiphora* woodland on limestone; 1000-1100 m. SD; ?Kenya. *Thulin* et al. 3601.

The Kenyan material, from the southern slopes of the Dawa River valley, has the habit of *E. ellenbeckii* sens. str. but with noticeably more robust spines. Such plants will probably be found within Ethiopia and probably deserve taxonomic recognition.

17. *E. inaequispina* N. E. Br. (1912)

- type: Somalia/HA, Web (Wabe-Shebele) River, *Robecchi-Bricchetti* 283 (FT holo.; K fragment, drawing & photo!).

Closely related to *E. ellenbeckii*. Stems few, lying along ground except when very young, c 7 mm thick when dried, very densely spined; prickles not discernible; spines mostly 15-18 mm long, relatively fewer short spines, not as widely divergent. Cymes orange.

Very open, flat, stony ground; below c 250 m. ?HA; Somalia.

There are not yet any certain records from Ethiopia. The type came from near where the Wabe-Shebele River crosses the Ethiopian-Somalia boundary. The species is known to be locally common in the general area of Belet Uen in Somalia and most probably does extend into the Flora area.

18. *E. quadrispina* Carter (1983)

- type: Kenya, *Bally* & *Radcliffe-Smith* 14928A.

Closely related to *E. ellenbeckii*, differing as follows: stems more spreading and forming a horizontal mat; spine-shields blackish when young or wet, prickles very well developed, up to 12 mm long, spines more slender, up to 20 mm long, not as variable; cymes solitary, peduncle to 1 mm long, branches up to 2 mm long, involucre funnel-shaped, 2.5 x 3.5 mm, glands contiguous, pinkish-yellow, ovary pedicellate. Fruit not known.

Limestone slopes with very sparse *Commiphora* bush-

land (denser woodland in Kenya); c 200(-400) m. HA; Kenya. *Ash* 1142; *Gilbert* s.n. (from junction of roads from Kelafo and Mustahil to Shillabo).

The Ethiopian collections have much more robust spines than the Kenyan material, also a more normal tufted habit, this may reflect their more exposed habitat. The typical form most probably occurs in SD along the Dawa River, just across from the type locality in Kenya.

19. *E. gymnocalycioides* Gilbert & Carter (1984)

- type: SD, 60 km from Negele on track to Welensu Ranch, *Friis* et al. 2777 (K holo.; ETH iso.).

*E. turbiniformis* Chiov. (1929) p.p. quoad *Ruspoli* & *Riva* '225 [966] 385', non sens. str.

Succulent reduced to a solitary, dark green, subspherical stem up to c 6 x 6 cm, apparently not branching, with up to 18 vertical ribs each divided into tubercles. Spine-shields minute, reduced to white tips on young tubercles. Flowering eyes 3-5 in horizontal line above tubercle, surrounded by 2-6 whitish ?secretory structures of uncertain homology. Peduncle up to 7.5 mm long, branches 1.5 mm; involucre cup-shaped, 1.5 x 2.5 mm, glands just touching, brown, styles bifid. Capsule small, exerted on 2.5 mm pedicel, only remains after dehiscence seen. Seeds oblong, rugose, grey.

More open areas within *Commiphora* - *Kirkia* - *Acacia* bushland/woodland in shallow soil overlying limestone; c 1350 m. SD; not known elsewhere. *Ruspoli* & *Riva* '225 (966) 385'.

A cultivated plant has produced small side shoots with paired spines which suggest a relationship to Somalian species such as *E. columnaris* Bally.

20. *E. piscidermis* M. Gilbert (1973)

- type: HA, W of Degheh Bur, *M. Gilbert* 2143 (K holo.; EA ETH iso.).

Succulent with simple subglobose-cylindrical stem up to 11 x 7.5 cm, usually less, covered by spirally arranged close-packed truncate tubercles with the upper margins produced upwards so that the stem looks as if it is covered with off-white to pale buff fish scales. Leaves absent. Cymes axillary, subapical, erect, up to 1.5 cm high; bracts subscarios, c 1.5 x 0.9 mm; all parts glaucous pinkish-grey. Primary cyathium male, on 2-3 mm stalk; involucre obconical, 3 x 3 mm, glands 5; the two lateral cyathia bisexual, sessile, smaller, glands 4, rarely a vestigial 5th gland present; ovary exerted, styles 0.9 mm long. Capsule exerted, 2.9 mm long, oblong, smooth. Seeds oblong, grey, rugose. Fig. 85.46.

Very open deciduous bushland with main cover of small shrublets belonging to the *Acanthaceae* and *Labiatae* on low, probably gypsum-bearing, ridges; 1000-1050 m. HA; not known elsewhere.

A highly specialized succulent whose affinities are uncertain. Seedlings develop in a manner very similar to that seen in certain Somalian species of *Euphorbia* (notably *E. turbiniformis* Chiov. and *E. horwoodii* Bally & Carter)

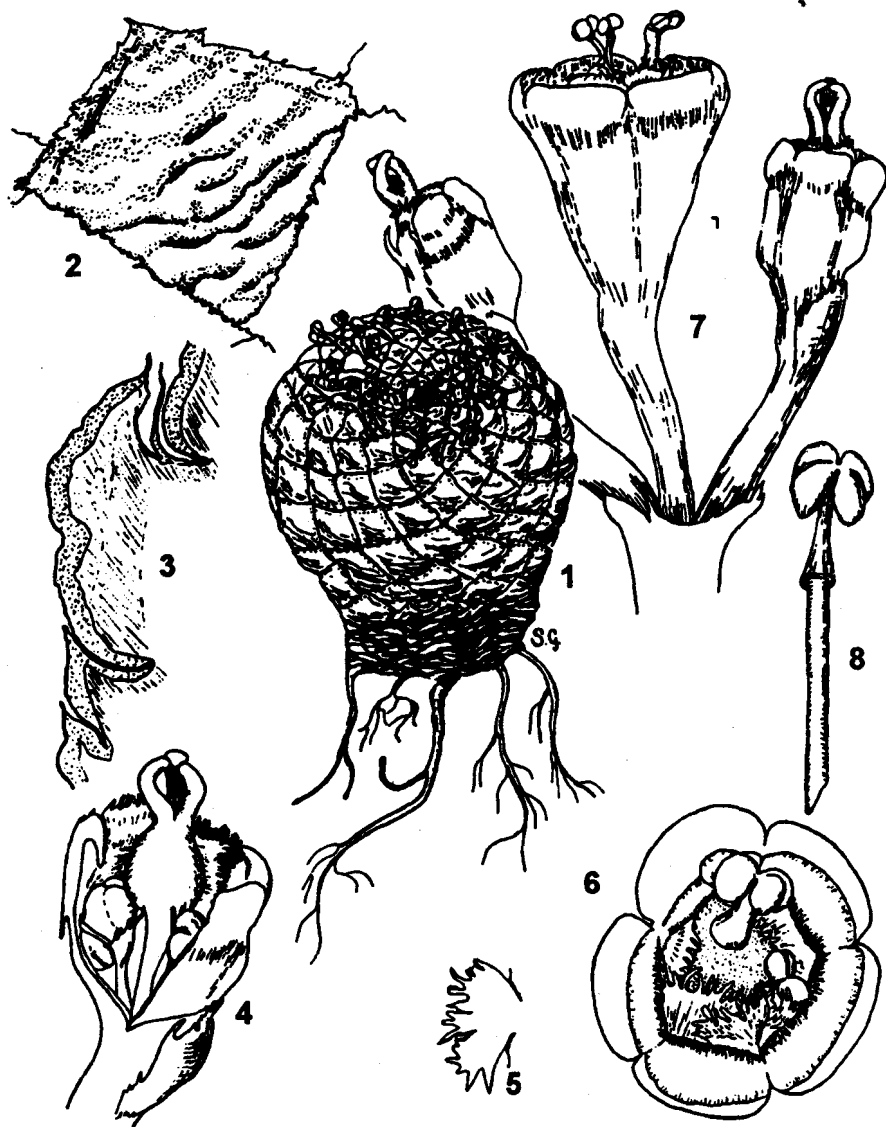


Figure 85.46  
*EUPHORBIA PISCIDERMIS*: 1 – whole plant in flower x 1; 2 – single tubercle x 10; 3 – slice through tubercles x 10; 4 – bisexual lateral cyathium; split open laterally x 12; 5 – interglandular bract x 12; 6 – top view of central male cyathium x 12; 7 – side view of inflorescence x 9; 8 – male flower x 12. Drawn by Sue Edwards. (Reproduced with permission from *K. Bull.* 45 (3) fig. 1, 1973.)

and produce a pair of spines from the lower margin of each 'scale'. This suggests that it belongs within this subgenus, nearest to *E. gymnocalycioides* among the Ethiopian species. Vigorous cultivated plants often branch dichotomously.

21. *E. sp.* = *Burger* 3154.

HA, S of Gara Muleta [Mulatta], above Mojo gorge.

Shrublet to 20 cm wide with numerous erect stems to 50 cm high; stems up to 2 cm thick at base, 10 mm thick above, 4-angled or winged, angles divided into triangular teeth up to 11 mm long with separate spine-shields on tips. Spine-shields 8 mm long, narrow; prickles at top of spine-shield, minute; spines paired, up to 8 mm long, slender. Flowering eye immediately above spine-shield, solitary; cymes not seen.

Described as locally common on limestone outcrops and cliffs; 2100 m. HA; known only from the one sterile collection.

A very distinctive plant whose affinities are not known

in the absence of any information on the inflorescences. It is placed here between the species with exserted fruits and those with fruiting pedicels shorter than the involucre.

22. *E. rubromarginata* L. E. Newton (1992).

– type: SD: Somatal Pass, G. Powys 547 (K holo.; EA iso.).

Shrub to 0.5–1 m high with clearly defined main stem which soon becomes terete, grey and decumbent, branches numerous, soon rebranching. Stems 4-angled, 7–10 mm wide, not segmented, angles very shallowly toothed. Spine shields continuous along angles, dark when young; prickles obsolete; spine paired, up to 8–10 mm long, 5–8 mm apart, uniform in length. Cymes solitary, 1-branched; peduncle and branches c 1 mm long; involucre funnel-shaped, c 2 x 4 mm, glands yellow with red margin; ovary not exserted from involucre. Fruit sessile.

*Acacia* – *Commiphora* – *Delonix* woodland, on basement-complex outcrop in deep shade; 1060–1350 m. GG SD; Kenya. *Gilbert & Phillips* 9129

The low habit and smooth, grey stems are diagnostic.

23. *E. nigrispinioides* M. Gilbert (1992)

– type: SU, 46 km E of Nazareth, Ash 1800 (K holo.).

Shrub or slender tree with well-defined trunk, to 3 m high, branches spreading-ascending forming relatively open round crown, dropping off when old. Stems (3–)4–5-angled, 12–20 mm wide, often only obscurely segmented. Spine-shields continuous along angles, black when young or wet; prickles almost obsolete; spines paired, up to 7–11(–13) mm long, 5–12 mm apart, varying only gradually along stem. Flowering eye immediately above prickles, solitary; cymes sessile, branches up to 1 mm long, all parts bright yellow; involucre funnel-shaped, 2 x 3 mm; ovary not exerted from involucre. Capsule c 3.2 mm long, slightly reticulate. Seeds subglobose, c 1.7 mm diameter, densely rugose, grey.

Locally common on lava flows with open deciduous woodland with *Terminalia brownii*, *Stereospermum kunthianum*, *Boswellia papyrifera*, *Steganotaenia araliacea* etc.; 1000–1450(–1700) m. SU ?HA; ?Somalia. Beals 961; Burger 3688; Mooney 8251.

24. *E. nigrispina* N. E. Br. (1912)

– type: BA/HA, Ueb Karanle c 6°15'N 42°35'E, Ruspoli & Riva '1030 (392) 929' (B holo. destr.; K fragment & drawing of holo.; FT iso.)

Closely related to *E. nigrispinioides* differing mainly in habit: shrub with many slender erect stems to 1.5(–2) m high, 9–10(–14) mm wide; spines longer, up to 13–15 mm, often varying rather regularly along stem with short spines intermingled with long; cymes shortly but distinctly pedunculate.

Limestone slopes; 1200 m. BA? HA; Somalia. Burger 2664, 3079, 3359.

The description is based on collections from the Gobelli Valley. The surviving isotype has rather uniformly thick stems with laxer, less variable spine arrangements than the Gobelli Valley plants and this is shown in the drawing of the holotype. Collections from the type locality are needed to check on the interpretation used here. Most Ethiopian material recently so named has been placed within *E. nigrispinioides*.

25. *E. polyacantha* Boiss. (1862)

– types: TU, near Djeladgeranne, Schimper III: 1790 (G lecto. as microfiche; K P isolecto.).

*E. thi* Schweinf. (1868).

*E. polyacantha* var. *subinarticulata* Schweinf. in Bull. Herb. Boiss. 7: Append. 2: 323 (1899); *E. thi* var. *subinarticulata* (Schweinf.) N. E. Br., Fl. Trop. Afr. 6.1: 582 (1912) – type: ?Sudan, Schweinfurth (1868) 204, 210 (not seen).

*E. polyacantha* subsp. *rosenii* Pax, Bot. Jahrb. 39: 632 (1907) – type: HA, Haramaja (Alemaya), Rosen (B holo. destr.).

*E. infausta* N. E. Br. (1912) – types: EW, Acgur, Schweinfurth & Riva 1008, 1694 (both K syn.) & Gheleb, Schweinfurth 1233, 1248 (both K syn.), 1094, 1438 (syn. not seen).

*E. tetragona* A. Rich. (1851) non Haw. (1826).

Shrub to 1.5(–2) m, broader than high with densely erect, mostly basal, branches. Stems 4–7-angled, 12–30 mm wide, shallowly segmented, dark green. Spine-shields continuous along ribs, dark when young; prickles obsolete or nearly so; spines paired, 4–8 mm long, 5–7(–10) mm apart. Flowering eye equidistant between spine-pairs; cyme to 5 mm long excluding capsule, peduncle to 0.8 mm long; involucre cupular, 1.5–2 x 2.5–3 mm. Capsule not exerted from involucre, 3-lobed, oblong, 3–4 x 3.5–5 mm, blackish-purple. Seeds broadly ovoid, 1.7 x 1.2 mm, rugose, grey. Fig. 85.47.

Rocky slopes and outcrops with open *Acacia* or evergreen bushland up to lower margins of *Juniperus* forest; 800(in Eritrea) 1200–2000(–2250)m. EE EW TU WU ?SU BA HA; Sudan, ?Somalia. Burger 1436; W. de Wilde 9886; Gilbert et al. 7923.

*E. thi*, with 5–7-angled stems, represents an extreme variant that on the available evidence does not seem different from *E. polyacantha*. Most Ethiopian material recently named as *E. thi* has nothing to do with this species and is included within *E. cactus*.

Burger 3276 from Alemaya is unusually tall (2.5 m) and has very short spines, up to 2.5 mm long. *E. polyacantha* grows intermingled with *E. abyssinica sensu lato* in this locality and there is a possibility that hybridization is occurring. *E. polyacantha* subsp. *rosenii* might be of such an origin.

Collections from Harerge (Burger 621 & 1588, from along the old Mieso-Dire Dawa road), described as shrubs from *Acacia tortilis* woodland and Meyer 7602 from 1700 m in the Blue Nile Gorge, are tentatively placed here but have longer spines than in typical material and show similarities to the 2 preceding taxa.

Schimper (1854) 1264, from Gölleb in the Tekeze Valley, cited in the protologue of *E. polyacantha* has spines up to 13 mm long and may represent a distinct species akin to *E. nigrispina*.

26. *E. makallensis* Carter (1981)

– type: TU, Igr Hariba, 10 km E of Mekele, Wilson 696 (K holo.).

Low shrub with close-packed erect stems up to 50 cm high forming cushions up to 1.5 m across. Stems 4(–5)-sided, up to 3 cm thick. Spine-shields continuous along ribs, whitish; prickles rudimentary; spines paired, up to 2.5 mm long, 3–7 mm apart. Cymes solitary, sessile; cyathia 3 x 4.5 mm, involucre cup-shaped; glands bright yellow, outer margin slightly emarginate; ovary with minute calyx. Capsule not exerted from involucre, similar to that of *E. polyacantha*. Seeds not seen.

Very locally common in rocky areas and steep hillsides on dolerite and sedimentaries including limestone, now with sparse cover of *Acacia etbaica* with occasional *Euclea schimperi*; 2260–2385 m. TU; not known elsewhere. Known only from the type and cultivated plants.

An isolated species apparently restricted to an area of c 4 sq. km.

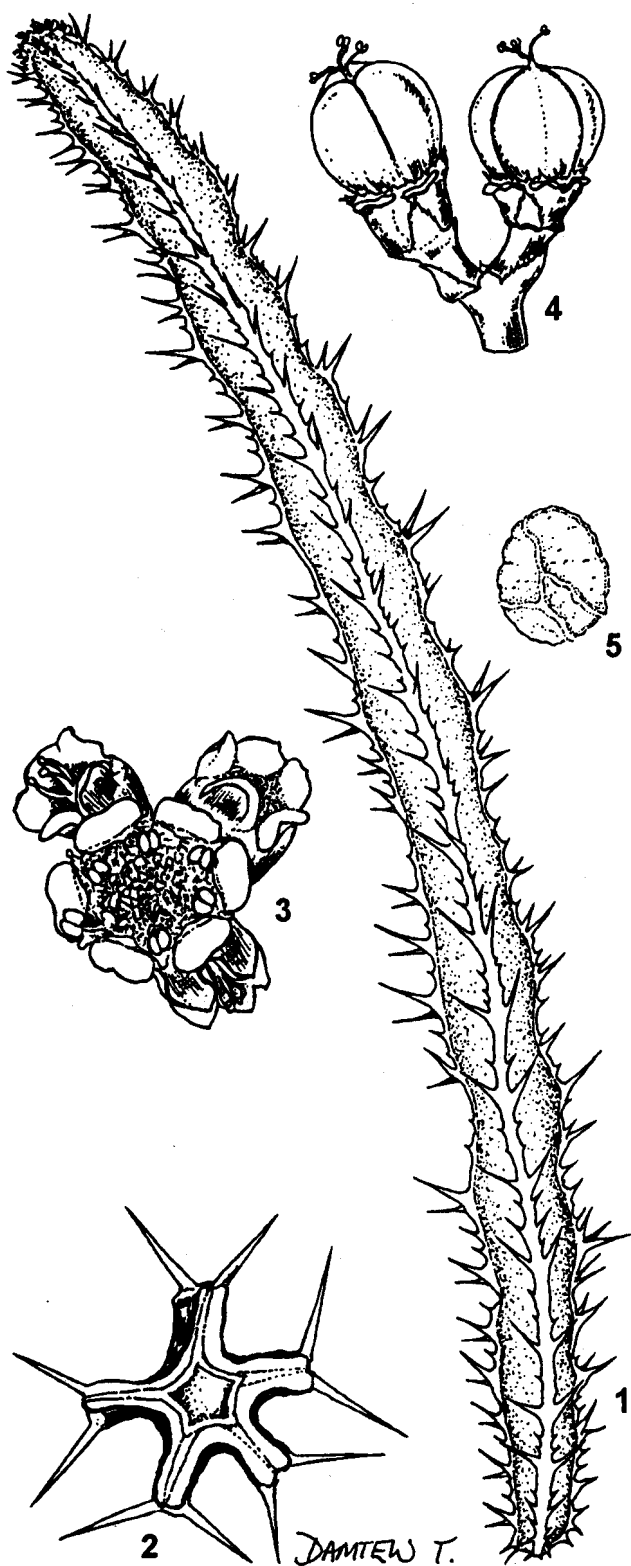


Figure 85.47 *EUPHORBIA POLYACANTHA*: 1 – branch x 1; 2 – branch cross section x 2; 3 – top view of inflorescence x 4½; 4 – fruit x 5; 5 – seed x 15. 1 & 2 from Gilbert et al. 7923; 3 from Burger 1307; 4 & 5 from Bally B-7031. Drawn by Damtew Teferra.

27. *E. septentrionalis* Bally & Carter (1974)

– type: Kenya, Ritchie in Bally E84.

Rhizomatous subshrub with dense tufts of short, and occasional sprawling longer, stems. Stems 4-sided with rounded, ± toothed, angles, c 10 mm thick, glaucous grey-green, sides with irregular pale central strip. Spine-shields separate, linear, 3–7 mm long, 1.5(–2) mm wide; prickles up to 1 mm long, very slender, sometimes ± obsolete; spines paired, 5–13 mm long, grey. Flowering eye just above spine-shield, solitary; cymes very slender, up to 7 mm long overall, peduncle 1–2(–5) mm long; involucre obconical, 2–2.5 x 1.5 mm, glands clearly separate, rounded, suberect. Capsule (immature) barely exerted from involucre. Seed (immature) ovoid, 2 x 1.2 mm, rugose.

subsp. *gemugofana* M. Gilbert Collect. Bot. (Barcelona) 21: 73 (1992).

– type: GG, along Caschei River, Corradi 5743 (FT holo.)

Spine shields extending for 4–6 mm below spines; spines 8–13 mm long.

Open *Acacia* – *Commiphora* – *Entada* woodland or bushland in crevices of basement complex rocks near to seasonal river; c 1050 m. GG; ?Kenya. Corradi 5743, 5762, 5813; Gilbert & Phillips 9082.

One collection, with spines up to 17 mm long, from NW Kenya may belong here.

Subsp. *septentrionalis* usually has shorter spine shields, extending 1.5–3(–4) mm below the spines and shorter spines, 5–9 mm long. It is known from Kenya and Uganda.

28. *E. sebsebei* M. Gilbert (1992)

– type: SD, inselberg 43 km S of Wachile on road to Moyale, Gilbert & Sebsebe 8740 (K holo.; ETH UPS iso.).

Succulent, seedlings with well developed tuberous root, soon spreading extensively by slender white rhizomes. Stems solitary or in clumps, to 30 cm long, c 7 mm thick, sharply 4-sided with obscure tubercles, very glaucous with pale patterning. Spine shields separate, linear, 7–8 mm long, less than 1 mm wide; prickles 1–1.5(–2.5) mm long; spines paired, up to 12.5 mm long, very slender, pale brown. Mature cyathia not seen, yellowish when young, probably similar to those of *E. septentrionalis*.

In crevices and grass tussocks on massive granitic inselbergs ('whale-backs') within areas of *Acacia* – *Commiphora* bushland; 1300–1450 m. SD; not known elsewhere. Gilbert 8051.

Readily separated from other species with a rhizomatous habit by the slender, very glaucous, sharply 4-sided stems.

There are photographs of a similar plant growing along the GG-SD border where the track from Yabelo to Konso crosses the Sagan River. This was even more slender, with reddish spines, and was stoloniferous, not rhizomatous. It would appear to be yet another species.



29. *E. bittataensis* M. Gilbert (1992)

– type: SD, Bittata Rocks, 20 km N of Negele, Gilbert et al. 7759 (K holo.).

Closely related to *E. septentrionalis* and *E. sebsebei*, with a similar habit. Stems clearly 4-sided with fairly prominently toothed angle, green with little or no patterning. Spine-shields separate, linear, 7–12 mm long; prickles up to 2 mm long; spines 8–10 mm long, blackish when young. Cymes probably similar to those of *E. septentrionalis* but shorter and stouter, involucre c 6 mm wide in spirit, glands dirty yellow with pinkish margins. Fruits and seeds not seen.

Growing in crevices on massive granitic outcrops with *Combretum* – *Terminalia* – *Lannea* – *Ozoroa* woodland; c 1600 m. SD; not known elsewhere. Friis et al. 3300.

30. *E. tetracantha* Rendle (1896)

– type: BA, a short distance W of the Wabe Shebele River, Donaldson-Smith 4 Sept. 1894 (BM holo.; K fragment of holo.).

Densely tufted subshrub less than 15 cm high with many erect branches from ill-defined short primary stem c 1 cm thick; stems 4-angled, c 5 mm thick, angles distinctly toothed. Spine shields narrow, c 7 mm long; prickles to 6 mm long, c 1.5 mm above spines; spines paired, to 18 mm long, slender with dark tips. Cymes solitary with single cyathium (probably immature or depauperate), c 1.5 mm long, obscurely minutely papillate, peduncle about as long as involucre; glands rather small, separate.

No data on habitat; c 600 m. BA; known only from the type.

The minutely papillate cyathium suggests an affinity to the group of species allied to *E. uhligiana* Pax, otherwise restricted to East Africa but this species has only a suggestion of the divided spine-shield most characteristic of that group. Good fertile material, preferably with fruits, is needed to determine the relationships of this very distinct species.

31. *E. fissispina* Bally & Carter (1987)

– type: SD, near Bogol Magna (Bogol Manyo), Bally 9315 (K holo.).

Shrub to 1.2 m, stems erect or subscaudent with few irregularly placed branches. Stems 4-ribbed, up to 10 mm thick. Spine-shields elongated, at least 9 mm long, continuous along ribs on juvenile growth and vigorous basal shoots; prickles to 3–5.5 mm long, up to 5 mm above spines; spines paired, 10–14 mm long, on adult shoots sometimes on distinct spine-like stipes up to as long as the spines themselves so as to look like a single forked spine, dull red when young, soon turning grey. Flowering eye at top of spine shield. Flowering material not seen, probably resembling that of *E. glochidiata*.

*Acacia* – *Commiphora* woodland on rocky slope; c 750 m. SD; not known elsewhere. Gilbert et al. 7657.

32. *E. baleënsis* M. Gilbert (1992)

– type: BA, Sof Omar Gorge, on Ghinir side, Gilbert et al. 8001 (K holo.; ETH iso.).

Closely related to *E. fissispina* but stems more slender, often forming quite dense tussocks and/or sprawling over the ground, apparently never scandent. Spine shields separate, 11–13 mm long, blackish when young; prickles 2–3 mm above spines, up to c 1 mm long; spines paired, 7–14 mm long overall sometimes including, on more vigorous growth, a short thick stipe up to 3 mm long. Leaves scale-like, ovate, c 0.5 mm long, soon lost. Mature cymes not seen, glands reddish-green. Fruits and seeds not seen.

In fairly dense *Commiphora* – *Kirkia* – *Acacia* woodland overlying limestone; 1150–1450 m. BA; not known elsewhere. Gilbert & Sebsebe 8571.

Another species in the *E. glochidiata* – *E. fissispina* complex, *E. dauana* Carter (1987), with strongly patterned stems and clearly toothed ribs occurs along the Kenyan side of the Dawa Parma River and must surely occur in Ethiopia.

33. *E. glochidiata* Pax (1897)

– type: BA, Ueb – Karanle river, Ruspoli & Riva '1122 (335) 1018' (B holo. destr.; FT iso.).

Shrublet to 1.2 m, rarely scandent to 3 m, usually growing through bushes, branches few and irregularly placed. Stems 4(–5)-sided, up to 10 mm thick, usually with pale markings. Spine-shields elongated, usually continuous along angles; prickles just above spines, 3–6.5 mm long; spines with well developed stipe 9–20 mm long, spines proper 3.5–6(–7.5) mm long, looking like the forked tip of a solitary spine, sometimes recurved, pale brown when young. Flowering eye solitary; cymes subsessile; involucre funnel-shaped, 2.5 x 5 mm, glands contiguous into flat disc, dark red (rarely yellow). Capsule sessile, 3.5 mm long, 3-sided. Seeds subglobose, c 2 mm diameter, rugose, grey. Fig. 85.43.3 & fig. 85.48.

*Acacia* – *Commiphora* bushland on red soils, often over limestone; *Acacia mellifera* – *A. senegal* bushland on soft black soil; 1000–1200 m. SD HA; Somalia, Kenya. Burger 2310; Friis et al. 2839; Gilbert et al. 7452.

34. *E. migiurtinorum* Chiov. (1929)

– type: Somalia, Stefanini & Puccioni 801.

Scandent to 2.1 m in shelter of bushes, forming densely tangled shrub to 1 m high when growing in open, base of stem swollen in seedlings. Stem subcylindrical with 4–5 lines of spine-shields. Spine-shields continuous along stems, almost as broad as the areas separating them; prickles absent; spines paired, to 5–10 mm long, 9–17 mm apart, often slightly recurved, sometimes strongly so. Flowering eye immediately above spines. Cymes solitary, very small, c 2 mm long, variously described as deep orange-red, brownish-yellow and green; involucre cup-shaped, c 2.5 mm wide; glands contiguous. Capsule very shortly exserted, c 2 mm long. Seeds not seen.

In high *Andropogon* grassland on red sandy soil; 720 m. HA (Haud); Somalia. Bally 10377.

The only Ethiopian collection seen has strongly recurved 5 mm spines and thus approaches the next species, *E. erlangeri*. More typical material with dense straight

spines has been collected just outside Ethiopia on gypsum. The identity of the plants from the Haud needs further investigation.

35. *E. erlangeri* Pax (1903)

— type: Somalia, *Ellenbeck* 2218.

Main stem swollen at base, erect, to 3 m high, up to 20 mm thick, cylindrical, growing through bushes and branching profusely when it reaches top of canopy, uppermost stems c 3 mm thick. Spine-shields forming 5–8 continuous lines, as broad as the areas separating them; prickles absent; spines paired, up to 4 mm long, 14–30 mm apart, recurved. Flowering eye immediately above spines, cymes as in *E. migiurtinorum*. Capsule 2.3 mm long, not seen intact. Seed subglobose, 1.5 x 1.1 mm, finely but prominently rugulose, brownish grey. Fig. 85.49.1–4.

Relatively dense *Acacia* – *Commiphora* bushland or woodland; (300–)750–900 m. SD 7BA; Somalia, Kenya. *Gilbert* et al. 7658, 8120.

*Gilbert* 8162 (from near Weldiya, BA, 300 m.) is from a population of plants, growing on gypsum, with numerous slender erect stems – these seem best regarded as just an ecotype.

36. *E. cryptospinosa* Bally (1962)

— type: Kenya, *Bally* E 159.

Similar to *E. erlangeri* in habit, reaching 5 m but usually less, sometimes forming densely tangled shrub less than 50 cm high in exposed sites. Stems almost covered by (5–)6–8(–10) lines of conspicuous spine-shields separated only by grooves, dark grey, resembling dead woody branches. Spine-shields minutely pubescent when young, with prickles absent and spines reduced to adpressed bristles less than 1 mm long. Flowering eyes immediately above spines, solitary; cymes c 1.7 mm long, dark red; cyathia 3 mm wide; glands contiguous into disc. Capsules not exserted, 3-lobed, c 2.5 x 3.3 mm, grey with reddish sutures. Seeds ovoid, 1.3 x 0.8 mm, conspicuously rugose, grey.

*Commiphora erythraea* woodland, ?also in more open *Acacia* – *Commiphora* bushland; 1000–1200 m. SD; Somalia, Kenya. *Gilbert* et al. 7726; *Gilbert & Sebsebe* D. 8755.

Difficult to see except when in flower and probably quite widespread in southern Sidamo.

37. *E. triaculeata* Forssk. (1775)

— type: Yemen, *Forsskål*.

*E. triacantha* Boiss. (1862); *E. triaculeata* var. *triacantha* (Boiss.) N. E. Br. (1911) — type: EE, Toalut Island, *Ehrenberg* (B ?holo. destr.; K iso.).

*E. infesta* Pax (1904) — type: EE, Dessei ('Dessi') Island, *Schweinfurth* April 1891 (B holo. destr.).

Irregular shrub up to 1.2 m high, sometimes with relatively slender central stem but often not medusoid; stems ascending, 5–10 mm thick with 3 or 5 spiral ranks of tubercles. Spine-shields narrow, 6–10 mm long; prickles 1.5–3.5 mm long; spine solitary, up to 12–27 mm long, reddish when young, juvenile plants with more prominently tuberculate/ribbed stems and slightly reflexed spines. Flowering eye solitary. Cyme 4–5 mm long, peduncle c 1.5 mm; cyathia funnel-shaped, c 2.5 x 4 mm; glands spreading, contiguous, red or yellow to pink. Capsule not exserted

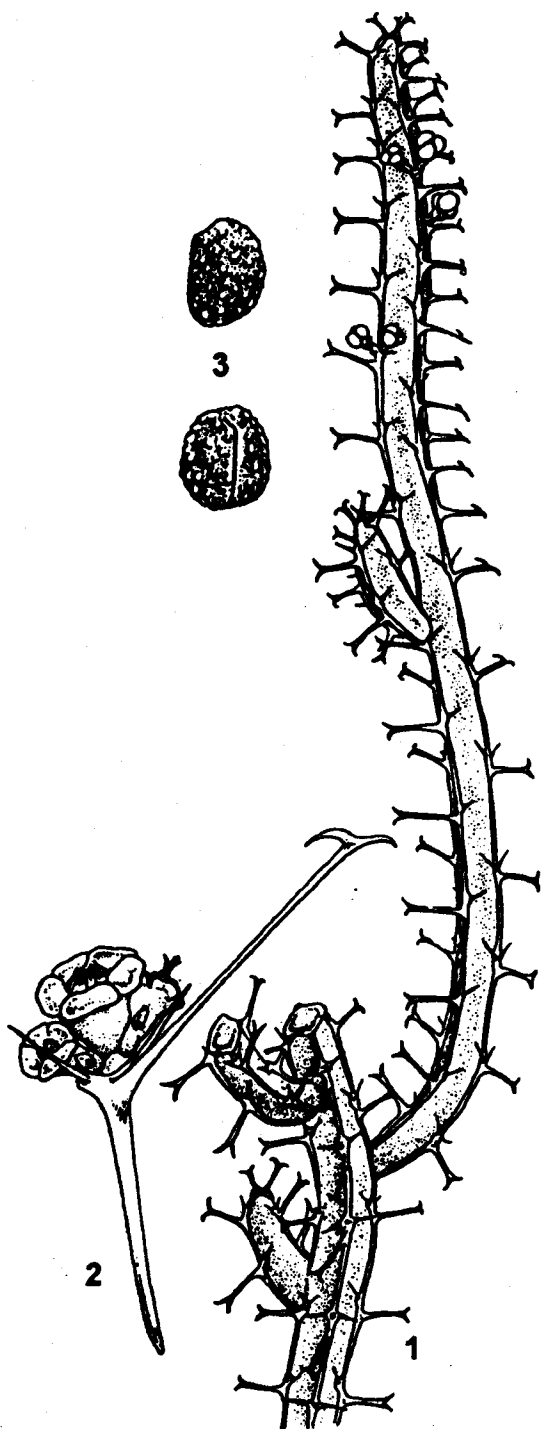


Figure 85.48 *EUPHORBIA GLOCHIDIATA*: 1 – fruiting branch x  $\frac{1}{2}$ ; 2 – cyme and spine-shield x 3; 3 – seeds x 6. 1 & 3 from *Bally & Carter* 16580; 2 from *Bally* 9440. Drawn by *Christine Grey-Wilson*. (Modified and reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 98.)

from involucre, 3 x 4.5 mm, straw-coloured, sharply angled. Seed subglobose, c 1.7 mm diameter, prominently rugose-papillate. Fig. 85.49.

Stony slopes with very sparse vegetation; near sea level-300 m. EE; Sudan, Djibouti, Arabia. *Bally* 6791; *Beccari* s.n.; *Pappi* 4526.

38. *E. kalisana* Carter (1983)

- type: Kenya, Carter & Stannard 198.

Robust 'medusoid' plant with a short, thick central stem broader than high, with spiral tubercles, each axil producing a persistent tuberculate spreading lateral stem to 1 m long, 20 mm thick. Spine-shields to 20 mm long, reddish when young; prickles 3-8 mm long; spines solitary, 32-70 mm long, sometimes very thick. Peduncles and cyme branches c 1.5 mm long; cyathia (in spirit) 3 x 7.5 mm, glands yellow. Capsule not exerted, deeply 3-lobed, 3.3 x 5 mm, purplish. Seeds subglobose, c 2 x 1.5 mm, pale brown, smooth.

'Sandy gravelly soil', probably with open *Acacia* - *Commiphora* bushland; 660 m. GG SD; Kenya. *Brown* 34; *Corradi* 5571.

39. *E. awashensis* M. Gilbert (1992)

- type: SU, near Mt Fantale (Awash National Park), *Negri* 1318 (FT holo.).

Main stem underground, with relatively few erect lateral stems to 30 cm high, c 7 mm thick, almost terete, glaucous. Spine shield up to 7 mm long, usually much less; prickles up to 2 mm long; spines solitary, up to 12 mm long, distinctly reflexed. Cymes (dried) to c 7 mm long, bright yellow, wellpressed involucre c 3.5 mm wide. Intact capsule not seen, columella not exerted, c 3 mm long.

*Chrysopogon* grassland; c 1000 m. SU; known only from the type and colour slides of a cultivated plant collected in Awash National Park, just E of Mt Fantale.

An extremely distinctive plant certainly different from any described species. The underground main stem is presumably an adaptation to survive grass fires.

40. *E. monacantha* Pax (1903)

- type: BA, Gorobube, 1 days walk from Sof Omar caves, *Ellenbeck* 1974 (B holo. destr.; K drawing.); 18 km from Sof Omar on road to Goro, *Friis* et al. 3706 (K neo.; C ETH isoneo.).

Medusoid succulent, main stem short and thick, every axil producing a slender, little-branched, lateral stem up to 20 cm long, c 10 mm thick with 5 spiral ranks of tubercles. Spine-shields 3-6 mm long, broadly T-shaped; prickles barely visible to 1 mm long; spines solitary, to 14 mm long, patent to inflexed. Cymes sessile; cyathia funnel-shaped, 2.5 x 3.4 mm (fresh), glands touching, bright yellow. Fruits not seen.

*Acacia* - *Combretum* woodland on stony ground over limestone; 1200-1800 m. SD BA ?HA; not known elsewhere. *Bally* 9117; *Friis* et al. 3706; *Thulin* et al. 3819b.

At present it seems best to separate *E. actinoclada* and *E. monacantha* on the basis of the apparent correlation between inflorescences colour and the length of the prick-

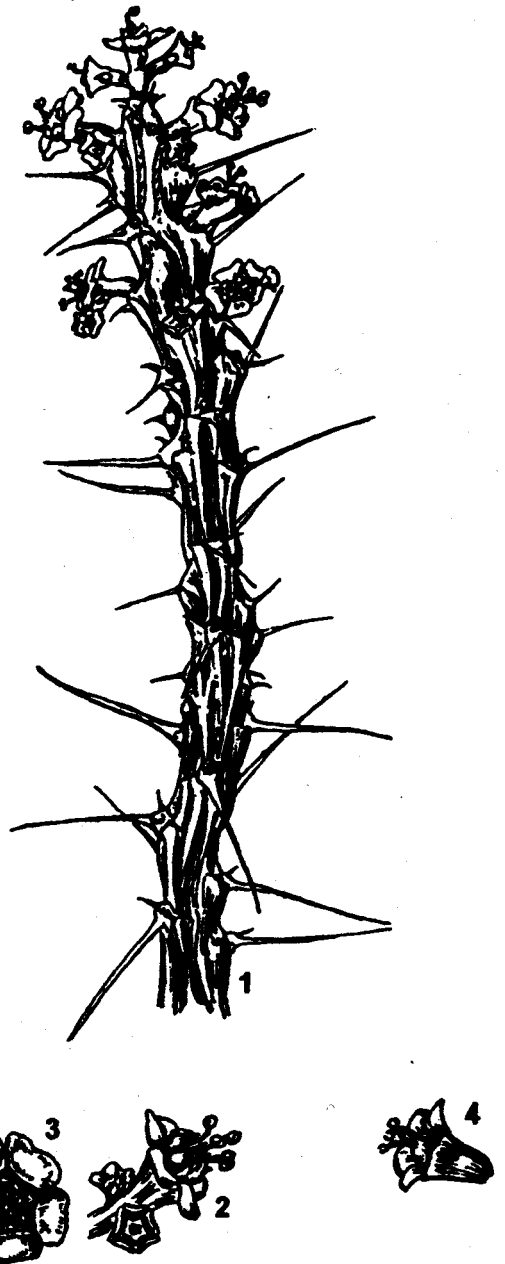


Figure 85.49 *EUPHORBIA TRIACULEATA*: 1 - flowering branch x 1; 2 - young cyme, central cyathium with male flowers x 2; 3 - top view of single cyathium x 3; 4 - side view of single cyathium x 2. (Reproduced with permission from *The Flowering Plants of the Anglo-Egyptian Sudan*, fig. 28, 1952. Scales and specimen citations not given in the original.)

les. However there appears to be a complex of populations of slender-stemmed plants that could prove to form a single polymorphic species. Collections from southern Sidamo are particularly difficult to place, coming closest to *E. monacantha* in stem morphology but with better developed prickles and sometimes rather dull coloured flowers. The record from HA is based on a photograph taken near Dire Dawa.

N.E. Brown and subsequent workers have included a series of collections from Somalia in this species which are better separated as *E. xylacantha* Pax. See note after *E. sp.* = *Gilbert* 2296 below.

41. *E. sp.* = *Le Houérou* 051176/04-06  
HA, 20-30 km S of Jigjiga).

Closely related to *E. monacantha* but much more robust, stems to 10(-17 when fresh) mm thick, strongly tuberculate. Spine-shields 9-11 mm long; prickles barely discernible; spines solitary, 13-20 mm long, patent. Cymes solitary; involucre broadly funnel-shaped, 3 x 5(-7 when fresh) mm, glands touching, bright yellow. Fruit not seen.

No data on habitat. SD HA; not known elsewhere. *Ash* 2403.

This may prove to be just a very robust form of *E. monacantha* but the 2 collections seen so far are very easily separated.

42. *E. sp.* = *Gilbert* 2296  
HA, Ogaden, 60 km from Kebri Dehar on road to Godé, c 30 km NE of Denan.

Medusoid succulent, central stem at ground level, lateral stems spreading, up to 25 cm long, 28 mm thick with up to 12 ranks of prominent laterally compressed tubercles when well developed. Spine shields oblong, c 7 mm long, soon turning white; prickles not discernible; spines solitary, up to c 20 mm long, patent, stout. Cymes (spirit material) with branches up to 3.5 mm long, bracts almost linear, 2 mm long; cyathia funnel-shaped, 3.4 x 4 mm, glands just touching, almost erect, dull dirty yellow (in cultivation, probably ± brown in habitat). Fruit not seen.

Growing in shade along margins of limestone gully in area of fairly dense deciduous bushland; c 600 m. HA; known only from the one collection.

Superficially similar collections from Somalia, mostly named as *E. monacantha*, differ by having fewer ranks of tubercles and well-developed prickles. These belong to *E. xylacantha* Pax which was erroneously indicated in the protologue to come from 'Harar'. The material cited was collected between Berbera and Hargeisa in Somalia.

43. *E. actinoclada* *Carter* (1983)  
- type: Kenya, *Gillett* 12631.

Medusoid shrublet with short thick main stem up to 5 x 2 cm which produces regularly spirally arranged slender little-branched lateral stems up to 15 cm long, 7-13 mm thick with 5 spiral ranks of tubercles. Spine-shields oblong, 2-9 mm long; prickles 1.5-2 mm above spine, 1.7-2.5 mm long; spines solitary, 16-24 mm long, patent. Flowering eye solitary. Peduncle and branches c 1 mm long; cyathia funnel-shaped, 1.8 x 4 mm, glands spreading, touching, dull red or pink; ovary not exerted at anthesis. Fruits not seen.

*Acacia* - *Commiphora* bushland, often overlying limestone, occasionally on dark soils with *Acacia drepanolobium*; 400-1350 m. SD ?HA; Kenya. *Ash* 1875; *Bally* 9314; *Gilbert* et al. 8121.

Plants from HA (*Gilbert* 2063 from 16 km SE of Aware) have much taller main stems, up to 15 cm high, and brownish cyathia and may represent a distinct taxon. Some plants from SD (*Friis* et al. 2775, 2776; *Gilbert* et al. 7436) have the main stem retracted below ground as in *E. awashensis* and may also be distinct.

44. *E. schizacantha* *Pax* (1898)  
- type: BA, Elba, on Ueb Ruspoli, *Ruspoli & Riva* '764 (544) 697' (B holo. destr.; FT iso.).

Closely related to *E. actinoclada* but bigger, up to 30(-45) cm tall with lateral stems up to 40 cm long, 12 mm thick. Spine-shields 9-13 mm long; pale brown to straw-coloured when young; prickles 3-5 mm long; spine solitary, to 20-27 mm long overall, tip asymmetrically forked for 1.5-7(-9) mm. Cymes larger, cyathia 2 x 6 mm, glands deep red. Capsule sessile, c 3 mm long, sharply 3-lobed. Seeds not seen. Fig. 85.43.4.

Open *Acacia* - *Commiphora* bushland on variety of soil types including gypsum; 300-750 m. SD HA; Somalia, Kenya. *Ellis* 249; *Gilbert* 2127; *Gilbert* et al. 7664.

This species has often been associated with *E. glochidiata* because of the forked spines but these are surely not homologous and there is no close relationship between the two species.

45. *E. monadenioides* *M. Gilbert* (1987)  
- type: GJ, cultivated in Addis Abeba from plants collected 30 km from Bahir Dar on road to Dangla and Debre Marcos, *M. & S. Gilbert* 2295 (K holo.; ETH iso.).

Geophyte, main stem napiform, to 4 cm thick, branches rhizome-like. Leaves deciduous, in apical rosette, sessile, oblanceolate to obovate, up to 8.5 x 3.2-4 cm, tip obtuse to subtruncate or acute, mucronate, entire or minutely crisped, fleshy, glossy with pale veins, streaked with red. Cymes produced in dry season; peduncles 3.3-3.7 cm long, fleshy, to 2.5 mm thick; bracts deltoid, 3.2-3.5 mm long, keeled, pinkish; cyathia sessile, involucre obconical, 3.2-3.5 x 5.2 mm; glands 5, transversely oblong, contiguous, brownish; ovary well exerted at anthesis, styles 1.9 mm long, joined at base. Immature capsule 3.3 x 4.2 mm, 3-angled. Seeds not seen. Fig. 85.50.1-6.

Deciduous woodland with *Albizia*, *Hymenodictyon floribundum*, *Stereospermum kunthianum* etc. on relatively recent lava flow, growing in rock crevices in full sun; 1600-1900 m. GJ; Uganda. *Mercier* 2959.

The only Ugandan specimen seen lacks flowers and has rather narrower acute leaves than the Ethiopian material. *E. бага* Chev. from West Africa is closely related but otherwise the relationships of these very highly adapted plants are uncertain. The most likely possibility is that they are a further development from a plant similar to *E. decidua* Bally & Leach, seedlings of which show similarities to these geophytes. As such they would belong to subgenus *Euphorbia*.

This species is valued in traditional medicine. The latex causes intense irritation to mucous membranes.

- Subgenus LACANTHIS (*Raf.*) *M. Gilbert* (1987).  
*Lacanthis* *Raf.* (1837); sect. *Diacanthium* *Boiss.* p.p.

Most species spiny, semisucculent shrubs restricted to Madagascar, in the Flora area a specialized group of geophytic succulents, glabrous throughout. Leaves alternate, well developed; stipules absent or thread-like in Flora area, elsewhere mostly spiny, sometimes complex, not inserted on a spine-shield as in subgen. *Euphorbia*. Cymes axillary, usually long-



Figure 85.50

**EUPHORBIA MONADENIOIDES:**

1 – portion of swollen underground stem with emergent inflorescences x 1/2; 2 – leaf x 1; 3 – rosette of leaves in the swollen top of the stem x 1/2; 4 & 5 young cyathium, top and side view x 8; 6 – old cyathium x 6. **E. CRYPTOCAULIS:** 7 – complete plant x 1/2; 8 – leaf x 1; 9 – tubercle showing leaf-scar at the base x 6; 10 & 11 – cyathium, top and side view x 8. 1–3 from photos taken at type locality; 2, 4–6 from Gilbert 2299; 7, 10 & 11 from Gilbert et al. 7730; 8 & 9 from Ash 825. Drawn by Eleanor Catherine.

pedunculate; cyathia subtended by pairs of conspicuous suborbicular bracts, usually brightly coloured and petaloid. Cyathia often small and obconical; glands transversely oblong, 5 or, in Flora area only, 4 larger oblong plus 2 small, ± round, glands; ovary often exerted. Seeds oblong, often rugose-warty, less often smooth, with small caruncle.

This group has a very well marked centre of diversity within Madagascar, with only the following species found on the African mainland. Most species are spiny shrubs obviously related to *E. millii*. These have usually been included along with subgen. *Euphorbia* within 'sect. *Diacanthium*'.

1. Minute succulent herbs with stems completely concealed below ground and with leaves forming acaulescent rosettes; stipules absent or thread-like. 2

– Much-branched cultivated shrub, leafy for most of the year, stipules forming conspicuous spines.

46. *E. millii*

2. Root-stock tuberos, smooth, obviously wider than tuberculate stem. 3

– Roots fibrous, stem with tubercles extending down almost to roots. 4

3. Root-tuber irregularly subglobose, often separated from stem by a narrow neck; bracts clear pink, rounded to very shortly acuminate, to 4 mm long.

47. *E. rubella*

– Root-tuber regular, napiform, only gradually narrowing into stem; bracts dirty pink or white to pale brown, rarely green, acute, to 2 mm long.

48. *E. brunellii*

4. Stem simple, erect, often subglobose, with *c* 12 well-defined slightly spiralled ranks of pointed tubercles; inflorescence often much branched.

49. *E. cryptocaulis*

- Stems branched, ± rhizomatous, with obscure well-spaced tubercles in *c* 3 spiral ranks; inflorescence apparently often not branched.

50. *E.* sp. = Gilbert & Jones 123

46. *E. millii* Des Moulins var. *splendens* (Hook.) Ursch & Leandri in Mem. Inst. Sc. Madag. B, 5: 148 (1954); *E. splendens* Hook. (1829).

Low shrub, usually less than 50 cm high; stems grey. Leaves conspicuous, oblanceolate; stipules forming pairs of well developed spines. Inflorescences long-pedunculate, exceeding leaves, lax; bracts usually bright red.

Widely grown as an ornamental plant, mainly as a low hedge plant in the tropics. Native of Madagascar.

A range of cultivars based on this species and hybrids with other related Madagascan species have been introduced into cultivation, including forms with yellow bracts and/or much more robust erect stems (e.g. var. *hislopilii* (N. E.Br.) Ursch & Leandri which is widely grown in Kenya).

47. *E. rubella* Pax (1903)

– type: HA, Mt. Hackim ('Djebel Haquim'), near Harar, *Ellenbeck* 954 (B holo. destr.; K drawing).

Geophyte; root a subglobose tuber sometimes elongated when growing in rock crevices, abruptly delineated from stem by constriction; stem usually unbranched, completely below ground, up to *c* 3 x 0.7 cm, covered by spirally arranged tubercles. Leaves long petiolate, usually with only the blade above ground where they form a rosette flat on ground, blade broadly elliptic, base rounded to subcordate, tip rounded to very shortly acuminate, dark blue-green above, reddish-purple below; stipules absent. Cymes produced with or before leaves, subapical, often solitary; peduncle up to 3 cm long, usually less and rather congested; bracts orbicular-reniform with clawed base, up to 4 mm long, shortly acuminate, entire, clear pink. Cyathia sessile; involucre *c* 1.5 x 1.5 mm, dark red; glands 6, 4 transversely oblong-elliptic, 2 smaller, suborbicular, red or yellow; ovary exserted, styles 1 mm long, shortly bifid. Capsule long exserted, oblong, *c* 2 x 2 mm, smooth. Intact seed not seen, fragments grey, warted.

Growing in dark soil in limestone crevices on open grassy slope with patches of evergreen bushland; 1850–1950 m. HA; known only from the type locality. *Bally* 9900; *M.G. & S.B. Gilbert* 1426; *Gillett* 5007.

48. *E. brunellii* Chiov. (1951);

*E. rubella* var. *brunellii* (Chiov.) Bally, *Candollea* 22: 262 (1967) – type: SD, Mt. G. da-Bongdi, *Vatova* 1997 (FT holo.).

Similar to *E. rubella*, differing as follows: more robust, rootstock a vertical inverted cone-shaped tuber to 3.5 cm thick with a gradual transition into the broad based, slightly

tapering stem up to 5 x 1.7 cm, stem covered with very close set indistinct tubercles; leaves larger, petiole up to 2 cm long, blade 5 x 3 cm, often cuneate into petiole and streaked with red above; cymes more slender, bracts ovate, to 2 mm long, acute, dull dirty white to buff, rarely pale green or pink; capsule more ovoid, 2.2 x 2.1 mm. Seed ovoid, 1.7–1.8 x 1.1–1.2 mm, pale brown or grey, densely warted or tuberculate; small, pale, caruncle present. Fig. 85.51.

Open sites in deciduous woodland/bushland with *Combretum*, *Terminalia*, *Lannea rivae* & *Commiphora africana*, usually on well drained sandy soils overlying basement complex rocks, rarely in poorly drained dark grey soils on volcanics; 1450–1900 m. GG SD BA; Kenya, Sudan, Uganda. *Gillett* 14425; *Gilbert et al.* 7763; *Thulin et al.* 3635.

Locally common and possibly far more widespread than records indicate.

49. *E. cryptocaulis* M. Gilbert (1987)

– type: SD, near Neghelli (Negele), *Corradi* s.n. (FT holo.).

Geophyte; roots fibrous; stem well below ground, up to 2 x 2–4 cm with *c* 12 well defined, slightly spiral, ranks of slender acute tubercles to 4.5 mm long. Leaves as in *E. rubella* but larger, petiole up to 6 cm long, blade 3.8 x 2.4 cm; stipules thread-like, 2 mm long, soon lost. Cymes very slender and lax, pale dirty pink throughout, up to 11 cm long with 4 dichotomies; bracts ± suborbicular and fan-shaped, fused dorsally, to 3 mm long, truncate-apiculate. Cyathia, fruits and seeds as in *E. rubella* and *E. brunellii*. Fig. 85.50.7–11.

Growing under bushes in *Acacia* – *Commiphora* bushland and open *Combretum* woodland; 1350–1600 m. SD; not known elsewhere. *Ash* 825; *Gilbert et al.* 7730.

*Gilbert & Jones* 124 (SD, 97 km from Negele on road to Filtu) has smaller stems, up to 1.5 x 1 cm, with very small tubercles and solitary, rarely 2 together, leaves lacking stipules. It grew in a distinctly drier type of *Acacia* – *Commiphora* bushland at 1250 m and further collections are needed to show whether it is merely a depauperate form or, quite possibly, yet another distinct taxon.

50. *E.* sp. = Gilbert & Jones 123

SD, 97 km from Negele on road to Filtu.

Geophyte; roots fibrous; stems rhizomatous, narrowly ovoid or clavate, to 9 mm thick, branching subapically to form chains, with obscure, well spaced tubercles in *c* 3 spiral ranks, white when young, later pale brown. Leaves from tips of mature stems only, very similar to those of *E. cryptocaulis*. Dried remains of inflorescences only available, apparently very similar to those of *E. cryptocaulis* but not branching and bracts more distinctly pointed.

Growing in grass tussocks and under bushes in *Acacia* – *Commiphora* bushland; 1250 m. SD; not known elsewhere.



Figure 85.51 *EUPHORBIA BRUNELLII*: 1 – habit  $\times \frac{3}{4}$ ; 2 – stem-apex with leaves in full growth  $\times \frac{3}{4}$ ; 3 – stem-apex, showing leaf-scars  $\times \frac{3}{4}$ ; 4 – cyme  $\times 8$ ; 5 – fruiting cyme  $\times 2$ ; 6 – seed  $\times 8$ . 1 & 4 from Gillett 12860; 2 & 6 from Tweedie 3608; 3 & 5 from Tweedie 355. Drawn by Christine Grey-Wilson. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 99.)

Subgenus *ESULA* Pers. (1806).

*Tithymalus* Gaertner (1790), *nom. cons.*

Gilbert, *Kew Bull.* 45: 265–275 (1990).

Trees, shrubs and herbs, occasionally succulent. Vegetative leaves usually alternate, rarely opposite (*E. lathyris*), stipules absent or represented by glands or, less often, thread-like structures, never spinescent. Vegetative growth usually terminated by a pseudumbel with a solitary cyathium surrounded by a whorl of ray bracts, each subtending a cyme, sometimes with axillary cymes immediately below, rarely (sect. *Pseudacalypha*) with axillary cymes only. Calyx of female flowers mostly reduced to a narrow rim; styles bifid, usually joined at base. Seeds various.

A grouping of rather diverse sections that are linked together through intermediate species.

1. Inflorescence a terminal false umbel, sometimes also with additional axillary cymes below; cyathial glands glabrous on upper surface. 2
- Inflorescences axillary; cyathial glands hairy on upper surface. sect. *Pseudacalypha* (spp. 51–54)
2. Stems herbaceous or softly woody with grey or brown bark, rarely green and succulent and then cymes axillary and/or branching to produce a succession of cyathia; cyathial glands often with 2 or more linear appendages on outer margin; leaves usually present at flowering. 3
- Stems succulent, green or grey; inflorescence a terminal pseudumbel, each ray producing just one cyathium or cyathia subsessile in dense terminal cluster, glands without appendages; leaves absent from flowering stems. sect. *Tirucalli* (spp. 75–77)
3. Stems woody, slender, usually with peeling brownish papery bark, older stems occasionally grey, rugulose; cyathial glands always entire. 4
- Stems usually herbaceous or succulent, if softly woody, then stems thick with smooth grey bark which does not peel; cyathial glands often with linear appendages. 5
4. Bracts triangular or reniform, green; capsule exserted from involucre; seeds oblong, with caruncle. 60. *E. polyantha* (sect. *Eremophyton*)
- Bracts spatulate, often yellow, white or red; capsule subsessile; seeds, where known, subglobose or ovoid, without caruncle. sect. *Lyciopsis* (spp. 64–70)
5. Softly wooded shrubs stems thick with smooth grey bark; rays of pseudumbels producing one cyathium; bracts scarious, soon falling. sect. *Somalica* (spp. 71–74)
- Herbs or shrubs but very rarely with smooth grey bark; rays of pseudumbels usually producing a succession of cyathia; bracts leafy, persistent. 6
6. Stipules present though always reduced to glands or filiform and sometimes soon falling; pseudumbel with (2–)3–4 rays. 7
- Stipules absent; pseudumbel with 5 or more rays, rarely fewer in some depauperate weedy ephemerals. sect. *Esula* (spp. 78–90)
7. Cyathial glands entire, flat or involute, truncate; capsule 3.5–6.5 mm long. sect. *Eremophyton* (spp. 55–60)
- Cyathial glands with outer margin with pectinate appendages, irregularly lobed or revolute and crenate; capsule 9–10 mm long. sect. *Trichadenia* (spp. 61–63)

#### Section *Pseudacalypha* Boiss. (1862)

Small herbs with slightly to markedly succulent stems, mostly sparsely branched. Leaves alternate, well developed but often soon falling; stipules very inconspicuous, glandular. Cymes strictly axillary, shorter than subtending leaves; bracts small, leafy. Cyathial glands 4, erect, hairy on inner surface. Capsule exserted. Seeds conical, pitted or wrinkled; caruncle absent.

A small group with 4 species only, all found in the Flora area.

The strictly axillary inflorescences and hairy cyathial glands readily distinguish them from all other Old World groups. The section is sometimes expanded to include sect. *Holstianae*, largely on the basis of the similar seeds but the overall morphology of those species is much closer to sect. *Eremophytum* and they have been included there in this account.

1. Main stem only slightly succulent with well spaced leaf scars, branching to form small shrublet. 2  
 - Main stem very succulent with close spirals of leaf scars, not branching unless apex damaged. 3
2. Leaves obovate to broadly elliptic or, if lanceolate, margins undulate; capsule barely exerted from involucre on stout pedicel, *c* 4.5 mm across; seeds smooth or obscurely rugulose. 51. *E. acalyphoides*  
 - Leaves linear/narrow lanceolate, not undulate; capsule distinctly exerted on slender pedicel, *c* 3.5 mm across; seeds densely and minutely wrinkled. 52. *E. perangustifolia*
3. Very small plant with stem not larger than ones little finger, smooth or only slightly tuberculate, usually dark green suffused with dark purple. 53. *E. hadramautica*  
 - Larger plant, stem up to 25 cm tall, thicker than ones thumb, leaf bases forming prominent peg-like tubercles, pale green sometimes suffused with pale pink. 54. *E. sp.* = *Ash* 1143

51. *E. acalyphoides* Boiss. (1862)

- types: Sudan, *Kotschy* 88 (G syn. microfiche; K P isosyn.); EE, Togodele, *Ehrenberg* (not seen) & Modat, *Schimper* III:1753 (P syn.; K isosyn.); TU, Gageros, *Schimper* (1854) 2294 (G syn.-microfiche; BM K isosyn.).

Annual or short-lived perennial herb, sometimes ± succulent, up to 45 cm high; stems longitudinally grooved. Leaves: petiole up to 25 mm; blade broadly elliptic to oblanceolate or obovate, to 4 x 2 cm, base cuneate, tip rounded to obtuse, often glabrous above. Cymes axillary, up to 10 mm long; bracts subsessile, suborbicular, to 5 mm across; peduncles to 8 mm. Involucre funnel-shaped, 1.8 x 3 mm; glands 4, transversely elliptic, reddish-yellow, hairy all over; styles 2 mm long, erect, hairy. Capsule on 1.7 mm pedicel, shallowly lobed, 3.5 x 4.5 mm, puberulent. Seeds conical, 2.5 x 1.7–2.1 mm, tip acute, obscurely 4-angled with 2 shallow transverse grooves.

1. Leaves broadly elliptic to obovate, rounded/shallowly emarginate, mucronulate, margin flat; seeds dark brownish, obscurely rugulose; branches usually ascending, not very succulent. subsp. *acalyphoides*  
 - Leaves obovate to oblanceolate, acute or subacute, margin undulate; seeds blackish, smooth; branches often spreading horizontally, more succulent with prominent leaf-scars. subsp. *cicatricosa*

subsp. *acalyphoides*

Open *Acacia* woodland or bushland, sometimes in dis-

turbed areas; 400–1400 m. EE TU SD BA HA; Sudan, Somalia, Kenya, N Tanzania, Chad, Angola. *Burger & Amare* 214; *Friis* et al. 956; *Gilbert & Jefford* 4544.

subsp. *cicatricosa* S. Carter

*Kew Bull.* 39: 648 (1984) – type: HA, 79 km SW of Jijiga towards Fick, *Corrá* JBK8 (K holo.).

*Acacia etbaica* – *A. seyal* – *A. nilotica* association; 1550 m. HA; Somalia. *Corrá* JBK8.

52. *E. perangustifolia* S. Carter (1985)

– type: Kenya, *Gilbert & Thulin* 1423.

Closely related to *E. acalyphoides*: leaves linear to narrowly lanceolate, 30–50 x 3–7.5 mm, subacute, not undulate; styles *c* 1.7 mm long; capsule more clearly exerted, pedicel 2–2.3 mm, capsule 2.5–3 x 3–3.5 mm; seeds blackish or brownish, 1.8–2 x 0.9–1.4 mm, with 2 conspicuous pits on each face and surface minutely but deeply wrinkled.

Roadsides in woodland dominated by *Commiphora*, overlying limestone; 750–1250m. SD BA; NE Kenya. *Gilbert* et al. 7662, 7859; *Friis* et al. 3654.

53. *E. hadramautica* Baker (1894)

– type: S Yemen, *Lunt* (K holo.).

*E. napoides* Pax (1897) – type: HA, Ueb Karank, *Ruspoli & Riva* '1106 (419) 1002' (FT holo.; K photo.)

Probably a short lived perennial; stem erect, succulent, unbranched, up to 4 x 1 cm, smooth with close set spiral leaf-scars, glabrous, often deeply suffused brown. Leaves near tip of stem only, obscurely petiolate; blade linear-lanceolate to oblanceolate, 15–50 x 3–5 mm, base cuneate, tip acute to rounded, entire or slightly crisped, puberulent, soon falling. Cymes axillary, up to 2 cm long including long peduncle; bracts suborbicular, *c* 1 mm across. Cyathia sessile; involucre cup-shaped, 1.2 x 1.7 mm; glands 4, suborbicular, hairy all over, pinkish; styles 1.5 mm long, recurved, bifid. Capsule exerted on 1–1.5 mm pedicel, lobed, basally truncate, 2.5 x 3.3 mm, puberulent. Seeds conical, 1.7 x 1.1 mm, tip pointed, 4-angular with 2 large shallow pits on each face, blackish.

Very open *Acacia* – *Commiphora* bushland; *c* 1000 m. HA; Somalia, Socotra, southern Arabia. *Gilbert* s.n. (photos, taken near Degehabur); *Stephenson* in *Bally* 9417.

An extremely insignificant plant, certainly undercollected.

54. *E. sp.* = *Ash* 1143

HA, junction of roads from Kelafo and Mustahil to Shillabo.

Closely related to *E. hadramautica* but stems much more robust, up to 25 cm high (fidé *Ash* 1152) with prominent slender tubercles up to 10 mm long, pale green tinged pink or beige; leaves linear-lanceolate, margin crisped.

Steep limestone slopes sparsely vegetated with *Commiphora*; *c* 400 m. HA; not known elsewhere. *Ash* 1152.



Section *Eremophyton* Boiss. (1862).sect. *Holstianae* Pax & K. Hoffm. (1921)

Annuals or short-lived perennial herbs, sometimes succulent, rarely a shrub with peeling bark. Leaves alternate, sometimes serrate or serrulate; stipules reduced to inconspicuous glands. Inflorescence a small, often 3-rayed, pseudumbel of well developed cymes. Bracts occasionally whorled, often leaf-like. Cyathial glands 2 or 4–5, entire. Seeds of 2 basic types: 4-sided with dorsally pointed tip, conical and smooth or sculptured into transverse ridges, without caruncle or oblong and longitudinally wrinkled with caruncle.

Predominantly tropical African extending into SW Asia but with a group of species, including the type of the section in Australia.

A diverse and possibly artificial group of species, some with very distinctive habits and/or cyathia. Species 55–58 in this account are sometimes placed within sect. *Pseudocalypha*, emphasizing seed morphology rather than overall form. They have also been placed in a section of their own, sect. *Holstianae* Pax & K. Hoffm.

1. Erect herb, sometimes succulent, occasionally woody at base but never with peeling bark; pseudumbels inconspicuous, dominated by the many-branched cymes. 2
  - Woody shrub, sometimes scandent, peeling reddish brown bark on older stems; pseudumbels obvious, the cymes often only 1–2-branched.
2. Basal stem only slightly succulent and not sharply distinct from upper branches; leaves serrate or serrulate. 3
  - Basal stem succulent, contrasting with upper branches, often distinctly tuberculate; leaves entire. 5
3. Capsule densely pilose to tomentose; seeds prominently transversely ridged, without caruncles. 4
  - Capsule inconspicuously adpressed puberulent; seeds rugulose, longitudinally grooved ventrally, with caruncles. 59. *E. agowensis*
4. Styles free, recurved, to 1.5 mm, shortly bifid; leaves usually spreading, occasionally bracts only reflexed. 58. *E. lophiosperma*
  - Styles joined for half length, erect except for tip, 2–2.5 mm, entire; leaves and bracts sharply reflexed. 57. *E. crotonoides*
5. Main stem almost smooth, often pilose, not more than 1 cm thick; cyathial glands 4, fleshy, deep green, spreading; seeds with caruncles (easily broken off). 55. *E. pirottiae*
  - Main stem prominently tuberculate, glabrous, at least 2 cm thick; cyathial glands 2, thin, orange or yellow, sticking out from involucre, seeds without caruncles. 56. *E. longituberculosa*

55. *E. pirottiae* Terracc. (1894)

– type: EE, Midir Island in Anfilah Bay, *Terracciano* 204 (FT holo.).

*E. gorinii* Chiov. (1932).

Annual herb 10–20(–30) cm high, stem swollen and suc-

culent below inflorescence, to 1 cm thick, smooth; all parts pilose becoming glabrous. Leaf: petiole to 1 cm; leaf blade lanceolate, up to 8 x 1 cm, base cuneate, tip rounded, entire. Pseudumbel 3-rayed with well-developed lax cymes; bracts petiolate, oblanceolate to obovate. Cyathia: peduncles 1–2 mm; involucre cup-shaped, 2.2 x 2.2 mm; glands 4, suborbicular, bright or reddish green; styles 1.4 mm long, bifid to halfway. Capsule on 6.5 mm pedicel, oblong-trigonal, 4.8 x 4 mm, sparsely pilose. Seeds oblong, 4 x 2 mm, obscurely 4-angled, tip pointed, greyish-brown, lightly wrinkled; caruncle 1.6 mm wide, yellow, easily broken off.

Open bushland or woodland with *Acacia* and *Commiphora* usually on limestone. Near sea level–1300 m. EE SD HA; Kenya, Somalia, Tanzania; Saudi Arabia. *Ash* 1896; *Friis* et al. 1000; *Gilbert* et al. 7420.

56. *E. longituberculosa* Boiss. (1862)

– type: TU, Agow, near Gurrarfa, *Schimper* (1854) 2307 (G holo. microfiche; K iso.).

*Tithymalus braunii* Schweinf. (1863) – type: TU, Gölleb, *Schimper* (1854) 221 (B holo. destr.; K drawing; FT P iso.).

Succulent herb up to 25 cm high overall; all parts glabrous; main stem succulent, up to 8 x c 3 cm, growth determinate, leaf bases persisting as prominent, spirally arranged tubercles, often purple marked. Basal leaves lanceolate, up to 8 x 1.3 cm, attenuate into indistinct petiole, tip acute, entire. Pseudumbels subterminal, peduncles sometimes forming swollen obscurely tuberculate branches, 3-rayed, cymes well developed, lax; bracts ovate, to 10 x 5 mm. Cyathia: peduncle 1.5–2.5 mm long; involucre cylindrical, 2.5–3 x 1.5–1.8 mm, margin deeply fimbriate-lobed; glands 2, erect, thin, involute, truncate, yellowish; ovary exserted, styles joined almost to tip, 2–2.5 mm long. Capsule on pedicel up to 9 mm long, lobed, 6–6.5 x 6.5–7 mm. Seeds conical, 2.8 x 2.1 mm, tip pointed, 3(–4)-angled with 2 obscure transverse grooves, dark grey to black sometimes flecked white; caruncle absent.

Rather open, often disturbed, sites on steep rocky slopes and level sites in areas of *Acacia* or *Acacia* – *Commiphora* bushland, sometimes in black soils; 600–1150 m. AF TU SU SD; Somalia, Kenya, S Yemen. *Ash* 292; *Friis* et al. 3341; *M. & S. Gilbert* 1721.

*E. pirottiae* is the only other Ethiopian species with a comparable habit.

57. *E. crotonoides* Boiss. (1862)

– type: Sudan, *Kotschy* 419.

Annual, slightly succulent herb to 0.5(–1) m high, usually woody at base; stems ridged to distinctly winged; all parts with spreading white hairs. Leaves and bracts reflexed; petiole 0.5–5 cm, winged; leaf blade linear-lanceolate (to ovate), 3–14 x 0.5–6 cm, tapered into petiole, tip acute. Inflorescence and fruits as in *E. lophiosperma* except that styles are 2–2.5 mm long, joined almost halfway, erect except for tips, entire. Capsule on 3 mm pedicel, subglobose, 6.5–7 mm diameter, densely pilose. Seeds brown to grey or reddish black. Fig. 85.52.1–3.

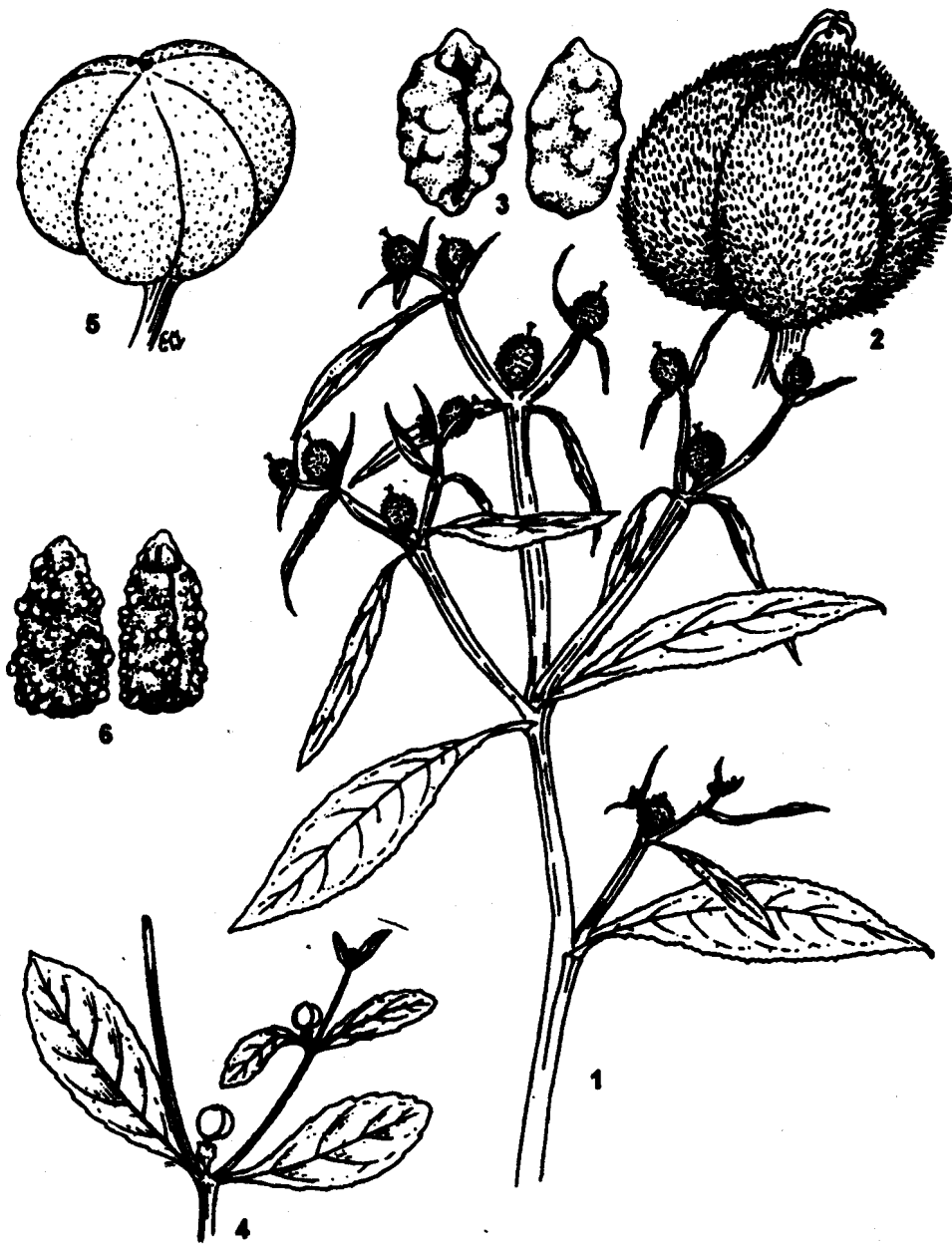


Figure 85.52  
**EUPHORBIA CROTONOIDES:**  
 1 - fruiting branch  $\times \frac{1}{2}$ ; 2 - capsule  
 $\times 6$ ; 3 - seeds  $\times 6$ . **E. LOPHIOSPERMA:**  
 4 - part of fruiting  
 branch  $\times \frac{1}{2}$ ; 5 - capsule  $\times 6$ ; 6 -  
 seeds  $\times 6$ . 1 from *Polhill & Paulo*  
 1941; 2 & 3 from *Bosley* 118; 4-6  
 from *Gillett* 20485. Drawn by  
 Christine Grey-Wilson. (Modified  
 and reproduced with permission  
 from *Fl. Trop. E. Afr. Euphor-*  
*biaceae*: fig. 82.)

subsp. *crotonoides*

*E. systyloides* Pax var. *hebecarpa* (Pax) N.E.Br.  
 (1911).

Leaves usually over 5 mm wide, margins markedly glandular-serrate. Seeds conical, 4.5 x 2.4 mm, distinctly 4-angled, tip pointed and distinctly ventrally constricted, tuberculate in irregular horizontal lines.

Disturbed sites in open *Acacia* or *Juniperus* woodland, mostly in well drained soils; 1500-2100 m. SU SD BA; Sudan, Kenya, Uganda, Tanzania, Malawi and Zambia south to South Africa (Transvaal) and west to Angola and Namibia. *Bally* 9223; *Gilbert & Gelahun* 3127; *Mooney* 5526.

Subsp. *narokensis* S. Carter, restricted to S Kenya, is a high altitude form with leaves up to 5 mm wide and smoother, more ovoid seeds.

58. *E. lophiosperma* S. Carter (1984)  
 -type: Kenya, *Scheffler* 77.

Annual herb to 1m, woody at base; stems ribbed, glabrous or with scattered hairs. Leaf: petiole to 3 cm on lower leaves, flat; leaf blade ovate, to 7.5 x 4 cm, base cuneate, tip acute, margin serrate, teeth sometimes gland-tipped. Pseudumbels 3-rayed, inconspicuous, cymes mostly 1-sided with cyathia apparently axillary. Involucre sessile or nearly so, cup-shaped, 2.5 x 2.5 mm, with hairs below glands; glands 4, transversely elliptic, yellow becoming brown; styles 1.5 mm long, joined for one third, spreading, shortly bifid. Capsule on pilose 3.5 mm pedicel, subglobose, 5 x 6 mm, densely pilose. Seeds conical, 3.8 x 2.8 mm, sharply 4-angled with 2 transverse ridges, greyish brown, warty with crested angles; caruncle absent. Fig. 85.52.4-6.

Deciduous woodland with *Lannea riva* and *Commiphora africana*. 1300–1700 m. SD; Kenya, Uganda, Tanzania. *Friis* et al. 3284; *Gilbert & Jefford* 4541; *Gilbert* et al. 7797.

59. *E. agowensis* Boiss. (1862)

—types: TU, Gölleb, *Schimper* 1414 (G syn.-microfiche; P isosyn.) & near Gölleb and Gageros, *Schimper* (1854) 2150 (G syn.-microfiche; K P isosyn.); EE, Dahlak Is., *Ehrenberg* (not seen).

Erect annual or short-lived sprawling perennial, 0.4–1 m high; glabrous or upper parts pubescent. Leaves spreading, obovate to linear-lanceolate, attenuate into ± indistinct petiole, tip rounded, margin serrulate, glabrous above, sparsely hairy below. Pseudumbel usually 3-rayed, cymes regularly forking; bracts leaf-like. Cyathia sessile; involucre cup-shaped, 1.8 x 1.8 mm, puberulous, margin deeply toothed; glands 4(–5), transversely elliptic, green becoming brown; styles 1.6 mm, joined at base, erect, bifid for one third. Capsule exserted on 4 mm pedicel, oblong, 3.5 x 3 mm, adpressed puberulent. Seeds oblong, ± dorsiventrally flattened, 2.8 x 1.6 mm, tip pointed, rugulose-tuberculate, longitudinally grooved ventrally, whitish with 4 rows of large tubercles on each side; caruncle cap-like, 1.2 mm wide, woolly beneath.

1. Leaves up to 7 x 4 cm, rarely with large marginal teeth; basal leaves often petiolate. var. *agowensis*  
– All leaves linear-lanceolate, to 17 x 1 cm, often with 1–2 pairs of large gland-tipped marginal teeth at base, sessile. var. *pseudoholstii*

var. *agowensis*

Fig. 85.53.1–3.

Woodland, usually with *Acacia*, usually in shelter of other bushes; 1000–1650 m. EE TU WU SU GG SD HA; Kenya, Somalia, Tanzania, N Yemen, India. *Gilbert* 3357; *Gilbert & Thulin* 132, 994.

var. *pseudoholstii* (Pax) Bally & Carter

*Kew Bull.* 39: 650 (1984). *E. pseudo-holstii* Pax (1903) —type: SD, Boran, near Genale Doria, *Ellenbeck* 2067 (B holo. destr.; K drawing.).

Fig. 85.53.4.

Disturbed areas in open *Acacia* bushland. 1050–1600 m. SU SD HA; Kenya, Somalia, Angola, N Yemen, India. *Corrà* JBR2; *Corradi* 5551; *Gilbert & Thulin* 187.

60. *E. polyantha* Pax (1909)

—type: Tanzania, *Merker* 578.

Shrub to 1.2 m, sometimes scandent to 3 m, older stems with peeling red-brown bark. Leaf: petiole 0.7–5 mm long, hispid; blade obovate, 5–35 x 3–23 mm, base cuneate, tip rounded, entire, glabrous except sometimes for hispid midrib. Pseudumbels 3–4-rayed, rays up to 3(–5) cm long, 1–2-forked; bracts sessile, deltoid or reniform, 8–14 x 8–14 mm, acute or rounded. Cyathia sessile; involucre funnel-shaped, 2.5 x 3 mm, margin denticulate, hairy; glands 4, transversely elliptic, yellow becoming dark red; styles 2 mm long, joined halfway, shortly bifid. Capsules exserted

on 5 mm pedicel, oblong, 5.5 x 4.5 mm, smooth, glabrous. Seeds oblong, dorsiventrally flattened, 3.5 x 2.3 mm, tip acute, pale brownish grey, pitted; caruncle pale yellow, 1.7 mm wide. Fig. 85.53.5–7.

*Acacia* – *Commiphora* bushland and woodland on limestone; (700–)1250–1400 m. ?GG SD BA; Kenya, Somalia, Tanzania. *Friis* et al. 946, 3034, 3653.

Very variable, most often a subscaudent shrub of dense bushlands with prominent peeling bark and large bracts; in more open habitats forming very dense rounded bushes less than 50 cm high whilst in very dry gypsum-bearing areas below c 700 m it is replaced by a rather slender erect form, to c 1 m high, with conspicuously grey young stems and smaller bracts. The prominently exserted capsule immediately separates this species from all other species of similar habit so far recorded in or near the Flora area.

Section *Trichadenia* Pax (1891)

Trees, shrubs or perennial herbs, stems often thick but rarely truly succulent. Leaves alternate, entire, deciduous; stipules reduced to glands or filamentous and soon falling. Umbels terminal, cymes well developed with accrescent leafy bracts. Cyathia large; involucre bowl-shaped; glands peltate, usually spreading, outer margin often with several slender appendages – ‘pectinate’, rarely subentire; ovary pedicellate, often with calyx. Capsule large, often fleshy. Seeds large, ovoid; caruncle absent.

An entirely African section except for 1 species in tropical Arabia.

Probably closely related to the strictly southern African sections *Dactylanthus* (Haw.) Pax and *Anthacantha* Pax.

1. Shrub or small tree with fleshy stems and smooth grey bark; seeds smooth. 61. *E. ogadenensis*
- Herbs, stems without secondary thickening; seeds tuberculate or papillate. 2
2. Stems with leaf-scars mostly clustered at intervals along stem; leaves minutely hairy; cyathial glands nearly over-lapping, spreading, outer margin lobed. 62. *E. goetzei*
- Stems with leaf-scars evenly distributed; leaves glabrous; cyathial glands well separated, revolute, subentire. 63. *E. omariana*

61. *E. ogadenensis* Bally & Carter (1986)

—type: HA, between Ferfer and Mustahil (‘Mustar hill’), *Ellis* 337 (K holo.).

Shrub or tree 1.5–3.5 m high, stems minutely puberulent when young. Leaves sessile, oblanceolate to obovate or broadly elliptic, up to 9 x 4.5 cm, base minutely rounded, tip rounded-mucronulate, margins minutely puberulent towards base when young; stipules thread-like, soon falling. Umbel 4-rayed, cymes up to 8 cm long in fruit; basal bracts broadly elliptic, up to 4.5 x 3 cm; upper bracts 0.7–1.5 cm long accrescent to c 3.2 x 2.5 cm in fruit. Cyathia c 9 mm across, involucre glabrous or puberulous; glands hairy below, fan-shaped, appendages c 1.5 mm long with swollen tips; ovary tomentose; styles 3 mm long, joined for 1 mm, capitate. Capsule subglobose, c 9 mm long, densely puberulent. Seeds oblong ovoid, 4.2 x 3.7 mm, dorsiventrally



Figure 85.53

*EUPHORBIA AGOWENSIS* var. *AGOWENSIS*: 1 – fruiting branch  $\times \frac{1}{2}$ ; 2 – capsule  $\times 6$ ; 3 – seeds  $\times 6$ . var. *PSEUDOHOLSTII*: 4 – flowering branch  $\times \frac{1}{2}$ . *E. POLYANTHA*: 5 – fruiting branch  $\times \frac{1}{2}$ ; 6 – capsule  $\times 6$ ; 7 – seeds  $\times 6$ . 1–3 from Polhill & Paulo 1026; 4 from Gilbert & Thulin 1552; 5 & 6 from Verdcourt 3875. Drawn by Christine Grey-Wilson. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 83.)

compressed with sharp lateral ridges and apical depression, smooth, pale mottled brown becoming almost white.

Slopes and bases of low limestone or sandstone hills in open deciduous bushland; c 300 m. BA, HA; not known elsewhere. Hemming 380; Keller s.n.; Popov 1090.

Most closely related to *E. noxia* Pax from Somalia.

62. *E. goetzei* Pax (1900)

– type: Tanzania, Goetze 450.

Erect shrub (0.5–)1–2(–4.5)m high, stem hollow, often clavately swollen, glabrous. Leaves clustered at tip of current growth, oblanceolate to obovate, 3–12  $\times$  0.8–5 cm, tapering into petiole to 3 cm long, tip rounded, membranous, thinly pubescent both sides; stipules glandular. Umbel on peduncle up to 10 cm long, 3(–4)-rayed, cymes up

to 7 cm long with leaf-like bracts up to 2.5  $\times$  2 cm. Cyathia mostly subsessile; involucre 3.5  $\times$  5.5 mm, glabrous; glands separated, irregularly lobed, yellow; ovary glabrous, styles 2.5–3.5 mm long, bifid. Capsule deeply 3-lobed, 9  $\times$  10 mm, smooth, glabrous. Seeds ovoid, 5.8  $\times$  4 mm, prominently irregularly warted, grey minutely spotted with rust-brown. Fig. 85.54.

Riverine forests and seasonal water courses within areas of *Acacia* – *Commiphora* bushland or woodland; 1250 m. SD(BA); Kenya, Tanzania, Malawi, N Zambia. Gilbert 3937a; Ruspoli & Riva '514 (1086) 489'.

This species was for a long time included within *E. transvaalensis* Schlecht., a strictly southern African species with tuberous roots, leaves glabrous except for petioles and longer subentire styles.

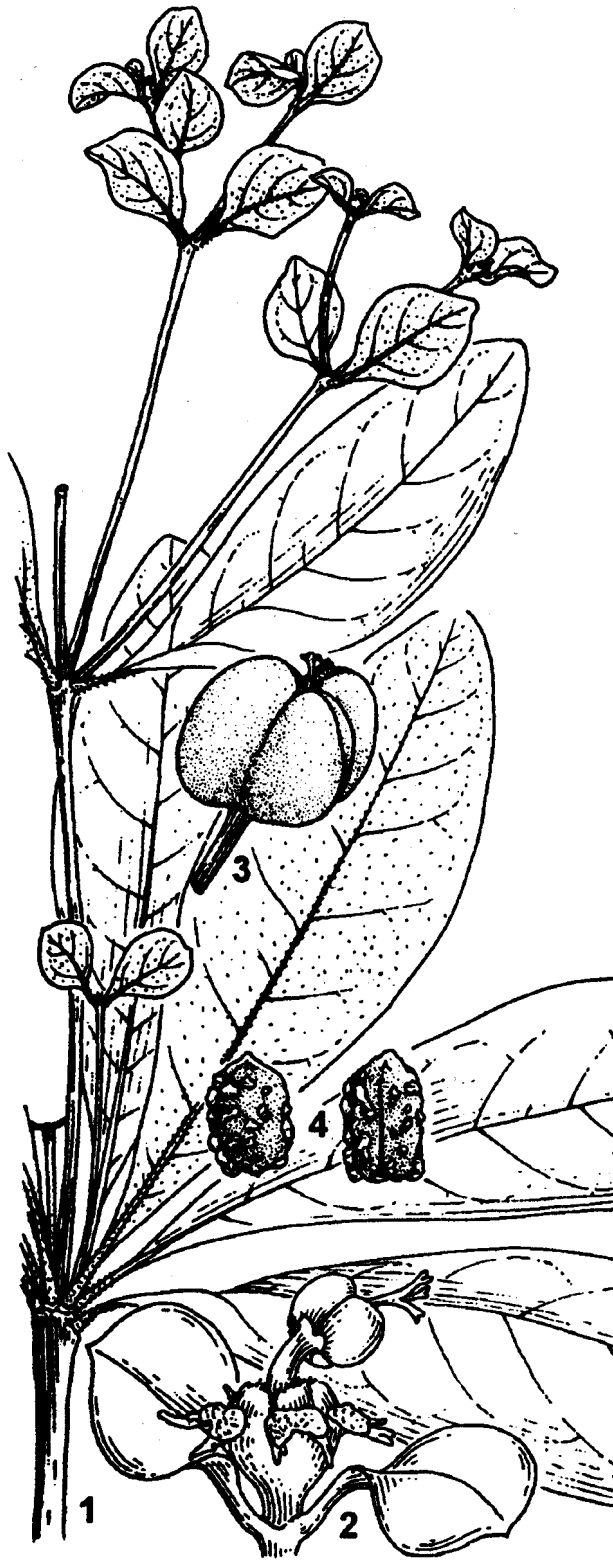


Figure 85.54 *EUPHORBIA GOETZEI*: 1 – flowering branch  $\times \frac{2}{3}$ ; 2 – cyathium  $\times 4$ ; 3 – capsule  $\times 2$ ; 4 – seeds  $\times 2$ . 1 from Richards 7401; 2 from Hooper & Townsend 1686; 3 & 4 from Richards 5618. Drawn by Christine Grey-Wilson. (Modified and reproduced with permission from *Fl. Trop. E. Afr.*, Euphorbiaceae: fig. 84.)

63. *E. omariana* M. Gilbert (1990)

– type: BA, 2 km from Sof Omar on road to Ginir, Gilbert et al. 7848 (K holo.; ETH iso).

Perennial herb; rootstock of fusiform tubers; stems 1(–)5, erect, to 0.8 m; glabrous throughout. Leaves sessile, oblanceolate, to 13 x 5 cm, base cuneate, tip obtuse-apiculate, margin cartilaginous; stipules glandular, black. Umbel sessile, 2–4-rayed, subtended by clustered leaves and smaller oblong bracts; cymes to 8.5 cm long, bracts oblong-ovate, up to 4 x 4 cm, base cordate. Cyathia shortly pedunculate; involucre c 4 x 9 mm; glands widely separated, stalked, outer margin strongly revolute, crenulate. Capsule just exerted, ellipsoidal, c 9 mm long, smooth, glaucous. Seeds ovoid, 4.8 x 3.5 x 3.9 mm, pointed, obscurely 3-angled, finely papillate-tuberculate, dark brown. Fig. 85.55.

In shade of bushes in dense *Commiphora* woodland with *Kirkia* & *Boswellia* on limestone; 1350–1400 m. BA; not known elsewhere. Dawit A. 277; Friis et al. 3674.

Most closely related to *E. macrophylla* Pax (S Sudan, N Ghana and Upper Volta) which has broader leaves and  $\pm$  reticulately wrinkled seeds.

Section *Lyciopsis* Boiss. (1862).

Woody shrubs or shrublets with tuberous roots, glabrous or finely pubescent or pubertulous, older stems with peeling bark, sometimes bark grey and rugose on old stems. Leaves alternate, often obovate to spatulate, sometimes much narrower on juvenile growth, entire, midrib often narrowly winged below, soon turning yellow and dropping at end of rains; stipules usually reduced to minute glands. Pseudumbels mostly terminal or subterminal, usually with few cyathia; bracts spatulate, sometimes conspicuously coloured. Cyathia often large; involucre bowl-shaped; glands often funnel-shaped or tubular because of erect margins, entire; male flowers very numerous; bracteoles much divided. Capsule usually hairy, sessile or shortly exerted. Seeds, where known, subglobose, usually smooth; caruncle absent.

A small group restricted to the Somali-Masai region of E and NE Africa except *E. cuneata* which extends into Arabia and *E. matabelensis* which extends from Kenya into the Transvaal.

Most of the taxa in the Flora area are inadequately known. Fruiting seems to take place in the dry season after leaf fall and fruits and seeds of several species are unknown.

1. Leaves with midribs flat or rounded on underside. 2
- Leaves with midribs raised into sharp keel or narrow wing on underside. 3
2. Shrublet to 0.3 m high from large, softly woody rootstock; branches not spine tipped; leaves elliptic. 67. *E. intricata*
- Shrub over 1 m high (in Flora area); branches spine-tipped; leaves cuneate-spatulate. 68. *E. cuneata*
3. Shrub, trunk often grey, rugose and not peeling, younger branches with dark reddish brown peeling bark; inflorescence green and white or yellow; ovary sessile. 4



Figure 85.55  
*EUPHORBIA OMARIANA*: 1 – plant with a complete stem  $\times \frac{1}{2}$ ; 2 – portion of stem showing leaf bases and associated gland  $\times 1$ ; 3 – stipular gland  $\times 12$ ; 4 – part of inflorescence  $\times \frac{1}{2}$ ; 5 – cyathium  $\times 3$ ; 6 – cyathium with involucre partly removed to show bracteoles and flowers  $\times 3$ ; 7 – bracteoles  $\times 6$ ; 8 – part of infructescence  $\times c \frac{1}{2}$ ; 9 – seed  $\times 6$ . 1–7 from plant cultivated at Kew from Friis et al. 3674; 8 from a slide of Gilbert et al. 7848; 9 from Gilbert et al. 7848. Drawn by Eleanor Catherine.

- Slender erect tree, trunk with bark peeling off in large papery sheets; inflorescence, at least when young, dark red; ovary pedicellate. 6
- 4. Stems dark reddish brown; outer bracts petaloid, white or pale yellow; involucre 7–10 mm wide. 5
- Stems yellowish brown soon becoming grey; outer bracts leaf-like; cyathia  $c$  5 mm wide. 66. *E. kelleri*
- 5. Leave obovate to broadly cuneate-spathulate, up to 40 mm wide, base tapering into ill-defined petiole up to 7 mm long. 64. *E. jatrophoides*
- Leaves narrowly oblong-ob lanceolate, up to 10 mm wide, base rounded with petiole up to 2 mm long. 65. *E. doloensis*
- 6. Petiole to 2 mm long; lateral veins of leaf  $c$  10 per side, curved, cyathia with 5 glands. 69. *E. betulicortex*

- Petiole to 7 mm long; lateral veins of leaf 15–20 per side, almost straight; cyathia with 1(–2) glands. 70. *E. uniglans*

64. *E. jatrophoides* Pax (1903)  
– types: HA, between Aroris & Rufa, *Ellenbeck* 1081 (B syn. destr.; K drawing); BA, between Wabi (Webi Shebele) River & Budugo, *Ellenbeck* 1161 (B syn. destr.; K fragment + drawing).  
*E. reghinii* (Chiov.) Vollesen (1985); *Commiphora reghinii* Chiov. (1940) – type: BA, between El Mara & Monte Ello ( $c$  6N 42E), *Reghini* 11 (FT holo.; K fragment.).

Erect shrub or small tree 2–5 m high; old trunks with rugulose grey bark; young stems dark reddish brown, adpressed puberulent when young, peeling. Leaves: petiole

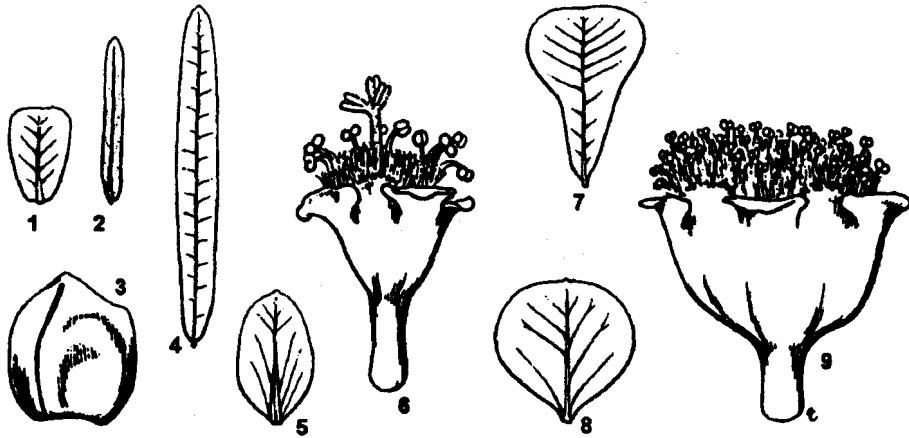


Figure 85.56 *EUPHORBIA KELLERI* var. *LATIFOLIA*: 1 – leaf  $\times \frac{1}{2}$ ; var. *KELLERI*: 2 – leaf  $\times \frac{1}{2}$ ; 3 – seed  $\times 8$ . *E. DOLOENSIS*: 4 – leaf  $\times \frac{1}{2}$ ; 5 – bract  $\times 4$ ; 6 – cyathium  $\times 4$ . *E. JATROPHOIDES*: 7 – leaf  $\times \frac{1}{2}$ ; 8 – bract  $\times 4$ ; 9 – cyathium  $\times 4$ . 1 from a photo of Keller 222; 2 & 3 from Boudet 7936; 4–6 from Gilbert et al. 7571; 7–9 from Gilbert et al. 8114. Drawn by Eleanor Catherine.

poorly differentiated, up to 7 mm long; leaf blade obovate to broadly cuneate-spathulate, 2.5–7  $\times$  1–4 cm, truncate to very shortly acuminate, sparsely puberulent to subglabrous above, puberulent below, midrib prominent, almost winged, below. Pseudumbels with up to 4 cyathia, basal bracts sessile, oblong; upper bracts suborbicular, up to 15  $\times$  15 mm, conspicuously white. Cyathia: peduncles up to 7 mm long; involucre up to 6  $\times$  10 mm, glabrous; glands up to 6, transversely elliptic, separated; bracteoles well developed, filling older cyathia with white woolly mass; ovary pilose, hidden, styles at least 3 mm long, hairy. Capsule subglobose, 6.5  $\times$  7–8 mm, densely white-tomentose. Seeds cylindrical-ovoid, 4  $\times$  2.6 mm, pale brown, minutely densely white-puberulent. Fig. 85.56.7–9.

Acacia woodland on limestone, variously with *Terminalia*, *Barbeya*, *Commiphora* and *Delonix*, 900–1600 m. SD BA HA; NE Kenya. Friis et al. 3132; Gilbert 3439; Gilbert et al. 7671.

Material from central Kenya assigned to this species is now placed in *E. joyae* Bally & Carter, distinguished by the low spreading habit, laxer more branched cymes, puberulous involucre and greenish yellow bracts. *E. reghinii* is known only from sterile material and material from near the type locality is needed to confirm its identity.

65. *E. doloensis* M. Gilbert (1990)

– type: SD, 24 km from Dolo on road to Melka Suftu, Gilbert et al. 7571 (K holo.; C ETH UPS iso.).

Similar to *E. jatrophioides*, differing as follows: more densely branching, spreading shrub to 3 m. Leaves: petiole 2 mm; blade narrowly oblong-ob lanceolate, up to 7  $\times$  1 cm, rounded at both ends, pubescent, lateral veins at 90° to midrib, fairly easily discerned; uppermost leaves and bracts with red stipular glands; bracts up to 12  $\times$  8 mm, white; involucre 5  $\times$  7 mm, glands up to 5, almost touching, styles 5.5 mm long, joined for 4 mm, bifid; capsule not seen. Fig. 85.56.4–6.

Very open *Commiphora*–*Boswellia*–*Moringa* bushland on steep rocky slope of small, ?gypsum, hill; 400 m. SD; known only from the type collection.

66. *E. kelleri* Pax (1898)

– type: BA, Abdallah, Keller 224 (Z holo.).

Densely branched shrub, size not recorded; new shoots slender, yellowish, soon turning pale grey, glabrescent. Leaves variable in shape, puberulous, midrib distinctly keeled or narrowly winged below, lateral veins obscure, only visible by holding leaf to light. Pseudumbels with up to 4 cyathia, outer bracts leaf-like, inner up to 6  $\times$  4.5 mm, yellowish, puberulent; involucre  $c$  3.5  $\times$  5 mm, glabrous outside, glands flat. Capsule  $c$  4 mm long, pubescent. Seeds ovoid-polyhedral, 3.3  $\times$  2.9 mm, ventrally 4-faced, dorsally more rounded, smooth, pinkish-brown to black.

1. Branches apparently erect, not spine-tipped; leaves narrowly oblong-ob lanceolate, 40–47  $\times$  5–7 mm.

var. *kelleri*

– Branches apparently spreading, possibly sometimes spine-tipped; leaves broadly cuneate-spathulate, 23  $\times$  14 mm.

var. *latifolia*

var. *kelleri*

Fig. 85.56.2 & 3.

Habitat not known;  $c$  400 m. BA HA; Somalia. Boudet 7936 (15 km N of Godé).

var. *latifolia* Pax

*Bull. Herb. Boiss.* 6: 740 (1898) – type: BA, Abdallah, Keller 222 (Z holo.).

Fig. 85.56.1

Known only from the type which lacks data on habit and habitat. Var. *latifolia* was collected at  $\pm$  the same time and place as var. *kelleri*. Its status cannot properly be assessed from the available information though the variation in leaf shape seen within *E. uniglans* suggests that the differences might well not be significant.

67. *E. intricata* S. Carter (1986)

– type: BA, 35 km from Ginir on road to Imi, 11 km past Hodda, Gilbert et al. 7999 (K holo.; C ETH UPS iso.).

Low, often intricately branched, tuberous-rooted shrublet to 30 cm high, lateral branches condensed but still with

visible internodes; stems pale brownish-grey, puberulent when young, sometimes peeling at base. Leaves short-lived, petiole 1 mm; leaf blade elliptic, up to 17 x 8 mm, base rounded-cuneate, tip subacute to rounded, uniformly puberulent. Cyathia solitary, terminal and axillary, subtended by several reduced leaves/bracts, puberulous except for glands; involucre 1.5–2 x 2.5–3.5 mm; glands spreading, greenish; ovary hairy, styles *c* 1 mm long, joined at base, very shortly bifid. Capsule rounded, *c* 3.5 x 4.5 mm, puberulent. Seed ovoid, 2.5 x 2 mm, pale brown, slightly glossy.

*Acacia mellifera* or *Combretum* – *Terminalia* bushland in areas of impeded drainage or on rocky slopes with *Acacia* – *Commiphora* bushland; 1150–1300 m. SD BA HA; Kenya. *J. de Wilde* 6658; *Gilbert* 3997; *Gilbert et al.* 7451.

68. *E. cuneata* Vahl (1791)

– type: N Yemen, *Forsskål*.

*S. Carter*, *Kew Bull.* 35: 423–431 (1980).

Woody shrubs/small trees to 4 m high with divaricate spine-tipped branches, most leaves and inflorescences clustered on specialized short shoots; bark peeling on older growth. Leaves obscurely petiolate, cuneate-spathulate, up to 3 x 1.1 cm, tip rounded or emarginate, midrib rounded on underside. Cymes terminal on long shoots or on short shoots, with 1–30 cyathia. Cyathia pedunculate to subsessile, bracts inconspicuous, spatulate, yellowish; glands yellow, spreading and almost touching or erect and tubular; styles 1.5–3 mm long, joined for up to ¾ of length. Capsule angular, 2.7–6.5 x 4.5–7.5 mm, usually densely pubescent. Seed subglobose, 1.5–2.7 x 1.3–2.2 mm, smooth, red-brown or dark brown marbled with grey.

A very polymorphic taxon with at least 5 subspecies, some further divided into varieties: subsp. *cretacea* *S. Carter* is restricted to Somalia.

1. Stems dull greyish-brown to purplish grey. 2  
– Stems glossy reddish or purplish brown. 3
2. Cymes usually with 4–5(–20) cyathia. subsp. *cuneata*  
– Cymes mostly with solitary cyathium, on short shoots, sometimes 2–3 together. subsp. *spinescens*
3. Cymes with 4–7(–30) cyathia; glands flat or transversely folded; styles less than 1.5 mm long, separate ± to base. subsp. *wajirensis*  
– Cymes with 1–3 cyathia; glands ± erect, tubular or radially folded at least when young; styles 2–3 mm long, joined for ¾ of length. subsp. *lamproderma*

subsp. *cuneata*;

*E. cuneata* Vahl var. *carpasus* Boiss. in DC, *Prodr.* 15.2: 97 (1862) – types include EE, Togodele, *Ehrenberg* (K isosyn.).

*Commiphora*-like shrub or small tree higher than broad, trunk with conspicuously transversely peeling bark. Branches dull purplish to brownish grey, pubescent when young. Leaves glabrous. Cyathia 4–5(–20) together, 5–7 mm diameter; glands saucer-shaped or transversely folded. Fig. 85.57.1.

Rocky slopes in semi-desert or very open *Acacia* bushland; 300–660 m. EE; Sudan, Somalia; Arabia; apparently introduced as a hedge plant along the E African coast as far south as Mozambique. *Bally* 6772; *Gilbert* 2562; *Schweinfurth & Riva* 355.

subsp. *spinescens* (Pax) *S. Carter*

loc. cit.: 428 (1980); *E. spinescens* Pax (1894) – type: Tanzania, *Fischer* 524.

Shrub 1.3–2 m high with several stems (elsewhere from a 15 cm shrublet – var. *pumilans* – to a 4 m high tree), trunks pale brown, peeling or dull grey, not obviously peeling. Stems dull pale grey-brown. Cyathia solitary, 4–6 mm diameter; glands sometimes deeply funnel-shaped when young, saucer shaped and often ± contiguous. Styles 1.5–2 mm, free to near base.

*Acacia* – *Commiphora* woodland and bushland on limestone or basement complex slopes; 900–1250 m. SD; (subsp. as a whole: Somalia, Kenya, Tanzania). *J. de Wilde & Gilbert* 350; *Gilbert et al.* 8124; *Mooney* 7699.

*Carter* (loc. cit.) recognized 2 varieties in East Africa, differing in habit: var. *spinescens*, with erect stems to 2 m high, and var. *pumila*, a low bush to 50 cm high with horizontally spreading branches; neither variety had been found north of Mt. Kenya. The Ethiopian collections are geographically isolated from other collections but are most similar to var. *spinescens*. *Gilbert et al.* 8124 (SD: 90 km E of Filtu, 900 m) differs from other collections by the lack of peeling bark, usually a conspicuous feature in this species.

There are also a series of collections from northern Somalia of an often rather low rounded bush with robust more divaricate branches that probably deserves formal recognition. However the situation is complicated by the existence of a variety of other forms in Somalia, each represented by very few collections, that might also represent distinct taxa and it is felt that it would be unwise to present a formal treatment until all these are better known.

subsp. *wajirensis* *S. Carter*

loc. cit.: 428 (1980) – type: Kenya, *Gillett* 21274.

Shrub or small tree with often rather flexuous spreading branches; trunk yellowish with conspicuously transversely peeling bark. Cyathia clustered into groups of up to *c* 30, *c* 5 mm diameter; glands deeply saucer-shaped. Styles *c* 1.5 mm long, joined at base only. Fig. 85.57.2.

1. Ovary pilose; leaves always densely puberulent.

var. *wajirensis*

– Ovary glabrous; leaves usually glabrous.

var. = *Hemming* 1520.

var. *wajirensis*

Spreading shrub. Leaves oblanceolate, (11–)20–42 mm long, 2–3 times as long as broad, always densely puberulent. Ovary pilose.

*Acacia* – *Commiphora* bushland on gypsum bearing soils; 200–600 m. SD BA HA; Kenya. *Gilbert et al.* 8179; *Glover & Gilliland* 407; *Rippstein* 998.





Figure 85.57  
**EUPHORBIA CUNEATA** subsp. **CUNEATA**: 1 – branch detail  $\times \frac{3}{4}$ .  
 subsp. **WAJIRENSIS**: 2 – branch detail  $\times 2$ . subsp. **LAMPRODERMA**: 3 –  
 branch detail  $\times \frac{3}{4}$ ; 4 – cyathium  $\times 4$ ; 5  
 – seeds  $\times 4$ . 1 from Tweedie 1024; 2  
 from Brenan & Gillett 14804; 3 & 4  
 from Carter & Stannard 209; 5 from  
 Gilbert et al. 5230. Drawn by Christine  
 Grey-Wilson. (Reproduced with per-  
 mission from *Fl. Trop. E. Afr.*  
*Euphorbiaceae*: fig. 88.)

var. = Hemming 1520.

Shrub or small tree. Leaves mostly obcordate, 7.5–13 mm long, 1.3–1.8(–3) times as long as broad, usually glabrous. Ovary glabrous.

*Acacia* – *Commiphora* bushland on red sandy soils; c 500 m. HA; Somalia. Hemming 1520.

Typical subsp. *wajirensis* from the Wajir area of Kenya is a spreading shrub with all parts densely puberulent. Collections from SD and BA match closely except that the branches are not quite so spreading whilst most collections from HA and from central Somalia differ by having glabrous fruits and leaves and are often described by the collectors as trees. There is also some suggestion that whereas typical subsp. *wajirensis* comes from area with gypsum present, the glabrous plants are largely from areas

of red sand, sometimes overlying limestone, free from gypsum. More information is needed to confirm these impressions and for the time being the glabrous form is treated as an informal variety.

subsp. *lamproderma* S. Carter

loc. cit.: 428 (1980) – type: Kenya, Carter & Stannard 209.

Shrub to 3 m high; trunk with yellowish-grey bark. Branches slender but stiff, with conspicuously peeling shiny purple-brown bark, glabrous or nearly so. Cyathia solitary, rarely with 2–3 lateral cyathia, c 5 mm diameter, glands distant, erect,  $\pm$  folded into tubes. Styles c 3 mm long, joined for c 2.5 mm. Capsule densely pilose. Fig. 85.57.3–5.

Often locally dominant in *Acacia* – *Commiphora* bush-

land on sandy reddish soils; 325–400 m. GG SD; N Kenya. *Corradi* 6770; *Gilbert* et al. 7633.

No good flowering material has been seen from the Flora area and the record needs confirmation.

69. *E. betulicortex* M. Gilbert (1990)

– type: SD, El Siro Waterholes, *Gilbert* et al. 7725 (K hol.; C ETH UPS iso.)

Erect slender tree to 7 m, trunk with pale, brown bark peeling off in large papery sheets; young stems dark reddish-brown, densely puberulent. Leaf: petiole up to 3 mm long, ill-defined; blades cuneiform-spathulate, 5.5–7.2 x 3.3–4.3 cm, tip rounded or shallowly emarginate, uniformly densely puberulent, midrib prominently keeled below; lateral veins *c* 10 per side, curved. Cyme solitary, terminal, uniformly dark red above uppermost foliage leaf, glabrous. Old cyathia sessile; involucre *c* 3.5 x 7 mm; glands 5, apparently broadly elliptic, spreading. Capsule not seen, remnants of columella 4.5 mm long. Fig. 85.58.5 & 6.

Dense *Commiphora erythraea* – *Kirkia burgeri* woodland on steep limestone slope; *c* 950 m. SD; not known elsewhere. *Gilbert* 3852 (photo only, material lost); *Gilbert* et al. 7725.

The only inflorescences available are the dried remnants after capsule dehiscence; a collection with young inflorescences was lost in a fire.

70. *E. uniglans* M. Gilbert (1990)

– type: Sidamo, Curre Liban, 42 km from Negele on road to Melka Guba, *Gilbert* et al. 8266 (K hol.; C ETH UPS iso.).

Similar to *E. betulicortex*, differing as follows: tree to 10 m; stems glabrous; leaves with distinct reddish petiole to 7 mm long, shape very variable, varying from obovate-cuneate to oblong-spathulate, 6–9.3 x 1.7–5.2 cm to linear-oblong, 8.5 x 0.7 cm, tips very shortly acuminate, glabrous above, underside and petiole very sparsely pubescent, lateral veins *c* 15–20 per side, almost straight. Cymes terminal, dark red, to 5 cm long; bracts dark red, up to 6.5 x 2.8 mm, mostly soon deciduous; cyathia with 1(–2) suborbicular glands; ovary tomentose. Fig. 85.58.1–4.

*Acacia* – *Commiphora* bushland mixed with evergreen scrub; 1400 m. SD; not known elsewhere. *Friis* et al. 3037.

Section Somalica Carter (1985)

Carter, *Kew Bull.* 40: 817–819 (1985).

Shrubs or small trees with spreading branches, stems thick, softly woody with smooth grey bark. Leaves large, slightly leathery, deciduous. Inflorescence a terminal pseudumbel often reduced to a single terminal cyathium, cymes not developing beyond first cyathia, bracts small, scarious, soon falling. Cyathia, capsules and seeds, where known, similar to those of sect. *Trichadenia*, glands more regularly pectinate, seeds smooth, often laterally compressed.

A small group restricted to E and NE Africa, mostly poorly known species — two of the four taxa recognized here are known only from single incomplete collections.

Formerly grouped with sect. *Trichadenia* but with very different inflorescences.

1. Shrub or small tree 3 m or more high; mid-rib of leaf rounded/obscurely winged. 2
- Low shrublet up to 50 cm high; mid-rib of leaf raised into a sharp keel or narrow wing on underside.

74. *E. sp.* = *Gilbert* 3381

2. Cyathial glands with outer margin with clearly defined pectinate gland-tipped appendages *c* 0.5 mm long. 3

– Cyathial glands with outer margin subentire or finely dentate/crenate. 72. *E. grosseri*

3. Cyathia 12–16 mm across; female flower with distinct calyx partly enclosing ovary. 71. *E. scheffleri*

– Cyathia *c* 10 mm across; female flower with calyx reduced to narrow rim. 73. *E. somalensis*

71. *E. scheffleri* Pax (1909)

– type: Kenya, *Scheffler* 104.

*E. grosseri* Pax (1903) p.p. quoad *Ellenbeck* 1163, non sens. str.

*E. somalensis* Pax (1897) p.p. quoad *Ruspoli & Riva* '1075 (325) 972', non sens. str.

*E. scheffleri* var. *carbadensis* Hässler nom. nud.

Spreading shrub or small tree to 4 m high; young stems reddish-brown, glabrescent, leaf scars prominent. Leaves clustered at stem tips, obovate, 5–12 x 2.5–6 cm, base cuneate into obscure petiole up to 8 mm long, tip shallowly emarginate to very shortly acuminate, entire, glabrous or sparsely pubescent above, pubescent below. Pseudumbel with 1–3 lateral cyathia, peduncles up to 14 mm long; bracts oblong-ovate, 4–7 mm long. Cyathia 12–17 mm wide overall; glands suborbicular, spreading, prominently pectinate, gland-tipped appendages *c* 1 mm long; ovary subsessile, surrounded by calyx, glabrous to pubescent, styles *c* 6 mm long, obscurely bifid. Capsule shortly exserted, globose, *c* 1.8–2 cm diameter when fresh, shrinking and becoming deeply 9-ribbed when dried, glabrous or pubescent with glabrous base. Seeds strongly laterally compressed, 7–8 x 6–7 x 4 mm, sharp edged, smooth, pale grey or fawn. Fig. 85.59.

*Acacia* – *Commiphora* bushland on well drained, usually rocky, sites or on dark clays; 1000–1350 m. SD BA HA; S Somalia, Kenya, N Tanzania. *Burger* 2308; *Corradi* 5600; *Gilbert* et al. 7709.

The records from eastern SD and HA, *Gilbert* et al. 8115 and *Burger* 2308 differ from Kenyan material by their more slender suberect habit, smaller cyathia and sparse-pubescent capsules. *Ellenbeck* 1163 from Bale ('Wabi-Budongo'), a syntype of *E. grosseri*, was named as this species by N. E. Brown (*Fl. Trop. Afr.* 6.2: 549) – the material was presumably destroyed in Berlin.

72. *E. grosseri* Pax (1903)

– type: Somalia, Malsaré (Malcaré), near Dolo on Ethiopian border, *Ellenbeck* 2151.

*E. sacchii* Chiov. (1916).

Very similar to *E. scheffleri* above, differs as follows: leaves glabrous except for margins; cyathia smaller, *c* 8–10 mm across, glands subentire with obscurely crenately

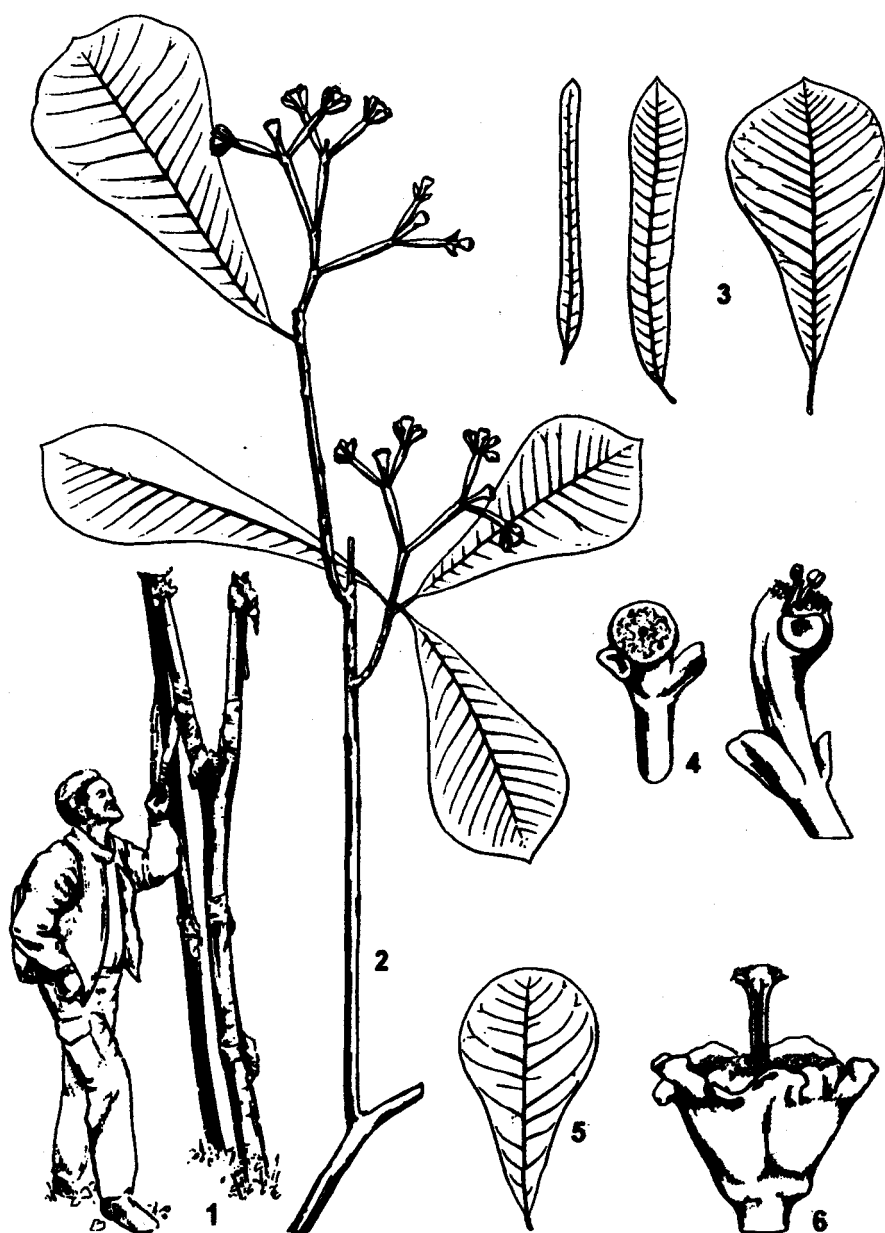


Figure 85.58  
**EUPHORBIA UNIGLANS:** 1 – trunk with peeling bark, size indicated by the standing man; 2 – flowering branch  $\times \frac{1}{2}$ ; 3 – range of leaf forms within the one population  $\times \frac{1}{2}$ ; 4 – young cyathium, top & side views  $\times 2$ . **E. BETULICORTEX:** 5 – leaf  $\times \frac{1}{2}$ ; 6 – old cyathium, capsule dehiscent  $\times 3$ . 1 from slide taken at type locality; 2–4 from Gilbert et al. 8266; 5 & 6 from Gilbert et al. 7725. Drawn by Eleanor Catherine.

toothed outer margin; calyx of female flower reduced to fleshy rim, ovary densely puberulous, styles 3 mm long; seeds not as strongly compressed,  $c 6 \times 4.5$  mm, edge rounded, grey with dark marks.

On low rocky hills in dense *Acacia - Commiphora* bushland; 250–750 m. SD? BA HA; Somalia. Bally 12974; Ellis 385.

Gilbert et al. 8164 from Weldiya, just NE of Dolo included  $\pm$  erect shrubs with smaller cyathia compared with plants seen in the Ogaden which had a more spreading habit, very similar to that of *E. scheffleri* in N Kenya, and slightly larger cyathia.

73. *E. somalensis* Pax (1897)  
 –type: HA, Milmil, Ruspoli & Riva '345 (210) 333'  
 (FT lecto.; K photo.).

Habit probably similar to that of *E. scheffleri*, stems puberulous or glabrescent. Leaves and bracts not seen. Cyathia solitary on stout peduncle  $c 5$  mm long,  $c 8$  mm wide overall;

glands with (3)–4–5 appendages 1–1.5 mm long. Female calyx reduced to a narrow rim; ovary glabrous, styles  $c 3$  mm long, joined for  $c 1$  mm, obscurely bifid. Capsule and seeds not seen.

From the 'Haud' and presumably in *Acacia - Commiphora* bushland on red sandy soil.  $c 1100$  m. HA; known only from type.

Very poorly known. The type is made of fragments. Pax cited 2 more collections in the protologue: Ruspoli & Riva '832 (623) 756' from near the junction of the Ganane (Genale) and Web Ruspoli (Weyb) rivers lacks both leaves and inflorescences and could be any species in this section; Ruspoli & Riva '1075 (325) 972', from which Pax must have taken his description of fruits and seeds, is *E. scheffleri*. Collections from Somalia named as this species by Bally belong to three other species, distinguished by their puberulent, winged or appendaged fruits. New collections from the northern Ogaden are needed to clarify the identity of this species.

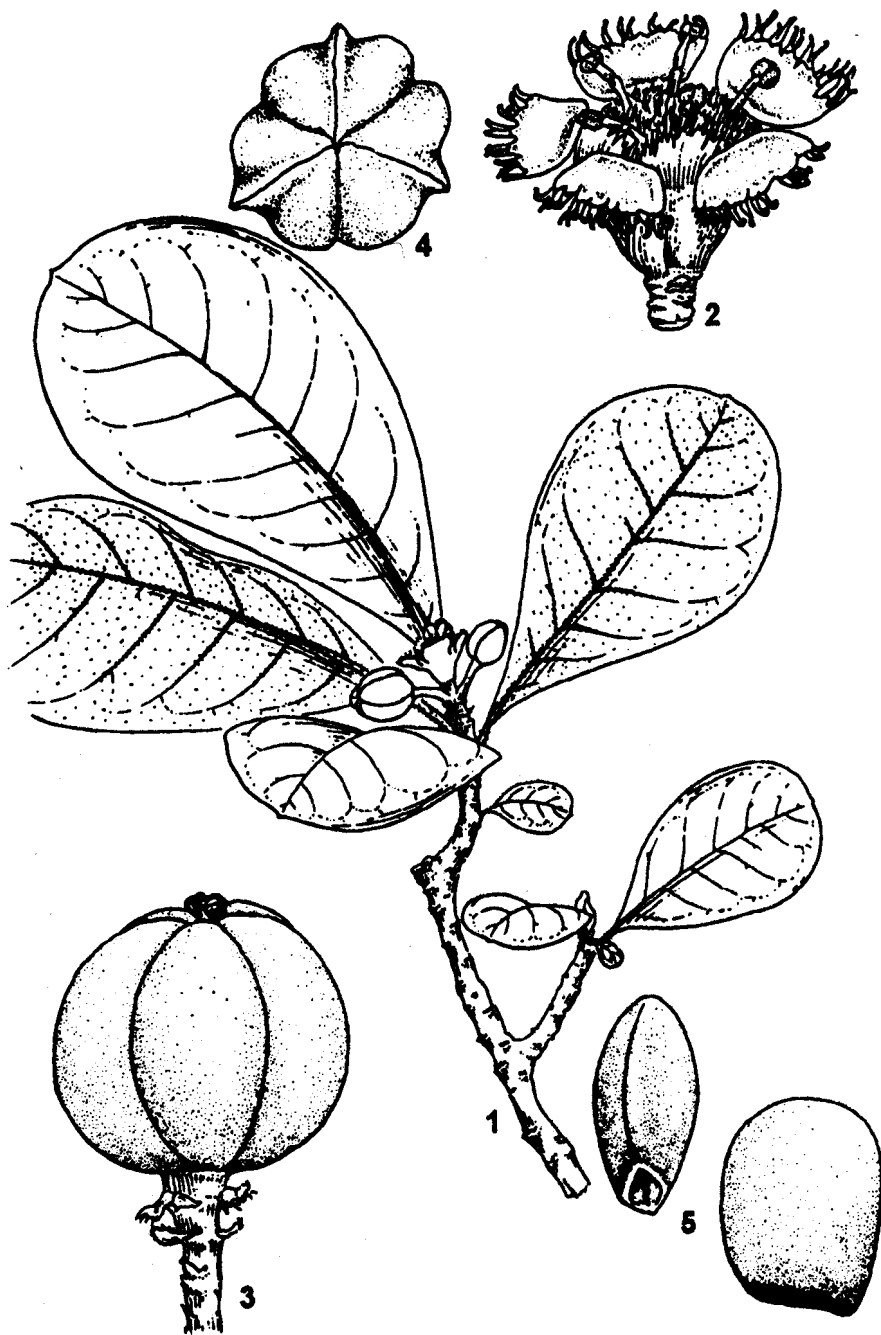


Figure 85.59

**EUPHORBIA SCHEFFLERI:**

1 – flowering branch  $\times \frac{3}{4}$ ; 2 – cyathium  $\times 3$ ; 3 – capsule  $\times 2$ ; 4 – capsule from above  $\times 2$ ; 5 – seed, side and front view  $\times 4$ . 1, 4 & 5 from Polhill & Paulo 993; 2 & 3 from Drummond & Hemsely 4415. Drawn by Christine Grey-Wilson. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 86.)

74. *E. sp.* = Gilbert 3381.

SD, 102 km from Negele on road to Filtu.

Spreading shrublet to 50 cm high, usually less; stems densely puberulent when young. Leaves obovate, up to 2 x 1.5 cm, very shortly petiolate, base rounded, tip rounded-apiculate, midrib prominently raised below, densely pubescent to subtomentose. Cyathia solitary,  $c$  8 mm wide, densely puberulous; glands with closely spaced short appendages. Young capsule globose, tomentose.

More open limestone slopes within area of dense *Commiphora*–*Acacia* bushland; 1250 m. SD; known only from a single collection where it was locally frequent.

The only collection seen has poorly preserved cyathia and very young fruits but the habit seems so different from other members of the section that probably a distinct species is involved.

Section Tirucalli Boiss. (1862)

Leach, *Kirkia* 9: 69 (1973).

Trees, shrubs or shrublets, sometimes scandent; stems terete, succulent, glabrous. Leaves alternate, sessile, soon lost (present only on actively growing shoots);

stipules reduced to glands. Inflorescence a pseudumbel, sometimes reduced to terminal clusters of sessile cyathia, sometimes dioecious. Involucre bowl-shaped; glands 4–5 (–8 in primary cyathia of pseudumbels), round or transversely elliptic, flat, entire; bracteoles often forming a prominent woolly mass. Calyx of female flower reduced to rim. Capsule exserted. Seeds ovoid, slightly compressed laterally, rugulose, with small caruncle.

Most diverse in southern Africa and Madagascar, outlying species recorded from the New World and Australia.

Species in this section are easily recognized by their often leafless, terete, succulent green stems. Some of the species are locally abundant but there is not enough information on characters such as habit, fruits and seeds to construct a reliable classification.

The group is probably heterogeneous: sect. *Tirucalli* sensu stricto (*E. tirucalli* and other species with similar habit and inflorescences) is rather isolated and best represented in Madagascar, other species, such as *E. nubica* and *E. calamiformis*, with more normal pseudumbels are clearly quite closely related to sect. *Esula*.

1. Stems longitudinally striate; plants often unisexual; cyathia *c* 1.5 mm across, in dense clusters at stem tips. 75. *E. tirucalli*  
 - Stems smooth; plants always bisexual; cyathia, including glands, 5.5–10 mm across, mostly distinctly pedunculate in pseudumbels, occasionally solitary. 2
2. Dried stems up to 6 mm thick, with prominent leaf bases; branches ascending and becoming subparallel; central cyathium of pseudumbel larger than lateral cyathia, with 6–8 glands, with male flowers only. 76. *E. nubica*  
 - Dried stems *c* 3–4 mm thick, with inconspicuous leaf bases; branches straight, diverging at wide angles; central cyathium of pseudumbel similar to lateral cyathia, with 5 glands, usually bisexual. 77. *E. calamiformis*

75. *E. tirucalli* L. (1753)

- type: a drawing based on material from Sri Lanka. *E. scoparia* N.E.Br. (1911) - types: Sudan, *Muriel* 67; TU, Schahagane, *Schimper* 896 (not seen); EW, Mai Mafales, *Schweinfurth* 345 (K drawing).

Eventually a tree to 18 m with well defined trunk, more often an erect shrub used as a live fence; stems dark green, striate, rarely hairy towards tip. Leaves linear-lanceolate, to 12 x 1.5 mm, reflexed, leaf-scars inconspicuous. Inflorescence a terminal cluster of subsessile cyathia, apparently often unisexual. Involucre *c* 1.5 x 1.5 mm; glands 4, round; female flowers sometimes with obvious calyx, hairy or glabrous. Capsule usually subspherical, rarely more deeply 3-lobed, *c* 8 mm diam. Seeds ellipsoidal, 4 mm long, smooth, dark brown; caruncle small, white. Fig. 85.60.1 & 2.

Mostly cultivated as a hedge plant over a wide range of rainfall regimes, often escaping or at least persisting in long-abandoned areas; in some areas of SD and GG apparently indigenous and the dominant tree in woodland on black clay soils; 1300–2000 m. EW TU WU SU IL GG SD BA HA; probably originating in Africa but introduced to India in early times and now pantropical. *Beals* 518; *Chaffey* 277; *W. de Wilde* 7356.

The latex can cause extreme irritation to mucous membranes, thus adding to the effectiveness of *E. tirucalli* hedges. There has been interest in this species as a possible source of hydrocarbons for fuel as it can grow in semiarid areas unsuitable for other crops.

76. *E. nubica* N. E. Br. (1911)

- types: Sudan, *Bent* s.n. and EW, *Acrur*, *Schweinfurth* & *Riva* 1083 (K syn.).

Erect shrublet to scandent shrub, woody at base but without trunk; stems pale green, up to 6 mm thick when dried, smooth, terete, glabrous, often glaucous, usually with prominent leaf-scars, branches ascending, subparallel. Leaves linear-lanceolate, to 14(–55) x 3 mm, reflexed. Pseudumbels well defined, ray bracts usually lanceolate, soon falling, (3–)5–7 rays, (5.5–)8–15 mm long. Primary cyathia up to 10 mm across with up to 8 glands, often all male; lateral cyathia 5–7 mm across, glands 4–5, transversely oblong-elliptic, yellowish; bracteoles forming conspicuous white centre; ovary exserted, styles 3–3.5 mm long, almost free to joined for *c* 1 mm, bifid. Capsule up to 7.5 x 10 mm, sometimes deeply lobed. Seeds ovoid, 3–4 x 2.4–2.8 mm, obscurely rugulose, brownish; caruncle *c* 1.2 mm wide. Fig. 85.60.3.

Wide range of habitats from very open *Acacia* bushland on rocky slopes to fairly dense *Acacia tortilis* subsp. *spirocarpa* woodland and margins of *Juniperus* forest, probably a good indicator of overgrazed areas where it can become subdominant; 400–1900 m. EE EW TU SD BA HA; Sudan, Somalia, Kenya, ?Tanzania.

*E. nubica* is closely related to the Arabian *E. schimperi* Presl. (1844) and has been treated by some workers as a variety of that species. The combination however has not been formally made. The Arabian material has rather distinctive irregularly branched flowering stems and until the group is better known seems best treated as distinct.

It is probable that more than one taxon is included here, differing in features such as habit, colouring and inflorescence size. Herbarium material is inadequate to resolve the situation as collections are few, mostly fragmentary and badly annotated with regard to details of habit and colourings. Field work is needed, paying particular attention to the variation of habit with age and environment. The following are the more distinct variants so far noted:

Form A (*E. nubica* sens. str.).

Forming broad clumps of stout, erect stems mostly branching near ground level, apparently often rather bright green; capsule relatively small.

850–2000 m. EE EW TU SD HA. *Bally* 7049, 9148; *Scott* 205.

Form B

Subscandent shrub forming tangled masses of stems, tending to become somewhat glaucous, sometimes ± stoloniferous, capsule large, globose when fresh.

1000–1500 m. SD HA. *Ash* 3579; *Burger* 633; *Gilbert* & *Jefford* 4473.

This material approaches *E. gossypina* Pax (1894) from Kenya and Tanzania but that species would seem to be separable by its broad, rather persistent, ray bracts and smaller fruits.

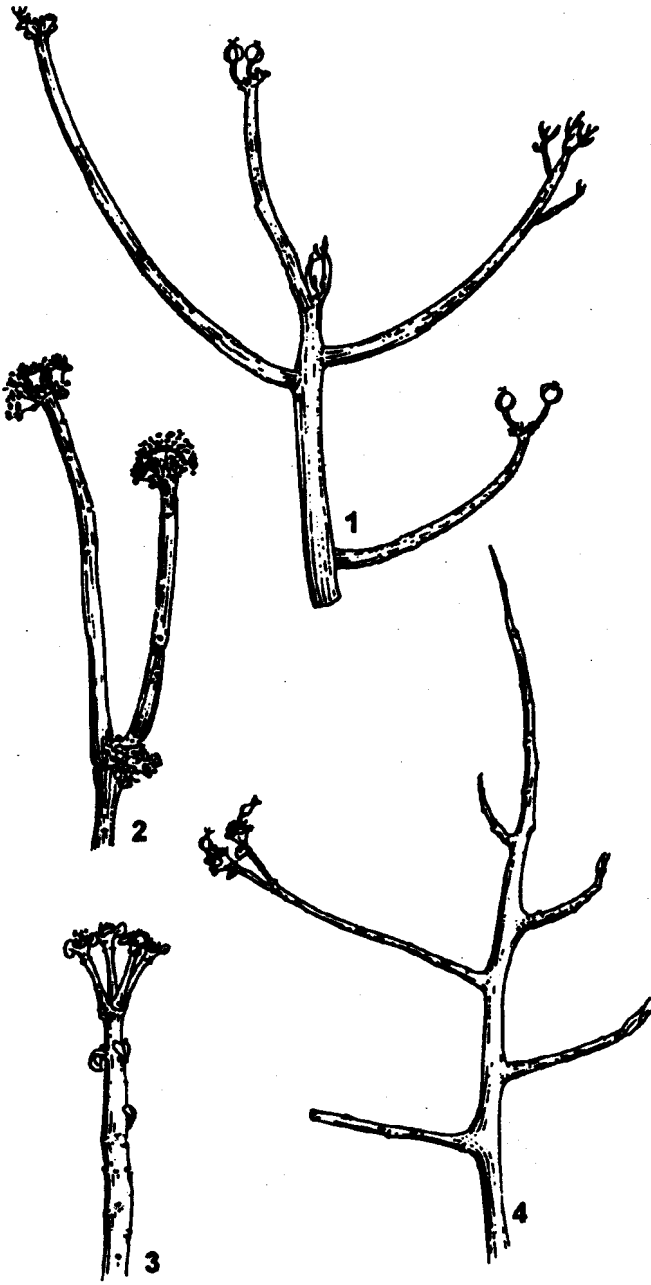


Figure 85.60 *EUPHORBIA TIRUCALLI*: 1 - branch detail, with female cyathia  $\times \frac{1}{2}$ ; 2 - flowering branch, with male cyathia  $\times \frac{1}{2}$ . *E. NUBICA*: 3 - flowering branch  $\times \frac{1}{2}$ . *E. CALAMIFORMIS*: 4 - branch detail  $\times \frac{1}{2}$ . 1 from *Bally & Carter* 14136; 2 from *Brasnett* B. 164; 3 from *Tweedie* 4238; 4 from *Carter & Stannard* 558. Drawn by Christine Grey-Wilson. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 89.)

#### Form C

To 1.5 m high, whitish stems, leaves up to 5.5 cm long, pseudumbel rays less than 5 mm long.

Known only from *Ellis* 404 from the Ogaden (390 m. HA).

#### 77. *E. calamiformis* Bally & Carter (1985)

- type: SD, Moyale-Mega road, *Gillett* 14174 (K holo.; FT iso.; EA iso. not seen.).

Closely related to form B of *E. nubica*, differing as follows:

stems more slender, c 3 mm thick when dried, with inconspicuous leaf-scars, branches at wide angle to stem, rather straight and rigid; central cyathium of pseudumbel with 5 glands, usually bisexual, capsule sometimes as small as 4.5 mm long. Fig. 85.60.4.

*Acacia - Commiphora* bushland ascending to lower margins of *Juniperus* forest, often on rock outcrops; 1150-1900 m. SD BA 7HA; Kenya. *Friis* et al. 2802; *Gilbert* 3437; *Gilbert* et al. 7962.

There are possibly significant differences in the organisation of flowering shoots: in some cases there are regular pseudumbels terminating main shoots, often with new shoots arising from immediately below the pseudumbel (eg. both *Gilbert* collections); in other cases the inflorescence is more paniculate with reduced pseudumbels on short side branches rather as in *E. schimperi* (eg. *Gillett* 14174). In some Kenyan collections the pseudumbels are borne on short, apparently deciduous, lateral branches.

#### Section ESULA Pers. (1806).

Herbs, ephemeral or perennial, occasionally  $\pm$  shrubby, never succulent. Leaves completely lacking stipules, often flushed deep or bright red when older. Cyathial glands transversely elliptic or crescent shaped, often with outer corners with a pair of appendages. Calyx of female flowers reduced to a narrow rim. Seeds oblong-ovoid, often  $\pm$  truncate, obscurely 4-sided, smooth or pitted, rarely rugulose, caruncle present in Ethiopian species.

A large group of several hundred species mostly in the temperate zone, especially Asia but also extending into the montane areas of Africa. Some species are widespread weeds.

1. Basal leaves alternate; capsule up to 6.5 mm long with thin walls. 2
- Basal leaves opposite, decussate; capsule 9-13 mm long with spongy walls. 90. *E. lathyris*
2. Primary cyathium of each pseudumbel with (4-)-5 glands; capsule to 4.5 mm long. 3
- Primary cyathium of each pseudumbel with 6 or more glands, often intermixed with male flowers; capsule c 6.5 mm long (pyrrhophyte typically flowering in recently burnt grassland). 82. *E. cyparissioides*
3. Leaves oblong-lanceolate to elliptic or linear, acute or emarginate; capsule lobes with rounded keels. 4
- Leaves obovate, rounded; capsule lobes with 2 narrow wings along sutures. 89. *E. peplus*
4. Leaf-tips forked or distinctly 3-toothed, otherwise entire. 5
- Leaf-tips acute, entire or minutely hyaline-toothed with solitary apical mucro. 6
5. Leaves oblong-lanceolate to elliptic, tip distinctly 3-toothed; bracts not 3-toothed. 85. *E. sp.* = *Sebsebe* 479
- Leaves linear, tip forked; bract tips with 2 subapical teeth so as to appear 3-toothed. 87. *E. furcatifolia*
6. Capsule tuberculate or papillate; cyathial glands always entire. 7

- Capsule smooth; cyathial glands usually 2-horned. 10
- 7. Leaves and often bracts minutely serrulate; seeds smooth, brown,  $\pm$  dorsiventrally compressed; erect annual or sparsely branched tuberous rooted perennial. 8
- Leaves and bracts entire; seeds rugulose, black, slightly laterally compressed; densely branched shrub. 78. *E. dumalis*
- 8. Perennial; cymes not well developed, up to 2-branched; capsule  $c$  4.5 mm long. 9
- Annual, usually a ruderal weed; capsule up to 2.5 mm long. 83. *E. platyphyllos*
- 9. Stems usually weak and sprawling; inflorescences very compact, cymes usually not developing beyond first cyathia, bracts often in whorls of 3. 79. *E. depauperata*
- Stems erect, to over 1 m high; inflorescence very lax, cymes to 12 cm long or more, bracts paired. 80. *E. sareciana*
- 10. Annual; leaves (20-)25-50(-85) mm long; cymes usually with well developed branches. 11
- Perennial; leaves 7-32 mm long; cymes usually sparsely branched. 12
- 11. Capsule 2-lobed; seeds rugulose. 88. *E. repetita*
- Capsule 3-lobed; seeds smooth. 86. *E. schimperiana*
- 12. Leaves and bracts entire; seeds smooth. 84. *E. wellbyi*
- Leaves and bracts minutely hyaline-denticulate; seeds irregularly pitted, rugulose when fully mature. 81. *E. petitiiana*

78. *E. dumalis* S. Carter (1985)

-type: BA, Gurie (Dinchu), Mooney 6441 (K holo.; ETH iso.).

Shrub 0.3-2 m high, densely branched from base, glabrous or thinly pilose except for cyathia. Leaves dense, oblanceolate, up to 2.3-8 x 0.7-2 cm, sessile or subsessile, tip obtuse to shortly acuminate, mucronate, glaucous with paler veins above. Pseudumbels 3-7-rayed, cymes 5-11 cm long, 2-3-dichotomous, all parts yellowish green; bracts triangular-ovate,  $c$  15 x 15 mm, sessile, axils densely pilose. Cyathia subsessile; involucre funnel-shaped, 3 x 3.5 mm, long pilose; glands transversely broadly elliptic, without horns; ovary densely tuberculate, styles 1.5 mm long. Capsule exserted, obtusely 3-lobed, 4.5 x 6.5 mm, tuberculate. Seeds ovoid, 2.8 x 2.2 mm, dark brown, obscurely rugulose; caruncle 1 mm broad. Fig. 85.61.

Disturbed forest margins, becoming particularly abundant around villages; 2400-3600 m. SU AR KF SD BA; not known elsewhere. Ash 1673; Burger 1792; Friis et al. 3717.

Collections of this species have often been named as *Euphorbia* sp. aff. *E. ugandensis* Pax. *E. ugandensis* sens. str. differs most obviously by the glabrous involucre and is restricted to East Africa.

79. *E. depauperata* A. Rich. (1851)

- types: TU, Mt. Selleuda (Scholloda), *Quartin Dillon* (P syn.), *Schimper* I:336 (P syn.; K isosyn.) & *Schimper* III:1532 (P syn.; K isosyn.).

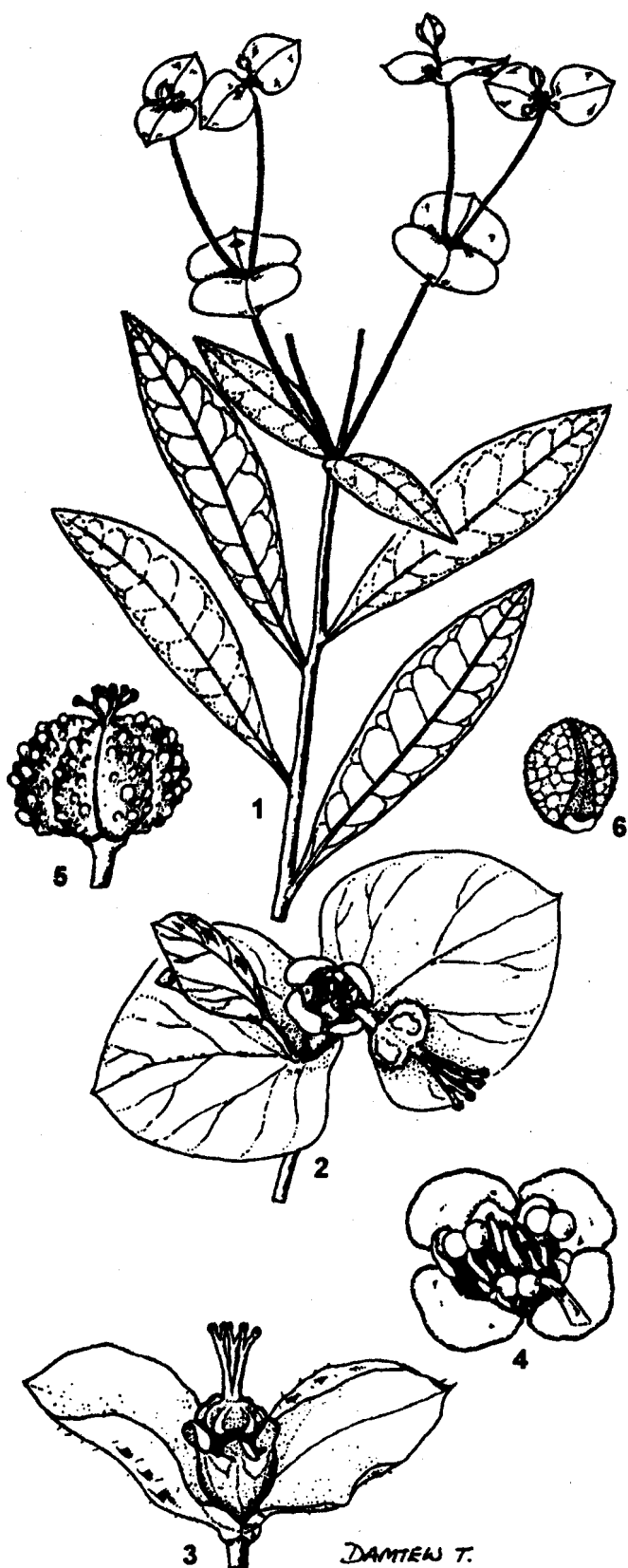


Figure 85.61 *EUPHORBIA DUMALIS*: 1 - flowering branch x 1; 2 - inflorescence with young fruit x  $4\frac{1}{2}$ ; 3 - side view of cyathium with young female flower x 9; 4 - top view of cyathium with male flowers x 7; 5 - fruit x 4; 6 - seed x 5. 1-4 from Mesfin T. 4824; 5 from Ash 1673; 6 from Mesfin T. 5658. Drawn by Dantew Teferra.

*E. depauperata* var. *pubescens* Pax, *Ann. Ist. Bot. Roma* 6:188 (1897) – type: SD, between Bidduma and Alge, *Ruspoli & Riva* '1360 (1293) 1234' (FT holo.).

*E. depauperata* subsp. *aprica* Pax, *Bot. Jahrb.* 39: 631 (1907) – type: SU, Akaki, 7 Feb. 1905, *Rosen* (B holo. destr.).

*E. trachycarpa* Pax (1903); *E. depauperata* var. *trachycarpa* (Pax) Carter, *Kew Bull.* 40: 815 (1985) Tanzania, *Pritwitz & Gaffron* 174.

Herbaceous perennial with rather tuberous root stock, stems usually slender and trailing, occasionally erect to 0.8(–1) m; mostly glabrous throughout, occasionally stems and leaves pilose. Leaves lanceolate to ovate, 1–4(–6) x 0.4–1.2 cm, base cuneate, tip acute or subacute, margin with minute hyaline teeth, usually slightly inrolled. Pseudumbel up to 6-rayed, cymes usually not branching further; bracts often in whorls of 3, 0.5–1(–2) x 0.4–1.1 cm, ovate to orbicular, subacute, entire, bright yellow-green sometimes flushed dark red. Cyathia sessile or subsessile; involucre cup-shaped, 2–4 x 2–3.5 mm, glands elliptic to subreniform, without horns; ovary warty, styles *c* 1.6 mm long. Capsule exserted, 4.5 x 6 mm, tuberculate; seeds 2.8–3 x 2.2 mm, oblong-ellipsoid, smooth, pale brown becoming grey; caruncle 1 mm wide, low, pale yellowish. Fig. 85.62.4–6.

Grassland; (1000–)1400–2850 m. EW TU WU SU AR SD HA; Sudan, Cameroon west to Sierra Leone; Kenya, Uganda, Tanzania, Burundi, Zambia, Malawi, Zimbabwe. *Burger* 1701; *Gilbert et al.* 8054; *Mesfin et al.* 3394.

A very variable species whose habit is environmentally influenced, particularly by fire. Varieties have been described: var. *laevicarpa* Friis & Vollesen, with almost smooth capsules, from Sudan and Uganda (Imatong Mts.), could occur in SW Ethiopia; var. *pubescens* has hairy young sterile shoots but such plants occur intermixed with the normal glabrous form in Ethiopia and do not merit formal recognition here.

*Senni* 2329, from near Irba Moda (SD), is a very distinctive erect plant with most leaves ± tomentose above and below, bracts glabrous except for the margins and with pilose styles. However it appears to be linked to normal *E. depauperata* through 'var. *pubescens*'. Var. *trachycarpa*, recognized by the pilose young sterile shoots and restricted to Tanzania, is also very closely related.

Most Ethiopian material seen has leaves with minutely denticulate margins, as in *E. petitiana*, but material from Kenya sometimes has only very obscure teeth and that from West Africa and from further south has entire leaves, as do some specimens from the Eritrean escarpment (*Fiori* 1362 & *De Benedicti* 372 from Imbatakala).

80. *E. sareciana* Gilbert (1990)

– type: BA, 10 km N of Menna, *Friis et al.* 3473. (K holo.; C ETH UPS iso.)

Erect perennial herb *c* 1 m high; branching from base; stems and leaves densely softly pubescent. Leaves: petiole up to 4 mm long; blades elliptic to oblanceolate, 4.5–6 x 1.1–1.5 cm, base cuneate, tip acute, mucronate, margin minutely hyaline-serrulate, narrowly revolute. Pseudumbel 5-rayed with several axillary cymes below; ray bracts

ovate, 15–19 x 7–9 mm, sessile, acute, hairy on margins only. Cymes lax, up to at least 12 cm long, hairy below nodes; bracts suborbicular, 9–10 x 10–14 mm, subsessile, subacute to slightly acuminate, mucronate, yellowish-green, glabrous except for some marginal hairs. Cyathia subsessile; involucre cup-shaped, 2.5–3 x 2.5–2.8 mm, glabrous outside, densely pilose on margin and inside; glands spreading, transversely elliptic-reniform, lime-green to yellow. Ovary exserted on glabrous *c* 1.5 mm pedicel, densely pilose, slightly tuberculate, styles *c* 1.7 mm long, sparsely hairy. Capsule not seen. Fig. 85.65.1–5.

Open area in mosaic of *Combretum* – *Terminalia* woodland and *Podocarpus* – *Warburgia* – *Filicium* forest; *c* 1500 m. BA; known only from the one collection.

The perennial habit, minutely toothed leaves and tuberculate ovary clearly relate this plant to *E. depauperata* but it is easily separated from that species by the distinctive indumentum and the laxer inflorescence with numerous axillary cymes.

81. *E. petitiana* A. Rich. (1851)

– type: TU, Wegerat ('Oudgerate') *Petit* (P holo.; K fragm. + drawing.)

*E. cerebrina* Boiss. (1862) – type: GD, Debra Eski, *Schimper* (1853) 937 (not seen, fide N. E. Brown).

*E. pseudofalcata* Chiov. (1951) – type: TU, plain of Enda Corcès, *Vátova* 2506 (FT holo.).

Herbaceous perennial with several ascending stems from woody rootstock, up to 40 cm high; glabrous throughout. Leaves oblanceolate, 1.8–3.2 x 0.5–0.7 cm, sessile, base cuneate, tip acute, mucronate, margin with minute hyaline teeth towards tip. Pseudumbel small, often ill-defined; bracts ovate-triangular to ovate, 8–10 x 5–10 mm, base cuneate, tip obtuse or subacute, margin minutely toothed. Involucre cup-shaped to suburceolate, 1.7–2 x 1.6–2 mm, lobes inconspicuous; glands reniform, entire or with 2 short horns to 0.5 mm long; styles 0.8 mm long. Capsule exserted, *c* 3.5 mm long, smooth; seeds oblong, 2.3 x 1.8 mm, 4-sided, pale grey with irregular dark pits; caruncle *c* 0.5 mm diameter, ± pointed, reddish-brown.

Open grassland or evergreen bushland; 2550–3650 m. EW TU GD WU SU BA; Yemen. *Gilbert & Getachew* A. 2617a; *Perdue* 6468; *Pichi-Sermolli* 2671.

A lens is needed to see the diagnostic minutely hyaline-toothed margins of the leaves and bracts.

82. *E. cyparissioides* Pax (1894)

– types: Sudan, *Schweinfurth* III: 149 & 3979.

Herbaceous perennial with numerous erect stems from woody rhizomatous root stock, flowering stems up to 30 cm, growth continuing vegetatively after most leaves have been produced; glabrous throughout. Leaves sparse below inflorescences, oblong-elliptic, 5–15 x 1–2(–3) mm, sessile, tip subacute, mucronate, entire, much denser and longer (to 25 mm) on later growth. Pseudumbel small, up to 3 cm wide; primary cyathium bowl-shaped, *c* 6 mm diameter, with numerous intermixed reniform glands and male flowers, lateral cyathia subsessile, involucre campanulate, 2 x 3 mm, glands 4, reniform, entire or with





Figure 85.62

***EUPHORBIA CYPARISSIOIDES*:**

1 - habit x  $\frac{1}{2}$ ; 2 - flowering branch x 2; 3 - seeds, front and side view x 4. *E. DEPAUPERATA*: 4 - flowering branch x  $\frac{1}{2}$ ; 5 - capsule x 2; 6 - seeds x 2. 1 & 3 from *Milne-Redhead & Taylor* 8032; 2 from *Richards* 12991; 4-6 from *Milne-Redhead & Taylor* 8198. Drawn by *Christine Grey-Wilson*. (Modified and reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 81.)

obscure horns; styles 1.2-1.4 mm. Capsule exerted on thick pedicel up to 12 mm long, lobes rounded, 6.5 x 7 mm, smooth. Seeds ovoid, 3.2 x 2.9 mm, blackish, smooth; caruncle 1 mm long, yellowish. Fig. 85.62.1-3.

Grasslands subject to regular burning; c 1700 m. AR; Sudan, Kenya, Uganda, Tanzania, Burundi, Zaire, Zambia, Zimbabwe, Malawi, Mozambique. *M. & S. Gilbert* 1765.

Apparently only flowering in response to burning as no late season material has been seen. To judge from the burnt stem bases it must get much taller after flowering.

83. *E. platyphyllos* L. (1753)

- type: 'from Europe'.

Slender annual to 40 cm high; glabrous or very sparsely pilose, often conspicuously yellow green. Leaves elliptic-lanceolate, up to 3 x 0.8 cm, sessile, tip acute, margin minutely serrulate. Pseudumbels (2-)4-5-rayed, rays and lateral cymes sometimes producing 3-rayed secondary umbels; bracts broadly triangular-ovate, c 6 x 7 mm, acuminate, serrulate. Cyathia subsessile; involucre cup-shaped, 0.9 x 1.2 mm, hairy towards rim; glands transversely elliptic, entire; ovary tuberculate; styles 0.6-0.8 mm, joined at base, deeply bifid with dark tips. Capsule 3-lobed, 1.8-2 x 2-2.2 mm, papillate. Seeds compressed ovoid, 1.7 x 1.2 mm, dark brown, smooth. Fig. 85.63.

Locally abundant among rocks along streams and ex-

tending into fallow fields; 2000–2500(–3200)m. GJ SU AR; Europe, Turkey. *W. de Wilde* 6119, 10874; *Thulin & Hunde* 3899.

Presumably an introduction though the collecting notes do not indicate it to be a weed. The capsules are rather more prominently papillate than normal but otherwise the Ethiopian material is a good match for European collections. *E. stricta* L., into which the Ethiopian collections were first placed, has relatively narrower reddish brown seeds up to 1.5 mm long.

84. *E. wellbyi* N. E. Br. (1911);  
– type: SU, Hawash (Awash) and Maki (Meki) Rivers, *Wellby* (K holo.).

Closely related to *E. schimperiana*, differing as follows: herbaceous perennial, rootstock woody, usually with many unbranched stems to 45 cm long, occasionally becoming woody and branching, to 60 cm; leaves ovate-elliptic, 0.7–1.5(–3) x 0.4–0.8(–1) cm, subsessile, tip rounded or subacute; pseudumbels small, less than 5 cm wide, cymes sparsely branched; seeds 2 mm long.

1. Upper internodes puberulent. var. *wellbyi*  
– Upper internodes glabrous. var. *glabra*

var. *wellbyi*

High altitude grassland; 2950–3500 m. SU AR BA; Kenya, N Tanzania. *Ash* 1671; *Mooney* 5184; *Scott* s.n.

var. *glabra* S. Carter

*Kew Bull.* 40: 814 (1985) – type: Kenya, *Hedberg* 4550.

High altitude grassland; (1700–)2950–3440 m. GJ AR BA; Kenya, Uganda, N Tanzania. *Ash* 1679; *Mooney* 5247.

Most material from East Africa belongs to var. *glabra* whereas in Ethiopia var. *wellbyi* appears to be more common. More collections are needed to assess this variation which seems to parallel that seen in other species in this section and which may be better treated as polymorphism. The relationship to *E. schimperiana* also needs further investigation, *E. wellbyi* seems to be a high altitude vicariad, possibly better regarded as just an ecotype of that species.

85. *E. sp.* = *Sebsebe* 479.

GJ, Metekel Awraja, 10 km from Chagni towards Mentawha village.

Herb to 1 m, base not known, stems densely leafy, probably perennial; glabrous throughout. Leaves oblanceolate, up to 4.2 x 1.1 cm, base cuneate, tip 3-toothed, teeth c 0.5 mm high, acuminate. Inflorescence very immature, with lateral cymes only, terminal pseudumbel not yet formed; bracts triangular-ovate, 9 x 8 mm, acute. Cyathia cup-shaped, c 2 x 2 mm; glands transversely crescent-shaped with long horns; ovary and fruit not seen.

Habitat not recorded; c 1600 m. GJ; known only from the one collection.

The material suggests that this is a distinct, undescribed species readily identified by the distinctive 3-toothed leaf-tips. Unfortunately it is much too immature to describe.

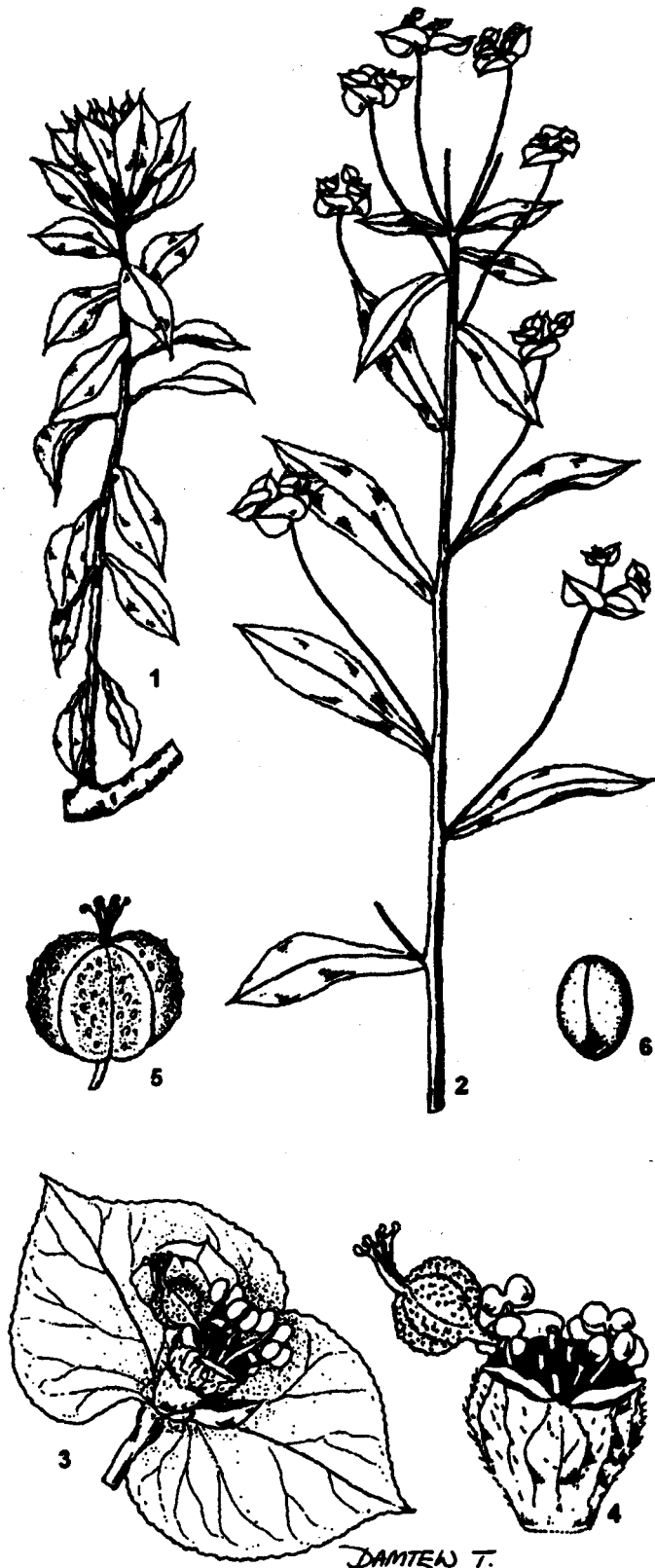


Figure 85.63 *EUPHORBIA PLATYPHYLLOS*: 1 – vegetative shoot x 1; 2 – flowering shoot x 1; 3 – cyathium and subtending bracts x 8; 4 – cyathium showing male and female flowers x 18; 5 – fruit x 10; 6 – seed x 10. 1, 3 & 4 from *W. de Wilde* 6109; 2 from *Mesfin T.* 4356; 5 & 6 from *W. de Wilde* 6119. Drawn by Dامتew Teferra.

86. *E. schimperiana* Scheele (1843);

*E. hochstetteriana* Pax (1894) *nom. superfl.* – type: Arabia, *Schimper* (1835) 897.

*E. dilatata* A. Rich. (1851) – type: GD, Mt. Bachit (Buhit), near Endshedcap, *Schimper* II: 543 (P holo. + iso.; K UPS iso.).

*E. monticola* A. Rich. (1851) *nom. illegit. non* Boiss. (1846); *Tithymalus hochstetterianus* Kl. & Gke. (1860) – type: TU, near Djeladjeranne, *Schimper* III: 1706 (P holo. + iso.; K iso.).

*E. longecornuta* Pax (1892) – type: GD, between Reb River and Gerra Abuna Tekle Hairmanot, *Schimper* (186?) s.n. (B holo. destr.; K iso.).

*E. buchananii* Pax (1905).

*E. longepetiolata* Pax & K. Hoffm. (1910).

*E. schimperiana* var. *velutina* N.E. Br. in *Fl. Trop. Afr.* 6(1): 534 (1911).

*E. longepetiolata* var. *pubescens* N.E. Br. in *Fl. Trop. Afr.* 6(1): 535 (1911); *E. schimperiana* var. *pubescens* (N.E. Br.) S. Carter in *Kew Bull.* 40: 813 (1985).

*E. schimperiana* var. *triloba* Chiov., *Atti R. Accad. d'Italia* 11: 56 (1940) – type: SU, between Doucan & Addàs (Dukam & Addis Abeba), *Senni* 1070 (FT holo.).

Erect annual to 60 cm, occasionally subshrubby to 2 m but apparently never branching from base, glabrous or upper parts sparsely hairy. Leaves linear-lanceolate to lanceolate, rarely oblong-elliptic (2–)2.5–5(–8.5) × (0.1–)0.3–1(–1.9) cm, sessile or attenuate into obscure petiole, tip acute, entire. Umbel (3–)5–7(–15)-rayed. Bracts ovate-triangular, 5–25(–55) × 5–10(–20) mm, amplexicaul to shortly cuneate, tip acute or acuminate. Cyathia shortly pedunculate, cup-shaped, 1.2–2 × 1.3–2 mm; lobes 2-toothed, hairy; glands reniform, green or orange-yellow, with 2 horns up to 1.5 mm long, rarely entire. Filaments glabrous or hairy. Capsule exerted, pedicel sometimes hairy, 3-lobed, 3–3.5 × 3.5–4 mm, usually glabrous. Seed oblong-ovoid, 2.3–2.7 × 1.4–1.8 mm, smooth, mostly grey; caruncle present. Fig. 85.64.

Open situations in grassland, evergreen bushland and montane forest; weed of cultivation. 1350–3000 m. All regions except EE AF GG; Sudan, Somalia, Kenya, Uganda, Tanzania, E Zaire, Burundi, Cameroon, Fernando Po, Zambia, Zimbabwe, Malawi, Mozambique, Madagascar, Arabia. See below for cited material.

A widespread and variable species with a tendency to form distinctive local variants. Collections from around Jigjiga, HA (such as *Gilbert* 1846) are uniformly narrow leaved (3–4 mm) ephemerals and look most like the Arabian type of the species.

Varieties based on variation in indumentum have been recognized for East Africa: var. *pubescens* (N.E.Br.) S. Carter — a robust plant of forest margins with the upper internodes hairy and the capsule glabrous, and var. *velutina* N.E.Br. — similar but restricted to S Tanzania and Malawi and with a hairy capsule. Plants with similar indumentums have been collected in SW Ethiopia, along with morphologically similar but glabrous plants, such as: *Mooney* 6011 with hairy capsules and internodes, *Mooney* 8728 with only the internodes hairy, and *Meyer* 7778 which is completely

glabrous. It seems better to regard such variation as polymorphism not deserving formal recognition.

The length of the cyathial gland horns tends to vary with altitude, being longest in lush lowland plants ('*E. longecornuta*') and shortest in plants from high altitudes which approach *E. wellbyi*. Collections from the Abbay (Blue Nile) Valley show a tendency to have glands without horns e.g. *Gilbert & Thulin* 984.

*J. de Wilde* 7151 and *Mercier* 2942 from near Gonder have distinctive oblong to obovate shallowly emarginate leaves and bracts and thus approach *E. furcatifolia* and the collection *Sebsebe* 479. They could represent yet another distinct taxon.

87. *E. furcatifolia* M. Gilbert (1990)

– type: SD, 24 km from Negele on road to Melka Guba, *Gilbert et al.* 7748 (K holo.; ETH iso.).

Erect rather woody annual c 30 cm high, with ascending branches from near base, glabrous throughout. Leaves linear with forked tip, up to 20 × 1 mm, sessile, subamplexicaul, apical lobes c 2 mm long, rounded, sometimes with minute mucro in sinus, margins inrolled, reflexed. Inflorescence as in *E. schimperiana* except for the more densely crowded bracts which have minutely 3-lobed tips, middle lobe acute, lateral lobes rounded. Fig. 85.65.6–11.

Roadside in open *Combretum* – *Pistacia* – *Olea* – *Barbeya* woodland in black clayey soils overlying limestone; 1600 m. SD; not known elsewhere. *Gilbert & Sebsebe* 8669U.

Seedlings first produce subacute leaves.

88. *E. repetita* A. Rich. (1851)

– types: TU, Wegerat ('Ouodgerate'), *Petit* (P syn.); SU/WU, Choa, *Petit* (P syn.); GD, Wegera ('Wogera'), *Schimper* II: 1281 (P syn. + isosyn.; K isosyn.).

Shrubby herb to 2 m, basal parts not recorded, probably short-lived; glabrous throughout. Leaves narrow-lanceolate to oblanceolate, 4–8 × 0.4–0.9 cm, base attenuate into very short petiole, tip obtuse or acute, entire. Inflorescence lax with numerous axillary cymes from below 5–8-rayed pseudumbel; bracts lanceolate to ovate, 1–2(–4) × 0.4–0.7 cm. Cyathia subsessile; involucre cup-shaped, 1.7 × 2 mm, lobes inconspicuous; glands crescent-shaped with 2 horns up to 1 mm long; ovary 2-locular, styles c 1 mm long. Capsule well exerted, subrectangular, 2.7–3 × 3.3 mm, smooth. Seeds oblong, 2 × 1.3 mm, pale grey, obscurely rugulose; caruncle c 0.4 mm diameter, yellowish, easily lost.

Along streams in disturbed montane forest; 2160–2700 m. TU GD WU SU AR; not known elsewhere. *Friis et al.* 1379; *Mooney* 5239; *Scott* 347.

Easily separated from other Ethiopian members of *Esula* by the 2-lobed fruits. *E. brevicornu* Pax, an East African endemic often treated as synonymous, differs by being hairy.

89. *E. peplus* L. (1753)

– type: 'from Europe'.

Annual to 30 cm, glabrous throughout, not flushed red.



Figure 85.64

**EUPHORBIA SCHIMPERIANA:**

1 - flowering branch  $\times \frac{2}{3}$ ; 2 - cyathium  $\times 2$ ; 3 - capsule  $\times 4$ ; 4 - seeds, front and side view  $\times 4$ ; 5 & 6 - fruiting branch, variation to show indumentum  $\times 2$ . 1 from Drummond & Hemsley 2816; 2 from Scott 1328; 3 & 4 from Bally 2490; 5 from A. S. Thomas 4378; 6 from Richards 24684. Drawn by Christine Grey-Wilson. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 80.)

Leaves petiolate, obovate, to 2 x 1.2 cm, base cuneate, tip rounded or emarginate, entire. Umbel few-rayed and often ill defined, cymes well developed. Bracts oblong-ovate, shortly petiolate, rounded. Cyathia with peduncle as long as involucre; involucre campanulate, 1 x 0.7 mm; glands transversely elliptic to reniform with white thread-like horns to 0.6 mm long; styles  $c$  0.3 mm long, joined at base, bifid. Capsule oblong-ovoid,  $c$  2.2 x 2.3 mm, smooth, keel of each lobe with 2 narrow wings; seeds oblong, 1.4 x 0.9 mm, pale grey with conspicuous regular dark pits; caruncle 0.5 mm diameter, white.

Winter rainfall area of escarpment; about 1300 m. EW; widespread weed probably originating in Eurasia. *Sue Edwards & Tewolde* 3747; *Fiori* 1372; *Pappi* 3819.

90. *E. lathyris* L. (1753).

- type: 'from Europe'.

Robust erect annual to 1.5 m high; glabrous and glaucous throughout. Leaves opposite, decussate, linear to oblong-lanceolate, 3-15(-20) x 0.5-2.5 cm, base amplexicaul, tip acute, margin entire. Pseudumbels 2-4(-6)-rayed, cymes up to 8 times dichotomous; bracts triangular-ovate, up to 6 x 4 cm, acuminate. Cyathia sessile; involucre funnel shaped, 2.5-3 x 3.5-4.5 mm; glands transversely oblong-reniform with 2 club-shaped horns; styles 3 mm long, free. Capsule shallowly lobed, 9-13 x 13-17 mm, smooth with spongy mesocarp. Seeds barrel-shaped, 5 x 4.45 mm, sharply rugulose, brown or grey, caruncle  $c$  1.5 mm wide, yellowish.

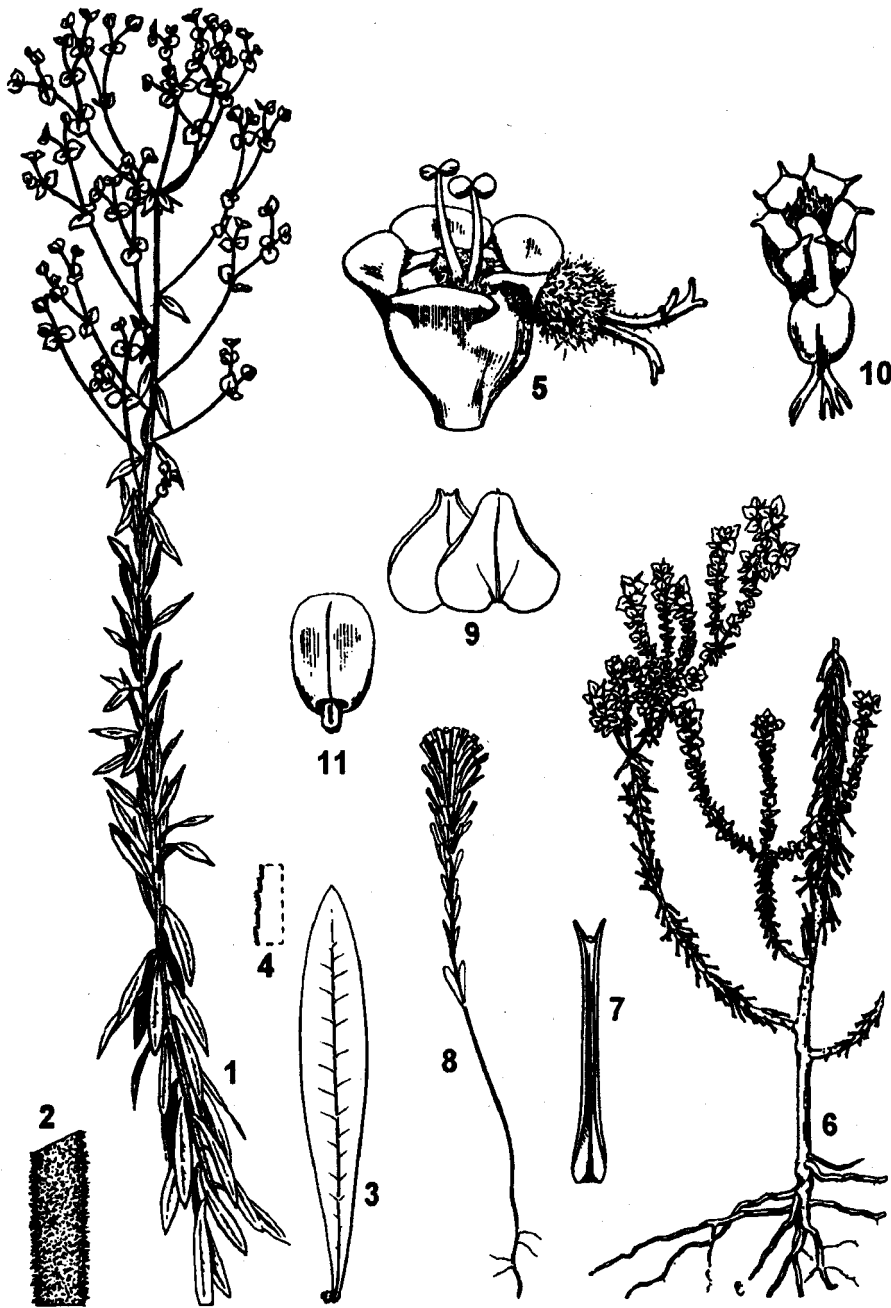


Figure 85.65  
*EUPHORBIA SARECIANA*: 1 – flowering stem  $\times \frac{1}{2}$ ; 2 – detail of stem to show indumentum  $\times 1\frac{1}{2}$ ; 3 – leaf  $\times \frac{1}{2}$ ; 4 – detail of margin, from upper side  $\times 5$ ; 5 – inflorescence  $\times 6$ . *E. FURCATIFOLIA*: 6 – habit  $\times \frac{1}{2}$ ; 7 – leaf  $\times 1\frac{1}{2}$ ; 8 – young seedling  $\times \frac{1}{2}$ ; 9 – two bracts  $\times 1\frac{1}{2}$ ; 10 – cyathium  $\times 6$ ; 11 – seed  $\times 6$ . 1–5 from Friis et al. 3473; 6 & 7, 9–11 from Gilbert et al. 7748; 8 from Gilbert & Sebsebe 8869U. Drawn by Eleanor Catherine.

Introduced, apparently as a medicinal plant; c 2000 m. SU? HA; Europe. *Burger* 2407; (*Quartin-Dillon* &) *Petit* s.n.

Remark on a herbarium sheet: 'seeds eaten for headache, never with honey'.

Subgenus *POINSETTIA* (*Graham*) *House* (1924).

*Poinsettia* *Graham* (1836).

Small trees, shrubs or herbs. Leaves alternate, uppermost often lobed and/or coloured; stipules glandular. Inflorescence a terminal, congested cyme, often one-sided and subtended by large bracts. Cyathia with 1(–3) peltate, often cupular, glands. Seeds tuberculate, with minute caruncle.

An entirely American group of perhaps a dozen species known in the Old World only from introduced ornamentals and weeds.

1. Shrub or small tree developing distinctly woody trunk; inflorescences with large bright-coloured, usually red, bracts; ornamental shrub.

91. *E. pulcherrima*

– Erect annual; bracts green, inconspicuous; weed.

92. *E. heterophylla*

91. *E. pulcherrima* *Klotzsch*. (1834)

*Poinsettia pulcherrima* (*Klotzsch*.) *Graham* (1836).

Shrub or small tree to 5 m high, old stems grey-rugose,

woody; young stems green. Leaves alternate,  $\pm$  rhomboidal, sinuate, acute; stipules reduced to glands. Inflorescence a terminal cyme with congested,  $\pm$  scorpioid branches; bracts very unequal, 1 of each pair leaf-like but bright red (or white or yellow in selected cultivars), the other similar but much smaller. Involucre barrel-shaped, red; cyathial gland erect, almost tubular, bright yellow.

Widely grown ornamental shrub, originating in Mexico or nearby. *Wilson* 650.

92. *E. heterophylla* L. (1753)

– type: 'from tropical America'.

*E. geniculata* Ortega (1797).

Erect annual to 1 m high; stems glabrous or sparsely hairy near tip, hollow. Petiole to 2(–4) cm; blade ovate, up to 12 x 6 cm, base cuneate, tip obtuse, margin with minute gland tipped teeth, glabrous to sparsely hairy near margins above, hairy, especially on veins, below, becoming glabrous; stipules forming purplish glands. Cyathia densely clustered in dichotomous axillary and terminal cymes; lowest bracts leaf-like but paler, upper progressively smaller. Cyathia glabrous; peduncles 1–5 mm; involucre barrel-shaped,  $c$  3.5 x 2.5 mm; gland solitary, 1 mm long, funnel shaped with red rimmed opening,  $c$  1.2 mm wide; ovary pedicellate, styles 1 mm long, bifid to halfway. Capsule exserted, deeply 3-lobed, 4.5 x 5.5 mm, smooth, glabrous. Seeds conical, 2.6 x 2.4 mm, base truncate, tip acute, 3-angled, blackish-brown, bluntly tuberculate.

Weed mostly recorded from damp ditches in areas of deciduous bushland or woodland; 250–1900 m. SU SD HA; pantropical weed probably originating in tropical America. *Ensermu & Tewolde-Berhan* 328; *Gilbert et al.* 7616; *Tewolde-Berhan* 94.

The name *E. heterophylla* has often been applied to material of *E. cyathophora* Murr. (1786), a closely related species sometimes grown as an ornamental and differing most obviously by the red markings on the bracts.

Subgenus AGALOMA (*Rafin.*) *House* (1924).

*Agaloma* *Rafin.* (1838).

Closely related to the following subgenus, *Chamaesyce*, with often very conspicuous petaloid appendages to the cyathial glands, but lacking the specialized habit of that group. The species most likely to be met with in Africa are further distinguished by the whorled leaves.

A very diverse, strictly New World subgenus represented in Africa only by cultivated ornamentals, one of which sometimes escapes. *Chamaesyce* is perhaps best regarded as a specialized derivative of this group.

1. Shrub or small tree, all parts suffused red; leaves in whorls of 3–4, long-petiolate. 93. *E. cotinifolia*  
– Erect annual herb, not suffused with red, upper leaves and bracts conspicuously white-margined; leaves alternate, sessile. 94. *E. marginata*

93. *E. cotinifolia* L. (1753)

Shrub or small tree to over 3 m high, glabrous throughout, stems and leaves deeply suffused dark reddish. Leaves in

whorls of 3–4; petiole as long as leaf blade; blade broadly ovate with rounded base and tip. Inflorescence a flat-topped terminal panicle. Cyathia  $c$  4 mm wide, glands 5, with conspicuous whitish appendages, capsule exserted.

Native to central America, widely grown as an ornamental around Awassa and Shashemane and can be expected to become more common or even naturalized as it has, to some extent, in Kenya. The latex is very caustic.

A related species, *E. leucocephala* Lotsy (1895) from central America, with green lanceolate leaves and showy white bracts when in flower, is widely cultivated elsewhere in Africa and may be expected in the Flora area.

94. *E. marginata* *Pursh* (1814)

Erect annual, glabrous except for inflorescence. Leaves alternate, subsessile, elliptic-ovate, to 8 x 4.5 cm, base rounded, tip acute, apiculate. Inflorescence a terminal pseudumbel; bracts leaf-like with conspicuous white margins; rays pilose. Cyathia with 4–5 glands, these with broad white petaloid appendages. Capsule exserted, pilose.

Cultivated;  $c$  1700 m. SU; native of SE USA introduced as a ornamental; *Serekeberhan* 4.

Subgenus CHAMAESYCE *Rafin.* (1817).

*Chamaesyce* S. F. Gray (1821).

*Anisophyllum* Haw. (1812), non *Jacquin* (1763).

*Gilbert, Kew Bull.* 48: 125–126 (1993).

Herbs, often ephemeral, or (less often) small woody based shrublets, often prostrate, branching mainly from base, often suffused red or purple, especially on undersides of leaves. Leaves opposite, distichous, base asymmetric; stipules present, not glandular, often lacinate. Cyathia terminal but usually appearing to be axillary due to dominant growth of axillary branches or on condensed leafy axillary shoots; glands 4(–5 in some all-male cyathia), outer margin produced into red, pink or white, usually petaloid, appendage; calyx of female flower reduced to a rim, styles joined at base only. Capsule exserted. Seeds oblong,  $\pm$  4-angled, without a caruncle.

A large group of  $c$  250 species found throughout the warmer parts of the world but with the major centre of diversity in the New World.

Several American authors have treated this group as a distinct genus, *Chamaesyce*. The arguments for doing this are strong but there are other groups with comparable claims to such status and it is felt that the *status quo* should be preserved till a more uniform treatment of the genus as a whole is possible. There is also the problem of the relationship to subgen. *Agaloma*.

Several species show a parallel cline from delicate ephemerals in the bimodal rainfall areas of the south through to woody perennials in the coastal lowlands of Eritrea; this is most notable in *E. arabica*, *E. granulata* and *E. polycnemoides*.

1. Cyathia clustered in dense, usually pedunculate, cymes with small bracts. 2  
– Cyathia solitary, terminal or apparently axillary,

- sometimes on condensed leafy lateral shoots but not in pedunculate cymes. 4
2. Plant hairy. 3  
 - Plant glabrous. 97. *E. glomerifera*
3. Leaf tips subacute; stems with short adpressed white hairs and long yellow hairs. 95. *E. hirta*  
 - Leaf tips rounded; stems with uniform white hairs. 96. *E. indica*
4. Stems and capsules uniformly hairy or glabrous. 5  
 - Stems hairy on upper side, glabrous below; capsule hairy at base and along keels of lobes only. 100. *E. prostrata*
5. Leaf margin toothed, sometimes rather obscurely so. 6  
 - Leaf margin entire, with no trace of teeth. 10
6. Plant pubescent, often densely so, never with scattered long hairs only. 7  
 - Plant glabrous or with scattered long hairs. 9
7. Leaves obtuse, up to 20 mm long, usually much less, laxly arranged along stems; seeds obscurely pitted or transversely ridged. 8  
 - Leaves acute, up to 35 mm long, usually closely and regularly overlapping; seeds with 3-4 transverse ridges on each face. *E. convolvuloides*
8. Indumentum of straight hairs, often very dense; appendages of cyathial glands very conspicuous, white or pale pink; seeds shallowly pitted. 98. *E. scordifolia*  
 - Indumentum of curved hairs, sometimes very sparse on leaves; appendages of cyathial glands inconspicuous, reduced to narrow dark rim; seeds obscurely transversely ridged or smooth. 99. *E. forskalii*
9. Stems usually prostrate, rarely suberect in shaded positions; leaves less than 4 times as long as broad; stipules deeply divided into 3-5 linear teeth. 101. *E. inaequilatera*  
 - Stems erect; leaves more than 4 times as long as broad; stipules acutely triangular, toothed but not divided. 102. *E. polycnemoides*
10. Ephemeral or with a slender woody tap root and/or ascending woody stems; flowers always produced after leaves. 11  
 - Glabrous perennial with thick woody or tuberous rootstock and prostrate herbaceous stems; flowers often produced before leaves. 106. *E. rivae*
11. Stems erect or nearly so; plant glabrous or with lower parts minutely hairy, rarely all parts densely but minutely hairy; leaves linear to narrowly oblong, more than 4 times as long as broad. 103. *E. arabica*  
 - Stems prostrate, rarely suberect in moist shaded sites; leaves pubescent to uniformly densely puberulent; leaves oblong-elliptic, less than 3 times as long as broad. 10
12. Leaves up to 10 mm long, obtuse. 13  
 - Leaves up to 35 mm long, acute. *E. convolvuloides*
13. Capsule hairy (very rarely glabrous), other parts pilose to subtomentose; seeds sharply 4-sided, transversely wrinkled. 104. *E. granulata*

- Capsule glabrous, other parts thinly pilose or glabrous; seeds ± rounded, smooth. 105. *E. sp.* = *Gilbert et al.* 7322

*E. convolvuloides* Boiss. (1862) is common in parts of Sudan adjacent to EW and GD and is likely to be found in Ethiopia. It looks most like an unusually robust *E. scordifolia* with regularly overlapping leaves.

95. *E. hirta* L. (1753);  
*Chamaesyce hirta* (L.) Millsp. (1909) - type: 'from India'.  
*E. pilulifera* auct. non L. (1753).

Annual or short-lived perennial herb, stems usually prostrate, flushed red throughout, rarely suberect, green, up to 50 cm long, all parts with mixture of minute white adpressed hairs and spreading pilose yellow hairs. Petiole up to 3.5 mm; blade obliquely ovate, 10-40 x 5-20 mm, tip subacute, margin finely toothed, often blotched purple; stipules usually linear, to 2.5 mm. Cyathia in dense, capitate, terminal and axillary cymes to 15 mm across on peduncles to 15(-20) mm long; bracts triangular, deeply lacinate, to 1 mm long; involucre cup-shaped, 0.8 x 0.8 mm, gland appendages minute. Capsule 1 x 1.3 mm, with short yellow adpressed hairs. Seeds oblong-conical, 0.8 x 0.4 mm, obtusely angled with transverse wrinkles, pinkish-brown.

Mostly in disturbed situations, often in cultivation or along paths; 240-2050 m. EE EW TU GD SU IL KF GG SD; pantropical weed. *Friis et al.* 2294; *M. & S. Gilbert* 1555; *Mooney* 8013.

96. *E. indica* Lam. (1786);  
*Chamaesyce indica* (Lam.) Croizat (1942) - types: East Indies, *Sonerat*.  
*E. indica* var. *angustifolia* Boiss. in DC., *Prodr.* 15.2: 22 (1862) - types include TU: Tekeze Valley, near Djeladjeranne, *Schimper* 1632 (MO isosyn.).  
*E. hypericifolia* sensu Hochstetter, N.E.Br., *Cufodontis*, and others, non L. (1753)

Resembling *E. hirta* in most features but never prostrate; indumentum of uniformly short white hairs, rarely subglabrous. Leaves with tip rounded, margins obscurely toothed, glaucous, stipules triangular, lacinate, up to 1.5 mm long. Cymes on peduncles up to 30 mm long; involucre 1 x 1 mm, glands with white appendages up to 1 mm diam. Capsule clearly exserted, 1.5 x 2 mm, usually hairy, rarely glabrous. Seeds smooth or obscurely transversely wrinkled, pale grey when fully mature, often sometimes blackish, 1 x 0.8 mm. Fig. 85.66.

Disturbed situations, often with impeded drainage, seasonally inundated or irrigated; 375-1600 m. AF TU GJ WU SU KF GG BA HA; pantropical weed. *M. & S. Gilbert* 1174; *Gilbert & Thulin* 375; *Mooney* 9036.

Until recently, *E. indica* was consistently named as *E. hypericifolia* L., but it is not this New World species which is completely glabrous, with smaller capsules and dimpled seeds (*Raju & Rao, Indian J. Bot.* 2: 202, 1979).

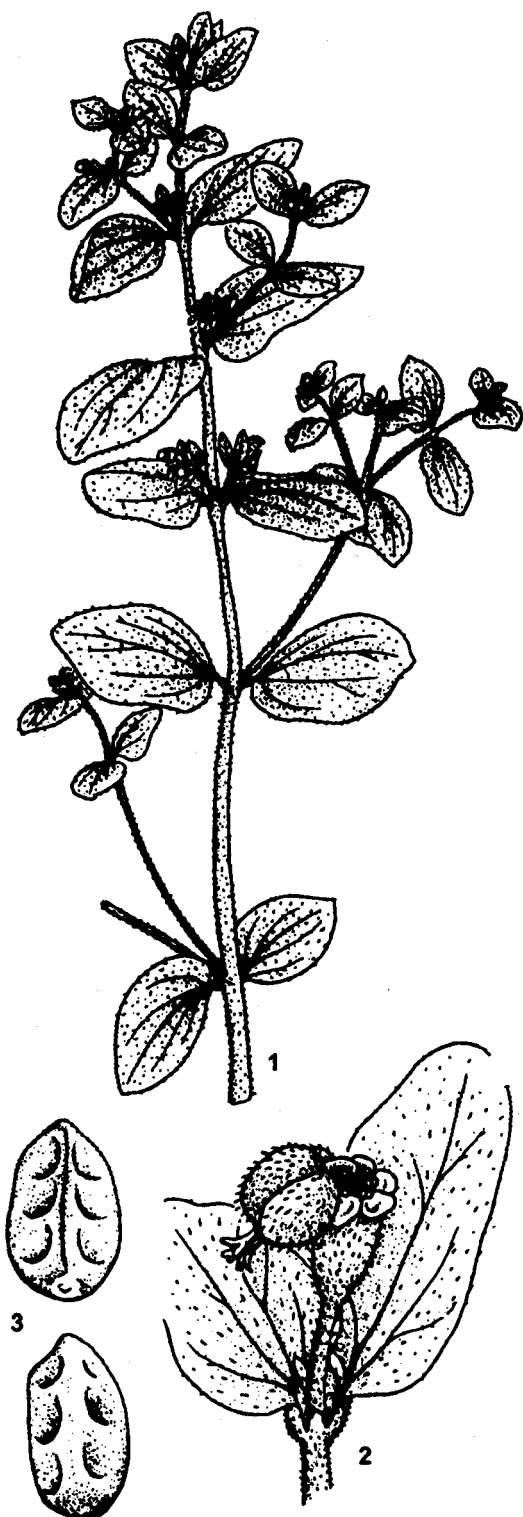


Figure 85.66 *EUPHORBIA INDICA*: 1 – fruiting branch  $\times \frac{1}{2}$ ; 2 – cyathium  $\times 8$ ; 3 – seeds  $\times 18$ . 1 & 3 from Tanner 2907; 2 from Tweedie 2253. Drawn by Christine Grey-Wilson. (Modified and reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 77.)

97. *E. glomerifera* (Millsp.) Wheeler (1939);  
*Chamaesyce glomerifera* Millsp. (1913) – type:  
Guatemala, Kellerman 8053.

Closely related to *E. indica*, differing only by the lack of indumentum and the subacute leaves which are not flushed with red.

Ecology in the Flora area not noted, in West Africa a weed of disturbed sites in populated areas. EW; West Africa, Central America. Pappi 5994, 6193.

The separation from *E. indica* is not clear cut, perhaps there has been introgression in Africa where the Asian and American taxa have met.

98. *E. scordifolia* Jacq. (1794);  
*Chamaesyce scordifolia* (Jacq.) Croizat (1937) –  
type: t.476 of Jacquin,  *Ic. Rar.* III.

Annual or perennial herb from slender woody taproot; stems usually prostrate, up to 40 cm long; all parts with dense erect white hairs. Petiole  $c$  1.5 mm long; blade very obliquely ovate, 8–13(–17)  $\times$  3–7(–10) mm, tip rounded, margin sharply serrate; stipules linear, up to 1.5 mm, falling off quickly. Cyathia on short dense lateral shoots; peduncles up to 1.5 mm. Involucre cup-shaped,  $c$  0.9  $\times$  1.1 mm, gland appendages  $c$  1  $\times$  1 mm, pink or white, bluntly toothed. Capsule 1.7  $\times$  1.7 mm. Seed ovoid, 1.2–1.3  $\times$  0.8, subacutely 4-angled, pale grey with shallow pits.

Coastal plain, mostly on sand including fixed dunes; 15–330 m. EE; west to Cape Verde Is., Somalia, Arabia. Bally 6852, 6924; Popov 1410.

99. *E. forskalii* Gay (1847);  
*E. aegyptiaca* Boiss. (1860) nom. superfl. – type:  
Upper Egypt, Aucher-Éloy 2033 (El Hadidi, loc. cit.)

Similar to *E. scordifolia* but indumentum of adpressed curved hairs; leaves obscurely serrate, sometimes glabrous above; cyathia subtended by pair of leafy bracts; glands with very narrow appendages; seeds brown, not pitted.

Along rivers, presumably in seasonally inundated sites, sometimes in very calcareous sites; 500–1000 m. EW TU ?GD; west to Cape Verde Isles., Arabia, north to Syria. Schimper II:618; Schweinfurth 899.

100. *E. prostrata* Ait. (1789)  
*Chamaesyce prostrata* (Ait.) Small (1903) – type:  
cultivated, from West Indies.

Prostrate much branched ephemeral herb; stems to 20 cm long, underside glabrous, upper side with short, curled hairs. Petiole to 1 mm; leaf blade obliquely ovate, up to 8  $\times$  5 mm, tip rounded, margin obscurely toothed, glabrous above, sparsely hairy near tip below; stipules free on upper side of node, 0.5 mm long, below joined into 2-toothed interpetiolar triangle  $c$  1 mm long. Cyathia mostly on lateral shoots; peduncle to 1.3 mm; involucre barrel-shaped, 1  $\times$  0.6 mm; gland appendages minute. Capsule on pilose pedicel, 1.3  $\times$  1.3 mm, base and purple-tinged sutures pilose. Seeds oblong-conical, 1  $\times$  0.5 mm, acutely 4-angled, greyish-brown with numerous distinct transverse ridges and grooves.

Relatively moist disturbed situations such as coffee



plantation and irrigated field; 300–2400 m. EW SU IL KF SD BA/HA; widespread in tropics and subtropics. *Sue Edwards* 700; *Friis et al.* 4141; *Mesfin & Sebsebe* 3920.

Apparently much more widespread than current records indicate.

101. *E. inaequilatera* Sond. (1850)

*Chamaesyce inaequilatera* (Sond.) Soják (1972) – type: South Africa, *Gueinzus* 167.

Slender ephemeral, usually prostrate but decumbent in shade; stems longitudinally ridged when dried. Petiole *c* 1.5 mm; blade obliquely ovate to occasionally lanceolate, up to 14 x 6 mm, tip obtuse, margin serrate, sometimes obscurely so; stipules free, lacerate, up to 1.5 mm long. Cyathia mostly on lateral shoots; peduncle *c* 1 mm long; involucre cup-shaped, 1 x 1 mm; gland-appendages small, lobed. Capsule on pedicel up to 2 mm long, 1.5 x 1.8 mm, sutures pigmented. Seeds oblong-conical, 1.3 x 0.8 mm, 4-angled, greyish-brown with shallow transverse wrinkles and pits.

1. Plant entirely glabrous. var. *inaequilatera*  
– Plant thinly, rarely densely, pilose. var. *dentata*

var. *inaequilatera*

*E. sanguinea* Boiss. (1860) – types include GD, Agrima, *Schimper* (1853) 182 (G syn. not seen; K isosyn.) & *Schimper* 1324 (G syn. not seen).

*E. sanguinea* var. *intermedia* Boiss. in A. DC., *Prodr.* 15.2: 35 (1862) – types: TU, Schoata, *Schimper* II:1133 (G syn. not seen; K isosyn.); loc?, *Schimper* 2472 (G syn. not seen).

Open, often disturbed or overgrazed sites in a range of habitats from dry deciduous bushlands with *Acacia* and *Commiphora* up to margins of montane forest and sides of irrigation channels; 850–2100 m. EE EW TU GD WU SU GG SD BA HA; Somalia, south to South Africa, Arabia. *Friis et al.* 3321; *Gilbert* 2036; *Mooney* 8006.

var. *dentata* (N. E. Br.) M. Gilbert, *Kew Bull.* 48: 126 (1993).

*E. granulata* Forssk. var. *dentata* N.E.Br., *Fl. Trop. Afr.* 6.1: 503 (1911) – types: HA, Harar, *Ellenbeck* 724 (B syn. destr.); Lake Rudolf (Turkana) (probably within Kenya), *Wellby* (K syn.).

Disturbed areas, often growing as a weed of cultivation, occurring in irrigated areas at lower altitudes; 800–2300 m. AF SU SD HA; Somalia, Kenya, Tanzania. *Gilbert & Jefford* 4531a; *Gilbert & Thulin* 144; *Mooney* 8940.

East African material, including the surviving syntype has smaller, hairier, less distinctly toothed leaves than most Ethiopian or Somalian material.

102. *E. polycnemoides* Boiss. (1862);

*Chamaesyce polycnemoides* (Boiss.) Soják (1972) – types: Sudan, *Kotschy* 302; TU?, Dschadscha, *Schimper* (1853) 1500 (G syn. not seen; P isosyn.).

Semierect annual or occasionally a woody-based short-lived perennial to 35 cm high, usually glabrous, occasionally with a few scattered hairs on basal branches, leaves and capsules. Leaves sessile, obliquely oblong-lanceo-

late, 6.5–15(–18) x 2–5(–6) mm, sometimes much reduced near tips of old plants, base rounded to subcordate, tip rounded to acute, serrate towards tip, often glaucous; stipules free, linear, 1 mm long. Cyathia mostly on short lateral shoots; peduncle 1 mm long; involucre cup-shaped, 1 x 1 mm; gland-appendages usually minute. Capsule on 1.5 mm pedicel, 1.5 x 1.5 mm, usually glabrous. Seeds oblong-conical, 1 x 0.5 mm, obtusely 4-angled, sides with 3–4 transverse wrinkled ridges, pinkish-brown. Fig. 85.67.5–7.

Disturbed areas, often on rocky slopes, in areas of open deciduous woodland; (600–)1050–2000 m. TU GD SU KF BA; west to Nigeria, Zaire, south to Malawi & Zambia. *W. de Wilde* 7501; *Gilbert & Thulin* 217, 538.

Plants from Eritrea are often apparently perennial with much reduced acute subtire upper leaves, conspicuous gland-appendages and more acutely angled seeds; this variation parallels closely that seen in *E. arabica* below.

*Gilbert et al.* 7404, from the Garibaldi Caldera between Nazareth and Awash Station, could represent another taxon: though very similar in most features, it differs by the long-pilose capsule and smooth seeds. More collections are needed from the area.

103. *E. arabica* Anderson in *Fl. Aden*: 34 (1860);

*Chamaesyce arabica* (Anderson) Soják (1972) – type: S Yemen, *Schimper* 756.

*E. seclusa* N.E.Br. (1911) – type: Eritrea, E of Amba Tokhan, *Schweinfurth & Riva* 612 (K holo.; FT iso.).

*E. propinqua* N.E.Br. (1911) – type: Ethiopia (between Mitsiwa and Gonder), *Salt* (BM holo.; K fragm.).

Slender semierect ephemeral or woody shrublet to 50 cm, glabrous except for minutely puberulous stem base and new basal shoots when present, less often uniformly minutely puberulous. Petiole *c* 1 mm long; blade linear to linear-lanceolate, to 23 x 2–3.5 mm, tip acute, entire; stipules free, linear, 0.8 mm long. Cyathia terminal or apparently axillary; peduncle to 1 mm; involucre barrel-shaped, 1 x 1 mm; gland-appendages pink, prominent (to 1 x 1.9 mm) or reduced to narrow rims. Capsule on 1.3 mm pedicel, 1.8 x 1.8 mm, acutely lobed. Seeds oblong-conical, shallowly pitted, 1.3 x 0.7 mm, pinkish-brown. Fig. 85.67.1–4.

Arid situations ranging from basalt slopes with very poor cover of *Rhigozium somalense* and *Moringa peregrina* through to bare shallow soil overlying lava within open *Acacia* bushland or *Chrysopogon* grassland; near sea level–1000 m. EE AF SU ?HA; east Sudan, Djibouti, Somalia, Kenya, Arabia. *Burger* 3483; *Gilbert* 2413; *W. de Wilde* 9742.

The epithet was first used by Hochstetter and Steudel and it has been assumed generally that the name was validated by Boissier in 1862. That publication is however antedated in an account of *Aden plants* by Anderson in 1860.

It is a polymorphic species that needs further study, especially within Eritrea. In southern Ethiopia and E Africa plants are always glabrous ephemerals with very narrow leaves and minute gland-appendages. In Eritrea and Arabia such plants merge with woody perennials, hairy with broad

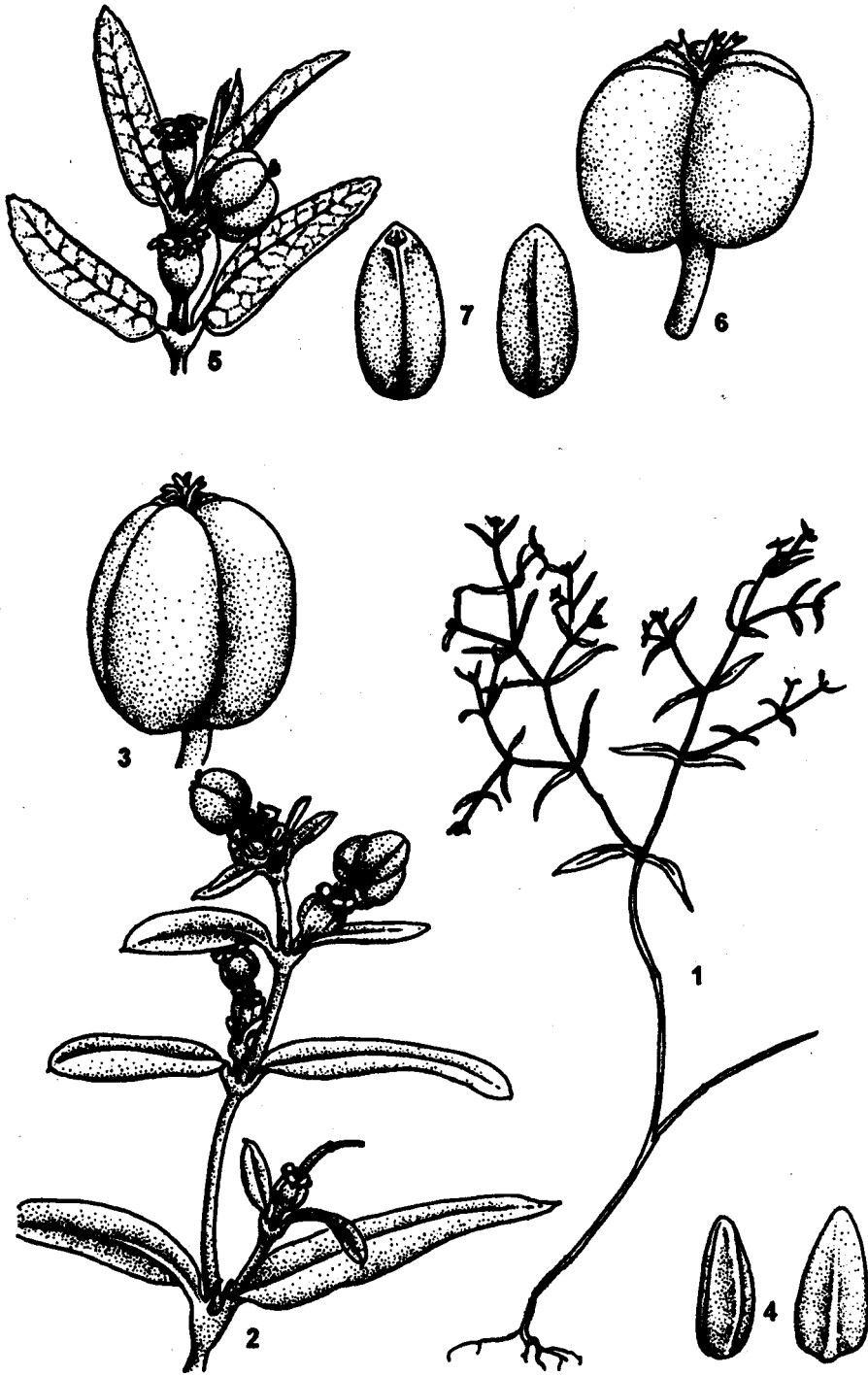


Figure 85.67

*EUPHORBIA ARABICA*: 1 - habit x  $\frac{3}{4}$ ; 2 - flowering branch x 8; 3 - capsule x 12; 4 - seeds x 12. *E. POLYCNEMOIDES*: 5 - flowering branch x 6; 6 - capsule x 18; 7 - seeds x 18. 1 from Gilbert 4750; 2 from Tweedie 1749; 3 & 4 from Carter & Stannard 297; 5-7 from Milne-Redhead & Taylor 9495. Drawn by Christine Grey-Wilson. (Reproduced with permission from *Fl. Trop. E. Afr. Euphorbiaceae*: fig. 79.)

gland-appendages (*E. seclusa*) or almost glabrous with broader leaves and reduced gland-appendages (*E. propinqua*) and plants with various other permutations of these characters. Detailed field studies may warrant the recognition of a complex of taxa but for the present it seems preferable to recognize just the one variable species.

104. *E. granulata* Forssk. (1775)

*Chamaesyce granulata* (Forssk.) Soják (1972) - type: Yemen, Forsskål.

Prostrate ephemeral, stems to 15 cm long, uniformly hairy except sometimes for upper side of leaves. Petiole c 1 mm; blade obovate to oblong-ovate, up to 8 x 5 mm, base

obliquely rounded to subcordate, tip rounded, margins entire or nearly so; stipules free, to 1.5 mm long, usually divided into 2-4 linear lobes. Cyathia solitary, mostly apparently axillary; peduncles to 0.5 mm; involucre cup shaped, c 1 x 1 mm; gland appendages very small and obscurely lobed. Capsule 1.5 x 1.5 mm. Seeds oblong-conical, 1 x 0.5 mm, acutely 4-angled, pinkish-brown with numerous transverse wrinkles.

1. Often perennial; indumentum uniformly densely puberulent, almost velvety; stems often somewhat thickened, yellowish. var. *granulata*  
- Ephemeral; indumentum sparsely pilose, upper leaf

surface often glabrous; stems slender, not yellowish.  
var. *glabrata*

var. *granulata*

Coastal plain, in sandy soil; 50–750 m. EE EW; Somalia, Arabia north to Iraq and east to Afghanistan & N India. *Bally* 6888 p.p.; *Jannone* 114a; *Pappi* 8741.

var. *glabrata* (Gay) Boiss.

in A. DC., *Prodr.* 15.2: 34 (1862); *E. forskoolii* var. *glabrata* Gay in Webb & Berth., *Phyt. Canar.* 3.3: 243 (1847) – types: Arabia, *Aucher-Éloy* 5304, *Schimper* 754 & *Botta*; Sudan, *Kotschy* 69.

Open areas in very dry bushland or grassland; 60–900 m. EE AF SU; Kenya, Somalia, Sudan, Egypt, Arabia. *Bally* 6857; *Burger* 3522; *Gilbert & Thulin* 167.

Further varieties have been described from NW Africa and the Middle East. None are very well defined though the extremes are distinctive.

105. *E. sp.* = *Gilbert et al.* 7322.

SU, Sodoble River near Wegidi, below Muger Cement Factory.

Prostrate annual, glabrous throughout; stems very numerous, longitudinally ridged when dried. Petiole *c* 0.5 mm; blade obliquely oblong-ovate, up to 3.5 x 2 mm, tip rounded, entire; stipules free, lacerate, up to 0.9 mm long. Cyathia apparently axillary but tending to cluster at shoot-tips; peduncle *c* 0.3 mm long; involucre cup-shaped, 0.6 x 0.7; gland appendages narrow. Capsule on 1.5 mm pedicel, 1.5 x 1.7 mm, sutures pigmented. Seeds ovoid-oblong, 0.9 x 0.7 mm, obtusely 4-angled, smooth, brown.

Silty sand deposit in dry river bed; *c* 1600 m. SU; not known from outside the Flora area.

Closely resembling *E. serpens* Kunth in most features but lacking the very distinctive pale triangular interpetiolar stipules of that species.

106. *E. rivae* Pax (1897)

– type: SD, between Surro & Rogono, *Ruspoli & Riva* '95 (1457) 94' (B holo. destr.; FT iso.; K drawing).  
*E. zambesiana* sensu Cufod. non Benth.

Herbaceous perennial from thick woody or tuberous root-stock, glabrous throughout; stems sometimes at first erect, later prostrate, to 15 cm long. Lowermost leaves sometimes scale-like; petiole up to 1 mm long; blade obliquely broadly ovate to suborbicular, up to 20 x 16 mm, tip rounded, entire; stipules triangular, 0.8 x 0.6 mm, toothed, sometimes joined at base. Cyathia often produced before normal leaves on erect branched stems; peduncle to 4 mm; involucre cup-shaped, 2 x 2 mm; gland-appendages usually prominent, up to 0.8 x 1.5 mm. Capsule on pedicel up to 5 mm long, 2.3 x 2.3 mm, deeply lobed. Seeds oblong-conical, shallowly pitted, 1.5 x 0.8 mm, pinkish-buff.

Wooded grassland subject to burning; 1750–1850 m. SD; Sudan, Kenya. *Corradi* 5722; *Gillett* 14737; *Mooney* 5436.

33. SYNADENIUM Boiss. (1860)

*S. compactum* N. E. Br. (1911)

*S. grantii* auct. non Hook.f.

Erect succulent shrub or tree to 4 m high, stems over 1 cm thick, all parts often flushed purplish red. Leaves alternate, sessile, obovate, tip acuminate, fleshy; stipules minute, glandular. Monoecious; cyathia in lax axillary cymes. Cyathia as in *Euphorbia* but gland forming continuous rim on involucre margin; bracts inconspicuous. Capsules *c* 7 mm long, deeply lobed. Seeds cylindrical-ovoid, *c* 2 mm long, rugulose; caruncle absent.

Commonly grown as an ornamental or hedge plant in many parts of Ethiopia but particularly common in the SW. EW SU IL KF SD; East Africa. Sight records.

The plants in cultivation probably belong to one clone selected for the distinctive deep red stems and leaves: var. *rubrum* S. Carter, *Kew Bull.* 42: 669 (1987). Other closely related species occur in eastern Africa north to Kenya and Uganda and could possibly turn up within the Flora area.

34. MONADENIUM Pax (1895)

*Lortia* Rendle (1898).

*Bally*, P. R. O., *The Genus Monadenium*, Benteli, Berne, 1961; *Gilbert, Bradleya* 8: 45–47 (1990).

Succulent herbs to small trees, often with tuberous roots. Stems perennial or annual, sometimes prominently tuberculate, spiny or grooved. Leaves alternate, sessile, succulent; stipules reduced to glands or forming short spines. Inflorescence an axillary dichasial cyme of cyathia. Cyathia as in *Euphorbia* but irregular; bracts usually fused on upper side to look like a single bract with 2 keels and a notched tip – 'bract pair'; involucre with a single U-shaped gland along rim on upper side, open below. Capsule as in *Euphorbia*. Seeds mostly oblong-cylindrical with large caruncle.

A genus of perhaps 50 species restricted to the drier areas of tropical Africa, most numerous in Tanzania.

1. Stems grooved or tuberculate, perennial; bracts green or yellow, up to 6 mm long. 2
- Stems smooth, dying back in dry season; bracts white, pink or red, 10–18 mm long. 4. *M. erubescens*
2. Stem without tubercles or with widely separated short patent tubercles, distinctly longitudinally grooved; flowering eye and leaf scar very close together. 3
- Stem densely covered with reflexed tapering tubercles 6–21 mm long; flowering eye and leaf scar widely separated, connected by single groove. 3. *M. reflexum*
3. Stems scandent or prostrate, mainly branching from base, without tubercles. 1. *M. ellenbeckii*
- Stems erect, not branching from base, distinctly tuberculate at least when young. 2. *M. shebeliensis*
1. *M. ellenbeckii* N.E. Br. (1911)
- type: SD, Tarro-Gumbi (between Tarre, and Fader Gumbi), *Ellenbeck* 2102 (B holo.; K fragment).
- Monadenium zavattari* Chiov. (1939); *M. ellen-*

*beckii* forma *caulopodium* Bally, l.c.: 68 (1961) – type: SD, between Mega and Dubuluk, *Cufodontis* 616 (FT holo.).

Shrublet scandent up to 1.5 m high, often prostrate, mainly branched from base; stems cylindrical, 15–25 mm thick, longitudinally grooved, leaf-scars slightly raised, glabrous. Leaves broadly ovate to suborbicular, 8–10 x 7–8 mm, tip acute, minutely puberulent, soon falling; stipular glands very small, dark. Cymes from upper axils, persisting after leaf fall; peduncles 6–10 mm long, up to 6 mm thick; bract pair c 4 mm long, yellow-green turning brown, minutely puberulent; gland entire, shortly exerted beyond bracts, yellow. Capsule exerted, 6 x 5 mm, obtusely 3-lobed. Seed 3.5 x 1.5 mm, rugulose, light brown; caruncle whitish-yellow.

Grassland on hardpan soils; rocky slopes with *Acacia* – *Commiphora* bushland; 1000–1500 m. SD HA; Kenya, Somalia. Gilbert 2062; Gillett 14268.

Plants growing in grassland are usually prostrate in contrast to the more scandent habit assumed in more sheltered sites. Such plants were called ‘forma *caulopodium*’ but some, though not all, of these assume a suberect habit in cultivation.

2. *M. shebeliensis* M. Gilbert (1990)

– type: HA, 6 km from Mustahil on road to Shillabo, Gilbert 2128 (K holo.).

Erect shrub to 1.75 m, main stem thick and rather woody at base, branches few and spreading. Stems deeply longitudinally grooved, prominently patent-tuberculate in young plants, upper branches much less prominently tuberculate, glabrous. Leaves not seen; stipules forming clusters of very short brown spines. Cymes as in *M. ellenbeckii* except for peduncle which is c 2 mm long, shorter than broad. Young fruit shortly exerted, slightly more rounded than in *M. ellenbeckii*.

Along top of limestone escarpment with very sparse *Acacia* – *Commiphora* bushland; c 300 m. HA; known only from the type collection.

Most closely related to *M. stellatum* Bally from S Somalia which has cylindrical tubercles topped by a prominent stellate cluster of spines.

3. *M. reflexum* Chiov. (1951)

– type: SD, between Filtu and Negele, *Vatova* 845 (FT holo.; K fragment of holo.).

Stems mostly solitary, sometimes forming small clump, to 75 cm high, c 6 cm thick, densely covered with tapering reflexed tubercles 6–21 mm long, grooved above, glabrous, grey-green. Leaves in apical tuft, soon falling, inserted at tip of tubercle, obovate to spatulate, up to 24 x 8 mm, tip acute, margin crisped near tip, minutely puberulent; stipules reduced to minute, obscurely spiny shields. Flowering eye near base of tubercle in groove which extends up to leaf insertion. Cymes crowded at stem tip, yellow-green; peduncle 10–26 mm long, otherwise as in

*M. ellenbeckii*. Capsule oblong, obtusely 3-angled, 4 x 3 mm. Seeds 3 x 1 mm, rugose, pale brown with darker reticulation; caruncle white.

Open to moderately dense *Acacia* – *Commiphora* bushland on both dark and red soils; 900–1200 m. SD; Kenya. Ash 1868; Corradi 5629; Gilbert & Thulin 1501.

Even slight traces of the dry latex can cause severe irritation of mucous membranes and extreme photosensitivity of the eyes if rubbed (personal observation).

4. *M. erubescens* (Rendle) N. E. Br. (1913);

*Lortia erubescens* Rendle (1898) – type: Somalia, *Lort-Phillips* (BM holo.).

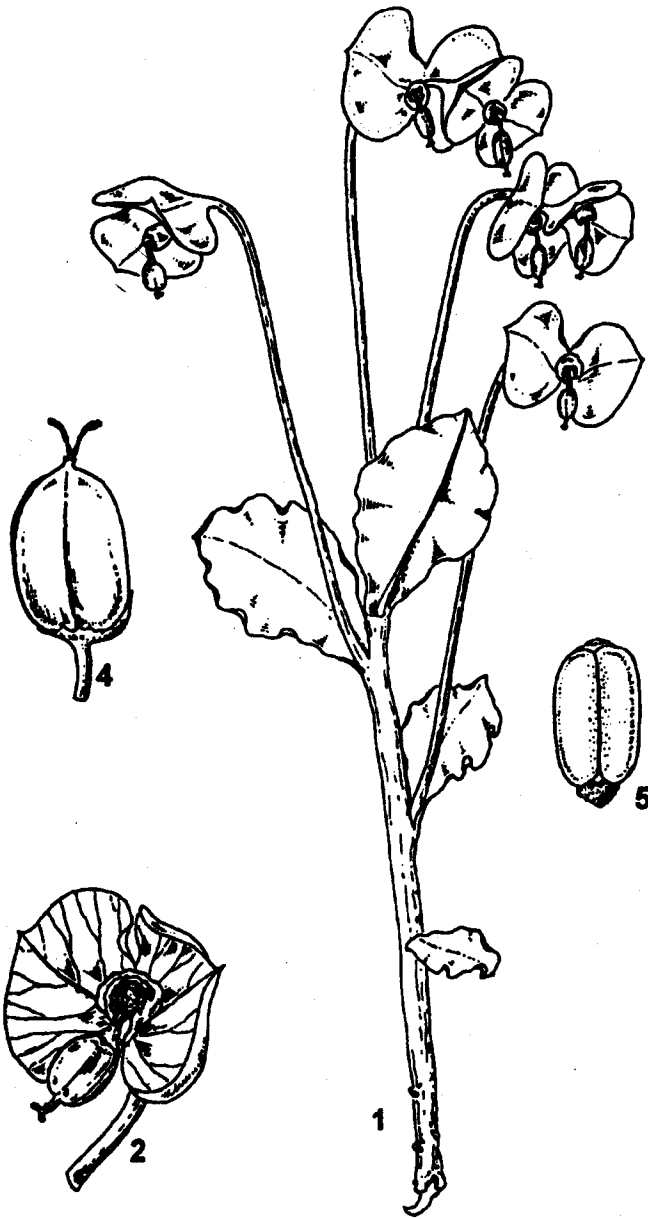
*Lortia major* Pax (1904); *Monadenium majus* (Pax) N.E.Br. (1913) – type: HA, Djebel Haquim (Mt Hackim), near Harar, *Ellenbeck* 921 (B holo. destr.) same loc.: *M. & S. Gilbert* 1435 (K neo.; ETH isoneo.), designated by Gilbert loc. cit. 46 (1990).

*M. majus* forma *floribunda* Bally in *Candollea* 17: 36 (1959) – type: SD, Curre Liban, *Bally* 9282 (EA holo.; K iso.).

Perennial herb from massive tuberous rootstock; stems 1 to many, usually unbranched, 5–60 cm high, 8–10 mm thick, smooth, green. Leaves orbicular-rhomboid to obovate or narrowly oblanceolate, tip mostly acute to acuminate, margin often reddish, entire, crisped or serrulate, veins pale, glabrous or minutely puberulent. Cymes from axils of uppermost leaves which are often reduced in size, peduncles 15–70 mm long, glabrous or puberulent; bracts obliquely suborbicular, 10–18 mm long, joined for up to half length, glabrous, white with greenish veins through pink to deep red, concealing cyathia; involucre 5–6.5 mm long, pale green. Capsule obtusely 3-angled, c 8–10 x 7–8 mm, angles often with a pair of toothed wings. Seeds 3.5–5(–6) x 2–3 mm, smooth, greyish or brownish; caruncle straw-coloured. Fig. 85.68.

Grasslands, both on shallow dark soils overlying limestone and in areas of clay soils overlying basalts; 1300–2100 m. SU SD BA HA; Somalia. *Burger* 1992; *Friis* et al. 988; *Gilbert* et al. 8022.

A variable species with some distinctive populations perhaps worthy of formal recognition. Material from Somalia and Mt Hackim have puberulent leaves, not seen elsewhere. Plants from between Jigjiga and Harar have narrower leaves than elsewhere and have been labelled ‘*M. pulchrum*’ by Bally – the name is unpublished. Plants from areas of impeded drainage form larger clumps with more branched cymes and have been separated as ‘forma *floribunda*’. The only collection from SU, *M.G. & S.B. Gilbert* 2199 from the Abay (Blue Nile) Gorge have taller stems and cymes shorter than the subtending leaves with white bracts not spreading as widely as typical for *M. erubescens* elsewhere. Observations of cultivated plants shows that bract colour can vary from very deep pink to almost pure white in the same plant dependant on growing conditions.



DAMTEW T.

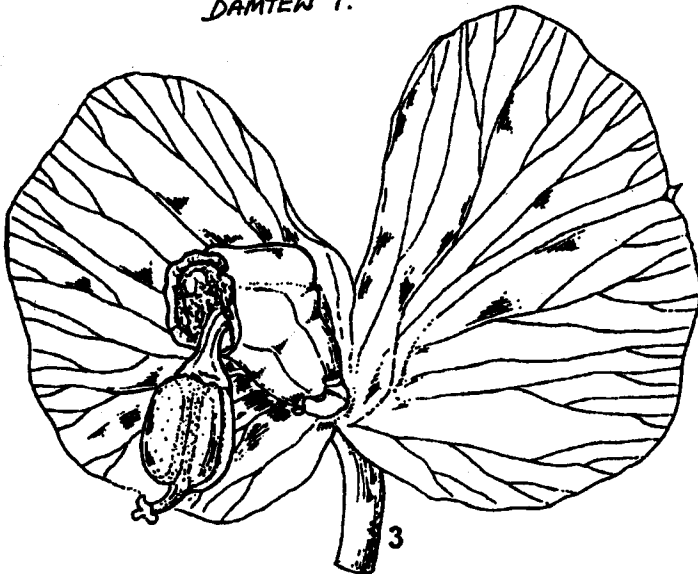


Figure 85.68 *MONADENIUM ERUBESCENS*: 1 – flowering branch x 1; 2 – immature cyathium with bracts and young fruit x 2; 3 – enlarged cyathium with immature female flower x 4; 4 – fruit x 4; 5 – seed x 5. All from *M.G. Gilbert et al. 8022*. Drawn by Damtew Teferra.

## 117. BALANOPHORACEAE

by B. Hansen\*

Andrews, *The Flowering Plants of the Sudan*, II: 297 (1952); Burger, *Families of Flowering Plants in Ethiopia*: 73 (1969); Hansen, *Bot. Jahrb. Syst.* 106: 359–377 (1986), *Balanophoraceae* in *Fl. Trop. E. Afr.*: 6 pp. (1993).

Herbaceous, fleshy root-parasites, without chlorophyll and roots of their own, often brightly coloured red or blood red. After germination on a suitable host root, a branched, cylindrical tuber develops, from which arise at regular intervals many endogenous inflorescence-bearing stems, or  $\pm$  spherical, polygonately furrowed tubers. Leaves scale-like, spirally arranged. Inflorescence like a spadix, or paniculately branched. Stamens united into syndandria or free. Ovary poorly differentiated or 3(–4)-merous, style 1 or much reduced. Fruit a minute, 1-seeded achene.

Family with 18 genera and 43 species widely distributed in the tropics and subtropics of both hemispheres: 4 genera exclusively African, 2 in the Flora area, each with 1 species.

## Key to Genera

1. Inflorescence conspicuously branched; stamens 3–4 free; style absent. 1. *Sarcophyte*
- Inflorescence apparently not branched, stamens 1 free or several united into a syndandrium. 2
2. Inflorescence axis 2.8–3 cm, hemispherical; stamens 3–6 forming a syndandrium. 2. *Thonningia*
- Inflorescence up to 12 cm, cylindrical; stamen 1.

*Cynomorium*

*Cynomorium coccineum*, usually found in saline areas parasitizing *Chenopodiaceae* etc., has been recorded from Hafun, Somalia, and could also occur along the Red Sea coast. Hence, it is included in the key to genera.

1. *SARCOPHYTE* *Sparrman* (1776)

Plants dioecious. Tuber subspherical, furrowed. Stem with numerous, spirally arranged, ovate lanceolate scale-like leaves. Inflorescences unisexual, paniculately branched, each branch subtended by a bract slightly smaller than the leaves. Male plants: branches with many shortly pedicellate flowers in groups of 2–3 on short secondary branches; flowers 3(–4)-merous with tepals valvate; stamens 3(–4) opposite to tepals, filament thick, anther globular, multilocellate<sup>1</sup>. Female plants: branches with 5–12 subglobular, almost sessile clusters of about 200 flowers completely sunk in a common receptacle; stigmas discoid, peltate on a reduced style, almost covering the surface of the receptacle; ovary 3(–4)-merous.

A genus confined to tropical East Africa and South Africa with one species and 2 subspecies.

*S. sanguinea* *Sparrman* (1776).

*S. piriei* *Hutchinson* (1914).

Flesh-coloured to crimson or purplish-red plants. Tuber 7–15 cm in diameter, strongly polygonately furrowed. Stem base surrounded by short, 3–4-lobed sheath, bracteate below, 8–25 x 5 cm below. Bracts spirally arranged, ovate-lanceolate, 1–3.5 x 0.3–1.2 cm. Inflorescence 5–10 cm wide, branches 2–6 cm long, each subtended by a bract. Male plants: flowers 3(–4)-merous with tepals valvate, 2.3

–3.6 mm long; stamens 3(–4), 1.5–2.5 mm long, opposite to tepals; filaments thick. Female plants: branches with 5–12 sub-globular almost sessile clusters of flowers 0.5–2 cm in diameter, each cluster containing about 200 flowers completely sunk in a receptacle; stigmas discoid, peltate on a reduced style; ovary 3(–4)-merous.

subsp. *piriei* (*Hutch.*) *B. Hansen*, loc. cit. (1986).

Plant odourless; tepal/stamen ratio (1.8)–2(–2.2); pollen with exine quite smooth. Fig. 117.1.

*Acacia* – *Cadaba* community on alluvial soil; 1320–1500 m. SD; widespread in riverine forests in tropical East Africa, southwards to northern Mozambique, one collection from Somalia. *Gillett* 15068 (found dry on surface of ground!).

There is a report from Mogadishu, Somalia, that a

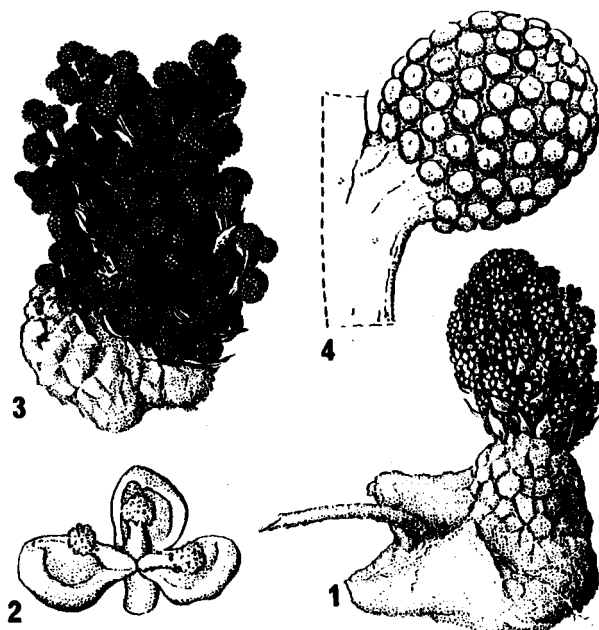


Figure 117.1 *SARCOPHYTE SANGUINEA* subsp. *PIRIEI*: 1 – young male plant, tuber with host root and juvenile inflorescence x 1/2; 2 – male flower x 6; 3 – female plant x 1/2; 4 – a single cluster of female flowers with discoid stigmas exposed x 3. Drawn by Victoria C.G. Friis. First published in *Fl. Trop. E. Afr.*, *Balanophoraceae*.

\* Botanical Museum, University of Copenhagen, Gothersgade 130, DK-1123 Copenhagen K, Denmark.

1. multilocellate: with many small compartments or chambers.

preparation of the tuber is used against bruises, toothache, sore throat, diarrhoea and abdominal pain.

Subsp. *sanguinea* occurs in eastern S Africa and the extreme south of Mozambique. It has an offensive smell, tepal/stamen ratio of (1.2–)1.5(–1.7) and pollen with exine coarsely rugulose.

## 2. THONNINGIA Vahl (1810)

Plants dioecious. Tuber rhizome-like, cylindrical, branched, swollen at point of contact with host root. Inflorescence-bearing stems breaking through buds on the tuber, leaving a short lobed volva basally. Stem with numerous, spirally arranged triangular-lanceolate, scale leaves. Inflorescences unisexual, unbranched, axis obconical, terminally convex, bearing numerous flowers. Male flowers pedicellate; perianth segments 2–6, linear, spirally arranged; anthers 3–6, linear-elongate, united but with apices finally free, 2-locular and extrorsely dehiscent. Female flowers linear prismatic, densely crowded, perianth superior, tubular, obscurely 2–3-lobed; style 1, exerted. Fruiting body a swollen hemisphere, bearing minute 1-seeded achenes.

A genus confined to tropical Africa and Madagascar with 1 polymorphic or up to 5 species recognized.

### *T. sanguinea* Vahl (1819).

#### *T. ugandensis* Hemsl. (1911).

Tuber creeping 10–15 cm below soil surface, 20 cm or more long, 0.6–0.8(1–1.5 swollen part) cm in diameter, minutely pilose. Inflorescence-bearing stems appearing above soil surface with their upper parts bright red, 15–20 cm tall. Leaves triangular ovate, lower *c* 8 x 4 mm, upper 20 x 8 cm forming an involucre around the spadix. Inflorescence 2.8–3 x 3.2–3.9 cm, male spadices depressed-hemispherical, female spadices hemispherical. Flowers apparently without bracts or males subtended by minute reduced bracts. Male flowers up to 1.5 cm long with perianth segments *c* 3 mm long and syndandrium 5–6 mm



Figure 117.2 *THONNINGIA SANGUINEA*: 1 – plant with several flower heads; 2 – male flower. (Reproduced from Andrews, *Fl. Anglo-Sudan*, fig. 107. Neither scale nor a specimen citation is given in Andrews, loc. cit.)

long. Female flowers 3 mm long, ovary with perianth *c* 2 mm, style 1–1.5 mm. Fruiting body dark red, fleshy, ovoid, with spadix strongly swollen above the involucre. Fig. 117.2.

In shade in forest; 1000–1300 m. IL KF; widely distributed all over wet areas of tropical Africa. *Mooney* 9282; *Friis* et al. 4116.

Outside Ethiopia, *T. sanguinea* has been found parasitizing roots of a wide variety of trees, e.g. *Acacia mildbraedii*, *Baphia nitida* (Fabaceae), *Antiaris africana* (Moraceae), *Bridelia micrantha* (Euphorbiaceae), *Funtumia africana* (Apocynaceae).

## Note on 124. MELIACEAE (Volume 3, pp. 479–489)

*Turraea mombassana* Hiern ex C. DC. (1878) subsp. *cuneata* (Gürke) Styles & White in *Bull. Jard. Bot. Nat. Belg.* 59: 258 (1989).

The second author, F. White, informed the editors that the Ethiopian populations of *T. mombassana* are now assigned to the above subspecies.

It is with regret that the editors record the death of both B.T. Styles and F. White, the authors of the Meliaceae for Volume 3. Both were outstanding taxonomists who took great interest in African botany throughout their careers. It

is a pleasure to have had their interest and support in producing Floras and other works when this side of botanical research was considered almost irrelevant. The Flora of Ethiopia project benefited from this interest, particularly that of Frank White who would have contributed further accounts if he had still been alive.

The editors and their colleagues in Ethiopia wish to record their gratitude for the contributions of Frank White and B.T. Styles to the development of systematic botany and knowledge of the flora in tropical Africa.

## GLOSSARY OF BOTANICAL TERMS

- abaxial** - the side or part facing away from the stem; the lower surface of a leaf (= dorsal); compare with adaxial.
- abortion** - the failure of a part to develop fully; suppression of a part usually present.
- acaulescent** - without an easily seen stem.
- accrescent** - increasing in size with age; as sepals enlarge around a developing fruit.
- accumbent** - leaning against another part, as cotyledons against the radicle.
- achene** - a small dry fruit, not opening when ripe, with only one seed; for example the fruits of *Urtica* and *Rumex*.
- achlamydeous** - without a perianth (sepals and petals lacking); as found in the *Euphorbia*.
- acicular** - needle-like; very narrow, stiff and pointed.
- acrodometia** - small cavities, possibly occupied by mites, found on the underside of the leaf in the axils of the main veins.
- acropetal** - development proceeding from the base to the apex with the youngest parts at the top and the older parts below, as in a raceme; movement of materials upwards to the apex.
- actinomorphic** - used for flowers which are radially symmetrical (at least in the perianth) and can, therefore, be divided along two or more longitudinal sections into halves which are mirror images of each other; the term applies mainly to the perianth: used as synonymous with radially symmetrical or regular; compare with zygomorphic, amorphic and irregular.
- aculeate** - armed with prickles, but not with spines as in many members of Malvaceae.
- aculeolate** - armed with small prickles.
- acuminate** - with a tip that becomes gradually narrower to a slender point.
- acute** - with a tip that comes to a sharp point with straight-sided edges that form an angle of less than 45°.
- adaxial** - the side or part facing the main stem; the upper surface of a leaf (= ventral); compare with abaxial.
- adnate** - when an organ or part is united to a different organ or part; for example the androecium (stamens) with the gynoecium (pistil) in Asclepiadaceae and Orchidaceae.
- adpressed** - parts pressed closely to the axis.
- adventitious** - in an unusual or abnormal place or coming from a distant place (buds that arise elsewhere than in the leaf-axils or at stem-tips, i.e. on roots; roots that arise elsewhere than from the radicle or other roots, i.e. from a stem or leaf).
- aerenchyma** - a plant tissue composed of unthickened, often irregularly shaped cells surrounding large air spaces; found in many plants associated with aquatic habitats.
- aerial** - of stems which arise from horizontal rhizomes; of roots which arise from stems and which have special functions such as the aerial roots of orchids which absorb water, and the aerial roots of climbers which attach the plant to its substrate.
- aestivation** - the way in which the flower parts are folded or arranged in bud, before opening.
- afro-alpine** - a distinct vegetation zone found above 3000 m on African mountains.
- agamous** - without gametes; reproduction without either production of and/or normally functioning gametes; (normally functioning pollen and ovules are not produced but fruits and seeds may be formed).
- aggregate fruit** - fruit formed from several separate pistils from the same flower, often together with the receptacle, e.g. *Rubus*, the strawberry, *Fragaria*, can also be used for fruits formed from an inflorescence as in figs, *Ficus*.
- albumen** - a name used for endosperm or perisperm in a seed; storage tissue which is not part of the embryo.
- alternate** - used for leaves that are attached, one at each node, at different levels along the stem; used for stamens borne between the sepals or petals.
- amorphous** - lacking shape or form; can be used for flowers lacking symmetry (compare with actinomorphic and zygomorphic).
- amphi-** - a prefix meaning 'both'.
- amplexicaul** - used for leaves where the base clasps the stem.
- androecium** - the male structures of a flower; stamens and accessories.
- androdioecious** - used for a species which has 2 sexual forms, plants with only male flowers and plants with bisexual flowers.
- androgynophore** - an elongated part of the receptacle carrying both androecium and gynoecium between the perianth and stamens in a bisexual flower.
- andromonoecious** - used for a plant having male and bisexual flowers on the same plant; no purely female flowers are formed.
- androphore** - an elongated part of the receptacle above the perianth which bears only the stamens as in Malvaceae.
- anemophilous** - pollinated by wind.
- angiosperms** - a major group of plants and the dominant land plants; seed plants with the seeds usually enclosed in an ovary.
- annual** - a plant which completes its life cycle in one growing season and then dies: where there are two or more growing seasons in a year, an annual species can have two or more generations in a year.
- annular** - arranged in a circle or in a ring; the shape of a ring.
- ant galls** - swollen hollow structures, usually on the stems or leaves of plants, which are inhabited by ants.
- anterior** - away from the axis (= abaxial); often used for the petal(s) found on the front of a flower.
- anther** - the part of the stamen producing the pollen, usually divided into pollen-sacs or pouches called thecae.
- anthesis** - the time when the pollen is shed and the stigma is receptive to pollen; from the opening of the flower bud to the setting of the seed.
- anthocyanins** - water-soluble pigments giving pink, red, purple, violet or bluish colours to flowers or vegetative parts of plants.
- antipetalous** - used for stamens or staminodes which occur opposite the petals.



- antisepalous** - used for stamens or staminodes which occur opposite the sepals.
- apetalous** - without petals or corolla.
- apex** - the tip or end-point of a structure.
- apical** - concerning or near the apex.
- apical placentation** - where the ovules are attached to the top of the ovary.
- apiculate** - ending abruptly in a short sharp point.
- apiculus** - a small extension between 2 leaflets in *Balanites*.
- apocarpous** - with the carpels free from one another.
- apomixis (apomictic)** - in seed plants, the production of seeds without normal sexual fertilization.
- appendage** - a part added or attached to another, usually larger, structure.
- appressed** - lying close or pressed flat against a surface or axis.
- aquatic** - living in water.
- arcuate** - curved or bent like a bow, usually used to describe a particular leaf shape.
- areolate** - surface of a leaf or seed divided into distinct spaces; with areoles.
- areole (areola)** - a space marked out on a surface; used to describe the raised area on the surface of certain seeds; also used to denote the area where spines and glochids arise on the stems of *Cactaceae*; the open area (cell) formed by anastomosing veins.
- aril** - an outer covering or appendage, often fleshy and/or brightly coloured, that encloses the seed or part of the seed and develops from the stalk of the seed.
- aristate** - with a long, very narrow, bristle-like point.
- armed** - provided with a means of defence such as spines.
- articulate** - with joints or nodes or places where a part will naturally break off.
- ascending** - a plant where the shoots start lying on the ground and then turn to grow mainly upright; usually used for herbs.
- asepalous** - without sepals.
- asexual** - without sex; without the production or fusion of gametes.
- asymmetric** - without any symmetry.
- attenuate** - tapering gradually to a slender point.
- auriculate** - with an ear-like lobe or appendage; as at the base of a leaf or other organ.
- auricle** - an ear-like lobe or appendage.
- autotrophic** - producing food by itself, neither parasitic nor saprophytic, the normal situation in green plants.
- awl-shaped** - used for a leaf which is narrow, flat, stiff and sharp-pointed (= subulate), such as in *Agave* and *Arucaria*.
- awn** - a fine, very narrow, bristle-structure usually at the tip of a leaf or bract; see also aristate.
- axial** - an adjective for any part which arises from the angle between a leaf and its subtending axis.
- axil** - the upper angle made between a leaf attachment and a stem.
- axillary** - in or arising from an axil.
- axis** - the central line of any symmetrical or nearly symmetrical body; in plants the main stem or branch on which other organs are arranged.
- baccate** - like a berry with fleshy and pulpy tissue.
- barbed** - with stiff short spines or bristles that point backward away from the apex of the organ.
- barbellate** - shortly barbed.
- basal** - found at or near the base of a structure.
- basifixed** - used for the attachment of the filament to the base of the anther.
- basipetal** - development of parts towards the base, the older parts are found above.
- beaded** - a structure which looks like a string of beads, synonymous with torulose.
- bearded** - with tufts of hairs or awns.
- berry** - a fleshy or juicy fruit with a soft outer portion and the seeds immersed in the fleshy or pulpy tissue, the seeds are not surrounded by a woody or stony endocarp, for example tomato. Compare drupe.
- betalains** - red and yellow alkaloid pigments found in plants of the *Caryophyllales*.
- bi-** - a prefix meaning 'two' or 'twice'.
- biennial** - living for two growing seasons; usually producing only vegetative growth in the first season, and flowering and fruiting in the second.
- bifid** - divided into two parts near the top.
- bifoliate** - having two leaves.
- bifoliolate** - having two leaflets.
- bifurcate** - with two branches or divisions at the end; Y-shaped.
- bilabiate** - with two lips; a corolla with an upper and lower lip, for example, the flowers of many *Lamiaceae* (*Labiatae*).
- bilateral** - when a structure has only one plane of symmetry; if cut along this plane the two halves are mirror images of each other, usually used for flowers (synonymous with zygomorphic).
- bilocular** - with two locules or chambers; usually used for ovaries and sometimes for stamens.
- binomial** - the scientific species-name composed of two words; the first is the generic name, the second the specific epithet.
- bipinnate** - twice pinnate, when the first divisions of a leaf are themselves pinnate.
- bipinnatifid** - twice pinnatifid.
- biseriate** - having two series or two whorls (as having both calyx and corolla).
- bisexual** - having both sexes and producing both male and female gametes. Bisexual flowers have both functional stamens and pistils.
- bisymmetric** - having two planes of symmetry, see also bilateral symmetry.
- blade** - the flat broad part of a leaf or petal; synonymous with lamina.
- bloom** - the flower or process of flowering (as in the flowers blooming); also used for a whitish waxy powder covering a surface.
- bole** - the unbranched stem or trunk of a tree.
- bostryx** - a cymose inflorescence with successive branches on one side only; normally coiled like a spring.
- bract** - a small leaf-like structure usually associated with a flower and/or inflorescence and found at the base of the pedicel or peduncle.
- bracteate** - having bracts.

- bracteole** - a small bract on the pedicel, or close under the flower, between the bract and the flower.
- branch** - a portion of a stem system which is attached to the main stem; often used for a stem from a woody plant.
- branchlet** - the smallest part of a branch; the growth of the current or the last growing season (a twig).
- brevistylous** - meaning 'short-styled'; used for flowers which have short styles where there are also flowers in the same species/population which have long styles - a condition described as heterostylous.
- bristle** - a stiff hair.
- bud** - an undeveloped shoot that may give rise to a branch or a flower.
- bud scales** - modified leaves or stipules which cover and protect an undeveloped shoot and drop off as soon as the shoot starts growing.
- budding** - the production of buds: in horticulture used for the grafting of a bud of one kind onto a rootstock of another compatible kind of plant, for example the budding of sweet orange onto the rootstock of sour orange: a type of asexual reproduction in which a small protuberance develops and is separated from the parent cell, typical of yeasts.
- bulb** - a short underground stem with a crown of usually fleshy overlapping scale-like leaves, for example an onion.
- bulbel** - a small bulb produced from the base of a larger bulb.
- bulbil** - a very small bulb produced in the leaf axils of some plants and providing a means of asexual reproduction.
- bullate** - used for leaves with a surface that is prominently raised between the veins.
- buttress** - supporting structure at the bottom of a stem or root.
- caducous** - falling off soon or quickly.
- caespitose** - forming mats or broad tufts.
- calcicole** - a plant which can grow in soil with a high calcium carbonate (lime) content.
- calcifuge** - a plant which cannot tolerate soil with a high lime content.
- calcine** - growth from a callus or receptacle.
- callus** - an irregular mass of parenchymatous tissue formed over wounds; often capable of being cultured indefinitely in nutrient media.
- calyculate** - having bracts round the calyx, or an involucre resembling an outer calyx as in *Hibiscus*.
- calyculus** - a ring of bracts or the involucre below the calyx.
- calyptra** - a cap-like or lid-like covering of certain fruits or flowers that comes off in one piece, for example, the perianth forms a calyptra which comes off when a *Eucalyptus* flower opens; see also operculum; the cap covering a moss capsule.
- calyx** - the outer whorl or envelope of most flowers, made up of the free or united sepals.
- calyx-tube** - the tube formed by the united sepals, also used for the receptacle-tube and hypanthium (see these terms).
- cambium** - a secondary meristem; vascular cambium produces secondary xylem and phloem, the cork cambium produces cork (phellogen) and secondary cortex.
- campanulate** - bell-shaped, with a broad tube and a wide opening.
- canal** - air spaces running longitudinally in a stem or root.
- canaliculate** - having a groove running lengthways.
- canescent** - covered with a grey pubescence or greyish colour.
- cantharophily** - pollinated by beetles.
- cap** - a lid-like covering (= calyptra or operculum).
- capitate** - like the head of a pin (as in the thickened stigma of some flowers) or a compact cluster of flowers forming a head.
- capitulum** - a dense head-like inflorescence of usually sessile flowers.
- capsule** - a dry fruit produced by an ovary composed of 2 or more united carpels and opening by slits or pores or breaking into pieces when ripe.
- carina** - synonymous with keel, a long projecting ridge at the back or on the bottom of a structure: sometimes used for the 2 anterior petals of the papilionaceous flower (Leguminosae subfamily Papilionoideae) which are partly fused along their lower margins; also used for the lower (abaxial or anterior) petal in many Polygalaceae.
- carinate** - a synonym for keeled, with a projecting longitudinal ridge.
- carotenoids** - a group of yellow pigments occurring in chloroplasts, chromoplasts and elsewhere in plant cell.
- carnivorous plants** - plants which catch small animals and digest them to obtain nitrogen. Often found in very wet habitats.
- carpel** - the basic unit of the gynoecium or pistil consisting of an ovary or part of an ovary with an associated style and stigma; generally considered to have developed from a leaf-like structure, often used in a theoretical sense. A simple pistil, such as a legume, has only 1 style and stigma and 1 locule; a compound pistil is made up of 2 or more carpels joined together.
- caruncle** - an outgrowth on the surface of a seed near the hilum as in many Euphorbiaceae.
- catkin** - a spike-like inflorescence with many bracteate and closely crowded unisexual flowers that is often pendulous and may resemble a cat's tail.
- caudate** - abruptly ending in a long and very narrow tip like a tail.
- caulescent** - with a clearly visible stem above the ground.
- cauliflorous** - producing flowers directly from the older stems.
- cauliflory** - having flowers produced directly from older, usually woody, stems, for example *Haleria lucida*.
- cauline** - borne on or arising from the stem.
- cell** - in descriptions of flower-parts the word cell is often used as a synonym for chamber, locule, or theca; a 4-celled ovary is a 4-locular ovary. This use must not be confused with the wider use of the word cell as the structural unit of living things.
- central placentation** - see free central placentation.
- centrifugal** - developing from the centre out, the older parts at the centre.
- centripetal** - developing from the outside towards the centre, the older parts on the outside.
- cespitose** - forming mats or broad tufts or cushions (an alternate American spelling of caespitose).
- chaff** - a small dry thin bract or scale.

- chamaephyte** - a plant in which the perennating buds occur within 20–30 cm of the soil surface, i.e. dwarf shrubs. Many Afro-alpine plants are chamaephytes, for example *Sida schimperiana*.
- chartaceous** - with paper- or parchment like texture; thin and opaque.
- chlorophyll** - the green pigment that absorbs light energy to form energy rich compounds in the process of photosynthesis.
- choripetalous** - having entirely free or separate petals; synonymous with polypetalous.
- ciliate** - with a fringe of hairs along the edge, or with regularly arranged hairs.
- ciliolate** - fringed with very short fine hairs, finer than ciliate.
- cilium (pl. cilia)** - unicellular hairs found on leaf margins and other structures; also used for motile organelles; usually numerous, almost identical to a short flagellum.
- cincinnus** - a type of cyme which curls up on itself; the same as a helicoid cyme.
- cinereous** - a dark grey or ash-colour.
- circumcissile** - opening as if cut circularly and the upper part coming off like a cap or lid.
- cirrhose** - having tendrils or with a long narrow coiling tip that acts as a tendril.
- cladode** - a leaf-like structure formed by a modified stem.
- cladophyll** - a synonym of cladode.
- clasping** - used for leaf-bases that partly or completely enclose the stem.
- clavate** - club-shaped, thickened at the end.
- claw** - the very narrow base of some petals; clawed petals have a long, narrow base and broad terminal lobe (as in Geraniaceae, some Caryophyllaceae and Caesalpiniaceae).
- cleistogamous** - flowers that fertilize themselves before they open, or which do not open at all even after fertilization; they are usually small and near the ground (as in *Commelina* and *Oxalis*).
- climbing** - used to describe plants that use other plants or objects as a means of support but have their roots in the ground.
- clone** - a population of plants all having the same genetic makeup, usually produced by vegetative reproduction or pseudosexual reproduction in which seeds are produced without sexual fertilization taking place - see apomixis.
- coccus** - a separate part of a lobed fruit, usually 1-seeded, as in some Rhamnaceae and Euphorbiaceae.
- cochleate** - shape of a human ear or coiled as in a snail shell.
- coherent** - parts in close contact but not united.
- colliculous (colliculose)** - a surface covered in round swellings, as the stem of *Ceiba pentandra*.
- colporate** - in pollen grains with both furrows (colpae) and pores.
- colpus** - a furrow forming a thin area in the exine of a pollen grain through which the pollen tube usually emerges.
- column** - the solid central structure in orchid flowers formed by the union of style and stamens; the stalk or tube formed by the united stamens, as in Malvaceae.
- coma** - a tuft of hairs on the end of some seeds.
- comal** - found at the tip or apex.
- commisure** - the faces (or seam, where the two faces are cohering) of two cohering carpels or mericarps (the plane along which the fruit separates) in the Malvaceae and Apiaceae (Umbelliferae).
- comose** - with a tuft of hairs.
- complanate** - arranged in the same plane.
- compound** - composed of two or more similar parts, the opposite of simple.
- compound fruit** - when the fruit of separate flowers becomes united; for example, *Dorstenia*.
- compound leaf** - when the leaf has two or more leaflets or blades.
- compound pistil** - a pistil made up of 2 or more carpels.
- compressed** - flattened or pressed together, either from side to side (laterally compressed) or from front to back (dorsally compressed).
- concolorous** - where the upper and lower surface of a leaf are more or less the same colour; compare with discolorous.
- concreescent** - grown together, coalesced.
- conduplicate** - folded together lengthways.
- confluent** - merging or blending together.
- connate** - when parts of the same kind are united.
- connective** - the tissue that unites the pollen sacs in an anther; it may form an extension of the filament.
- connivent** - coming close together or converging, but not united, often closer together above than below.
- contorted** - twisted in bud; synonymous with convolute.
- convolute** - used to describe sepals or petals in bud, when one edge is always above the adjacent part and the opposite edge is always below an adjacent part.
- coplanar** - in the same plane.
- coradial** - on the same radius.
- coralloid** - a multibranched structure with all parts close to each other.
- cordate** - when the base of the leaf is deeply notched; heart shaped.
- cordiform** - 'heart-shaped'; an ovate leaf with a pointed tip and a heart-shaped base.
- coriaceous** - with a thick and firm texture, similar to leather.
- cork** - the outer tissue covering woody stems, formed by the activity of the cork cambium and consisting of dead cells with suberised walls which are impervious to water.
- corm** - a short thick underground stem, which grows vertically, for example, in many Iridaceae.
- corolla** - the inner whorl or inner envelope of sterile appendages in the flower, made up of the free or united petals which are usually colourful.
- corona** - a whorl of appendages between the petals and the stamens, and sometimes united to form a ring or cylinder, usually borne on the petals or corolla-tube, found in some Cucurbitaceae.
- cortex** - the tissue in stems and roots found between the vascular cylinder and the epidermis or cork cambium.
- corymb** - a panicle-like inflorescence in which the branches or flower-stalks start from different places on the stem but all the flowers are borne at about the same level.
- corymbose** - corymb-like.
- costa** - a rib, or the midvein of a simple leaf.

- costate** - having a rib or ribs that are usually projecting above the surface of the structure and parallel with its long axis.
- cotyledon** - the seed leaf, usually the first leaf or leaves produced by the germinating seed; the cotyledons are usually different from the following leaves, and sometimes the cotyledons do not leave the seed.
- crenate** - the margin notched with rounded or broad and blunt teeth or projections.
- crenulate** - margin with small blunt teeth or projections.
- crisp (crisped)** - having the margin excessively and irregularly divided and twisted.
- crispate** - with a curled edge.
- crustaceous** - hard, thin and brittle.
- cryptophyte** - a plant in which the perennating buds are below the soil surface.
- cuscollate** - hooded or hood-shaped (a hood is a covering for a person's head).
- cultivar** - a variety of plant that has been developed under cultivation and selection by man.
- cuneate** - wedge-shaped or triangular, as when the base of a leaf-blade tapers gradually from being widest at the top and narrowest at the petiole.
- cuneiform** - shaped like a wedge or inverted triangle, and attached at the narrowest point.
- cupule** - a cup-shaped structure surrounding, but not enclosing, another structure.
- cuspidate** - with the tip abruptly narrowed to a point (can be considered intermediate between apiculate and caudate).
- cuticle** - the non-cellular waxy coating of the epidermis of all higher plants.
- cutin** - the waxy material forming the major part of cuticle.
- cyathium** - a flower-like inflorescence characteristic of the genus *Euphorbia*; it is made up of naked, unisexual flowers that are grouped together within fused, perianth-like bracts.
- cyclic** - arranged in cycles or whorls; the opposite of spiralled.
- cymbiform** - shaped like a boat.
- cyme** - an inflorescence in which the central axis is terminated by a flower which opens first, this flower is subtended by two opposite branches each of which ends in a flower, these open next and are likewise subtended by two opposite branches; this branching-pattern may continue.
- cymose** - cyme-like.
- cymose branching** - where the terminal bud becomes a flower or aborts and growth is taken over by one or more lateral buds.
- deca-** - a prefix meaning 'ten'.
- deciduous** - falling off at the end of the growing season; the opposite of evergreen.
- declinate** - bent or curved downward or forward; also used for stamens in sympetalous flowers, such as those of Lamiaceae, which are inserted on the ventral (abaxial) side of the corolla tube and then usually bend up.
- decumbent** - lying on the ground but with the ends growing upwards.
- decurrent** - when the leaf-edges continue down the sides of the petiole and stem.
- decussate** - when each pair of opposite leaves is inserted on the stem at right angles (90°) or perpendicular to pairs of leaves both above and below.
- deflexed** - bent abruptly downward or outward; the opposite of inflexed, and often used as synonymous with reflexed.
- dehiscence (dehiscent)** - the method or process of opening; as in anthers and fruits.
- deliquescent** - to melt away or to break up into many small parts, as in petals that soften and liquify (Commelinaceae), or as in the trunks of many trees which 'break up' into many branches above (many *Acacia* spp.); the opposite of excurrent.
- deltoid** - shaped like an equal-sided triangle.
- dentate** - with a toothed margin, the teeth pointing outwards, not forward; compare serrate.
- denticulate** - with very small teeth perpendicular to the margin.
- dentiform** - toothed.
- depressed** - pressed down or flattened from above.
- derived** - originating from an earlier form or group.
- determinate** - having a definite end-point, as in an inflorescence in which the main axis ends in a flower and cannot continue to grow; the opposite of indeterminate.
- dextrorse** - clockwise, towards the right.
- di-** - a prefix meaning 'two', 'away from' or 'unlike'.
- diandrous** - having two stamens.
- diaspore** - a plant part that breaks away from the parent to develop into a new individual.
- dichasium (pl. dichasia)** - a cymose inflorescence in which the main axis and branches end in flowers that are subtended by two opposite branches (see cyme); an inflorescence which consists of dichasia.
- dichlamydeous** - having two coats or envelopes, as flowers with both calyx (sepals) and corolla (petals).
- dichotomous** - dividing regularly into two parts; as in a dichotomous key where the contrasting choices are always two.
- diclinous** - having the male and female reproductive organs on separate parts of the same plant.
- dicotyledonae** - one of the major subdivisions within the angiosperms, characterized by having two cotyledons within the seed; also called dicotyledons or dicots.
- didymous** - in pairs, two closely united structures, or 2-lobed.
- didynamous** - in two pairs of unequal length; as four stamens with two long and two short ones; common in *Commiphora* (Burseraeae) and Lamiaceae (Labiatae).
- diffuse** - of branching that is open or loosely spreading.
- digitate** - where the parts are attached to the same point, as in a palmately compound leaf.
- dimorphic** - having two forms, as in juvenile and adult foliage in *Eucalyptus* and some introduced species of *Acacia* with true bipinnate leaves on seedlings and phyllodes on older plants.
- dioecious (dioecious)** - plants with unisexual flowers in which the male and female flowers are not found on the same plant, as if the plants are either male or female, but not both.
- diplostemonous** - having the stamens in two whorls (and usually twice as many as the petals) with the outer whorl

- alternating with the petals and the inner whorl opposite the petals; the opposite of obdiplostemonous.
- disc (disk)** - an enlargement of the receptacle beneath or around the pistil or within the corolla or stamens, usually in the form of a ring or cushion, or of separate gland-like parts; the term disc is also used for the broad receptacle on which the flowers are borne in the capitate or head-like inflorescence of the Asteraceae (Compositae).
- disk** - see disc.
- dissected** - divided into many slender parts.
- disseminule** - a plant part that breaks away from the parent to develop into a new individual; synonymous with diaspore.
- distal** - the part or end furthest away from the base or point of attachment; the opposite of proximal.
- distichous** - arranged in two opposing rows along the opposite sides of the stem; neither decussate nor spiral.
- distinct** - free and separate from other parts.
- diurnal** - active during the day, as in flowers that open during the day and close during the night; the opposite of nocturnal.
- divaricate** - spreading apart widely and in different directions.
- divergent** - spreading apart but not as widely as in divaricate.
- divided** - separated almost to the base.
- dormant** - a structure or organ which is not active.
- dormant bud** - an inactive bud. Plants produce many more buds than can develop at any one time. If something happens to remove the active shoots from a plant, dormant buds are stimulated to start growing and this is how a tree will sprout from the trunk when all the branches are removed, for example *Eucalyptus*.
- domatia** - small tufts of hair, a cavity or pocket formed by a plant which is usually inhabited by insects, particularly ants, or mites.
- dorsal** - the back or side away from the stem or central axis, the abaxial side; the opposite of ventral and adaxial. (Note that in Lawrence's *An Introduction to Plant Taxonomy*, 1955, the dorsal side is called adaxial; the use of the terms abaxial and adaxial are incorrect in that book).
- dorsifixed** - attached to the back or dorsal side.
- dorsiventral** - having distinct upper and lower sides.
- double-serrate** - a margin with large serrations bearing smaller serrations.
- downy** - with fine soft hairs.
- drupaceous** - like a drupe but not with the morphology of a true drupe.
- drupe** - a fruit with a fleshy exterior and with the seed or seeds enclosed in a hard covering formed by the inner part (the endocarp) of the ovary wall, which forms a hard 'stone' around the seed.
- drupelet** - a small drupe; in the genus *Rubus* (Rosaceae) each flower produces an aggregation of many drupelets.
- duct** - a tube or canal through the tissue of the plant; as an oil duct or a lactiferous duct in Euphorbiaceae.
- dwarf-shoot** - a small lateral stem with short internodes, often bearing leaves and/or reproductive structures; characteristic of *Phyllanthus* in Euphorbiaceae.
- e- or ex-** - a prefix indicating the lack or absence of something (see examples below).
- ebracteate** - without bracts.
- echinate** - covered with short spines or prickles.
- efoliate** - without leaves.
- elaiosome** - an outgrowth from a seed containing oil or fat and which is often attractive to ants and aids in the dispersal of the seed.
- ellipsoid** - an elliptical three-dimensional structure or body.
- elliptic** - having the shape of an ellipse, broadest at the middle; a rounded two dimensional figure that is symmetrical but has a long and a short axis, as an elliptical leaf.
- emarginate** - with a notch at the apex, without a tip or entire margin at the end; as a leaf with an emarginate apex.
- enation** - an outgrowth on the surface, often only one cell thick.
- endemic** - native and often used in the sense of being confined to a particular geographic region; not native to other areas.
- endocarp** - the innermost layer of the ovary wall in a fruit which may be hard or leathery as in a drupe or pyrene, or fleshy as in Cucurbitaceae.
- endogenous** - developing or originating from the inside; typical of development of a root.
- endosperm** - the food material formed by the female gametophyte that initially surrounds the embryo and is often also found in the seed.
- entire** - with an even and continuous margin without lobes, teeth, etc.
- envelopes** - the floral envelopes enclosing the stamens and ovary, the sepals and petals.
- ephemeral** - short-living, as flowers that open and wilt within the same day; a plant with a very short life cycle which is completed in a few weeks, typical of many weeds.
- epi-** - a prefix meaning on, upon or attached to the organ indicated by the term; as epipetalous = upon the petal.
- epicalyx** - a whorl of bracts borne on the pedicel of the flower immediately below the sepals and similar to the sepals or calyx, for example, always found in *Hibiscus*.
- epidermis** - the primary (first) outer layer of cells of all plant organs.
- epigynous** - borne upon or above the inferior ovary (not perigynous); the perianth or stamens may be epigynous but this term is not used for the ovary itself.
- epipetalous** - borne on the petals or corolla.
- epiphyte** - a plant which grows on other plants for support but is not a parasite and does not have its roots in the ground (compare 'climbing', 'liana', and 'parasite').
- erect** - a plant which is quite upright, growing straight upwards.
- ericoid** - with an appearance similar to that of *Erica arborea*; a plant with many branches held erect and close together and covered with adpressed scale-like leaves.
- erose** - with a jagged margin that is too irregular to be called dentate or serrate.
- estipulate** - without stipules.
- even-pinnate** - a pinnate leaf with an even number (2, 4, 6, 8, etc.) of leaflets; lacking a single terminal leaflet; the

- same as *paripinnate* and the opposite of *imparipinnate* or *odd-pinnate*.
- evergreen** - retaining green leaves through the dormant or dry season, as in most true rain forest trees.
- ex-** - a prefix indicating the lack or absence of something; also used to indicate the outer portion of a structure or the outside.
- excurrent** - going out beyond the margin of an organ (as a vein going beyond the margin of a leaf).
- exfoliate** - to peel off in thin flakes or plates, as the bark in many species of *Eucalyptus*.
- exocarp** - the outer layer of the fruit, the outer part of the pericarp, the soft fleshy part of a drupe.
- exogenous** - developing or coming from the outside.
- exserted** - projecting outside or beyond the edge, as stamens projecting beyond the corolla-tube; the opposite of *included*.
- extipulate** - without stipules.
- extant** - living; as opposed to *extinct*.
- extra-axillary** - arising beyond or outside the leaf-axil.
- extra-floral** - arising outside the flower.
- extrorse** - facing the outside; of an anther which opens away from the central axil of the flower.
- eye** - used to describe the bud in a tuber, as in the potato.
- facultative** - having the ability to live under more than one specific set of conditions, as a plant that can be either parasitic or non-parasitic.
- falcate** - curved like a scythe or sickle.
- family** - a unit of classification above the level of genus and subfamily; the main unit used for writing and arranging this Flora. A family name always ends in *aceae*.
- farinose** - covered with a usually whitish meal-like powder.
- fascicle** - a close cluster of structures arising from about the same point but lacking a distinctive arrangement of parts.
- fasciclude** - a cluster or condensation of sterile stamens (staminodes).
- fasciculate** - borne in fascicles.
- faucal** - concerning the throat, as the throat or opening of a corolla-tube; faucal appendages are appendages arising from the upper part of the corolla-tube or perianth-tube.
- female flower** - producing the larger stationary gametes and the seeds; used as synonymous with *pistillate*.
- ferruginous** - rust-coloured, brownish red.
- fertile** - having the ability to produce gametes or seeds; fertile anthers produce pollen; fertile pistils produce ovules and, if pollinated, seeds; the opposite of *sterile*.
- fetid (foetid)** - with a bad or disagreeable odour, as in flowers that attract flies.
- few** - in botany used for parts that can be counted and are usually between two and five, occasionally between two and ten; the opposite, many is usually more than 10, or a larger, indefinite number.
- filament** - a thread or thread-like structure; the slender stalk that supports the anther.
- filamentous** - made up of many thread-like structures.
- filiform** - slender and thread-like.
- fimbriate** - with a fringe or series of slender structures along the margin.
- flabellate** - fan-shaped or broadly wedge-shaped.
- flaccid** - soft or weak, limp, wilted; the opposite of *firm* or *stiff*.
- flexuose** - having a wavy form, bent alternatively in opposite directions.
- floccose** - covered with soft wool-like hairs that often rub off.
- flower** - the reproductive organs in the angiosperms.
- foliaceous** - like a leaf.
- follicle** - a fruit developed from a single carpel (a simple pistil), dry and breaking open along one line, usually opening along the inner (adaxial or ventral) suture to which the seeds are attached.
- foveolate** - marked with small pits or depressions on the surface.
- free** - not united with or adherent to any other structure.
- free basal placentation** - a type of placentation where the ovules are attached to a central column arising from the base of the locule within the ovary, but not reaching the top.
- free central placentation** - a type of placentation where the ovules are attached to a central column in the centre of the single locule, the column extends from the base of the locule to the apex; compare with the above.
- free venation** - the veins do not unite to form a network; compare with *net venation* (*reticulate venation*).
- fruit** - a true fruit is the product of a ripened ovary and its adnate parts; the seed containing structure.
- frutescent** - having the characteristics of a small shrub.
- fruticose** - having the characteristics of a shrub, being woody.
- fugaceous** - falling off early, deteriorating rapidly.
- fulvous** - tawny or dark yellow or yellowish-brown in colour.
- funicle** - the stalk of the ovule which attaches it to the placenta.
- funnelform** - funnel-shaped, gradually widening, as the corolla in many *Convolvulaceae*.
- furcate** - forked or divided into branches.
- furrowed** - with channels or grooves parallel with the long-axis.
- fuscous** - grey-brown or dark greyish-brown.
- fusiform** - spindle-shaped, thick in the middle and narrowing at both ends.
- fusion** - when two or more organs grow together.
- galea** - a helmet or helmet-like structure, as in the upper part of some corollas.
- galeate** - with a helmet-like form or hooded.
- gamopetalous** - when the petals are united partly or completely.
- gamophyllous** - when the perianth parts are united partly or completely.
- gamosepalous** - when the sepals are united partly or completely.
- geniculate** - bent like a knee.
- geophilous** - occurring on or from the ground.
- geotropism** - a growth movement in a plant in response to gravity, for example the pods of groundnuts.
- gibbous** - with a pouch or inflated on one side.
- glabrate** - nearly without hairs; *glabrous*.
- glabrescent** - becoming glabrous; nearly hairless.
- glabrous** - without hairs, a surface devoid of hairs.
- gland** - a structure that secretes, usually found on the surface or within the surface of an organ (leaf, flower, etc.), often

- borne on a short stalk (as a glandular hair); also used for a fleshy gland-like body or structure.
- glandular** - bearing or containing glands.
- glanduliferous** - bearing glands.
- glaucous** - slightly bluish-green, or covered with a thin layer of wax.
- glaucous** - covered with a very thin, often waxy, whitish substance; pale bluish-green in colour.
- globose** - a spherical structure.
- glochid** - a very small spine or bristle barbed at the tip.
- glochidiate** - with glochids, with barbed bristles or hooked hairs, as found on *Opuntia* (Cactaceae).
- glomerate** - in a compact cluster or group of clusters.
- glomerule** - a small and compact cluster.
- glutinous** - covered with a sticky or glue-like substance.
- gregarious** - growing in colonies containing many individual plants.
- gynandrous** - with the stamens united with and borne on the pistil.
- gynobasic** - arising from a deep depression in the centre of the ovary, between the ovary lobes, or from the lower part of a single pistil; as the gynobasic style of Lamiaceae (Labiatae) and Geraniaceae.
- gynodioecious** - used for a species with 2 sex forms; plants with only female flowers and others with only bisexual flowers.
- gynoecium** - the female part of the flower.
- gynomonoecious** - used for a species which has both female and bisexual flowers on the same plant, no male flowers are present.
- gynophore** - a stalk bearing the pistil.
- habit** - the overall appearance of a plant.
- habitat** - the environment or plant-community in which the plant occurs.
- half-inferior ovary** - an ovary that is in part united with and in part free from the calyx and corolla.
- halophyte** - a plant growing in and tolerating high concentrations of salt in the soil or in the air.
- hapaxanthic** - used for herbs which only flower once and then die; see also monocarpic.
- hardy** - a plant which can survive adverse conditions such as cold or drought.
- hastate** - when the base of a leaf has two more or less triangular lobes that diverge away from the midvein.
- haustorium** - the modified root (in Angiosperms) or mycelium (in fungi) with which a parasite enters the tissue of the host; the plural of haustorium is haustoria.
- head** - an inflorescence of closely packed flowers that is more or less round or disc-shaped.
- helicoid cyme** - a type of cyme in which the flowers are developed along only one side and which normally curls at the tip; the same as cincinnus.
- hemi-** - a prefix meaning 'half' or 'partly'.
- hemicyptophyte** - a plant whose perennating buds occur at or very close to the soil surface.
- herb** - a plant with no persisting stem above ground; if a stem is formed it lives for only one growing season or one year, without forming woody parts.
- herbaceous** - like a herb; with a stem that dies back to the ground each year.
- hermaphrodite** - with stamens and pistil in the same flower; the same as bisexual.
- hetero-** - a prefix meaning 'of two or more kinds'.
- heterogamous** - when an inflorescence bears more than one kind of flower, e.g. bisexual and male, as in many Asteraceae (Compositae) or male and female as in *Begonia* (Begoniaceae).
- heterophyllous** - having more than one leaf form.
- heterostyly** - when the styles and stamens vary in relation to each other by length or position within the flowers of the same plant or plants of the same species.
- hexa-** - a prefix meaning six.
- hilum** - a scar left on the seed where it was attached to the funicle or placenta; the place where this scar is formed.
- hirsute** - with rather coarse stiff hairs.
- hirsutulous** - with slightly stiff hairs or a few stiff hairs.
- hispid** - with a covering of stiff erect hairs.
- hispidulous** - with a covering of small stiff erect hairs.
- homogamous** - when all the flowers of an inflorescence are of the same kind.
- homologous** - of the same origin; as bracts being homologous with leaves.
- honey guide** - markings, usually on the corolla, which show a visiting bird or insect where to find nectar in a plant.
- host** - the organism from which a parasite obtains its food.
- husk** - an outer, usually loose, covering of a fruit.
- hyaline** - very thin and almost transparent.
- hybrid** - produced by crossing two different species, subspecies or varieties of plants.
- hydrophyte** - a plant that grows in very wet places and requires a large amount of water for its growth.
- hygroscopic** - responds to changes in atmospheric humidity by absorbing and/or losing water.
- hypanthium** - the often cup-like part of the flower between the sepal-lobes and the base of the ovary, produced by the union of the base of the sepals, petals, and filaments; often used interchangeably with calyx-tube or floral-tube as in Cucurbitaceae.
- hypercrateriform** - salver-shaped; with a narrow tube opening suddenly into a wide cup-shaped mouth.
- hypo-** - a prefix meaning 'beneath' or 'less than'.
- hypogynous** - attached below the level of the gynoecium or ovary, as sepals, petals, or stamens attached near the base of the ovary or below the base of the superior ovary.
- imbricate** - overlapping like the tiles of a roof; in a flower-bud when the petals or the sepals overlap with usually two petals (or sepals) with both edges outside the other petals (or sepals), one with one edge outside, the other within, and one with both edges covered.
- immersed** - completely submerged or surrounded.
- imparipinnate** - odd-pinnate with 1, 3, 5, etc. leaflets; pinnate with a single leaflet at the end of the rachis.
- imperfect flower** - a flower lacking either male or female parts; a unisexual flower.
- incised** - with the margin deeply cut.
- included** - not projecting beyond the rim, as stamens not projecting beyond the rim of the corolla tube; the opposite of exserted.
- incompatibility** - the inability of gametes to fuse and form a zygote, or pollen to germinate on a stigma.

- incomplete flower** - a flower lacking one of the perianth whorls.
- incumbent** - leaning or resting on another structure.
- incurved** - curving inward or bent inward.
- indefinite** - numerous or many, as an indefinite number of stamens; in botany usually more than 10 or 20.
- indehiscent** - remaining closed and not opening when ripe or mature.
- indeterminate inflorescence** - one that can continue growing along the main axis and is not terminated by a flower, for example a raceme.
- indigenous** - native to a region, not introduced.
- indumentum** - any covering on a surface but usually restricted to a covering of hair-like structures.
- induplicate** - with the edges bent inwards but not overlapping; the outer surface may then be connivent with other parts.
- inferior ovary** - an ovary that is below the attachment of the sepals, petals, stamens, and, if present, calyx-tube or hypanthium. Compare with a superior ovary and note that the sepal-lobes and stamens may be borne above the ovary in a superior ovary if a calyx-tube, receptacle-tube, or hypanthium is present.
- inflexed** - bent inward, turned abruptly inward, as in the stamens of many species in Urticaceae.
- inflorescence** - the flowering portion of a plant; also used for the arrangement of flowers on the flowering axis.
- infra-** - a prefix meaning 'below'.
- infructescence** - the fruiting portion of a plant; also used for a collection of fruits attached to a common axis.
- infundibuliform** - funnel- or cone-shaped.
- inserted** - borne or growing out from.
- inter-** - a prefix meaning 'between'; compare with intra-.
- internode** - the part of the stem between two adjacent nodes.
- interpetiolar** - between the petioles, as an interpetiolar stipule that extends from the base of one petiole across the stem to the base of the petiole of the opposite leaf, as in most species of the Rubiaceae.
- intra-** - a prefix meaning 'within'; compare with inter-.
- introduced plant** - a plant that has been brought in from another region and is not native to the region under discussion.
- introrse** - turned inward towards the central axis of an organ; of anthers that open towards the centre of the flower; the opposite of extrorse.
- intruding** - to thrust inward or extend inward, as a placenta that extends into the locule.
- involucel** - a whorl of bracteoles.
- involucral bract** - a bract forming part of an involucre; see also phyllary.
- involucre** - a number of bracts that surround the base of an umbel or the base of a flower-head.
- involute** - with the edges rolled inwards, the lower surface outwards.
- irregular flowers** - usually used to denote bilaterally symmetrical flowers (flowers that can be divided into two equal halves along only one plane), in this sense it is synonymous with zygomorphic; sometimes used to denote that the flower is asymmetrical or without a plane of symmetry; compare with regular/actinomorphic.
- iso-** - prefix meaning 'equal' or 'like'.
- isomerous** - with the same numbers, as in flowers with the same number of sepals, petals, and stamens.
- isomorphic** - of similar form.
- jointed** - with joints or nodes or articulations where parts separate.
- jointed stem** - one that can be broken easily at the nodes, such as in Viscaceae.
- jugate** - joined or united together, as the leaflets of a compound leaf.
- juvenile** - the youthful or early stages of growth.
- keel** - a projecting ridge running the length of the organ on the outer or under surface; like the keel or bottom of a boat (= carinate).
- keeled** - with a longitudinal ridge running along the under surface of a flat or convex structure.
- keel-petal** - the loosely united lower or abaxial petals of the pea flowers and related plants (= carina).
- key** - in plant identification a text with a series of alternate choices; making the correct choice leads, eventually, to the name of the family, genus and species of the plant which is being keyed.
- labellum** - a lip-like petal; the usually lower or abaxial petal of the flowers of the Orchidaceae.
- lacerate** - with the margin deeply or irregularly cut.
- laciniate** - with the margin cut into many slender lobes or segments.
- lactiferous** - containing milk-like substances; see laticiferous, as in many species of the Euphorbiaceae.
- lacuna (pl. lacunae)** - an air chamber, open space, or gap.
- lacustrine** - growing in or associated with lakes or ponds.
- laevigate** - smooth, as if polished.
- lamella** - a flat plate; a thin partition or septum.
- lamina** - the flat and thin broad part of a leaf, a sepal, or a petal.
- laminated** - broad, flat, and thin like the blade of a leaf.
- lanate** - covered with long soft white wool-like hairs; woolly.
- lanceolate** - with the shape of the end of a lance or spear, tapering to both ends from a broader middle, as in a lanceolate leaf; usually used to indicate a shape which is widest below the middle, but occasionally also at the middle.
- lateral** - on the side or along the margin.
- latex** - a liquid substance that is often white and sometimes contains rubber, or is fragrant, found in special, often much elongated, cells or ducts called laticifers.
- laticiferous** - having latex or latex-like fluid.
- lax** - loose and not crowded together, distant.
- leaf** - an organ originating from and attached to a stem, usually with a short stalk attached to a flat blade, the most usual site for photosynthesis.
- leaflet** - a leaf-like part, or one of the individual blades, of a compound leaf.
- lenticel** - a channel filled with loosely packed cork cells allowing the diffusion of gases into and out of stems and sometimes also roots; seen as small areas on the young bark often with a colour different from the surrounding bark.
- lenticular** - lens-shaped, with two convex sides.
- lepidote** - with broad and flat hairs or scales.



- liana (liane)** - a woody climbing plant.
- ligneous** - woody.
- lignotuber** - a swollen mass of woody tissue formed at the base of a trunk, e.g. *Eucalyptus*.
- ligulate** - with the shape of a tongue or strap; flowers of the Compositae that have a strap-shaped corolla.
- limb** - the upper, usually broad, part of a sepal or petal.
- linear** - long and narrow with parallel edges.
- lip** - the large lobes of a 2-lipped corolla, or the large, usually abaxial, petal of the Orchidaceae.
- lithophyte** - a plant living on stone.
- littoral** - found on the shore of a lake, sea, or ocean.
- lobate** - divided into lobes.
- lobe** - a rounded area along the margin bounded by two indentations or sinuses.
- lobulate** - having small lobes.
- locular** - divided into chambers or compartments; i.e. 3-locular means having three chambers.
- locule (loculus)** - a chamber or compartment, mostly of an ovary or fruit.
- loculicidal** - opening into the locule.
- loment** - a fruit formed by a simple pistil in which each seed is part of a separate segment that breaks apart from the adjacent segment at maturity.
- longistylous** - applied to flowers which have long styles where there are also flowers in the same population/species which have short styles; one of the conditions in heterostyly.
- long shoot** - shoot with long internodes and relatively rapid annual growth as compared with dwarf or short shoots as in *Phyllanthus*.
- lyrate** - with pinnate lobes in which the terminal lobe or lobes are the largest.
- lysigenous** - a space formed by the breakdown of a cell or cells; as compared with schizogenous.
- macro-** a prefix meaning 'large'; see also mega-.
- male (male flower)** - producing small or mobile gametes or pollen; often used in place of staminate.
- mangrove formation** - a grove of usually small trees with intertwining roots often with pneumatophores, that grow on mud flats within the tidal zone along tropical sea shores.
- many** - as used in the description of flowering plants usually more than 15.
- marcescent** - wilting or withering but not falling off.
- marginal placentation** - with the ovules placed along the margin of the carpels.
- marine** - of the sea or ocean, able to live in salt water.
- mega-** a prefix meaning 'large'.
- membranous (membranaceous)** - of a thin texture and translucent.
- mericarp** - a part of a dry fruit which splits off and is spread individually, as in many species of Malvaceae.
- meristem** - a tissue of cells that can divide and produce new structures as well as producing cells capable of further division; an embryonic tissue present in all growing parts in plants.
- mesocarp** - the middle layer when three layers are present in the wall (or pericarp) of a fruit, often fleshy.
- mesophyll** - the parenchymatous tissue in leaves lying between the upper and lower epidermis.
- mesophyte** - a plant that requires an average amount of moisture to grow; compare with hydrophyte and xerophyte.
- mesostylous** - a flower with intermediate style length; used for species/populations where flowers are heterostylous with 3 different style lengths.
- micro-** a prefix meaning 'small' or 'very small'.
- midrib** - the principal or central vein or rib of a leaf or other organ.
- monadelphous** - with the filaments of the stamens united to form a single group or bundle, as in the Malvaceae.
- moniliform** - like a string of beads; see also torulose.
- mono-** a prefix meaning 'one'.
- monochasium** - a one-sided cyme; i.e. where only one branch develops from under each successive terminal flower.
- monocarpic** - dying after the production of flowers and fruit, synonymous with hapaxanthic such as *Ensete*.
- monochlamydeous** - with a perianth of only one whorl, having only one coat or envelope.
- monoclinous** - having separate male and female flowers on the same plant.
- monocotyledonae** - one of the two major subdivisions of the angiosperms, characterized by the presence of one embryonic leaf (cotyledon) within the seed; also called monocotyledons or monocots or Liliopsida; see also dicotyledonae.
- monoecious** - when the male and female flowers are borne on the same plant; the flowers are unisexual but the plant is bisexual.
- monogeneric** - when a family consists of only one genus, for example Bixaceae (Vol. 2, part 1).
- monophyletic** - evolving from a single ancestral stock.
- monopodial branching** - where the main axis remains dominant so that all secondary shoots are clearly lateral.
- monotypic** - a family or genus with a single species, as the Barbeyaceae, with the single genus *Barbeya*, and the single species *B. oleoides*.
- morphology** - the study of the form and related anatomy of living organisms.
- mucronate** - with the broad tip suddenly narrowed to a short stiff point which is a continuation of the midrib.
- multilocellate** - with many small compartments or chambers.
- multiple fruit** - a fruit formed by the union of the female parts of several to many different flowers, as in *Morus* (Moraceae); compare with aggregate fruit.
- multiseriate** - in many rows.
- muricate** - with a rough surface covered with short hard projections or tubercles.
- muticous** - blunt and without a point.
- myrmecophily** - the association between certain plants and ants.
- naked bud** - a bud without a covering of bud scales.
- naked flower** - a flower without a perianth, an achlamydeous flower.
- napiform** - underground stem shaped like a carrot or beetroot.
- naturalized** - introduced from a foreign area and now established and growing successfully in the new area.
- navicular** - shaped like a boat.

- nectar** - a sugary liquid produced by flowers or other plant parts, the liquid on which insects and birds that visit the flower feed.
- nectariferous** - producing nectar.
- nectary** - a glandular structure which secretes a sugary liquid, the nectar, either associated with a flower (floral nectary) or elsewhere on the plant, as in *Passifloraceae* (extrafloral nectary).
- needle** - a slender, pointed structure, used to describe certain types of leaf.
- nerve** - in plants the word nerve is often used in place of vein or vascular bundle; sometimes used only for the more conspicuous vein or ribs of a leaf, a sepal, or a petal.
- nervose** - with prominent nerves, ribs, or veins.
- net-veined** - when the smaller veins are interconnected to form a net-like (reticulate) pattern.
- net-venation** - closed venation in which the veins branch and join.
- neutral flower** - a flower without sexual parts, without functioning stamens or pistils.
- nocturnal** - active at night, as in flowers that open at night; the opposite of diurnal.
- node** - the place on a stem where a leaf or bud is formed; a thickened area on a stem-like organ where other parts are attached or where the organ will later break in two.
- nodule** - a small node or thickening; especially used in roots with thickened swellings in which nitrogen-fixing bacteria live.
- nude flower** - a flower without a perianth, naked or achlamydeous.
- numerous** - used for parts of a flower which are 15 or more in number; see also indefinite.
- nut** - a fruit with a hard outer covering that does not split open when ripe, mostly comparatively large and with one or two seeds; see also nutlet and achene.
- nutlet** - a small nut.
- ob-** - a prefix meaning 'opposite', 'inverse', or 'against'.
- obcordate** - with a broad 2-lobed apex and a narrowed base, as the leaflets in species of *Oxalis*.
- obdiplostemonous** - having two whorls of stamens (usually twice as many as the petals) with the outer stamens opposite the petals.
- oblanceolate** - with the shape of the end of a lance or spear but with the narrow end towards the base; the inverse of lanceolate.
- oblate** - broadly elliptic with the long dimension perpendicular to the axis of the organ.
- obligate** - no choice; generally used for organisms which can only exist as parasites.
- oblique** - a leaf-base in which the two sides are unequal, as in *Begonia*.
- oblong** - a plane shape longer than broad with nearly parallel sides, almost rectangular in outline but with rounded ends and with the length two or three times the width.
- obovate** - a plane shape with an egg-shaped outline but with the broadest part near the apex and the narrow side near the base.
- obovoid** - egg-shaped but with the broadest part near the apex and the narrow part near the base; the solid or 3-dimensional form of obovate.
- obpyriform** - shape like a water pot.
- obtuse** - with a blunt or rounded end or the margins of the tip forming an angle of more than 50°; compare acute.
- ocrea (ochrea)** - a stipular growth that sheaths the stem near the leaf-base, as in *Polygonaceae*.
- octa-** - a prefix meaning 'eight'.
- odd-pinnate** - a pinnate leaf with an odd number (3, 5, 7, etc.) of leaflets, with a single terminal leaflet; the same as imparipinnate; compare with even-pinnate and paripinnate.
- oligo-** - a prefix meaning 'few-'.
- opaque** - something that does not allow light to pass through, a surface that is dull and not lustrous or shiny.
- operculate** - opening by a lid or cover; covered with a cap.
- operculum** - a lid, cap or covering that comes off as a single unit.
- opposite** - a term used for two leaves or two branches that arise from the same node on the opposite sides of the stem; a term also used for organs that arise opposite each other or when one arises at the base of another, as stamens opposite a petal or sepal.
- orbicular** - a flat structure with an almost circular outline.
- organism** - any individual living thing.
- ortho-** - a prefix meaning 'straight', 'upright', or 'true' or 'correct'.
- ostiole** - an opening or pore.
- oval** - broadly elliptic or having an egg-shaped outline, usually widest at the middle.
- ovary** - that part of the pistil which contains the ovules within one or more locules and which will produce the fruit if pollination (and fertilization) takes place; all angiosperms have ovaries.
- ovate** - a flat structure which is egg-shaped in outline with the broadest part near the base and the narrow part near the apex; the opposite of obovate; compare elliptic and oblong.
- ovoid** - egg-shaped with the broadest part near the base and the narrow part near the apex; the solid or 3-dimensional form of ovate.
- ovule** - an organ which contains the embryo sac and the egg cell within the locule of the ovary (in angiosperms) or borne on fertile scales (in gymnosperms); after fertilization develops into a seed.
- palmate** - with three or more parts attached to a single point and radiating outward, as the fingers of an open hand radiating outwards from the palm of the hand; as in palmate venation, or in palmately compound leaves.
- palmatifid** - with palmately arranged lobes, the leaf being divided more than halfway to the single point from which the nerves radiate.
- palmatilobed** - with palmately arranged lobes, the leaf being divided halfway or less to the single point from which the nerves radiate; compare with palmatifid.
- palmatipartite** - palmately divided almost to the centre or midrib.
- palmatisect** - palmately divided to the centre or midrib.
- pandurate** - a rounded plane figure with a slender portion near the centre and with two broad ends one of which is broader than the other, the shape of a body of a violin.
- panicle** - an inflorescence with an indeterminate axis (that continues to grow and does not end in a flower) and many

- side branches each of which bears two or more flowers. This term is often used for a branched inflorescence which is difficult to classify into any of the other more precise types such as raceme, cyme, etc.
- papilionaceous** - flowers that resemble the flower type of the subfamily Papilionoideae of the Fabaceae (Leguminosae).
- papillate** - covered with many minute rounded gland-like structures or papillae; compare with muriccate.
- parallel venation** - generally used for veins that are parallel with each other and with the margin of the leaf; sometimes used for secondary veins that are parallel with each other but not with the midrib or the margin, as in *Musa* and *Ensete*.
- parasite** - a plant (or animal) that lives upon another plant (or animal) and takes nourishment from it; compare epiphyte.
- parietal placentation** - when the ovules are attached to the inner surface of the peripheral or outside wall of the ovary, or the outer wall of the locule.
- paripinnate** - a pinnate leaf with an even number (2, 4, 6, 8, etc.) of leaflets and without a single leaflet at the end; the same as even-pinnate; compare with imparipinnate, odd-pinnate.
- parted** - divided almost to the base or to the midvein.
- parthenogenesis** - the development of a female gamete into a new individual without fertilization.
- partite** - the same as parted; also used as a suffix showing the number of parts in a structure, for example tripartite (3 parts).
- patent** - spreading or open.
- peat** - a deposit of incompletely decomposed plant material with little or no soil, dark brown or black with a high carbon content; in Europe, mostly made up of the moss *Sphagnum*.
- pectinate** - divided to form many parallel parts like the teeth of a comb.
- pedate** - used for leaves which are palmately divided, with each division two-cleft, as in some Passifloraceae.
- pedicel** - the stalk of a single flower within an inflorescence or group of flowers (also used for the stalk of a solitary flower).
- peduncle** - the stalk that bears an inflorescence consisting of two or more flowers; the flowers may themselves each have a stalk (the pedicel) or be without a stalk.
- pellucid** - clear and translucent, bright when viewed against the light.
- peltate** - with the stalk attached near the centre of a more or less rounded shape and not at the edge, as in a peltate leaf.
- pendulous** - hanging down or drooping.
- penicillate** - with a tuft of hairs, often shaped into a point like a pencil.
- penninerved** - with pinnate nervation.
- penta-** - a prefix meaning 'five'.
- pentamerous** - with five parts, or with sets of five parts, sometimes with multiples of five (5, 10, 15, etc.).
- pepo** - a fleshy fruit with hard outer rind and without septa or separate chambers within, as in the Cucurbitaceae.
- perennating** - surviving from one growing season to the next; a structure or organ which enables a plant to survive a non-growing season.
- perennial** - living for three or more growing seasons.
- perfect flower** - a bisexual flower with stamens and pistil functional.
- perfoliate** - when the leaf-base grows around the stem and the stem appears to have grown through the leaf.
- peri-** - a prefix meaning 'around'.
- perianth** - the outer sterile whorls or envelopes of a flower, made up of identical perianth segments, or by two different kinds of perianth segments; sepals (calyx) or petals (corolla).
- pericarp** - the wall of the ripened ovary or fruit (between the locules and the outer surface); it may be of one or as many as three layers (see exocarp, mesocarp, and endocarp).
- perigynous** - arising from a cup-like or tubular structure around the ovary, surrounding the ovary but not at its base nor united to it.
- periphery** - along the margin or on the outer wall.
- persistent** - remaining attached to the plant and not falling off.
- perulate** - with a covering of protective scales, as in many buds.
- petal** - a flat and usually broad part of the inner whorl of sterile appendages in the flower that together are called the corolla, different from the outer whorl (sepals) and often brightly coloured.
- petaloid** - like a petal in colour and form; used for bracts (as in *Bougainvillea*), sepals and stamens.
- petiole** - the stalk of a leaf on which the blade is borne.
- petiolule** - the stalk of a leaflet.
- phanerophyte** - a plant with the perennating organs borne high above ground level.
- phenotype** - the visible, or chemical, or biologically detectable, manifestation of the genotype produced as a consequence of growth and development.
- phloem** - the part of the vascular system made up of living cells that function primarily in the conduction of food, the inner bark.
- photosynthesis** - the process through which green plants make sugar from carbon dioxide and water using sunlight energy captured by the green pigment chlorophyll.
- phototaxis** - the movement of a whole organism in response to light.
- phototropism** - a change in growth direction in response to light.
- phyllary** - a bract-like part of the involucre which subtends the flower-heads in the Compositae and some other families.
- phyllode** - a flattened leaf-stalk (petiole) or leaf-rachis with the form and function of a leaf, as in some of the species of *Acacia* introduced from Australia; compare with cladode.
- phyllotaxy** - the arrangement of leaves on the stem.
- phylogeny** - the evolutionary history of an organism or group of organisms.
- pilose** - with a loose covering of soft long simple hairs.
- pinna** - the primary division of a pinnate leaf which can be a leaflet in simple pinnate leaves, or can be divided again into pinnules in a bipinnate leaf.
- pinnate** - when a compound leaf has its leaflets borne along an extension (the rachis) of the leaf-stalk (petiole) or

- when the leaflets are borne on divisions or branches of the rachis; leaves can be bipinnate, tripinnate, etc.; compare palmate.
- pinnatifid** - with the margin divided more than halfway to the midvein or centre and forming pinnate lobes.
- pinnatilobed** - with the margin divided to about half the distance to the midvein or centre and forming pinnate lobes.
- pinnatipartite** - with the leaf divided almost to the midvein or centre and forming pinnate lobes.
- pinnatisect** - with the leaf divided to the midvein or centre and forming pinnate lobes.
- pinnule** - the second or third branching of a compound pinnate leaf; the branches or divisions that arise from the primary rachis of a pinnate leaf; compare pinna.
- pistil** - the individual female structure that contains the ovule and will produce the seeds. It is made up of one or several carpels and is usually divided into the following parts: ovary, style, and stigma. A flower may have one pistil or many pistils.
- pistillate** - often used for flowers with female parts but no male parts and, therefore, unisexual; a female flower.
- pistillode** - a reduced non-functioning pistil that does not produce seeds; often present in functionally male flowers.
- pith** - the soft spongy tissue found in the centre of many stems.
- placenta** - the part of the ovary on which the ovules are attached.
- placentation** - the arrangement of the ovules in the ovary.
- pleomorphism** - having more than one form or shape.
- plicate** - folded, with the edges folded together like a fan.
- plumose** - with tufted or feather-like hairs or feather-like bristles.
- pneumatophores** - air passages; more often used for the vertical wooden projections from the roots of some trees growing in very wet situations, as in swamps or mangrove formations. These woody projections rise above the water level and are believed to function in bringing air to the roots.
- pod** - a dry fruit that opens when ripe; often used as synonymous with legume.
- pollen** - the powder-like grains produced in the anthers that will produce the male gametes necessary in fertilization. The pollen will germinate on the stigmatic surface of the style (in angiosperms) or in the micropyle (in gymnosperms) and produces the pollen tube. The pollen tube grows into the ovule and releases the male gametes where they can reach and fuse with the female gametes; the pollen-grain is homologous with a microspore.
- pollen-grain** - see pollen.
- pollen-sac** - the chamber in which the pollen is produced after meiosis has taken place; the theca (pl. *thecae*) of the anther.
- pollination** - the act of taking pollen from the anther and bringing it to the receptive stigmatic part of a style or to an ovule; this can be carried out by different agents.
- poly-** - a prefix meaning 'many-' or 'much-'.
- polyadelphous (polyadelphus)** - with three or more groups of united stamens.
- polyandrous** - with many (more than 15) stamens.
- polycarpic** - bearing fruit many times, as opposed to monocarpic.
- polygamodioecious** - dioecious but with some bisexual flowers or with some flowers of the opposite sex.
- polygamomonoecious** - monoecious but with a few bisexual flowers.
- polygamous** - when a plant or different plants of the same species have both bisexual and unisexual flowers.
- polygynous** - with many pistils.
- polymorphous** - with several or many forms, variable.
- polypetalous** - with petals that are separate and free from each other.
- polyphyletic** - evolved from more than one ancestral group.
- polysepalous** - with sepals that are separate and free from each other.
- pome** - a fleshy fruit with a soft outer covering and seeds borne within stiff central partitions, as in the fruits of *Malus* (apple) and *Casimoroa* (Rutaceae).
- pore** - a small, usually round opening, as in anthers opening by pores in the Ericaceae.
- posterior** - towards the axis, on or nearest the axis (adaxial or ventral); the opposite of anterior.
- precocious** - developing early; used for flowers that develop before the leaves.
- prickle** - a small sharp outgrowth from the bark or surface.
- procumbent** - lying along the ground.
- pro parte (proparte)** - often abbreviated p.p., meaning 'in part only'.
- prophyll** - a much reduced leaf or bract.
- precocious** - developing early; used for flowers that develop before the leaves.
- procumbent** - with stems that lie on the ground.
- proliferous** - with adventitious buds on the leaves or in the flowers that are capable of producing new plants.
- prostrate** - lying flat on the ground.
- protandrous** - when the anthers discharge pollen before the stigma (in the same flower) is receptive; sometimes spelt proterandrous.
- proto-** - a prefix meaning 'first' or 'original'.
- protogynous (proterogynous)** - when the stigma is receptive before the anthers (in the same flower) have discharged their pollen.
- proximal** - nearer to the place of attachment; the opposite of distal.
- pruinose** - covered with a whitish wax or very fine powder.
- pseudo** - prefix meaning 'false'.
- pseudowhorl** - where leaves arise so close together around the stem that they appear to be in a ring.
- puberulous (puberulent)** - covered with very short fine hairs or slightly hairy.
- pubescent** - with a covering of soft hairs.
- pulverulent** - covered with a powder; see also pruinose and glaucous.
- pulvinus (pulvinate)** - an enlargement or swelling, shaped like a cushion or pad, round and flattened, usually found at the base of the leaf or petiole.
- punctate** - marked with dots or glands or very small depressions 1 mm or less in diameter.
- punctiform** - covered in small dots or depressions 1 mm or less in diameter.
- pungent** - ending in a sharp stiff point; with a strong smell or taste.

- pustule (pustulate)** - many small elevations like pimples or blisters.
- pyrene** - a nutlet or kernel; the 'stone' of a drupe or similar fruit.
- pyriform (piriform)** - shaped like a pear (*Pyrus*); a solid shape with a broad apex (away from the point of attachment) narrowing to a wide neck at or below the middle.
- pyrophytic** - a plant able to tolerate fire or needing fire to stimulate flowering.
- pyxis** - a capsular fruit in which the top comes off as a lid.
- quadr- or quadri-** - a prefix meaning 'four'.
- raceme** - an indeterminate inflorescence in which the flowers are borne along a single axis with the uppermost the youngest, each flower with a stalk of about the same length; compare with cyme.
- racemose (racemous)** - arranged like a raceme.
- rachilla (rhachilla)** - a small axis or rachis; the axis of pinnules in compound pinnate leaves. The central axis of the spikelet in the Poaceae (Gramineae) and Cyperaceae.
- rachis (rhachis)** - the axis of a compound leaf or frond; the axis of an inflorescence.
- radial symmetry** - symmetrical about a central axis; when the structure is divided longitudinally along any axis, the two halves are mirror images of each other.
- radiate (radiating)** - spreading outward from a point.
- radical leaves** - leaves that arise so close to the base of the stem that they appear to come from the top of the root.
- random branching** - branches which arise without any relationship to subtending leaves.
- rank** - a vertical row; when 2-ranked leaves are in two vertical rows; a general term to denote a level in the taxonomic hierarchy (variety, subspecies, species, genus, family, etc.).
- raphe** - the part of the stalk of the ovule (funicle) that is united or coherent to the outer wall of the ovule and forms a ridge on the surface of the seeds.
- raphides** - needle-shaped crystals found within cells of plants.
- receptacle** - the axis or the central body of the flower on which the flower parts (sepals, petals, stamens, and pistil) are borne.
- recurved** - curved backwards.
- reduced** - not properly developed or undeveloped.
- reflexed** - bent downwards or backwards; bent abruptly backwards towards the base.
- regular** - (of flowers) radially symmetrical or actinomorphic, a flower that can be divided into two equal halves by two or more vertical sections (some authors consider regular synonymous with symmetrical and include both bilateral and radial symmetry); compare with irregular, asymmetric, and zygomorphic.
- reniform** - kidney-shaped, as the seed of many Fabaceae (Leguminosae), and some leaves.
- repand** - with an uneven or wavy margin, not as uneven as sinuate; compare with undulate.
- repent** - stems that creep along the ground and root at the nodes.
- replum** - a septum within the ovary formed by the placenta; as in the Brassicaceae (Cruciferae) where the replum forms a frame to which the seeds are attached when the two outer valves fall away.
- resin (resinous)** - a solid or semisolid substance produced by plants from special canals or ducts found within the plant, not soluble in water and often sticky and aromatic.
- reticulate** - with many interconnections as in a net; applied to a surface being marked by a network of fine lines or ridges.
- reticulate venation** - see net-venation.
- retorse** - bent abruptly backwards or downwards.
- retuse** - with a rounded tip that has a small notch at the centre.
- revolute** - with the margin or tip rolled or bent backwards towards the centre.
- rhachis** - synonymous with rachis.
- rhipidium** - a cymose inflorescence with branches alternating from one side of the vertical axis to the other; normally flattened in one plane and fan-shaped.
- rhizome** - a root-like stem on or beneath the ground with roots growing downwards and leaves and shoots upwards; differing from a true root in the presence of buds, leaves, or scales; especially robust rhizomes are often called rootstocks.
- rib** - a primary vein or prominently raised vein or nerve.
- riparian** - growing in or at the edge of rivers and streams.
- root** - the underground portion of the plant that never produces leaves and thus lacks nodes and internodes; with a special anatomy.
- root cap** - a cap of tissue over the root apex.
- root hair** - a hair-like outgrowth of an epidermal cell which absorbs water and minerals, found on young actively growing roots.
- rootstock** - a short, vertical, underground stem, bearing roots.
- rosette** - a cluster of parts in a circular form; often used for leaves produced at ground level.
- rostrate** - with a beak or beak-like projection.
- rosulate** - when the leaves are in a circle or in a rosette.
- rotate** - wheel-shaped; a corolla with a very short tube and spreading lobes.
- rotund** - with a shape between orbicular and broadly elliptic.
- rudimentary** - incompletely developed.
- rufous** - rusty or brownish red.
- rugose** - with wrinkles or grooves on the surface.
- runcinate** - a margin in which the lobes or teeth point backwards towards the base.
- runner** - a slender stem running along the ground and rooting at the nodes, see also stolon.
- rupturing** - breaking open irregularly.
- saccate** - bag-shaped or sack-shaped, pouched.
- sack (sac)** - a pouch or bag-like structure.
- sagittate** - arrow shaped; the base has two acute lobes that point backwards to the base of the petiole.
- samara** - a one-seeded nut-like fruit with a wing.
- saponins** - a toxic, soap-like group of compounds which is present in many plants.
- saprophyte** - a plant that obtains its nourishment from dead organic matter and usually does not possess chlorophyll.
- sarcocarp** - a fleshy covering to a fruit.
- sarmentose** - with long slender stolons or whip-like branches.

- scabrid (scabrous)** - rough to touch, usually caused by the presence of very short stiff hairs which point backwards to the line of growth.
- scale** - any small flat and thin structure like a flattened hair or very small leaf, often triangular in shape.
- scale leaf** - small, usually addressed as in *Erica* (Ericaceae) or much reduced as in *Tamarix* (Tamaricaceae).
- scandent** - a general term for climbing.
- scape** - a flower stalk (a pedicel or, more often, a peduncle) without leaves that arises from the ground, as in *Crinum* (Amaryllidaceae).
- scarious (scariose)** - thin and dry, not green.
- schizocarp** - a dry fruit breaking up into one-seeded nut-like parts (each part called a mericarp), as in many genera in the Malvaceae and in Apiaceae (Umbelliferae).
- scorpioid** - a cymose inflorescence curved to one side and coiled like the tail on a scorpion; see also helicoid cyme.
- scrambler** - a plant which usually climbs with the help of hooks, thorns or tendrils so that it spreads out over or through its support.
- scrub** - more or less dense vegetation of small shrubs (up to about 3 m high).
- secund** - one-sided; as when branches, leaves or flowers are all attached along one side of an axis.
- seed** - the ripened ovule containing the embryo with or without additional storage tissue.
- seedling** - the young plant which develops from a germinated seed.
- segment** - a division or part of an organ.
- semi-parasite** - a plant which can parasitize another plant but is also capable of growing by itself.
- sensu** - Latin meaning 'in the sense of'.
- sepal** - a flat part of the outer whorl of sterile appendages that protects the flower in bud, often green or dull in colour; the sepals together are called the calyx.
- sepaloid** - a structure which is similar to a sepal.
- septa** - partitions; plural of septum.
- septate** - divided by one or more partitions or septa.
- septicidal** - opening at or along the partition (or septum) or opening along the placenta; not opening into the locule.
- septum** - a partition or cross-wall.
- seriate** - arranged in a row.
- sericeous** - with silk-like hairs that are soft and straight.
- serrate (serrulate)** - with teeth like that of a saw, the teeth more or less regular and pointing forwards; compare with dentate.
- sessile** - without a stalk, meaning 'seated'.
- seta** - a bristle or stiff hair.
- setaceous (setiform)** - like a bristle.
- setose** - with a covering of bristles, similar to hispid.
- sheath (sheathing)** - a tubular structure that encloses an organ or part, as in the lower tubular part of a grass leaf which encloses the stem.
- shoot** - a stem axis together with its leaves.
- short shoot** - with very short internodes, growth usually slow and often bearing leaves and/or reproductive structures.
- showy** - brightly coloured or conspicuous.
- shrub** - a woody plant with perennial woody stems, there are usually two or more stems coming from near the ground or sometimes one slender stem; a term which is not very precise but differs from the term tree in not possessing a trunk or bole between the ground and the branches.
- shrublet** - a small shrub; see also suffrutescent.
- silicule (silicula)** - the short fruit found in some Brassicaceae (Cruciferae), not more than two or three times as long as broad; see also silique.
- silique (siliqua)** - the long slender fruit of some Brassicaceae (Cruciferae), more than two times as long as broad; divided into two compartments by a thin partition on which the seeds are borne and from which the two outer valves separate.
- simple fruit** - derived from a single carpel or syncarpous ovary.
- simple leaf** - with only a single blade, the opposite of a compound leaf.
- sinuate (sinuose)** - when the margin is uneven or wavy by turning inwards or outwards but not deeply enough to be lobed.
- sinus** - a rounded depression between two projecting lobes or teeth; the space between two lobes.
- siphon (siphonaceous)** - a tube (tubular).
- solitary** - one alone and without companions or similar structures; as a solitary flower in the axil of a leaf.
- spathaceous** - like a spathe.
- spathulate (spatulate)** - a flat shape with the outline of a spoon or spatula, broadly rounded above and long and narrow below.
- species** - the basic unit in a taxonomic classification denoting a group of organisms that appear more similar to each other than to any other group and are usually assumed to be able to interbreed and produce fully fertile progeny.
- spike (spicate)** - an indeterminate inflorescence with the flowers sessile (without stalks or pedicels) on a simple unbranched or undivided axis or rachis.
- spine** - a hard sharp-pointed structure, often long and narrow.
- spinescent** - ending in a spine or in a very sharp hard point, or provided with spine-like teeth.
- spinose** - having spines.
- spinulose** - having small spines.
- spongy** - light in weight, porous, and compressible.
- spur** - a slender, usually hollow, extension of some part of the flower; a short lateral branch.
- squamellate (squamulose)** - covered with small scales, but larger than those described as lepidote.
- squamose** - covered with scales.
- stalk** - the stem or narrow portion beneath and supporting an organ.
- stamen** - the pollen producing organ of higher plants, usually made up of a narrow stalk (the filament) and an anther in which the pollen is produced.
- staminate** - (of flowers) with stamens but without pistil; male flower.
- staminode** - a non-functional stamen, often highly modified or reduced.
- staminodium** - a non-functional stamen without anther or with anther that does not produce pollen; synonymous with staminode.
- stellate** - star-shaped, as in stellate hairs that have several arms or branches radiating outward from a central point.

- stem** - the main axis of a plant or a branch of the main axis that (at first) produces leaves at the nodes.
- sterile** - not producing sex cells or gametes; a sterile flower does not produce either pollen or functional ovaries.
- stigma** - the portion of the pistil (usually at the top of the style) which is receptive to pollen, usually with a sticky or minutely papillate surface on which the pollen germinates and grows into the tissue of the style.
- strigose** - with short stiff hairs that lie close to the surface; see also strigose.
- stipe (stipitate)** - the stalk of a pistil (see also gynophore); sometimes also used about the stalk of an inflorescence, as about the stalk of the fig in *Ficus* (Moraceae).
- stipel** - a stipule-like structure subtending a leaflet in some compound leaves.
- stipules** - scale-like or bract-like appendages, usually found in pairs, at the base of the petiole; many leaves have three parts: the blade, the petiole, and two stipules.
- stolon** - a branch which grows over the ground (a runner) which produces adventitious roots, mainly at the nodes.
- stoma (stomate) (pl. stomata)** - a minute pore in the epidermis, usually found on leaves; these pores are important in the exchange of gases and loss of water.
- stomatate** - having or provided with stomata.
- stone cells** - heavily lignified, more or less isodiametric cells.
- striate** - marked with longitudinal parallel ridges, grooves, lines, or streaks.
- strict** - standing upright, straight and narrow.
- strigose** - with short stiff hairs that lie close to the surface.
- style (stylar)** - the narrow portion found in most pistils above the ovary upon which the stigma is borne.
- sub-** - a prefix meaning 'slightly', 'somewhat', 'almost', or 'below'.
- submerged (submersed)** - below the water level.
- subshrub** - a plant with a perennial, woody base to the stems, but with upper part of the stems herbaceous.
- subspecies** - a unit of classification below the rank of species above the rank of variety; often used for geographical variants of a species.
- substrate** - foundation, the underlying surface providing a point of attachment or anchorage.
- subtend** - to extend under, or be opposite to, another structure.
- subulate** - flat and narrow, tapering from the base to a sharp tip.
- succulent** - fleshy and juicy, thick and soft within.
- suffrutescent** - like a small shrub, with a woody base near the ground that produces leafy and flowering shoots each growing season, usually less than 1 m tall.
- suffruticose** - shrubby or like a small shrub, with a woody stem that is somewhat larger than in the case of suffrutescent, usually less than 1 m tall.
- sulcus (sulcate)** - a longitudinal furrow.
- super-** or **supra-** - prefixes meaning 'above'.
- superior ovary** - an ovary that is borne above the attachment of the sepals, the petals, the stamens, or, if present, receptacle-tube or hypanthium; the opposite of inferior ovary; compare with hypogynous, perigynous, and epigynous.
- suture** - the line along which two parts have been united or the line along which a structure splits open.
- sym-** or **syn-** - prefixes meaning 'together'.
- symbiosis** - an association between two different types of organisms in which there is some type of mutual benefit; also referred to as reciprocal parasitism.
- sympetalous (synpetalous)** - with the petals at least partly united.
- synandrium** - when the anthers of a flower or anthers from several flowers are united or coherent.
- syncarpous** - composed of two or more united carpels, as in a syncarpous pistil; the opposite of apocarpous.
- syngenesious** - with united anthers or cohering anthers, typical of many Cucurbitaceae.
- synoptic key** - a key which gives a summary of the taxonomic relationships in a group. Such a key often uses cryptic characters and is difficult to use for identification, whereas an artificial key for identification should use easily found characters.
- synsepalous** - with the sepals at least partly united.
- tangential** - perpendicular to a radius.
- taproot** - a persistent primary root, often swollen with food reserve and/or going deep into the soil.
- taxon** - the general term for any unit of classification such as variety, subspecies, species, genus, family, order, class, etc.
- tendril** - a slender, usually coiling, part of a leaf or stem that helps support a stem.
- tepal** - used for the parts of the perianth where the sepals and petals cannot be readily distinguished as in *Begonia* (Begoniaceae).
- terete** - round or circular in cross section.
- terminal** - found at the end; near or at the apex.
- ternate** - arranged in a whorl or cluster of three.
- terrestrial** - growing on or in the ground or on rocks but not on other plants (epiphytic) or in water (aquatic).
- tessellated** - marked with a fine pattern, like a mosaic of small tiles; usually used for leaves and seeds.
- testa** - the outer coat of a seed.
- tetra** - a prefix meaning 'four'.
- tetradynamous** - of six stamens when four are long and two are short; characteristic of the Brassicaceae (Cruciferae).
- tetramerous** - with four parts or parts in multiples of four.
- tetrandrous** - with four stamens.
- thalamus** - the receptacle or torus of a flower.
- theca (pl. thecae)** - the pollen-sac or locule of an anther, one of the anther-lobes.
- therophyte** - an annual plant, the perennating organs being seeds.
- thorn** - a sharp-pointed branch, sometimes used as synonymous with spine.
- throat** - the spreading upper portion or the area at the top of the perianth-tube where the lobes become free from each other.
- thyrs** - a panicle with ultimate branches that are cymose.
- tomentose** - covered with soft, more or less appressed, hairs that are not straight; woolly.
- tomentellous (tomentulose)** - with very short woolly hairs.
- torulose** - an uneven cylinder with contractions and swellings at intervals to give the appearance of a row of beads; see also moniliform.

- torulose** - an uneven cylinder with contractions and swellings at intervals to give the appearance of a row of beads; see also moniliform.
- torus** - the central axis or receptacle of a flower.
- transverse** - across or at right angles to the long axis.
- tree** - a woody plant with a single main stem (a trunk or a bole) and a distinct upper crown; compare with shrub.
- tri** - a prefix meaning 'three'.
- trichome** - a hair or bristle, usually small.
- trifoliolate** - with three leaves; compare with trifoliate.
- trifoliate** - of a compound leaf with three leaflets as in *Trifolium* Fabaceae (Leguminosae) subfamily Papilionoideae.
- trigonous (trimerous)** - with three parts; with parts in multiples of three.
- triquetrous** - with three sharp angles.
- truncate** - with the base or apex at right angles to the midvein as if cut across at the bottom or top.
- trunk** - the large single woody stem of trees, the main stem or bole.
- tube** (in flowers) - the cylindrical part of the perianth, usually made up of the united sepals and/or petals.
- tuber** - a thickened portion of a stem, usually underground, that is capable of producing new branches.
- tubercle** - a swelling, knob or thickened protuberance on a surface, sometimes found at the base of a hair.
- tuberculate** - having tubercles.
- tumid** - swollen or inflated.
- tunic** - a thin coat or covering; as in the covering of an onion.
- turbinate (turbiniform)** - cone-shaped but with the broad portion up and the pointed portion down.
- turgid** - filled out or swollen, usually with water, but not with air and not distended in shape.
- turion** - a short, scaly branch produced from a rhizome.
- twig** - a young woody stem or branch, the last season's growth.
- twining** - climbing by winding the stem around the support.
- umbel (umbellate)** - an inflorescence in which the pedicels of the flowers all arise from one point and the flowers are borne at one level; the umbels themselves may be arranged in an umbel called a compound umbel, as in the Apiaceae (Umbelliferae).
- umbo** - a small cone-like projection from a surface.
- uncinate** - with a hook at the end, as an uncinat hair.
- undershrub** - a perennial plant with lower woody parts, but herbaceous upper parts that die back after each growing season; also refers to a plant growing in the lower shrub layer in a multistoried forest.
- understory** - a layer of shrubs, small trees and saplings growing under the main canopy of a forest.
- undulate** - with a wavy margin.
- unguiculate** - shaped like the hoof of an animal; with a wide rounded terminal lobe narrowed at the base, as in a 'clawed' petal.
- uni-** - a prefix meaning 'one' or 'single'.
- unifoliolate** - a leaf with a single leaflet where the leaf-stalk of the leaflet can be differentiated from the main leaf stalk.
- unilocular** - with one locule or chamber.
- uniseriate** - arranged in a single row, or layer.
- unisexual** - producing either male or female gametes, but not both; having either functional stamens or functional ovaries (ovules) but not both; the opposite of bisexual.
- urceolate** - shaped like a water pot or urn; with a rounded base and short broad tube that is narrowed above and slightly expanded at the very top.
- utricle** - a small one-seeded fruit with a loose thin outer covering, as in *Carex* (Cyperaceae) and many genera of Chenopodiaceae; also used for the small traps of *Utricularia* (Lentibulariaceae).
- vaginate** - with a sheath or enclosed in a sheath.
- valvate** - opening by regular lines to leave valves between; of petals or sepals that are joined edge to edge and do not overlap in bud.
- valve** - formed when an organ opens along regular lines, as when a capsular fruit splits open; also a flap-like lid.
- variety** - a unit of classification below the level of a species; varieties are separated on the basis of form and colour, but the varieties are usually not geographically separated and individuals of different varieties can freely interbreed.
- vascular** - referring to the xylem and phloem; vascular plants are those with xylem and phloem which transport water and nutrients.
- vascular bundle** - a strand or unit of phloem and xylem, with or without a surrounding sheath, which carries water and nutrients.
- vascular tissue** - a collective term for phloem and xylem together.
- vein** - a small strand of vascular tissue.
- velutinous** - with a covering of velvet-like hairs, dense and straight.
- venation** - the arrangement of the veins or vascular bundles.
- ventral** - the inner face or the surface towards the axis, adaxial; compare with dorsal or abaxial.
- ventricose** - swollen or bulging on one side (but not as much as gibbous).
- vernation** - the arrangement of leaves in bud or of the parts (sepals and petals or tepals) in a flower-bud.
- verrucose** - having a surface with raised projections or warts.
- versatile** - turning freely on its support or stalk; as versatile anthers.
- verticil** - a whorl or an arrangement of similar parts in a circle at the same level; also used as synonymous with verticillaster.
- verticillaster** - an inflorescence which has opposite cymes forming whorls of flowers at the nodes along an elongated axis; typical of most species in Lamiaceae (Labiatae) such as *Ocimum* and *Malva* in Malvaceae.
- verticillate** - having parts arranged in whorls.
- vestigial** - undeveloped or poorly developed, or a trace or mark left by a structure no longer developed but present in ancestral forms.
- vesture (vestiture)** - a covering on a surface, as hairs or scales; see also indumentum.
- villous (villose)** - with a covering of long soft, often crooked hairs.
- virgate** - long, slender, and straight; as a virgate stem.
- viscid** - sticky or glue-like.
- viscous** - very sticky or glue-like; glutinous.



- viviparous** - when the seeds germinate to form seedlings on the parent plant; often seen in *Agave sisalana*.
- whorl** - when there are three or more leaves or flowers at a single node or at the same level; see also verticil.
- wing** - any flat or thin extension on an organ; as in a winged fruit; the two lateral petals in pea-like flowers in Fabaceae (Leguminosae) subfamily Papilionoideae; the two lateral sepals in Polygalaceae.
- wood** - the xylem of plants with secondary vascular growth; the main tissues in the stems of trees and shrubs.
- xanthophyll** - a class of yellow, carotenoid pigments associated with chlorophyll in the chloroplasts.
- xeromorph** - a plant possessing features often found in xerophytes, but not necessarily confined to growing in dry places.

- xerophyte** - a plant that is able to live under very dry conditions and having structural adaptations for this.
- xylem** - the principal cells of the wood; important in water movement.
- zygomorphic** - flowers having bilateral symmetry so that the corolla can be divided equally only along one plane, used as synonymous with irregular; compare with actinomorphic and amorphous.
- zygote** - a fertilized egg formed by the union of a male and female gamete.

This glossary is an adapted and shortened version of that appearing in Volume 3.

Comments on this glossary should be sent to:  
The Editor, Ethiopian Flora Project,  
The National Herbarium, P.O. Box 3434,  
Addis Ababa, Ethiopia.

## INDEX TO SCIENTIFIC NAMES

- Abelmoschus esculentus** (L.) Moench., 212  
**Abelmoschus ficulneus** (L.) Wight & Arn., 212, 213  
**ABELMOSCHUS** Medic., 212  
**Abutilon angulosomaliae** Cufod., 247, 248  
**Abutilon angulatum** (Guill. & Perr.) Mast., 242, 245  
**Abutilon bidentatum** (Hochst.) A. Rich., 245, 246  
**Abutilon cecillii** N.E.Br., 242, 243  
**Abutilon crassinervium** Hochst. ex Mattei, 241  
**Abutilon denticulatum** (Fres.) Webb, 244  
**Abutilon dubium** Mattei, 244  
**Abutilon elaeocarpoides** Webb, 242  
**Abutilon erythraeum** Mattei, 245, 246  
**Abutilon figarianum** Webb, 246, 247  
**Abutilon fruticosum** Guill. & Perr., 244, 245  
**Abutilon graveolens** (Roxb. ex Hornem.) Wight & Arn., 247, 248  
**Abutilon hirtum** (Lam.) Sweet, 247, 248  
     var. *heterotrichum* (Hochst. ex Mattei) Cufod., 248  
**Abutilon impressum** Hochst. ex Mattei, 246  
**Abutilon indicum** sensu Cufod., 246  
     var. *microphyllum* Hochv., 246  
     var. *populifolium* (Lam.) Wight & Arn., 246  
**Abutilon intermedium** Hochst. ex Garcke, 242  
**Abutilon kotschyi** Hochst. ex Webb, 244  
**Abutilon longicuspe** Hochst. ex A. Rich., 241, 243  
**Abutilon longipes** Mattei, 246  
**Abutilon mauritianum** (Jacq.) Medic., 245, 246  
**Abutilon microcarpum** Mattei, 246  
**Abutilon microphyllum** A. Rich., 244  
**ABUTILON** Mill., 239  
**Abutilon molle** Bak., 248  
**Abutilon pannosum** (Forst. f.) Schlechtend., 246, 247  
**Abutilon ramosum** Guill. & Perr., 242, 243  
**Abutilon smenospermum** Pichi-Serm., 242  
**Abutilon somalense** Mattei, 242, 243  
**Abutilon** sp. = *Burger* 2946, 244  
**Abutilon** sp. = *Gilbert* 2100, 244  
**Abutilon** sp. = *Gilbert* et al. 8226, 244  
**Abutilon** sp. = *Glover & Gilliland* 395, 244  
**Abutilon** sp. = *Meyer* 8848, 242  
**Acalypha acrogyna** Pax, 300  
**Acalypha adenotricha** A. Rich., 300  
**Acalypha bailloniana** Muell. Arg., 303  
**Acalypha betulina** Retz., 301  
**Acalypha boehmerioides** Miq., 304  
     var. *glandulosa* (Muell. Arg.) Pax & K. Hoffm., 304  
**Acalypha brachystachya** Hornem., 303  
**Acalypha ciliata** Forssk., 303  
**Acalypha crenata** A. Rich., 303  
     var. *glandulosa* Muell. Arg., 304  
**Acalypha elegantulus** Hochst., 303  
**Acalypha fimbriata** Schum. & Thonn., 303  
**Acalypha fruticosa** Forssk., 301  
     var. *eglandulosa* A. Radcl.-Smith, 301  
     var. *fruticosa*, 301  
     var. *villosa* Hutch, 301  
**Acalypha glomerata** Hutch., 304  
**Acalypha indica** L., 303  
**Acalypha kilimandscharica** Pax & K. Hoffm., 301  
**ACALYPHA** L., 299  
**Acalypha lanceolata** Willd., 304  
     var. *glandulosa* (Muell. Arg.) A. Radcl.-Smith, 304  
**Acalypha marissima** M. Gilbert, 302  
**Acalypha neptunica** Muell. Arg., 300  
**Acalypha ornata** A. Rich., 300  
**Acalypha paniculata** Miq., 300  
**Acalypha psilostachya** Hochst., 302  
     var. *glandulosa* Hutch., 302  
     var. *psilostachya*, 302  
**Acalypha racemosa** Baill., 300  
**Acalypha segetalis** Muell. Arg., 304  
**Acalypha sidaefolia** A. Rich., 301  
**Acalypha sonderiana** Muell. Arg., 300  
**Acalypha villicaulis** A. Rich., 301  
**Acalypha volkensii** Pax, 302  
**ACALYPHOIDEAE**, 265  
**Acridocarpus glaucescens** Engl., 257  
     var. *ferrugineus* (Engl.) Launert, 258, 259  
     var. *glaucescens*, 258  
     var. *graniticus*, 258  
**ACRIDOCARPUS** Guill. & Perr., 257  
**Acridocarpus scheffleri** Engl., 258  
**Acridocarpus ugandensis** Sprague, 258, 259  
**Adansonia digitata** L., 186, 188, 189  
**ADANSONIA** L., 186  
**Adenia aculeata** (Hook. f.) Engl., 9  
     subsp. *aculeata*, 9, 10  
     subsp. *inermis* W.J. de Wilde, 9  
     subsp. *manganiana* (Chiov.) W.J. de Wilde, 9  
**Adenia ellenbeckii** Harms, 11  
**ADENIA** Forssk., 6  
**Adenia gedoensis** W.J. de Wilde, 9  
**Adenia globosa** Engl., 7  
     subsp. *curvata*, 9  
     subsp. *globosa*, 8  
     subsp. *pseudoglobosa*, 9  
**Adenia gummifera** (Harvey) Harms, 11  
     var. *cerifera* W.J. de Wilde, 12  
     var. *gummifera*, 12  
**Adenia inermis** (W.J. de Wilde) W.J. de Wilde, 9, 10  
**Adenia pulchra** M.G. Gilbert & W.J. De Wilde, 11  
**Adenia rumicifolia** Engl., 10  
**Adenia schweinfurthii** Engl., 9  
**Adenia toxicaria** Harms, 11  
**Adenia venenata** Forssk., 7, 8  
**Adenia vitifolia** Hutch. & Bruce, 11  
**Adenia volkensii** Harms, 11  
**Adenopus abyssinicus** Hook. f., 49  
**Adenopus cienkowskii** Schweinf., 47  
**AFROLEBRETONIA** Ulbr., 225  
**AFROTYPHALAEA** Ulbr., 228  
**Agaloma** Rafin., 373  
**AGALOMA** (Rafin.) House, 373  
**ALCEA** L., 239  
**Alcea rosea** L., 239  
**Alchornea laxiflora** (Benth.) Pax & K. Hoffm., 291, 293  
**ALCHORNEA** Swartz, 291  
**Althaea rosea** (L.) Cav., 239  
**ANCISTROCLADACEAE**, 70  
**Ancistrocladus robertsoniorum** Leonard, 70

- Andrachne aspera** Spreng., 271  
 var. *aspera*, 272, 273  
 var. *glandulosa* A. Rich., 272, 273  
 var. *maritima* A. Terrac., 272
- Andrachne ephemera** M. Gilbert, 272, 273
- ANDRACHNE** L., 271
- Andrachne somalensis*, 272
- Andrachne* sp. = *Terracciano* 728 (647), 272
- Andrachne telephioides*, 272
- Anisophyllea*, 133
- Anisophyllum* Haw., 373
- ANOGEISSUS** (A. DC.) Guill. & Perr., 130
- Anogeissus leiocarpa** (A. DC.) Guill. & Perr., 130, 132  
 forma *grandifolia* Engl. & Diels, 130  
 forma *parvifolia* Engl. & Diels, 130
- Anogeissus schimperi* Hochst. ex Hutch. & Dalz., 130
- Anthacantha* Pax, 354
- ANTHEROTOMA** (Naud.) Hook.f., 111
- Antherotoma naudinii* Hook.f., 111, 112
- ANTIDESMA** L., 269
- Antidesma venosum* Tul., 270
- Argomuelleria macrophylla** Pax, 290
- ARGOMUELLERA** Pax, 289
- ARISTIVALVIS** Ulbr., 205
- AXILLARES** Burret, 145
- BALANOPHORACEAE**, 381
- Barringtonia*, 107
- Barringtonia racemosa* (L.) Spreng., 107
- BARRINGTONIACEAE**, 107
- Basananthe berberoides* (Chiov.) W.J. de Wilde, 12
- Basananthe hanningtoniana* (Mast.) W.J. de Wilde, 12, 13
- BASANANTHE** Peyr., 12
- Basananthe scabrifolia* (Dandy) W.J. de Wilde, 12
- Basananthe spinosa* W.J. de Wilde, 12
- Bazzia longipedicellata* Verdc., 144
- Begonia abyssinica* Cufod., 61
- Begonia coccinea* Hook., 61
- Begonia coccinea* Ruiz ex Klotzsch, 61
- Begonia corallina* Carr., 61
- Begonia cucullata* Willd., 62  
 var. *cucullata*, 62, 63
- Begonia foliosa* HBK., 61
- Begonia foliosa* Kunth, 61  
 var. *miniata* (Planchon) L.B. Smith & Schubert, 61
- Begonia fuchsioides* Hook., 61  
 var. *miniata* (Planchon) A. DC., 61
- Begonia heracleifolia* Cham. et Schlecht., 62, 63
- BEGONIA** L., 60
- Begonia lebrunii* Robyns & Lawal, 60
- Begonia manicata* Cels ex Vis., 62, 63
- Begonia masoniana* Irmsh. ex Ziesen., 60
- Begonia metallica* L. Smith, 61
- Begonia miniata* Planchon, 61
- Begonia semperflorens* Link et Otto, 62
- Begonia wollastonii* Bak., 60, 63
- Begonia* x *argenteo-guttata* Lemoine, 61, 63
- Begonia* x *ricinifolia* A. Dietr., 62
- BEGONIACEAE**, 60
- Blastania cerasiformis* (Stocks) A. Meeuse, 38
- BOMBACACEAE**, 186
- BOMBYCELLA** DC., 206
- Breynia disticha* J. R. & G. Forst., 284, 285  
 var. *nivosa* (Bull.) A. Radcl. Smith, 285
- BREYNIA** J. R. & G. Forst., 284
- Bridelia abyssinica* Pax, 269  
 var. *rosenii* Gehrm., 269
- Bridelia atroviridis** Muell. Arg., 268
- Bridelia cathartica** Bertol. f., 268
- Bridelia melanthesioides* (Baill.) Klotzsch, 268
- Bridelia micrantha** (Hochst.) Baill., 269
- Bridelia ndellensis* Beille, 267
- Bridelia scleroneura** Muell. Arg., 267, 268
- Bridelia scleroneuroides* Pax, 267
- Bridelia taitensis** Vatke & Pax, 268
- BRIDELIA** Willd., 267
- Bryonia epigaea* Roettl., 25
- Bryonia grandis* L., 54
- Bryonia jatrophiifolia* A. Rich., 52
- Bryonia micrantha* Hochst. ex A. Rich., 29
- Bryonia palmata* L., 56
- Bryonia scabra* L.f., 27
- Bryonia scrobiculata* Hochst., 27
- Byttneria catalpifolia** Jacq., 166, 167  
 subsp. *africana* (Mast.) Exell & Mendonça, 166  
 subsp. *catalpifolia*, 166
- BYTTNERIA** Loefl., 165
- CALLICARPIDIUM** Ulbr., 228
- Callistemon citrinus** (Curtis) Skeels, 78
- Callistemon lanceolatus* DC., 78
- CALLISTEMON** R. Br., 78
- Calpidosicyos friesiorum* Harms, 41
- CALVOA** Hook.f., 113
- CALYPHYLLI** Ulbr., 191
- Calvola orientalis* Taub., 114
- Camellia sinensis* (L.) O. Kuntze, 65
- Camellia thea* Link., 65
- Camellia*, 65
- Campylospermum* van Tiegh., 69
- Candelabria micrantha* Hochst., 269
- CANELLACEAE**, 1
- Caperonia gallabatensis* Pax & K. Hoffm., 287
- Caperonia serrata* (Turcz.) Presl., 287, 288
- CAPERONIA** St.-Hil., 287
- Carania berberoides* Chiov., 12
- Carania* Chiov., 12
- CARICA** L., 64
- Carica papaya* L., 64
- CARICACEAE**, 64
- CASSIPOUREA** Aubl., 134
- Cassipourea abyssinica* (Engl.) Alston, 134
- Cassipourea avettae* (Chiov.) Alston, 134
- Cassipourea malosana* (Baker) Alston, 134
- Cassipourea ruwenzoriensis* [as *ruwenzorensis*?] auct. non  
 (Engl.) Alston, 134
- Cassipourea salvago-ragei* (Chiov.) Alston, 134
- Caucanthus albidus** (Niedenzu) Niedenzu, 262  
 var. *fimbripetalus* (Niedenzu) Niedenzu, 262  
 forma *trystylus* (Niedenzu) Niedenzu, 262
- Caucanthus argenteus* Chiov., 262
- Caucanthus argenteus* Niedenzu, 262
- Caucanthus auriculatus** (Radlk.) Niedenzu, 262, 263
- Caucanthus chiovendae* Cufod., 262
- Caucanthus cinereus* Niedenzu, 262
- Caucanthus edulis** Forssk., 263
- CAUCANTHUS** Forssk., 262

- CEIBA** Mill., 186  
*Ceiba pentandra* (L.) Gaertn., 186, 187  
*Cephalandra diversifolia* Naud., 54  
*Cephalocroton cordofanus* Hochst., 291, 292  
**CEPHALOCROTON** Hochst., 291  
*Cephalocroton incanus* M. Gilbert, 291, 292  
*Cephalocroton nudus* Pax & K. Hoffm., 291  
*Cephalocroton polygynus* Pax & K. Hoffm., 291  
*Cephalocroton velutinus* Pax & K. Hoffm., 291  
**CEPHALOPENTANDRA** Chiov., 48  
*Cephalopentandra ecirrhosa* (Cogn.) C. Jeffrey, 48  
*Chadra arborea* Forssk., 146  
*Chadra tenax* Forssk., 152  
*Chadra velutina* Forssk., 148  
*Chamaesyce arabica* (Anderson) Soják, 376  
*Chamaesyce glomerifera* Millsp., 375  
*Chamaesyce granulata* (Forssk.) Soják, 377  
*Chamaesyce hirta* (L.) Millsp., 374  
*Chamaesyce inaequilatera* (Sond.) Soják, 376  
*Chamaesyce indica* (Lam.) Croizat, 374  
*Chamaesyce polycnemoides* (Boiss.) Soják, 376  
*Chamaesyce prostrata* (Ait.) Small, 375  
**CHAMAESYCE** Rafin., 373  
*Chamaesyce* S. F. Gray, 373  
*Chamaesyce scordifolia* (Jacq.) Croizat, 375  
**CHORISIA** H.B. & K., 187  
*Chorisia speciosa* St. Hil., 187  
**CHROZOPHORA** A. Juss., 288  
*Chrozophora brocciana* Vis., 288  
*Chrozophora obliqua* auct. non (Vahl) A. Juss., 289  
*Chrozophora oblongifolia* (Del.) A. Juss., 289  
*Chrozophora plicata* (Vahl) A. Juss., 288, 289  
*Cicca discoidea* Baill., 284  
**CIENFUGOSIA** Cav., 216  
*Cienfugosia somaliana* Fryx., 219, 223  
*Cienfugosia welshii* (T. Anders.) Garcke, 216, 223  
**CISTACEAE**, 2  
*Cistus*, 2  
*Citrullus colocynthis* (L.) Schrad., 48, 49  
*Citrullus lanatus* (Thunb.) Matsum. & Nakai, 48, 49  
**CITRULLUS** Schrad. ex Eckl. & Zeyh., 48  
*Citrullus vulgaris* Schrad. ex Eckl. & Zeyh., 48  
*Claoxyton trichogyne* Muell. Arg., 298  
**CLUSIACEAE**, 135  
*Clutia abyssinica* Jaub. & Spach., 286  
    var. *abyssinica*, 286, 287  
    var. *calvescens* Pax, 286  
    var. *firma* Pax, 286  
    var. *glabra* Pax, 286  
    var. *pedicellaris* (Pax) Pax, 256  
    var. *usambarica* Pax & Hoffm., 286  
**CLUTIA** L., 286  
*Clutia lanceolata* Forssk., 286, 287  
    subsp. *lanceolata* Forssk., 286  
    subsp. *rubosta* (Pax) Gilbert, 287  
    var. *glabra* A. Rich., 286  
    var. *angustifolia* A. Rich., 286  
    var. *pubescens* A. Rich., 286  
*Clutia myricoides* Jaub. & Spach., 286  
*Clutia richardiana* Muell. Arg., 286  
    var. *trichophora* Muell. Arg., 286  
*Cluytia* Ait., 286  
*Cluytiandra* Muell. Arg., 270  
*Cluytiandra somalensis* Pax, 271  
*Coccinia adoensis* (Hochst. ex A. Rich.) Cogn., 52, 53  
*Coccinia abyssinica* (Lam.) Cogn., 54  
*Coccinia aostae* Busc. & Muschl., 52  
*Coccinia diversifolia* (Naud.) Cogn., 54  
    var. *glabrescens* Cogn., 54  
*Coccinia ecirrhosa* Cogn., 48  
*Coccinia grandis* (L.) Voigt, 53, 54  
*Coccinia indica* Wight & Arn., 54  
*Coccinia jatrophiifolia* (A. Rich.) Cogn., 52  
*Coccinia megarrhiza* C. Jeffrey, 54, 55  
*Coccinia moghadd* (J.F. Gmel.) Schweinf. & Aschers., 54  
*Coccinia obbiadensis* (Chiov.) Cufod., 48  
*Coccinia quercifolia* Hutch. & Bruce, 48  
*Coccinia schliebenii* Harms, 52  
*Coccinia* sp. = *Bally* 12989, 53  
*Coccinia* sp. = *Burger* 2947A, 54  
*Coccinia* sp. = *Gilbert & Jones* 129, 54  
*Coccinia stefaninii* Chiov., 37  
**COCCINIA** Wight & Arn., 52  
*Cola* spp., 165  
**COMBRETACEAE**, 115  
*Combretum aculeatum* Vent., 120, 123  
    forma *kotschyana* Almagia, 120  
    forma *nudiflorum* Almagia, 120  
    forma *schimperii* Almagia, 120  
    forma *stenophyllum* Almagia, 120  
*Combretum adenogonium* Steud. ex A. Rich., 117, 119  
*Combretum bricchettii* Engl. & Diels, 118  
*Combretum capituliflorum* Fenzl ex Schweinf., 120, 122  
*Combretum collinum* Fresen., 116  
    subsp. *binderianum* (Kotschy) Okafor, 116, 119  
    subsp. *collinum*, 116, 119  
    subsp. *elgonense* (Engl.) Okafor, 116, 119  
    subsp. *hypopilinum* (Diels) Okafor, 117  
*Combretum contractum* Engl. & Diels, 116, 121  
*Combretum cufodontii* Chiov., 120  
*Combretum cyclocarpum* Chiov., 116  
*Combretum erlangerianum* Engl. & Diels, 120  
*Combretum ferrugineum* A. Rich., 118  
*Combretum fragrans* F. Hoffm., 117  
*Combretum gallabatense* Schweinf., 117  
*Combretum ghasalense* Engl. & Diels, 117  
*Combretum hartmannianum* Schweinf., 117, 122  
*Combretum hereroense* Schinz, 118, 122  
    subsp. *grotei* (Exell), 120  
    subsp. *volkensii* (Engl.) Wickens, 120  
    var. *parvifolium* (Engl.) Wickens, 120  
    var. *volkensii*, 120  
*Combretum insculptum* Engl. & Diels, 118  
*Combretum lepidotum* A. Rich., 118  
**COMBRETUM** Loefl., 115  
*Combretum marchettii* Chiov., 116  
*Combretum molle* R. Br. ex G. Don, 118, 121  
*Combretum nigricans* Lepr. ex Guill. & Perr., 117, 122  
*Combretum ovale* R. Br. ex G. Don, 120  
*Combretum paniculatum* Vent., 120, 123  
*Combretum petitianum* A. Rich., 118  
*Combretum punctatum* A. Rich., 118  
*Combretum quartianum* A. Rich., 118  
*Combretum reticulatum* Fresen., 117  
*Combretum richardianum* van Heurck & Mull. Arg., 118  
*Combretum rochetianum* A. Rich. ex A. Juss., 117, 122

- Combretum ruppellianum* A. Rich., 118  
*Combretum schimperianum* A. Rich., 118  
*Combretum sublancifolium* Chiov., 118  
*Combretum trichanthum* Fresen., 118  
     var. *angustifolium* Fiori, 118  
     var. *petitianum* (A. Rich.) Fiori, 118  
*Combretum volkensii* Engl., 120  
*Commiphora reghinii* Chiov., 357  
**CONOCARPUS L.**, 130  
*Conocarpus lancifolius* Engl. & Diels, 130, 132  
*Corallocarpus courbonii* Naud. Cong., 25  
*Corallocarpus ehrenbergii* (Schweinf.) Hook.f., 25  
*Corallocarpus erostris* (Schweinf.) Hook.f., 25  
*Corallocarpus hildebrandtii* Gilg, 25  
*Corallocarpus longiracemosus* Gilg, 25  
*Corallocarpus epigaeus* (Roettl.) C.B.Cl., 25, 26  
*Corallocarpus pedunculatus* (Naud.) Cogn., 25  
*Corallocarpus pseudogijef* Gilg, 24  
*Corallocarpus schimperi* (Naud.) Hook.f., 25  
**CORALLOCARPUS Welw. ex Hook. f.**, 25  
*Corchorus aestuans* L., 156, 157  
*Corchorus baldaccii* Mattei, 155, 157  
*Corchorus brevicornutus* Vollesen, 155  
*Corchorus bricchettii* Weimarck, 155  
*Corchorus cinerascens* Deflers, 155, 157  
*Corchorus depressus* (L.) C. Chr., 156, 157  
*Corchorus echinatus* Hochst. ex Garcke, 156  
*Corchorus fascicularis* Lam., 155, 157  
*Corchorus gracilis* R. Br. in Salt, 155  
*Corchorus hochstetteri* Milne-Redh., 158  
**CORCHORUS L.**, 154  
*Corchorus microphyllus* Fresen., 156  
*Corchorus muricatus* Hochst. ex A. Rich., 156  
*Corchorus olitorius* L., 155, 157  
*Corchorus pseudocapsularis* Schweinf., 156, 157  
*Corchorus quinquenervis* Hochst. ex A. Rich., 156  
*Corchorus schimperi* Cufod., 156, 157  
*Corchorus serraefolius* sensu A. Rich., 155  
*Corchorus tridens* L., 156, 157  
*Corchorus trilocularis* L., 155, 157  
*Corchorus urticifolius* Wight & Arn., 156, 157  
*Couroupita*, 107  
*Couroupita guianensis* Aubl., 107  
**CRASPEDOCARPIDIUM Ulbr.**, 230  
*Croton dichogamus* Pax, 324  
*Croton hastatus* L., 306  
**CROTON L.**, 324  
*Croton lobatus* Forssk., 321  
*Croton lobatus* L., 326  
*Croton macrostachyus* Del., 326, 327  
     var. *mollissimus* Chiov., 326  
*Croton menyhartii* Pax, 325  
*Croton oblongifolius* Del., 289  
*Croton oppositifolius* Geisel, 304  
*Croton plicatus* Vahl, 288  
*Croton scheffleri* Pax, 326  
*Croton schimperianus* Muell. Arg., 326  
     var. *acutissimus* Chiov., 326  
*Croton somalense* Vatke & Pax, 325  
*Croton sylvaticus* Krauss, 325, 326  
*Croton tinctorius* sensu Burm.f., 288  
*Croton urens* L., 306  
*Croton villosus* Forssk., 321  
*Croton zambesicus* Muell. Arg., 325  
**CROTONOIDEAE**, 265  
*Ctenolepis cerasiformis* (Stocks) Hook.f., 38, 40  
**CTENOLEPIS Hook. f.**, 38  
**CUCUMELLA Chiov.**, 30  
*Cucumella engleri* sensu C. Jeffrey, 30  
*Cucumella jeffreyana* Kirkbride, 30, 32  
*Cucumella kelleri* (Cogn.) C. Jeffrey, 30, 32  
*Cucumis abyssinicus* A. Rich., 34  
*Cucumis aculeatus* Cogn, 33, 35  
*Cucumis bardana* Fenzl ex Naud., 33  
*Cucumis carolinus* Kirkbride, 36  
*Cucumis dipsaceus* Ehrenb. ex Spach, 37  
*Cucumis dipsaceus* x *pustulatus*, 33  
*Cucumis ficifolius* A. Rich., 33, 34, 35  
*Cucumis ficifolius* sensu Cufod., 34  
*Cucumis figarei*, 34  
     var. *cyrtopodus* Naud., 34  
     var. *ficifolius* Naud., 34  
     var. *microphyllus* Naud., 34  
*Cucumis humifructus* Stent, 34  
*Cucumis insignis* C. Jeffrey, 36  
*Cucumis jeffreyanus* Thulin, 36  
**CUCUMIS L.**, 31  
*Cucumis maderaspatanus* L., 29  
*Cucumis maderaspatensis* L., 29  
*Cucumis melo* L., 33, 35  
     subsp. *agrestis* (Naud.) Grebensc., 34  
     subsp. *melo*, 34  
*Cucumis membranifolius* Hook.f., 30  
*Cucumis metuliferus* E. Mey. ex Naud., 34  
*Cucumis prolator* Kirkbride, 36  
*Cucumis prophetarum* L., 36  
     subsp. *dissectus* (Naud.) C. Jeffrey, 33, 36  
     subsp. *prophetarum*, 33, 36  
*Cucumis pustulatus* Naud. ex Hook.f., 33, 34  
*Cucumis pustulatus* Hook.f., 36  
     var. *echinophorus* A. Terr., 36  
*Cucumis sativus* L., 37  
*Cucurbita ficifolia* Bouche, 58  
**CUCURBITA L.**, 57  
*Cucurbita maxima* Duchesne ex Lam., 58, 59  
*Cucurbita moschata* (Duchesne ex Lam.) Duchesne ex Poir., 58  
*Cucurbita pepo* L., 58  
     var. *moschata* Duchesne ex Lam., 58  
*Cucurbita siceraria* Molina, 50  
**CUCURBITACEAE**, 17  
**CUCURBITOIDEAE**, 18  
**CYCLANTHEROPSIS Harms**, 18  
*Cyclantheropsis parviflora* (Cogn.) Harms, 18, 21  
*Cynomorium coccineum*, 381  
*Cyrtonema convolvulacea* Fenzl ex A. Rich., 23  
*Cyrtonema divergens* Hochst. ex A. Rich., 23  
*Cyrtonema foetens* Hochst., 23  
*Cyrtonema Schrad.* ex Ecke & Zeyh., 23  
*Dactylanthes* (Haw.) Pax, 354  
**DACTYLIANDRA (Hook.f.) Hook.f.**, 37  
*Dactyliandra nigrescens* C. Jeffrey, 37  
*Dactyliandra stefaninii* (Chiov.) C. Jeffrey, 37, 39  
*Dalechampia cordofana* ['cordafana'] Webb, 313  
*Dalechampia ipomoeifolia* sensu Agnew, 313  
**DALECHAMPIA L.**, 312

- Dalechampia parvifolia** Lam., 312, 313  
**Dalechampia pavoniifolia** (Chiov.) M. Gilbert, 314  
*Dalechampia scandens* auct. Afric. non L., 313  
*Dalechampia scandens* L., 312, 313  
   var. *condofana* (Webb) Muell. Arg., 313  
   var. *hildebrandtii* (Pax) Pax, 314  
   var. *parvifolia* (Lam.) Muell. Arg., 312  
**Dalechampia trifoliata** Verdc. & Greenway, 313, 314  
   var. *trifida* A. Radcl.-Smith, 314  
   var. *trifoliata*, 314  
**Diacanthium** Boiss., 332, 347  
**Diaspis albida** Niedenzu, 262  
   var. *fimbripetala* Niedenzu, 262  
   forma *trystyla* Niedenzu, 262  
**DIASPIS** Niedenzu, 262  
**DIPLOCYCLOS** (Endl.) Post & O. Kuntze, 56  
**Diplocyclos palmatus** (L.) C. Jeffrey, 56  
*Diporidium schimperii* van Tiegh., 67  
**DIPTEROCARPACEAE**, 70  
*Dipterocarpoideae*, 70  
*Dipterocarpxylum africanum*, 70  
**DISSOTIS** Benth., 108  
*Dissotis alepstris* Taub., 109  
**Dissotis brazza** Cogn., 109, 110  
**Dissotis canescens** (Graham) Hook.f., 110  
   var. *sudanicu* Jacques-Felix, 111  
   var. *zambesiensis*, 111  
**Dissotis decumbens** (P. Beauv.) Triana, 111  
*Dissotis incana* (Walp.) Triana, 110  
*Dissotis irvingiana* Hook.f., 109  
   var. *irvingiana*, 109  
   forma *abyssinica* (Gilg) A. & R. Fernandes, 109  
   forma *irvingiana* (Hook.) A. & R. Fernandes, 109  
**Dissotis princeps** (Kunth) Triana, 110  
   var. *candolleana* (Cong.) A. & R. Fernandes, 110  
   var. *princeps*, 110  
*Dissotis rotundifolia* (Sm.) Triana, 111  
**Dissotis senegambiensis** (Guill. & Perr.) Triana, 109  
   var. *alpestris* (Taub.) A. & R. Fernandes, 109  
   forma *alpestris*, 109  
   forma *osbeckioides*, 109  
   var. *senegambiensis*, 109  
   forma *senegambiensis*, 109  
**Dombeya aethiopica** Gilli, 168, 169  
*Dombeya alascha* K. Schum., 170  
*Dombeya albiflora* K. Schum., 168  
*Dombeya bruceana* A. Rich., 168  
*Dombeya buettneri* K. Schum., 168  
**DOMBEYA** Cav., 166  
*Dombeya gallana* K. Schum. & Engl., 168  
   var. *floribunda* Fiori, 168  
**Dombeya kirkii** Mast., 170  
**Dombeya longibracteolata** Seyani, 166  
*Dombeya mastersii* sensu Cufod., 168  
*Dombeya multiflora* (Endl.) Planch., 170  
**Dombeya quinqueseta** (Del.) Exell, 170  
**Dombeya rotundifolia** (Hochst.) Planch., 170  
*Dombeya schimperiana* A. Rich., 168  
   var. *glabrata* K. Schum., 168  
**Dombeya** sp = *Vatova* 1153, 168  
*Dombeya stipulosa* Chiov., 168  
**Dombeya torrida** (J. F. Gmel.) P. Bamps, 168, 169  
*Dombeya vatovae* Chiov., 170  
**Eremophyton** Boiss., 352  
**Erythrococca abyssinica** Pax, 296, 297  
**ERYTHROCOCCA** Benth., 296  
**Erythrococca bongensis** Pax, 298  
*Erythrococca parvifolia* Chiov., 296  
**Erythrococca trichogyne** (Muell. Arg.) Prain, 297, 298  
**Erythrococca uniflora** M. Gilbert, 297, 298  
**ERYTHROXYLACEAE**, 264  
*Erythroxyllum coca* Lam., 264  
**Erythroxyllum fischeri** Engl., 264  
*Erythroxyllum novagranatensis* (Morris) Hieron, 264  
**ERYTHROXYLUM** P. Browne, 264  
**ESULA** Pers., 350, 365  
**Esula** Pers., 365  
**Eucalyptus amygdalina** Labill., 90  
**Eucalyptus astringens** (Maiden) Maiden, 94  
*Eucalyptus bicolor* Cunn. ex Hook., 103  
*Eucalyptus bicostata* Maiden, Blakeley & J. Simm., 100  
**Eucalyptus bosistoana** F. Muell., 104  
**Eucalyptus botryoides** Smith, 83, 92  
**Eucalyptus brockwayi** C. Gardner, 95  
**Eucalyptus camaldulensis** Dehnh., 84, 98  
*Eucalyptus* cf. *studleyensis*, 81  
**Eucalyptus cinerea** Benth., 103  
**Eucalyptus citriodora** Hook., 83, 86  
**Eucalyptus cladocalyx** F. Muell., 96  
**Eucalyptus cloeziana** F. Muell., 87  
**Eucalyptus cornuta** Labill., 93  
*Eucalyptus costata* F. Muell., 97  
**Eucalyptus crebra** F. Muell., 104  
**Eucalyptus dalrympleana** Maiden, 102  
   subsp. *dalrympleana*, 102  
   subsp. *heptantha* L. Johnson, 102  
**Eucalyptus deanei** Maiden, 91  
*Eucalyptus decisneana*, 81  
**Eucalyptus delegatensis** R. Baker, 90  
**Eucalyptus diversicolor** F. Muell., 90  
**Eucalyptus dundasii** Maiden, 97  
**Eucalyptus dunnii** Maiden, 99  
**Eucalyptus fastigiata** Deane & Maiden, 88, 89  
**Eucalyptus ficifolia** F. Muell., 83, 86  
*Eucalyptus glabratus*, 81  
**Eucalyptus globulus** Labill., 100  
   subsp. *bicostata* (Maiden, Blakely & J. Simm.) Kirkpatr., 100, 101  
   subsp. *globulus*, 100  
   subsp. *maidenii* (F. Muell.) Kirkpatr., 101  
**Eucalyptus gomphocephala** DC., 93  
**Eucalyptus goniocalyx** Miq., 99  
**Eucalyptus grandis** Maiden, 83, 91  
**Eucalyptus gunnii** J. D. Hook., 102, 103  
**Eucalyptus incrassata** Labill., 97  
**Eucalyptus johnstonii** Maiden, 101  
**EUCALYPTUS** L'Hérit., 79  
**Eucalyptus largiflorens** F. Muell., 103, 104  
**Eucalyptus leucoxydon** F. Muell., 105  
   subsp. *leucoxydon*, 105  
**Eucalyptus maculata** Hook., 83, 87  
**Eucalyptus melliodora** Schauer, 105  
**Eucalyptus microcorys** F. Muell., 106  
**Eucalyptus microtheca** F. Muell., 103  
*Eucalyptus mucronata*, 98  
**Eucalyptus nitens** (Deane & Maiden) Maiden, 99, 100

- Eucalyptus obliqua* L'Hérit., 89  
*Eucalyptus occidentalis* Endl., 94  
*Eucalyptus ovata* Labill., 98  
*Eucalyptus paniculata* Smith, 84, 105  
*Eucalyptus parvifolia* Cabbage, 98, 99  
*Eucalyptus patens* Benth., 87, 88  
*Eucalyptus pilularis* Smith, 88  
*Eucalyptus planchoniana* F. Muell., 89  
*Eucalyptus regnans* F. Muell., 88  
*Eucalyptus resinifera* Smith, 92, 93  
*Eucalyptus rostrata* Schldl. non Cav., 98  
*Eucalyptus rostratus*, 98  
*Eucalyptus robusta* Smith, 83, 92  
*Eucalyptus rubida* Deane & Maiden, 102  
*Eucalyptus rudis*, 97  
*Eucalyptus saligna* Smith, 91, 92  
*Eucalyptus salmonophloia* F. Muell., 96  
*Eucalyptus salubris* F. Muell., 95  
*Eucalyptus sideroxylon* Wolls, 106  
   subsp. *sideroxylon*, 106  
*Eucalyptus tereticornis* Smith, 84, 97  
*Eucalyptus torelliana* F. Muell., 86  
*Eucalyptus transcontinentalis* Maiden, 96  
*Eucalyptus viminalis* Labill., 101  
   subsp. *viminalis*, 102  
   var. *viminalis*, 101  
   subsp. *cygnetensis* Boosma, 102  
*Eucalyptus wandoo* Blakely, 95  
*Eugenia capensis* (Eckl. & Zeyh.) Sond., 75  
   subsp. *nyassensis* (Engl.) F. White, 75  
*Eugenia caryophyllus*, 75  
**EUGENIA** L., 72  
*Eugenia uniflora* L., 75, 76  
*Eugenia bukobensis* Engl., 75, 76  
*Euphorbia abyssinica* Gmel., 334, 336  
   var. *tetragona* Schweinf., 334  
*Euphorbia acalyphoides* Boiss., 351  
   subsp. *acalyphoides*, 351  
   subsp. *cicatricosa* S. Carter, 351  
*Euphorbia acurensis* N.E.Br., 336  
*Euphorbia actinoclada* Carter, 347  
*Euphorbia adjurana* Bally & Carter, 336, 338  
*Euphorbia aegyptiaca* Boiss., 375  
*Euphorbia aethiopicum* Croizat, 336  
*Euphorbia agowensis* Boiss., 354  
   var. *agowensis*, 354, 355  
   var. *pseudoholstii* (Pax) Bally & Carter, 354, 355  
*Euphorbia ampliphylla* Pax, 334, 335  
*Euphorbia arabica* Anderson, 376, 377  
*Euphorbia awashensis* M. Gilbert, 346  
*Euphorbia бага* Chev., 347  
*Euphorbia baleënsis* M. Gilbert, 344  
*Euphorbia betulicortex* M. Gilbert, 361, 362  
*Euphorbia bittataensis* M. Gilbert, 344  
*Euphorbia borenensis* M. Gilbert, 339  
*Euphorbia breviararticulata* Pax, 337  
   var. *breviararticulata*, 337  
   var. *trunciformis* S. Carter, 337  
*Euphorbia brevicornu* Pax, 370  
*Euphorbia brunellii* Chiov., 349, 350  
*Euphorbia buchananii* Pax, 370  
*Euphorbia burgeri* M. Gilbert., 338  
*Euphorbia bussei* Pax, 338  
*Euphorbia cactus* Boiss., 337  
*Euphorbia calamiformis* Bally & Carter, 365  
*Euphorbia calycina* N.E.Br., 336  
*Euphorbia candelabrum* Kotschy, 336, 337  
   var. *erythraeae* Berger, 336  
*Euphorbia candelabrum* Welwitsch, 336  
*Euphorbia cerebrina* Boiss., 367  
*Euphorbia colubrina* Bally & Carter, 339  
*Euphorbia columnaris* Bally, 340  
*Euphorbia controversa* N.E.Br., 336  
*Euphorbia convolvuloides* Boiss., 374  
*Euphorbia cotinifolia* L., 373  
*Euphorbia crotonoides* Boiss., 352, 353  
   subsp. *crotonoides*, 353  
   subsp. *narokensis* S. Carter, 353  
*Euphorbia cryptocaulis* M. Gilbert, 348, 349  
*Euphorbia cryptospinosa* Bally, 345  
*Euphorbia cuneata* Vahl, 359  
   subsp. *cuneata*, 359, 360  
   var. *carpasus* Boiss., 359  
   subsp. *lamproderma* S. Carter, 360  
   subsp. *spinescens* (Pax) S. Carter, 359  
   var. *pumila*, 359  
   var. *pumilans*, 359  
   var. *spinescens*, 359  
   subsp. *wajirensis* S. Carter, 359, 360  
   var. = *Hemming* 1520, 360  
   var. *wajirensis*, 359  
*Euphorbia cuneata*, 356  
*Euphorbia cyathophara* Murr., 373  
*Euphorbia cyparissioides* Pax, 367, 368  
*Euphorbia dalettiensis* M. Gilbert, 339  
*Euphorbia dauana* Carter, 344  
*Euphorbia decidua* Bally & Leach, 347  
*Euphorbia depauperata* A. Rich., 366, 368  
   var. *laevicarpa* Friis & Vollesen, 367  
   var. *pubescens* Pax, 367  
   var. *trachycarpa* (Pax) Carter, 367  
   subsp. *aprica* Pax, 367  
*Euphorbia dilatata* A. Rich., 370  
*Euphorbia disclusa* N.E.Br., 336  
*Euphorbia doloensis* M. Gilbert, 358  
*Euphorbia dumalis* S. Carter, 366  
*Euphorbia ellenbeckii* Pax, 340  
*Euphorbia erlangeri* Pax, 345  
*Euphorbia erythraeae* (Berger) N.E.Br., 336  
*Euphorbia fissispina* Bally & Carter, 344  
*Euphorbia forskaoilii* Gay, 375  
   var. *glabrata* Gay, 378  
*Euphorbia furcatifolia* M. Gilbert, 370, 372  
*Euphorbia geniculata* Ortega, 373  
*Euphorbia glochidiata* Pax, 337, 344, 345  
*Euphorbia glomerifera* (Millsp.) Wheeler, 375  
*Euphorbia goetzei* Pax, 355, 356  
*Euphorbia gorinii* Chiov., 352  
*Euphorbia gossypina* Pax, 364  
*Euphorbia grandicornis* auct. non N.E.Br., 337  
*Euphorbia grandicornis* N.E.Br., 337  
*Euphorbia grandis* Lem., 334  
*Euphorbia granulata* Forssk., 377  
   var. *dentata* N.E.Br., 376  
   var. *glabrata* (Gay) Boiss., 378.  
   var. *granulata*, 378

- Euphorbia grosseri* Pax, 361  
**Euphorbia grosseri** Pax, 361  
*Euphorbia gymnocalycioides* Gilbert & Carter, 340  
**Euphorbia hadramautica** Baker, 351  
*Euphorbia hararensis* Pax, 334  
*Euphorbia heterochroma* sensu Burger, 339  
**Euphorbia heterophylla** L., 373  
**Euphorbia hirta** L., 374  
*Euphorbia hochstetteriana* Pax, 370  
*Euphorbia horwoodii* Bally & Carter, 340  
*Euphorbia hypericifolia* L., 374  
*Euphorbia hypericifolia* sensu Hochstetter, 374  
**Euphorbia inaequilatera** Sond., 376  
   var. *inaequilatera*, 376  
   var. *dentata* (N.E.Br.) M. Gilbert, 376  
**Euphorbia inaequispina** N.E.Br., 340  
**Euphorbia indica** Lam., 374, 375  
   var. *angustifolia* Boiss., 374  
*Euphorbia infausta* N.E.Br., 342  
*Euphorbia infesta* Pax, 345  
**Euphorbia intricata** S. Carter, 358  
*Euphorbia jatrophioides* Pax, 357, 358  
*Euphorbia joyae* Bally & Carter, 358  
**Euphorbia kalisana** Carter, 346  
**Euphorbia kelleri** Pax, 358  
   var. *kelleri*, 358  
   var. *latifolia* Pax, 358  
*Euphorbia kibwezensis*, 338  
**EUPHORBIA**, 332  
**EUPHORBIA** L., 331  
   Subgenus **AGALOMA** (Rafin.) House, 373  
   Subgenus **CHAMAESYCE** Rafin., 373  
   Subgenus **ESULA** Pers., 350  
     Section *Anthacantha* Pax, 354  
     Section *Dactylanthes* (Haw.) Pax, 354  
     Section *Eremophyton* Boiss., 352  
     Section *Esula* Pers., 365  
     Section *Holstianae* Pax & K. Hoffm., 351  
     Section *Lyciopsis* Boiss., 356  
     Section *Pseudacalypha* Boiss., 350  
     Section *Somalica* Carter, 361  
     Section *Tirucalli* Boiss., 363  
     Section *Trichadenia* Pax, 354  
   Subgenus **EUPHORBIA**, 332  
     Sect. *Diacanthium* Boiss., 332  
   Subgenus **LACANTHIS** (Raf.) M. Gilbert, 347  
     Sect. *Diacanthium* Boiss., 347  
   Subgenus **POINSETTIA** (Graham) House, 372  
**Euphorbia lathyris** L., 371  
*Euphorbia leucocephala* Lotsy, 373  
*Euphorbia longecornuta* Pax, 370  
*Euphorbia longepetiolata* Pax & K. Hoffm., 370  
   var. *pubescens* N.E.Br., 370  
**Euphorbia longispina** Chiov., 338  
**Euphorbia longituberculosa** Boiss., 352  
**Euphorbia lophiosperma** S. Carter, 353  
*Euphorbia macrophylla* Pax, 356  
**Euphorbia makallensis** Carter, 342  
**Euphorbia marginata** Pursh, 373  
*Euphorbia matabelensis*, 356  
*Euphorbia menelikii* Pax, 334  
*Euphorbia migiurtinorum* Chiov., 344  
**Euphorbia milii** Des Moulins, 349  
   var. *hislopii* (N.E.Br.) Ursch & Leandri, 349  
   var. *splendens* (Hook.) Ursch & Leandri, 349  
**Euphorbia monacantha** Pax, 346  
**Euphorbia monadenioides** M. Gilbert, 347, 348  
*Euphorbia monticola* A. Rich., 370  
*Euphorbia napoides* Pax, 351  
*Euphorbia neglecta* N.E.Br., 334  
*Euphorbia neutra* Berger, 334  
**Euphorbia nigrispina** N.E.Br., 342  
**Euphorbia nigrispinioides** M. Gilbert, 342  
*Euphorbia noxia* Pax, 355  
**Euphorbia nubica** N. E.Br., 364, 365  
   Form **A** (*Euphorbia nubica* sens. str.), 364  
   Form **B**, 364  
   Form **C**, 365  
*Euphorbia obovalifolia* A. Rich., 334  
*Euphorbia obovalifolia* sensu N.E.Br., 334  
*Euphorbia officinarum* L. B kolquall Willd., 334  
**Euphorbia ogadenensis** Bally & Carter, 354  
**Euphorbia omariana** M. Gilbert, 356, 357  
**Euphorbia peplus** L., 370  
**Euphorbia perangustifolia** S. Carter, 351  
**Euphorbia petitiana** A. Rich., 367  
*Euphorbia pilulifera* auct. non L., 374  
**Euphorbia pirottae** Terracc., 352  
**Euphorbia piscidermis** M. Gilbert, 340, 341  
**Euphorbia platyphyllos** L., 368, 369  
**Euphorbia polyacantha** Boiss., 342, 343  
   subsp. *rosenii* Pax., 342  
   var. *subinarticulata* Schweinf., 342 -  
**Euphorbia polyantha** Pax, 354, 355  
**Euphorbia polycnemoides** Boiss., 376, 377  
*Euphorbia propinqua* N.E.Br., 376  
**Euphorbia prostrata** Ait., 375  
*Euphorbia pseudo-holstii* Pax, 354  
*Euphorbia pseudofalcata* Chiov., 367  
**Euphorbia pulcherrima** Klotzsch., 372  
**Euphorbia quadrispina** Carter, 340  
*Euphorbia reghinii* (Chiov.) Vollesen, 357  
**Euphorbia repetita** A. Rich., 370  
*Euphorbia richardeana* Baill., 334  
**Euphorbia rivaie** Pax, 378  
**Euphorbia robecchii** Pax, 337, 338, 339  
**Euphorbia rubella** Pax, 349  
   var. *brunellii* (Chiov.) Bally, 349  
**Euphorbia rubromarginata** L.E. Newton, 341  
*Euphorbia ruspolii* Chiov., 338  
*Euphorbia sacchii* Chiov., 361  
*Euphorbia sancta* Pax, 334  
*Euphorbia sanguinea* Boiss., 376  
   var. *intermedia* Boiss., 376  
**Euphorbia sareciana** Gilbert, 367, 372  
**Euphorbia scheffleri** Pax, 361, 363  
   var. *carbadensis* Hässler, 361  
*Euphorbia schimperii* Presl., 364  
**Euphorbia schimperiana** Scheele, 370, 371  
   var. *pubescens* (N.E.Br.) S. Carter, 370  
   var. *triloba* Chiov., 370  
   var. *velutina* N.E.Br., 370  
**Euphorbia schizacantha** Pax, 337, 347  
*Euphorbia scoparia* N.E.Br., 364  
**Euphorbia scordifolia** Jacq., 375  
**Euphorbia sebsebei** M. Gilbert, 343



- Euphorbia seclusa* N.E.Br., 376  
***Euphorbia septentrionalis*** Bally & Carter, 343  
     subsp. *gemugofana* M. Gilbert, 343  
     subsp. *septentrionalis*, 343  
*Euphorbia somalensis* Pax, 361  
*Euphorbia serpens* Kunth, 378  
***Euphorbia somalensis*** Pax, 362  
*Euphorbia* sp. = *Ash* 1143, 351  
*Euphorbia* sp. = *Burger* 2287, 338  
*Euphorbia* sp. = *Burger* 3154, 341  
*Euphorbia* sp. = *Gilbert & Jones* 123, 349  
*Euphorbia* sp. = *Gilbert* 2296, 347  
*Euphorbia* sp. = *Gilbert* 3381, 363  
*Euphorbia* sp. = *Gilbert et al.* 7322, 378  
*Euphorbia* sp. = *Le Houérou* 051176/04-06, 347  
*Euphorbia* sp. = *Sebese* 479, 369  
*Euphorbia* sp. aff. *E. ugandensis* Pax, 366  
*Euphorbia stricta* L., 369  
*Euphorbia spinescens* Pax, 359  
*Euphorbia splendens* Hook., 349  
*Euphorbia systyloides* Pax, 353  
     var. *hebecarpa* (Pax) N. E. Br., 353  
***Euphorbia tescorum*** Carter, 339  
***Euphorbia tetracantha*** Rendle, 344  
*Euphorbia tetragona* A. Rich., 342  
*Euphorbia thi* Schweinf., 342  
     var. *subinarticulata* (Schweinf.) N.E.Br., 342  
***Euphorbia tirucalli*** L., 364, 365  
*Euphorbia trachycarpa* Pax, 367  
*Euphorbia transvaalensis* Schlecht., 355  
*Euphorbia triacantha* Boiss., 345  
***Euphorbia triaculeata*** Forssk., 345, 346  
     var. *triacantha* (Boiss.) N.E.Br., 345  
*Euphorbia turbiniformis* Chiov., 340  
*Euphorbia ugandensis* Pax, 366  
*Euphorbia uhligiana* Pax, 344  
***Euphorbia uniglans*** M. Gilbert, 361, 362  
***Euphorbia venenifica*** Kotschy, 334  
***Euphorbia wellbyi*** N.E.Br., 369  
     var. *glabra* S. Carter, 369  
     var. *wellbyi*, 369  
*Euphorbia xylacantha* Pax, 346  
*Euphorbia zambesiana* sensu Cufod. non Benth, 378  
**EUPHORBIACEAE**, 265  
**EUPHORBIOIDEAE**, 265  
***Eureiandra cogniauxii*** (Gilg) C. Jeffrey, 51  
**EUREIANDRA** Hook.f., 51  
*Eureiandra somalensis* (Chiov.) C. Jeffrey, 51  
*Eureiandra* sp. = *De Wilde* 6662, 51  
*Excoecaria abyssinica* Muell. Arg., 328  
*Excoecaria manniana* Muell. Arg., 328  
**FELJOA** O. Berg, 72  
*Feijoa sellowiana* (O. Berg) O. Berg, 72  
*Ficalhoa*, 65  
***Fioria dictyocarpa*** (Webb) Mattei, 214, 215  
**FIORIA** Mattei, 214  
*Fioria pavonioides* (Fiori) Mattei, 214  
**FLABELLARIA** Cavan., 261  
***Flabellaria paniculata*** Cavan., 261  
*Flueggea fagifolia* Pax, 284  
***Flueggea leucopyrus*** Willd., 275  
*Flueggea microcarpa* Bl., 272  
*Flueggea nitida* Pax, 284  
***Flueggea virosa*** (Willd.) Voigt., 272  
     subsp. *melanthesoides* (F. Muell.) Webster, 274  
     subsp. *virosa*, 274  
**FLUEGGEEA** Willd., 272  
**Foetidia**, 107  
*Frankenia pulverulenta* L., 2  
*Frankenia*, 2  
**FRANKENIACEAE**, 2  
**FURCARIA** DC., 194  
***Garcinia buchananii*** Baker, 142  
*Garcinia buxifolia*, 142  
*Garcinia ferrandii* Chiov., 142  
     var. *affinis* Chiov., 142  
*Garcinia huillensis* sensu auct. non Welw. ex Oliver, 142  
**GARCINIA** L., 140  
***Garcinia livingstonei*** T. Anders., 142, 143  
*Garcinia mangostana* L., 142  
***Garcinia ovalifolia*** Oliver, 142  
*Gelonium procerum* Prain, 317  
*Gelonium* Willd., 316  
*Gerrardanthus aethiopicus* Chiov., 18  
*Gerrardanthus grandifolius*, 18  
     var. *lobatus* Cogn., 18  
**GERRARDANTHUS** Hook.f., 18  
***Gerrardanthus lobatus*** (Cogn.) C. Jeffrey, 18, 19  
*Gerrardanthus parviflorus* Cogn., 18  
**GIGANTOCALYX** Ulbr., 200  
***Givotia gosai*** A. Radcl.-Smith, 328, 329  
**GIVOTIA** Griff., 328  
**GLOMERATAE** Burret, 152  
**GOMPHIA** Schreb., 69  
*Gomphia* sp. = *Mooney* 9249, 69, 68  
*Gossypium abyssinicum* Watt, 222  
***Gossypium anomalum*** Wawra & Peyritsch, 219, 221  
     subsp. *senarense* (Fenzl ex Wawra & Peyr.) Vollesen, 219  
*Gossypium arboreum* L., 222  
*Gossypium barbadense* L., 222  
***Gossypium benadirensis*** Mattei, 220, 221  
***Gossypium bricchettii*** (Ulbr.) Vollesen, 220, 221  
*Gossypium ellenbeckii* (Gürke) Mauer, 220  
*Gossypium herbaceum* L., 219  
     var. *steudneri* Schweinf. ex Gürke, 219  
*Gossypium herbaceum* L., 222  
     var. *acerifolium* (Guill. & Perr.) A. Chev., 222  
***Gossypium hirsutum*** L., 222  
     var. *punctatum* (Schumach. & Thonn.) Roberty, 222  
**GOSSYPIUM** L., 219  
***Gossypium somalense*** (Gürke) Hutch., 220, 221  
***Grewia arborea*** (Forssk.) Lam., 146  
*Grewia beguinotii* Lanza, 150  
***Grewia bicolor*** Juss., 146, 147  
     var. *tephrodermis* (K. Schum.) Burret, 148  
*Grewia cinerea* A. Rich., 146  
*Grewia columinaris* Hochst. non Smith., 150  
*Grewia corylifolia* A. Rich. apud. Guill. & Perr., 152  
*Grewia discolor* Fresen., 146  
*Grewia echinulata* Del., 152  
***Grewia erythraea*** Schweinfurth, 152  
*Grewia fallax* K. Schum., 146  
***Grewia ferruginea*** Hochst. ex A. Rich., 150, 151  
***Grewia flavescens*** Juss., 147, 149

- Grewia forbesii** Harv. ex Mast., 149  
**Grewia gillettii** Sebsebe & Mathew, 148  
**Grewia heterophylla** A. Rich., 146  
**Grewia kakothamnus** K. Schum., 152  
**GREWIA** L., 145  
   Section AXILLARES Burret, 145  
   Section GLOMERATAE Burret, 152  
   Section GREWIA (OPPOSITIFLORAE Burret), 149  
   Section PLURIOVULATAE Burret, 149  
**Grewia lilacina** K. Schum., 150  
**Grewia membranacea** A. Rich., 150  
**Grewia mollis** A. Juss., 146  
   var. *morifolia* (Fiori) Cufod., 148  
   var. *petitiana* (A. Rich.) Burret, 146  
   var. *trichocarpa* (Hochst. ex A. Rich.) Burret, 148  
**Grewia ogadenensis** Sebsebe, 152  
**GREWIA (OPPOSITIFLORAE)** Burret, 149  
**Grewia pallida** Hochst., 146  
**Grewia parviflora** Hochst. ex A. Rich., 150  
**Grewia pennicillata** Chiov., 154  
**Grewia petitiana** A. Rich., 146  
**Grewia reticulata** Hochst., 150  
**Grewia schweinfurthii** Burret, 149  
**Grewia similis** K. Schum., 150  
**Grewia** sp. = *Gilbert & Sebsebe* 8598, 148  
**Grewia tembensis** Fresen., 150  
   var. *kakothamnus* (K. Schum.) Burret, 152  
   var. *ellenbeckii* Burret, 150  
   var. *tembensis*, 150  
**Grewia tenax** (Forssk.) Fiori, 152  
   var. *capillipes* Lanza, 152  
   var. *ribesifolia* Fiori, 152  
**Grewia trichocarpa** Hochst. ex A. Rich., 148  
   var. *morifolia* Fiori, 148  
**Grewia tristis** K. Schum., 148  
**Grewia velutina** (Forssk.) Vahl, 148  
**Grewia velutina** A. Rich., 146  
**Grewia venusta** Fresen., 146  
**Grewia villosa** Willd., 152, 153  
**GUTTIFERAE**, 135  
*Halimium*, 2  
*Harmsia emarginata* Schinz, 170  
**HARMSIA** K. Schum., 170  
*Harmsia microblastos* K. Schum., 170  
*Harmsia sidoides* K. Schum., 170, 171  
*Helianthemum*, 2  
*Hermannia abyssinica* (Hochst. ex Harv.) K. Schum., 181  
*Hermannia boranensis* K. Schum., 180  
*Hermannia donaldsonii* Bak., 180  
*Hermannia erlangeriana* K. Schum., 183  
*Hermannia erythraeae* Chiov., 180  
*Hermannia exappendiculata* (Mast.) K. Schum., 180, 182  
*Hermannia kirkii* Mast., 181  
**HERMANNIA** L., 178  
*Hermannia modesta* (Ehrenb.) Mast., 181  
*Hermannia paniculata* Franch., 180, 182  
*Hermannia quartiniana* A. Rich., 181, 182  
*Hermannia* sp. = *Friis* et al. 2977, 180  
*Hermannia testacea* Vollesen, 181, 182  
*Hermannia tigreensis* Hochst. ex A. Rich., 181  
*Heteropodium abyssinicum* van Tiegh., 67  
**HEVEA** Aubl., 314  
*Hevea brasiliensis* (Adr. Juss.) Muell. Arg., 314, 315  
*Hibiscus abyssinicus* Steud., 205  
**HIBISCUS acetosella** Welw. ex Hiern, 198  
**HIBISCUS aethiopicus** L., 202, 203  
   var. *helvolus* Harv., 202  
*Hibiscus ambelacensis* Schweinf. ex Ulbr., 202  
*Hibiscus amblycarpus* Hochst. ex Webb, 204  
**HIBISCUS aponeurus** Sprague & Hutch., 209  
*Hibiscus aristivalvis* Garcke, 205  
**HIBISCUS articulatus** Hochst. ex A. Rich., 203, 204  
   var. *stenolobus* Hochst. ex Mast., 204  
*Hibiscus asper* Hook. f., 198  
**HIBISCUS berberidifolius** A. Rich., 196, 197  
**HIBISCUS boranensis** Cufod., 208  
*Hibiscus brevitybus* Cufod., 209  
**HIBISCUS bricchettii** Gurke ex Ulbr., 200  
*Hibiscus calycinus* Willd., 192  
*Hibiscus calycosus* A. Rich., 192  
**HIBISCUS calyphyllus** Cavan., 192, 193  
**HIBISCUS cannabinus** L., 198, 199  
   var. *punctatus* (A. Rich.) Hochr., 198  
   var. *tripartitus* (Forssk.) Chiov., 198  
*Hibiscus cernuus* Terrac., 208  
*Hibiscus chiovendae* Cufod., 209  
**HIBISCUS corymbosus** Hochst. ex A. Rich., 204  
   var. *integrifolia* Chiov., 204  
   var. *palmatilobata* Chiov., 204  
**HIBISCUS crassinervius** Hochst. ex A. Rich., 209, 211  
   var. *flammeus* (Schweinf. ex Spreng.) Schweinf. ex N.E.Br., 209  
   var. *minor* Sprague, 209  
**HIBISCUS deflersii** Schweinf. ex Cufod., 208  
*Hibiscus dictyocarpus* Webb, 214  
**HIBISCUS diversifolius** A. Rich., 196, 197  
*Hibiscus diversifolius* Jack., 196  
   var. *witteanus* Hochr., 196  
**HIBISCUS dongolensis** Del., 192, 195  
*Hibiscus ellenbeckii* Ulbr., 194  
*Hibiscus erianthus* R. Br. in Salt, 209  
**HIBISCUS eriospermus** Hochst. ex Cufod., 209  
**HIBISCUS flavifolius** Ulbr., 208  
**HIBISCUS fuscus** Garcke, 206  
**HIBISCUS gallaënsis** Ulbr., 212  
*Hibiscus grandifolius* Hochst. ex A. Rich., 192  
*Hibiscus greenwayi* sensu Cufod. (l.c.) quoad Bally 9128, 196  
*Hibiscus greenwayi* Bak. f., 196  
   var. *megensis* J. P. Lebrun, 196  
*Hibiscus hansalii* Cufod., 208  
**HIBISCUS hildebrandtii** Sprague & Hutch., 208  
**HIBISCUS hochstetteri** Cufod., 210  
*Hibiscus intermedius* A. Rich., 205  
*Hibiscus intermedius* Hochst., 210  
*Hibiscus jatrophifolius* A. Rich., 205  
**HIBISCUS** L., 191  
   Sect. *Aristivalvis* Ulbr., 205  
   Sect. *BOMBYCELLA* DC., 206  
   Sect. *CALYPHYLLI* Ulbr., 191  
   Sect. *FURCARIA* DC., 194  
   Sect. *GIGANTOCALYX* Ulbr., 200  
   Sect. *KETMIA* Endl. emend. Hochr., 202  
   Sect. *LILIBISCUS* Hochr., 200  
   Sect. *PANDURIFORMES* Ulbr., 202  
   Sect. *PTEROCARPUS* Garcke, 205

- Sect. *SOLANDRA* Hochr., 205  
 Sect. *Trichospermum* Hochr., 202  
 Sect. *TRIONUM* DC., 200  
*Hibiscus lanzae* Cufod., 192  
*Hibiscus lobatus* (Murr.) O. Ktze., 205  
*Hibiscus ludwigii* Eckl. & Zeyh., 194  
*Hibiscus lunariifolius* Willd., 194  
*Hibiscus macranthus* Hochst. ex A. Rich., 194, 195  
*Hibiscus micranthus* L. f., 210, 211  
 var. *grandifolius* Fiori, 210  
 var. *hermanniaefolius* (Hochst. ex Hochr.) Cufod., 210  
 var. *parvifolius* (Hochst. ex Anders.) Cufod., 210  
*Hibiscus modaticus* Hochst. ex A. Rich., 205  
*Hibiscus neumannii* Ulbr., 192  
*Hibiscus noldeae* Bak. f., 200, 201  
*Hibiscus obscurus* A. Rich., 205  
*Hibiscus obtusilobus* Garcke, 204  
*Hibiscus ovalifolius* (Forssk.) Vahl, 192, 193  
*Hibiscus palmatus* Forssk., 205, 207  
*Hibiscus panduriformis* Burm. f., 202, 203  
*Hibiscus parvifolius* R. Br., 205  
*Hibiscus pavonioides* Fiori, 214  
*Hibiscus physaloides* Guill. & Perr., 204  
*Hibiscus pospischilii* Cudod., 210  
*Hibiscus pycnostemon* Hochr., 210  
*Hibiscus rhabdotospermus* Garcke, 201, 202  
*Hibiscus richardii* Riedl, 205  
*Hibiscus rosa-sinensis* L., 200  
*Hibiscus rostellatus* Guill. & Perr., 198  
*Hibiscus rupestris* Hochst. ex Cufod., 209  
*Hibiscus sabdariffa* L., 198  
*Hibiscus schizopetalus* (Mast.) Hook. f., 200  
*Hibiscus seineri* Ulbr. ex Engl., 192  
*Hibiscus sidiformis* Baill., 205, 207  
*Hibiscus somalensis* Franch., 208  
*Hibiscus* sp. = *Beals* 951, 210  
*Hibiscus* sp. = *Burger* 3095, 209  
*Hibiscus* sp. = *Carr* 945, 210  
*Hibiscus* sp. = *Gillett* 14256, 209  
*Hibiscus sparseaculeatus* Bak. f., 196, 197  
*Hibiscus spartioides* Chiov., 208  
*Hibiscus surattensis* L., 198, 201  
*Hibiscus teramnensis* Ulbr., 194  
*Hibiscus trionum* L., 199, 200  
*Hibiscus verrucosus* Guill. & Perr., 198  
*Hibiscus vitifolius* L., 205, 207  
 subsp. *vulgaris* Brenan & Exell, 205  
*Hibiscus wellbyi* Sprague, 209  
*Hibiscus zeylanicus* L. (not *P. zeylanica*), 233  
*Holstianae* Pax & K. Hoffm., 351  
*Hymenocardia acida* Tulasne, 285  
 var. *acida*, 286  
 var. *mollis* Radcliffe-Smith, 286  
**HYMENOCARDIA** Wall. ex Lindl., 285  
**HYPERICACEAE**, 135  
*Hymenosicyos membranifolius* (Hook. f.) Chiov., 30  
*Hypericum afromontanum* Bullock, 139  
*Hypericum annulatum* Moris, 138  
 subsp. *afromontanum* (Bullock) N. Robson, 139  
 subsp. *intermedium* (Steud. ex A. Rich.) N. Robson, 138  
*Hypericum degenii* Bornm., 138  
*Hypericum gnidiifolium* A. Rich., 138  
*Hypericum intermedium* Steud. ex A. Rich., 138  
 forma *obtusifolium* R. Keller ex Moggi & Pisacchi, 139  
**HYPERICUM** L., 135  
*Hypericum lanceolatum* sensu Cufod., 136  
*Hypericum leucoptychodes* Steudel ex A. Rich., 136  
*Hypericum pepilidifolium* A. Rich., 140  
*Hypericum perforatum*, 138  
 var. *annulatum* (Moris) Fiori, 138  
*Hypericum martinianum* A. Rich., 136, 137  
 subsp. *roeperianum*, 136  
 var. *roeperianum* (A. Rich.) Moggi & Pisacchi, 136  
*Hypericum revolutum* Vahl, 136  
 subsp. *keniense* (Schweinf.) N. Robson, 136  
 subsp. *revolutum*, 136  
*Hypericum roeperianum* W.G. Schimp. ex A. Rich., 136, 137  
 subsp. *gnidiifolium* (A. Rich.) Moggi & Pisacchi, 138  
 subsp. *roeperianum*, 138  
 var. *schimper* (W.G. Schimp. ex A. Rich.) Moggi & Pisacchi, 138  
*Hypericum schimperi* Hochst. ex A. Rich., 136  
*Hypericum scioanum* Chiov., 139  
*Hypericum synstylum* N. Robson, 136  
*Jatropha aceroides* (Pax & K. Hoffm.) Hutch., 321  
*Jatropha aethiopica* Muell. Arg., 320, 322  
*Jatropha arguta* Chiov., 319  
*Jatropha arguta* sensu Radcl.-Smith, 319  
*Jatropha curcas* L., 324  
*Jatropha dichter* Macbride, 319, 320  
*Jatropha ellenbeckii* Pax, 321, 323  
*Jatropha euarguta* Pax, 319  
*Jatropha ferox* Pax, 319  
*Jatropha fissispina* Pax, 321  
*Jatropha gallabatensis* Schweinf., 320, 322  
*Jatropha glandulosa* Vahl, 321  
*Jatropha glauca* Vahl, 321, 323  
*Jatropha horizontalis* M. Gilbert, 319, 320  
**JATROPHA** L., 318  
*Jatropha lobata* Muell. Arg., 321  
 subsp. *aceroides* Pax & K. Hoffm., 321  
 var. *richardiana* Muell. Arg., 321  
*Jatropha mollis* Pax, 322  
*Jatropha multifida* L., 324  
*Jatropha parvifolia* Chiov., 319  
*Jatropha pelargoniifolia* Courb., 321, 323  
 var. *glandulosa* (Vahl) A. Radcl.-Smith, 321  
 var. *pelargoniifolia*, 321  
 var. *glabra* (Muell. Arg.) Radcl.-Smith, 321  
 var. *sublobata* (Schwartz) Radcl.-Smith, 321  
*Jatropha podagrica*, 324  
*Jatropha pungens* Forssk., 308  
*Jatropha ricinifolia* Courb., 321  
*Jatropha rivae* Pax, 319, 320  
 subsp. *parviflora* (Chiov.) Gilbert & Thulin, 319  
 subsp. *quereifolia* Gilbert & Thulin, 319  
 subsp. *rivae*, 319  
*Jatropha robecchii* Pax, 319  
*Jatropha* sp. = *Frisi* et al. 1011, 322  
*Jatropha spicata* Pax, 322  
*Jatropha stuhlmannii* Pax, 319  
*Jatropha trifida* Chiov., 322  
*Jatropha tropaeoliifolia* Pax, 321, 323  
*Jatropha villosa* (Forssk.) Muell. Arg., 321  
 var. *pelargoniifolia* (Courb.) Chiov., 321

- Kedrostis brevispinosa* Cogn., 41  
*Kedrostis cufodontii* Chiov., 23  
*Kedrostis foetidissima* (Jacq.) Cogn., 23, 24  
     subsp. *obtusiloba* (Sond.) A. Meeuse, 23  
*Kedrostis gijef* (Forssk.) C. Jeffrey, 23  
*Kedrostis hirtella* (Naud.) Cong., 23  
*Kedrostis leloja* (Forssk.) C. Jeffrey, 23, 24  
*Kedrostis macrosperma* Cogn., 41  
*Kedrostis malvifolia* Chiov., 44  
**KEDROSTIS** Medik., 23  
*Kedrostis pseudogijef* (Gilg) C. Jeffrey, 24  
*Kedrostis spinosa* Gilg, 41  
**KETMIA** Endl. emend. Hochr., 202  
*Kosteletzkya adoensis* (Hochst. ex A. Rich.) Mast., 215, 217  
*Kosteletzkya begoniifolia* (Ulbr.) Ulbr., 215, 217  
*Kosteletzkya grantii* (Mast.) Garcke, 215  
*Kosteletzkya buettneri* Gurke, 215  
**KOSTELETZKYA** Presl, 214  
**LACANTHIS** (Raf.) M. Gilbert, 347  
*Lacanthia* Raf., 347  
*Lagenaria abyssinica* (Hook.f.) C. Jeffrey, 49, 50  
*Lagenaria idolatrica* Ser. ex Hochst., 50  
*Lagenaria leucantha* Rusby, 50  
**LAGENARIA** Ser., 49  
*Lagenaria siceraria* (Molina) Standl., 50  
*Lagenaria vulgaris* Ser., 50  
*Laguna abyssinica* Hochst. ex A. Rich., 205  
**LAGUNARIA** G. Don, 214  
*Lagunaria patersonii* (Andr.) G. Don, 214  
*Lavatera abyssinica* Hutch. & Bruce, 237, 238  
**LAVATERA** L., 237  
*Lebretonia acuminata* A. Rich., 225  
**LECYTHIDACEAE**, 107  
*Lepidococca serrata* Turcz., 287  
*Lepidoturus laxiflora* Benth., 291  
**LILIBISCUS** Hochr., 200  
*Lophira lanceolata* Van. Tiegh. ex Keay, 66  
*Lophostemon confertus* (R. Br.) Wilson & Waterhouse, 79  
*Lophostemon* (Schott) Benth., 79  
**LOPHOSTEMON** Schott, 79  
*Lortia erubescens* Rendle, 379  
*Lortia major* Pax, 379  
*Lortia* Rendle, 378  
*Luffa aegyptiaca* Mill., 56  
*Luffa cylindrica* (L.) M. J. Roem., 56, 57  
*Luffa echinata* Roxb., 56  
**LUFFA** Mill., 56  
*Lyciopsis* Boiss., 356  
*Macaranga capensis* (Baill.) Sim, 295  
     var. *kilimandscharica* (Pax) Friis & Gilbert, 295, 296  
*Macaranga kilimandscharica* Pax, 295  
     var. *giordanoi* ['giordanii'] Cufod., 295  
*Macaranga lophostigma* Chiov., 295  
**MACARANGA** Thou., 295  
**MALLOTUS** Lour., 304  
*Mallotus oppositifolius* (Geisel) Muell. Arg., 304  
     var. *lindicus* (Radcl.-Smith) Radcl.-Smith, 304  
     var. *oppositifolius*, 304, 305  
     forma *glabratus* (Muell. Arg.) Pax, 304  
     forma *oppositifolius*, 304  
**MALPIGHIACEAE**, 257  
*Malva abyssinica* A. Braun, 237  
**MALVA** L., 236  
*Malva nicaeensis* All., 237, 238  
*Malva parviflora* Höjer, 237, 238  
     var. *cristata* Boiss., 237  
     var. *microcarpa* (Desf. ex Pers.) Fiori & Paol., 237  
*Malva sylvestris* L., 237, 238  
*Malva verticillata* L., 237, 238  
**MALVACEAE**, 190  
**MALVASTRUM** A. Gray, 239  
*Malvastrum americanum* (L.) Torrey, 239  
*Malvastrum corchorifolium* (Desr.) Small, 239  
*Malvastrum coromandelianum* (L.) Garcke, 239  
*Manihot esculenta* Crantz., 315, 316  
*Manihot glaziovii* Muell. Arg., 316  
**MANIHOT** Mill., 314  
*Manihot utilissima* Pohl, 315  
*Mappa capensis* Baill., 295  
*Margaritaria discoidea* (Baill.) Webster, 284  
     var. *fagifolia* (Pax) A. Radcl.-Smith, 284  
     var. *nitida* (Pax) A. Radcl.-Smith, 284  
     var. *discoidea*, 284  
     var. *triplosphaera*, 284  
**MARGARITARIA** L.f., 282  
*Marquesia* Gilg, 70  
**MEINECKIA** Baill., 270  
*Meineckia phyllanthoides* Baill., 270  
     subsp. *capillariformis* (Vatke & Pax), 271  
     subsp. *phyllanthoides*, 271  
     subsp. *somalensis* (Pax) Webster, 271  
     subsp. *trichopoda* (Muell. Arg.), 271  
**MELALEUCA** L., 79  
*Melaleuca leucadendron* (L.) L., 79  
*Melastomastrum capitatum* (Vahl) A. & R. Fernandes, 111  
*Melastomastrum capitatum* sensu Cufod., 112  
**MELASTOMASTRUM** Naud., 111  
*Melastomata capitata* Vahl, 111  
*Melastomata decumbens* P. Beauv., 111  
**MELASTOMATACEAE**, 108  
*Melchiora*, 65  
*Melhania abyssinica* A. Rich., 173  
*Melhania angustifolia*, 174  
*Melhania beguinotii* Cufod., 175  
*Melhania cyclophylla* Hochst. ex Mast., 174  
*Melhania denhamii* R. Br., 173, 176, 177  
*Melhania ferruginea* A. Rich., 174  
*Melhania fiorii* Chiov., 176  
**MELHANIA** Forssk., 172  
*Melhania grandibracteata* (K. Schum.) K. Schum., 176  
*Melhania kelleri* Schinz, 176  
*Melhania muricata* Balf.f., 176  
*Melhania ovata* (Cav.) Spreng., 173  
     var. *abyssinica* (A. Rich.) K. Schum., 173  
     var. *oblongata* K. Schum., 173  
*Melhania parviflora* Chiov., 173, 174  
*Melhania phillipsiae* Bak. f., 173, 176  
*Melhania prostrata*, 175  
*Melhania rotundata* Hochst. ex Mast., 173, 174  
*Melhania somalensis* Bak. f., 174  
*Melhania* sp. = Friis et al. 2971, 173, 176  
*Melhania* sp. = Gilbert et al. 7432, 174  
*Melhania* sp. = Gilbert et al. 7589, 175  
*Melhania* sp. = Hemming 1465, 176  
*Melhania* sp. = Thesiger 1945, 173  
*Melhania steudneri* Schweinf., 175

- Melhania stipulosa** *J. R. I. Wood*, 175  
**Melhania velutina** *Forssk.*, 173, 174, 177  
**Melhania velutina** x **Melhania ovata**, 175  
**Melhania zavattarii** *Cufod.*, 175  
**MELIACEAE**, 382  
**Melochia corchorifolia** *L.*, 178, 179  
**MELOCHIA** *L.*, 178  
*Melothria cipriani* *Pichi-Serm.*, 27  
*Melothria gilgiana* *Cogn.*, 27  
*Melothria longepedunculata* (*Hochst. ex A. Rich. Cogn.*), 27  
*Melothria maderaspatana* (*L. Cogn.*), 29  
*Melothria minutiflora* *Cogn.*, 27  
*Melothria pallidinervia* *Harms*, 27  
*Melothria pulchra* *Busc. & Muschl.*, 27  
*Melothria scrobiculata* (*Hochst. ex A. Rich. Cogn.*), 27  
*Melothria tomentosa* *Cogn.*, 27  
     var. *parvifolia* *Cogn.*, 27  
**Mercurialis annua** *L.*, 295  
**MERCURIALIS** *L.*, 295  
*Metrosideros floribunda*. 79  
**MEZIEREA** *Gaud.*, 60  
**Microcacca mercurialis** (*L. Benth.*), 298, 299  
**MICROCOCCA** *Benth.*, 298  
*Modecca abyssinica* *A. Rich.*, 7  
*Modecca aculeata* *Hook.f.*, 9  
*Modecca gummifera* *Harvey*, 11  
*Momordica adoensis* *A. Rich.*, 52  
**Momordica balsamina** *L.*, 42  
**Momordica boivinii** *Baill.*, 44, 45  
*Momordica brevispinosa* (*Cogn.*) *Chiov.*, 41  
**Momordica charantia** *L.*, 42  
*Momordica brichetti* *Chiov.*, 41  
*Momordica cucullata* *Hook.f.*, 42  
*Momordica cylindrica* *L.*, 56  
**Momordica cymbalaria** *Fenzl ex Hook.f.*, 44  
*Momordica dasycarpa* *Hochst. ex A. Rich.*, 37  
**Momordica dissecta** *Bak.*, 44  
**Momordica foetida** *Schumach.*, 42, 43  
     var. *villosa* *Cogn.*, 42  
**Momordica friesiorum** (*Harms*) *C. Jeffrey*, 41, 45  
**MOMORDICA** *L.*, 39  
*Momordica lanata* *Thunb.*, 48  
**Momordica macrosperma** (*Cogn.*) *Chiov.*, 41  
*Momordica microphylla* *Chiov.*, 43  
*Momordica mokorra* *A. Rich.*, 42  
**Momordica pterocarpa** *Hochst. ex A. Rich.*, 41  
**Momordica rostrata** *A. Zimm.*, 43  
*Momordica schimperiana* *Naud.*, 42  
**Momordica sessilifolia** *Cogn.*, 44  
*Momordica somalensis* *Chiov.*, 51  
**Momordica spinosa** (*Gilg*) *Chiov.*, 41, 45  
**Momordica trifoliolata** *Hook.f.*, 42  
*Momordica tuberosa* (*Roxb.*) *Cogn.*, 44  
**Monadenium ellenbeckii** *N.E.Br.*, 378  
     forma *caulopodium* *Bally*, 379  
**Monadenium erubescens** (*Rendle*) *N.E.Br.*, 379, 380  
     forma *floribunda*, 379  
*Monadenium majus*, 379  
     forma *floribunda* *Bally*, 379  
**MONADENIUM** *Pax*, 378  
*Monadenium pulchrum*, 379  
**Monadenium reflexum** *Chiov.*, 379  
**Monadenium shebeliensis** *M. Gilbert*, 379  
*Monadenium stellatum* *Bally*, 379  
*Monadenium zavattari* *Chiov.*, 378  
**Monotes** *A. DC.*, 70  
*Monotes kerstingii* *Gilg*, 70  
**Monotoideae** *Gilg*, 70  
**MUKIA** *Arn.*, 28  
**Mukia maderaspatana** (*L. M.J. Roem.*), 29  
**MYRTACEAE**, 71  
**Myrtus communis** *L.*, 71, 73  
**MYRTUS** *L.*, 71  
*Myrtus leucadendra* *L.*, 79  
*Ochna ardisioides* *Webb*, 67  
*Ochna boranensis* *Cufod.*, 67  
*Napoleana*, 107  
**Ochna bracteosa** *Robyns & Lawalré*, 67, 68  
**Ochna holstii** *Engl.*, 66, 68  
**Ochna inermis** (*Forssk.*) *Schweinf. ex Penzig*, 67, 68  
**Ochna insculpta** *Sleumer*, 67, 69  
**OCHNA** *L.*, 66  
**Ochna leucophloeos** *Hochst. ex A. Rich.*, 67, 69  
*Ochna leucophloeos* *A. Rich.*, 67  
     var. *micropetala* *Fiori*, 67  
*Ochna macrocalyx* *sensu Cufod.*, 67  
*Ochna micropetala* *Hochst. ex Martelli*, 67  
*Ochna rivae* *Engl.*, 67  
**Ochna schweinfurthiana** *F. Hoffm.*, 67, 68  
**OCHNACEAE**, 66  
**OLDFIELDIOIDEAE**, 265  
**Oreosyce africana** *Hook.f.*, 30, 31  
**OREOSYCE** *Hook.f.*, 30  
*Oreosyce kelleri* *Cogn.*, 30  
*Orthostemon sellowianus* *O. Berg*, 72  
*Osbeckia abyssinica* *Gilg*, 109  
*Osbeckia antherotoma* *Naud.*, 111  
*Osbeckia canescens* *Graham*, 110  
**OSBECKIA** *L.*, 108  
*Osbeckia rotundifolia* *Sm.*, 111  
*Osbeckia senegambiensis* *Guill. & Perr.*, 109  
*Ouratea Aubl.*, 69  
*Ouratea floribunda* *W.J. de Wild.*, 69  
*Pakaraimoideae* *Maguire, Ashton & de Zeeuw*, 70  
**PANDURIFORMES** *Ulbr.*, 202  
*Paropsieae*, 6  
**Passiflora caerulea** *L.*, 15, 16  
**Passiflora edulis** *Sims*, 15  
*Passiflora eichleriana* *Master*, 16  
**Passiflora foetida** *L.*, 14  
**PASSIFLORA** *L.*, 13  
**Passiflora ligularis** *Juss.*, 15  
**Passiflora mollissima** (*Kunth*) *Baily*, 14  
**Passiflora quadrangularis** *L.*, 15  
**Passiflora suberosa** *L.*, 14  
**Passiflora subpeltata** *Ortega*, 16  
**PASSIFLORACEAE**, 6  
*Passifloreae*, 6  
**Pavonia arabica** *Hochst. & Steud. ex Boiss.*, 232, 235  
     var. *flavovelutina* *Ulbr.*, 232  
     var. *glanduligera* *Ulbr.*, 232  
     var. *procumbens* *Terrac.*, 232  
**Pavonia burchellii** (*DC.*) *Dyer*, 225, 227  
     var. *glandulosa* (*Ulbr.*) *Heine*, 225  
     var. *tomentosa* (*Ulbr.*) *Heine*, 225  
**PAVONIA** *Cav.*, 224

- Sect. **PTEROCARPIDIUM** Ulbr., 230  
 Sect. **AFROLEBRETONIA** Ulbr., 225  
 Sect. **AFROTYPHALAEA** Ulbr., 228  
 Sect. **CALLICARPIDIUM** Ulbr., 228  
 Sect. **CRASPEDOCARPIDIUM** Ulbr., 230  
**Pavonia cristata** Schinz ex Gürke, 230, 231  
**Pavonia ctenephora** Ulbr., 226  
**Pavonia digitata** Hochst. ex Chiov., 233  
**Pavonia elegans** Garcke, 230, 231  
**Pavonia ellenbeckii** Gürke, 233, 235  
**Pavonia eremogeiton** Ulbr., 233  
**Pavonia erlangeri** Ulbr., 232, 235  
**Pavonia erythraeae** Chiov., 232  
**Pavonia gallaënsis** Ulbr., 226, 227  
**Pavonia glechomifolia** (A. Rich.) Garcke, 226, 227  
   var. *glabrescens* Ulbr., 226  
   var. *tomentosa* Ulbr., 226  
**Pavonia grewoides** Hochst. ex Boiss., 230  
**Pavonia hildebrandtii** Gürke ex Ulbr., 234, 235  
**Pavonia kilimandscharica** Gürke, 228, 229  
**Pavonia kotschyi** Hochst. ex Webb, 234, 235  
**Pavonia kraussiana** Hochst., 225  
   subsp. *dictyocarpa* Ulbr., 225  
   var. *genuina* Ulbr., 225  
**Pavonia lavae** Engl., 234  
**Pavonia melhanioides** Thulin, 230, 231  
**Pavonia neumannii** Ulbr., 228  
**Pavonia patens** (Andr.) Chiov., 236  
**Pavonia patens** (Andr.) Chiov., 246  
**Pavonia patens** sensu auct. mult. Afr. non (Andr.) Chiov., 225  
**Pavonia pirottae** (Terrac.) Chiov., 233, 235  
**Pavonia procumbens** (Wight & Arn.) Walp., 226, 227  
**Pavonia propinqua** Garcke, 230, 231  
**Pavonia schimperiana** Hochst. ex A. Rich., 228, 229  
**Pavonia schweinfurthii** Ulbr., 234, 235  
**Pavonia serrata** Franch., 234  
**Pavonia** sp. = *Corradi* 3527, 234  
**Pavonia** sp. = *Friis* et al. 2798, 232  
**Pavonia** sp. = *Friis* et al. 2801, 226  
**Pavonia** sp. = *Gilbert* 2074, 236  
**Pavonia** sp. = *Gilbert* et al. 7523, 234  
**Pavonia** sp. = *Simmons* 65, 236  
**Pavonia steudneri** Ulbr., 232  
**Pavonia triloba** Guill. & Perr., 232, 235  
**Pavonia ukambanica** Ulbr., 226  
**Pavonia urens** Cav., 228, 229  
   var. *glabrescens* (Ulbr.) Brenan, 228  
   var. *hirsuta* (Hochst. ex Ulbr.) Brenan, 228  
   var. *schimperiana* (Hochst. ex A. Rich.) Brenan, 228  
   var. *tomentosa* (Hochst.) Brenan, 228  
**Pavonia zeylanica** Cav., 233, 235  
   subsp. *afro-arabica* Cufod., 233  
   var. *microphylla* Ulbr., 233  
   var. *subquinqueloba* Ulbr., 233  
**Peponia cogniauxii** Gilg, 51  
**Peponia vogelii** Hook.f., 46  
**Peponium cienkowskii** (Schweinf.) Engl., 47  
**PEPONIMUM** Engl., 45  
**Peponium vogelii** (Hook.f.) Engl., 46, 47  
**PHYLLANTHOIDEAE**, 265  
**Phyllanthus amarus** Schum. & Thonn., 282, 283  
**Phyllanthus aspericaulis** Pax, 280  
**Phyllanthus boehmii** Pax, 282  
   var. *boehmii*, 282  
   var. *humilis* A. Radcliffe-Smith, 282  
**Phyllanthus borensis** M. Gilbert, 278, 279  
**Phyllanthus callidiscus** Brunel, 280  
**Phyllanthus capillaris** Schumach. & Thonn., 277  
**Phyllanthus dewildeanus** Brunel, 282  
**Phyllanthus dewildiorum** M. Gilbert, 279, 280  
**Phyllanthus dinteri** Pax, 280  
**Phyllanthus discoideus** (Baill.) Muell. Arg., 284  
**Phyllanthus fischeri** Pax, 279, 280  
**Phyllanthus fraternus** Webster, 281, 283  
   subsp. *togoensis* Brunel & Roux, 281  
**Phyllanthus glaucophyllus** Sond., 281  
**Phyllanthus guineensis** Pax, 276  
**Phyllanthus hildebrandtii** Pax, 278  
**PHYLLANTHUS** L., 275  
**Phyllanthus lalambensis** Schweinf., 276  
**Phyllanthus leucanthus** Pax, 281, 283  
**Phyllanthus limmuensis** Cufod., 278  
**Phyllanthus maderaspatensis** L., 276  
**Phyllanthus magudensis** Brunel, 276  
**Phyllanthus meruensis** Pax, 278  
**Phyllanthus mooneyi** M. Gilbert, 281, 283  
**Phyllanthus myrtilloides** Chiov., 281  
**Phyllanthus niruri** auct. non L., 282  
**Phyllanthus niruroides** Muell. Arg., 282  
**Phyllanthus nummulariifolius** Poir., 277  
**Phyllanthus oblongiglans** M. Gilbert, 282, 283  
**Phyllanthus ovalifolius** Forssk., 276, 277  
**Phyllanthus pentandrus** Schum. & Thonn., 277  
**Phyllanthus pseudoniruri** Muell. Arg., 280, 283  
**Phyllanthus punctulatus** Brunel, 280  
**Phyllanthus reticulatus** Poir., 277  
   var. *glaber* (Thw.) Muell. Arg., 277  
   var. *reticulatus*, 277  
**Phyllanthus rivae** Pax, 281  
**Phyllanthus rotundifolius** Willd., 280  
**Phyllanthus sepialis** Muell. Arg., 278, 279  
**Phyllanthus suffrutescens** Pax, 281  
**Phyllanthus tanzaniensis** Brunel, 277  
**Phyllanthus tenellus** Roxb., 277  
**Phyllanthus trichotepalus** ('trichopetalus') sensu Brunel, 280  
**Phyllanthus venosus** A. Rich., 276  
**Phyllanthus virosus** Willd., 272  
**PLURIOVULATAE** Burret, 149  
**Poinsettia** Graham, 372  
**Poinsettia pulcherrima** (Klotzsch.) Graham, 372  
**POINSETTIA** (Graham) House, 372  
**Pseudacalypha** Boiss., 350  
**Psidium cattleianum** Sabine, 72  
**Psidium guajava** L., 72, 74  
**PSIDIUM** L., 72  
**Psorospermum febrifugum** Spach, 140, 141  
**Psorospermum niloticum** Kotschy ex Ascherson, 140  
**PSOROSPERMUM** Spach, 140  
**Psorospermum tenuifolium** sensu Kotschy, 140  
**PTEROCARPIDIUM** Ulbr., 230  
**PTEROCARPUS** Garcke, 205  
**Quisqualis indica** L., 124  
**QUISQUALIS** L., 124  
**Raphanistrocarpus boivinii** (Baill.) Cogn., 44  
**Raphanistrocarpus boivinii** (Baill.) Chiov., 44

- Rhizophora candelaria*, 133  
**RHIZOPHORA** L., 133  
*Rhizophora mucronata* Lam., 133  
**RHIZOPHORACEAE**, 133  
*Rhynchocharpa courbonii* Naud., 25  
*Rhynchocharpa ehrenbergii* Schweinf., 25  
*Rhynchocharpa erostris* Schweinf., 25  
*Rhynchocharpa hirtella* Naud., 23  
*Rhynchocharpa pedunculosa* Naud., 25  
*Rhynchocharpa schimperi* Naud., 25  
**RICINUS** L., 293, 294  
 var. *africanus* (Willd.) Muell., 295  
 var. *communis*, 295  
**RICINUS** L., 293  
*Santalum album* L., 1  
*Sapium abyssinicum* (Muell. Arg.) Benth., 328  
*Sapium ellipticum* (Krauss) Pax, 328, 330  
*Sapium mannianum* (Muell. Arg.) Benth., 328  
**SAPIUM** P. Browne, 328  
*Sapium sebiferum* (L.) Roxb., 328  
**SARCOPHYTE** Sparrman, 381  
*Sarcophyte sanguinea* Sparrman, 381  
 subsp. *piriei* (Hutch.) B. Hansen, 381  
 subsp. *sanguinea*, 381  
*Sarcophyte piriei* Hutchinson, 381  
*Sauvagesia erecta* L., 66  
*Sclerocroton ellipticus* Krauss, 328  
**SCYTOPETALACEAE**, 144  
*Securinea abyssinica* A. Rich., 272  
*Securinea virosa* (Willd.) Baill., 272  
**SENRA** Cav., 216  
*Senra incana* Cav., 216, 218  
*Senra zoës* Volkens & Schweinf., 216, 218  
*Sicyos angulatus* sensu A. Rich., 59  
*Sicyos australis* sensu Cufod., 59  
**SICYOS** L., 59  
*Sicyos polyacanthus* Cogn., 59  
*Sida abyssinica* Hochst. ex D. Dietr., 254  
*Sida acuminata* R. Br. in Salt, 241  
*Sida acuta* Burm. f., 252, 253  
 var. *carpinifolia* sensu Cufod., 252  
*Sida alba* L., 251, 253  
*Sida collina* Schlechtend., 252, 253  
*Sida cordifolia* L., 251, 253  
*Sida corymbosa* R. E. Fries, 252  
*Sida cuneifolia* sensu Cufod., 251  
*Sida densiflora* A. Rich., 249  
*Sida gracilis* R. Br. in Salt, 244  
*Sida humilis* non sensu Cav., 251  
*Sida javensis* Cav., 250, 251  
**SIDA** L., 248  
*Sida ostryaefolia* Webb, 254  
*Sida ovata* Forssk., 254, 255  
*Sida permutata* Hochst. ex A. Rich., 249  
*Sida rhombifolia* L., 254, 255  
*Sida riparia* Hochst., 254  
*Sida scabrida* Wight & Arn., 254  
*Sida schimperiana* Hochst. ex A. Rich., 251, 252  
*Sida serratifolia* Wilczek & Steyaert, 254, 255  
*Sida* sp. = Bally 9622, 254  
*Sida* sp. = Ellis 177, 254  
*Sida* sp. = Gilbert & Getachew Aweke 2984, 252  
*Sida spinosa* sensu Cufod., 251  
 var. *sennaarensis* Visiani, 251  
*Sida subrotunda* Hochst., 254  
*Sida tenuicarpa* Vollesen, 251, 252  
*Sida ternata* L. f., 249, 250  
*Sida urens* L., 249, 250  
*Sida veronicifolia* non sensu Lam., 251  
**SOLANDRA** Hochr., 205  
**Somalica** Carter, 361  
*Sparmannia abyssinica* Hochst. ex A. Rich., 158  
 var. *concolor* Chiov., 158  
**SPARMANNIA** L. f., 158  
*Sparmannia macrocarpa* Ulbr., 158, 159  
*Sparmannia ricinocarpa* (Eckl. & Zeyh.) O. Ktze., 158  
 subsp. *abyssinica* (Hochst. ex A. Rich.) Weimarck, 158  
 var. *macrocarpa* (Ulbr.) Weimarck, 158  
*Sparmannia ricinocarpa* (Eckl. & Zeyh.) O. Ktze., 158, 159  
 subsp. *abyssinica* (Hochst. ex A. Rich.) Weimarck, 158  
 subsp. *hirsuta* (Oliv.) Weimarck, 158  
 var. *fischeri* (Engl.) Weimarck, 158  
*Sterculia abyssinica* R. Br. ex Bennett, 184  
*Sterculia africana* (Lour.) Fiori, 184, 185  
 var. *rivae* (K. Schum.) Cufod., 184  
 var. *socotrana* (K. Schum.) Fiori, 184  
*Sterculia arabica* (R. Br.) T. Anders., 184  
*Sterculia cinerea* A. Rich., 184, 185  
*Sterculia hartmanniana* Schweinf., 184  
**STERCULIA** L., 183  
*Sterculia rhynchocharpa* K. Schum., 184, 185  
*Sterculia rivae* (K. Schum.) Chiov., 184  
*Sterculia setigera* Del., 183  
*Sterculia stenocarpa* H. Winkler, 184, 185  
**STERCULIACEAE**, 165  
*Suregada procera* (Prawn) Croizat, 317  
**SUREGADA** Rottl., 316  
*Symphochlamys erlangeri* Gürke, 212, 213  
**SYMPHYOCHLAMYS** Gürke, 212  
**SYNADENIUM** Boiss., 378  
*Synadenium compactum* N.E.Br., 378  
 var. *rubrum* S. Carter, 378  
*Synadenium grantii* auct. non Hook. f., 378  
**SYZYGIUM** Gaertn., 75  
*Syzygium cuminii* (L.) Skeels, 75  
*Syzygium guineense* (Willd.) DC., 77  
 subsp. *afromontanum* F. White, 78  
 subsp. *guineense*, 77  
 subsp. *macrocarpum* (Engl.) F. White, 78  
*Tacsonia mollissima* Kunth, 14  
**TAMARICACEAE**, 3  
*Tamarix africana* Poir., 4  
*Tamarix aphylla* (L.) Karst., 3, 4  
*Tamarix arabica* Bunge, 3  
*Tamarix arborea*, 4  
*Tamarix arborea* (Sieb. ex Ehrenb.) Bunge, 5  
*Tamarix articulata* Vahl, 3  
*Tamarix gallica* L., 3  
 subsp. *nilotica* (Ehrenb.) Maire, 4  
 var. *nilotica* Ehrenb., 4  
 var. *nilotica* f. *glaucescens* (Ehrenb.) Bunge, 4  
*Tamarix gallica* sensu Oliver, 4  
**TAMARIX** L., 3  
*Tamarix manifera* (Ehrenb.) Bunge, 3  
*Tamarix manifera* auct. non (Ehrenb.) Bunge, 4  
*Tamarix nilotica* (Ehrenb.) Bunge, 4

- var. *abyssinica* Hochst. ex Bunge, 4  
 var. *pallasii* (Desv.) Bunge, 4  
*Tamarix orientalis* Forssk., 3  
*Tamarix passerinoides* auct. non Del. ex Desv., 4  
*Tamarix passerinoides* Del. ex Desv., 3  
*Tamarix pentandra* Pallas, 4  
*Tamarix pentantra* Pallas sensu Cufod., 4  
*Tamarix ramosissima* Ledeb., 4  
*Tamarix senegalensis* auct. non DC., 4  
*Tamarix socotrana* Vierh., 3  
**TELFARIA** Hook., 45  
*Telfairia pedata* (Sm. ex Sims) Hook., 45, 46  
*Terminalia avicennioides* sensu Cufod., 128  
*Terminalia basilei* Chiov., 127  
*Terminalia bispinosa* Schweinf. & Volkens, 125  
*Terminalia brevipes* Pampan., 125, 126  
*Terminalia brownii* Fresen., 127, 129  
   var. *gallaensis* Engl. ex Diels, 127  
   var. *stenocarpa* Fiori, 127  
*Terminalia catappa* L., 130  
*Terminalia confertifolia* Steud. ex A. Rich., 127  
*Terminalia cycloptera* R. Br. in Salt, 127  
*Terminalia glaucescens* Planch. ex Benth., 128  
*Terminalia hararensis* Engl. ex Diels, 130  
*Terminalia hecistocarpa* Engl. ex Diels, 130  
*Terminalia hemignosta* Steud. ex Del., 127  
*Terminalia kelleri* Engl. & Diels, 125  
**TERMINALIA** L., 124  
*Terminalia laxiflora* Engl. & Diels, 128, 129  
*Terminalia macroptera* Guill. & Perr., 127, 129  
*Terminalia mollis* Laws, 128  
*Terminalia orbicularis* Engl. & Diels, 124, 126  
   var. *macrocarpa* Engl. & Diels, 124  
*Terminalia polycarpa* Engl. & Diels, 125, 127  
*Terminalia prunioides* Laws., 125, 127  
*Terminalia robecchii* Chiov., 125  
*Terminalia ruspolii* Engl. & Diels, 124  
*Terminalia salicifolia* Schweinf., 128  
*Terminalia schimperiana* Hochst., 128, 131  
*Terminalia schweinfurthii* Engl. & Diels, 128  
*Terminalia somalensis* Engl. & Diels, 125  
*Terminalia* sp. = *Friis* et al. 3443, 128  
*Terminalia spinosa* Engl., 125, 126  
*Ternstroemia*, 65  
**TERNSTROEMIACEAE**, 65  
**THEA** L., 65  
*Thea sinensis* L., 65  
**THEACEAE**, 65  
*Theobroma cacao* L., 165  
**THEOBROMA** L., 165  
*Thespesia danis* Oliv., 223, 222  
*Thespesia populnea* (L.) Solander ex Correa, 223, 222  
**THESPESIA** Solander ex Correa, 222  
**THONNINGIA** Vahl, 381  
*Thonningia sanguinea* Vahl, 382  
*Thonningia ugandensis* Hemsl., 382  
*Thuja aphylla* L., 3  
*Tibouchina semi-decandra* Cogn., 108  
*Tibouchina viminea* (D. Don) Cogn., 108  
**TILIACEAE**, 145  
*Tirucalli* Boiss., 363  
*Tithymalus braunii* Schweinf., 352  
*Tithymalus* Gaertner, 350  
*Tithymalus hochstetterianus* Kl. & Gke., 370  
*Tragia abortiva* M. Gilbert, 309, 310  
*Tragia arabica* Prain, 308  
*Tragia ashiae* M. Gilbert, 311, 312  
*Tragia benthami* auct. non Bak., 307  
*Tragia brevipes* Pax, 307, 309  
*Tragia cannabina* L.f., 306  
*Tragia cinerea* (Pax) Gilbert & Radcl.-Smith, 308, 309  
*Tragia cordata* Willd., 308  
*Tragia cordifolia* Vahl, 308  
   var. *cinerea* (Pax) Prain, 308  
*Tragia crenata* M. Gilbert, 307, 309  
*Tragia doryodes* M. Gilbert, 310, 311  
*Tragia gallabatensis* Prain, 306  
*Tragia hostatus* Hassk., 306  
*Tragia hildebrandtii* Muell. Arg., 307  
*Tragia impedita* Prain, 307  
*Tragia insuavis* Prain, 307  
**TRAGIA** L., 304  
   Sect. *Tragia*, 305  
*Tragia mercurialis* L., 298  
*Tragia mitis* Muell. Arg., 310, 311  
*Tragia mitis* Muell. Arg., 308  
   var. *cinerea* Pax, 308  
*Tragia mixta* M. Gilbert, 307, 309  
*Tragia moamarensis* Baill., 308  
*Tragia negeliensis* M. Gilbert, 307, 309  
*Tragia parvifolia* Pax, 308  
*Tragia plukenetii* A. Radcl.-Smith, 306  
*Tragia pungens* (Forssk.) Muell. Arg., 308, 309  
   var. *cinerea* (Pax) Pax, 308  
*Tragia* sp. = *Fiori* 1393, 312  
*Tragia* sp. = *Pappi* 6086, 310  
*Tragia tripartita* Prain, 306  
*Tragia triumfettoides* M. Gilbert, 311, 312  
*Tragia uncinata* M. Gilbert, 308, 309  
*Tragia urens* L., 306  
*Tragiella pavoniifolia* Chiov., 314  
*Triaspis auriculata* Radlk., 262  
**TRIASPIS** Burch., 258  
*Triaspis erlangeri* Engl., 258, 260  
*Triaspis niedenzuiana* Engl., 260  
*Trichadenia* Pax, 354  
*Trichospermum* Hochr., 202  
*Tristania conferta* R. Br., 79  
**TRIONUM** DC., 200  
*Tristania*, 79  
   Sect. *Lophostemon* (Schott) Benth., 79  
*Tristellateia africana*, 263  
   var. *somalensis* (Chiov.), 263  
*Tristellateia cynanchoides* Chiov., 260  
*Tristellateia somalensis* Chiov., 263  
*Tristemma incompletum* R. Br., 112  
**TRISTEMMA** Juss., 112  
*Tristemma mauritianum* J.F. Gmel., 112, 113  
*Triumfetta abyssinica* K. Schum., 161  
*Triumfetta actinocarpa* S. Moore, 162  
*Triumfetta annua* L., 160, 163  
*Triumfetta arussorum* Chiov., 164  
*Triumfetta brachyceras* K. Schum., 161, 163  
   var. *macrophylla* (K. Schum.) Cufod., 161  
   var. *rothii* (Sprague & Hutch.) Cufod., 161



- Triumfetta cordifolia** *A. Rich.*, 161  
*Triumfetta cuneata* Hochst. ex *A. Rich.*, 162  
*Triumfetta dembianensis* Chiov., 162  
**Triumfetta flavescens** *Hochst.*, 163, 164  
   var. *macrocarpa* Chiov., 164  
**Triumfetta heterocarpa** *Sprague & Hutch.*, 163, 164  
   var. *glabrior* *Sprague & Hutch.*, 164  
   var. *heterocarpa*, 164  
*Triumfetta intermedia* *De Wild.*, 160  
**TRIUMFETTA** *L.*, 158  
*Triumfetta macrophylla* *K. Schum.*, 161  
*Triumfetta neghelliensis* *Lanza*, 164  
   var. *obtusifolia* *Lanza*, 164  
**Triumfetta pentandra** *A. Rich.*, 162, 163  
**Triumfetta pilosa** *Roth*, 161, 163  
   var. *glabrescens* *Sprague & Hutch.*, 161  
   forma *tricuspidata* *Sprague & Hutch.*, 161  
   var. *lejocarpa* *Fiori*, 161  
*Triumfetta pleiacantha* *Sprague & Hutch.*, 162  
**Triumfetta rhomboidea** *Jacq.*, 162, 163  
   var. *angulata* (*Lam.*) *Baker*, 162  
   var. *glandulosa* (*Lam.*) *Baker*, 162  
*Triumfetta schimperi* *Hochst.*, 160  
**Triumfetta setulosa** *Mast.*, 160, 163  
**Triumfetta tomentosa** *Boj.*, 161, 163  
   var. *macrocerata* *Chiov.*, 160  
**Triumfetta trichocarpa** *Hochst. ex A. Rich.*, 160, 163  
**TROCHOMERIA** *Hook.f.*, 37  
*Trochomeria macrocarpa* (*Sond.*) *Hook.f.*, 37, 38  
*Trochomeria stefanii* (*Chiov.*) *C. Jeffrey*, 37  
*Tryphostemma hanningtonianum* *Mast.*, 12  
*Tryphostemma Harvey*, 12  
*Tryphostemma scabrifolium* *Dandy*, 12  
*Tryphostemma volkensii* *auct. non Harms.*, 12  
*Turia gijef* *Forssk. ex J.F. Gmel.*, 23  
*Turia leloja* *Forssk. ex J.F. Gmel.*, 23  
*Turraea mombassana* *Hiern ex C. DC.*, 382  
   subsp. *cuneata* (*Gürke*) *Styles & White*, 382  
*Tzellemtinia* *Chiov.*, 267  
*Tzellemtinia nervosa* *Chiov.*, 267  
*Urena glabra* *R. Br. in Salt*, 226  
**URENA** *L.*, 222  
*Urena lobata* *L.*, 224, 229  
*Urena mollis* *R. Br. in Salt*, 225  
*Waltheria americana* *L.*, 178  
   var. *indica* (*L.*) *K. Schum.*, 178  
*Waltheria indica* *L.*, 178, 179  
**WALTHERIA** *L.*, 178  
**WARBURGIA** *Engl.*, 1  
*Warburgia salutaris* (*Bertol. f.*) *Chiov.*, 1  
*Warburgia ugandensis* *Sprague*, 1  
*Weihea abyssinica* *Engl.*, 134  
*Weihea avettea* *Chiov.*, 134  
*Weihea boranensis* *Chiov.*, 134  
*Weihea malosana* *Baker*, 134  
*Weihea salvago-ragei* *Chiov.*, 134  
*Wissadula amplissima* (*L.*) *R. E. Fries*, 239  
*Wissadula hernandioides* (*L'Herit.*) *Garcke*, 239  
**WISSADULA** *Medic.*, 239  
*Wissadula periplocifolia* *sensu Cufod.*, 239  
*Wissadula rostrata* (*Schumach. & Thonn.*) *Hook. f.*, 239,  
   240  
**ZANONIOIDEAE**, 18  
*Zehneria anomala* *C. Jeffrey*, 27, 28  
*Zehneria cerasiformis* *Stocks*, 38  
**ZEHNERIA** *Endl.*, 26  
*Zehneria longepedunculata* *Hochst. ex A. Rich.*, 27  
*Zehneria macrocarpa* *Sond.*, 37  
*Zehneria minutiflora* (*Cogn.*) *C. Jeffrey*, 27  
*Zehneria pallidinervia* (*Harms*) *C. Jeffrey*, 27  
*Zehneria scabra* (*Linn. f.*) *Sond.*, 27  
*Zehneria scrobiculata* *Hochst. ex A. Rich.*, 27

## VERNACULAR NAMES FOR VOLUME 2, PART 2

edited by Damtew Teferra  
compiled by Mirutse Giday

### Introduction

In the compilation and arrangement of the vernacular names for the Volume 2, Part 2, the same procedure has been used as was applied in Volume 3 with some modifications. In this volume, the languages are divided between two main groups. The first group comprises languages mainly from the north and central parts of the country where Ge'ez (Ethiopic) letters have been and are still in use. The second group consists of languages mainly spoken in the southern and central parts of the country where for some languages Latin (Roman) letters have already been in use for some time, while the others plan to use Latin script in the near future. Both Ge'ez and Latin scripts have been used in writing the vernacular names of the first group of languages while only Latin has been used for the names of the second group.

### Names in Ge'ez script

There is some variation among languages in the way that the Ge'ez script is normally used to represent sounds. An effort has been made to avoid the possible use of a Ge'ez letter (FIDEL) in more than one way. This has been found desirable for ease of reading the names in the various languages without having to keep being constrained by the identity of the language. To make this possible, the following conventions and simplifications have been adopted throughout.

*Consistency of the first form of a FIDEL:* The first forms of the FIDELS ሀ, ሐ, ኀ, አ, ዐ are usually read as if they were the fourth forms, ሃ, ሐ, ኃ, አ, ዓ, and not in a consonant-vowel combination consistent with the other FIDELS ለ, መ, ደ, በ, ከ, etc. as contrasted with ላ, ማ, ዳ, ባ, ካ, etc. There has been a recent tendency to disregard this old convention and to treat the five FIDELS ሀ, ሐ, ኀ, አ, ዐ as if they were like the rest. This convention has been adopted here throughout. The FIDEL ሀ (he) is thus read the way ኸ is normally read in Amharinya, and ኂ is often forced to double in being read in Tigrinya, and the FIDEL አ now replaces ኧ in Amharinya and the second use of አ in Tigrinya. This frees the FIDEL ኸ to be used exclusively as it is used in Tigrinya.

*Avoidance of redundancy:* In some of the Semitic languages of Ethiopia (Amharinya and Guragenya), the typical Semitic guttural sounds (ሐ, ኸ, ዐ) and one palatal sound (ኸ) have been dropped. In Ge'ez, it is believed that the FIDEL ኀ was what is now written in

Tigrinya and the other Semitic languages, which retain the guttural sounds, as ኸ. It is also believed that the Ge'ez ሠ was what has now come to be written as ኸ. For the sake of the cross-language consistency, the presumed old Ge'ez sounds of these FIDELS have been adopted here with ሠ being replaced by ኸ, and ኀ by ኸ. The FIDEL ሠ has thus been totally dropped, though ኀ has been retained as standing for the sound that is redundantly used for in Amharinya, i.e. as ሀ, but only in the diphthong form ኃ. Of the two identical sounding FIDELS, አ and ዐ, the second has been used.

*Long and short vowels:* In many of the Ethiopian languages, there are long and short vowels. It has not been possible to represent FIDELS to be read with long vowels as distinct from those read with short vowels.

*Stress:* In the Ge'ez script, no effort has been made to distinguish stressed from non-stressed FIDELS, though the usual doubling of consonants has been adopted to represent this in the Roman script. In ignoring to show stress in the Ge'ez script, the prevalent convention has been followed though this is not to be taken to mean that we belittle the useful convention of making stressed FIDELS through placing points over them. We have not adopted this useful system because we could not consistently apply it to all FIDELS.

*Correspondence between the Ge'ez FIDELS and the Roman script:* A number of sounds found in Ethiopian languages are often represented by combinations of Roman letters when this is done with a European readership in mind, for example she (ኸ), che or tche (ኸ or ጠ). Some transliteration letters are often used for more than one Ethiopian sound, particularly a (አ, ዓ), ha (ሃ, ሐ, ኸ), ka (ካ, ኃ, ኸ). To avoid ambiguities, the equivalents given below have strictly been followed.

*Vowels:* The sixth forms of the Ge'ez glottal stops, አ and ዐ, are represented by ' and ' respectively. The sixth forms of all other FIDELS are each represented by the consonant or the group of consonants in the case of sh (ኸ) standing for the sound without a vowel following it. The other forms are each represented by the appropriate consonant followed by -e for the first, -u for the second, -i for the third, -a for the fourth, -ie for the fifth, and -o for the seventh forms. The two glottal stops አ and ዐ, when varying their forms, are represented by the former with the vowels unmodified, and the latter with the vowels modified. The following four examples will illustrate this:

Form	1st	2nd	3rd	4th	5th	6th	7th
Ge'ez	ለ	ሉ	ሊ	ላ	ሌ	ለ	ሎ
Roman	le	lu	li	la	lie	l	lo
Ge'ez	ሀ	ሁ	ሂ	ሃ	ሄ	ሀ	ሆ
Roman	he	hu	hi	ha	hie	h	ho
Ge'ez	ህ	ሁ	ህ	ህ	ህ	ህ	ህ
Roman	e	u	i	a	'ie	'	o
Ge'ez	ዐ	ዑ	ዒ	ዓ	ዔ	ዐ	ዖ
Roman	é	ú	i	ä	'ie	'	ó

The representation in roman script of all the simple FIDELS in their sixth form is given as follows:

ለ-, ዐ-, ለ-b, ሸ-c, ሞ-ç, ድ-d, ፍ-f, ገ-g, ሀ-h, ስ-ሰ, ጅ-j, ከ-k, ል-l, ሞ-m, ን-n, ሸ-ሰ, ጥ-p, አ-ቅ, ቅ-q, ቅ-ቫ, ር-r, ስ-s, ዐ-ጅ, ጥ-t, ጥ-ጅ, ው-w, ይ-y, ዝ-z, ሸ-ጅ, ከ-k, ሸ-k.

The representation of the diphthong FIDELS in their fourth forms is given as follows:

ሀ-bwa, ሞ-cwa, ሸ-çwa, ድ-dwa, ፍ-fwa, ገ-gwa, ሀ-hwa, ስ-jwa, ስ-kwa, ስ-kwa, ስ-lwa, ጅ-nwa, ጅ-ጅwa, ጅ-qwa, ጅ-ቫwa, ጅ-rwa ስ-swa, ስ-shwa, ጥ-twa, ስ-twa, ስ-zwa.

**The languages featuring in this list of vernacular names**

English is the only widely spoken international language included — all the other languages are found as first languages within Ethiopia.

Owing to the weakness of the data collected on vernacular names, not all languages spoken in Ethiopia have been included. Some languages are found only a few times. This is not to be taken to mean that these languages do not have many vernacular names; it means that only a few plant names in these languages have been collected.

Our data base is weak even in the three most widely spoken major languages: Amharinya, Orominya and Tigrinya. The user of this Flora will find that there are many more vernacular names in use in the various languages than have been included here. To simplify the situation, we have, therefore, as much as possible tried to select the most commonly used local name for a species or group of species so that this name can be considered as an official vernacular name for use in the country.

However, we appeal to all of you to help us strengthen our data base by sending us vernacular names of

identified plants and, whenever possible, sending us specimens of the plants as well. The languages for which names occur are as follows with the abbreviated form as found in the lists followed by the full name for that language.

*Group one - Languages which use Ge'ez FIDELS*

Agew - Agewinya  
Amh. - Amharinya  
Ge'ez - Ge'ez  
Gur. - Guragenya  
Saho - Sahonya  
Tigre - Tigre  
Tya - Tigrinya

*Group two - Languages which use Roman script*

Ade. - Aderinya  
Afar - Afarinya  
Ahi. - Ahinasha  
Anu. - Anuwakinya  
Arb. - Arbore  
Bod. - Bodi  
Caro - Caro  
Das. - Dasenechinya  
Dor. - Dorziyina  
Dre. - Dreeasa  
Eng. - English  
Gam. - Gamonya  
Ghe. - Ghebba  
Gim. - Gimranya  
Had. - Hadiyinya  
Kef. - Kefinya  
Kil. - Kilinj  
Koe. - Koegu  
Kon. - Konsonya  
Mako - Mako  
Mao - Maonya  
Me. - Me'eninya  
Mes. - Mesengonya  
Moch. - Mochinya  
Mur. - Mursinya  
Nuw. - Nuwer  
Orom. - Orominya  
Sha. - Shakoniya  
Sid. - Sidamonya  
Som. - Somalinya  
Tob. - Tobed  
Tse. - Tsemay  
Wel. - Welaytinya

## ARRANGED ALPHABETICALLY BY SCIENTIFIC NAMES

(with page number(s) to the main text)

- Abelmoschus esculentus* (212): 82. Malvaceae - bamia (Som.); ባምቦ bamiya (Amh. & Tya); bandakai, gobbo, lady's finger, ochra, okra (Eng.)
- Abelmoschus ficulneus* (212): 82. Malvaceae - bamia, bobo (Som.)
- Abutilon anglosomaliae* (248): 82. Malvaceae - balambal (Som.)
- Abutilon angulatum* (242): 82. Malvaceae - የቆላ ነቅላ yeqola neçlo (Amh.)
- Abutilon bidentatum* (246): 82. Malvaceae - balambal (Som.); leescia, olbe (Sha.); oyoo (Orom.); ተፋ ተፋር tefa tefur (Amh.)
- Abutilon figarium* (246): 82. Malvaceae - balambal (Som.); hamokto (Afar); ነቅላ ነቅላ neçalo, ነቅላ ነቅላ neçlo (Amh.); olbe (Arb.); የውሻ ነቅላ yewsha neçlo (Amh.)
- Abutilon fruticosum* (244): 82. Malvaceae - balambal, ghedad (Som.); gumfortio (Koe.); gurbii (Orom.); habahad (Som.); surret (Sha.); wana ad (Som.)
- Abutilon graveolens* (248): 82. Malvaceae - balambal (Som.)
- Abutilon hirtum* (248): 82. Malvaceae - balambal (Som.); kannaa (Orom.); ompolto (Sha.)
- Abutilon longicuspe* (241): 82. Malvaceae - አመድማዶ amedmado, ነቅላ ነቅላ neçlo (Amh.); የዕዳ ቡዋሽ ša'da buwaḡ (Tya)
- Abutilon mauritiamum* (246): 82. Malvaceae - alkee (Orom.); አረዞ arezo (Agew); compolto (Caro & Sha.); daannisa (Orom.); dansa (Sid.); kaasum (Orom.); kompolto (Caro & Sha.); ጢፍ እንጆራ ሹፍ 'njera (Amh.)
- Abutilon pannosum* (246): 82. Malvaceae - balambal (Som.); ቡዋሽ buwaḡ (Tya)
- Abutilon ramosum* (242): 82. Malvaceae - balambal (Som.)
- Abutilon* spp. (239): 82. Malvaceae - balambal (Som.)
- Acalypha acrogyna* (300): 85. Euphorbiaceae - ateco (Anu.); gidigeer (Anu. & Mes.)
- Acalypha fruticosa* (301): 85. Euphorbiaceae - ቡጋማ bogama (Amh.); diigree, diileh (Orom.); dirrhi, ghed arar (Som.); ጉሎ gulo, ናቂ naça, ነር ጅሂሎ ner jhilo (Amh.); qobboo, tirii (Orom.)
- Acalypha indica* (303): 85. Euphorbiaceae - eburga (Gam.); lobwite (Das.)
- Acalypha ornata* (300): 85. Euphorbiaceae - alablabe (Orom.); ናቂ naça (Amh.)
- Acalypha psilostachya* (302): 85. Euphorbiaceae - ናቂ naça (Amh.)
- Acridocarpus glaucescens* (257): 83. Malpighiaceae - marmora (Som.)
- Adansonia digitata* (186): 81. Bombacaceae - ba'obaab (Orom.); baobab (Eng.); ባምባ bamba (Amh. & Tya); cream of tartar tree (Eng.); dhumuugaa (Orom.); ዲማ dima, ዲዳ diza (Amh.); Ethiopian sourgourd (Eng.); humaar (Orom.); jach, jag (Som.); juda's bag, monkey bread (Eng.); yag (Som.)
- Adenia aculeata* (9): 64. Passifloraceae - agirot, bocol barre, gedebes, gurunle, lamagoye (Som.)
- Adenia ellenbeckii* (11): 64. Passifloraceae - kaguto (Kon.)
- Adenia globosa* (7): 64. Passifloraceae - adai (Som.)
- Adenia venenata* (7): 64. Passifloraceae - adhai, adhai meduw, gorri (Som.)
- Alchornea laxiflora* (291): 85. Euphorbiaceae - birakash (Sha.); dashe (Mes.)
- Andrachne aspera* (271): 85. Euphorbiaceae - እፀ ተከዜ 'še tekezie (Ge'ez)
- Anogeissus leiocarpa* (130): 75. Combretaceae - adrite, arite (Anu.); galaljo (Gam.); ላንሰ hanse (Tya); kokodan (Mes.); ሞክ mok (Amh. & Gam.); ቅርቅረ qrqre (Tya); rid, rit (Anu.); rit (Mes.); silag (Eng.); silek (Orom.)
- Antidesma venosum* (270): 85. Euphorbiaceae - ghed biod (Som.)
- Argomuelleria macrophylla* (290): 85. Euphorbiaceae - abraangoo (Orom.); adbooch, adeeboach (Anu.); babooch, gadei (Mes.); keike (Sha.)
- Bridelia micrantha* (269): 85. Euphorbiaceae - anenobo (Orom.); ደርከዶም derkedum (Amh.); diimoo, dugdarbaa, galaaloo (Orom.); ooh chee (Gim.); oput (Anu.); ራሰራ rasraba (Gur.); reegarabbaa (Orom.); welakoo (Sid.); wush (Sha.); የነብር ጥፍር yenebr ሻፍ (Amh.)
- Bridelia scleroneura* (267): 85. Euphorbiaceae - garcho (Gam.); nikaja, opus, oput, orwiech (Anu.); zuziraa (Wel.)
- Callistemon citrinus* (78): 72. Myrtaceae - bottle brush, crimson bottle brush (Eng.)
- Carica papaya* (64): 67. Caricaceae - maffafai (Som.); ፓፓያ papaya (Tya); ፓፓዬ papayie (Amh.); papaja (Som.)
- Cassipourea malosana* (134): 76. Rhizophoraceae - (Orom.); ቡፍ ቅጠል buna qfel (Amh.); diimestuu, dillo, gaaliis, gachanfulasa, galisaa (Orom.); gima

- (Sha.); jimaa, kulloo, laalessaa, lookoo (Orom.); lookoo adii, lookoo gurraachaa, mukafaaqqee (Orom.); olati (Sid.); pillar wood (Eng.); ጠቾ teco (Amh.); tehlo, waatoo, xiliyyoo, xilloo, xxirroo (Orom.)
- Cassipourea* spp. (134): 76. Rhizophoraceae - ቡፍ ቕጠል buna q̄fel (Amh.); dimmistuu, gaaliis, gachanfulasa, jiimaa, kulloo, laalessaa, malosana loko, mukafaaqqee (Orom.); pillar wood (Eng.); ተሆይ tehoi (Amh.); xiliyyoo, xxirroo (Orom.)
- Caucanthus auriculatus* (262): 83. Malpighiaceae - galle addi (Orom.)
- Caucanthus edulis* (263): 83. Malpighiaceae - marmora (Som.)
- Ceiba pentandra* (186): 81. Bombacaceae - dum dum (Som.); ካፖክ kapok (Amh.); kapok, kapok tree, silk cotton tree (Eng.); waro (Anu.); የፍራሽ ጥጥ ዛፍ yefrash ሺ zaf (Amh.)
- Cephalocroton cordofanus* (291): 85. Euphorbiaceae - chimba, itin (Som.)
- Cienfugosia welshii* (216): 82. Malvaceae - balambal (Som.)
- Citrullus colocynthis* (48): 65. Cucurbitaceae - ዕንጉለ ባይታ 'ngule baita (Tya); ሃምቦቢል hambobil (Tigre); qare demer (Som.); የምድር እምባይ yemdr 'mbway (Amh.)
- Citrullus lanatus* (48): 65. Cucurbitaceae - ቡጊጋ betih (Geez); ብርጭቅ brçq̄ (Tya); ብርጭቅ ዱባ brçq̄ duba, ከርቡሽ kerbush (Amh.); qara, qare, unun (Som.); water melon (Eng.)
- Clutia abyssinica* (286): 85. Euphorbiaceae - ብርከትየት brktyet (Tya); ፍየለ ፈጅ fyele fej (Amh.); fyella fagii (Orom.); hulelone (Kef.); mokadeega (Dre.); mukadeegaa, uleefoonii (Orom.); ጥሽ በዓለልቴ ስh beälalti (Tya); uleeloonii (Orom.)
- Clutia lanceolata* (286): 85. Euphorbiaceae - ዓለዕለላ äla' file (Tigre); ብርከትየት brktyet (Tya); ፍየለ ፈጅ fyele fej (Amh.); ባከሮት bakarot (Tya); ዓለ äla (Tigre); ጥሽ እንሰቴ ስh ansti, ጥሽ በዓለልቴ ስh beälalti (Tya)
- Clutia* spp. (286): 85. Euphorbiaceae - obromo (Kef.)
- Coccinia abyssinica* (54): 65. Cucurbitaceae - uschusche (Wel.); ውሽሽ wshsh (Tya)
- Coccinia grandis* (54): 65. Cucurbitaceae - alundui (Som.); አምባላ ጎሳ ambala gosa (Agew); ኢኪኪ ikiki (Tigre); ilgal, raha roho, roh, rohor, ruho, sar gudun, sara sara (Som.)
- Coccinia* spp. (52): 65. Cucurbitaceae - gosie, gosie haise (Gam.); ወርቅ በሜዳ werq bemieda (Amh.)
- Combretum aculeatum* (120): 75. Combretaceae - ዓፍሉት äflot (Tya); deriamu (Arb.); kalawuri (Mur.); ilmaretch ruukeesaa (Orom.); ismud (Som.); kaaladdee (Orom.); kaito (Som.); kilaito (Afar); kunyo (Anu.); maga (Koe.); magga (Sha.); ቃዕቶይ qa'toy, ቀርፍት qemot (Tya); rokes (Som.); shuna shuna (Das. & Som.); tataruma (Kon.); ኡንጎይ ungoi (Amh.); zerema, zermari (Sha.)
- Combretum adenogonium* (117): 75. Combretaceae - ዓለንቆሃ älenqoza (Tya); chamberang (Mes.); dandalee (Orom.); dot, doth (Anu.); galaasee (Orom.); kunyon (Anu.); lalayi (Mur.); shalawta (Kon.); sibaka (Sha.); ወይባ weyba (Amh.)
- Combretum collinum* (116): 75. Combretaceae - alahingalle, daannisa, dabacca, dandalee (Orom.); duna (Anu.); gomorii (Orom.); kunyon (Anu.); ሰሰወ sesewe (Tya); ulweato (Anu.); የቆላ አባሎ yeqola abalo (Amh.)
- Combretum hartmannianum* (117): 75. Combretaceae - አለንቆሃ älenqoza, ሰብዓ sebä, ሰብያ sebya (Tya)
- Combretum hereroense* subsp. *volkensii* (120): 75. Combretaceae - gogu, kokoni, sirso (Som.)
- Combretum hereroense* (118): 75. Combretaceae - docrako (Tse.); keenoo (Orom.); tekarama (Kon.); zurguma (Sha.)
- Combretum molle* (118): 75. Combretaceae - abah (Som.); አባሎ abalo (Amh.); abele (Som.); አባሎዋ abeliwa (Tya); abol, abole, abul (Som.); aibetpaha (Kon.); አምፈርፋሮ amferfaro, አንፋርፋሮ anfarfaro (Tya); አውሎ-አ awloa (Agew); biqaa, bik'aa (Orom.); chamberang (Mes.); daannisa, dadamsaa, diddiqissaa (Orom.); doth (Anu.); dugheessa (Orom.); ፋቱካ fatuka (Amh.); ሓዲባ ስሕሳባ ስhäsiba (Tya); oba, obah, obalo, obol, ogaden (Som.); ruukeesaa (Orom.); soobuwa (Wel.); ሰሰወ sesewe (Tya); velvet leaved combretum (Eng.); ወይባ weyba (Amh. & Tya); ዛኩራ zakura (Amh.)
- Combretum paniculatum* (120): Combretaceae - baaggii, baghee, bayie, gaabai (Orom.); gabai, shaga (Kef.)
- Combretum rochetianum* (117): 75. Combretaceae - suufaari (Orom.)
- Combretum* spp. (115): 75. Combretaceae - አባሎ abalo (Amh.); achevan (Anu.); አፍከሞ afkemo (Tya); አጋሎ agalo (Amh.) አኹማ akuma, አለንቆሃ älenqoza (Tya); angapriya (Wel.); atewa (Anu.); biileele (Orom.); digiisuwa (Wel.); gela (Kef.); karecishaa (Wel.); kogne (Anu.); kogne,

- latec (Me.); maga (Tse.); ruukeesaa (Orom.); ስስፀ sesewe (Tya); ዘግዶም zegdom (Amh.)
- Conocarpus lancifolius* (130): 75. Combretaceae - damass (Som.)
- Corallocarpus schimperi* (25): 65. Cucurbitaceae - sarsar (Som.)
- Corchorus baldaccii* (155): 79. Tiliaceae - gos agare (Som.)
- Corchorus cinerascens* (155): 79. Tiliaceae - adar, duhrud, tohdaddlem (Som.)
- Corchorus depressus* (156): 79. Tiliaceae - ኣፍትሕ afth (Tigre)
- Corchorus trilocularis* (155): 79. Tiliaceae - ged mide (Som.)
- Croton dichogamus* (324): 85. Euphorbiaceae - ፍየለ ፈጅ fyele fej (Amh.); gobole (Som.); magoof, mukaa fulaa, uleefoonii (Orom.)
- Croton macrostachyus* (326): 85. Euphorbiaceae - alaloo (Orom.); ኣማዶ amado (Saho); anka (Wel.); ankowaa, baddessaa, bakannoo, bakkannisa (Orom.); ብሳና bsana (Amh.); ቡሲና businna (Saho); cacaniraa (Orom.); gomelit (Me.); masichoo (Sid.); masinchu (Sha.); massaganta (Kon.); orbelow (Anu.); scismo (Mako); shomoy (Mes.); ታምቡቲ tambuk (Tya); ulush (Sha.); wago (Kef.); woshu, wushea (Sha.)
- Croton menyhartii* (325): 85. Euphorbiaceae - anam eie, bogh et (Som.)
- Croton* spp. (324): 85. Euphorbiaceae - bakkannisa (Orom.); dongomarango (Tse.); ፍየለ ፈጅ fyele fej (Amh.)
- Croton sylvaticus* (326): 85. Euphorbiaceae - bataba (Sha.); gidi (Mes.); kidi (Anu.)
- Croton zambesicus* (325): 85. Euphorbiaceae - bulithoi (Mur.); gigasa (Gam.)
- Cucumella kelleri* (30): 65. Cucurbitaceae - aneko, hanehob (Som.)
- Cucumis dipsaceus* (37): 65. Cucurbitaceae - caradamer (Som.); ዳሓቲቶ dahaqito (Tigre); ዶኳዕታ dokwa'ta (Tya); firari, gambol (Som.); ኣፋፍሎ hafaflo (Tya); የእሞራ ምሳ yeamora msa (Amh.)
- Cucumis ficifolius* (34): 65. Cucurbitaceae - ዕንቀፍታሓ 'nqftaha (Tya); hiddii (Orom.); qalfon, qarre (Som.); የምድር እምቧይ yemdr 'mbway (Amh.)
- Cucumis melo* (33): 65. Cucurbitaceae - corongi (Som.); ርሓታ rhota (Tigre)
- Cucumis metuliferus* (34): 65. Cucurbitaceae - ጃምቡሉ jambulu (Tya); qalfon (Som.); ነውሪ ባርያ newri barya (Tya)
- Cucumis prophetarum* (36): 65. Cucurbitaceae - ambuu (Orom.); cara demer, ghed hamar, qalfon, unun hamad (Som.); የምድር እምቧይ yemdr 'mbway (Amh.)
- Cucumis pustulatus* (34): 65. Cucurbitaceae - ዓፋቶ äfto (Tya); cambob, curari (Som.); ዳሓቲቶ dahaqito (Tigre); ዶኳዕታ dokwa'ta ድቻላ ዱባ dǧala duba (Tya); gare damere (Som.); ኣፋፍሎ hafaflo (Tya)
- Cucumis sativus* (37): 65. Cucurbitaceae - cucumber (Eng.); kyarii (Orom.)
- Cucumis* spp. (31): 65. Cucurbitaceae - holotoo (Orom.); qelfon (Som.)
- Cucurbita maxima* (59): 65. Cucurbitaceae - abbuubbii (Orom.); duba (Tya); ኣምኣም hamham (Tigre)
- Cucurbita pepo* (58): 65. Cucurbitaceae - bohöt (Som.); botu (Gam.); bukeh, buko (Kef.); buko dabaa qula (Orom.); ዱባ duba (Amh., Saho & Tya); ኣምኣም hamham (Tigre); መልጸጸ melpepo (Ge'ez); ውሽሽ wshsh (Tya); የባህር ቅል yebahr ql, የቁራ ሃረግ yequra hareg, ዝኩኒ zkuni (Amh. & Tya)
- Dactyliandra stefanii* (37): 65. Cucurbitaceae - arundo (Som.)
- Dissotis* spp. (108): 74. Melastomataceae - gonjamat (Gim.)
- Dombeya quinqueseta* (170): 80. Sterculiaceae - ኩልኩሊ kulkubili, ኢጅን ijen, ኣፍዲ lafdi (Amh.)
- Dombeya torrida* (168): 80. Sterculiaceae - daannisa (Orom.); ፀሊም ብዋሽ selim bwak, ዕንቁያ snquya (Tya); welkafa (Sid.); ውልከፋ wulkfa (Amh.)
- Erythrococca abyssinica* (296): 85. Euphorbiaceae - agmundi (Had.); agomdii (Orom.); ዓላ መይዳ äla meyda (Tya); daallaa, gaalo daltu, geelloo (Orom.); መራራ merarie (Amh.); ogom diil, ydaallaa dhaltuu (Orom.)
- Erythrococca* spp. (296): 85. Euphorbiaceae - chakofu'o (Orom.)
- Erythrococca trichogyne* (298): 85. Euphorbiaceae - fu'o, geelloo (Orom.); ሻምሊ shamli (Amh.)
- Erythroxyllum fischeri* (264): 84. Erythroxyllaceae - gegem (Mes.); jemma, jemmoh (Anu.)
- Eucalyptus amygdalina* (90): 72. Myrtaceae - black peppermint (Eng.)
- Eucalyptus astringens* (94): 72. Myrtaceae - brown mallett (Eng.)
- Eucalyptus bosistoana* (104): 72. Myrtaceae - bosisto's box, coast grey box (Eng.)
- Eucalyptus botryoides* (92): 72. Myrtaceae - bangalay, southern mahogany (Eng.)

- Eucalyptus brockwayi* (95): 72. Myrtaceae - dundas mahogany (Eng.)
- Eucalyptus camaldulensis* (98): 72. Myrtaceae - akakilti, baarzaafii dimaa (Orom.); barzaf (Ade.); bisha barzaafa (Kem.); ብሽ ባርዛፍ bsha barzaf (Gur.); long break eucalyptus, murray red gum (Eng.); ቀይ ባህር ዛፍ qey bahr zaf (Amh.); red eucalyptus, red gum, river red gum (Eng.); zafiya, zo o zafiya (Wel.)
- Eucalyptus cinerea* (103): 72. Myrtaceae - argyle apple (Eng.)
- Eucalyptus citriodora* (86): 72. Myrtaceae - ባህር ዛፍ bahr zaf (Amh.); lemon scented gum, lemon scented spotted gum (Eng.); ሽቶ ባህር ዛፍ shto bahr zaf (Amh.); spotted gum (Eng.)
- Eucalyptus cladocalyx* (96): 72. Myrtaceae - sugar gum (Eng.)
- Eucalyptus cloeziana* (87): 72. Myrtaceae - gypmie messmate (Eng.)
- Eucalyptus cornuta* (93): 72. Myrtaceae - yate (Eng.)
- Eucalyptus crebra* (104): 72. Myrtaceae - narrow leaved ironbark (Eng.)
- Eucalyptus dalrympleana* (102): 72. Myrtaceae - mountain gum (Eng.)
- Eucalyptus deanei* (91): 72. Myrtaceae - deane's gum (Eng.)
- Eucalyptus delegatensis* (90): 72. Myrtaceae - alpine ash (Eng.)
- Eucalyptus diversicolor* (90): 72. Myrtaceae - karri (Eng.)
- Eucalyptus dundasii* (97): 72. Myrtaceae - dundas black butt (Eng.)
- Eucalyptus dunnii* (99): 72. Myrtaceae - dunn's white gum (Eng.)
- Eucalyptus fastigiata* (88): 72. Myrtaceae - brown barell (Eng.)
- Eucalyptus ficifolia* (86): 72. Myrtaceae - red flowering gum (Eng.)
- Eucalyptus globulus* subsp. *bicostata* (100): 72. Myrtaceae - southern blue gum (Eng.)
- Eucalyptus globulus* (100): 72. Myrtaceae - accachilti, aka chitta, akakilti, atakili, baarzaafii adi (Orom.); ባህር ዛፍ bahr zaf (Amh.); baraazaafiya (Wel.); barzaf (Ade. & Nuw.); botta zafiya (Wel.); fever tree, maiden's gum (Eng.); ነጭ ባህር ዛፍ neç bahr zaf (Amh.); ነጭ ባርዛፍ neç barzaf (Gur.); ቀላሚጦስ qelamiጥ (Tya); southern blue gum, tasmanian blue gum (Eng.); weju barzaafa (Kem.); white eucalyptus (Eng.)
- Eucalyptus gomphocephala* (93): 72. Myrtaceae - tuart (Eng.)
- Eucalyptus goniocalyx* (99): 72. Myrtaceae - long leaved box (Eng.)
- Eucalyptus grandis* (91): 72. Myrtaceae - flooded gum, rose gum (Eng.)
- Eucalyptus gunnii* (102): 72. Myrtaceae - cidar gum (Eng.)
- Eucalyptus incrassata* (97): 72. Myrtaceae - lerp mallee (Eng.)
- Eucalyptus johnstonii* (101): 72. Myrtaceae - tasmanian yellow gum (Eng.)
- Eucalyptus largiflorens* (103): 72. Myrtaceae - black box (Eng.)
- Eucalyptus leucoxylon* (105): 72. Myrtaceae - blue gum, yellow gum (Eng.)
- Eucalyptus maculata* (87): 72. Myrtaceae - spotted gum (Eng.); ጠቃጥቆ ባህር ዛፍ teqatqo bahr zaf (Amh.)
- Eucalyptus melliodora* (105): 72. Myrtaceae - yellow box (Eng.)
- Eucalyptus microcorys* (106): 72. Myrtaceae - tallow wood (Eng.)
- Eucalyptus microtheca* (103): 72. Myrtaceae - coolibah (Eng.)
- Eucalyptus nitens* (99): 72. Myrtaceae - shining gum (Eng.)
- Eucalyptus obliqua* (89): 72. Myrtaceae - messmate stringybark (Eng.)
- Eucalyptus occidentalis* (94): 72. Myrtaceae - flat topped yate, swamp yate (Eng.)
- Eucalyptus ovata* (98): 72. Myrtaceae - swamp gum (Eng.)
- Eucalyptus paniculata* (105): 72. Myrtaceae - grey ironbark (Eng.)
- Eucalyptus parvifolia* (98): 72. Myrtaceae - kybean gum (Eng.)
- Eucalyptus patens* (87): 72. Myrtaceae - black butt (Eng.)
- Eucalyptus planchoniana* (89): 72. Myrtaceae - needlebark stringybark (Eng.)
- Eucalyptus regnans* (88): 72. Myrtaceae - mountain ash (Eng.)
- Eucalyptus resinifera* (92): 72. Myrtaceae - red mahogany (Eng.)
- Eucalyptus robusta* (92): 72. Myrtaceae - ባህር ዛፍ bahr zaf (Amh.); swamp mahogany (Eng.)
- Eucalyptus rubida* (102): 72. Myrtaceae - candlebark (Eng.)
- Eucalyptus saligna* (91): 72. Myrtaceae - baarzaafii (Orom.); ባህር ዛፍ bahr zaf, ሳሊ.ግፍ saligna (Amh.); sidney blue gum, willow leaved gum (Eng.)

- Eucalyptus salmonophloia* (96): 72. Myrtaceae - salmon gum (Eng.)
- Eucalyptus salubris* (95): 72. Myrtaceae - gimlet (Eng.)
- Eucalyptus sideroxylon* (106): 72. Myrtaceae - black ironbark, red ironbark (Eng.)
- Eucalyptus tereticornis* (97): 72. Myrtaceae - forest red gum (Eng.)
- Eucalyptus torelliana* (86): 72. Myrtaceae - cadaga (Eng.)
- Eucalyptus transcontinentalis* (96): 72. Myrtaceae - redwood (Eng.)
- Eucalyptus viminalis* (101): 72. Myrtaceae - manna gum, ribbon gum (Eng.)
- Eucalyptus wandoo* (95): 72. Myrtaceae - wandoo (Eng.)
- Eugenia* spp. (72): 72. Myrtaceae - አደስ ades (Amh.); clove tree (Eng.); ቅርንፋድ qmfd (Amh. & Gur.); kurunfudiya (Wel.); kirunful (Ade.); ቅርንፋል qmfl (Tya); qurunfuda (Kem.); qurunfuda (Orom.)
- Eugenia uniflora* (75): 72. Myrtaceae - brazilian cherry, pitanga or surinam cherry (Eng.)
- Euphorbia abyssinica* (334): 85. Euphorbiaceae - hadaamii (Orom.); hassadin (Som.); kerekara (Had.); ቁልቁል qulqwal (Amh. & Gur.); ቁልቁል qolqwal (Tya); ቃላገቃል qalanqal (Tigre); to hit (Tob.); ዋላል walal (Saho)
- Euphorbia adjurana* (336): 85. Euphorbiaceae - dongkola (Gam.)
- Euphorbia agowensis* (354): 85. Euphorbiaceae - pseudoholstii (Som.)
- Euphorbia ampliphylla* (334): 85. Euphorbiaceae - arku (Gim.); domchi (Mes.); enjir (Som.); ቁልቁል qulqwal (Amh.)
- Euphorbia borenensis* (339): 85. Euphorbiaceae - cheeraholstii (Sha.)
- Euphorbia breviarticulata* (337): 85. Euphorbiaceae - dibu, galol (Som.)
- Euphorbia cactus* (337): 85. Euphorbiaceae - ቁልቁል qolqwal (Tya); ወለቡ welebu (Tigre)
- Euphorbia candelabrum* (336): 85. Euphorbiaceae - akiirsaa (Orom.); candelabrum (Eng.); cokac, dirgonit (Me.); gecho (Kef.); hadaamii, kachoo (Orom.); ቀለቃል qeleqal (Gur.); ቁልቁል qulqwal (Amh.)
- Euphorbia cuneata* (359): 85. Euphorbiaceae - derender (Som.); ሻዋቃ shawaqa (Tigre)
- Euphorbia dalettiensis* (339): 85. Euphorbiaceae - hadaamii (Orom.)
- Euphorbia depauperata* (366): 85. Euphorbiaceae - አይንሻሽ ayndash (Tya); guri (Orom.); ፀባ ንጉሳ ጅባ ነኩሳ (Tya)
- Euphorbia dumalis* (366): 85. Euphorbiaceae - አንተርፋ anterfa (Amh.); guri, hunxxarffaa (Orom.)
- Euphorbia glochidiata* (344): 85. Euphorbiaceae - gaboyaryar, gahar (Som.)
- Euphorbia granulata* (377): 85. Euphorbiaceae - ghed anole, kabagois (Som.)
- Euphorbia grosseri* (361): 85. Euphorbiaceae - enghir, latex aeldo (Som.)
- Euphorbia heterophylla* (373): 85. Euphorbiaceae - galano (Som.)
- Euphorbia hirta* (374): 85. Euphorbiaceae - ayo, ballambal (Som.); dallamba, enolai (Gam.)
- Euphorbia inaequispina* (340): 85. Euphorbiaceae - abera, cabojar jal, dadan (Som.)
- Euphorbia indica* (374): 85. Euphorbiaceae - እፀ ዮዲት 'še yodit (Ge'ez); deefa ka gie (Koe.); gedanod, ghed anod, malaebene (Som.); oroburga (Das.)
- Euphorbia longispina* (338): 85. Euphorbiaceae - gabo, kabo (Som.)
- Euphorbia longituberculosa* (352): 85. Euphorbiaceae - ged ambar (Som.); llabnaba (Afar)
- Euphorbia monacantha* (346): 85. Euphorbiaceae - dela nya durh, donedugh (Som.)
- Euphorbia nigripina* (342): 85. Euphorbiaceae - dibu (Som.)
- Euphorbia nubica* (364): 85. Euphorbiaceae - aannoo (Orom.); agno (Sid.); en (Som.); ergin (Orom.); ቅንጭብ qnçb (Tya)
- Euphorbia petitiata* (367): 85. Euphorbiaceae - ኡንዲቸዲቸ hnduqduq (Tya); ቅባደም qbadem, የቀበሮ ወተት yeqebero wetet (Amh.)
- Euphorbia platyphyllos* (368): 85. Euphorbiaceae - አንተርፋ anterfa (Amh.)
- Euphorbia polyacantha* (342): 85. Euphorbiaceae - dibu (Som.); መርሲ mersi (Amh.); መዝባዕ mezba' (Tya); ትሂ thi (Amh.)
- Euphorbia repetita* (370): 85. Euphorbiaceae - አንተርፋ anterfa (Amh.)
- Euphorbia scheffleri* (361): 85. Euphorbiaceae - incher (Som.)
- Euphorbia schimperiana* (370): 85. Euphorbiaceae - አቢዳም abidamo, አንተርፋ anterfa (Amh.); ባልድባልድ baldbaldo (Tya); gure (Sid.); ሀንዲግዲግ hndugdug (Amh.); ኡንዲቸዲቸ hnduqduq (Tya); ቅንጭብ qnçb (Tigre); shishik (Som.)







- Jatropha dictar* (319): 85. Euphorbiaceae - dictar (Som.)
- Jatropha pelargonifolia* (321): 85. Euphorbiaceae - degleh, jilbadig (Som.)
- Jatropha rivae* (319): 85. Euphorbiaceae - tarrao (Som.)
- Jatropha spicata* (322): 85. Euphorbiaceae - album (Som.); mowo (Orom.)
- Jatropha tropaeoliifolia* (321): 85. Euphorbiaceae - joho (Som.)
- Kedrostis foetidissima* (23): 65. Cucurbitaceae - tukelelmis (Som.)
- Kosteletzkya adoensis* (215): 82. Malvaceae - anch'a (Orom.); cicciniinaa, kouni alaua (Orom.); ናጫ naça (Amh.); ዕጎት šgot (Tya); የምድር መቃ yemdr meqa (Amh.)
- Kosteletzkya begoniifolia* (215): 82. Malvaceae - heexoo (Orom.)
- Lagenaria abyssinica* (49): 65. Cucurbitaceae - dukarkula (Sid.); የቅል እምቧይ yeql 'mbway (Amh.)
- Lagenaria siceraria* (50): 65. Cucurbitaceae - bohor, bor ubo (Som.); dabaa qula, follaa (Orom.); gareh (Som.); ሓም-ሓም ስምጵም (Saho & Tya); ቅል qil (Amh.); ሽንክናብ shknab (Tigre)
- Lophostemon confertus* (79): 72. Myrtaceae - brisbane box (Eng.)
- Luffa cylindrica* (56): 65. Cucurbitaceae - lipa (Anu.); madodoki (Som.)
- Macaranga capensis* (295): 85. Euphorbiaceae - arjoo (Orom.); ብሳና bsana (Amh.); babbe, baddeessaa, chilekoo, doggomaa, harbuu, hongo, koofalee, kordee, kordii, ongo, safale (Orom.); shakaro (Kef.); shakere (Wel.); shakiro (Kef.); sholda, showshowe (Orom.); uerongo (Mao.); urayu, wongo, worongo, worenjo, worongo (Orom.)
- Malva parviflora* (237): 82. Malvaceae - ዕንቅፍታሓ 'nqftaha (Tya); አበባ abeba (Gur.); አድጋኡር adgaur (Amh.); Egyptian mallow (Eng.); ልኩት lhti (Tya); little mallow (Eng.); ሉሳና lusena (Agew); ሉት lut (Amh.); mallow, march mallow, small flower mallow (Eng.)
- Malva verticillata* (237): 82. Malvaceae - አድጋኡር adgaur, አድጋዋር adgwar (Amh.); dohoqonuu (Orom.); ልኩት lhti (Tya); ሉሳና lusena (Agew); ሉት lut (Amh.); hincinii, lutt (Orom.); yuma (Kem.)
- Manihot esculenta* (315): 85. Euphorbiaceae - batata (Som.); bitter cassava, cassava (Eng.); deekikaa (Orom.); ferege boye (Gam.); furnge (Gam.); mananga (Som.); manioc (Eng.); mohogo, moogo (Som.); para arrow root, rio arrow root, sweet cassava (Eng.); yeferenj buye (Gam.)
- Manihot glaziovii* (316): 85. Euphorbiaceae - ceara rubber (Eng.)
- Margaritaria discoidea* (284): 85. Euphorbiaceae - bobeyaa (Orom.); bobyaa (Sid.); burbukee (Orom.); chuchu (Sha.)
- Melastomastrum capitatum* (111): 74. Melastomataceae - gonjamet (Gim.)
- Melhania denhamii* (176): 80. Sterculiaceae - dashale (Som.)
- Momordica foetida* (42): 65. Cucurbitaceae - ዓጎጎ ሻ ሽ ängo kwak (Tya); አረግ ሬሳ areg riesa (Amh.); bararit (Me.); ሓፋፋል ስላል hafafal (Tigre); ከኮይቲ ባስካ kokoyti baska (Saho); ማር ቁራ mar qura (Amh.); መዓር ሻ ሽ meär kwak (Tya); sara (Som.)
- Momordica macrosperma* (41): 65. Cucurbitaceae - madabene, madabug (Som.)
- Momordica pterocarpa* (41): 65. Cucurbitaceae - መዓር ተመን meär temen (Tya); cum illis, makato (Wel.); mokootaa (Orom.)
- Momordica sessilifolia* (44): 65. Cucurbitaceae - gesanges (Som.)
- Momordica* spp. (39): 65. Cucurbitaceae - ado (Dor.); cioco (Gam.); roho (Som.); ወፍ ጠጭ wef tēç, የቁራ ሃረግ yequra hareg (Amh.)
- Momordica trifoliolata* (42): 65. Cucurbitaceae - gaanogoi, ilgal, macurumbi, madapisciar, sarsare (Som.)
- Mukia maderaspatana* (29): 65. Cucurbitaceae - አንስተይቲ ሓፋፋሉ ቐላ ansteyti hafaflo qola (Tya); የአምራ ምሳ yeamora msa (Amh.)
- Myrtus communis* (71): 72. Myrtaceae - addisaa (Orom.); አደስ ades (Amh., Gur. & Tya); ቦርስነት bersnet (Amh.); ብርስኖት brsnot, ብርስዩን brsyun (Ge'ez); coddoo (Orom.); common myrtle (Eng.); kodoo (Orom.); myrtle, myrtle bush (Eng.); wobattaa (Wel.)
- Ochna bracteosa* (67): 69. Ochnaceae - worchakisaa (Orom.)
- Ochna holstii* (66): 69. Ochnaceae - baabai, baabbee, babaa, bobeyaa, worchakisaa (Orom.)
- Ochna inermis* (67): 69. Ochnaceae - አባጋማ abagamma (Tya); baarichaa, beenatee, dulfalid, dulfallid (Som.); eergat'aa nenjaa, eyun enemer (Orom.); ghedud maddovie, mejabe, lolgi, oloncho (Som.); ቁዓት qiät, ቁዓት መሪር qiät merir (Tya); selibatiko, seligatiko (Som.)
- Ochna leucophloeos* (67): 69. Ochnaceae - ቁዓት qiät (Tya)

- Ochna schweinfurthiana* (67): 69. Ochnaceae - ogoonee (Orom.)
- Ochna* spp. (66): 69. Ochnaceae - gnipolo (Anu. & Mes.)
- Passiflora ligularis* (15): 64. Passifloraceae - sweet granadilla (Eng.)
- Passiflora mollissima* (14): 64. Passifloraceae - banana passion fruit (Eng.)
- Passiflora quadrangularis* (15): 64. Passifloraceae - granadilla (Eng.)
- Passiflora* spp. (13): 64. Passifloraceae - passion flower (Eng.)
- Pavonia arabica* (232): 82. Malvaceae - chime bralle (Som.); gurbi hatawi (Orom.); mirugiljili (Som.)
- Pavonia burchellii* (225): 82. Malvaceae - balambal, balumbal (Som.); carrabaa, darguu, gurbi matawi (Orom.); ሐማት ፅጎት ስማት ስጎት (Tya); ማፍቴሉ-ጠፍቲዮ, ናጫ ጠፍቲዮ (Amh.); ፅጎት ስጎት (Tya); salo weni, salo weyn (Som.)
- Pavonia eremogeton* (233): 82. Malvaceae - duffmod, haggin (Som.)
- Pavonia gallaënsis* (226): 82. Malvaceae - gumbi daleti (Orom.)
- Pavonia glechomifolia* (226): 82. Malvaceae - gini hamoh (Afar); saloweini (Som.); ፅጎት ስጎት (Tya)
- Pavonia kotschyi* (234): 82. Malvaceae - balambal, duffonod (Som.); ሃምበግጋ ስጎት ስጎት (Tya); hoga galli, kabargurud, kolmale, salaweineye (Som.)
- Pavonia patens* (236): 82. Malvaceae - capgal (Som.)
- Pavonia procumbens* (226): 82. Malvaceae - hamokto (Afar); laaghi (Sha.); moloaci (Arb.)
- Pavonia propinqua* (230): 82. Malvaceae - agherheret, balambal, granais, sou dur (Som.)
- Pavonia schimperiana* (228): 82. Malvaceae - ሐማት ፅጎት ስማት ስጎት (Tya); thogo (Kef. & Orom.)
- Pavonia* spp. (224): 82. Malvaceae - ለንደድ 'ndod (Amh.); ፅንደት 'ndot (Tya); ሐብላሊት ablalit (Amh.); babale, babarich (Som.); balambal (Orom.); balambal, capgal, duffulot (Som.); hambaltaa (Orom.); ሃምበግጋ ስጎት ስጎት (Tya); hincinii (Orom.); ናጫ ጠፍቲዮ, ነጭሉ-ጠፍቲዮ (Amh.); shamaldowa, subaglai (Som.); thogo, togo (Kef.); የቆላ ነጭሉ-ጠፍቲዮ yeqola neçlo (Amh.)
- Pavonia urens* (228): 82. Malvaceae - ሐብላሊት ablalit (Amh.); dubba (Orom.); ሐማት ፅጎት ስማት ስጎት (Tya); hambaltaa, hincinii, karchabaa, kitaa, leeta (Orom.)
- Pavonia zeylanica* (233): 82. Malvaceae - chimbrale, dafnod (Som.); hamokto (Afar); metara, shimbrale (Som.)
- Phyllanthus ovalifolius* (276): 85. Euphorbiaceae - jilolafaa, jilohafaa, kottuu (Orom.); lamon (Mes.); ተጨቆ ገጽጽ, የተተገ ገጽጽ-ገጽጽ yekebt shmbra (Amh.)
- Phyllanthus reticulatus* (277): 85. Euphorbiaceae - hachabe, macciabe (Som.)
- Phyllanthus sepialis* (278): 85. Euphorbiaceae - dirri (Orom.)
- Phyllanthus* spp. (275): 85. Euphorbiaceae - ecama (Koc.)
- Psidium guajava* (72): 72. Myrtaceae - common guava, guava (Eng.); zeitun (Som.); zeyiton (Ade.); zeyitum (Afar); ዘይትሁን zeythun (Tya); ዘይትን zeytun (Amh.); zeyitunnaa (Orom.)
- Psidium* spp. (72): 72. Myrtaceae - baddessaa (Orom.); ዶቅማ doqma (Amh.); ocha (Gam.); yino (Moch.)
- Quisqualis indica* (124): 75. Combretaceae - rangoon creeper (Eng.)
- Rhizophora mucronata* (133): 76. Rhizophoraceae - gandallo (Som.); ጎንደል gondel (Tya); mangrove (Eng.); makanda, mcanda (Som.)
- Ricinus communis* (293): 85. Euphorbiaceae - ati (Gam.); ባላምባላ balambai, ባላን balan, ባላን balon (Saho); bolut (Me.); bolutt (Bod.); bor (Som.); bora (Sha.); ቡላቃ bulqa, ጫንጫ ጫንጫ caqma (Amh.); castorbean, castor oil tree (Eng.); chengi (Mes.); cobo (Som.); ግልጺ gli (Tigre); ጎልጽ golqwa (Amh.); ጉልጺ guli (Saho & Tya); ጉሉ-gulo (Amh.); hambaltaa (Orom.); kalishe (Gam.); ቆብ qobo (Gur.); kobo (Som.); ምባላቻ mbalica (Saho); ቃጫ ጫ ጫ ጫ qaçima (Amh.); ቂንቸ ሃራ qince hara (Agew); qobboo (Orom.); tofoile (Som.); uleeru (Anu.)
- Sapium ellipticum* (328): 85. Euphorbiaceae - baro (Sha.); ቦርቦሪ ሐሳማይ berbere aslamay (Tya); bosoqqee, ganchoo, gelloo, qobboo (Orom.); shedo (Kef.); waxisaa, wakissaa (Orom.)
- Sapium sebiferum* (328): 85. Euphorbiaceae - chinese tallow tree (Eng.)
- Senra incana* (216): 82. Malvaceae - amonktou (Afar); balambal (Som.); ሃምበግጋ ሐሐ ስጎት ስጎት aha (Tya); ነጭሉ-ጠፍቲዮ (Amh.); olbe (Arb.); sent'aro, sentero (Gam.)
- Senra zoës* (216): 82. Malvaceae - balambal (Som.)
- Sida acuta* (252): 82. Malvaceae - gandaletere (Som.); ካራብ karaba (Amh.); shoro'ac, shoroshintit (Me.); torhsu, torshu (Sha.)
- Sida alba* (251): 82. Malvaceae - gandaletere (Som.)
- Sida collina* (252): 82. Malvaceae - ካራብ karaba (Amh.); torshu (Sha.)

- Sida ovata* (254): 82. Malvaceae - ad addis, ada des (Som.); azemba (Caro); borara (Had.); ጥፍርግ cfrg (Amh.); ዳዕሮ ባይታ da'ro baita, ዳዕሮ ምድሪ da'ro mdri (Tya); dandarreesa (Orom.); ደቂቅ ዳዕሮ deqiḳ da'ro (Tya); gandelet tire (Som.); guffee (Orom.); kindichuwa (Wel.); rugageita (Afar)
- Sida rhombifolia* (254): 82. Malvaceae - broom jute sida (Eng.); ciunbiscia (Sha.); common sida (Eng.); ዳዕሮ ምድሪ da'ro mdri, ደቂቅ ዳዕሮ deqiḳ da'ro (Tya); ጎርጂጂት gorjejit (Amh.); inasa (Ghe.); jelly leaf (Eng.); karaba (Amh.); karrabaa (Orom.); poddy's lucerne (Eng.); ቀርኒ ጤል qemi tiel (Tya); queensland hemp (Eng.)
- Sida schimperiana* (251): 82. Malvaceae - ancakiiraa, ancakiiree, ancqqarrii, carrabaa (Orom.); ጥፍርግ cfrg (Amh. & Tya); ጎርጂጂት gorjejit (Amh.); guffee, kotte jaabesaa, metragaa (Orom.); shetto (Kef.); ጥፍረርያ ifrerya (Tya)
- Sida tenuicarpa* (251): 82. Malvaceae - ጥፍርግ cfrg (Amh.); chetto (Kef.); girenchi (Orom.); kote jabessa (Sid.); kotte jaabesaa, shetto (Orom.)
- Sida ternata* (249): 82. Malvaceae - ልኩት lîti, ጡጥ ኣድጊ tuṭ adgi (Tya); ምድር ኣረግ yemdr areg (Amh.)
- Sparmannia ricinocarpa* (158): 79. Tiliaceae - ውልከፋ wulkfa (Amh.)
- Sterculia africana* (184): 80. Sterculiaceae - danrab (Som.); ዳርለ darle (Tya); darrab, carare, carari, garaho, garanro, garare, gareri (Som.); uriemo (Amu.)
- Sterculia setigera* (183): 80. Sterculiaceae - ጭልፋ ሀበይ ርፊላ hbey, ዳርለ darle (Tya); ጋገገዳ galageda (Amh.); mago (Gam.)
- Sterculia* spp. (183): 80. Sterculiaceae - ዳርለ darle (Tya)
- Syzygium guineense* (77): 72. Myrtaceae - a acha (Sha.); ኣኖት anot (Ge'ez); ኣንቃ anqa (Amh.); ኣሮት arot (Ge'ez); ኣውሊሽ awlish (Agew); baddessaa (Orom.); badesa (Wel.); corat, corut (Me.); dair (Som.); dekericho (Orom.); ድግግ dgta (Amh.); ድቅማ doqma (Amh. & Gur.); duancho (Sha.); duandoo gafu (Orom.); dubana (Had.); duwancho (Sid.); gagamaa, gasii (Orom.); gegame (Had.); giu (Anu.); gofu, gomorii, gossuu (Orom.); guinea syzygium (Eng.); kurunfuli (Had.); ሊኣም lihām (Tya); mochaa, ochu, oicha (Orom.); oochcha (Wel.); qurunfullii (Orom.); ስተረ ቤሎን setere bielōn (Ge'ez); water berry (Eng.); woraricho (Orom.); worarico (Sid.); worariko (Had. & Orom.); yeenoo (Orom.); yino (Had.)
- Syzygium* spp. (75): 72. Myrtaceae - black olum tree (Eng.); goomorii (Orom.); indian black berry, java plum, malabar plum (Eng.)
- Tamarix aphylla* (3): 63. Tamaricaceae - ዕብል 'bel (Tigre); dokan, dur gohr, gol (Som.); segentu (Afar); ዑብል úbel (Tya)
- Tamarix nilotica* (4): 63. Tamaricaceae - ዕብል 'bel (Tigre); dur (Som.); ሳጋን sagan (Amh.); ዑብል úbel (Tya)
- Tamarix* spp. (3): 63. Tamaricaceae - ሳጋም sagan (Saho)
- Terminalia basilei* (127): 75. Combretaceae - harere, hareri (Som.)
- Terminalia brevipes* (125): 75. Combretaceae - eiret, elan, erep, gioar eile, heireb, herab (Som.); kilaitu (Afar)
- Terminalia brownii* (127): 75. Combretaceae - abaaloo (Orom.); aibetpaha (Kon.); aluloo (Orom.); alulo (Som.); arra, aru (Sha.); aya veini (Som.); balangaa, baresaa (Orom.); biiris, bires (Som.); brown's myrobalan (Eng.); bukwe (Mur.); eubata (Kon.); galaldo (Gam. & Orom.); glelio (Gam. & Orom.); hare haiyita (Wel.); hareri (Som.); ሆኩባ houba, ቀይ እንጨት qey 'nçet (Amh.); reessaa (Orom.); ወይባ weyba (Amh. & Tya); ወዋፍባ weyefba (Amh.); wob, wol, woob, woube, wuub, youb, yoube (Som.)
- Terminalia laxiflora* (128): 75. Combretaceae - pik, poswedoh, powdoh, powedoh (Anu.)
- Terminalia macroptera* (127): 75. Combretaceae - kokora, qoqoraa (Orom.)
- Terminalia orbicularis* (124): 75. Combretaceae - bessek, bissak (Som.); bisik (Orom.); bisik, deng, korgub, ro o (Som.)
- Terminalia polycarpa* (125): 75. Combretaceae - arar, ateri, gabbro, harar, hareri (Som.)
- Terminalia prunioides* (125): 75. Combretaceae - hareri (Som.)
- Terminalia schimperiana* (128): 75. Combretaceae - ኣባሎ abalo (Amh.); ኣበሊዋ abeliwa (Tya); ambe (Orom.); bagure (Ahi.); bagure, kolisa, qaxalee (Orom.); ታግዬ tagyie (Amh.)
- Terminalia spinosa* (125): 75. Combretaceae - ateri, gebro, harar, hareri (Som.); hollata (Kon.); kalle, motekeda (Sha.)
- Terminalia* spp. (124): 75. Combretaceae - ኣፍከሞ afkemo (Tya); ኣኩማ akuma (Amh.)
- Thea sinensis* (65): 68. Theaceae - ሻሂ shahi (Tya); ሻይ shay (Amh.)
- Thespesia danis* (222): 82. Malvaceae - cobbanne (Som.); danis (Orom.)

- Tragia brevipes* (307): 85. Euphorbiaceae -  
አለብላቢት aleblabit, አውላሊት awlalit (Amh.);  
gob dahayo (Som.); gurgubbee, laalessaa (Orom.);  
sese (Bod.)
- Tragia cinerea* (308): 85. Euphorbiaceae -  
አለብላቢት aleblabit (Amh.); አምዐ amé (Tya);  
laalessaa (Orom.); መስከጸት meschayit (Tya)
- Tragia hildebrandtii* (307): 85. Euphorbiaceae -  
danic, goubtino (Som.)
- Tragia plukenetii* (306): 85. Euphorbiaceae -  
አለብላቢት aleblabit (Amh.); dannaniye (Som.);  
doobbii (Orom.); goubtinio, gubtanya (Som.);  
nyangatom (Gam.)
- Tragia pungens* (308): 85. Euphorbiaceae -  
አለብላቢት aleblabit (Amh.); አምዐ amé (Tya);  
ሃብላት hablalit (Amh.); hambaltee (Orom.);  
ካራስ አምዐ haras amé (Tya); kalishe (Gam.);  
ቂንቸ ሃራ qince hara (Agew); sese (Me.)
- Tragia* spp. (304): 85. Euphorbiaceae - አውላሊት  
awlalit (Amh.); baba (Koe.); hambaltee (Orom.);  
kosho, mere (Kef.); sheshoo (Orom.)

- Triumfetta flavescens* (164): 79. Tiliaceae - ባዕዳ  
ቡዋሽ ša'da buwaḵ (Tya); salo weyn (Som.)
- Triumfetta heterocarpa* (164): 79. Tiliaceae - cobgal,  
granais, saloweyn (Som.)
- Triumfetta pentandra* (162): 79. Tiliaceae - ዱባ  
duba (Tya)
- Triumfetta pilosa* (161): 79. Tiliaceae - adazuli  
(Som.); ሽምገሊት shemgegit (Amh.)
- Triumfetta rhomboidea* (162): 79. Tiliaceae - wea  
(Mes.)
- Triumfetta* spp. (158): 79. Tiliaceae - lola (Wel.)
- Triumfetta tomentosa* (161): 79. Tiliaceae - danigola  
(Orom.); ናታ naça (Amh.)
- Warburgia ugandensis* (1): 60. Canellaceae - befti  
(Orom.); ካናፋ kanafa (Amh.)
- Zehneria anomala* (27): 65. Cucurbitaceae - አረግ  
ሬሳ areg riesa (Amh.); ካፋፍሎ hafaflo (Tya)
- Zehneria scabra* (27): 65. Cucurbitaceae - እፀ ሳቤቅ  
'še sabieq (Ge'ez); አረግ ሬሳ areg riesa (Amh.);  
gesanges (Som.); ካፋፍሎ hafaflo, ካረግ ረይሳ  
hareg reysa (Tya); ሳቤቅ sabieq (Ge'ez)

ETHIOPIC NAMES ARRANGED ALPHABETICALLY  
(in Ge'ez and Latin script)

- ዕባል 'bel (Tigre) - *Tamarix aphylla* (3) 63.  
Tamaricaceae, *Tamarix nilotica* (4) 63.  
Tamaricaceae
- ዕገዶት 'ndot (Tya) - *Pavonia* spp. (224) 82.  
Malvaceae
- ዕገገል ባይታ 'ngule baita (Tya) - *Citrullus colocynthis* (48) 65. Cucurbitaceae
- ዕገገገት ላ 'ngitaha (Tya) - *Cucumis ficifolius* (34) 82. Malvaceae, *Malva parviflora* (237) 65.  
Cucurbitaceae
- እገዶድ 'ndod (Amh.) - *Pavonia* spp. (224) 82.  
Malvaceae
- እገ ልባዊት 'se ibawit (Ge'ez) - *Hibiscus* spp. (191) 82. Malvaceae
- እገ ላቢት 'se sabieq (Ge'ez) - *Zehneria scabra* (27) 65. Cucurbitaceae
- እገ ተከላ 'se tekezie (Ge'ez) - *Andrachne aspera* (271) 85. Euphorbiaceae
- እገ ዮዲት 'se yodit (Ge'ez) - *Euphorbia indica* (374) 85. Euphorbiaceae
- አሊግግ abagamma (Tya) - *Ochna inermis* (67) 69.  
Ochnaceae
- አባሉ abalo (Amh.) - *Combretum molle* (118),  
*Combretum* spp. (115), *Terminalia schimperiana* (128) 75. Combretaceae
- አባይ ገገብ abay ngus (Amh.) - *Hibiscus crassinervius* (209) 82. Malvaceae
- አባባ abeba (Gur.) - *Malva parviflora* (237) 82.  
Malvaceae
- አባባዎ abchiwa (Tya) - *Combretum molle* (118),  
*Terminalia schimperiana* (128) 75.  
Combretaceae
- አባላዎ abidamo (Amh.) - *Euphorbia schimperiana* (370) 85. Euphorbiaceae
- አባላት ablatit (Amh.) - *Pavonia* spp. (224),  
*Pavonia urens* (228) 82. Malvaceae
- አዶስ ades (Amh.) - *Eugenia* spp. (72) 72. Myrtaceae
- አዶስ ades (Amh., Gur. & Tya) - *Myrtus communis* (71) 72. Myrtaceae
- አዶጋክር adgaur (Amh.) - *Malva parviflora* (237),  
*Malva verticillata* (237) 82. Malvaceae
- አዶግዮር adgwar (Amh.) - *Malva verticillata* (237) 82. Malvaceae
- አፍገዎ askemo (Tya) - *Combretum* spp. (115),  
*Terminalia* spp. (124) 75. Combretaceae
- ዓፍለት äfiot (Tya) - *Combretum aculeatum* (120) 75. Combretaceae
- አፍትሕ afih (Tigre) - *Corchorus depressus* (156) 79.  
Tiliaceae
- ዓፍቶ äfto (Tya) - *Cucumis pustulatus* (34) 65.  
Cucurbitaceae
- አጋሎ agalo (Amh.) - *Combretum* spp. (115) 75.  
Combretaceae
- አጎብዳይ agobday (Amh.) - *Grewia villosa* (152) 79.  
Tiliaceae
- ዓገር ላሬሽ akor harish (Tya) - *Hibiscus cannabinus* (198) 82. Malvaceae
- አሎግ akuma (Amh.) - *Terminalia* spp. (124) 75.  
Combretaceae
- አሎግ akuma (Tya) - *Combretum* spp. (115) 75.  
Combretaceae
- ዓላ ሜዳ äla meyda (Tya) - *Erythrococca abyssinica* (296) 85. Euphorbiaceae
- ዓላ äla (Tigre) - *Clutia lanceolata* (286) 85.  
Euphorbiaceae
- ዓላዕላ äla'file (Tigre) - *Clutia lanceolata* (286) 85.  
Euphorbiaceae
- አለብላቢት aleblabit (Amh.) - *Tragia brevipes* (307),  
*Tragia cinerea* (308), *Tragia plukenetii* (306),  
*Tragia pungens* (308) 85. Euphorbiaceae
- አለገቶላ alenqoza (Amh.) - *Grewia ferruginea* (150) 79. Tiliaceae
- ዓለገቶላ älenqoza (Tya) - *Combretum adenogonium* (117) 75. Combretaceae
- አለገቶላ alenqoza (Tya) - *Combretum hartmannianum* (117), *Combretum* spp. (115) 75.  
Combretaceae
- አግዶ amado (Saho) - *Croton macrostachyus* (326) 85. Euphorbiaceae
- አግባ ጎሳ ambala gosa (Agew) - *Coccinia grandis* (54) 65. Cucurbitaceae
- አግዕ amé (Tya) - *Tragia cinerea* (308) 85.  
Euphorbiaceae
- አግደግዶ amedmado (Amh.) - *Abutilon longicuspe* (241) 82. Malvaceae
- አግፈርፋር amferfaro (Tya) - *Combretum molle* (118) 75. Combretaceae
- አግዥ anja (Amh.) - *Hypericum gnidiifolium* (138),  
*Hypericum quartianum* (136), *Hypericum revolutum* (136) 77. Guttiferae
- አግፋርፋር anfarfaro (Tya) - *Combretum molle* (118) 75. Combretaceae
- ዓገገ ጃሽ ängo kwak (Tya) - *Momordica foetida* (42) 65. Cucurbitaceae
- አፍት anot (Ge'ez) - *Syzygium guineense* (77) 72.  
Myrtaceae
- አገጎ anqa (Amh.) - *Syzygium guineense* (77) 72.  
Myrtaceae

አንተይቲ አፋፍሎ ቻላ ansteyti hafaflo qola (Tya) - *Mukia maderaspatana* (29) 65. Cucurbitaceae  
 አንተርፋ anterfa (Amh.) - *Euphorbia dumalis* (366), *Euphorbia platyphyllos* (368), *Euphorbia repetita* (370), *Euphorbia schimperiana* (370), *Euphorbia wellbyi* (369) 85. Euphorbiaceae  
 አረግ ሬሳ areg riesa (Amh.) - *Momordica foetida* (42) 65. Cucurbitaceae, *Zehneria anomala* (27) 65. Cucurbitaceae, *Zehneria scabra* (27) 65. Cucurbitaceae  
 አረዞ arezo (Agew) - *Abutilon mauritianum* (246) 82. Malvaceae  
 አሮት arot (Ge'ez) - *Syzygium guineense* (77) 72. Myrtaceae  
 አውላሊት awlalit (Amh.) - *Tragia brevipes* (307), *Tragia* spp. 85. Euphorbiaceae  
 አውሊሽ awlish (Agew) - *Syzygium guineense* (77) 72. Myrtaceae  
 አውሎላ awloa (Agew) - *Combretum molle* (118) 75. Combretaceae  
 አይላዳ ayhada (Tya) - *Flueggea virosa* (272) 85. Euphorbiaceae  
 አይሃዳ ayhada (Amh.) - *Flueggea virosa* (272) 85. Euphorbiaceae  
 አይንዳሽ ayndash (Tya) - *Euphorbia depauperata* (366) 85. Euphorbiaceae  
 ባሀር ዛፍ bahr zaf (Amh.) - *Eucalyptus citriodora* (86), *Eucalyptus globulus* (100), *Eucalyptus robusta* (92), *Eucalyptus saligna* (91) 72. Myrtaceae  
 ባኩት bakarot (Tya) - *Clusia lanceolata* (286) 85. Euphorbiaceae  
 ባላምባሊ balambai (Saho) - *Ricinus communis* (293) 85. Euphorbiaceae  
 ባላን balan (Saho) - *Ricinus communis* (293) 85. Euphorbiaceae  
 ባልድባልዶ baldbaldo (Tya) - *Euphorbia schimperiana* (370) 85. Euphorbiaceae  
 ባለን balon (Saho) - *Ricinus communis* (293) 85. Euphorbiaceae  
 ባምባ bamba (Amh. & Tya) - *Adansonia digitata* (186) 81. Bombacaceae  
 ባምያ bamya (Amh. & Tya) - *Abelmoschus esculentus* (212) 82. Malvaceae  
 ባራር barar (Saho) - *Grewia tenax* (152) 79. Tiliaceae  
 ባርባረ አሰላማይ berbere aslamay (Tya) - *Sapium ellipticum* (328) 85. Euphorbiaceae  
 ባርስት bersnet (Amh.) - *Myrtus communis* (71) 72. Myrtaceae  
 ባቲህ betih (Ge'ez) - *Citrullus lanatus* (48) 65. Cucurbitaceae

ባትረ ሙሴ betre music (Amh.) - *Grewia* spp. (145) 79. Tiliaceae  
 ባትረ ሙሴ betre music (Tya) - *Grewia mollis* (146), *Grewia* spp. (145) 79. Tiliaceae  
 ባዦዝ bezez (Amh.) - *Hibiscus berberidifolius* (196), *Hibiscus* spp. (191) 82. Malvaceae  
 ቢና bina (Amh.) - *Flueggea virosa* (272) 85. Euphorbiaceae  
 ቢጋማ bogama (Amh.) - *Acalypha fruticosa* (301) 85. Euphorbiaceae  
 ብርጭቻ brçq (Tya) - *Citrullus lanatus* (48) 65. Cucurbitaceae  
 ብርጭቻ ዱባ brçq duba (Amh.) - *Citrullus lanatus* (48) 65. Cucurbitaceae  
 ብርሽትጥት brktyet (Tya) - *Clusia abyssinica* (286), *Clusia lanceolata* (286) 85. Euphorbiaceae  
 ብርስጥት brsnot (Ge'ez) - *Myrtus communis* (71) 72. Myrtaceae  
 ብርስጥን brsyun (Ge'ez) - *Myrtus communis* (71) 72. Myrtaceae  
 ብሳና bsana (Amh.) - *Croton macrostachyus* (326), *Macaranga capensis* (295) 85. Euphorbiaceae  
 ብሻ ባርዛፍ bsha barzaf (Gur.) - *Eucalyptus camaldulensis* (98) 72. Myrtaceae  
 ቡሉቃ bulqa (Amh.) - *Ricinus communis* (293) 85. Euphorbiaceae  
 ቡና ትጠል buna qitel (Amh.) - *Cassipourea malosana* (134), *Cassipourea* spp. (134) 76. Rhizophoraceae  
 ቡሲና busina (Saho) - *Croton macrostachyus* (326) 85. Euphorbiaceae  
 ቡዋሽ buwaḥ (Tya) - *Abutilon pannosum* (246) 82. Malvaceae  
 ጫትማ ርቃማ (Amh.) *Ricinus communis* (293) 85. Euphorbiaceae  
 ጥፍርግ cfrg (Amh.) - *Sida ovata* (254), *Sida schimperiana* (251), *Sida temucarpa* (251) 82. Malvaceae  
 ጥፍርግ cfrg (Tya) - *Sida schimperiana* (251) 82. Malvaceae  
 ጥፋፋ ሀብይ ቀፊላ hbey (Tya) - *Sterculia setigera* (183) 80. Sterculiaceae  
 ጥራ ግንደል çra ändiel (Tya) - *Hibiscus crassinervius* (209) 82. Malvaceae  
 ጥራ ሙርፀን ጤል çra merßen tiel (Tya) - *Hibiscus crassinervius* (209) 82. Malvaceae  
 ጥፋም ሓሊ çrum hali (Tigre) - *Euphorbia triaculeata* (345) 85. Euphorbiaceae  
 ዳዕር ባይታ da'ro baita (Tya) - *Sida ovata* (254) 82. Malvaceae  
 ዳዕር ምድሪ da'ro mdri (Tya) - *Sida ovata* (254), *Sida rhombifolia* (254) 82. Malvaceae



- ዳሓቲቶ dahaqito (Tigre) - *Cucumis dipsaceus* (37),  
*Cucumis pustulatus* (34) 65. Cucurbitaceae
- ዳኩብ dakub (Tigre) - *Grewia flavescens* (149),  
*Grewia mollis* (146) 79. Tiliaceae
- ዳኩብ dakub (Tya) - *Grewia trichocarpa* (148) 79.  
Tiliaceae
- ዳርላ darle (Tya) - *Sterculia africana* (184), *Sterculia*  
*setigera* (183), *Sterculia* spp. (183) 80.  
Sterculiaceae
- ደማይ demayi (Tya) - *Euphorbia scordifolia* (375)  
85. Euphorbiaceae
- ደቂቅ ዳዕር deqīq da'ro (Tya) - *Sida rhombifolia*  
(254), *Sida ovata* (254) 82. Malvaceae
- ደርከዳም derkedum (Amh.) - *Bridelia micrantha*  
(269) 85. Euphorbiaceae
- ደግግ dgā (Amh.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- ዲማ dima (Amh.) - *Adansonia digitata* (186) 81.  
Bombacaceae
- ዲስክ disk (Amh.) - *Hibiscus* spp. (191) 82.  
Malvaceae
- ዲዛ diza (Amh.) - *Adansonia digitata* (186) 81.  
Bombacaceae
- ደጃዕታ dokwa'ta (1 ya) - *Cucumis dipsaceus* (37),  
*Cucumis pustulatus* (34) 65. Cucurbitaceae
- ደቅማ doqma (Amh.) - *Psidium* spp. (72), *Syzygium*  
*guineense* (77) 72. Myrtaceae
- ደቅማ doqma (Gur.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- ደቅላ ዳብ dāqala duba (Tya) - *Cucumis pustulatus*  
(34) 65. Cucurbitaceae
- ዳብ duba (Amh. & Saho) - *Cucurbita pepo* (58) 65.  
Cucurbitaceae
- ዳብ duba (Tya) - *Cucurbita maxima* (59), *Cucurbita*  
*pepo* (58) 65. Cucurbitaceae, *Triumfetta*  
*pentandra* (162) 79. Tiliaceae
- ፋቱካ fatuka (Amh.) - *Combretum molle* (118) 75.  
Combretaceae
- ፍየላ ፈጅ fyele fej (Amh.) - *Clutia abyssinica* (286),  
*Clutia lanceolata* (286), *Croton dichogamus*  
(324), *Croton* spp. (324) 85. Euphorbiaceae
- ጋላገዳ galageda (Amh.) - *Sterculia setigera* (183) 80.  
Sterculiaceae
- ገልጊ gū (Tigre) - *Ricinus communis* (293) 85.  
Euphorbiaceae
- ገገ ሓረስታይ gogo harestay (Tya) - *Grewia villosa*  
(152) 79. Tiliaceae
- ገልጃ golqwa (Amh.) - *Ricinus communis* (293) 85.  
Euphorbiaceae
- ገንደል gondel (Tya) - *Rhizophora mucronata* (133)  
76. Rhizophoraceae
- ገርጅጂት gorjejit (Amh.) - *Sida rhombifolia* (254),  
*Sida schimperiana* (251) 82. Malvaceae
- ገልጊ gū (Saho & Tya) - *Ricinus communis* (293)  
85. Euphorbiaceae
- ገሎ gulo (Amh.) - *Acalypha fruticosa* (301), *Ricinus*  
*communis* (293) 85. Euphorbiaceae
- ሓበኝ ስላቤ ስላቤ habene (Tya) - *Grewia bicolor* (146) 79.  
Tiliaceae
- ሃብላሊት hablalit (Amh.) - *Tragia pungens* (308) 85.  
Euphorbiaceae
- ሓፋፍሎ ስላቤ ስላቤ hafaflo (Tya) - *Cucumis dipsaceus* (37),  
*Cucumis pustulatus* (34), *Zehneria anomala* (27),  
*Zehneria scabra* (27) 65. Cucurbitaceae
- ሓፋፍሎ ስላቤ ስላቤ hafaful (Tigre) - *Momordica foetida* (42) 65.  
Cucurbitaceae
- ሓፋፍሎ ስላቤ ስላቤ hafule (Tigre) - *Grewia villosa* (152) 79.  
Tiliaceae
- ሓማት ዕገት ስላቤ ስላቤ hamat šgot (Tya) - *Pavonia burchellii*  
(225), *Pavonia schimperiana* (228), *Pavonia*  
*urens* (228) 82. Malvaceae
- ሃምበቲ ስላቤ ስላቤ hambeku aña (Tya) - *Senra incana*  
(216) 82. Malvaceae
- ሃምበቲ ስላቤ ስላቤ hambekway (Tya) - *Pavonia kotschyi*  
(234), *Pavonia* spp. (224) 82. Malvaceae
- ሃምበቲ ስላቤ ስላቤ hambobil (Tigre) - *Citrullus colocynthis*  
(48) 65. Cucurbitaceae
- ሓምሓም ስላቤ ስላቤ hamham (Saho & Tya) - *Lagenaria*  
*siceraria* (50) 65. Cucurbitaceae
- ሓምሓም ስላቤ ስላቤ hamham (Tigre) - *Cucurbita maxima* (59),  
*Cucurbita pepo* 65. (58) Cucurbitaceae
- ሓንሰ ስላቤ ስላቤ hanse (Tya) - *Anogeissus leiocarpa* (130) 75.  
Combretaceae
- ሓራሰ ስላቤ ስላቤ haras amé (Tya) - *Tragia pungens* (308)  
85. Euphorbiaceae
- ሓረግ ረይሳ ስላቤ ስላቤ hareg reysa (Tya) - *Zehneria scabra* (27)  
65. Cucurbitaceae
- ሓርማሽ ስላቤ ስላቤ harmazo (Tya) - *Flueggea virosa* (272) 85.  
Euphorbiaceae
- ሓገሰ ስላቤ ስላቤ hašiba (Tya) - *Combretum molle* (118) 75.  
Combretaceae
- ሓዋውቲ ስላቤ ስላቤ hawawti (Tya) - *Grewia mollis* (146) 79.  
Tiliaceae
- ሕዳ ስላቤ ስላቤ hda (Tya) - *Grewia tembensis* (150) 79.  
Tiliaceae, *Grewia tenax* (152) 79. Tiliaceae
- ሕልብ ሕልብ ስላቤ ስላቤ hlb hlb (Tya) *Euphorbia scordifolia*  
(375) 85. Euphorbiaceae
- ሀንዳግዳግ ስላቤ ስላቤ hndugdug (Amh.) - *Euphorbia*  
*schimperiana* (370) 85. Euphorbiaceae
- ሕንዳግዳግ ስላቤ ስላቤ hnduqduq (Tya) - *Euphorbia petitiana*  
(367), *Euphorbia schimperiana* (370) 85.  
Euphorbiaceae, *Hypericum annulatum* (138) 77.  
Guttiferae
- ሆባ ስላቤ ስላቤ hoba (Tigre) - *Grewia mollis* (146) 79. Tiliaceae
- ሆባ ስላቤ ስላቤ hoba (Tya) - *Grewia tenax* (152), *Grewia*  
*trichocarpa* (148) 79. Tiliaceae

- ሆባ ጭጭሮ hoba šenqway (Tya) - *Grewia bicolor* (146) 79. Tiliaceae
- ሆኦብ houba (Amh.) - *Terminalia brownii* (127) 75. Combretaceae
- ኦኦኦ ስዋኔ (Tya) - *Grewia villosa* (152) 79. Tiliaceae
- ኦኦኦ ገገገ ijen (Amh.) - *Dombeya quinqueseta* (170) 80. Sterculiaceae
- ኦኦኦ ገገገ ikiki (Tigre) - *Coccinia grandis* (54) 65. Cucurbitaceae
- ጸግብ-ጸግብ jambulu (Tya) - *Cucumis metuliferus* (34) 65. Cucurbitaceae
- ካፍፋ kanafa (Amh.) - *Warburgia ugandensis* (1) 60. Canellaceae
- ካፖክ kapok (Amh.) - *Ceiba pentandra* (186) 81. Bombacaceae
- ካራባ karaba (Amh.) - *Sida acuta* (252), *Sida collina* (252), *Sida rhombifolia* (254) 82. Malvaceae
- ከርቡሽ kербush (Amh.) - *Citrullus lanatus* (48) 65. Cucurbitaceae
- ከርከዶ kerkede (Tigre & Tya) - *Hibiscus sabdariffa* (198) 82. Malvaceae
- ከኮይቲ ባሰካ kokoyti baska (Saho) - *Momordica foetida* (42) 65. Cucurbitaceae
- ከ-ልከሊከሊ kulkubili (Amh.) - *Dombeya quinqueseta* (170) 80. Sterculiaceae
- ላፍዲ lafdi (Amh.) - *Dombeya quinqueseta* (170) 80. Sterculiaceae
- ለሽን leshn (Tigre) - *Grewia bicolor* (146) 79. Tiliaceae
- ልገዐ አጣል lge'e aṭal (Tya) - *Hibiscus micranthus* (210) 82. Malvaceae
- ልኦቲ ስከቲ (Tya) - *Malva parviflora* (237), *Malva verticillata* (237), *Sida ternata* (249) 82. Malvaceae
- ሊኦም ስከቲ (Tya) - *Syzygium guineense* (77) 72. Myrtaceae
- ሊሰፍ lusena (Agew) - *Malva parviflora* (237), *Malva verticillata* (237) 82. Malvaceae
- ሉት lut (Amh.) - *Malva parviflora* (237), *Malva verticillata* (237) 82. Malvaceae
- ማፍቲሎ maftielo (Amh.) - *Pavonia burchellii* (225) 82. Malvaceae
- ማጂቲ majitie (Amh.) - *Grewia mollis* (146) 79. Tiliaceae
- ማር ቁራ mar qura (Amh.) - *Momordica foetida* (42) 65. Cucurbitaceae
- ምባሊቻ mbalica (Saho) - *Ricinus communis* (293) 85. Euphorbiaceae
- መግር ጃኸ meār kwak (Tya) - *Momordica foetida* (42) 65. Cucurbitaceae
- መግር ተመን meār temen (Tya) - *Momordica pterocarpa* (41) 65. Cucurbitaceae
- መልልል melpepo (Ge'ez) - *Cucurbita pepo* (58) 65. Cucurbitaceae
- መራራ merarie (Amh.) - *Erythrococca abyssinica* (296) 85. Euphorbiaceae
- መርፀን አጣል meršen aṭal (Tya) - *Hibiscus micranthus* (210), *Hibiscus vitifolius* (205) 82. Malvaceae
- መርሲ mersi (Amh.) - *Euphorbia polyacantha* (342) 85. Euphorbiaceae
- መሰኩዶት meseḥayit (Tya) - *Tragia cinerea* (308) 85. Euphorbiaceae
- መሰጃ meseqwa (Tya) - *Grewia bicolor* (146), *Grewia flavescens* (149) 79. Tiliaceae
- መዝባዕ mezba' (Tya) - *Euphorbia polyacantha* (342) 85. Euphorbiaceae
- ሞክ mok (Amh.) - *Anogeissus leiocarpa* (130) 75. Combretaceae
- ናጫ naqa (Amh.) - *Acalypha fruticosa* (301), *Acalypha ornata* (300), *Acalypha psilostachya* (302) 85. Euphorbiaceae, *Hibiscus dongolensis* (192), *Hibiscus macranthus* (194), *Hibiscus micranthus* (210), *Hibiscus ovalifolius* (192), *Hibiscus* spp. (191), *Hibiscus vitifolius* (205), *Kosteletzkya adoensis* (215), *Pavonia burchellii* (225), *Pavonia* spp. (224) 82. Malvaceae, *Triumfetta tomentosa* (161) 79. Tiliaceae
- ነጫጫቡ neqaqlo (Amh.) - *Abutilon figarianum* (246) 82. Malvaceae
- ነጭ ባሀር ዛፍ neḥ bahr zaf (Amh.) - *Eucalyptus globulus* (100) 72. Myrtaceae
- ነጨ ባርዛፍ neḥ barzaf (Gur.) - *Eucalyptus globulus* (100) 72. Myrtaceae
- ነጭቡ neqlo (Amh.) - *Abutilon figarianum* (246), *Abutilon longicuspe* (241), *Pavonia* spp. (224), *Senra incana* (216) 82. Malvaceae
- ነር ጅሂሎ ner jhilo (Amh.) - *Acalypha fruticosa* (301) 85. Euphorbiaceae
- ነውራ ባርያ newri barya (Tya) - *Cucumis metuliferus* (34) 65. Cucurbitaceae
- ንጎት መርቋ ngot merqwa (Agew & Tya) - *Hibiscus eriospermus* (209) 82. Malvaceae
- አትቦ otbe (Saho) - *Gossypium barbadense* (222) 82. Malvaceae
- ፓፓያ papaya (Tya) - *Carica papaya* (64) 67. Caricaceae
- ፓፓዬ papayie (Amh.) - *Carica papaya* (64) 67. Caricaceae
- ቃዕቶል qa'toy (Tya) - *Combretum aculeatum* (120) 75. Combretaceae
- ቃጨማ qaçima (Amh.) - *Ricinus communis* (293) 85. Euphorbiaceae
- ቃላንቃል qalanqal (Tigre) - *Euphorbia abyssinica* (334) 85. Euphorbiaceae

- ቃናጥላ qanañl (Tigre) - *Grewia tembensis* (150) 79.  
Tiliaceae
- ቅባደም qbadem (Amh.) - *Euphorbia petitiata* (367)  
85. Euphorbiaceae
- ቀጨም qeçemo (Amh.) - *Phyllanthus ovalifolius*  
(276) 85. Euphorbiaceae
- ቀላሚጠስ qelamiños (Tya) - *Eucalyptus globulus*  
(100) 72. Myrtaceae
- ቀሊቃላ qeleqal (Gur.) - *Euphorbia candelabrum*  
(336) 85. Euphorbiaceae
- ቀራጣጥም qerañatmo (Tya) - *Grewia* spp. (145) 79.  
Tiliaceae
- ቀርኒ ጤላ qerni ðiel (Tya) - *Hibiscus hochstetteri*  
(210), *Hibiscus micranthus* (210), *Sida*  
*rhombifolia* (254) 82. Malvaceae
- ቀርኖት qernot (Tya) - *Combretum aculeatum* (120)  
75. Combretaceae
- ቀይ እንጨት qey 'nçet (Amh.) - *Terminalia brownii*  
(127) 75. Combretaceae
- ቀይ ባሀር ዛፍ qey bahr zaf (Amh.) - *Eucalyptus*  
*camaldulensis* (98) 72. Myrtaceae
- ቂዓት qiät (Tya) - *Ochna inermis* (67), *Ochna*  
*leucophloeos* (67) 69. Ochnaceae
- ቂዓት መሪር qiät merir (Tya) - *Ochna inermis* (67)  
69. Ochnaceae
- ቂበን ግዳ qiben mada (Agew) - *Grewia tembensis*  
(150), *Grewia tenax* (152) 79. Tiliaceae
- ቂንጨ ሃራ qince hara (Agew) - *Ricinus communis*  
(293), *Tragia pungens* (308) 85. Euphorbiaceae
- ቅል qil (Amh.) - *Lagenaria siceraria* (50) 65.  
Cucurbitaceae
- ቅንጭብ ጠቅቆ (Amh.) - *Euphorbia tirucalli* (364) 85.  
Euphorbiaceae
- ቅንጭብ ጠቅቆ (Tigre) - *Euphorbia schimperiana*  
(370) 85. Euphorbiaceae
- ቅንጭብ ጠቅቆ (Tya) - *Euphorbia nubica* (364),  
*Euphorbia tirucalli* (364) 85. Euphorbiaceae
- ቆብ qobo (Gur.) - *Ricinus communis* (293) 85.  
Euphorbiaceae
- ቀላቋላ qolqwal (Tya) - *Euphorbia abyssinica*  
(334), *Euphorbia cactus* (337) 85. Euphorbiaceae
- ቅርንፍላ ጠፍብ (Tya) - *Eugenia* spp. (72) 72.  
Myrtaceae
- ቅርንፍቱ ጠፍቆ (Amh. & Gur.) - *Eugenia* spp. (72)  
72. Myrtaceae
- ቅርቅር qrqre (Tya) - *Anogeissus leiocarpa* (130) 75.  
Combretaceae
- ቀላቋላ qulqwal (Amh.) - *Euphorbia abyssinica*  
(334), *Euphorbia ampliphylla* (334), *Euphorbia*  
*candelabrum* (336) 85. Euphorbiaceae
- ቀላቋላ qulqwal (Gur.) - *Euphorbia abyssinica* (334)  
85. Euphorbiaceae
- ራሲብ rasraba (Gur.) - *Bridelia micrantha* (269) 85.  
Euphorbiaceae
- ርሆታ rhota (Tigre) - *Cucumis melo* (33) 65.  
Cucurbitaceae
- ገዕዳ ቡዋሽ ša'da buwaḳ (Tya) - *Abutilon longicuspe*  
(241) 82. Malvaceae, *Triumfetta flavescens* (164)  
79. Tiliaceae
- ሳቢቅ sabieq (Ge'ez) - *Zehneria scabra* (27) 65.  
Cucurbitaceae
- ሳጋም sagam (Saho) - *Tamarix* spp. (3) 63.  
Tamaricaceae
- ሳጋን sagan (Amh.) - *Tamarix nilotica* (4) 63.  
Tamaricaceae
- ሳሊ ገና saligna (Amh.) - *Eucalyptus saligna* (91) 72.  
Myrtaceae
- ሳንሱሪ sansuri (Amh.) - *Hibiscus ludwigii* (194) 82.  
Malvaceae
- ሰብዓ sebä (Tya) - *Combretum hartmannianum* (117)  
75. Combretaceae
- ፀባ ገዥ ጌ šeba nkuñ (Tya) - *Euphorbia depauperata*  
(366) 85. Euphorbiaceae
- ሰብያ sebya (Tya) - *Combretum hartmannianum*  
(117) 75. Combretaceae
- ሰፋ sefa (Amh.) - *Grewia bicolor* (146) 79. Tiliaceae
- ፀሊም ቡዋሽ šelim bwaḳ (Tya) - *Dombeya torrida*  
(168) 80. Sterculiaceae
- ሰሰፀ sesewe (Tya) - *Combretum collinum* (116),  
*Combretum molle* (118), *Combretum* spp. (115)  
75. Combretaceae
- ሰተረ ቤሉን setere bielön (Ge'ez) - *Syzygium*  
*guineense* (77) 72. Myrtaceae
- ፅጎት šgot (Tya) - *Hibiscus calyphyllus* (192),  
*Hibiscus cannabinus* (198), *Hibiscus macranthus*  
(194), *Hibiscus ovalifolius* (192), *Hibiscus*  
*vitifolius* (205), *Kosteletzkya adoensis* (215),  
*Pavonia burchellii* (225), *Pavonia glechomifolia*  
(226) 82. Malvaceae
- ሻሂ shahi (Tya) - *Thea sinensis* (65) 68. Theaceae
- ሻምሊ shamli (Amh.) - *Erythrococca trichogyne*  
(298) 85. Euphorbiaceae
- ሻዋቃ shawaqa (Tigre) - *Euphorbia cuneata* (359)  
85. Euphorbiaceae
- ሻይ shay (Amh.) - *Thea sinensis* (65) 68. Theaceae
- ሽምገሊት shemgegit (Amh.) - *Triumfetta pilosa* (161)  
79. Tiliaceae
- ሽንክናብ shnkñab (Tigre) - *Lagenaria siceraria* (50)  
65. Cucurbitaceae
- ሽቶ ባሀር ዛፍ shto bahr zaf (Amh.) - *Eucalyptus*  
*citriodora* (86) 72. Myrtaceae
- ፅንቁቃ šñquya (Tya) - *Dombeya torrida* (168) 80.  
Sterculiaceae, *Grewia ferruginea* (150), *Grewia*  
*trichocarpa* (148) 79. Tiliaceae

- ሰግያ somaya (Amh.) - *Grewia bicolor* (146) 79.  
Tiliaceae
- ሰጎጎ sugot (Amh.) - *Hibiscus calyphyllus* (192) 82.  
Malvaceae
- ታግዮ tagyie (Amh.) - *Terminalia schimperiana*  
(128) 75. Combretaceae
- ታምቡ ትጎ ትጎ tambuk (Tya) - *Croton macrostachyus*  
(326) 85. Euphorbiaceae
- ታዋዲ tawadi (Amh.) - *Hypericum peplidifolium*  
(140) 77. Guttiferae
- ጠጅ ጅeco (Amh.) - *Cassipourea malosana* (134) 76.  
Rhizophoraceae
- ተፋ ተፋፍ tefa tefur (Amh.) - *Abutilon bidentatum*  
(246) 82. Malvaceae
- ተሆይ tehoi (Amh.) - *Cassipourea* spp. (134) 76.  
Rhizophoraceae
- ጠቃጥቆ ባህር ዛፍ ጅqatqo bahr zaf (Amh.) -  
*Eucalyptus maculata* (87) 72. Myrtaceae
- ጥፍረርያ ስፍራ ያፍ ስፍራ ifrerya (Tya) - *Sida schimperiana* (251) 82.  
Malvaceae
- ትሂ thi (Amh.) - *Euphorbia polyacantha* (342) 85.  
Euphorbiaceae
- ጤፍ እንጅራ tief 'njera (Amh.) - *Abutilon*  
*maurittanum* (246) 82. Malvaceae
- ጥሽ እንሰቲ ስሽ ansti (Tya) - *Clutia lanceolata* (286)  
85. Euphorbiaceae
- ጥሽ በዓለቲ ስሽ bealalti (Tya) - *Clutia abyssinica*  
(286), *Clutia lanceolata* (286) 85. Euphorbiaceae
- ጥጥ ስፍ (Amh.) - *Gossypium arboreum* (222),  
*Gossypium barbadense* (222), *Gossypium*  
*herbaceum* (222), *Gossypium hirsutum* (222),  
*Gossypium* spp. (219) 82. Malvaceae
- ጥጢ ስፍ (Gur) - *Gossypium barbadense* (222),  
*Gossypium herbaceum* (222) 82. Malvaceae
- ጠጥ ስፍ (Saho) - *Gossypium* spp. (219) 82.  
Malvaceae
- ጠጥ ስፍ (Tya) - *Gossypium anomalum* (219),  
*Gossypium arboreum* (222), *Gossypium*  
*herbaceum* (222), *Gossypium hirsutum* (222) 82.  
Malvaceae
- ጠጥ እድገ ስፍ adgi (Tya) - *Sida ternata* (249) 82.  
Malvaceae
- ዐብል ስፍ (Tya) - *Tamarix aphylla* (3), *Tamarix*  
*nilotica* (4) 63. Tamaricaceae
- አንጎይ ungoi (Amh.) - *Combretum aculeatum* (120)  
75. Combretaceae
- ዋልል walal (Saho) - *Euphorbia abyssinica* (334) 85.  
Euphorbiaceae
- ወፍ ጠጥ ወፍ ጥፍ (Amh.) - *Momordica* spp. (39) 65.  
Cucurbitaceae
- ወለቡ welebu (Tigre) - *Euphorbia cactus* (337) 85.  
Euphorbiaceae
- ወርቅ በግዳ werq bemieda (Amh.) - *Coccinia* spp.  
(52) 65. Cucurbitaceae
- ወይባ weyba (Amh.) - *Combretum adenogonium*  
(117), *Combretum molle* (118), *Terminalia*  
*brownii* (127) 75. Combretaceae
- ወይባ weyba (Tya) - *Combretum molle* (118),  
*Terminalia brownii* (127) 75. Combretaceae
- ወዋፍ ወዋፍ (Amh.) - *Terminalia brownii* (127)  
75. Combretaceae
- ወሽሽ wshsh (Tya) - *Coccinia abyssinica* (54),  
*Cucurbita pepo* (58) 65. Cucurbitaceae
- ወልከፋ wulkfa (Amh.) *Dombeya torrida* (168) 80.  
Sterculiaceae, *Sparmannia ricinocarpa* (158) 79.  
Tiliaceae
- የአጥራ ምሳ yeamora msa (Amh.) - *Cucumis*  
*dipsaceus* (37), *Mukia maderaspatana* (29) 65.  
Cucurbitaceae
- የባህር ቅል ወይባ yebahr ql (Amh.) - *Cucurbita pepo* (58)  
65. Cucurbitaceae
- የበራ ለብቅ ወይባ yeberie lebq (Amh.) - *Hibiscus*  
*micranthus* (210) 82. Malvaceae
- የፍራሽ ጥጥ ወፍ yefrash ስፍ zaf (Amh.) - *Ceiba*  
*pentandra* (186) 81. Bombacaceae
- የከብቅ ሽምብራ ወይባ yekebt shmbra (Amh.) - *Phyllanthus*  
*ovalifolius* (276) 85. Euphorbiaceae
- የምድር እምባይ ወይባ yemdr 'mbway (Amh.) - *Citrullus*  
*colocynthis* (48), *Cucumis ficifolius* (34),  
*Cucumis prophetarum* (36) 65. Cucurbitaceae
- የምድር ሃረግ ወይባ yemdr hareg (Amh.) - *Sida ternata*  
(249) 82. Malvaceae
- የምድር ሙቃ ወይባ yemdr meqa (Amh.) - *Kosteletzkya*  
*adoensis* (215) 82. Malvaceae
- የካብር ጥፍ ወይባ yenebr ስፍ (Amh.) - *Bridella micrantha*  
(269) 85. Euphorbiaceae
- የቀበሮ ወተት ወይባ yeqebro wetet (Amh.) - *Euphorbia*  
*petitiana* (367) 85. Euphorbiaceae
- የቅል እምባይ ወይባ yeql 'mbway (Amh.) - *Lagenaria*  
*abyssinica* (49) 65. Cucurbitaceae
- የቅል አባሎ ወይባ yeqola abalo (Amh.) - *Combretum*  
*collinum* (116) 75. Combretaceae
- የቅል ነጭሎ ወይባ yeqola neçlo (Amh.) - *Abutilon*  
*angulatum* (242) 82. Malvaceae, *Pavonia* spp.  
(224) 82. Malvaceae
- የቅራ ሃረግ ወይባ yequra hareg (Amh.) - *Cucurbita pepo*  
(58), *Momordica* spp. (39) 65. Cucurbitaceae
- የጥጃ ወንገር ወይባ yeçja çenger (Amh.) - *Hibiscus*  
*crassinervius* (209), *Hibiscus micranthus* (210),  
*Hibiscus* spp. (191) 82. Malvaceae
- የጥጃ ናጃ ወይባ yeçja naça (Amh.) - *Hibiscus crassinervius*  
(209) 82. Malvaceae
- የወፍ ቅል ወይባ yewef qolo (Amh.) *Hibiscus triomum* (200)  
82. Malvaceae

የውሻ ነጭሎ yewsha neçlo (Amh.) - *Abutilon*  
*figarianum* (246) 82. Malvaceae  
 ዛኩራ zakura (Amh.) - *Combretum molle* (118) 75.  
 Combretaceae  
 ዘግዶም zegdom (Amh.) - *Combretum* spp. (115) 75.  
 Combretaceae

ዘይትሁን zeythun (Tya) - *Psidium guajava* (72) 72.  
 Myrtaceae  
 ዘይቱን zeytun (Amh.) - *Psidium guajava* (72) 72.  
 Myrtaceae  
 ገሽኒ zkuni (Amh. & Tya) - *Cucurbita pepo* (58) 65.  
 Cucurbitaceae

## ETHIOPIC AND ENGLISH NAMES ARRANGED ALPHABETICALLY

(in Latin script)

- a acha (Sha.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- aannoo (Orom.) - *Euphorbia nubica* (364),  
*Euphorbia tirucalli* (364) 85. Euphorbiaceae
- abaaloo (Orom.) - *Terminalia brownii* (127) 75.  
Combretaceae
- abah (Som.) - *Combretum molle* (118) 75.  
Combretaceae
- abboma (Ghe.) - *Hibiscus pycnostemon* (210) 82.  
Malvaceae
- abbuubbii (Orom.) - *Cucurbita maxima* (59) 65.  
Cucurbitaceae
- abei (Som.) - *Hibiscus pycnostemon* 82. (210)  
Malvaceae
- abele (Som.) - *Combretum molle* (118) 75.  
Combretaceae
- abera (Som.) - *Euphorbia inaequispina* (340) 85.  
Euphorbiaceae
- abol (Som.) - *Combretum molle* (118) 75.  
Combretaceae
- abole (Som.) - *Combretum molle* (118) 75.  
Combretaceae
- abraangoo (Orom.) - *Argomuelleria macrophylla*  
(290) 85. Euphorbiaceae
- abul (Som.) - *Combretum molle* (118) 75.  
Combretaceae
- accachilti (Orom.) - *Eucalyptus globulus* (100) 72.  
Myrtaceae
- achevan (Anu.) - *Combretum* spp. (115) 75.  
Combretaceae
- ad addis (Som.) - *Sida ovata* (254) 82. Malvaceae
- ada des (Som.) - *Sida ovata* (254) 82. Malvaceae
- adai (Som.) - *Adenia globosa* (7) 64. Passifloraceae
- adar (Som.) - *Corchorus cinerascens* (155) 79.  
Tiliaceae
- adazuli (Som.) - *Triumfetta pilosa* (161) 79.  
Tiliaceae
- adbooch (Anu.) - *Argomuelleria macrophylla* (290)  
85. Euphorbiaceae
- addisaa (Orom.) - *Myrtus communis* (71) 72.  
Myrtaceae
- adeboach (Anu.) - *Argomuelleria macrophylla* (290)  
85. Euphorbiaceae
- adhai (Som.) - *Adenia venenata* (7) 64.  
Passifloraceae
- adhai meduw (Som.) - *Adenia venenata* (7) 64.  
Passifloraceae
- ado (Dor.) - *Momordica* spp. (39) 65. Cucurbitaceae
- adrite (Anu.) - *Anogeissus leiocarpa* (130) 75.  
Combretaceae
- aedissee (Som.) - *Hibiscus triomum* (200) 82.  
Malvaceae
- afola (Sha.) - *Gossypium hirsutum* (222) 82.  
Malvaceae
- agherheret (Som.) - *Pavonia propinqua* (230) 82.  
Malvaceae
- agirot (Som.) - *Adenia aculeata* (9) 64.  
Passifloraceae
- agmundi (Had.) - *Erythrococca abyssinica* (296) 85.  
Euphorbiaceae
- agno (Sid.) - *Euphorbia nubica* (364) 85.  
Euphorbiaceae
- agomdii (Orom.) - *Erythrococca abyssinica* (296) 85.  
Euphorbiaceae
- aibetpaha (Kon.) - *Combretum molle* (118),  
*Terminalia brownii* (127) 75. Combretaceae
- aka chitta (Orom.) - *Eucalyptus globulus* (100) 72.  
Myrtaceae
- akakilti (Orom.) - *Eucalyptus camaldulensis* (98),  
*Eucalyptus globulus* (100) 72. Myrtaceae
- akiirsaa (Orom.) - *Euphorbia candelabrum* (336) 85.  
Euphorbiaceae
- alablabe (Orom.) - *Acalypha ornata* (300) 85.  
Euphorbiaceae
- alahingalle (Orom.) - *Combretum collinum* (116) 75.  
Combretaceae
- alaloo (Orom.) - *Croton macrostachyus* (326) 85.  
Euphorbiaceae
- alangudd (Som.) - *Hibiscus somalensis* (208) 82.  
Malvaceae
- alun (Som.) - *Jatropha spicata* (322) 85.  
Euphorbiaceae
- alkee (Orom.) - *Abutilon mauritianum* (246) 82.  
Malvaceae
- alpine ash (Eng.) - *Eucalyptus delegatensis* (90) 72.  
Myrtaceae
- alulo (Som.) - *Terminalia brownii* (127) 75.  
Combretaceae
- aluloo (Orom.) - *Terminalia brownii* (127) 75.  
Combretaceae
- alundui (Som.) - *Coccinia grandis* (54) 65.  
Cucurbitaceae
- ambe (Orom.) - *Terminalia schimperiana* (128) 75.  
Combretaceae
- ambuu (Orom.) - *Cucumis prophetarum* (36) 65.  
Cucurbitaceae

- American cotton (Eng.) - *Gossypium herbaceum* (222) 82. Malvaceae
- American upland cotton (Eng.) - *Gossypium hirsutum* (222) 82. Malvaceae
- amonktou (Afar) - *Senra incana* (216) 82. Malvaceae
- anam eie (Som.) - *Croton menyhartii* (325) 85. Euphorbiaceae
- an'hi (Orom.) - *Hibiscus micranthus* (210) 82. Malvaceae
- ancakiiraa (Orom.) - *Sida schimperiana* (251) 82. Malvaceae
- ancakiiree (Orom.) - *Sida schimperiana* (251) 82. Malvaceae
- ancelle (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- anch'a (Orom.) - *Hibiscus micranthus* (210), *Kosteletzkya adoensis* (215) 82. Malvaceae
- ancqgarrii (Orom.) - *Sida schimperiana* (251) 82. Malvaceae
- andelmeluc (Som.) - *Jatropha curcas* (324) 85. Euphorbiaceae
- aneko (Som.) - *Cucumella kelleri* (30) 65. Cucurbitaceae
- anenobo (Orom.) - *Bridelia micrantha* (269) 85. Euphorbiaceae
- angapriya (Wel.) - *Combretum* spp. (115) 75. Combretaceae
- anka (Wel.) - *Croton macrostachyus* (326) 85. Euphorbiaceae
- ankowaa (Orom.) - *Croton macrostachyus* (326) 85. Euphorbiaceae
- anohe (Tya.) - *Tragia pungens* (308) 85. Euphorbiaceae
- antelmeluc (Som.) - *Jatropha curcas* (324) 85. Euphorbiaceae
- anthalmelou (Som.) - *Jatropha curcas* (324) 85. Euphorbiaceae
- araarsaa (Orom.) - *Grewia bicolor* (146), *Grewia trichocarpa* (148) 79. Tiliaceae
- arangaleicia (Ghe.) - *Hibiscus cannabinus* (198) 82. Malvaceae
- arar (Som.) - *Terminalia polycarpa* (125) 75. Combretaceae
- areri (Som.) - *Terminalia polycarpa* (125), *Terminalia spinosa* (125) 75. Combretaceae
- argyle apple (Eng.) - *Eucalyptus cinerea* (103) 72. Myrtaceae
- arite (Anu.) - *Anogeissus leiocarpa* (130) 75. Combretaceae
- arjoo (Orom.) - *Macaranga capensis* (295) 85. Euphorbiaceae
- arku (Gim.) - *Euphorbia ampliphylla* (334) 85. Euphorbiaceae
- arra (Sha.) - *Terminalia brownii* (127) 75. Combretaceae
- arsum (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- aru (Sha.) - *Terminalia brownii* (127) 75. Combretaceae
- arundo (Som.) - *Dactyliandra stefaninii* (37) 65. Cucurbitaceae
- ascha (Kil.) - *Flueggea virosa* (272) 85. Euphorbiaceae
- atakili (Orom.) - *Eucalyptus globulus* (100) 72. Myrtaceae
- ateeo (Anu.) - *Acalypha acrogyna* (300) 85. Euphorbiaceae
- atewa (Anu.) - *Combretum* spp. (115) 75. Combretaceae
- ati (Gam.) - *Ricinus communis* (293) 85. Euphorbiaceae
- aya veini (Som.) - *Terminalia brownii* (127) 75. Combretaceae
- ayo (Som.) - *Euphorbia hirta* (374) 85. Euphorbiaceae
- azemba (Caro) - *Sida ovata* (254) 82. Malvaceae
- ba'obaab (Orom.) - *Adansonia digitata* (186) 81. Bombacaceae
- baabai (Orom.) - *Ochna holstii* (66) 69. Ochnaceae
- baabbee (Orom.) - *Ochna holstii* (66) 69. Ochnaceae
- baaggii (Orom.) - *Combretum paniculatum* (120) 75. Combretaceae
- baarichaa (Orom.) - *Ochna inermis* (67) 69. Ochnaceae
- baarzaafii (Orom.) - *Eucalyptus saligna* (91) 72. Myrtaceae
- baarzaafii adi (Orom.) - *Eucalyptus globulus* (100) 72. Myrtaceae
- baarzaafii dimaa (Orom.) - *Eucalyptus camaldulensis* (98) 72. Myrtaceae
- baba (Koe.) - *Tragia* spp. (304) 85. Euphorbiaceae
- babaa (Orom.) - *Ochna holstii* (66) 69. Ochnaceae
- babale (Som.) - *Pavonia* spp. (224) 82. Malvaceae
- babarleh (Som.) - *Pavonia* spp. (224) 82. Malvaceae
- babbe (Orom.) - *Macaranga capensis* (295) 85. Euphorbiaceae
- babooch (Mes.) - *Argomuellera macrophylla* (290) 85. Euphorbiaceae
- baddeessaa (Orom.) - *Macaranga capensis* (295) 85. Euphorbiaceae, *Psidium* spp. (72), *Syzygium guineense* (77) 72. Myrtaceae
- baddessaa (Orom.) - *Croton macrostachyus* (326) 85. Euphorbiaceae

- badesa (Wel.) - *Syzygium guineense* (77) 72.**  
 Myrtaceae
- baghee (Orom.) - *Combretum paniculatum* (120) 75.**  
 Combretaceae
- bagure (Ahi.) - *Terminalia schimperiana* (128) 75.**  
 Combretaceae
- bagure (Orom.) - *Terminalia schimperiana* (128) 75.**  
 Combretaceae
- bakannoo (Orom.) - *Croton macrostachyus* (326) 85.**  
 Euphorbiaceae
- bakkannisa (Orom.) - *Croton macrostachyus* (326) 85.**  
 Euphorbiaceae
- bakkannisa (Orom.) - *Croton* spp. (324) 85.**  
 Euphorbiaceae
- balambal (Som.) - *Abutilon anglosomaliae* (248), *Abutilon bidentatum* (246), *Abutilon figarianum* (246), *Abutilon fruticosum* (244), *Abutilon graveolens* (248), *Abutilon hirtum* (248), *Abutilon pannosum* (246), *Abutilon ramosum* (242), *Abutilon* spp. (239), *Cienfigosia welshii* (217), *Fioria dictyocarpa* (214), *Gossypium somalense* (221), *Hibiscus cannabinus* (198), *Hibiscus dongolensis* (192), *Hibiscus panduriformis* (202), *Pavonia burchellii* (225), *Pavonia kotschyi* (234), *Pavonia propinqua* (230), *Pavonia* spp. (224), *Senra incana* (216), *Senra zoës* (216) 82. Malvaceae**
- balangaa (Orom.) - *Terminalia brownii* (127) 75.**  
 Combretaceae
- ballambal (Som.) - *Abutilon fruticosum* (244) 82.**  
 Malvaceae, *Euphorbia hirta* (374) 85.  
 Euphorbiaceae, *Hibiscus dongolensis* (192) 82.  
 Malvaceae
- balumbal (Som.) - *Pavonia burchellii* (225) 82.**  
 Malvaceae
- bamia (Som.) - *Abelmoschus esculentus* (212), *Abelmoschus ficulneus* (212) 82. Malvaceae**
- banana passion fruit - *Passiflora mollissima* (14) 64.**  
 Passifloraceae
- bandakai (Eng.) - *Abelmoschus esculentus* (212) 82.**  
 Malvaceae
- bangalay (Eng.) - *Eucalyptus botryoides* (92) 72.**  
 Myrtaceae
- baobab (Eng.) - *Adansonia digitata* (186) 81.**  
 Bombacaceae
- bar'ie (Gam.) - *Grewia bicolor* (146), *Grewia mollis* (146) 79. Tiliaceae**
- baraazaafiya (Wel.) - *Eucalyptus globulus* (100) 72.**  
 Myrtaceae
- bararit (Me.) - *Momordica foetida* (42) 65.**  
 Cucurbitaceae
- baresaa (Orom.) - *Terminalia brownii* (127) 75.**  
 Combretaceae
- barzaf (Ade.) - *Eucalyptus camaldulensis* (98), *Eucalyptus globulus* (100) 72. Myrtaceae**
- barzaf (Nuw.) - *Eucalyptus globulus* (100) 72.**  
 Myrtaceae
- bataba (Sha.) - *Croton sylvaticus* (326) 85.**  
 Euphorbiaceae
- batata (Som.) - *Manihot esculenta* (315) 85.**  
 Euphorbiaceae
- bayie (Orom.) - *Combretum paniculatum* (120) 75.**  
 Combretaceae
- beenatee (Orom.) - *Ochna inermis* (67) 69.**  
 Ochnaceae
- befti (Orom.) - *Warburgia ugandensis* (1) 60.**  
 Canellaceae
- bessek (Som.) - *Terminalia orbicularis* (124) 75.**  
 Combretaceae
- biileelee (Orom.) - *Combretum* spp. (115) 75.**  
 Combretaceae
- biiqaa (Orom.) - *Combretum molle* (118) 75.**  
 Combretaceae
- biiris (Som.) - *Terminalia brownii* (127) 75.**  
 Combretaceae
- bik'aa (Orom.) - *Combretum molle* (118) 75.**  
 Combretaceae
- birakash (Sha.) - *Alchornea laxiflora* (291) 85.**  
 Euphorbiaceae
- bires (Som.) - *Terminalia brownii* (127) 75.**  
 Combretaceae
- bisha barzaafa (Kem.) - *Eucalyptus camaldulensis* (98) 72. Myrtaceae**
- bisik (Orom.) - *Terminalia orbicularis* (124) 75.**  
 Combretaceae
- bisik (Som.) - *Terminalia orbicularis* (124) 75.**  
 Combretaceae
- bissak (Som.) - *Terminalia orbicularis* (124) 75.**  
 Combretaceae
- bitter cassava (Eng.) - *Manihot esculenta* (315) 85.**  
 Euphorbiaceae
- black box (Eng.) - *Eucalyptus largiflorens* (103) 72.**  
 Myrtaceae
- black butt (Eng.) - *Eucalyptus patens* (87) 72.**  
 Myrtaceae
- black ironbark (Eng.) - *Eucalyptus sideroxylon* (106) 72. Myrtaceae**
- black olum tree (Eng.) - *Syzygium* spp. (75) 72.**  
 Myrtaceae
- black peppermint (Eng.) - *Eucalyptus amygdalina* (90) 72. Myrtaceae**



- blue gum (Eng.) - *Eucalyptus leucoxylon* (105) 72.  
Myrtaceae
- bobeeyaa (Orom.) - *Margaritaria discoidea* (284)  
85. Euphorbiaceae, *Ochna holstii* (66) 69.  
Ochnaceae
- bobo (Som.) - *Abelmoschus ficulneus* (212) 82.  
Malvaceae
- bobya (Sid.) - *Margaritaria discoidea* (284) 85.  
Euphorbiaceae
- bocol barre (Som.) - *Adenia aculeata* (9) 64.  
Passifloraceae
- bogh et (Som.) - *Croton menyhartii* (325) 85.  
Euphorbiaceae
- bohor (Som.) - *Lagenaria siceraria* (50) 65.  
Cucurbitaceae
- bohot (Som.) - *Cucurbita pepo* (58) 65.  
Cucurbitaceae
- bolut (Me.) - *Ricinus communis* (293) 85.  
Euphorbiaceae
- bolutt (Bod.) - *Ricinus communis* (293) 85.  
Euphorbiaceae
- bor (Som.) - *Ricinus communis* (293) 85.  
Euphorbiaceae
- bor ubo (Som.) - *Lagenaria siceraria* (50) 65.  
Cucurbitaceae
- bora (Sha.) - *Ricinus communis* (293) 85.  
Euphorbiaceae
- borara (Had.) - *Sida ovata* (254) 82. Malvaceae
- boriti poles (Eng.) - *Rhizophora mucronata* (133) 76.  
Rhizophoraceae
- bosisto's box (Eng.) - *Eucalyptus bosistoana* (104)  
72. Myrtaceae
- bosoqee (Orom.) - *Sapium ellipticum* (328) 85.  
Euphorbiaceae
- botta zafiya (Wel.) - *Eucalyptus globulus* (100) 72.  
Myrtaceae
- bottle brush (Eng.) - *Callistemon citrinus* (78) 72.  
Myrtaceae
- botu (Gam.) - *Cucurbita pepo* (58) 65.  
Cucurbitaceae
- Brazilian cherry (Eng.) - *Eugenia uniflora* (75) 72.  
Myrtaceae
- brisbane box (Eng.) - *Lophostemon confertus* (79)  
72. Myrtaceae
- broom jute sida (Eng.) - *Sida rhombifolia* (254) 82.  
Malvaceae
- brown barell (Eng.) - *Eucalyptus fastigiata* (88) 72.  
Myrtaceae
- brown mallett (Eng.) - *Eucalyptus astringens* (94) 72.  
Myrtaceae
- brown's myrobalan (Eng.) - *Terminalia brownii*  
(127) 75. Combretaceae
- bukeh (Kef.) - *Cucurbita pepo* (58) 65.  
Cucurbitaceae
- buko (Kef.) - *Cucurbita pepo* (58) 65. Cucurbitaceae
- bukwe (Mur.) - *Terminalia brownii* (127) 75.  
Combretaceae
- bulithoi (Mur.) - *Croton zambesicus* (325) 85.  
Euphorbiaceae
- bunaa koroboo (Orom.) - *Hibiscus crassinervius*  
(209), *Hibiscus micranthus* (210) 82. Malvaceae
- bungalla (Orom.) - *Hibiscus flavifolius* (208) 82.  
Malvaceae
- bungula (Orom.) - *Hibiscus boranensis* (208) 82.  
Malvaceae
- burbukee (Orom.) - *Margaritaria discoidea* (284)  
85. Euphorbiaceae
- bururi (Som.) - *Hibiscus micranthus* (210) 82.  
Malvaceae
- buruurii (Orom.) - *Grewia ferruginea* (150) 79.  
Tiliaceae
- cabojar jal (Som.) - *Euphorbia inaequispina* (340)  
85. Euphorbiaceae
- cacaniraa (Orom.) - *Croton macrostachyus* (326) 85.  
Euphorbiaceae
- cadaga (Eng.) - *Eucalyptus torelliana* (86) 72.  
Myrtaceae
- cambob (Som.) - *Cucumis pustulatus* (34) 65.  
Cucurbitaceae
- candelabrum (Eng.) - *Euphorbia candelabrum* (336)  
85. Euphorbiaceae
- candlebark (Eng.) - *Eucalyptus rubida* (102) 72.  
Myrtaceae
- capgal (Som.) - *Pavonia patens* (236) 82. Malvaceae
- cara demer (Som.) - *Cucumis prophetarum* (36) 65.  
Cucurbitaceae
- caradamer (Som.) - *Cucumis dipsaceus* (37) 65.  
Cucurbitaceae
- carare (Som.) - *Sterculia africana* (184) 80.  
Sterculiaceae
- carari (Som.) - *Sterculia africana* (184) 80.  
Sterculiaceae
- carrabaa (Orom.) - *Pavonia burchellii* (225), *Sida*  
*schimperiana* (251) 82. Malvaceae
- cassava (Eng.) - *Manihot esculenta* (315) 85.  
Euphorbiaceae
- castor oil tree (Eng.) - *Ricinus communis* (293) 85.  
Euphorbiaceae
- castorbean (Eng.) - *Ricinus communis* (293) 85.  
Euphorbiaceae

- ceara rubber (Eng.) - *Manihot glaziovii* (316) 85.  
Euphorbiaceae
- chamberang (Mes.) - *Combretum adenogonium*  
(117), *Combretum molle* (118) 75. Combretaceae
- cheben (Som.) - *Grewia villosa* (152) 79. Tiliaceae
- chebesc (Som.) - *Grewia villosa* (152) 79. Tiliaceae
- chebesci (Som.) - *Grewia villosa* (152) 79. Tiliaceae
- cheeraholstii (Sha.) - *Euphorbia borenensis* (339) 85.  
Euphorbiaceae
- chengi (Mes.) - *Ricinus communis* (293) 85.  
Euphorbiaceae
- chetto (Kef.) - *Sida tenuicarpa* (251) 82. Malvaceae
- chilekoo (Orom.) - *Macaranga capensis* (295) 85.  
Euphorbiaceae
- chimba (Som.) - *Cephalocroton cordofanus* (291)  
85. Euphorbiaceae
- chimbale (Som.) - *Pavonia zeylanica* (233) 82.  
Malvaceae
- chime bralle (Som.) - *Pavonia arabica* (232) 82.  
Malvaceae
- Chinese rose (Eng.) - *Hibiscus rosa-sinensis* (200)  
82. Malvaceae
- Chinese tallow tree (Eng.) - *Sapium sebiferum* (328)  
85. Euphorbiaceae
- christmas poinsettia (Eng.) - *Euphorbia* subgenus  
*Poinsettia* (372) 85. Euphorbiaceae
- chuchu (Sha.) - *Margaritaria discoidea* (284) 85.  
Euphorbiaceae
- ciaferot (Som.) - *Garcinia livingstonei* (142) 77.  
Guttiferae
- cianfrut (Som.) - *Garcinia livingstonei* (142) 77.  
Guttiferae
- cicciiniinaa (Orom.) - *Kosteletzkya adoensis* (215) 82.  
Malvaceae
- cidar gum (Eng.) - *Eucalyptus gunnii* (102) 72.  
Myrtaceae
- cioco (Gam.) - *Momordica* spp. (39) 65.  
Cucurbitaceae
- ciunbiscia (Sha.) - *Sida rhombifolia* (254) 82.  
Malvaceae
- clove tree (Eng.) - *Eugenia* spp. (72) 72. Myrtaceae
- coast grey box (Eng.) - *Eucalyptus bosistoana* (104)  
72. Myrtaceae
- cobbanne (Som.) - *Thespesia danis* (222) 82.  
Malvaceae
- cobbo (Som.) - *Ricinus communis* (293) 85.  
Euphorbiaceae
- cobec (Som.) - *Grewia villosa* (152) 79. Tiliaceae
- cobesc (Som.) - *Grewia bicolor* (146) 79. Tiliaceae
- cobgal (Som.) - *Triumfetta heterocarpa* (164) 79.  
Tiliaceae
- cobo (Som.) - *Ricinus communis* (293) 85.  
Euphorbiaceae
- coddoo (Orom.) - *Myrtus communis* (71) 72.  
Myrtaceae
- cokac (Me.) - *Euphorbia candelabrum* (336) 85.  
Euphorbiaceae
- comesc (Som.) - *Grewia bicolor* (146), *Grewia  
villosa* (152) 79. Tiliaceae
- common guava (Eng.) - *Psidium guajava* (72) 72.  
Myrtaceae
- common myrtle (Eng.) - *Myrtus communis* (71) 72.  
Myrtaceae
- common sida (Eng.) - *Sida rhombifolia* (254) 82.  
Malvaceae
- compolto (Caro & Sha.) - *Abutilon mauritianum*  
(246) 82. Malvaceae
- coolibah (Eng.) - *Eucalyptus microtheca* (103) 72.  
Myrtaceae
- corat (Me.) - *Syzygium guineense* (77) 72. Myrtaceae
- corongi (Som.) - *Cucumis melo* (33) 65.  
Cucurbitaceae
- corut (Me.) - *Syzygium guineense* (77) 72. Myrtaceae
- cotton (Eng.) - *Gossypium arboreum* (222),  
*Gossypium barbadense* (222), *Gossypium  
herbaceum* (222), *Gossypium hirsutum* (222)  
82. Malvaceae
- cotton tree (Eng.) - *Gossypium arboreum* (222) 82.  
Malvaceae
- cream of tartar tree (Eng.) - *Adansonia digitata* (186)  
81. Bombacaceae
- crimson bottle brush (Eng.) - *Callistemon citrinus*  
(78) 72. Myrtaceae
- cucumber (Eng.) - *Cucumis sativus* (37) 65.  
Cucurbitaceae
- cum illis (Wel.) - *Momordica pterocarpa* (41) 65.  
Cucurbitaceae
- curari (Som.) - *Cucumis pustulatus* (34) 65.  
Cucurbitaceae
- daallaa (Orom.) - *Erythrocoeca abyssinica* (296) 85.  
Euphorbiaceae
- daallaa dhaltuu (Orom.) - *Erythrocoeca abyssinica*  
(296) 85. Euphorbiaceae
- daannisa (Orom.) - *Abutilon mauritianum* (246) 82.  
Malvaceae, *Combretum collinum* (116),  
*Combretum molle* (118) 75. Combretaceae,  
*Dombeya torrida* (168) 80. Sterculiaceae
- dabaa qula (Orom.) - *Cucurbita pepo* (58),  
*Lagenaria siceraria* (50) 65. Cucurbitaceae
- dabacca (Orom.) - *Combretum collinum* (116) 75.  
Combretaceae

- dadamsaa (Orom.) - *Combretum molle* (118) 75.  
Combretaceae
- dadan (Som.) - *Euphorbia inaequispina* (340) 85.  
Euphorbiaceae
- dafarur (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- dafnod (Som.) - *Pavonia zeylanica* (233) 82.  
Malvaceae
- dafurur (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- dair (Som.) - *Syzygium guineense* (77) 72. Myrtaceae
- dallamba (Garn.) - *Euphorbia hirta* (374) 85.  
Euphorbiaceae
- dalmoc (Som.) - *Euphorbia* Sect. *Somalica* (361) 85.  
Euphorbiaceae
- damak (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- damass (Som.) - *Conocarpus lancifolius* (130) 75.  
Combretaceae
- dananie (Som.) - *Tragia hildebrandtii* (307) 85.  
Euphorbiaceae
- dandalee (Orom.) - *Combretum adenogonium* (117),  
*Combretum collinum* (116) 75. Combretaceae
- dandarreesa (Orom.) - *Sida ovata* (254) 82.  
Malvaceae
- danego (Som.) - *Euphorbia triaculeata* (345) 85.  
Euphorbiaceae
- danferur (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- dania (Som.) - *Euphorbia tirucalli* (364) 85.  
Euphorbiaceae
- danie (Som.) - *Euphorbia tirucalli* (364) 85.  
Euphorbiaceae
- danigola (Orom.) - *Triumfetta tomentosa* (161) 79.  
Tiliaceae
- danis (Orom.) - *Thespesia danis* (222) 81.  
Bombacaceae
- dankaronne (Som.) - *Hibiscus bricchettii* (200) 82.  
Malvaceae
- dannaniye (Som.) - *Tragia plukenetii* (306) 85.  
Euphorbiaceae
- danno (Som.) - *Euphorbia tirucalli* (364) 85.  
Euphorbiaceae
- dano (Som.) - *Euphorbia tirucalli* (364) 85.  
Euphorbiaceae
- danrab (Som.) - *Sterculia africana* (184) 80.  
Sterculiaceae
- dansa (Sid.) - *Abutilon mauritianum* (246) 82.  
Malvaceae
- danunu (Orom.) - *Hibiscus cannabinus* (198) 82.  
Malvaceae
- darguu (Orom.) - *Pavonia burchellii* (225) 82.  
Malvaceae
- darrab (Som.) - *Sterculia africana* (184) 80.  
Sterculiaceae
- dashale (Som.) - *Melhania denhamii* (176) 80.  
Sterculiaceae
- dashe (Mes.) - *Alchornea laxiflora* (291) 85.  
Euphorbiaceae
- dbeferur (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- deane's gum (Eng.) - *Eucalyptus deanei* (91) 72.  
Myrtaceae
- debba medu (Som.) - *Grewia bicolor* (146) 79.  
Tiliaceae
- debbi (Som.) - *Grewia mollis* (146) 79. Tiliaceae
- debi (Som.) - *Grewia bicolor* (146), *Grewia  
tembensis* (150) 79. Tiliaceae
- debi ad (Som.) - *Grewia mollis* (146) 79. Tiliaceae
- debi fita widir (Som.) - *Grewia arborea* (146) 79.  
Tiliaceae
- deefa ka gie (Koe.) - *Euphorbia indica* (374) 85.  
Euphorbiaceae
- deekikaa (Orom.) - *Manihot esculenta* (315) 85.  
Euphorbiaceae
- deekkaa (Orom.) - *Grewia* spp. (145) 79. Tiliaceae
- defarur (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- deferur (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- degleh (Som.) - *Jatropha pelargonifolia* (321) 85.  
Euphorbiaceae
- dekericho (Orom.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- dela nya durh (Som.) - *Euphorbia monacantha* (346)  
85. Euphorbiaceae
- deng (Som.) - *Terminalia orbicularis* (124) 75.  
Combretaceae
- derender (Som.) - *Euphorbia cuneata* (359) 85.  
Euphorbiaceae
- deriamu (Arb.) - *Combretum aculeatum* (120) 75.  
Combretaceae
- derinder (Som.) - *Euphorbia cuneata* (359) 85.  
Euphorbiaceae
- devi (Som.) - *Grewia tembensis* (150) 79. Tiliaceae
- dhoqonuu (Orom.) - *Grewia ferruginea* (150) 79.  
Tiliaceae
- dhumuugaa (Orom.) - *Adansonia digitata* (186) 81.  
Bombacaceae
- dibu (Som.) - *Euphorbia breviararticulata* (337),  
*Euphorbia nigrispina* (342), *Euphorbia  
polyacantha* (342) 85. Euphorbiaceae
- dichtar (Som.) - *Jatropha dichtar* (319) 85.  
Euphorbiaceae
- diddiqissaa (Orom.) - *Combretum molle* (118) 75.  
Combretaceae
- digiissuwa (Wel.) - *Combretum* spp. (115) 75.  
Combretaceae

- diigree (Orom.) - *Acalypha fruticosa* (301) 85.  
Euphorbiaceae
- diileh (Orom.) - *Acalypha fruticosa* (301) 85.  
Euphorbiaceae
- diimestuu (Orom.) - *Cassipourea malosana* (134) 76.  
Rhizophoraceae
- diimoo (Orom.) - *Bridelia micrantha* (269) 85.  
Euphorbiaceae
- diloo (Orom.) - *Cassipourea malosana* (134) 76.  
Rhizophoraceae
- dimmistuu (Orom.) - *Cassipourea* spp. (134) 76.  
Rhizophoraceae
- dirgonit (Me.) - *Euphorbia candelabrum* (336) 85.  
Euphorbiaceae
- dirri (Orom.) - *Phyllanthus septialis* (278) 85.  
Euphorbiaceae
- dirrhi (Som.) - *Acalypha fruticosa* (301) 85.  
Euphorbiaceae
- dobarkula (Sid.) - *Lagenaria abyssinica* (49) 65.  
Cucurbitaceae
- docrako (Tse.) - *Combretum hereroense* (118) 75.  
Combretaceae
- doggomaa (Orom.) - *Macaranga capensis* (295) 85.  
Euphorbiaceae
- dohoqonuu (Orom.) - *Malva verticillata* (237) 82.  
Malvaceae
- dokan (Som.) - *Tamarix aphylla* (3) 63.  
Tamaricaceae
- dokumu (Orom.) - *Grewia* spp. (145) 79. Tiliaceae
- domchi (Mes.) - *Euphorbia ampliphylla* (334) 85.  
Euphorbiaceae
- domoc (Som.) - *Euphorbia* Sect. *Somalica* (361) 85.  
Euphorbiaceae
- domok (Som.) - *Euphorbia* Sect. *Somalica* (361) 85.  
Euphorbiaceae
- donedugh (Som.) - *Euphorbia monacantha* (346) 85.  
Euphorbiaceae
- dongkola (Gam.) - *Euphorbia adjurana* (336) 85.  
Euphorbiaceae
- dongomarrango (Tse.) - *Croton* spp. (324) 85.  
Euphorbiaceae
- doobbii (Orom.) - *Tragia plukenetii* (306) 85.  
Euphorbiaceae
- dot (Anu.) - *Combretum adenogonium* (117) 75.  
Combretaceae
- doth (Anu.) - *Combretum adenogonium* (117),  
*Combretum molle* (118) 75. Combretaceae
- duancho (Sha.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- duandoo (Orom.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- dubana (Had.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- dubba (Orom.) - *Pavonia urens* (228) 82. Malvaceae
- duferour (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- duffimod (Som.) - *Pavonia eremogeiton* (233) 82.  
Malvaceae
- duffonod (Som.) - *Pavonia kotschyi* (234) 82.  
Malvaceae
- duffukot (Som.) - *Pavonia patens* (236) 82.  
Malvaceae
- dugdarbaa (Orom.) - *Bridelia micrantha* (269) 85.  
Euphorbiaceae
- dugheessa (Orom.) - *Combretum molle* (118) 75.  
Combretaceae
- duhrud (Som.) - *Corchorus cinerascens* (155) 79.  
Tiliaceae
- dulfalid (Orom.) - *Ochna inermis* (67) 69. Ochnaceae
- dulfalid (Som.) - *Ochna inermis* (67) 69. Ochnaceae
- dum dum (Som.) - *Ceiba pentandra* (186) 81.  
Bombacaceae
- duna (Anu.) - *Combretum collinum* (116) 75.  
Combretaceae
- dundas black butt (Eng.) - *Eucalyptus dundasii* (97)  
72. Myrtaceae
- dundas mahogany (Eng.) - *Eucalyptus brockwayi*  
(95) 72. Myrtaceae
- dunferur (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- dunn's white gum (Eng.) - *Eucalyptus dunnii* (99) 72.  
Myrtaceae
- dur (Som.) - *Tamarix nilotica* (4) 63. Tamaricaceae
- dur gohr (Som.) - *Tamarix aphylla* (3) 63.  
Tamaricaceae
- duwancho (Sid.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- eburga (Gam.) - *Acalypha indica* (303) 85.  
Euphorbiaceae
- ecama (Koe.) - *Phyllanthus* spp. (275) 85.  
Euphorbiaceae
- edera (Orom.) - *Hypericum revolutum* (136) 77.  
Guttiferae
- ederra (Sid.) - *Hypericum revolutum* (136) 77.  
Guttiferae
- edi libah (Som.) - *Hibiscus cannabinus* (198) 82.  
Malvaceae
- eergataa nenjaa (Orom.) - *Ochna inermis* (67) 69.  
Ochnaceae
- Egyptian mallow (Eng.) - *Malva parviflora* (237) 82.  
Malvaceae
- eiret (Som.) - *Terminalia brevipes* (125) 75.  
Combretaceae

- elan (Som.) - *Terminalia brevipes* (125) 75.  
Combretaceae
- elan damera (Som.) - *Flueggea virosa* (272) 85.  
Euphorbiaceae
- ellan iri (Som.) - *Hibiscus aponeurus* (209) 82.  
Malvaceae
- en (Som.) - *Euphorbia nubica* (364) 85.  
Euphorbiaceae
- endie (Orom.) - *Hypericum revolutum* (136) 77.  
Guttiferae
- enghir (Som.) - *Euphorbia grosseri* (361) 85.  
Euphorbiaceae
- engir (Som.) - *Euphorbia* Sect. *Somalica* (361),  
*Euphorbia somalensis* (362) 85. Euphorbiaceae
- enjir (Som.) - *Euphorbia amphiphylla* (334) 85.  
Euphorbiaceae
- enolai (Gam.) - *Euphorbia hirta* (374) 85.  
Euphorbiaceae
- erep (Som.) - *Terminalia brevipes* (125) 75.  
Combretaceae
- ergin (Orom.) - *Euphorbia nubica* (364) 85.  
Euphorbiaceae
- Ethiopian sourgourd (Eng.) - *Adansonia digitata*  
(186) 81. Bombacaceae
- eubata (Kon.) - *Terminalia brownii* (127) 75.  
Combretaceae
- eyum enemer (Orom.) - *Ochna inermis* (67) 69.  
Ochnaceae
- fagatedawi (Tse.) - *Hibiscus micranthus* (210) 82.  
Malvaceae
- falla falla (Som.) - *Euphorbia* Sect. *Somalica* (361),  
*Euphorbia somalensis* (362) 85. Euphorbiaceae
- farki ka caaci (Koe.) - *Hibiscus micranthus* (210) 82.  
Malvaceae
- ferenge boye (Gam.) - *Manihot esculenta* (315) 85.  
Euphorbiaceae
- fever tree (Eng.) - *Eucalyptus globulus* (100) 72.  
Myrtaceae
- finger euphorbia (Eng.) - *Euphorbia tirucalli* (364)  
85. Euphorbiaceae
- firari (Som.) - *Cucumis dipsaceus* (37) 65.  
Cucurbitaceae
- flat topped yate (Eng.) - *Eucalyptus occidentalis* (94)  
72. Myrtaceae
- flooded gum (Eng.) - *Eucalyptus grandis* (91) 72.  
Myrtaceae
- follaa (Orom.) - *Lagenaria siceraria* (50) 65.  
Cucurbitaceae
- forest red gum (Eng.) - *Eucalyptus tereticornis* (97)  
72. Myrtaceae
- fu'o (Orom.) - *Erythrococca* spp. (296),  
*Erythrococca trichogyne* (298) 85.  
Euphorbiaceae
- furnge (Gam.) - *Manihot esculenta* (315) 85.  
Euphorbiaceae
- futoo (Had.) - *Gossypium barbadense* (222),  
*Gossypium herbaceum* (222) 82. Malvaceae
- futota (Kon.) - *Gossypium hirsutum* (222) 82.  
Malvaceae
- futtuwa (Wel.) - *Gossypium barbadense* (222),  
*Gossypium herbaceum* (222) 82. Malvaceae
- fuuta (Kem.) - *Gossypium barbadense* (222),  
*Gossypium herbaceum* (222) 82. Malvaceae
- fyella fagii (Orom.) - *Clutia abyssinica* (286) 85.  
Euphorbiaceae
- gaabai (Orom.) - *Combretum paniculatum* (120) 75.  
Combretaceae
- gaajoo (Orom.) - *Hibiscus berberidifolius* (196) 82.  
Malvaceae
- gaaliis (Orom.) - *Cassipourea malosana* (134),  
*Cassipourea* spp. (134) 76. Rhizophoraceae
- gaalo daltu (Orom.) - *Erythrococca abyssinica* (296)  
85. Euphorbiaceae
- gaanogoi (Som.) - *Momordica trifoliolata* (42) 65.  
Cucurbitaceae
- gaarambaa (Orom.) - *Hypericum revolutum* (136)  
77. Guttiferae
- gaararruu bicuu (Orom.) - *Hypericum revolutum*  
(136) 77. Guttiferae
- gaassa (Wel.) - *Garcinia buchananii* (142) 77.  
Guttiferae
- gabai (Kef.) - *Combretum paniculatum* (120) 75.  
Combretaceae
- gabbro (Som.) - *Terminalia polycarpa* (125) 75.  
Combretaceae
- gabo (Som.) - *Euphorbia longispina* (338) 85.  
Euphorbiaceae
- gaboyaryar (Som.) - *Euphorbia glochidiata* (344)  
85. Euphorbiaceae
- gachanfulasa (Orom.) - *Cassipourea malosana*  
(134), *Cassipourea* spp. (134) 76.  
Rhizophoraceae
- gadei (Mes.) - *Argomuellera macrophylla* (290) 85.  
Euphorbiaceae
- gafu (Orom.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- gagamaa (Orom.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- gahar (Som.) - *Euphorbia glochidiata* (344) 85.  
Euphorbiaceae

- galaaloo (Orom.) - *Bridelia micrantha* (269) 85.  
Euphorbiaceae
- galaasee (Orom.) - *Combretum adenogonium* (117)  
75. Combretaceae
- galaldo (Gam. & Orom.) - *Terminalia brownii* (127)  
75. Combretaceae
- galaljo (Gam.) - *Anogeissus leiocarpa* (130) 75.  
Combretaceae
- galano (Som.) - *Euphorbia heterophylla* (373) 85.  
Euphorbiaceae
- galisaa (Orom.) - *Cassipourea malosana* (134) 76.  
Rhizophoraceae
- galle addi (Orom.) - *Caucanthus auriculatus* (262)  
83. Malpighiaceae
- gallini cotton (Eng.) - *Gossypium barbadense* (222),  
*Gossypium herbaceum* (222) 82. Malvaceae
- galol (Som.) - *Euphorbia breviararticulata* (337) 85.  
Euphorbiaceae
- gambol (Som.) - *Cucumis dipsaceus* (37) 65.  
Cucurbitaceae
- ganchoo (Orom.) - *Sapium ellipticum* (328) 85.  
Euphorbiaceae
- gandaletere (Som.) - *Sida alba* (251) 82. Malvaceae
- gandallo (Som.) - *Rhizophora mucronata* (133) 76.  
Rhizophoraceae
- gandelel tire (Som.) - *Sida ovata* (254) 82. Malvaceae
- garaho (Som.) - *Sterculia africana* (184) 80.  
Sterculiaceae
- garanneais (Som.) - *Grewia villosa* (152) 79.  
Tiliaceae
- garanro (Som.) - *Sterculia africana* (184) 80.  
Sterculiaceae
- garare (Som.) - *Sterculia africana* (184) 80.  
Sterculiaceae
- garatita (Kon.) - *Gossypium herbaceum* (222) 82.  
Malvaceae
- garcho (Gam.) - *Bridelia scleroneura* (267) 85.  
Euphorbiaceae
- gare damere (Som.) - *Cucumis pustulatus* (34) 65.  
Cucurbitaceae
- garebicho (Sid.) - *Hypericum revolutum* (136) 77.  
Guttiferae
- gareh (Som.) - *Lagenaria siceraria* (50) 65.  
Cucurbitaceae
- gareri (Som.) - *Sterculia africana* (184) 80.  
Sterculiaceae
- gasia (Orom.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- gebo (Anu.) - *Jatropha curcas* (324) 85.  
Euphorbiaceae
- gebro (Som.) - *Terminalia spinosa* (125) 75.  
Combretaceae
- gecho (Kef.) - *Euphorbia candelabrum* (336) 85.  
Euphorbiaceae
- ged ambar (Som.) - *Euphorbia longituberculosa*  
(352) 85. Euphorbiaceae
- ged medu (Som.) - *Hibiscus spartioides* (208) 82.  
Malvaceae
- ged mide (Som.) - *Corchorus trilocularis* (155) 79.  
Tiliaceae
- gedanod (Som.) - *Euphorbia indica* (374) 85.  
Euphorbiaceae
- gedebes (Som.) - *Adenia aculeata* (9) 64.  
Passifloraceae
- geelloo (Orom.) - *Erythrococca abyssinica* (296),  
*Erythrococca trichogyne* (298) 85.  
Euphorbiaceae
- gegame (Had.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- gegem (Mes.) - *Erythroxylum fischeri* (264) 84.  
Erythroxylaceae
- gela (Kef.) - *Combretum* spp. (115) 75.  
Combretaceae
- gelloo (Orom.) - *Sapium ellipticum* (328) 85.  
Euphorbiaceae
- geratita (Kon.) - *Gossypium herbaceum* (222) 82.  
Malvaceae
- gesanges (Som.) - *Momordica sessilifolia* (44),  
*Zehneria scabra* (27) 65. Cucurbitaceae
- ghed anod (Som.) - *Euphorbia indica* (374) 85.  
Euphorbiaceae
- ghed anole (Som.) - *Euphorbia granulata* (377) 85.  
Euphorbiaceae
- ghed arar (Som.) - *Acalypha fruticosa* (301) 85.  
Euphorbiaceae
- ghed biod (Som.) - *Antidesma venosum* (270) 85.  
Euphorbiaceae
- ghed hamar (Som.) - *Cucumis prophetarum* (36) 65.  
Cucurbitaceae
- ghedad (Som.) - *Abutilon fruticosum* (244) 82.  
Malvaceae
- ghedud maddovie (Som.) - *Ochna inermis* (67) 69.  
Ochnaceae
- gibo (Anu.) - *Jatropha curcas* (324) 85.  
Euphorbiaceae
- gidi (Mes.) - *Croton sylvaticus* (326) 85.  
Euphorbiaceae
- gidigeer (Anu. & Mes.) - *Acalypha acrogyna* (300)  
85. Euphorbiaceae
- gigasa (Gam.) - *Croton zambesicus* (325) 85.  
Euphorbiaceae

- gima (Sha.) - *Cassipourea malosana* (134) 76.  
Rhizophoraceae
- gimlet (Eng.) - *Eucalyptus salubris* (95) 72.  
Myrtaceae
- gini hamoh (Afar) - *Pavonia glechomifolia* (226) 82.  
Malvaceae
- gioar cile (Som.) - *Terminalia brevipes* (125) 75.  
Combretaceae
- girenchi (Orom.) - *Sida temucarpa* (251) 82.  
Malvaceae
- giu (Anu.) - *Syzygium guineense* (77) 72. Myrtaceae
- glelio (Gam. & Orom.) - *Terminalia brownii* (127)  
75. Combretaceae
- gnipolo (Anu. & Mes.) - *Ochna* spp. (66) 69.  
Ochnaceae
- gob daheyo (Som.) - *Tragia brevipes* (307) 85.  
Euphorbiaceae
- gobbo (Eng.) - *Abelmoschus esculentus* (212) 82.  
Malvaceae
- gobole (Som.) - *Croton dichogamus* (324) 85.  
Euphorbiaceae
- gofu (Orom.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- gogu (Som.) - *Combretum hereroense* subsp.  
*volkensii* (120) 75. Combretaceae
- gol (Som.) - *Tamarix aphylla* (3) 63. Tamaricaceae
- gomash (Som.) - *Grewia villosa* (152) 79. Tiliaceae
- gomelit (Me.) - *Croton macrostachyus* (326) 85.  
Euphorbiaceae
- gomorii (Orom.) - *Combretum collinum* (116) 75.  
Combretaceae, *Syzygium guineense* (77) 72.  
Myrtaceae
- gonjamat (Gim.) - *Dissotis* spp. (108) 74.  
Melastomataceae
- gonjamet (Gim.) - *Melastomastrum capitatum* (111)  
74. Melastomataceae
- goomorii (Orom.) - *Syzygium* spp. (75) 72.  
Myrtaceae
- gorgoraa (Orom.) - *Hypericum revolutum* (136) 77.  
Guttiferae
- gorgoroo (Orom.) - *Hypericum gnidiifolium* (138)  
77. Guttiferae
- gorobora (Das.) - *Flueggea virosa* (272) 85.  
Euphorbiaceae
- gorri (Som.) - *Adenia venenata* (7) 64. Passifloraceae
- gos agare (Som.) - *Corchorus baldaccii* (155) 79.  
Tiliaceae
- gosie (Gam.) - *Coccinia* spp. (52) 65. Cucurbitaceae
- gosie haise (Gam.) - *Coccinia* spp. (52) 65.  
Cucurbitaceae
- gossuu (Orom.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- goubtinio (Som.) - *Tragia plukenetii* (306) 85.  
Euphorbiaceae
- goubtino (Som.) - *Tragia hildebrandtii* (307) 85.  
Euphorbiaceae
- granadilla (Eng.) - *Passiflora quadrangularis* (15) 64.  
Passifloraceae
- granais (Som.) - *Pavonia propinqua* (230) 82.  
Malvaceae, *Triumfetta heterocarpa* (164) 79.  
Tiliaceae
- grey ironbark (Eng.) - *Eucalyptus paniculata* (105)  
72. Myrtaceae
- guava (Eng.) - *Psidium guajava* (72) 72. Myrtaceae
- gubtanya (Som.) - *Tragia plukenetii* (306) 85.  
Euphorbiaceae
- guftce (Orom.) - *Sida ovata* (254), *Sida*  
*schimperiana* (251) 82. Malvaceae
- guinea syzygium (Eng.) - *Syzygium guineense* (77)  
72. Myrtaceae
- gumbi daleti (Orom.) - *Pavonia gallaënsis* (226) 82.  
Malvaceae
- gumfortio (Koe.) - *Abutilon fruticosum* (244) 82.  
Malvaceae
- gurbi hatawi (Orom.) - *Pavonia arabica* (232) 82.  
Malvaceae
- gurbi matawi (Orom.) - *Hibiscus vitifolius* (205),  
*Pavonia burchellii* (225) 82. Malvaceae
- gurbii (Orom.) - *Abutilon fruticosum* (244) 82.  
Malvaceae
- gure (Sid.) - *Euphorbia schimperiana* (370) 85.  
Euphorbiaceae
- gurgubbee (Orom.) - *Tragia brevipes* (307) 85.  
Euphorbiaceae
- gurii (Orom.) - *Euphorbia depauperata* (366),  
*Euphorbia dumalis* (366) 85. Euphorbiaceae
- gurunle (Som.) - *Adenia aculeata* (9) 64.  
Passifloraceae
- gussi (Sha.) - *Hibiscus vitifolius* (205) 82. Malvaceae
- guuraajegaa (Orom.) - *Garcinia buchananii* (142)  
77. Guttiferae
- gympie messmate (Eng.) - *Eucalyptus cloeziana* (87)  
72. Myrtaceae
- habahad (Som.) - *Abutilon fruticosum* (244) 82.  
Malvaceae
- hachabe (Som.) - *Phyllanthus reticulatus* (277) 85.  
Euphorbiaceae
- hadaamii (Orom.) - *Euphorbia abyssinica* (334),  
*Euphorbia candelabrum* (336), *Euphorbia*  
*dalettiensis* (339) 85. Euphorbiaceae

- hadabowissa (Orom.) - *Hibiscus berberidifolius* (196), *Hibiscus diversifolius* (196) 82. Malvaceae
- haggin (Som.) - *Pavonia eremogeiton* (233) 82. Malvaceae
- hajinle (Som.) - *Hibiscus pycnostemon* (210) 82. Malvaceae
- hambaltaa (Orom.) - *Pavonia* spp. (224), *Pavonia urens* (228) 82. Malvaceae, *Ricinus communis* (293), *Tragia pungens* (308), *Tragia* spp. (304) 85. Euphorbiaceae
- hamokto (Afar) - *Abutilon figarianum* (246), *Pavonia procumbens* (226), *Pavonia zeylanica* (233) 82. Malvaceae
- hanehob (Som.) - *Cucumella kelleri* (30) 65. Cucurbitaceae
- harar (Som.) - *Terminalia polycarpa* (125), *Terminalia spinosa* (125) 75. Combretaceae
- harbuu (Orom.) - *Macaranga capensis* (295) 85. Euphorbiaceae
- hare haiyita (Wel.) - *Terminalia brownii* (127) 75. Combretaceae
- harere (Som.) - *Terminalia basilei* (127) 75. Combretaceae
- hareri (Som.) - *Terminalia basilei* (127), *Terminalia brownii* (127), *Terminalia polycarpa* (125), *Terminalia prunioides* (125), *Terminalia spinosa* (125) 75. Combretaceae
- hassadin (Som.) - *Euphorbia abyssinica* (334) 85. Euphorbiaceae
- heexoo (Orom.) - *Kosteletzkya begoniifolia* (215) 82. Malvaceae
- heireb (Som.) - *Terminalia brevipes* (125) 75. Combretaceae
- hengir (Som.) - *Euphorbia* Sect. *Somalica* (361), *Euphorbia somalensis* (362) 85. Euphorbiaceae
- herab (Som.) - *Terminalia brevipes* (125) 75. Combretaceae
- hibiscus (Eng.) - *Hibiscus rosa-sinensis* (200) 82. Malvaceae
- hiddii (Orom.) - *Cucumis ficifolius* (34) 65. Cucurbitaceae
- hin'ee (Orom.) - *Hypericum revolutum* (136) 77. Guttiferae
- hincinii (Orom.) - *Abutilon* spp. (239), *Hibiscus dongolensis* (192), *Hibiscus macranthus* (194), *Hibiscus noldeae* (200), *Hibiscus triumum* (200), *Malva verticillata* (237), *Pavonia urens* (228) 82. Malvaceae
- hoga galli (Som.) - *Pavonia kotschyi* (234) 82. Malvaceae
- hogo gel (Som.) - *Hibiscus somalensis* (208) 82. Malvaceae
- hohob (Som.) - *Grewia villosa* (152) 79. Tiliaceae
- hollata (Kon.) - *Terminalia spinosa* (125) 75. Combretaceae
- holotoo (Orom.) - *Cucumis* spp. (31) 65. Cucurbitaceae
- hongo (Orom.) - *Macaranga capensis* (295) 85. Euphorbiaceae
- hoolee (Orom.) - *Hibiscus micranthus* (210) 82. Malvaceae
- hulelone (Kef.) - *Clutia abyssinica* (286) 85. Euphorbiaceae
- humaar (Orom.) - *Adansonia digitata* (186) 81. Bombacaceae
- hunxxarffaa (Orom.) - *Euphorbia dumalis* (366) 85. Euphorbiaceae
- ilgal (Som.) - *Coccinia grandis* (54), *Momordica trifoliolata* (42) 65. Cucurbitaceae
- ilmarech (Das.) - *Combretum aculeatum* (120) 75. Combretaceae
- inasa (Ghe.) - *Sida rhombifolia* (254) 82. Malvaceae
- incher (Som.) - *Euphorbia scheffleri* (361) 85. Euphorbiaceae
- Indian black berry (Eng.) - *Syzygium* spp. (75) 72. Myrtaceae
- inni (Orom.) - *Hypericum revolutum* (136) 77. Guttiferae
- ismud (Som.) - *Combretum aculeatum* (120) 75. Combretaceae
- itin (Som.) - *Cephalocroton cordofanus* (291) 85. Euphorbiaceae
- jach (Som.) - *Adansonia digitata* (186) 81. Bombacaceae
- jag (Som.) - *Adansonia digitata* (186) 81. Bombacaceae
- java plum (Eng.) - *Syzygium* spp. (75) 72. Myrtaceae
- jelly leaf (Eng.) - *Sida rhombifolia* (254) 82. Malvaceae
- jemma (Anu.) - *Erythroxylum fischeri* (264) 84. Erythroxylaceae
- jemmoh (Anu.) - *Erythroxylum fischeri* (264) 84. Erythroxylaceae
- jiimaa (Orom.) - *Cassipourea malosana* (134), *Cassipourea* spp. (134) 76. Rhizophoraceae
- jilbadig (Som.) - *Jatropha pelargonifolia* (321) 85. Euphorbiaceae
- jilohafaa (Orom.) - *Phyllanthus ovalifolius* (276) 85. Euphorbiaceae
- jilolafaa (Orom.) - *Phyllanthus ovalifolius* (276) 85. Euphorbiaceae



- jirbii (Orom.) - *Gossypium arboreum* (222),  
*Gossypium barbadense* (222), *Gossypium herbaceum* (222), *Gossypium hirsutum* (222) 82.  
Malvaceae
- jirbii buqqee (Orom.) - *Gossypium barbadense* (222)  
82. Malvaceae
- joho (Som.) - *Jatropha tropaeoliifolia* (321) 85.  
Euphorbiaceae
- juda's bag (Eng.) - *Adansonia digitata* (186) 81.  
Bombacaceae
- kaaladdee (Orom.) - *Combretum aculeatum* (120) 75.  
Combretaceae
- kaasum (Orom.) - *Abutilon mauritianum* (246) 82.  
Malvaceae
- kabagois (Som.) - *Euphorbia granulata* (377) 85.  
Euphorbiaceae
- kabargurud (Som.) - *Pavonia kotschy* (234) 82.  
Malvaceae
- kabo (Som.) - *Euphorbia longispina* (338) 85.  
Euphorbiaceae
- kachoo (Orom.) - *Euphorbia candelabrum* (336) 85.  
Euphorbiaceae
- kadi (Sha.) - *Euphorbia* spp. (331) 85.  
Euphorbiaceae
- kaguto (Kon.) - *Adenia ellenbeckii* (11) 64.  
Passifloraceae
- kaito (Som.) - *Combretum aculeatum* (120) 75.  
Combretaceae
- kalawuri (Mur.) - *Combretum aculeatum* (120) 75.  
Combretaceae
- kalishe (Gam.) - *Ricinus communis* (293), *Tragia pungens* (308) 85. Euphorbiaceae
- kalle (Sha.) - *Terminalia spinosa* (125) 75.  
Combretaceae
- kannaa (Orom.) - *Abutilon hirtum* (248) 82.  
Malvaceae
- kapok (Eng.) - *Ceiba pentandra* (186) 81.  
Bombacaceae
- kapok tree (Eng.) - *Ceiba pentandra* (186) 81.  
Bombacaceae
- kara (Gam.) - *Euphorbia tesorum* (339) 85.  
Euphorbiaceae
- karchabaa (Orom.) - *Pavonia urens* (228) 82.  
Malvaceae
- karecishaa (Wel.) - *Combretum* spp. (115) 75.  
Combretaceae
- karfade (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- karrabaa (Orom.) - *Sida rhombifolia* (254) 82.  
Malvaceae
- karri (Eng.) - *Eucalyptus diversicolor* (90) 72.  
Myrtaceae
- kasum (Mur.) - *Hibiscus ovalifolius* (192) 82.  
Malvaceae
- keenoo (Orom.) - *Combretum hereroense* (118) 75.  
Combretaceae
- keike (Sha.) - *Argomuelleria macrophylla* (290) 85.  
Euphorbiaceae
- kerekara (Had.) - *Euphorbia abyssinica* (334) 85.  
Euphorbiaceae
- kidi (Anu.) - *Croton sylvaticus* (326) 85.  
Euphorbiaceae
- kilaito (Afar) - *Combretum aculeatum* (120) 75.  
Combretaceae
- kilaitu (Afar) - *Terminalia brevipes* (125) 75.  
Combretaceae
- kinchib (Ade.) - *Euphorbia tirucalli* (364) 85.  
Euphorbiaceae
- kindichuwa (Wel.) - *Sida ovata* (254) 82. Malvaceae
- kirunful (Ade.) - *Eugenia* spp. (72) 72. Myrtaceae
- kitaa (Orom.) - *Pavonia urens* (228) 82. Malvaceae
- kobo (Som.) - *Euphorbia longispina* (338) 85.  
Euphorbiaceae
- kobo (Som.) - *Ricinus communis* (293) 85.  
Euphorbiaceae
- kodoo (Orom.) - *Myrtus communis* (71) 72.  
Myrtaceae
- kogne (Anu. & Mes.) - *Combretum* spp. (115) 75.  
Combretaceae
- kokodan (Mes.) - *Anogeissus leiocarpa* (130) 75.  
Combretaceae
- kokoni (Som.) - *Combretum hereroense* subsp.  
*volkensis* (120) 75. Combretaceae
- kokora (Orom.) - *Terminalia macroptera* (127) 75.  
Combretaceae
- kolisa (Orom.) - *Terminalia schimperiana* (128) 75.  
Combretaceae
- kolmale (Som.) - *Pavonia kotschy* (234) 82.  
Malvaceae
- kompolto (Caro & Sha.) - *Abutilon mauritianum*  
(246) 82. Malvaceae
- koofalee (Orom.) - *Macaranga capensis* (295) 85.  
Euphorbiaceae
- koosaa (Orom.) - *Hibiscus micranthus* (210) 82.  
Malvaceae
- kordee (Orom.) - *Macaranga capensis* (295) 85.  
Euphorbiaceae
- kordii (Orom.) - *Macaranga capensis* (295) 85.  
Euphorbiaceae
- korgub (Som.) - *Terminalia orbicularis* (124) 75.  
Combretaceae
- kosho (Kef.) - *Tragia* spp. (304) 85. Euphorbiaceae

- kote jabessa (Sid.) - *Sida temucarpa* (251) 82.  
Malvaceae
- kotte jaabesaa (Orom.) - *Sida schimperiana* (251),  
*Sida temucarpa* (251) 82. Malvaceae
- kottuu (Orom.) - *Phyllanthus ovalifolius* (276) 85.  
Euphorbiaceae
- kouni alaua (Orom.) - *Kosteletzkya adoensis* (215)  
82. Malvaceae
- kuldenna (Sha.) - *Hibiscus cannabimus* (198) 82.  
Malvaceae
- kullo (Orom.) - *Cassipourea malosana* (134),  
*Cassipourea* spp. (134) 76. Rhizophoraceae
- kunyo (Anu.) - *Combretum aculeatum* (120) 75.  
Combretaceae
- kunyon (Anu.) - *Combretum adenogonium* (117),  
*Combretum collinum* (116) 75. Combretaceae
- kurunfudiya (Wel.) - *Eugenia* spp. (72) 72.  
Myrtaceae
- kurunfuli (Had.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- kyarii (Orom.) - *Cucumis sativus* (37) 65.  
Cucurbitaceae
- kybean gum (Eng.) - *Eucalyptus parvifolia* (98) 72.  
Myrtaceae
- laaghe (Arb.) - *Hibiscus ovalifolius* (192) 82.  
Malvaceae
- laaghi (Sha.) - *Pavonia procumbens* (226) 82.  
Malvaceae
- lalessaa (Orom.) - *Cassipourea malosana* (134),  
*Cassipourea* spp. (134) 76. Rhizophoraceae,  
*Tragia brevipes* (307), *Tragia cinerea* (308) 85.  
Euphorbiaceae
- laanqessaa (Orom.) - *Grewia ferruginea* (150) 79.  
Tiliaceae
- lady's finger (Eng.) - *Abelmoschus esculentus* (212)  
82. Malvaceae
- lalayi (Mur.) - *Combretum adenogonium* (117) 75.  
Combretaceae
- lamagoyan (Som.) - *Euphorbia* spp. (331) 85.  
Euphorbiaceae
- lamagoye (Som.) - *Adenia aculeata* (9) 64.  
Passifloraceae
- lamon (Mes.) - *Phyllanthus ovalifolius* (276) 85.  
Euphorbiaceae
- latec (Me.) - *Combretum* spp. (115) 75.  
Combretaceae
- latex aeldo (Som.) - *Euphorbia grosseri* (361) 85.  
Euphorbiaceae
- lazi (Nuw.) - *Gossypium barbadense* (222),  
*Gossypium herbaceum* (222) 82. Malvaceae
- lebellamala (Som.) - *Garcinia livingstonei* (142) 77.  
Guttiferae
- lebelbelii (Som.) - *Garcinia livingstonei* (142) 77.  
Guttiferae
- leescia (Sha.) - *Abutilon bidentatum* (246), *Hibiscus  
cannabimus* (198) 82. Malvaceae
- leeta (Orom.) - *Pavonia urens* (228) 82. Malvaceae
- lemon scented gum (Eng.) - *Eucalyptus citriodora*  
(86) 72. Myrtaceae
- lemon scented spotted gum (Eng.) - *Eucalyptus  
citriodora* (86) 72. Myrtaceae
- lerp mallee (Eng.) - *Eucalyptus incrassata* (97) 72.  
Myrtaceae
- levant cotton (Eng.) - *Gossypium herbaceum* (222)  
82. Malvaceae
- lipa (Anu.) - *Luffa cylindrica* (56) 65. Cucurbitaceae
- little mallow (Eng.) - *Malva parviflora* (237) 82.  
Malvaceae
- llabnaba (Afar) - *Euphorbia longituberculosa* (352)  
85. Euphorbiaceae
- lobwite (Das.) - *Acalypha indica* (303) 85.  
Euphorbiaceae
- lola (Wel.) - *Triumfetta* spp. (158) 79. Tiliaceae
- long break eucalyptus (Eng.) - *Eucalyptus  
camaldulensis* (98) 72. Myrtaceae
- long leaved box (Eng.) - *Eucalyptus goniocalyx* (99)  
72. Myrtaceae
- lookoo (Orom.) - *Cassipourea malosana* (134) 76.  
Rhizophoraceae
- lookoo adii (Orom.) - *Cassipourea malosana* (134)  
76. Rhizophoraceae
- lookoo gurraachaa (Orom.) - *Cassipourea malosana*  
(134) 76. Rhizophoraceae
- lovei (Som.) - *Grewia tembensis* (150) 79. Tiliaceae
- lukaa (Orom.) - *Hibiscus crassinervius* (209) 82.  
Malvaceae
- lutt (Orom.) - *Malva verticillata* (237) 82. Malvaceae
- macciabe (Som.) - *Phyllanthus reticulatus* (277) 85.  
Euphorbiaceae
- macurumbi (Som.) - *Momordica trifoliolata* (42) 65.  
Cucurbitaceae
- madabene (Som.) - *Momordica macrosperma* (41)  
65. Cucurbitaceae
- madabug (Som.) - *Momordica macrosperma* (41)  
65. Cucurbitaceae
- madapisciar (Som.) - *Momordica trifoliolata* (42) 65.  
Cucurbitaceae
- madodoki (Som.) - *Luffa cylindrica* (56) 65.  
Cucurbitaceae
- maffafai (Som.) - *Carica papaya* (64) 67. Caricaceae

- maga (Koe.) - *Combretum aculeatum* (120) 75.  
Combretaceae
- maga (Tse.) - *Combretum* spp. (115) 75.  
Combretaceae
- magga (Sha.) - *Combretum aculeatum* (120) 75.  
Combretaceae
- maggiava (Som.) - *Flueggea virosa* (272) 85.  
Euphorbiaceae
- mago (Gam.) - *Sterculia setigera* (183) 80.  
Sterculiaceae
- magoo (Orom.) - *Croton dichogamus* (324) 85.  
Euphorbiaceae
- maiden's gum (Eng.) - *Eucalyptus globulus* (100) 72.  
Myrtaceae
- makanda (Som.) - *Rhizophora mucronata* (133) 76.  
Rhizophoraceae
- makotoo (Orom.) - *Momordica pterocarpa* (41) 65.  
Cucurbitaceae
- malabar plum (Eng.) - *Syzygium* spp. (75) 72.  
Myrtaceae
- malaebene (Som.) - *Euphorbia indica* (374) 85.  
Euphorbiaceae
- mallow (Eng.) - *Malva parviflora* (237) 82.  
Malvaceae
- malosana loko (Orom.) - *Cassipourea* spp. (134) 76.  
Rhizophoraceae
- maltese cotton (Eng.) - *Gossypium herbaceum* (222) 82. Malvaceae
- mananga (Som.) - *Manihot esculenta* (315) 85.  
Euphorbiaceae
- mangrove (Eng.) - *Rhizophora mucronata* (133) 76.  
Rhizophoraceae
- manioc (Eng.) - *Manihot esculenta* (315) 85.  
Euphorbiaceae
- manna gum (Eng.) - *Eucalyptus viminalis* (101) 72.  
Myrtaceae
- marasaio (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- march mallow (Eng.) - *Malva parviflora* (237) 82.  
Malvaceae
- marmora (Som.) - *Acridocarpus glaucescens* (257),  
*Caucanthus edulis* (263) 83. Malpighiaceae
- masichoo (Sid.) - *Croton macrostachyus* (326) 85.  
Euphorbiaceae
- masinchu (Sha.) - *Croton macrostachyus* (326) 85.  
Euphorbiaceae
- massaganta (Kon.) - *Croton macrostachyus* (326) 85. Euphorbiaceae
- maxajjii (Orom.) - *Hibiscus dongolensis* (192),  
*Hibiscus macranthus* (194) 82. Malvaceae
- mcanda (Som.) - *Rhizophora mucronata* (133) 76.  
Rhizophoraceae
- meda ainyu (Som.) - *Grewia tenax* (152) 79.  
Tiliaceae
- medanyu (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- medo ainyo (Som.) - *Grewia tenax* (152) 79.  
Tiliaceae
- mejabe (Som.) - *Ochna inermis* (67) 69. Ochnaceae
- mere (Kef.) - *Tragia* spp. (304) 85. Euphorbiaceae
- messmate stringybark (Eng.) - *Eucalyptus obliqua* (89) 72. Myrtaceae
- metara (Som.) - *Pavonia zeylanica* (233) 82.  
Malvaceae
- metragaa (Orom.) - *Sida schimperiana* (251) 82.  
Malvaceae
- mide gel jire (Som.) - *Hibiscus hildebrandtii* (208),  
*Hibiscus* spp. (191) 82. Malvaceae
- milk bush (Eng.) - *Euphorbia tirucalli* (364) 85.  
Euphorbiaceae
- mira'asse (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- mirhig (Som.) - *Euphorbia tirucalli* (364) 85.  
Euphorbiaceae
- mirhigyer (Som.) - *Euphorbia tirucalli* (364) 85.  
Euphorbiaceae
- mirugiljili (Som.) - *Pavonia arabica* (232) 82.  
Malvaceae
- mixoo (Orom.) - *Hypericum revolutum* (136) 77.  
Guttiferae
- mochaa (Orom.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- mohogo (Som.) - *Manihot esculenta* (315) 85.  
Euphorbiaceae
- mok (Gam.) - *Anogeissus leiocarpa* (130) 75.  
Combretaceae
- mokadeega (Dre.) - *Clusia abyssinica* (286) 85.  
Euphorbiaceae
- mokootaa (Wel.) - *Momordica pterocarpa* (41) 65.  
Cucurbitaceae
- moloaci (Arb.) - *Pavonia procumbens* (226) 82.  
Malvaceae
- monkey bread (Eng.) - *Adansonia digitata* (186) 81.  
Bombacaceae
- moogo (Som.) - *Manihot esculenta* (315) 85.  
Euphorbiaceae
- motekeda (Sha.) - *Terminalia spinosa* (125) 75.  
Combretaceae
- mountain ash (Eng.) - *Eucalyptus regnans* (88) 72.  
Myrtaceae
- mountain gum (Eng.) - *Eucalyptus dalrympleana* (102) 72. Myrtaceae
- mowo (Orom.) - *Jatropha spicata* (322) 85.  
Euphorbiaceae
- mudagno (Som.) - *Grewia tenax* (152) 79. Tiliaceae

- muka foonii (Orom.) - *Hypericum revolutum* (136)  
77. Guttiferae
- mukaa fulaa (Orom.) - *Croton dichogamus* (324) 85.  
Euphorbiaceae
- mukadeegaa (Orom.) - *Clutia abyssinica* (286) 85.  
Euphorbiaceae
- mukafaaqqee (Orom.) - *Cassipourea malosana*  
(134), *Cassipourea* spp. (134) 76.  
Rhizophoraceae
- muri (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- murio (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- murjo (Som.) - *Grewia tenax* (152) 79. Tiliaceae
- murray red gum (Eng.) - *Eucalyptus camaldulensis*  
(98) 72. Myrtaceae
- myrtle (Eng.) - *Myrtus communis* (71) 72. Myrtaceae
- myrtle bush (Eng.) - *Myrtus communis* (71) 72.  
Myrtaceae
- naccia (Afar & Som.) - *Hibiscus dongolensis* (192)  
82. Malvaceae
- nagar (Som.) - *Hermannia paniculata* (180) 80.  
Sterculiaceae
- narrow leaved ironbark (Eng.) - *Eucalyptus crebra*  
(104) 72. Myrtaceae
- needlebark stringybark (Eng.) - *Eucalyptus*  
*planchoniana* (89) 72. Myrtaceae
- nikaja (Anu.) - *Bridelia scleroneura* (267) 85.  
Euphorbiaceae
- nilobrbay (Anu.) - *Hibiscus calyphyllus* (192) 82.  
Malvaceae
- nilorbary (Mes.) - *Hibiscus calyphyllus* (192) 82.  
Malvaceae
- nilorbe (Anu.) - *Hibiscus lunariifolius* (194) 82.  
Malvaceae
- nyangatom (Gam.) - *Tragia plukenetii* (306) 85.  
Euphorbiaceae
- oba (Som.) - *Combretum molle* (118) 75.  
Combretaceae
- obah (Som.) - *Combretum molle* (118) 75.  
Combretaceae
- obalo (Som.) - *Combretum molle* (118) 75.  
Combretaceae
- obdi (Som.) - *Gossypium herbaceum* (222) 82.  
Malvaceae
- obol (Som.) - *Combretum molle* (118) 75.  
Combretaceae
- obromo (Kef.) - *Clutia* spp. (286) 85. Euphorbiaceae
- ocha (Gam.) - *Psidium* spp. (72) 72. Myrtaceae
- ochra (Eng.) - *Abelmoschus esculentus* (212) 82.  
Malvaceae
- ochu (Orom.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- odbi (Som.) - *Gossypium arboreum* (222),  
*Gossypium barbadense* (222) 82. Malvaceae
- ogaden (Som.) - *Combretum molle* (118) 75.  
Combretaceae
- ogadie (Gam.) - *Grewia villosa* (152) 79. Tiliaceae
- ogom diil (Orom.) - *Erythrococca abyssinica* (296)  
85. Euphorbiaceae
- ogomdii (Orom.) - *Grewia villosa* (152) 79. Tiliaceae
- ogooonee (Orom.) - *Ochna schweinfurthiana* (67) 69.  
Ochnaceae
- ogubdii (Orom.) - *Grewia* spp. (145) 79. Tiliaceae
- oicha (Orom.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- okra (Eng.) - *Abelmoschus esculentus* (212) 82.  
Malvaceae
- olati (Sid.) - *Cassipourea malosana* (134) 76.  
Rhizophoraceae
- olbe (Arb.) - *Abutilon figarium* (246), *Hibiscus*  
*vitifolius* (205), *Senra incana* (216) 82.  
Malvaceae
- olbe (Sha.) - *Abutilon bidentatum* (246) 82.  
Malvaceae
- ololgi (Som.) - *Ochna inermis* (67) 69. Ochnaceae
- oloncho (Som.) - *Ochna inermis* (67) 69. Ochnaceae
- ompolto (Sha.) - *Abutilon hirtum* (248) 82.  
Malvaceae
- ongo (Orom.) - *Macaranga capensis* (295) 85.  
Euphorbiaceae
- oochcha (Wel.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- oohchee (Gim.) - *Bridelia micrantha* (269) 85.  
Euphorbiaceae
- opus (Anu.) - *Bridelia scleroneura* (267) 85.  
Euphorbiaceae
- oput (Anu.) - *Bridelia micrantha* (269), *Bridelia*  
*scleroneura* (267) 85. Euphorbiaceae
- orbelow (Anu.) - *Croton macrostachyus* (326) 85.  
Euphorbiaceae
- oroburga (Das.) - *Euphorbia indica* (374) 85.  
Euphorbiaceae
- orormaie (Arb.) - *Hibiscus cannabinus* (198) 82.  
Malvaceae
- orwiech (Anu.) - *Bridelia scleroneura* (267) 85.  
Euphorbiaceae
- oyoo (Orom.) - *Abutilon bidentatum* (246) 82.  
Malvaceae
- papaja (Som.) - *Carica papaya* (64) 67. Caricaceae
- para arrow root (Eng.) - *Manihot esculenta* (315) 85.  
Euphorbiaceae
- passion flower (Eng.) - *Passiflora* spp. (13) 64.  
Passifloraceae

- pencil cactus (Eng.) - *Euphorbia tirucalli* (364) 85.  
Euphorbiaceae
- perideegu (Sha.) - *Jatropha curcas* (324) 85.  
Euphorbiaceae
- physic nut (Eng.) - *Jatropha curcas* (324) 85.  
Euphorbiaceae
- pik (Anu.) - *Terminalia laxiflora* (128) 75.  
Combretaceae
- pillar wood (Eng.) - *Cassipourea malosana* (134),  
*Cassipourea* spp. (134) 76. Rhizophoraceae
- pitanga or surinam cherry (Eng.) - *Eugenia uniflora*  
(75) 72. Myrtaceae
- poddo (Arb.) - *Gossypium hirsutum* (222) 82.  
Malvaceae
- poddy's lucerne (Eng.) - *Sida rhombifolia* (254) 82.  
Malvaceae
- poinsettia (Eng.) - *Euphorbia* subgenus *Poinsettia*  
(372) 85. Euphorbiaceae
- poswedoh (Anu.) - *Terminalia laxiflora* (128) 75.  
Combretaceae
- powdoh (Anu.) - *Terminalia laxiflora* (128) 75.  
Combretaceae
- powedoh (Anu.) - *Terminalia laxiflora* (128) 75.  
Combretaceae
- pseudoholstii (Som.) - *Euphorbia agowensis* (354)  
85. Euphorbiaceae
- qaawaa (Orom.) - *Grewia mollis* (146) 79. Tiliaceae
- qalfon (Som.) - *Cucumis ficifolius* (34), *Cucumis*  
*metuliferus* (34), *Cucumis prophetarum* (36) 65.  
Cucurbitaceae
- qara (Som.) - *Citrullus lanatus* (48) 65.  
Cucurbitaceae
- qare (Som.) - *Citrullus lanatus* (48) 65.  
Cucurbitaceae
- qare demer (Som.) - *Citrullus colocynthis* (48) 65.  
Cucurbitaceae
- qarre (Som.) - *Cucumis ficifolius* (34) 65.  
Cucurbitaceae
- qaxalee (Orom.) - *Terminalia schimperiana* (128)  
75. Combretaceae
- qelfon (Som.) - *Cucumis* spp. (31) 65. Cucurbitaceae
- qobboo (Orom.) - *Acalypha fruticosa* (301), *Ricinus*  
*communis* (293), *Sapium ellipticum* (328) 85.  
Euphorbiaceae
- qoqoraa (Orom.) - *Terminalia macroptera* (127) 75.  
Combretaceae
- queensland hemp (Eng.) - *Sida rhombifolia* (254) 82.  
Malvaceae
- quncee (Orom.) - *Hibiscus micranthus* (210) 82.  
Malvaceae
- qurunfuda (Kem. & Orom.) - *Eugenia* spp. (72) 72.  
Myrtaceae
- qurunfullii (Orom.) - *Syzygium guineense* (77) 72.  
Myrtaceae
- rabraba (Afar) - *Flueggea virosa* (272) 85.  
Euphorbiaceae
- raha roho (Som.) - *Coccinia grandis* (54) 65.  
Cucurbitaceae
- rangoon creeper (Eng.) - *Quisqualis indica* (124) 75.  
Combretaceae
- red eucalyptus (Eng.) - *Eucalyptus camaldulensis*  
(98) 72. Myrtaceae
- red flowering gum (Eng.) - *Eucalyptus ficifolia* (86)  
72. Myrtaceae
- red gum (Eng.) - *Eucalyptus camaldulensis* (98) 72.  
Myrtaceae
- red ironbark (Eng.) - *Eucalyptus sideroxylon* (106)  
72. Myrtaceae
- red mahogany (Eng.) - *Eucalyptus resinifera* (92) 72.  
Myrtaceae
- redwood (Eng.) - *Eucalyptus transcontinentalis* (96)  
72. Myrtaceae
- reegarabbaa (Orom.) - *Bridelia micrantha* (269) 85.  
Euphorbiaceae
- reessaa (Orom.) - *Terminalia brownii* (127) 75.  
Combretaceae
- reko (Som.) - *Hermannia paniculata* (180) 80.  
Sterculiaceae
- ribbon gum (Eng.) - *Eucalyptus viminalis* (101) 72.  
Myrtaceae
- rid (Anu.) - *Anogeissus leiocarpa* (130) 75.  
Combretaceae
- riga ganzi (Orom.) - *Hypericum quartianum* (136)  
77. Guttiferae
- rio arrow root (Eng.) - *Manihot esculenta* (315) 85.  
Euphorbiaceae
- rit (Anu. & Mes.) - *Anogeissus leiocarpa* (130) 75.  
Combretaceae
- river red gum (Eng.) - *Eucalyptus camaldulensis* (98)  
72. Myrtaceae
- ro o (Som.) - *Terminalia orbicularis* (124) 75.  
Combretaceae
- roh (Som.) - *Coccinia grandis* (54) 65.  
Cucurbitaceae
- roho (Som.) - *Momordica* spp. (39) 65.  
Cucurbitaceae
- rohor (Som.) - *Coccinia grandis* (54) 65.  
Cucurbitaceae
- rokes (Som.) - *Combretum aculeatum* (120) 75.  
Combretaceae

rose gum (Eng.) - *Eucalyptus grandis* (91) 72.

Myrtaceae

rose mallow (Eng.) - *Hibiscus rosa-sinensis* (200) 82.

Malvaceae

roselle (Eng.) - *Hibiscus sabdariffa* (198) 82.

Malvaceae

rugageita (Afar) - *Sida ovata* (254) 82. Malvaceae

ruho (Som.) - *Coccinia grandis* (54) 65.

Cucurbitaceae

ruukeesaa (Orom.) - *Combretum aculeatum* (120),  
*Combretum molle* (118), *Combretum* spp. (115)

75. Combretaceae

safale (Orom.) - *Macaranga capensis* (295) 85.

Euphorbiaceae

salaweineye (Som.) - *Pavonia kotschyi* (234) 82.

Malvaceae

salmon gum (Eng.) - *Eucalyptus salmonophloia* (96)

72. Myrtaceae

salo weni (Som.) - *Pavonia bruchellii* (225) 82.

Malvaceae

salo weyn (Som.) - *Pavonia burchellii* (225) 82.

Malvaceae, *Triumfetta flavescens* (164),

*Triumfetta heterocarpa* (164) 79. Tiliaceae

saloweini (Som.) - *Pavonia glechomifolia* (226) 82.

Malvaceae

sar gudun (Som.) - *Coccinia grandis* (54) 65.

Cucurbitaceae

sara (Som.) - *Momordica foetida* (42) 65.

Cucurbitaceae

sara sara (Som.) - *Coccinia grandis* (54) 65.

Cucurbitaceae

sarsar (Som.) - *Corallocarpus schimperi* (25) 65.

Cucurbitaceae

sarsare (Som.) - *Momordica trifoliolata* (42) 65.

Cucurbitaceae

scedfarod (Som.) - *Garcinia livingstonei* (142) 77.

Guttiferae

scenforngnot (Som.) - *Garcinia livingstonei* (142) 77.

Guttiferae

scianfarod (Som.) - *Garcinia livingstonei* (142) 77.

Guttiferae

scianfarot (Som.) - *Garcinia livingstonei* (142) 77.

Guttiferae

scismo (Mako) - *Croton macrostachyus* (326) 85.

Euphorbiaceae

sea island cotton (Eng.) - *Gossypium barbadense*  
(222), *Gossypium herbaceum* (222) 82.

Malvaceae

sefa (Orom.) - *Hibiscus micranthus* (210) 82.

Malvaceae

segentu (Afar) - *Tamarix aphylla* (3) 63.

Tamaricaceae

selibatiko (Som.) - *Ochna inermis* (67) 69.

Ochnaceae

seligatiko (Som.) - *Ochna inermis* (67) 69.

Ochnaceae

sent'aro (Gam.) - *Senra incana* (216) 82. Malvaceae

sentero (Gam.) - *Senra incana* (216) 82. Malvaceae

sese (Bod.) - *Tragia brevipes* (307) 85.

Euphorbiaceae

sese (Me.) - *Tragia pungens* (308) 85. Euphorbiaceae

shaga (Kef.) - *Combretum paniculatum* (120) 75.

Combretaceae

shakaro (Kef.) - *Macaranga capensis* (295) 85.

Euphorbiaceae

shakere (Wel.) - *Macaranga capensis* (295) 85.

Euphorbiaceae

shakiro (Kef.) - *Macaranga capensis* (295) 85.

Euphorbiaceae

shalawta (Kon.) - *Combretum adenogonium* (117)

75. Combretaceae

shamaldowa (Som.) - *Pavonia patens* (236) 82.

Malvaceae

shardetch (Das.) - *Hibiscus micranthus* (210) 82.

Malvaceae

shedo (Kef.) - *Sapium ellipticum* (328) 85.

Euphorbiaceae

sheshoo (Orom.) - *Tragia* spp. (304) 85.

Euphorbiaceae

shetto (Kef.) - *Sida schimperiana* (251) 82.

Malvaceae

shetto (Orom.) - *Sida tenuicarpa* (251) 82.

Malvaceae

shimbrale (Som.) - *Pavonia zeylanica* (233) 82.

Malvaceae

shining gum (Eng.) - *Eucalyptus nitens* (99) 72.

Myrtaceae

shishik (Som.) - *Euphorbia schimperiana* (370) 85.

Euphorbiaceae

shoe flower (Eng.) - *Hibiscus rosa-sinensis* (200) 82.

Malvaceae

sholda (Orom.) - *Macaranga capensis* (295) 85.

Euphorbiaceae

shomoy (Mes.) - *Croton macrostachyus* (326) 85.

Euphorbiaceae

shoro'ac (Me.) - *Sida alba* (251) 82. Malvaceae

shoroshintit (Me.) - *Sida alba* (251) 82. Malvaceae

short staple American cotton (Eng.) - *Gossypium*  
*herbaceum* (222) 82. Malvaceae

showshowe (Orom.) - *Macaranga capensis* (295) 85.

Euphorbiaceae

- shuna shuna (Som.) - *Combretum aculeatum* (120)  
75. Combretaceae
- si hini (Som.) - *Jatropha aethiopica* (322) 85.  
Euphorbiaceae
- sibaka (Sha.) - *Combretum adenogonium* (117) 75.  
Combretaceae
- silag (Eng.) - *Anogeissus leiocarpa* (130) 75.  
Combretaceae
- silek (Orom.) - *Anogeissus leiocarpa* (130) 75.  
Combretaceae
- silk cotton tree (Eng.) - *Ceiba pentandra* (186) 81.  
Bombacaceae
- sirso (Som.) - *Combretum hereroense* subsp.  
*volkensii* (120) 75. Combretaceae
- small flower mallow (Eng.) - *Malva parviflora* (237)  
82. Malvaceae
- snowberry tree (Eng.) - *Flueggea virosa* (272) 85.  
Euphorbiaceae
- soobuwa (Wel.) - *Combretum molle* (118) 75.  
Combretaceae
- sou dur (Som.) - *Pavonia propinqua* (230) 82.  
Malvaceae
- southern blue gum (Eng.) - *Eucalyptus globulus*  
subsp. *bicostata* (100), *Eucalyptus globulus* (100)  
72. Myrtaceae
- southern mahogany (Eng.) - *Eucalyptus botryoides*  
(92) 72. Myrtaceae
- spotted gum (Eng.) - *Eucalyptus citriodora* (86),  
*Eucalyptus maculata* (87) 72. Myrtaceae
- subaglai (Som.) - *Pavonia* spp. (224) 82. Malvaceae
- suf (Som.) - *Gossypium anomalum* (219),  
*Gossypium arboreum* (222), *Gossypium*  
*barbadense* (222) 82. Malvaceae
- sugar gum (Eng.) - *Eucalyptus cladocalyx* (96) 72.  
Myrtaceae
- surret (Sha.) - *Abutilon fruticosum* (244) 82.  
Malvaceae
- suufaari (Orom.) - *Combretum rochetianum* (117)  
75. Combretaceae
- swamp gum (Eng.) - *Eucalyptus ovata* (98) 72.  
Myrtaceae
- swamp mahogany (Eng.) - *Eucalyptus robusta* (92)  
72. Myrtaceae
- swamp yate (Eng.) - *Eucalyptus occidentalis* (94) 72.  
Myrtaceae
- sweet cassava (Eng.) - *Manihot esculenta* (315) 85.  
Euphorbiaceae
- sweet granadilla (Eng.) - *Passiflora ligularis* (15) 64.  
Passifloraceae
- Sydney blue gum (Eng.) - *Eucalyptus saligna* (91)  
72. Myrtaceae
- Syrian cotton (Eng.) - *Gossypium herbaceum* (222)  
82. Malvaceae
- tallow wood (Eng.) - *Eucalyptus microcorys* (106)  
72. Myrtaceae
- tarraho (Som.) - *Jatropha rivae* (319) 85.  
Euphorbiaceae
- tarrao (Som.) - *Jatropha rivae* (319) 85.  
Euphorbiaceae
- Tasmanian blue gum (Eng.) - *Eucalyptus globulus*  
(100) 72. Myrtaceae
- Tasmanian yellow gum (Eng.) - *Eucalyptus*  
*johnstonii* (101) 72. Myrtaceae
- tataruma (Kon.) - *Combretum aculeatum* (120) 75.  
Combretaceae
- tehlo (Orom.) - *Cassipourea malosana* (134) 76.  
Rhizophoraceae
- tekaruma (Kon.) - *Combretum hereroense* (118) 75.  
Combretaceae
- tenqersa (Gam.) - *Hypericum revolutum* (136) 77.  
Guttiferae
- tenti (Me.) - *Euphorbia* spp. (331) 85. Euphorbiaceae
- thogo (Kef.) - *Pavonia schimperiana* (228), *Pavonia*  
spp. (224) 82. Malvaceae
- thogo (Orom.) - *Pavonia schimperiana* (228) 82.  
Malvaceae
- tima (Wel.) - *Grewia mollis* (146) 79. Tiliaceae
- tirii (Orom.) - *Acalypha fruticosa* (301) 85.  
Euphorbiaceae
- tisha (Sha.) - *Hibiscus* spp. (191) 82. Malvaceae
- to hit (Tob.) - *Euphorbia abyssinica* (334) 85.  
Euphorbiaceae
- tohdaddlem (Som.) - *Corchorus cinerascens* (155)  
79. Tiliaceae
- tofoile (Som.) - *Ricinus communis* (293) 85.  
Euphorbiaceae
- togo (Kef.) - *Hibiscus* spp. (191), *Pavonia* spp. (224)  
82. Malvaceae
- togoy (Mes.) - *Hibiscus calyphyllus* (192) 82.  
Malvaceae
- torhsu (Sha.) - *Sida acuta* (252) 82. Malvaceae
- torshu (Sha.) - *Sida collina* (252) 82. Malvaceae
- tuart (Eng.) - *Eucalyptus gomphocephala* (93) 72.  
Myrtaceae
- tuka labniss (Som.) - *Hibiscus* spp. (191) 82.  
Malvaceae
- tukelalmis (Som.) - *Grewia tenax* (152) 79. Tiliaceae,  
*Kedrostis foetidissima* (23) 65. Cucurbitaceae
- ture (Som.) - *Grewia tembensis* (150) 79. Tiliaceae
- tut (Ade., Afar & Had.) - *Gossypium barbadense*  
(222) 82. Malvaceae

uanle (Som.) - *Euphorbia* Sect. *Somalica* (361) 85.

Euphorbiaceae

ubah (Som.) - *Grewia tenax* (152) 79. Tiliaceae

uerongo (Mao.) - *Macaranga capensis* (295) 85.

Euphorbiaceae

uffo (Kef.) - *Grewia mollis* (146) 79. Tiliaceae

uleefoonii (Orom.) - *Clutia abyssinica* (286), *Croton dichogamus* (324) 85. Euphorbiaceae

uleeru (Anu.) - *Ricinus communis* (293) 85.

Euphorbiaceae

ulush (Sha.) - *Croton macrostachyus* (326) 85.

Euphorbiaceae

ulweato (Anu.) - *Combretum collinum* (116) 75.

Combretaceae

unun (Som.) - *Citrullus lanatus* (48) 65.

Cucurbitaceae

unun hamad (Som.) - *Cucumis prophetarum* (36) 65.

Cucurbitaceae

urayu (Orom.) - *Macaranga capensis* (295) 85.

Euphorbiaceae

uriemo (Anu.) - *Sterculia africana* (184) 80.

Sterculiaceae

uschusche (Wel.) - *Coccinia abyssinica* (54) 65.

Cucurbitaceae

velvet leaved combretum (Eng.) - *Combretum molle* (118) 75. Combretaceae

waatoo (Orom.) - *Cassipourea malosana* (134) 76.

Rhizophoraceae

wagisaa (Orom.) - *Sapium ellipticum* (328) 85.

Euphorbiaceae

wago (Kef.) - *Croton macrostachyus* (326) 85.

Euphorbiaceae

wakissaa (Orom.) - *Sapium ellipticum* (328) 85.

Euphorbiaceae

wana ad (Som.) - *Abutilon fruticosum* (244) 82.

Malvaceae

wandoo (Eng.) - *Eucalyptus wandoo* (95) 72.

Myrtaceae

waro (Anu.) - *Ceiba pentandra* (186) 81.

Bombacaceae

water berry (Eng.) - *Syzygium guineense* (77) 72.

Myrtaceae

water melon (Eng.) - *Citrullus lanatus* (48) 65.

Cucurbitaceae

wea (Mes.) - *Triumfetta rhomboidea* (162) 79.

Tiliaceae

weju barzaafa (Kern.) - *Eucalyptus globulus* (100)

72. Myrtaceae

welakoo (Sid.) - *Bridelia micrantha* (269) 85.

Euphorbiaceae

welkafa (Sid.) - *Dombeya torrida* (168) 80.

Sterculiaceae

white eucalyptus (Eng.) - *Eucalyptus globulus* (100)

72. Myrtaceae

willow leaved gum (Eng.) - *Eucalyptus saligna* (91)

72. Myrtaceae

wob (Som.) - *Terminalia brownii* (127) 75.

Combretaceae

wobataa (Wel.) - *Myrtus communis* (71) 72.

Myrtaceae

wol (Som.) - *Terminalia brownii* (127) 75.

Combretaceae

wongo (Orom.) - *Macaranga capensis* (295) 85.

Euphorbiaceae

woob (Som.) - *Terminalia brownii* (127) 75.

Combretaceae

woraricho (Orom.) - *Syzygium guineense* (77) 72.

Myrtaceae

worarico (Sid.) - *Syzygium guineense* (77) 72.

Myrtaceae

worariko (Had. & Orom.) - *Syzygium guineense* (77) 72.

72. Myrtaceae

worchakisaa (Orom.) - *Ochna bracteosa* (67), *Ochna holstii* (66) 69. Ochnaceae

worengo (Orom.) - *Macaranga capensis* (295) 85.

Euphorbiaceae

worenjo (Orom.) - *Macaranga capensis* (295) 85.

Euphorbiaceae

worongo (Orom.) - *Macaranga capensis* (295) 85.

Euphorbiaceae

woshu (Sha.) - *Croton macrostachyus* (326) 85.

Euphorbiaceae

woube (Som.) - *Terminalia brownii* (127) 75.

Combretaceae

wuas (Som.) - *Hibiscus bricchettii* (200) 82.

Malvaceae

wushea (Sha.) - *Croton macrostachyus* (326) 85.

Euphorbiaceae

wuub (Som.) - *Terminalia brownii* (127) 75.

Combretaceae

xaaxesaa (Orom.) - *Grewia ferruginea* (150) 79.

Tiliaceae

xichoo (Orom.) - *Garcinia b Buchananii* (142) 77.

Guttiferae

xiliyyoo (Orom.) - *Cassipourea malosana* (134), *Cassipourea* spp. (134) 76. Rhizophoraceae

xilloo (Orom.) - *Cassipourea malosana* (134) 76.

Rhizophoraceae

xxirroo (Orom.) - *Cassipourea malosana* (134), *Cassipourea* spp. (134) 76. Rhizophoraceae



yag (Som.) - *Adansonia digitata* (186) 81.

Bombacaceae

yate (Eng.) - *Eucalyptus cornuta* (93) 72. Myrtaceae

yeenoo (Orom.) - *Syzygium guineense* (77) 72.

Myrtaceae

yeferenj buye (Gam.) - *Manihot esculenta* (315) 85.

Euphorbiaceae

yellow box (Eng.) - *Eucalyptus melliodora* (105) 72.

Myrtaceae

yellow gum (Eng.) - *Eucalyptus leucoxylon* (105) 72.

Myrtaceae

yino (Had.) - *Syzygium guineense* (77), *Psidium* spp.  
(72) 72. Myrtaceae

youb (Som.) - *Terminalia brownii* (127) 75.

Combretaceae

yoube (Som.) - *Terminalia brownii* (127) 75.

Combretaceae

yuma (Kem.) - *Malva verticillata* (237) 82.

Malvaceae

zafiya (Wel.) - *Eucalyptus camaldulensis* (98) 72.

Myrtaceae

zeitun (Som.) - *Psidium guajava* (72) 72. Myrtaceae

zemat (Me.) - *Hibiscus micranthus* (210) 82.

Malvaceae

zerema (Sha.) - *Combretum aculeatum* (120) 75.

Combretaceae

zermi (Sha.) - *Combretum aculeatum* (120) 75.

Combretaceae

zeyiton (Ade.) - *Psidium guajava* (72) 72. Myrtaceae

zeyitum (Afar) - *Psidium guajava* (72) 72. Myrtaceae

zeyitunnaa (Orom.) - *Psidium guajava* (72) 72.

Myrtaceae

zo o zafiya (Wel.) - *Eucalyptus camaldulensis* (98)  
72. Myrtaceae

zurguma (Sha.) - *Combretum hereroense* (118) 75.

Combretaceae

zuziraa (Wel.) - *Bridelia scleroneura* (267) 85.

Euphorbiaceae