

MEDICINAL PLANTS

(Indigenous and Exotic) Used in Ceylon

PART I

ACANTHACEAE – BURSERACEAE

With 101 illustrations including three colour plates

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WITH TAXONOMIC UPDATING

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AUTHOR'S PREFACE

The object in compiling this work was to acquaint the Ayurvedic physicians of this country and others interested, with a basis for the identification of the plants used medicinally. It is very important that patients taking Ayurvedic treatment must use the correct drug prescribed for treatment to be effective. Since some of these plants are very rare or not available in Ceylon, substitutes have been used knowingly or through ignorance. These substitutes may be local plants given the same name by mistake or exotics introduced through the Botanical Gardens. They may be harmless or ineffective for the ailments for which they are used.

This work describes 625 species used in Ayurvedic practice in Ceylon and will be published in five parts for convenience. The first part contains 105 species belonging to 22 families. Almost all species are illustrated to bring out characters used in identification. Most of the drawings were made from freshly gathered material, from herbarium sheets, or redrawn from paintings deposited in the Herbarium, Peradeniya.

An index to plants according to therapeutic properties and specific diseases has been included to facilitate the selection of the plants. Also included are indexes to Sinhalese, Tamil and scientific names.

I wish to thank the Commissioner for Ayurveda and numerous Ayurvedic physicians who were consulted on the uses of these plants in cases where such uses are not mentioned in available literature.

I also wish to thank Prof. B. A. Abeywickrama, Professor of Botany, University of Sri Lanka, for assistance and encouragement given at all times in the course of preparation of this work and Mrs. Nimala Amarasuriya of the National Science Council, for her valuable suggestions and contributions editorially.

INTRODUCTION

There is no record that primitive man used medicine for his ailments but he must have experimented on the uses of the plants in his environment both as a source of food and as cures for his illnesses. By a process of trial and error, he would have gathered a certain amount of information which he handed down to his progeny. In the course of many centuries the knowledge accumulated thus may have been considerable.

It is possible that this knowledge may have evolved in different centres of the origin of early man and a great deal of this knowledge may have been lost due to ignorance of the art of writing.

It is believed in India that Brahma, the creator himself, had written down the uses of medicinal plants and their prescriptions in 100,000 stanzas which have been later reduced to 10,000 to suit the poverty of the human intellect. Whatever it is, the Ayurvedic system was founded by the Rishis in India about 3,000 years before Hinduism came into existence as a religion. The Rishis appear to have made extensive investigations into the properties and uses of plants. Their knowledge of the therapeutical properties of plants appear to be almost intuitive and this led to the belief that these findings were divinely inspired. This belief was fatal to the advancement of the Ayurvedic science. Any deviation from what was laid down by the masters was regarded as interfering with the curative properties. Hence the treatment for a particular disease depended on the ability of the Ayurvedic physician to select the prescriptions from among many given in old books.

The ancient medical works such as Charaka and Susrutha appear to have been compiled in the Pre-Buddhist era. With the spread of Buddhism as a religion this knowledge, too, spread to countries which adopted it. The Greek invasion of India established contact between the two countries and some of the drugs used in Central Asia and Asia Minor found their way to India and *vice versa*. The Mohammedan influence is noted by the introduction of opium into the Ayurvedic system of medicine.

The Ayurvedic system as practised in Ceylon is the same as that in India and was introduced to the island along with the Vijayan invasion in the fifth century before Christ. Almost all plants used for medicinal purposes in Ceylon are those found growing in different parts of India as well. Others which are not found in Ceylon and which are used in Ayurvedic practice are imported from abroad.

The earliest book on medicine compiled in Ceylon, written in Sanskrit, was "Sarthartha Sangrahaya" by King Buddhadasa, a great physician and surgeon, who ruled at Anuradhapura between 330 A. D. and 400 A. D. King Parakrama Bahu the Great who had his capital at Polonnaruwa was also a noted physician. Both kings built several hospitals in different parts of the island. Other medical works compiled later were "Manjuse" written in Pali and "Yogaratnakara" in Sinhalese.

INTRODUCTION

As a first step to medical education and training, every student had to commit to memory the contents of two Sanskrit Nigandus, namely, Saraswathi and Mahausada, which mention all the important drugs with their numerous synonyms.

Modern chemical analysis does not reveal the true nature of most drugs as some of them may have escaped detection while others have been destroyed in the process of extraction. Furthermore, the Ayurvedic prescriptions contain a number of drugs and they would interact with each other chemically when subjected to heat and the final product which acts on the disease may be different from the original constituents.

During the nineteenth century, many works on medicinal plants were compiled in India. These have been brought up to date by Nadkarni in his "Materia Medica" (1927) and K. R. Kirtikar and B. D. Basu in Indian Medicinal Plants (1933). Those published in Ceylon are by no means complete. Of these the Sinhalese "Materia Medica" by J. Attygalle and "Vegetable Materia Medica" by E. Roberts are noteworthy.

The present work is to bring together all plants used in Ayurvedic practice in this country, their exact identities, descriptions illustrated by drawings and the localities in which they are found. Botanical names are used for the plants described. Vernacular names are also given to each plant including the Sanskrit names. Much reliance could not be placed on the vernacular names as a means of identification. The same plant is known by different names in different parts of the country or different plants are known by the same name. Owing to ignorance of the exact identities of the plants used in Ayurvedic practice, many exotics are being used mistakenly or as substitutes in the absence of the original plants recommended. The aim of this work is to rectify such errors which have crept into the present system and to help practitioners to identify the plants they use.

The species are described under different families which are arranged in alphabetical order. The genera in each family also follow the alphabetical sequence so that the reader who is not conversant with the botanical arrangement of families and genera may be able to trace the species without much difficulty. No descriptions of the families and genera are given as they are readily available in any standard book on plant taxonomy.

REPRINT OF MEDICINAL PLANTS (INDIGENOUS AND EXOTIC) USED IN
CEYLON – PARTS I-V BY D.M.A.JAYAWEERA (1981-1982)

NOTES ON PLANT NAMES TO USERS OF THIS REPRINT

Many of the names of plant taxa given in D.M.A.Jayaweera's "Medicinal Plants (Indigenous and Exotic) Used in Ceylon" Parts I-V (1981-1982), have been changed for taxonomic and/or nomenclatural reasons and for the correction of misidentifications of certain plants by the authors of early floras. Further the author citations and the abbreviations used to indicate the names of authors also have to be given in a specific form. Some of the names of plant families have been changed and a few genera have been transferred from one family to another.

In these corrections lists the plant name as it is indicated in Jayaweera's publication is given against the name now considered to be the correct one. This does not necessarily mean that the name in Jayaweera's work is a synonym of the second name.

These corrections have been based primarily on "A Revised Handbook to the Flora of Ceylon" Volumes I-XIV (1980-2000) Edited by Dassanayaka, M.D., Fosberg, F.R. and Clayton, W.D. and on "A Check List of the Flowering Plants of Sri Lanka" by Senaratna, L.K. (2001). Reference has been made to several other publications to establish the correct names, especially for the exotic plants. A list of the more important of these works is given at the end of each corrections list.

In the reference given against each name considered to be the correction, "R" refers to the "A Revised Handbook to the Flora of Ceylon". For other references, the number indicates the numeral against the name of the publication in the References, and this is followed by the number of the volume, if any, and the page on which the name of the plant is given.

Lilani Kumudini Senaratna
The Open University of Sri Lanka
15th August 2005

CORRECTIONS LIST - PART I

PAGE	CORRECTIONS	Ref.
03	For <i>Acanthus ilicifolius</i> Linn. read: <i>Acanthus ilicifolius</i> L.	R12:139
05	For <i>Adhatoda vasica</i> Nees read: <i>Justicia adhatoda</i> L.	R12:111
07	For <i>Andrographis paniculata</i> (Burm. f.) Nees read: <i>Andrographis paniculata</i> (Burm.f.) Wall. ex Nees	R12:97
09	For <i>Asteracantha longifolia</i> (Linn.) Nees read: <i>Hygrophila schulli</i> (Buch. -Ham.) M.R. & S.N.Almeida	R12:14
11	For <i>Barleria prionitis</i> Linn. read: <i>Barleria prionitis</i> L.	R12:87
13	For <i>Blepharis repens</i> (Vahl) Roth read: <i>Blepharis integrifolia</i> (L.f.) E.Meyer ex Krauss	R12:137

15	For <i>Justicia betonica</i> Linn. read: <i>Justicia betonica</i> L.	R12:110
19	For <i>Justicia procumbens</i> Linn. read: <i>Justicia procumbens</i> L.	R12:119
21	For <i>Rhinacanthus nasuta</i> (Linn.) Kurz read: <i>Rhinacanthus nasutus</i> (L.) Kurz	R12:107
23	For <i>Rungia repens</i> (Linn.) Nees read: <i>Rungia repens</i> (L.) Nees	R12:105
25	AIZOACEAE - This family has been divided into two families. The genera <i>Gisekia</i> , <i>Glinus</i> and <i>Mollugo</i> are now placed in the family MOLLUGINACEAE; <i>Trianthema</i> remains in the family Aizoaceae. For <i>Gisekia pharnacioides</i> Linn. read: <i>Gisekia pharnaceoides</i> L. (Now in Molluginaceae)	R9:320 R11:03 R9:321
27	For <i>Glinus oppositifolius</i> (Linn.) A.DC. read: <i>Glinus oppositifolia</i> (L.) A.DC. (Now in Molluginaceae)	10:224
29	For <i>Mollugo cerviana</i> Seringe read: <i>Mollugo cerviana</i> (L.) Seringe (Now in Molluginaceae)	R9:327
31	For <i>Mollugo pentaphylla</i> Linn. read: <i>Mollugo pentaphylla</i> L. (Now in Molluginaceae)	R9:329
33	For <i>Trianthema decandra</i> Linn. read: <i>Trianthema decandra</i> L.	R11:03
35	For <i>Trianthema portulacastrum</i> Linn. read: <i>Trianthema portulacastrum</i> L.	R11:05
37	For <i>Alangium salviifolium</i> (Linn.f.) Wangerin read: <i>Alangium salviifolium</i> (L.f.) Wangerin	R13:01
39	For <i>Achyranthes aspera</i> Linn. read: <i>Achyranthes aspera</i> L.	R1:38
41	For <i>Aerva lanata</i> (Linn.) Juss. read: <i>Aerva lanata</i> (L.) Juss. ex Schult.	R1:32
43	For <i>Alternanthera sessilis</i> (Linn.) R.Br. read: <i>Alternanthera sessilis</i> (L.) DC.	R1:49
45	For <i>Amaranthus paniculatus</i> Linn. read: <i>Amaranthus hybridus</i> L. subsp. <i>hybridus</i> var. <i>erythrostachys</i> Moq.	R1:12 R1:13
47	For <i>Amaranthus polygonoides</i> Linn. read: <i>Amaranthus lividus</i> L. subsp. <i>polygonoides</i> (Moq.) Probst	R1:17 R1:18
49	For <i>Amaranthus spinosus</i> Linn. read: <i>Amaranthus spinosus</i> L.	R1:09
51	For <i>Amaranthus tricolor</i> Linn. read: <i>Amaranthus tricolor</i> L.	R1:15
53	For <i>Amaranthus viridis</i> Linn. read: <i>Amaranthus viridis</i> L.	R1:19
55	AMARYLLIDACEAE - The genus <i>Allium</i> has now been separated from this family and it is placed in the family ALLIACEAE. For <i>Allium ascalonicum</i> Linn. read: <i>Allium cepa</i> L. cv.group <i>Aggregatum</i> (Now in Alliaceae)	R14:09 R14:11

57	For <i>Allium sativum</i> Linn. read: <i>Allium sativum</i> L. (Now in Alliaceae)	R14:11
59	For <i>Crinum asiaticum</i> Linn. read: <i>Crinum asiaticum</i> L.	R14:16
61	For <i>Crinum bulbispermum</i> (Burm.) Milne-Redhead and Schweicherdt read: <i>Crinum latifolium</i> L.	R14:19
63	For <i>Pancratium zeylanicum</i> Linn. read: <i>Pancratium zeylanicum</i> L.	R14:21
65	For <i>Anacardium occidentale</i> Linn. read: <i>Anacardium occidentale</i> L.	R4:08
69	For <i>Lanea coromandelica</i> (Houtt.) Merrill read: <i>Lanea coromandelica</i> (Houtt.) Merr.	R4:21
71	For <i>Mangifera indica</i> Linn. read: <i>Mangifera indica</i> L.	R4:06
75	For <i>Rhus succedanea</i> Linn. read: <i>Rhus succedanea</i> L.	4:87
77	For <i>Semecarpus anacardium</i> Linn.f. read: <i>Semecarpus anacardium</i> L.f.	3:225
79	For <i>Semecarpus coriacea</i> Thwaites read: <i>Semecarpus coriacea</i> Thw.	R4:13
81	For <i>Semecarpus gardneri</i> Thwaites read: <i>Semecarpus gardneri</i> Thw.	R4:14
85	For <i>Semecarpus obscura</i> Thwaites read: <i>Semecarpus nigro-viridis</i> Thw.	R4:16
87	For <i>Semecarpus subpeltata</i> Thwaites read: <i>Semecarpus subpeltata</i> Thw.	R4:11
89	For <i>Spondias pinnata</i> Kurz read: <i>Spondias pinnata</i> (L.f.) Kurz	R4:23
91	For <i>Annona squamosa</i> Linn. read: <i>Annona squamosa</i> L.	R5:74
93	For <i>Alstonia scholaris</i> (Linn.) R.Br. read: <i>Alstonia scholaris</i> (L.) R.Br.	R4:42
95	For <i>Carissa carandas</i> Linn. read: <i>Carissa carandas</i> L.	R4:37
97	For <i>Catharanthus roseus</i> (Linn.) G.Don read: <i>Catharanthus roseus</i> (L.) G.Don	R4:44
99	For <i>Ervatamia divaricata</i> (Linn.) Burkill read: <i>Tabernaemontana divaricata</i> (L.) R.Br. ex Roem. & Schult.	10:29
101	For <i>Holarrhena antidyenterica</i> (Roxb.) Wall. read: <i>Holarrhena pubescens</i> (Buch.-Ham.) G.Don f.	9:343
103	For <i>Holarrhena mitis</i> (Vahl) R.Br. read: <i>Holarrhena mitis</i> (Vahl) Roem. & Schult.	R4:46
105	For <i>Ichnocarpus frutescens</i> (Linn.) Ait.f. read: <i>Ichnocarpus frutescens</i> (L.) R.Br.	R4:71
107	For <i>Nerium oleander</i> Linn. read: <i>Nerium oleander</i> L.	R4:28
109	For <i>Plumeria acuminata</i> Ait.f. read: <i>Plumeria rubra</i> L.	R4:29
111	For <i>Rauvolfia serpentina</i> (Linn.) Benth.ex Kurz read: <i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	R4:49

113	For <i>Rejoua dichotoma</i> (Roxb.) Gamble read: <i>Pagiantha dichotoma</i> (Roxb.) Markgraf	R4:39
115	For <i>Wrightia antidysenterica</i> (Linn.) R.Br. read: <i>Walidda antidysenterica</i> (L.) M.Pichon	R4:61
117	For <i>Wrightia tomentosa</i> Roem. & Schultes read: <i>Wrightia arborea</i> (Dennst.) Mabb.	10:30
121	ARACEAE – The genus <i>Acorus</i> has been separated from this family and is now placed in the family – ACORACEAE. All the other genera remain in the family Araceae. For <i>Acorus calamus</i> Linn. read: <i>Acorus calamus</i> L. (Now in Acoraceae)	10:10 R6:28
123	For <i>Alocasia indica</i> (Roxb.) Schott read: <i>Xanthosoma sagittifolium</i> (L.) Schott	R6:52
125	For <i>Alocasia macrorrhiza</i> (Linn.) Schott read: <i>Alocasia macrorrhizos</i> (L.) G. Don	R6:58
127	For <i>Amorphophallus campanulatus</i> (Roxb.) Blume ex Decne. read: <i>Amorphophallus paeoniifolius</i> (Dennst.) Nicolson	R6:37
129	For <i>Arisaema leschenaultii</i> Bl. read: <i>Arisaema leschenaultii</i> Blume	R6:71
131	For <i>Colocasia esculenta</i> (Linn.) Schott read: <i>Colocasia esculenta</i> (L.) Schott	R6:54
133	For <i>Cryptocoryne spiralis</i> (Retz.) Fischer ex Wydler read: <i>Cryptocoryne walkeri</i> Schott	R6:87
135	For <i>Lasia spinosa</i> (Linn.) Thwaites read: <i>Lasia spinosa</i> (L.) Thw.	R6:35
137	For <i>Pistia stratiotes</i> Linn. read: <i>Pistia stratiotes</i> L.	R6:100
139	For <i>Pothos scandens</i> Linn. read: <i>Pothos scandens</i> L.	R6:25
141	For <i>Rhaphidophora laciniata</i> (Burm.f.) Merr. read: <i>Rhaphidophora pertusa</i> (Roxb.) Schott	R6:31
145	For <i>Typhonium trilobatum</i> (Linn.) Schott read: <i>Typhonium trilobatum</i> (L.) Schott	R6:67
149	For <i>Aristolochia indica</i> Linn. read: <i>Aristolochia indica</i> L.	R13:16
151	ASCLEPIADACEAE – The genera <i>Cryptolepis</i> and <i>Hemidesmus</i> have been separated from this family and transferred to the family PERIPILOCACEAE. All the other genera remain in the family Asclepiadaceae. For <i>Asclepias curassavica</i> Linn. read: <i>Asclepias curassavica</i> L.	R4:182 R4:74
153	For <i>Calotropis gigantea</i> (Linn.) Ait.f. read: <i>Calotropis gigantea</i> (L.) R.Br.	R4:78
157	For <i>Cryptolepis buchananii</i> Roem. and Schult. read: <i>Cryptolepis buchananii</i> Roem. & Schult. (Now in Periplocaceae)	R4:183
159	For <i>Dregia volubilis</i> (Linn.f.) Hook.f. read: <i>Wattakaka volubilis</i> (L.f.) Stapf	R4:108
163	For <i>Hemidesmus indicus</i> (L.) R.Br. read: <i>Hemidesmus indicus</i> (L.) R.Br. (Now in Periplocaceae)	R4:185
165	For <i>Hoya ovalifolia</i> Wight & Arn. in Wight read: <i>Hoya ovalifolia</i> Wight & Arn. ex Wight	R4:110
169	For <i>Pergularia daemia</i> (Forsk.) Chiov. read: <i>Pergularia daemia</i> (Forssk.) Chiov.	10:45

171	For <i>Sarcostemma brunonianum</i> W. & A. read: <i>Sarcostemma brunonianum</i> Wight & Arn. ex Wight	R4:82
173	For <i>Tylophora indica</i> (Burm.f.) Merr. read: <i>Tylophora indica</i> (Burm.f.) Merr. var. <i>indica</i>	R4:91 R4:92
175	For <i>Tylophora flava</i> Trimen read: <i>Tylophora indica</i> (Burm.f.) Merr. var. <i>glabra</i> (Decne.) Huber	R4:91 R4:93
179	BAMBUSACEAE - This family is included with all other grasses in the family POACEAE. For <i>Bambusa arundinacea</i> (Retz.) Willd. read: <i>Bambusa bambos</i> (L.) Voss ex Vilmorin	R8:74
181	For <i>Basella alba</i> Linn. read: <i>Basella alba</i> L.	R7:01
183	For <i>Berberis aristata</i> DC. read: <i>Berberis tinctoria</i> Leschen.	R14:100
187	For <i>Oroxylum indicum</i> (Linn.) Vent. read: <i>Oroxylum indicum</i> (L.) Vent.	R2:389
189	For <i>Stereospermum suaveolens</i> (Roxb.) DC. read: <i>Stereospermum suaveolens</i> DC.	R2:388
191	For <i>Adansonia digitata</i> Linn. read: <i>Adansonia digitata</i> L.	R1:67
193	For <i>Ceiba pentandra</i> (Linn.) Gaertner read: <i>Ceiba pentandra</i> (L.) Gaertn. var. <i>pentandra</i>	R1:70
195	For <i>Salmaalina malabarica</i> (DC.) Schott & Endl. read: <i>Bombax ceiba</i> L.	R1:64
197	For <i>Carmona microphylla</i> (Lamk.) G.Don read: <i>Carmona retusa</i> (Vahl) Masamune	R7:05
201	For <i>Heliotropium indicum</i> Linn. read: <i>Heliotropium indicum</i> L.	R7:30
203	For <i>Ananas comosus</i> Merril read:A <i>nanas comosus</i> (L.) Merr.	R14:105
207	For <i>Canarium zeylanicum</i> Blume read: <i>Canarium zeylanicum</i> (Retz.) Blume	R13:24
209	For <i>Commiphora mukul</i> Engl. read: <i>Commiphora mukul</i> (Stocks) Engl.	9:174

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PART-I

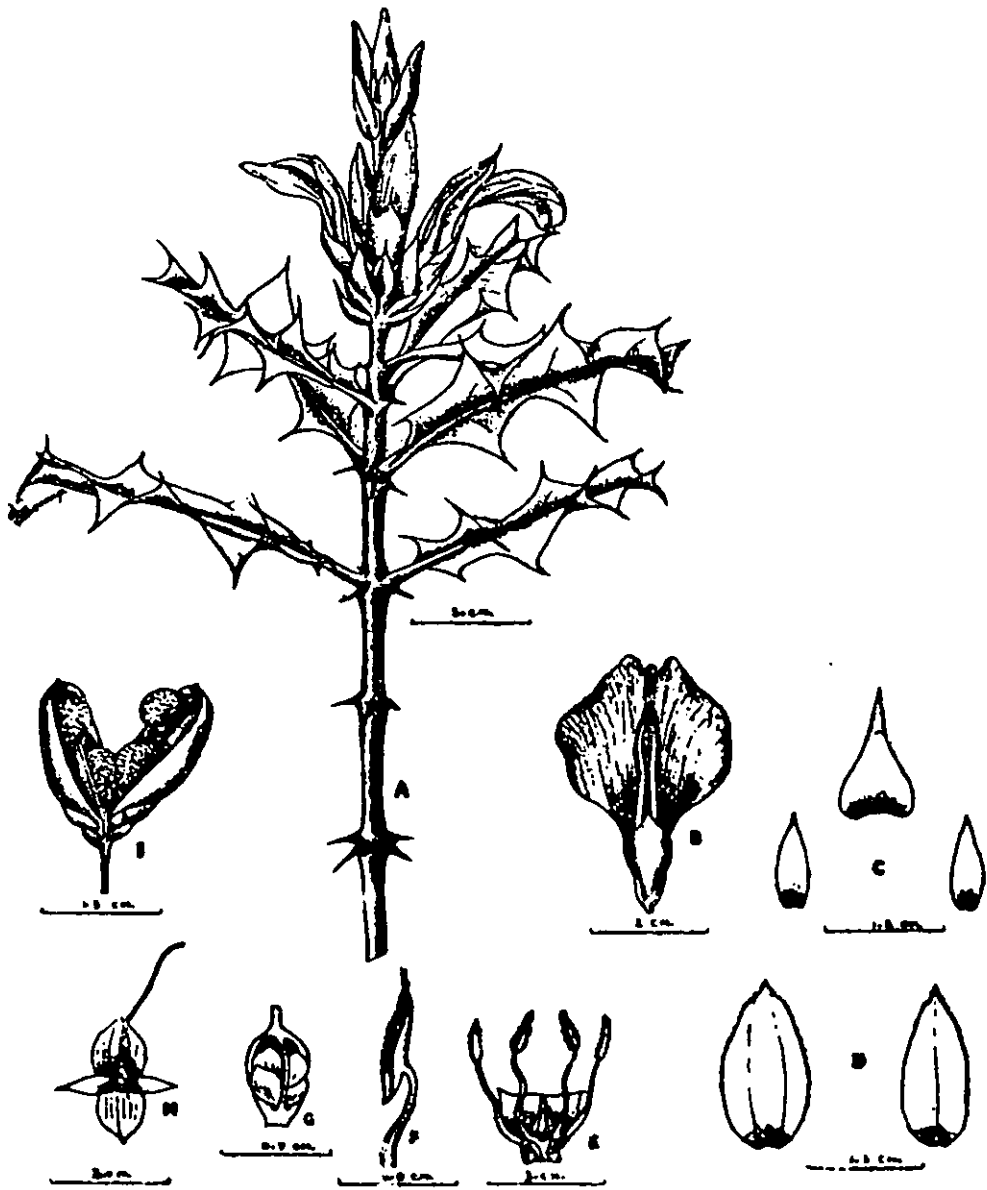


FIG. 1. *Acanthus ilicifolius*. A, branch with a terminal spike. B, front view of flower. C, bract and inner pair of sepals. D, outer pair of sepals. E, flower with sepals and petals removed showing the stamens and the ovary. F, anther with a part of the filament. G, longitudinal view of the ovary. H, flower with petals removed showing the sepals and the pistil. I, fruit capsule with seeds.

1. ACANTHACEAE

1. *Acanthus ilicifolius* Linn. Sp. Pl. 639. 1753. (Fig. 1).

Acanthus doloariu Blanco.—*Dilivaria ilicifolia* Nees.

Engl. Sea Holly ; *Sinh.* Ikili, Katu-ikili ; *Tam.* Attumulli, Kaludaimulli, Kolimulli, Uppukkarinimulli ; *Hindi* Harkuchkanta ; *Sans.* Harikusa.

A large perennial herb, 0.6—2 m tall, with several, erect, more or less unbranched, stout, cylindrical, glabrous stems ; leaves simple, opposite, without stipules but with 1—3 pairs of sharp spines at the base, 6—9(—15) cm long, 2—4.5 cm broad, oblong-oval, acute at apex terminating in a sharp spine, margin deeply wavy with 6—8 large spines on each side, terminating the lateral veins, glabrous and shining, coriaceous and rigid, petiole 5—7 mm long and stout ; flowers large, bisexual, zygomorphic, sessile in opposite pairs, in terminal spikes ; bract ovate, 1.5 cm long, 0.8 cm broad, acuminate, acute, terminating in a bristle ; bractlets opposite, 1.2 cm long, 0.4 cm broad, ovate, acute ; sepals 4, free in two pairs, glabrous outside, adpressed pubescent within, outer pair larger, 1.8 cm long, 1.2—1.5 cm broad, oval or oblong-oval, subacute, hairy along margin, inner pair slightly smaller, 1.8 cm long, 1 cm broad, oblong-ovate, acute, pinkish and hairy at the apex ; corolla fused into a short tube, 0.8 cm long and the limb flapped over to form an obovate-oval, bright purplish blue, slightly 3-lobed, recurved lower lip 4 cm long, 3 cm broad, middle lobe the smallest, pubescent within, upper lip absent ; stamens 4, very large, epipetalous ; filaments stout, 1.8 cm long ; anthers 1—1.2 cm long, basi-fixed, very densely bearded ; disc absent ; ovary superior, 4—5 mm long, glabrous, 2-locular with two ovules in each loculus ; style 3.5 cm long ; stigma slightly bifid ; fruit capsule, ovoid, loculicidal, 2.5 cm long, blunt, apiculate, shining, bright brown.

Flowers in March and April and also from September to November.

ILLUSTRATIONS. Rheede, Hort. Mal. 2 : pl. 48 ; Wight, Ic. Pl. Ind. Orient. pl. 459, 1840—1843 ; Kirtikar and Basu, Indian Med. Pl. pl. 719A, 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Grows along the sea coast on the margin of swamps in India, Ceylon, Burma, Malaya, Philippine Islands, Australia and tropical West Africa. In Ceylon, it is a common undershrub in mangrove swamps and ditches, along the sea coast.

India. Bengal, Wallich ex Herb. Calc. Ceylon. Thwaites C.P. 2017 ; Central Prov. Peradeniya, Bot. Gard., cultivated, Jayaweera 2646, Jan. 1966 ; Jayaweera 2881, Nov. 1966.

COMPOSITION. The leaves contain a bitter alkaloid, an organic acid, resin and fatty matter.

USES. The whole plant is used as a nervine tonic, expectorant and stimulant. The root is used for coughs and asthma. The tender shoot and leaves are used in India as a snake-bite cure. In Goa, the leaves are employed as an emollient fomentation for rheumatism and neuralgia. The Siamese and Indo-Chinese consider the roots to be useful in paralysis and asthma. In the Philippines, the leaves and roots are used in the form of a decoction as an anti-asthmatic.

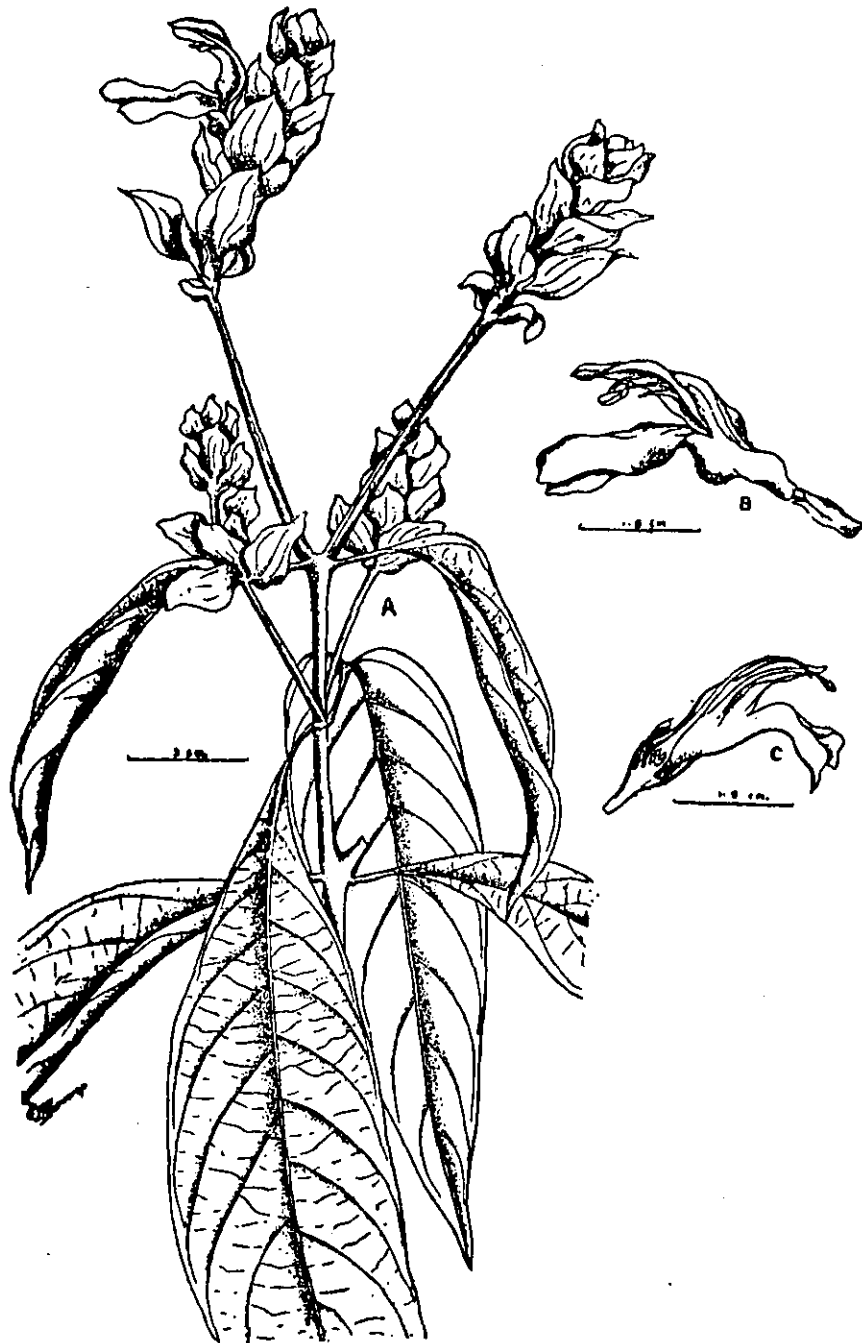


FIG. 2. *Adhatoda vasica*. A. branch with leaves and flowering spikes. B. lateral view of flower. C. longitudinal section of flower showing the pistil and a fertile stamen.

2. *Adhatoda vasica* Nees in Wall. Pl. As. Rar. 3 : 103. 1832. (Fig. 2).*Justicia adhatoda* Linn.

Sinh. Agaladara, Adatoda, Wanepala, Wetahera ; *Tam.* Adadodi, Kattumurungai, Pavettai, Vachai ; *Hindi* Adalsa, Adarsa, Adulasa, Adulaso, Arusa, Arusha, Bansa, Bashing, Rusa, Vasaka ; *Sans.* Amalaka, Atarusha, Bashika, Bhashangmata, Kanthiravi, Kasanotpatana, Matrisinhi, Mrigendrani, Nasa, Panchamukhi, Raktappittaghni, Ramrupaka, Rasadani, Sinhamukhi, Sinhanana, Sinhaparni, Sinhapatni, Sinhasya, Sinhi, Sinhika, Sitakarni, Vaidyamata, Vaidyasinhhi, Vaji, Vajidantaka, Vajidanti, Vasa, Vasaka, Vasha, Vasika, Vrisha.

A shrub 1—2 m tall with many, opposite, ascending branches ; stem cylindrical, glabrous, young parts finely puberulous ; leaves simple, large, opposite, decussate, 9—25 cm long, 2.5—8.5 cm broad, lanceolate, tapering at both ends, acuminate, subacute, very faintly crenate, glabrous, dark green above and paler beneath, lateral veins 4—13 pairs, parallel and reticulate, puberulous below, petioles 0.7—3.5 cm long and hairy ; flowers irregular, bisexual, large, white, in dense bracteolate spikes on long, stout, axillary peduncles towards the ends of branches ; peduncles 3.5—5 cm long, grooved and puberulous ; bracts oval, 1.4—3.5 cm long, 0.9—1.8 cm broad, subacute, glabrous, erect and imbricated, bractlets 1.2—1.5 cm long, 0.3—0.5 cm broad, oblong-lanceolate, acute ; sepals 5, oblong-lanceolate, 0.7—0.9 cm acute, slightly connate at base, finely woolly pubescent on both surfaces ; petals 5, fused into a 2-lipped corolla, pubescent outside, corolla-tube 1.2 cm long, lower part cylindrical, inflated above and compressed dorsiventrally, upper lip 1.8 cm long, 1.2 cm broad, oblong-oval, curved, obtuse, notched, veins reddish-purple at the back, lower lip as long, 3-lobed deeply, the centre lobe the largest and with reddish-purple veins inside ; stamens 2, epipetalous ; filaments 2.2 cm long, arched, hairy at base, anthers green, 2-celled, cells more or less distant at different levels, lower ones pointed ; ovary superior, 3 mm long, hairy, 2-locular with 2 ovules in each loculus ; style and stigma 2.5 cm long, hairy towards the base and somewhat bifid at apex ; fruit capsule 1.8 cm long, clavate, pubescent ; seeds 4, glabrous, tubercular-verrucose.

Flowers in October and December.

ILLUSTRATIONS. Curtis, Bot. Mag. *pl.* 861 ; Rheede, Hort. Mal. 9 : *pl.* 43 ; Griffith, Ic. Pl. As. *pl.* 424 ; Kirtikar and Basu, Indian Med. Pl. *pl.* 722A ; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs throughout India, Ceylon and the Malay Peninsula. In Ceylon, it is usually found planted along hedges in the low-country, particularly in the dry regions and waste ground.

Ceylon *Thwaites* C.P. 1991 ; Muppene, *Alston* 2464, May 1928 ; Central Prov., Peradeniya, Bot. Gard., cultivated, *Jayaweera* 2871, Oct. 1966.

COMPOSITION. The leaves contain the alkaloids vasicine, vasicinone and betaine and an essential oil.

USES. The expressed juice of the leaves of this shrub is used for diarrhoea, dysentery, phthisis, cough, asthma and other bronchial diseases. According to Roberts, it is useful for pneumonia, typhoid and rheumatic fevers. The leaves dried and made into cigarettes are smoked for asthma. The root bark is used for haemoptysis, heart diseases, catarrh and eye diseases. The fresh flowers are used for ophthalmia. The plant is recommended as a snake-bite remedy. The fresh roots, bark and leaves are bruised and applied to wounds and given internally in the form of a decoction. Internally, it acts as a direct cholagogue increasing the flow of and liquefying the bile proving useful in acute and chronic congestion of the liver, jaundice and biliousness. In Mysore, the powdered root is used in cases of malarial fever, while in Burma the pounded leaves are used as a poultice on fresh wounds. In the Tenasserim district, the leaves are used externally on swellings, bleeding from the nose and headache ; internally for fever, colic, asthma and dysentery.

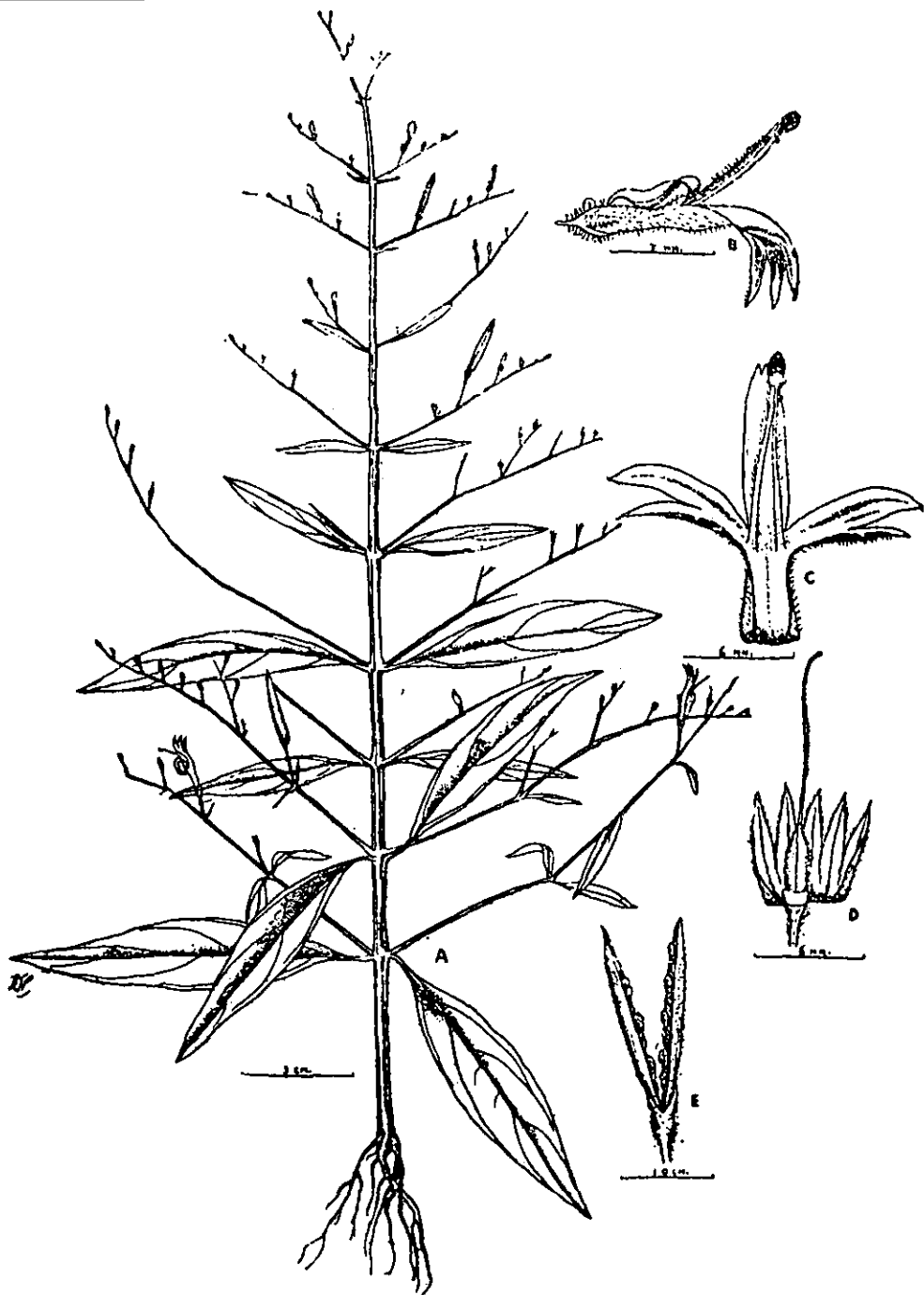


FIG. 3. *Andrographis paniculata*. A, plant showing roots, leaves, flowers and fruits. B, side view of flower. C, corolla spread out showing epipetalous stamens coherent at apex. D, flower with corolla removed showing sepals spread out and the pistil. E, dehiscent fruit showing the seeds.

3. *Andrographis paniculata*. (Burm. f.) Nees in Wall. Pl. As. Rar. 3 : 116. 1832. (Fig. 3).
Justicia paniculata Burm. f.

Engl. Creat ; *Sinh.* Hin-binkohomba ; *Tam.* Nilavembu ; *Hindi* Charayetah, Kiryat, Mahatita ; *Sans.* Bhunimba, Kirata.

An annual herb, 30—60 cm tall, erect, branches sharply quadrangular, glabrous ; leaves simple, opposite, entire, 3.7—10 cm long, 0.9—2.7 cm broad, lanceolate, tapering at both ends, slightly undulate, glabrous, dark green on the upper surface, paler beneath, lateral nerves 4—6 pairs, slender, prominent below ; petioles 2—8 mm long ; flowers irregular, bisexual, solitary, distant, 1.2 cm long, on slender, divaricate, glandular-pubescent, erect pedicels, 3.5 mm long, in very lax, spreading axillary and terminal racemes or panicles, the whole forming a large pyramidal paniculate inflorescence ; bracts and bractlets equal, 1—1.5 mm long, 0.4 mm broad, lanceolate, acute and hairy along the margin ; sepals 5, free, 2.5—3 mm long, 0.5 mm broad, linear, pubescent on both sides, glandularly hairy outside ; petals 5, fused into a conspicuously 2-lipped, white corolla, tube 6 mm long, glandular-pubescent, lips spreading and as long as the tube, upper lip 2-toothed at apex and curled back on the corolla tube, lower lip 3-toothed, spread out, lateral lobes marked with a long and short, parallel, reddish-purple lines, mid-lobe blotched purple with a slight constriction at the base ; stamens 2, epipetalous, exerted ; filaments 7 mm long, flattened, coherent at apex, hairy and streaked purple on the upper part ; anthers 1.5 mm long with a tuft of deflexed hairs at the base ; ovary superior, 1.5 mm long, glandular hairy, 2-locular, placentation axile, style 1.3 cm long, purplish, scantily hairy exerted beyond the anthers ; fruit capsule 1.8 cm long, linear-oblong, compressed and grooved on the two sides, acute at both ends, brownish ; seeds 6 in each loculus, ovoid, brownish, glabrous, rugose, slightly compressed, 2 mm long, 1.5 mm broad.

Flowers in March, April and September. The Ceylon plant agrees with Wight's drawing but differs from Bentley and Trimen's in that the flowers are white and the ovary pubescent.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient. 2 : pl. 518, 1840—1843 ; Rheede, Hort. Mal. pl. 56.

DISTRIBUTION. Occurs throughout India and Ceylon, often cultivated. In Ceylon, it is rather rare in the low-country ; Negombo, Colombo, Raigam Korale, etc.

Ceylon. *Thwaites* C.P. 3664 ; Central Prov., Peradeniya, Bot. Gard., *Jayaweera* 2749, Aug. 1965.

USES. The plant is useful for treating general debility, dysentery and certain forms of dyspepsia. The roots and leaves are febrifuge, stomachic, tonic, alterative and anthelmintic. In India, the expressed juice of the leaves with certain spices is dried in the sun, made into small pellets and prescribed for infants to relieve griping, irregular stools and loss of appetite. An infusion of the plant is given to fever patients in Chota Nagpore, while certain gypsy tribes in the Madras Presidency consider it to be an antidote to cobra venom.

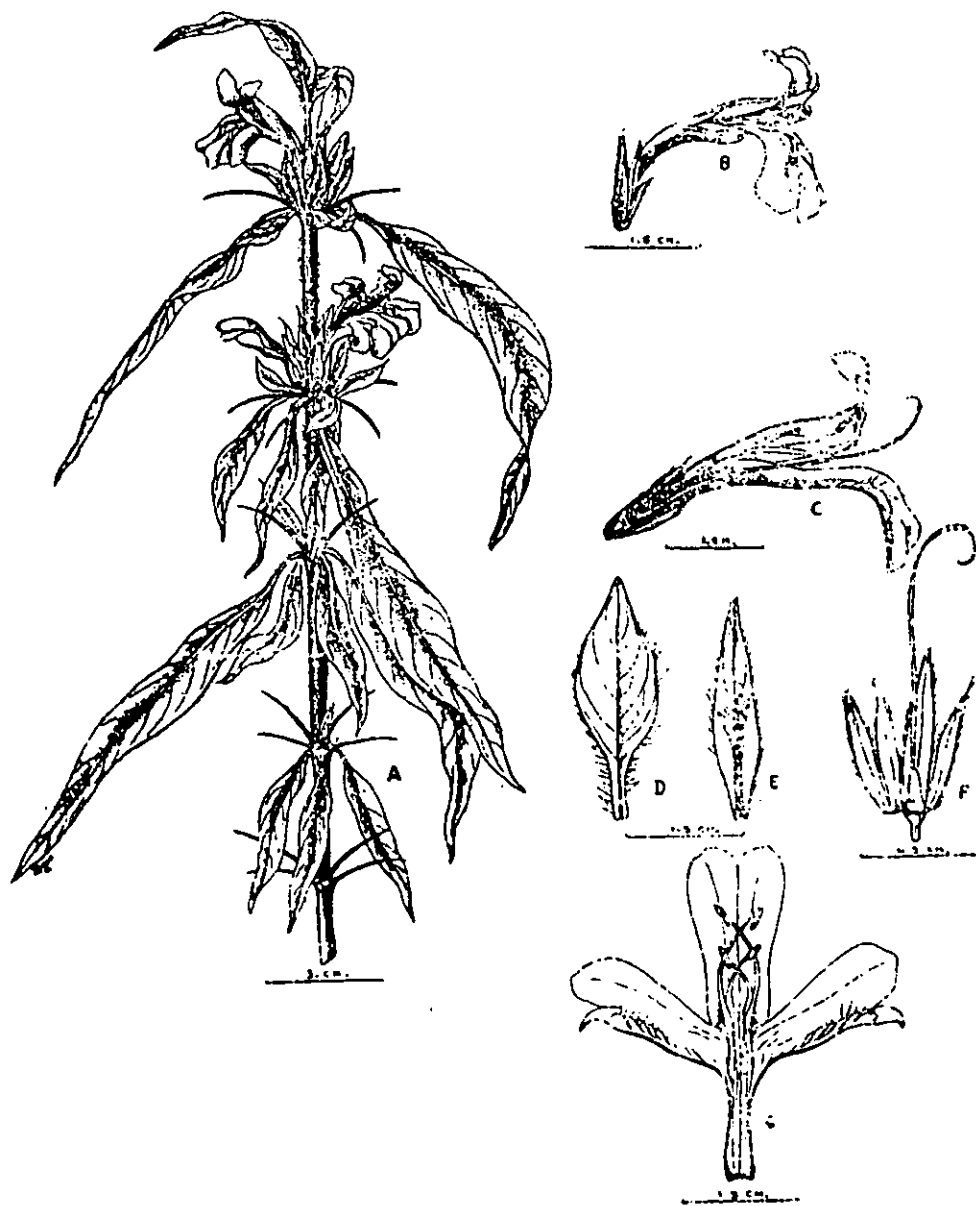


FIG. 4. *Asteracantha longifolia*. A, branch with whorled leaves, flowers and spines at the nodes. B, lateral view of a flower. C, longitudinal section of a flower showing the stamens and pistil. D, bract. E, bractlet. F, calyx spread out showing the sepals and pistil. G, corolla spread out showing the didynamous stamens.

4. *Asteracantha longifolia*. (Linn.) Nees in Wall. Pl. As. Rar. 3 : 90. 1832. (Fig. 4).

Barleria longifolia Linn.—*Hygrophila spinosa* T. And.—*Hygrophila longifolia* Kurz.—*Barleria hexacantha* Moris.—*Ruellia longifolia* Roxb.—*Asteracantha auriculata* Nees.

Sinh. Katu-ikiriya, Neera-mulliya ; *Tam.* Neremulli, Nirmalli ; *Hindi* Gokhulakanta, Gokshura, Kailaya, Talmakhana ; *Sans.* Atichhatra, Bhikshu, Chhatraka, Ikshugandha, Ikshura, Ikshuvalika, Kakekshu, Kandekshtu, Kokilaksha, Kokilanayana, Kshura, Kshuraka, Kulahaka, Pichhila, Pikekshana, Shrigalaghanti, Shrigali, Shrinkhali, Shuklapushpa, Shuraka, Triksura, Vajra, Vajrakantaka, Vajrasthi, Virataru.

A perennial herb with an ascending rhizome ; stems numerous, 60—120 cm tall, erect, nearly unbranched, somewhat compressed, thickened at nodes and hispid with long hair between nodes ; leaves simple, sessile, whorled, 6 to a whorl, two opposite large ones 9—12 cm long, 1.3—2 cm broad, the four in between 3.5—4.5 cm long, 1.3—1.5 cm broad, each having a slightly arched, sharp, yellow spine 2.5—3 cm long in the axil of each, lanceolate, tapering at both ends, sparsely hispid on both sides, spinous ciliate and somewhat undulate ; flowers large, irregular, bisexual, purplish-blue in a cluster of 8 round each node in 4 pairs ; bracts similar to leaves but smaller, 2.5 cm long, 0.8—1 cm broad, dark green and twisted, hairy outside ; bractlets linear, 2.3 cm long, 0.5 cm broad ; glabrous on the upper surface, bristly on the outer surface, ciliate and hyaline below ; sepals 4, linear, overlapping at the edges, 1.3—1.8 cm long, 0.2—0.4 cm broad, hyaline, covered with long hair outside, the anterior sepal bifid at apex ; petals 5, fused to about half way up into a narrow corolla-tube expanding into a 2-lipped funnel-shaped limb, contorted in the bud, the centre of the mid lobe of the lower lip blotched yellow, lobes oblong, truncate, 1 cm long, 0.6—0.7 cm broad, covered with glandular hairs outside ; stamens 4, didynamous, epipetalous ; ovary superior, 3 mm long, glabrous, 2-carpellary with a few ovules in axile placentation ; style 3.5 cm long, hairy ; stigma narrow, linear curved at the top ; fruit a loculicidal, linear capsule with a few seeds.

Flowers in September, October and January.

ILLUSTRATIONS. Moris in mem. Acad. Torin. 36 : pl. 7 ; Wight, Ic. Pl. Ind. Orient. pl. 449. 1840—1843 ; Rheedee, Hort. Mal. 2 : pl. 45 ; Kirtikar and Basu, Indian Med. Plants, pl. 714, 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs throughout India and Ceylon. In Ceylon, it is common in the dry zone and in the low-country in ditches and marshy places.

India. Misor and Carnatic, *G. Thomson*. Ceylon. *Thwaites C.P.* 2900 ; Anuradhapura, *Jayaweera* 2807, April 1966 ; Peradeniya, Royal Bot. Gard., *Jayaweera* 305, January 1951 ; *Jayaweera* 2208, July 1957.

COMPOSITION. The plant contains the alkaloids lupeol in the roots and hentriacontane in the leaves. The root also contains a trace of a volatile oil, a yellowish-green wax, a sticky gum, maltose, hygrosterol and a crystalline substance. The leaf contains cholesterol and the seeds, a semi-drying oil.

USES. The burnt ashes of the plant with cow urine is given for oedema and dropsy. A decoction of the root is a diuretic and administered for stones in the kidney, hepatic derangements and as an antidiysenteric. The seeds are given for gonorrhoea, jaundice, anasarca and to serve as an aphrodisiac. In the Muslim system of Ayurveda, the plant is used externally as a poultice or embrocation for rheumatism.

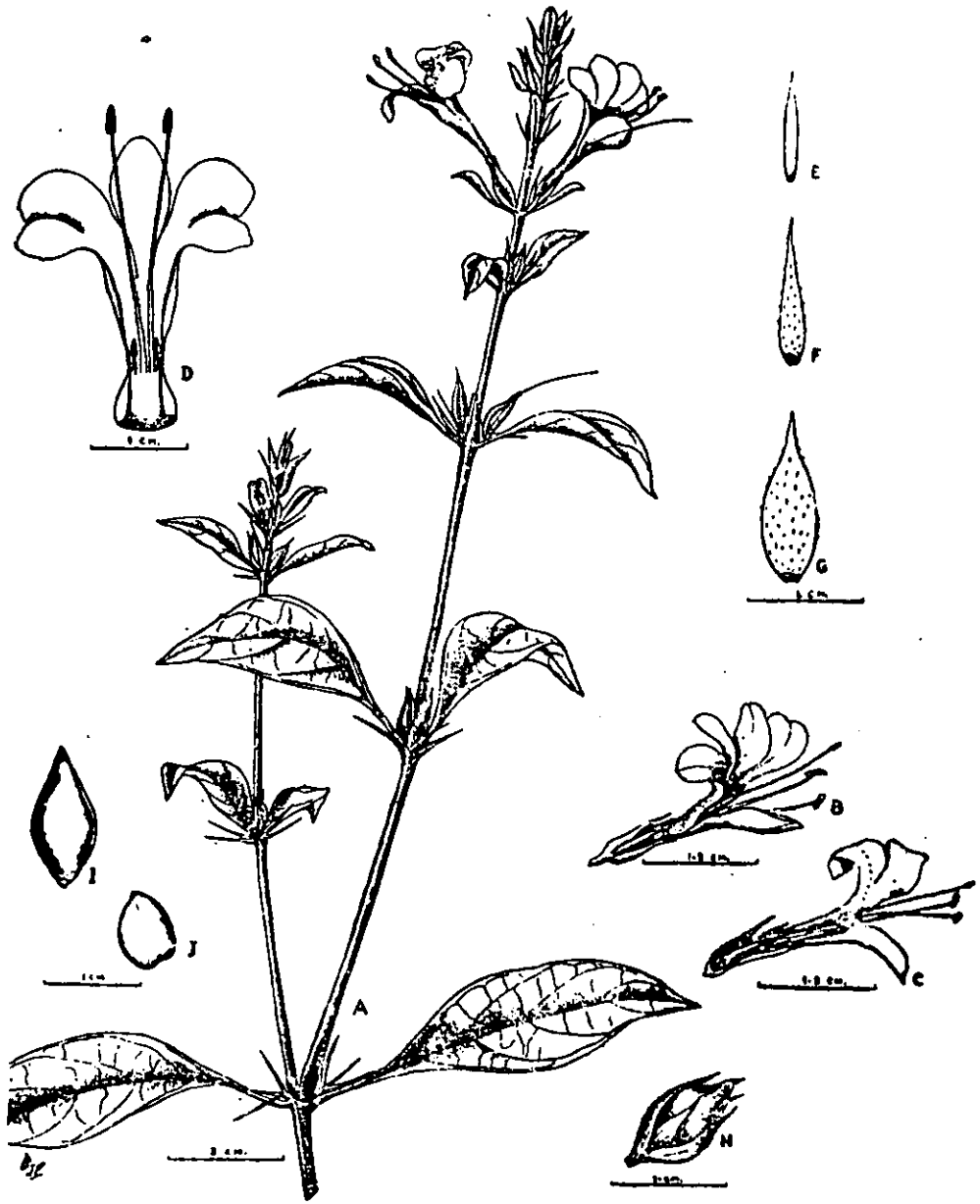


FIG. 5. *Barleria prionitis*. A, branch with leaves, spines and flowers. B, lateral view of a flower. C, longitudinal section of a flower showing the stamens and the pistil. D, corolla opened out showing the stamens and staminodes. E, bractlet. F, inner sepal. G, outer sepal. H, fruit with persistent calyx. I, fruit capsule. J, seed.

5. *Barleria prionitis* Linn. Sp. Pl. 636. 1753. (Fig. 5).

Barleria hystrix Linn.—*Barleria pubiflora* Benth.—*Prionitis hystrix* Miq.—*Prionitis pubiflora* Miq.—*Barreliera prionitis* Blanco.

Sinh. Katukaranda ; *Tam.* Kodippachalai, Kovindam, Kudan, Kurinji, Manjache-mulli, Semmulli, Sengudan, Varalmulli, Vettargutti ; *Hindi* Katsareya, Vajradanti ; *Sans.* Ananta, Bana, Bhindi, Dasi, Jhinti, Jhintika, Kanaka, Kantakuranta, Katarika, Kinkirata, Kuranta, Kurantaka, Mahasaha, Mridukanta, Pitamlana, Pitapushpaka, Pitasaireyaka, Pura, Sahachara, Saireyaka, Sauriyaka, Shretapushpa, Udyanapaki, Vira.

A small shrub, 0.6—1.4 m tall, much branched, branches cylindrical, swollen above nodes glabrous with slender, very sharp spines in leaf axils, each with 3—5 divaricate branches ; leaves simple, opposite, passing into bracts above, 5—13.5 cm long, 1.5—6.5 cm broad, ovate, tapering below, acute, mucronate, glabrous above, slightly pubescent on veins beneath with 2—6 pairs of arching lateral veins, prominent beneath ; flowers zygomorphic, bisexual, rather large, 2.5—3 cm across, orange, solitary, opposite, sessile becoming spicate above; bractlets 2, opposite, linear, 0.6—1 cm long, mucronate, stiff, almost spinous and spreading ; sepals 4, in pairs, outer pair much larger, ovate, 1.2 cm long, 4.5—5 mm broad, acuminate-mucronate, inner pair linear-lanceolate, aristate, 1.2 cm long, 2 mm broad, glandular on both sides and hairy outside ; petals 5, fused into a cylindrical tubular corolla-tube 1.5 cm long, hairy outside, corolla lobes strongly imbricate, recurved, 3 outer lobes oval, 1.5 cm long, 0.9—1 cm broad, hairy outside, 2 inner lobes smaller, oblong, 1.3 cm long, 0.7 cm broad, obtuse ; stamens 4 epipetalous, two reduced to staminodes, the fertile stamens exserted, filaments 2.5 cm long and hairy, anther 2-celled, not spurred ; ovary superior, 3 mm long, glabrous, 2-locular with 2 ovules in each loculus, style 3.3 cm long, stigma slightly bifid ; fruit capsule 1.4 cm long, ovoid with a long, tapering, solid beak ; seeds 2 with silky adpressed hair.

Flowers in March, August and October.

ILLUSTRATIONS. Rheede, Hort. Mal. 9 : pl. 41 ; Wight, Ic. Pl. Ind. Orient. pl. 452. 1840—1843 ; Kirtikar and Basu, Indian Med. Pl. pl. 720. 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs in India, Ceylon, Malaya, Philippine Islands and Tropical Africa. In Ceylon, it is a common weed found in open places in the dry regions of the Island.

Ceylon. Northern Prov., Jaffna, *Thwaites C.P.* 2012 ; Central Prov., Haragama, *Alston* 1320, Oct. 1926 ; Peradeniya, Bot. Gard., cultivated, *Jayaweera* 567, Feb. 1954 ; *Jayaweera* 2598, June 1957.

COMPOSITION. There is no trace of any alkaloidal principle in the plant but it contains a large amount of neutral and acid resins.

USES. The plant is a cholagogue and diuretic, and useful in acute and chronic congestion of the liver, jaundice, urinary and paralytic affections and in cardiac, renal and hepatic dropsy. It has antirheumatic properties and gives excellent results in both acute and chronic rheumatism. The root is given in decoction form for enlargement of scrotum and rat-bite poisoning. In Konkan, the dried bark is given for whooping cough while in Madras the juice of the leaves is given to children for catarrhal affections. The ashes of the plant with conjee and water is given for dropsy and coughs. In the Philippine Islands the juice of the leaves is applied on bleeding gums and dropped into the ear for otitis. With honey it is given to children with catarrhal affections. In Africa a decoction of the root is used as a mouthwash to relieve toothache. A paste of the root is applied with benefit to boils and glandular swellings. The plant is used as a snake-bite remedy in Thailand.

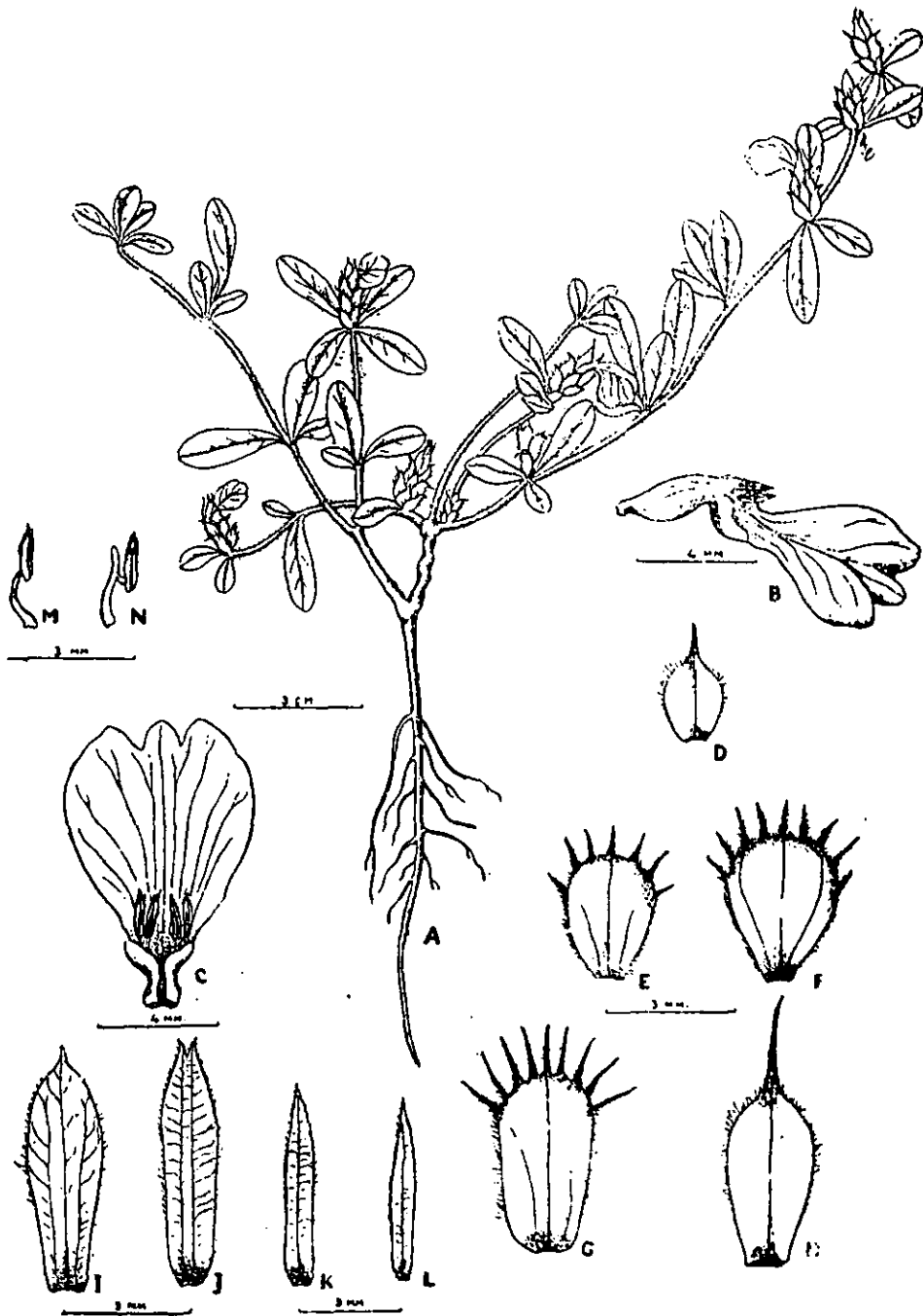


FIG. 6. *Blepharis repens*. A, entire plant with roots, leaves and flowers. B, side view of flower with bracts and calyx removed. C, corolla opened out from top showing the tube and lower lip. D, bracteole. E—H, one of each pair of bracts from outside inwards. I, J, outer pair of sepals. K, L, inner pair of sepals. M, N, one of each pair of stamens, upper and lower, respectively.

6. *Blepharis repens* (Vahl) Roth, Nov. Sp. 321. 1821. (Fig. 6).*Acanthus repens* Vahl.—*Blepharis molluginifolia* Pers.*Sinh.* Samadana ; *Sans.* Grahaka.

A slender, perennial herb with prostrate, hispid-hairy, slightly branched, wiry stems; leaves sessile, 4 in a whorl, two of each whorl larger than others, oblong, 0.8—1.5 cm long, 0.3—0.5 cm broad, obtuse or rounded at apex, glabrous or slightly scabrid, fleshy and paler beneath; flowers violet, irregular, solitary and axillary, bisexual, sessile, surrounded by 4 pairs of decussate-imbricate spinous bracts supported by a pair of tiny bracteoles outside in some flowers; bracteoles ovate, 2 mm long, 1.5 mm broad, hairy with a single spine at the apex; 3 outer pairs of bracts obovate, chartaceous, hairy, veined with long spreading spines at the margin in the upper part, the outermost pair 3 mm long, 2 mm broad, the next pair inner to it 4 mm long and 2.5 mm broad, the 3rd pair 6 mm long and 3 mm broad, the innermost 4th pair boat-shaped, or oblong-ovate membranous, veined, 6 mm long, 2.5 mm broad, ciliated with a solitary, terminal spine; sepals 4 in two pairs, membranous, linear or linear-oblong, apiculate and hairy, the outer pair larger 9 mm long, 2—2.7 mm broad, one being 2-veined and the other 2-veined and bifid at apex, the inner pair linear 8.5 mm long, 1.2 mm broad, 1-veined; corolla 1 cm long, the upper portion tubular inflated without an upper lip, lower lip obovate, as long as broad, 3-lobed at apex and hairy; stamens 4, epipetalous in two pairs; filaments short, the lower pair borne on stout cylindrical appendages; anther stout, 1.5 mm long, basifixed with a tuft of hair at the apex; capsule small, 0.6 cm long, completely enclosed in persistent sepals and bracts, ovoid, compressed, smooth, loculicidally dehiscent with 2 compressed, hairy seeds inside.

Flowers during February and March.

ILLUSTRATION. Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs in India from Delhi to Chota Nagpore and in Ceylon. It is, rather rare in Ceylon but found in Jaffna, Mannar, Trincomalee and Batticaloa Districts.

India. Malabar, Concan, etc., *Stocks, Law*, etc. Ceylon. Eastern Prov., *Thwaites C.P.* 3576; Mullaitivu, *Alston* 1449, March 1927 by roadside, flowers mauve; N.W.P., Mannar Dist., *Herb. Peradeniya* Feb., 1890.

USES. This plant is used as a substitute for *Blepharis edulis* Pers. which is employed as an astringent to the bowels, aphrodisiac, urinary discharges, leucoderma, mental derangements and applied to wounds and ulcers. The seeds are considered attenuant, resolvent, diuretic aphrodisiac, expectorant and deobstruent.

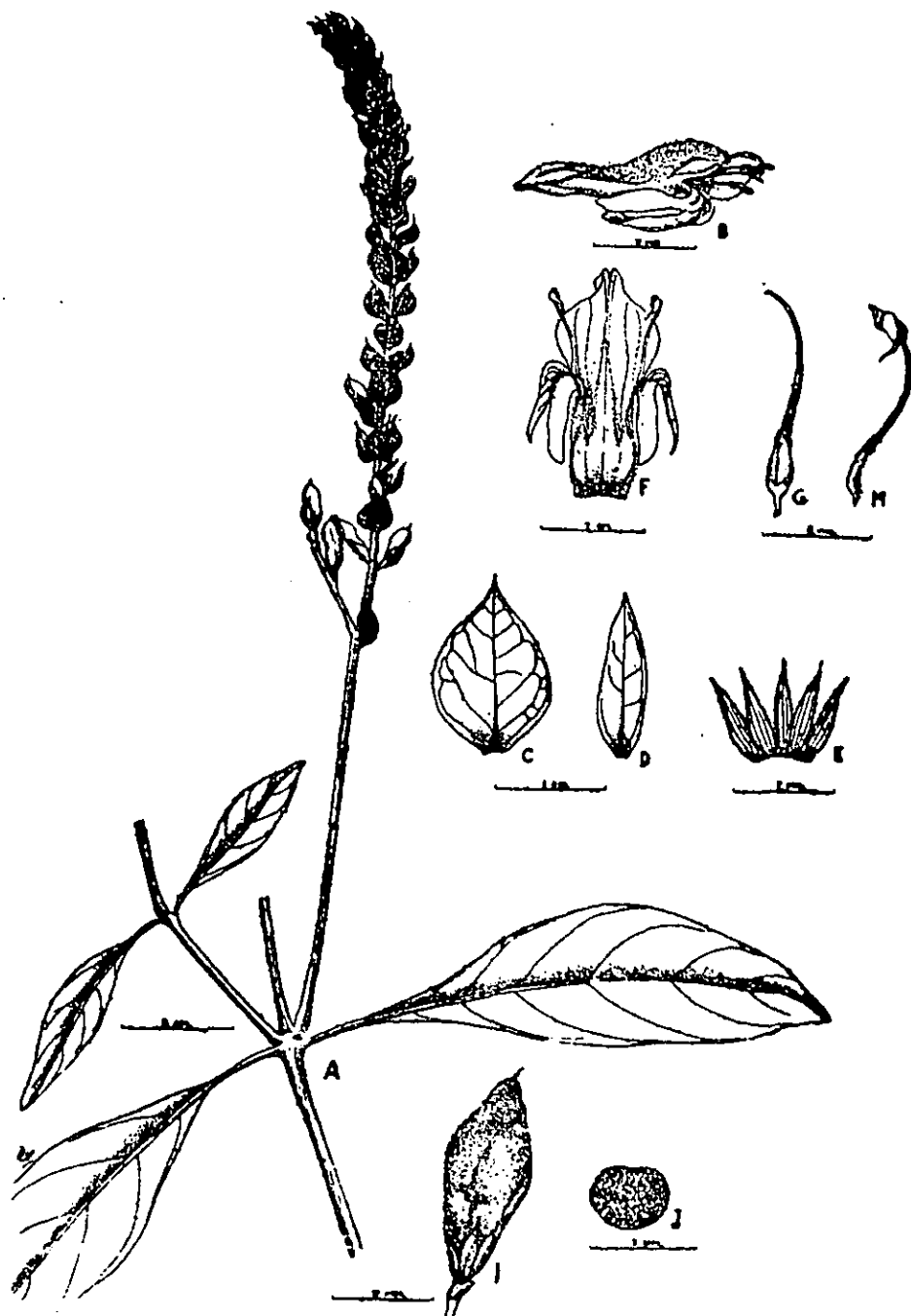


FIG. 7. *Justicia betonica*. A, branch with leaves and flower spike. B, lateral view of a flower. C, bract. D, bracteole. E, sepals spread out. F, corolla spread out from inside. G, pistil showing the ovary with the hairy style. H, stamen. I, fruit capsule. J, seed.

7. *Justicia betonica* Linn., Sp. Pl. 16. 1753. (Fig. 7).*Justicia ochroleuca* Blume.—*Adhatoda betonica* Nees.*Sinh.* Sudu-puruk.

A shrub, 0.5—1.5 m tall with erect, cylindrical, glabrous stems, swollen and purple above the nodes; leaves simple, opposite, 7.5—14.5 cm long, 3—6 cm broad, lanceolate or oblong tapering at both ends, entire or shallowly crenate, glabrous and shining above, grooved along the midrib on the upper surface, paler beneath and scantily hairy along veins on the lower surface; petioles 1—2.5 cm long; flowers irregular, bisexual, light purple, numerous in erect, pedunculate, terminal spikes 8—23 cm long; bracts large, 1.2—1.5 cm long, 0.8—1.2 cm broad ovate, white with green veins, acute, minutely hairy on both surfaces, in decussate, opposite pairs; bracteoles similar but smaller and narrower; sepals 5, lanceolate, 4.5—5 mm long, 1 mm broad, green, minutely hairy and connate at base; corolla infundibuliform, 2-lipped, 1.4 cm long, hairy outside and inside hairy only along main veins, lower lip of 3 recurved segments and the upper lip hooded; stamens 2, epipetalous; filaments hairy at the base; anther 2-celled at different levels, apical cells hairy and lower ones spurred; ovary superior, 2 mm long, hairy at the conical apex, 2-locular with 2 ovules in each loculus; style about 1 cm long, hairy; stigma slightly lobed; fruit-capsule ovoid, 1.5 cm long with a solid base, hairy; seeds 4 to a capsule, 3 mm across, brown and tubercular.

Flowers in July and October.

ILLUSTRATIONS. Rheede, Hort. Malab. 2: pl. 21; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs throughout India, Ceylon, Malaya and Tropical Africa. In Ceylon, it is very common in shrub jungles in the low-country up to 3,000 feet altitude.

Ceylon. Thwaites C.P. 1990; Herb. Peradeniya. without locality; Central Prov. Peradeniya, Bot. Gard., Jayaweera 811, January 1952; Hantane, Jayaweera 2944, Oct. 1967.

USES. The leaves are used as a poultice for boils.

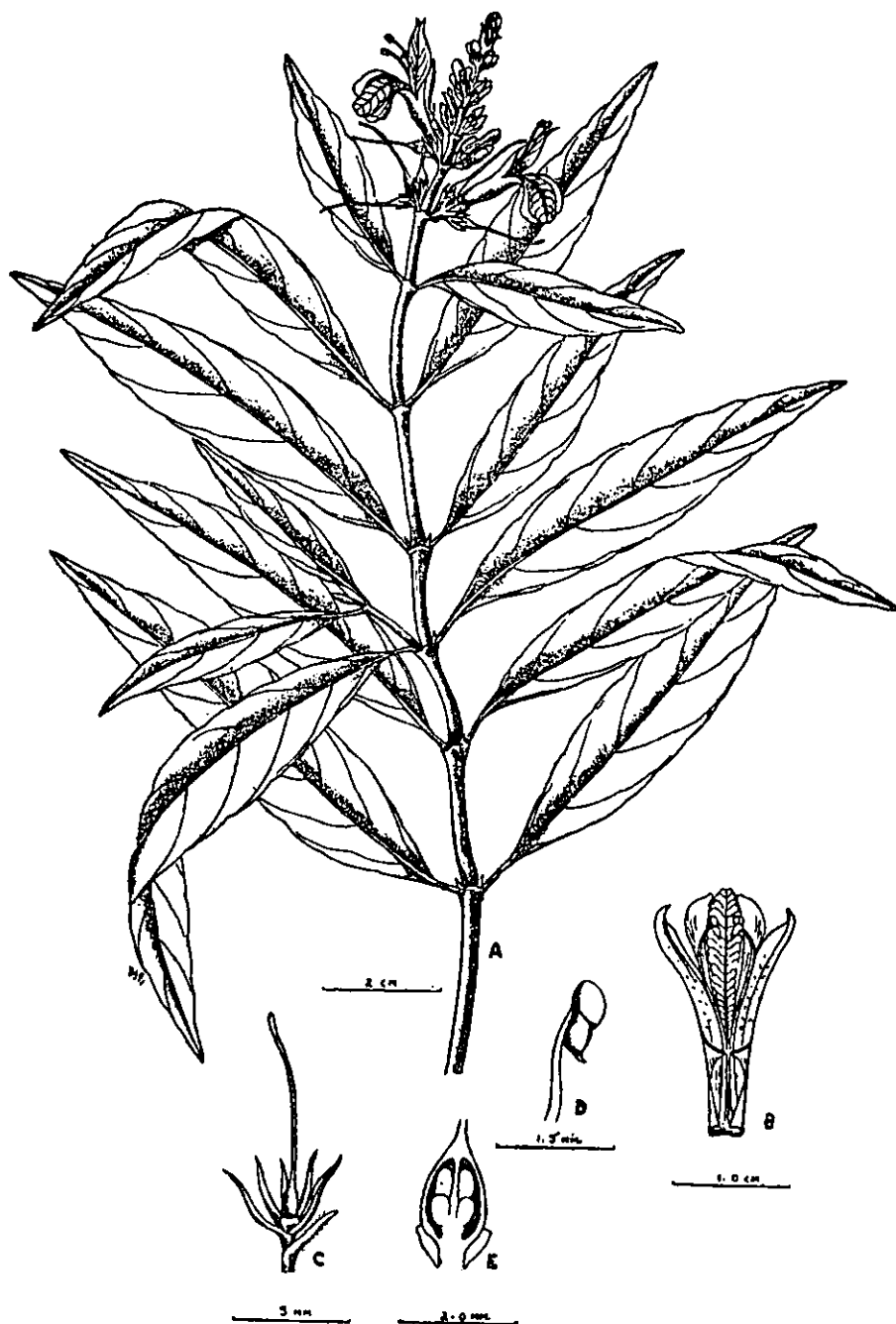


FIG. 8. *Justicia gendarussa*. A, branch with leaves and flowers. B, flower opened from behind showing the stamens and the transversely rugose lip. C, flower without corolla showing the bract, calyx and pistil. D, stamen. E, longitudinal section of the ovary.

8. *Justicia gendarussa* Burm. f., Fl. Ind. 10, 1768. (Fig. 8).

Gendarussa vulgaris Nees.—*Adhatoda subserrata* Nees.—*Dianthera subserrata* Blanco.

Sinh. Kalu-weraniya ; *Tam.* Karunochchi ; *Hindi* Nilinargandi, Udisanbhalu ; *Sans.* Bhutakeshi, Gandharasa, Indrani, Kapika, Krishnanirgundi, Krishnasurasu, Marupatni, Nilamanjari, Nilanirgundi, Nilasinduka, Nilasinduvar, Nilika, Nirgundi, Pitasaha, Shitabhiru, Shophalika, Sinduka, Vanaja, Vanendrani.

A much branched shrub, 0.6—1.2 m tall, with quadrangular stems thickened at and above the nodes and suddenly constricted, glabrous, purple, internodes 2—7 cm long ; leaves simple, opposite, 8—12.5 cm long, 1.2—2 cm broad, lanceolate or linear-lanceolate, acute at base tapering into a rounded apex, entire or slightly crenate, glabrous and shining, veins prominent beneath and purple ; petiole 0.5—0.8 cm long ; flowers irregular, bisexual, sessile, white or pink spotted red in the throat and lip, in opposite clusters of 3, in short, interrupted, terminal spikes, 3—5 cm long ; bracts 2—3 mm long, linear and hairy ; sepals 5, 2.7—3.7 mm long, linear, subulate, free or slightly connate at the base and glabrous ; corolla 2-lipped, tube 1 cm long, upper lip notched, lower lip broad, spreading, 3-lobed and transversely rugose ; stamens 2, epipetalous ; anthers 2-celled, cells distant at different levels, the lower ones spurred at the base ; filaments about 1 cm long and anthers 1 mm long ; ovary superior, 1.5—2 mm long, 2-carpelary, 2-locular with 2 ovules in each loculus ; style filiform 1.05 cm long ; stigma shortly 2-fid ; fruit not seen.

ILLUSTRATIONS. Rumph. Herb. Ambo. 4 : pl. 28, 1741—1745 ; Rheede, Hort. Mal. 9 : pl. 42 ; Wight, Ic. Pl. Ind. Orient. pl. 468, 1840—1843 ; Edward, Bot. Reg. pl. 635 ; Kirtikar and Basu, Indian Med. Pl. pl. 724. 1933.

DISTRIBUTION. Probably a native of China and now grows as an escape from cultivation in India, Ceylon, Malaya and Philippine Islands. It is rather common in the low-country in Ceylon.

Ceylon. *Thwaites* C.P. 3662 : Eastern Prov., Batticaloa, *Walker* 194, Sept. 1885.

COMPOSITION. The leaves are rich in potassium salts and contain a bitter alkaloid, justicine.

USES. The root of the plant is boiled in milk and given as a remedy for rheumatism, fever, jaundice and diarrhoea. It has diuretic and diaphoretic properties. The bark is a good emetic. An infusion of the leaves is given internally for fever, cephalalgia, hemiplegia and facial paralysis. The juice of the fresh leaves is given for coughs in children, colic and as drops for ear-ache. An oil prepared from the leaves is useful as an application for glandular swellings and for eczema. In Madagascar, the plant is chiefly employed as a remedy for rheumatism. In the Philippines, an extract of the juice of the leaves is given as an emetic for coughs and asthma and the fresh leaves as topicals to cure oedema of beriberi and rheumatism.



FIG. 9. *Justicia procumbens*. A, branch with leaves and terminal spikes from Thwaites C. P. 2904. B, branch from C. P. 228. C, bractlets. D, lateral view of a flower. E, sepals. F, view of corolla from top showing the upper and lower lips with stamens. G, corolla opened out showing the strigose lower lip, stamens and pistil. H, stamen. I, pistil showing a 4-ovuled ovary and hairy style.

9. *Justicia procumbens* Linn., Sp. Pl. 15. 1753. (Fig. 9).

Justicia macrantha Wall.—*Justicia hirtella* Wall.—*Rostellularia procumbens* Nees.—*Rostellularia adenostachya* Nees.—*Dianthera americana* Blanco.—*Dianthera ciliata* Blanco.—*Rostellularia blancoi* Hassk.—*Rostellularia mollissima* Nees.—*Justicia mollissima* Wall.—*Rostellularia royeniana* Thw.

Sinh. Mayani ; *Tam.* Nereipootie.

Diffuse, perennial herb with slender, divaricate branches rooting at lower nodes ; stems hairy below nodes and along furrows of internodes ; leaves simple, opposite, 1.3—5 cm long, 0.4—2 cm broad, lanceolate, oval or ovate-oval, obtuse at both ends, entire or slightly crenate, scantily pubescent on both sides ; petioles 0.2—0.3 cm long ; flowers small, pale violet-pink, irregular, bisexual, in rather dense, cylindrical, terminal spikes 1—4 cm long ; bracts and bracteoles linear or linear-lanceolate, 5—6 mm long, 0.5—1 mm broad, acute, hairy with scarious, ciliate margins ; sepals 4 or 5, linear, 4.2—5.5 mm long, 0.4—0.6 mm broad, filiform, one shorter or absent, strongly ciliate ; petals 5, fused into a 2-lipped, funnel-shaped corolla, 0.9 cm long, lower lip broader than long, spotted with dark pink, 3-lobed, lobes shallow and obtuse, the mid-lobe strigose inside ; stamens 2, filaments somewhat flattened, 3.5 mm long ; anthers 1.5 mm long, 2-celled, cells oblong more or less distant at different levels, the lower cells spurred at base ; ovary superior, 1.3 mm long, 2-locular with 2 ovules in each loculus ; style 5 mm long, hairy about half-way including the top of the ovary, very slightly bilobed ; fruit capsule 4 mm long, 1.5 mm broad with a short, solid base and containing 4, glabrous, finely tuberculate seeds.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient. *pl.* 1539. 1850 ; Kirtikar and Basu, Indian Med. Pl., *pl.* 725. 1933 copied from Wight Ic. ; Herb. Peradeniya drawing.

DISTRIBUTION. Occurs along the Western Ghats in India, Ceylon, Malaya, Philippine Islands, China and Australia. In Ceylon, it grows in moist regions from sea-level to about 7000 feet altitude. It is very common among grass, especially in the Montane Zone.

Ceylon *Thwaites C.P.* 2904 ; *Thwaites C.P.* 228. Central Prov. Hakgala, *A. de Alwis*, March 1922 ; Ambawela, *A. M. Silva*, March 1906 ; Hakgala Patanas, *Willis*, Feb. 1906.

COMPOSITION. Contains a bitter alkaloid.

USES. In India, an infusion of the plant is given for asthma, coughs and rheumatism. The juice of the leaves is squeezed into the eye for ophthalmia. It is also used as a laxative and diuretic. In the Philippines, the leaves are used as an astringent externally for certain eruptions of the skin.

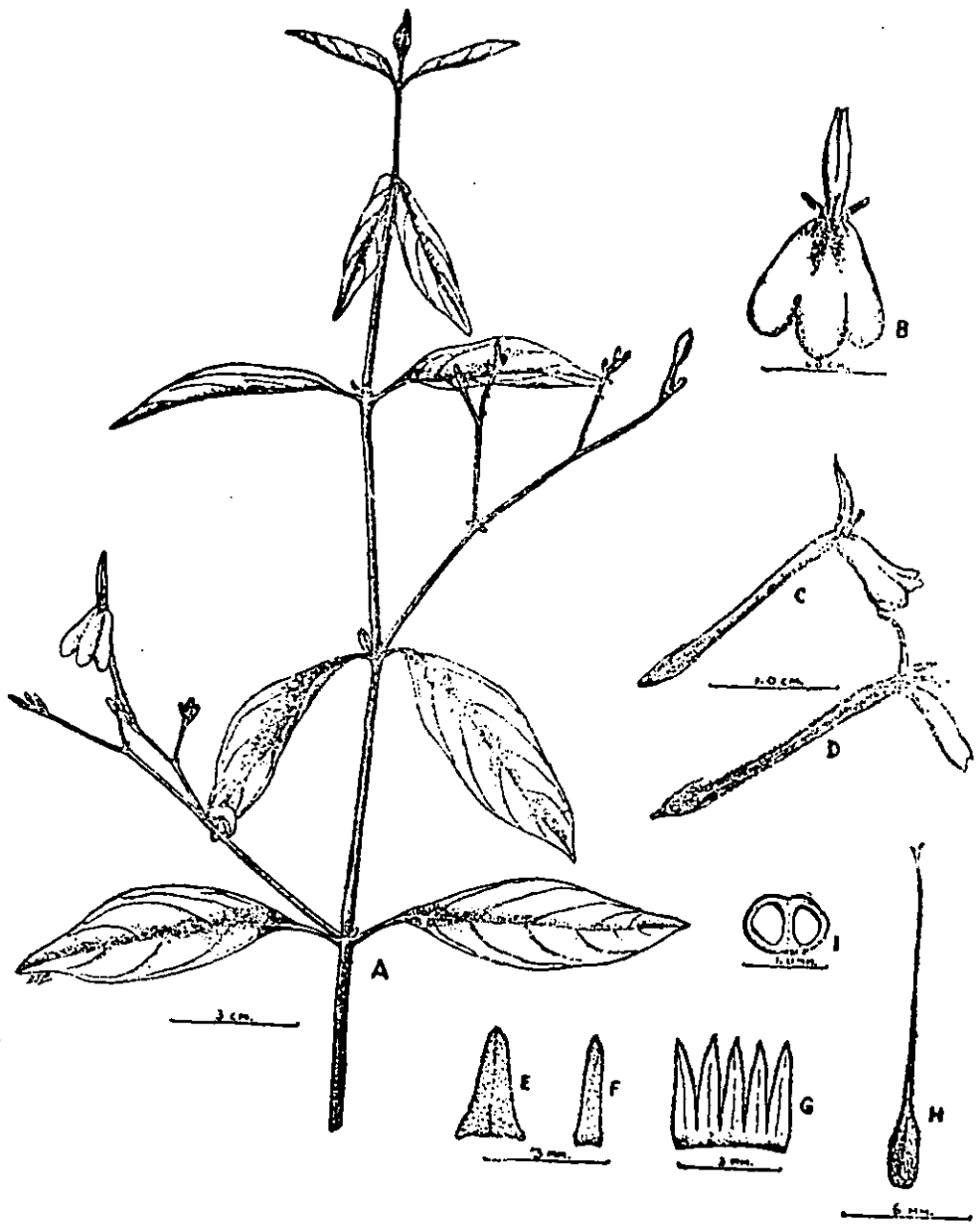


FIG. 10. *Rhinacanthus nasuta*. A, branch with leaves and flowers. B, front view of a flower. C, side view of a flower. D, longitudinal section of a flower showing the stamens and the pistil. E, bract. F, bractlet ; G, sepals. H, pistil. I, transverse section of ovary.

10. *Rhinacanthus nasuta* (Linn.) Kurz in Journ. As. Soc. Beng. 39, 1870. (Fig. 10).

Rhinacanthus nasutus (Linn.) Kuntze.—*Justicia nasuta* Linn.—*Rhinacanthus communis* Nees.—*Rhinacanthus rottlerianus* Nees.—*Justicia rottleriana* Wall.

Sinh. Anitta ; *Tam.* Anichai, Kaligai, Nagamalli, Nagamalligai, Uragamalli ; *Hindi* Juipani, Palakjuhi, Palikjuhia ; *Sans.* Yuthikaparni.

A small, slender undershrub ; stem 0.6—1.2 m tall, slightly branched, nearly cylindrical, internodes 3.5—5.5 cm long, slightly rough with hairs ; leaves simple, opposite, decussate, 3.5—9.5 cm long, 1—3.5 cm broad, lanceolate, tapering at both ends, acute, entire, scantily hairy on both sides ; petioles 0.3—1.3 cm long and hairy ; flowers zygomorphic, bisexual, white in simple axillary cymes at the ends of branches together forming a large, lax, pubescent, terminal panicle ; bracts linear-lanceolate, 1.7 mm long, 0.7 mm broad, acute, hairy ; bractlets 2 to each flower, as long as bracts but narrower ; sepals 5, equal, 2.5—3 mm long, 0.5 mm broad, linear, glandular pubescent, slightly connate at base ; petals 5, fused into a long, cylindrical corolla-tube expanded into a 2-lipped limb, 1.7 cm across, corolla-tube 1.3—1.7 cm long, very narrow, greenish-white, pubescent outside with some hairs glandular, glabrous inside, upper lip narrow, linear, 8.5 mm long, 2 mm broad, bifid at apex and pubescent outside, lower lip 3-lobed, 1.4 cm long, 1.3 cm broad, lobes oblong and obtuse ; stamens 2 inserted in the throat of the corolla-tube, diverging ; filaments 2.5 mm long ; anthers 2-celled, cells superposed, blunt at base ; ovary superior, 1.7 mm long, hairy, 2-locular with 2 ovules in each loculus ; style 1.8 cm long, hairy ; stigma bilobed, lobes linear ; fruit capsule 1.2 cm long, glabrous, loculicidally dehiscent with 4 glabrous seeds.

Flowers in January and also from July to October.

ILLUSTRATIONS. Curtis, Bot. Mag. *pl.* 325 ; Rheede, Hort. Mal. 9 : *pl.* 69 ; Wight, Ic. Pl. Ind. Orient. *pl.* 464, 1840—1843 ; Kirtikar and Basu, Indian Med. Pl., *pl.* 726 B. 1933.

DISTRIBUTION. Occurs in India, Ceylon, Malay Peninsula, Java, Philippine Islands Madagascar and Tropical Africa. In Ceylon, it is a very common road-side plant at the edges of the jungle in dry regions.

India. Malabar, Concan, etc. *Stocks, Law* etc. Pen. Ind. Orient. *Herb. Wight* 2276, Kew Distribution 1866—8. Ceylon. North Central Prov., Polonnaruwa, Govt. Farm, *Senaratne* 3512, June 1943 ; Central Prov., Dambulla, *Alston* 2397, May 1928 ; Peradeniya, Bot. Gard., cultivated, *Alston* 1609, Sept. 1927 ; *Jayaweera* 820, Sept. 1952 ; *Jayaweera* 2592, Oct. 1957 ; Uva Prov., lower Badulla Road, *Thwaites C.P.* 1982 ; Wellawaya, *Alston* 1646, Jan. 1928 ; Southern Prov., Tissamaharama, *Alston* 1638, Jan. 1928. Indo-China. Hue and vicinity, *Squires* 66, Jan.—May 1927.

COMPOSITION. The roots of the plant contain an active principle, rhinacanthin. The plant is also rich in potassium salts.

USES. This plant is used externally for scabies, ringworm and other parasitic skin diseases. The fresh root is very valuable for the treatment of inflammatory skin diseases. In Sind and Madagascar, the root boiled in milk is often used for its extraordinary aphrodisiacal powers, while in the Philippine Islands the sap of the roots and leaves or a decoction is employed to cure obstinate forms of dermatitis, particularly dhobies' itch. The fresh leaves crushed and applied on itching skin give immediate relief.

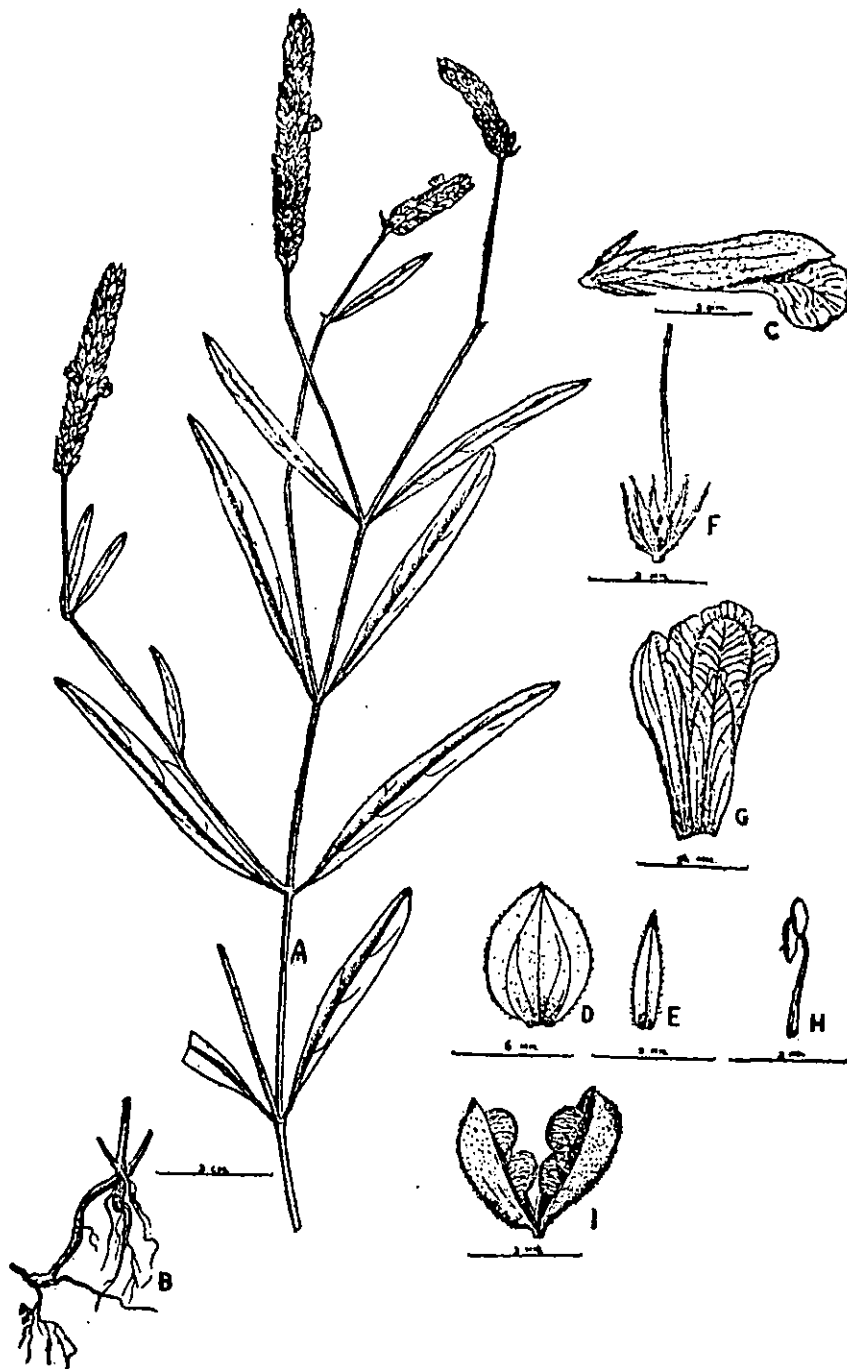


FIG. 11. *Rungia repens*. A, branch with leaves and flower spikes. B, stem with roots. C, lateral view of a flower. D, bract. E, bracteole. F, calyx and pistil. G, corolla opened out showing the stamens. H, stamen. I, fruit capsule dehiscent.

11. *Rungia repens* (Linn.) Nees in Wall. Pl. As. Rar. 3 : 110. 1832. (Fig. 11).

Justicia repens Linn.—*Dicliptera repens* Roem. and Sch.

Sinh. Sulunayi ; *Tam.* Kodagasalai ; *Hindi* Kharmor ; *Sans.* Parpatha.

Annual herb with decumbent stems, rooting at the base and then erect, slender, cylindrical and puberulous ; leaves simple, opposite, oblong, lanceolate or linear, 2.5—7.8 cm long, 0.5—1 cm broad on very short petioles, acute at the base, subacute at apex, entire, glabrous, densely lineolate above ; flowers irregular, bisexual, in erect, 4-sided terminal spikes 3—12.5 cm long ; bracts all similar, much imbricate with white scarious margin, 7 mm long, 5 mm broad, broadly oval, obtuse, sharply mucronate, pubescent, very slightly ciliate ; bracteoles 3, linear-lanceolate, 3-5 mm long, 0.7—1.2 mm broad, minutely pubescent with scarious margins ; sepals 5, linear, 3—3.5 mm long, 0.5 mm broad, very acute and pubescent ; corolla violet with red dots in the throat, 2-lipped, 1 cm long, pubescent outside, upper lip emarginate, lower lip shortly 3-lobed, transversely rugose inside ; stamens 2, epipetalous ; anther 2-celled at different levels, each cell 1 mm long ; ovary superior, 1 mm long, 2-locular with 2 ovules in each loculus ; style 5 mm long, hairy, bilobed at apex ; fruit a 4-seeded, ovoid-oblong, hairy capsule, 4-5 mm long.

Flowers from September to March.

ILLUSTRATIONS. Burmann, Thes. Zeyl. pl. 3, fig. 2, 1737. ; Roxburgh, Pl. Corom. 2 : pl. 152. 1798 ; Wight, Ic. Pl. Ind. Orient 2 : pl. 465. 1840—1843 ; Kirtikar and Basu, Indian Med. Pl., pl. 728. 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs throughout the warmer parts of India and Ceylon. It is a common herb found in the low-country dry regions.

Ceylon. *Thwaites C.P.* 1972 and 1973 ; Southern Prov., Kirinda, *Herb. Peradeniya*, Dec. 1882.

USES. This plant is a diuretic and considered a vermifuge. A decoction of the roots and stems is given for fever and coughs and also in cases of snake-bite. If the victim is in a coma, the roots are ground with water and poured into each nostril.

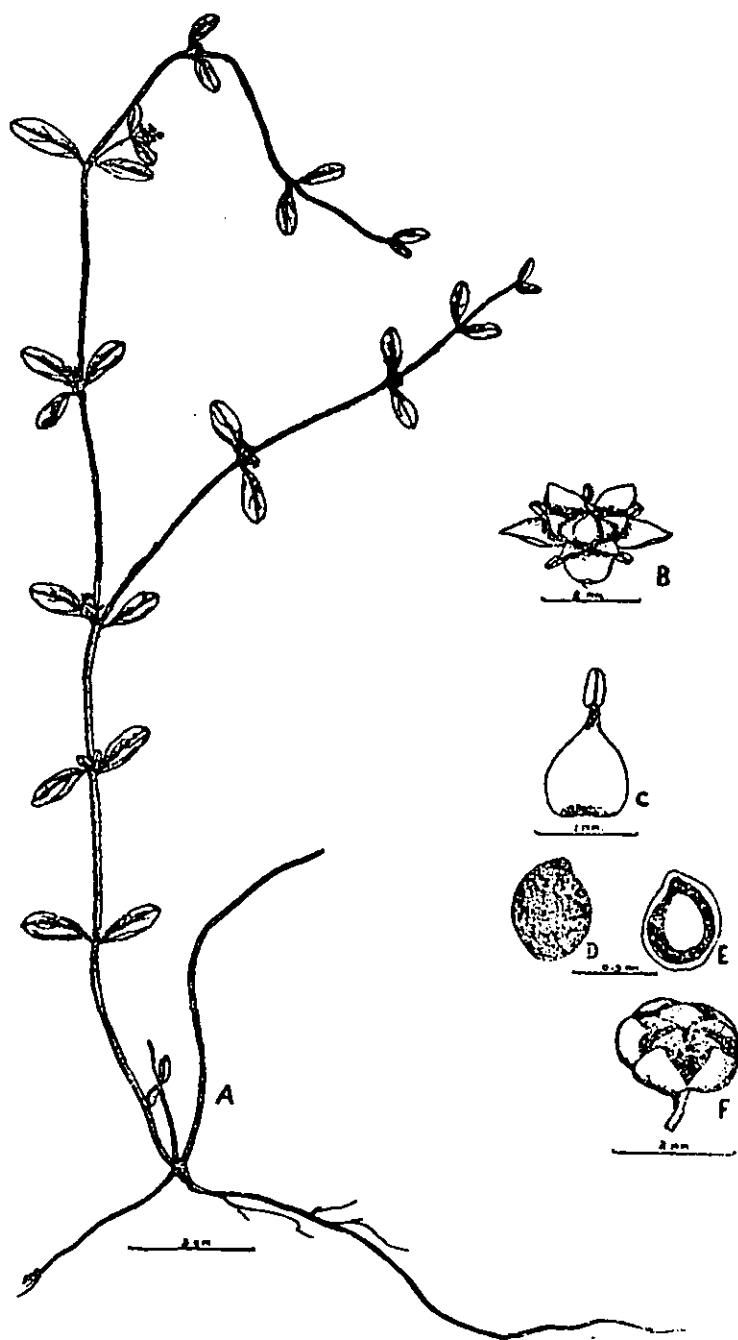


FIG. 12. *Gisekia pharnacioides*. A, whole plant with roots, leaves and flowers. B, top view of an open flower showing the sepals, stamens and the pistil. C, stamen with a broad filament. D, seed with white protuberances. E, section of the seed. F, fruit with persistent sepals and distinct 1-seeded carpels.

2. AIZOACEAE

1. *Gisekia pharmacioides*. Linn. Mant. 562. 1771. (Fig. 12).

Gisekia molluginoides Wight.—*Gisekia linearifolia* Schum.—*Pharnaceum oculatum* Forsk.

Sinh. Etirillapala ; *Tam.* Manalikkirai, Manali ; *Sans.* Aileya, Aluka, Alavaluka, Elavulu, Gandhatvaka, Harivaluka, Kapitha, Kapithatvaka, Kushtagandhi, Sugandhi, Valu, Valuka.

A prostrate, somewhat succulent, annual herb with stems 15—40 cm long ; leaves simple opposite, exstipulate, 1—2 cm long, 0.4—0.8 cm broad, obovate, elliptic-lanceolate or spatulate-oblong, tapering at the base to a short petiole, obtuse or emarginate at apex, glabrous and glaucous ; flowers small, pinkish or green, 4 mm across, regular, bisexual, numerous on slender pedicels and in nearly sessile, dense, axillary umbels ; sepals 5, equal, 2 mm long, 1.5 mm broad, oblong-oval, obtuse with membranous margins, slightly connate at base and persistent ; petals absent ; stamens 5, hypogynous ; filaments dilated at base, 1 mm long, 0.7 mm broad at the base ; ovary superior, 0.7 mm diameter, 5-carpellary ; carpels distinct with a solitary ovule in each carpel at the base ; fruit membranous enclosed in persistent sepals separating into 1-seeded segments ; seeds 1—1.2 mm long, black with scattered white protuberances.

ILLUSTRATIONS. Roxburgh, Pl. Corom. 2 : pl. 183. 1798 ; Wight, Ic. Pl. Ind. Orient, 4 : pls. 1167 add 1168. 1850 ; Kirtikar and Basu, Indian Med. Pl., pl. 475. 1933.

DISTRIBUTION. Occurs in Africa, Afghanistan, India and Ceylon. In Ceylon, it is rather common in sandy, damp places along the seashore in Jaffna, Mannar, Trincomalee, Mount Lavinia, Chilaw, Hambantota, etc.

India. Punjab : *T. Thomson* at 1000 feet altitude ; Upper Gangetic Plain : *Wallich* 1509 ; *Stocks* 6, Sept. 1845. Banks of Jumma, *Wallich* 1509 *D. and E.* Ceylon. *Thwaites C.P.* 1093. North Western Prov., Mannar, *Herb. Peradeniya*, Feb. 1890 ; Chilaw, *Simpson* 8163, May 1931. Southern Prov., *Alston* 1908, Dec., 1926.

COMPOSITION. The plant contains tannin, while the seeds contain the tannin-like principle α - and β -gisekia.

USES. The plant is a powerful anthelmintic in cases of taeniasis. In South Africa and Tanganyika it is used as a taenicide and for severe diarrhoea. The fruit is poisonous.

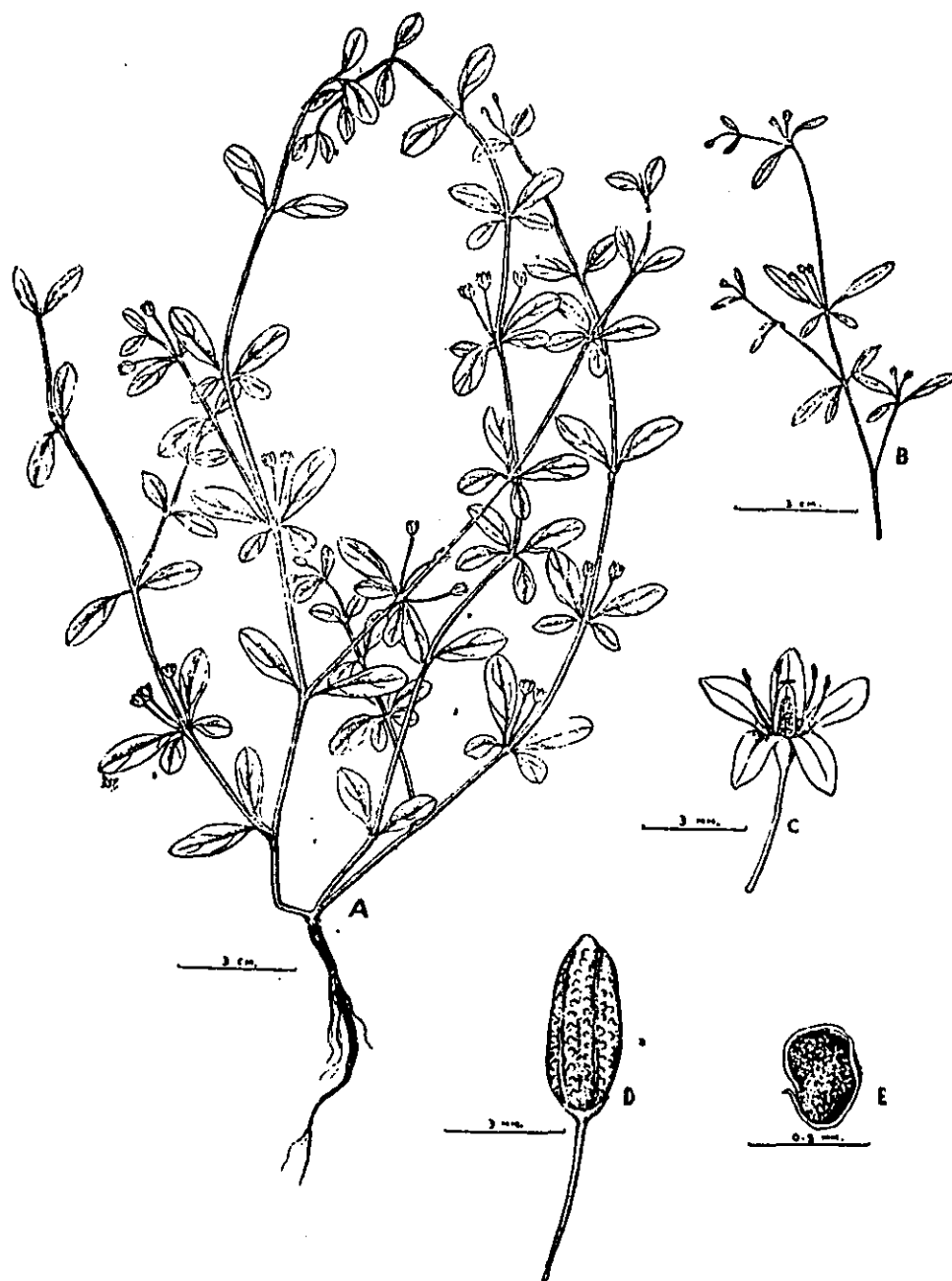


FIG. 13. *Glinus oppositifolius*. A, whole plant with roots, leaves, flowers and fruits. B, a branch of a smaller-leaved form. C, flower, side view. D, fruit. E, tubercled seed showing filiform scale.

2. *Glinus oppositifolius*. (Linn.) A. DC. in Bull. Herb. Boiss. Ser. 2, 1 : 559 (Fig. 13).

Mollugo oppositifolia Linn.—*Mollugo spergula* Linn.—*Mollugo verticillata* Roxb.—*Mollugo parviflora* DC.—*Pharnaceum parviflorum* Roth.—*Pharnaceum mollugo* Linn.—*Glinus mollugo* Fenzl.—*Mollugo subserrata* Blanco.—*Polycarpaea frankenioides* Presl.

Sinh. Hinipala ; Tam. Kachantarai ; Sans. Phanija.

A diffuse, prostrate or ascending, slender dichotomously branched, glabrous, annual herb with internodes 1.5—4 cm long; leaves simple, exstipulate, 5—28 mm long, 2—10 mm broad, in whorls of 4 or 5, unequal, obovate to linear-lanceolate or even spatulate, much tapering to the base, rounded or acute and apiculate at apex; petiole obscure or very short; flowers white, regular, bisexual, 5 mm across in axillary fascicles of 1—5 to a node; pedicels 4—10 mm long and very slender; sepals 5, distinct, imbricate, 4 mm long, 1.5 mm broad, oblong, subacute with membranous margins, persistent in the fruit; petals absent; stamens 3 or 4, hypogynous with slender filaments; ovary superior, 2.5 mm high, 3-locular with numerous ovules on an axile placenta; styles 3, very short and stigmas spreading; fruit an ellipsoidal, loculicidal capsule, 3.5 mm long, with numerous, subreniform, dark-brown, tubercular seeds 0.4 mm long; seeds appendaged with a very small, white scale at the hilum extended into a long, filiform thread which curves round the seed.

Flowers and fruits throughout the year.

ILLUSTRATIONS. Rheede, Hort. Mal. 10 : pl. 24 ; Kirtikar and Basu, Indian Med. Pl. pl. 474. 1933.

DISTRIBUTION. Occurs in Tropical Africa, India, Ceylon, Burma, Indo-China, Australia and Philippine Islands. In Ceylon, it grows as a common weed in the low-country especially in the dry regions. Jaffna, Talaimannar, Anamaduwa, Karativu, Kurunegala, Batalagoda, Bintenne, Bibile, etc.

India Decca : Clarke 16969, April, 1872. Bengal : J. D. Hooker; Clarke 4410, March 1867, perianth segments white brown, subequal, similar; Calcutta, Bot. Gard., cultivated. Mysore : Maisor and Carnatic. G. Thomson. Ind. Orient. Herb. Wight 157. Ceylon. Thwaites C.P. 1095. Northern Prov., Jaffna, Simpson 9286, March 1932, in short turf; Herb. Peradeniya, Feb. 1890; Talaimannar, J. M. Silva, July 1918. North Western Prov., Anamaduwa, Herb. Peradeniya, Aug. 1883; Karativu, Herb. Peradeniya, Aug., 1883; Batalagoda, Alston 1602, Sept. 1927, damp place near tank. Uva Prov., Bintenne, Soraborawewa, J. M. Silva., Oct. 1908; Bibile, J. M. Silva, Oct. 1925. Burma. Upper Burma : Shwebo, Huk 8, June 1891, flowers yellow. Indo-China. Hue and vicinity : Squires 217, Jan.-May 1927. Philippine Islands. Luzon. Cagayan Prov., Ramos and Edano 46560, April 1926.

COMPOSITION. Rich in iron and a good source of calcium.

USES. The stems and leaves of this plant are eaten as a vegetable but is very bitter if not properly cooked. The plant is considered to be a stomachic, aperient and antiseptic. It is given to children for dyspepsia. The juice of the plant is applied for itch and other skin diseases with beneficial results.

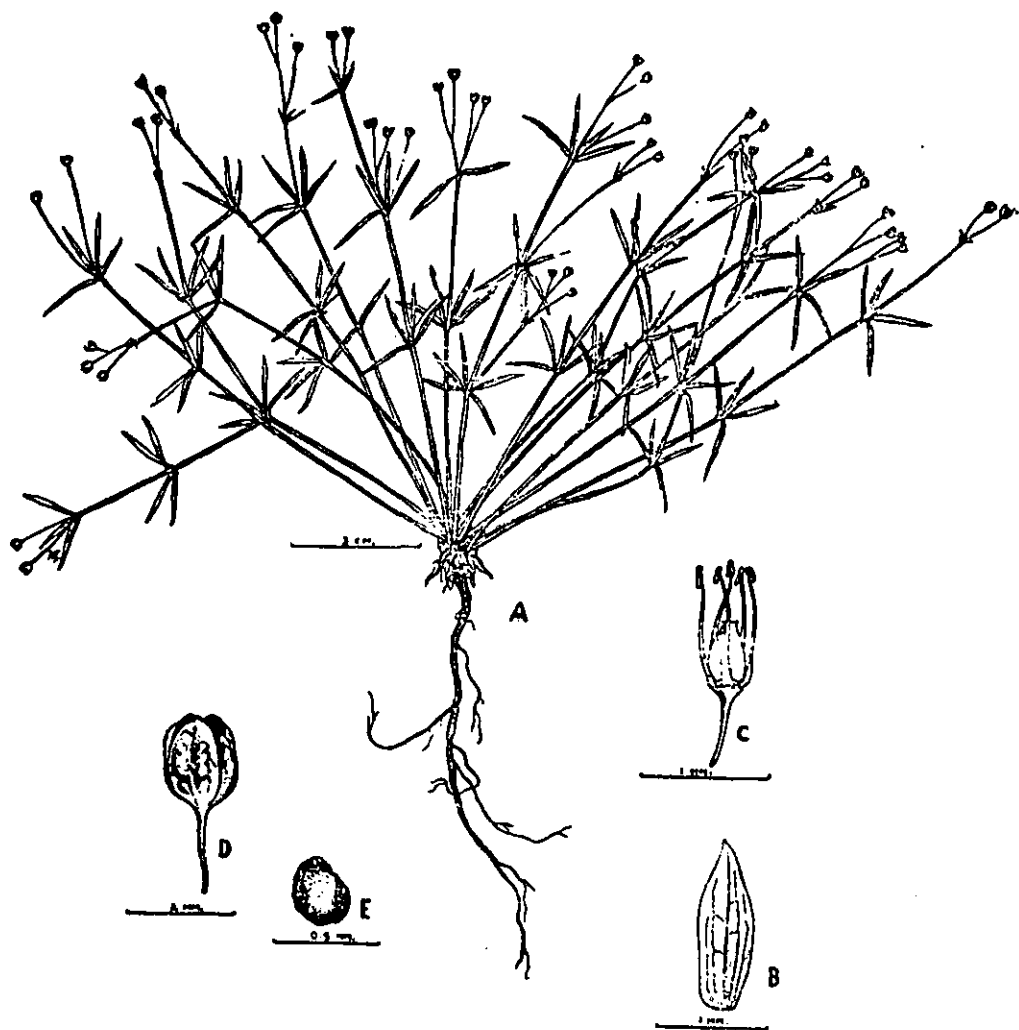


FIG. 14. *Mollugo cerviana*. A, whole plant with roots, branches, leaves and flowers. B, sepal. C, flower with the sepals removed showing the stamens and the pistil. D, fruit. E, seed.

3. *Mollugo cerviana* Seringe in DC. Prodr. 1 : 392. 1824. (Fig. 14).

Mollugo umbellata Seringe.—*Pharnaceum cerviana* Linn.—*Pharnaceum triflorum* Moon.

Sinh. Patpadagam, Udetta ; *Tam.* Parpadagam ; *Sans.* Pharnija, Grishma-sundaraka.

An annual herb with numerous, erect, very slender stems 12—30 cm long, branches umbellate and nodes thickened ; leaves of two kinds, simple, whorled ; radical leaves 6—13 mm long, 0.5—0.7 mm broad, rosulate, spathulate or linear-spathulate ; cauline leaves 2—6 or more in a whorl at a node, 6—15 mm long, 0.8 mm broad, linear, apiculate ; flowers numerous, greenish-white, regular, bisexual, 1.5 mm diameter on long, stiff, filiform pedicels usually in threes at the ends long, filiform, axillary and terminal peduncles ; pedicels 1—1.5 cm long ; sepals 5, distinct, 1.5 mm long, 0.7—1 mm broad, oval-oblong, obtuse with membranous margins ; petals absent ; stamens 5, hypogynous ; filaments 0.7 mm long, broad at the base ; anthers 0.2 mm long ; ovary superior, 3-carpellary, 3-locular, with numerous ovules on an axile placenta ; fruit a loculicidal, subglobose capsule, 1.5 mm long with persistent sepals enclosing it ; seeds triangular-ovate, 0.3 mm long, 0.2 mm broad, reddish-brown in colour and somewhat areolar.

Flowers in December.

ILLUSTRATIONS. Kirtikar and Basu, Indian Med. Pl., pl. 473 C. 1933.

DISTRIBUTION. Occurs in Tropical Africa, India, Ceylon and Australia. In Ceylon, it is rather common in the dry regions, Jaffna, Kalpitiya and along the coast in Eastern and Southern Provinces.

India. Carnatic : *G. Thomson*. Pen. Ind. Orient., *Herb.*, *Wight* 162 ; *Herb. Wight* 9467, Kew Distribution 1866—8. Ceylon. *Thwaites* C.P. 1092. Eastern Prov., Okanda, *Herb. Peradeniya* ; Southern Prov., *Alston* 607, Dec., 1926, leaves glaucous, flowers white.

USES. The fresh juice of the plant is antiseptic and is supposed to cure itch and other skin diseases. The plant is used in the treatment of fever and gonorrhoea. It is believed to promote the flow of the lochial discharge.

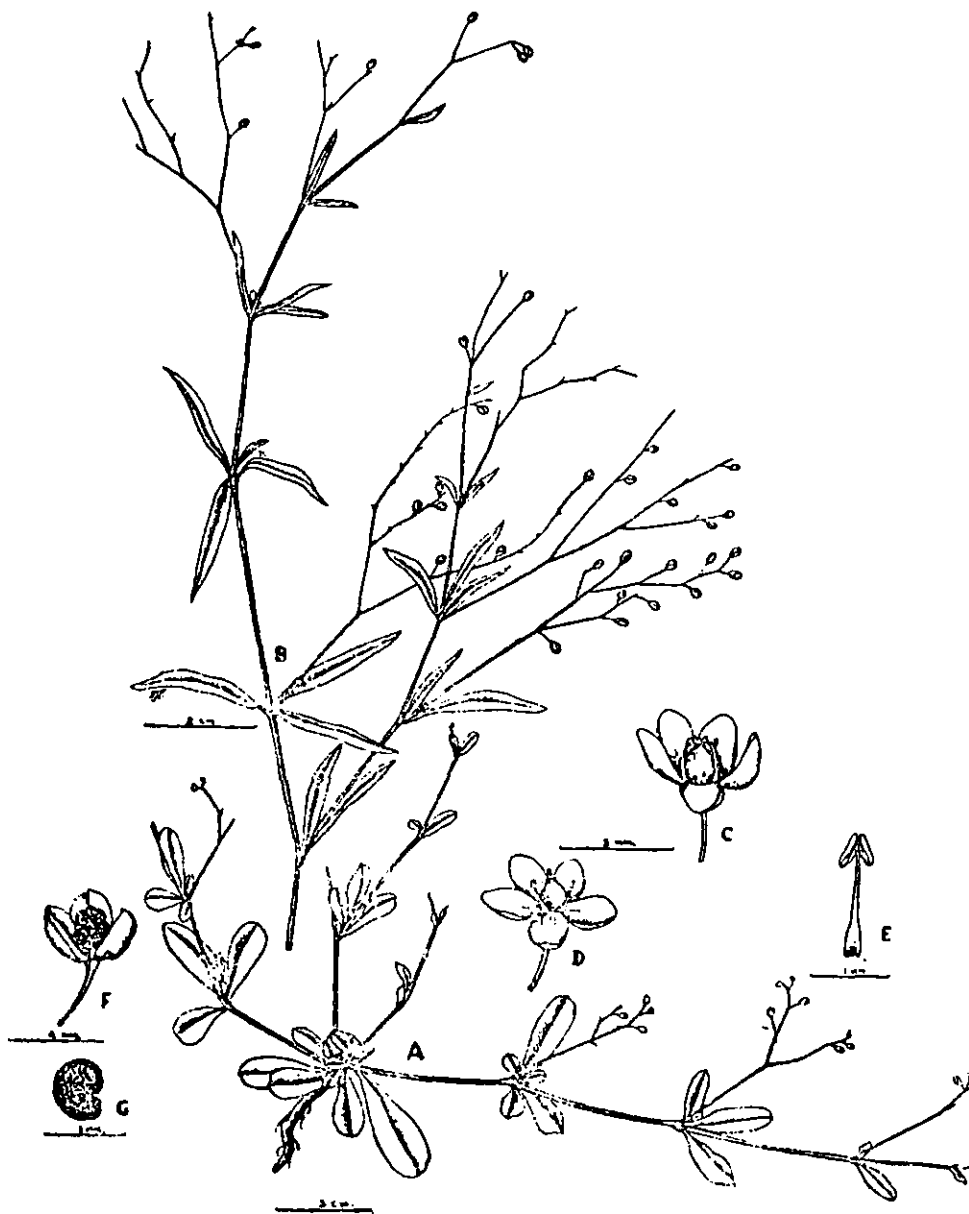


FIG. 15. *Mollugo pentaphylla*. A, whole plant with roots, leaves and flowers. B, a branch of a narrow-leaved form. C, lateral view of a flower of B. D, frontal view of a flower of A. E, stamen. F, dehiscent fruit. G, seed.

4. *Mollugo pentaphylla* Linn., Sp. Pl. 89. 1753. (Fig. 15).

Mollugo stricta Linn.—*Mollugo triphylla* Lour.—*Mollugo linkii* Seringe.—*Mollugo sumatrana* Gandog.—*Pharnaceum strictum* Spreng.—*Pharnaceum triphyllum* Spreng.—*Pharnaceum pentaphyllum* Spreng.

Sinh. Wal-pathpadagam.

An annual herb with slender, glabrous, quadrangular, dichotomously branching, diffuse stems, 7—30 cm high; leaves simple, exstipulate, 2—6 in a whorl at each node, 0.9—2.5 cm long, 0.4—1.2 cm broad, variable from linear-oblong to obovate, much tapering to the base, obtuse or acute and apiculate at apex; petioles obscure; flowers small, white, 4 mm across, regular, bisexual, apetalous, numerous on filiform pedicels arranged in lax, corymbose, terminal cymes; bracts 0.7—1 mm long, ovate or lanceolate; sepals 5, distinct, imbricate, oblong or rotundate-oval, 2 mm long, 1—1.4 mm broad, parallel-nerved and rounded at apex; stamens usually 3, hypogynous, filaments 1—1.2 mm long, broader at the base; ovary superior, 1 mm long, 3-locular with numerous ovules on an axile placenta, styles 3 short; fruit a sub-globose loculicidal capsule with thin walls, 2.2 mm long, 2 mm broad, within or protruding beyond the persistent calyx; seeds numerous, roundish, reniform, 0.6—0.7 mm long, compressed, dark brown, covered with minute tubercular points.

Flowers and fruits almost throughout the year.

ILLUSTRATIONS. Rheede, Hort. Mal. 10 : pl. 26; Kirtikar and Basu, Indian Med. Pl., pl. 473 B. 1933.

DISTRIBUTION. Occurs in India, Ceylon, Malaya, extending on to China, Japan and the Philippine Islands. In Ceylon, it is common in the low-country especially in the dry regions, Elephant Pass, Batticaloa, Kurunegala, Dambulla, Madugoda, etc.

India. Calcutta, Wallich 650 C, Oct. 1836. Madras : G. Thomson. Ceylon. Walker ; Thwaites C.P. 1096; Northern Prov., Elephant Pass, Simpson 9303, March 1932. North Central Prov., Kurunegala, Wetakeyapotha, Alston 1452, Jan. 1927. Central Prov., Madugoda, Simpson 9470; Peradeniya, Bot. Gard., cultivated, Jayaweera 862, July 1952; Jayaweera. 2619, June 1957. Indo-China. Hue and vicinity : Squires 367, Jan-May 1927. Philippine Islands. Cagayan : Sulu Prov., Tawitawi, Ramos and Edano 44187, July-Aug. 1924.

COMPOSITION. Contains saponin and salt-petre.

USES. In India, it is esteemed as a bitter vegetable owing to its stomachic, aperient and antiseptic properties. An infusion of the plant is given to women to promote menstrual discharge. In Malaya, it is used for poulticing sore legs and in Java for sprue.

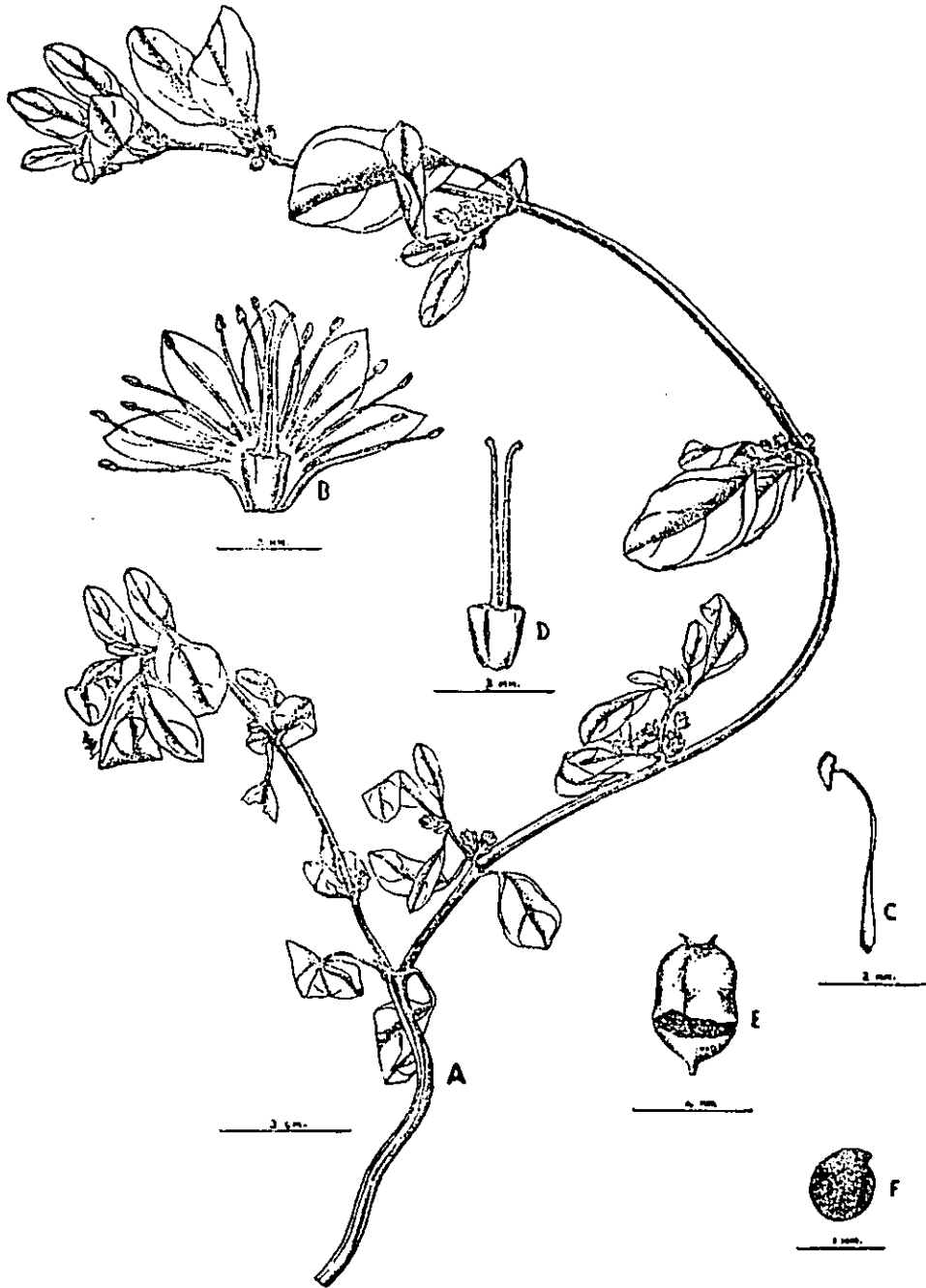


FIG. 16. *Trianthena decandra*. A, branch with leaves and clusters of flowers. B, flower spread out. C, stamen. D, pistil with 2 styles. E, dehiscent fruit with remains of persistent styles. F, seed.

5. *Trianthema decandra* Linn., Mant. 1 : 70. 1767. (Fig. 16).
Zaleya decandra Burm.

Sinh. Maha-sarana ; *Tam.* Vellaisharunnai, Charanai ; *Hindi* Gadabani ; *Sans.* Punarnavi.

A prostrate, succulent, glabrous herb with slightly branched, long, angular stems and internodes 2.5—9.5 cm long ; leaves simple, exstipulate, opposite, somewhat unequal, 2—3.7 cm long, 0.8—2.2 cm broad, oblong-oval, rounded and apiculate at the apex ; petioles puberulous, 0.6—1.2 cm long, much dilated and amplexicaul at the base ; flowers regular, bisexual, 4 mm diameter, apetalous, short-pedicelled in dense, sub-umbellate, axillary clusters ; bracts thin, membranous and acute ; sepals 5, fused at the base into a short calyx-tube, not connate with the ovary, upper segments free, 2.5 mm long, 1.5 mm broad, oval, acute with membranous margins ; petals absent ; stamens 10—15 on the rim of the calyx-tube ; filaments 3.5 mm long ; ovary superior, oval, 3 mm long, truncate at apex with a few basal ovules ; styles 2 ; fruit a membranous 4-seeded capsule, 4.5 mm long with a hard thick truncate cap which is detached by a transverse dehiscence carrying away two of the seeds with it ; seeds orbicular reniform, 1.5 mm diameter, black and somewhat flat on the side.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient. 1 : pl. 296. 1840 ; Burmann f., Fl. Ind. pl. 31, Fig. 3, 1765 ; Kirtikar and Basu, Indian Med. Pl. pl. 472. 1933.

DISTRIBUTION. Occurs in India, Ceylon, Burma, Timor and Ava. In Ceylon, it is rather rare growing chiefly in the dry regions, Jaffna, Trincomalee, Batticaloa, Colombo, Tissamaharama, etc.

Ceylon. *Thwaites* C.P. 1104. North Western Prov., Manner Dist., Mantai, *Herb. Peradeniya*, Feb. 1890. Southern Prov., Tissamaharama, *Alston* 1255, Jan. 1927, flowers pinkish ; *Herb. Peradeniya*, Dec. 1892.

USES. The root of the plant is an aperient and is useful in hepatitis and asthma. Given with milk, it is supposed to be specific for orchitis. The juice of the leaf is dropped into the nostrils to relieve migraine.

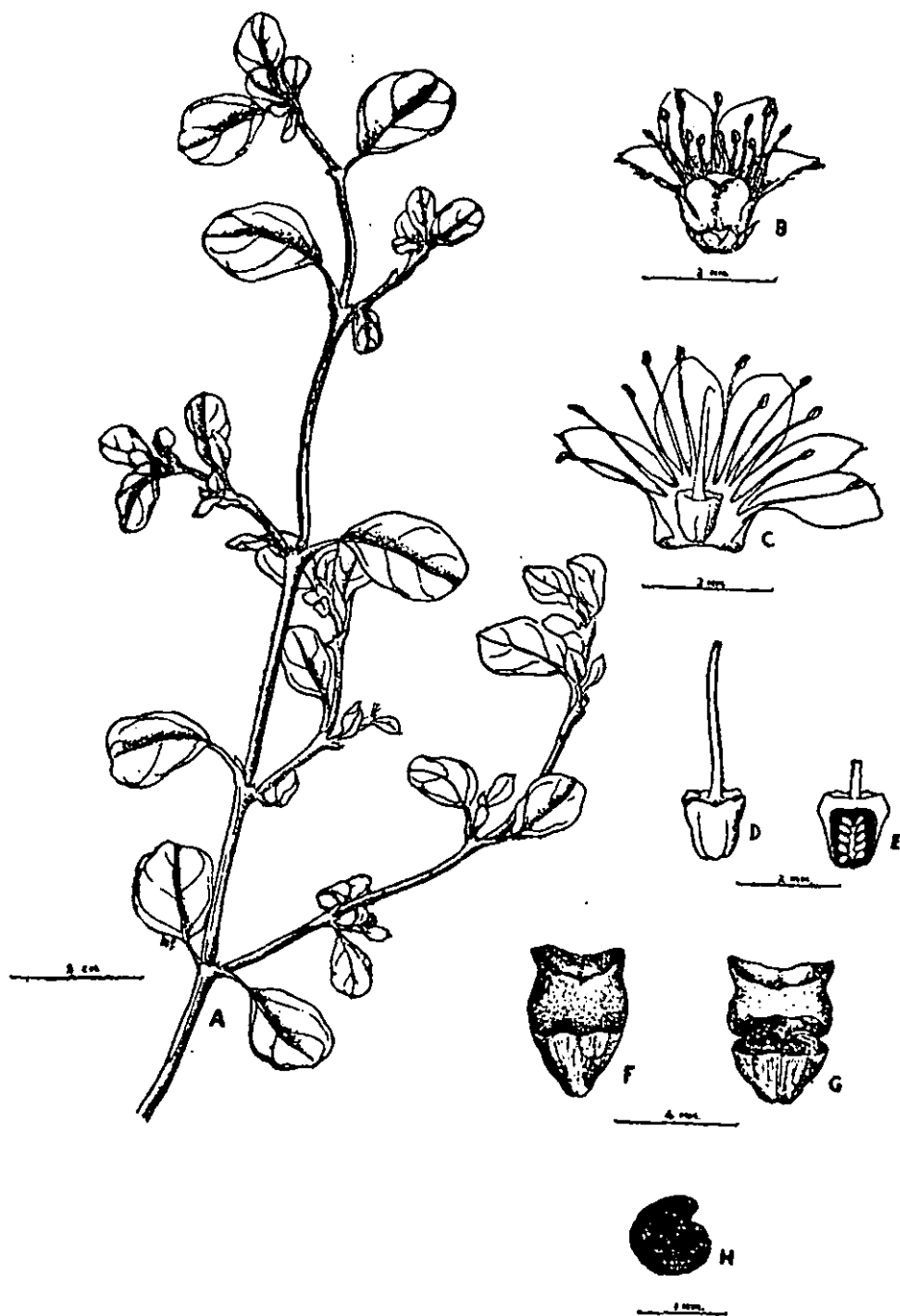


FIG. 17. *Trianthera portulacastrum*. A, a branch of the herb with leaves and flowers. B, side view of the flower. C, flower spread out showing the calyx, stamens and pistil. D, pistil showing the ovary and style. E, longitudinal section of the ovary. F, fruit. G, dehiscing capsule. H, seed.

6. *Trianthema portulacastrum* Linn., Sp. Pl. 223. 1753. (Fig. 17).

Trianthema monogyna Linn.—*Trianthema obcordata* Roxb.—*Trianthema pentandra* Var. *obcordata* DC.—*Portulaca toston* Blanco.—*Portulaca axilliflora* Blanco.

Engl. Horse Purslane; *Sinh.* Hin-sarana; *Tam.* Sharunnai, Shavalai; *Hindi* Salsabuni, Sabuni, Svetsabuni, Vishakhapara; *Sans.* Chiratika, Dhanapatra, Dirghapatrika, Kathilla, Kathillaka, Prithvi, Punaravi, Shashivatica, Shothaghni, Shvetamula, Shvetapunarava, Sitavarshabhu, Varshahi, Varshangi, Vishakha, Vrischira.

A prostrate, much branched, succulent herb with rather angular stems; internodes 2—6 cm long, grooved, hairy and somewhat brownish coloured on the upper surface; leaves simple, obliquely opposite, very unequal, succulent, glabrous, the upper ones larger, 1.5—2.5 cm long, 1.2—3 cm broad, lower ones 1—1.5 cm by 0.7—1 cm, broadly obovate, rounded, emarginate or slightly apiculate, tapering to the base; petioles 0.3—1.2 cm long, grooved above, much dilated and membranous at the base especially of the smaller leaves which form a deep, triangular, axillary pouch containing the solitary, sessile flowers; flowers small, light pink, regular, 4 mm diameter, bisexual, apetalous, sessile, axillary, almost inside the pouch of the petioles of the smaller leaves; bracteoles 2, ovate, 1.7—2 mm long, 1—1.2 mm broad, fused to the calyx-tube; sepals 5, fused at the base into a calyx-tube, not connate to the ovary; calyx lobes free, unequal, oblong, 3 mm long, 1.2—2 mm broad, each bearing a reddish green, hairy peg at the back of the obtuse apex; stamens 10—20, inserted on the rim of the calyx-tube, filaments 1—2.5 mm long; ovary superior, 1.2—2 mm long, unilocular with 7 or more ovules on a basal placenta, the upper part thickened to serve as an operculum at dehiscence; fruit capsule 7 mm long, 5 mm broad, obconical, truncate, somewhat like the cusp of a molar tooth at apex with 1—4 seeds in the upper portion at dehiscence; seeds reniform, black, muriculate, 1.5—1.7 mm diameter.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient. 1: pl. 228. 1840; Kirtikar and Basu, Indian Med. Pl., pl. 47. 1933.

DISTRIBUTION. Occurs throughout India, Ceylon, and most tropical countries. In Ceylon, it grows in the low-country especially on the coast and in the Dry Zone near tanks. Colombo, Kantalai, Anuradhapura, etc.

Ceylon. Eastern Prov., Kantalai, *Herb. Peradeniya*, Aug. 1885. North Central Prov. Polonnaruwa, *Senaratne* 3490, June 1943 in the dry bed of the tank. Central Prov., *Jayaweera* 2949, Nov. 1967, purchased from the Kandy market. Western Prov., Colombo, *Thwaites C.P.* 1102.

COMPOSITION. The root contains a glucoside similar to saponin. The plant is a good source of calcium, iron and phosphorus.

USES. This plant is eaten as a pot herb. The powdered bitter and nauseous root is given in combination with ginger as cathartic. A decoction of the root is an abortifacient and emmenagogue. According to Nadkarni, an infusion of the roots is given for constipation, jaundice, strangury, dropsy, turpid liver and asthma. In Ghana, the plant is applied as a dressing or poultice, while in the Philippine Islands the powdered root is given as a cathartic.

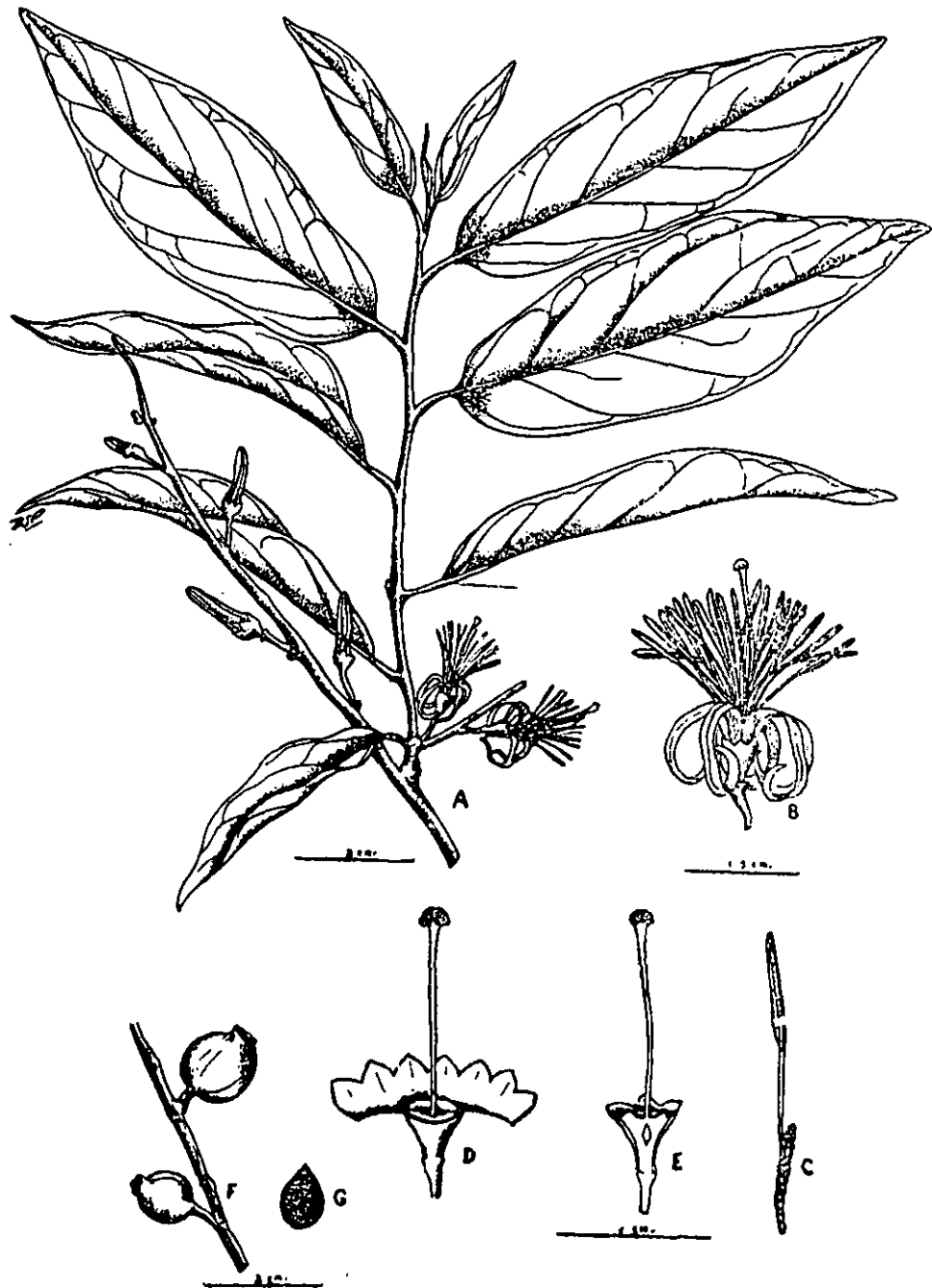


FIG. 18. *Alangium salviifolium*. A, branch with leaves and flowers. B, side view of open flower. C, stamen. D, pistil with sepals spread out. E, longitudinal section of the ovary. F, fruits. G, seed.

3. ALANGIACEAE

1. *Alangium salviifolium* (Linn. f.) Wangerin, *Alangiaceae* in Engl. *Pflanzenreich* 9. 1910. (Fig. 18).

Grewia salviifolia Linn. f.—*Alangium lamarckii* Thw.—*Alangium decapetalum* Lamk.—*Alangium hexapetalum* Lamk.—*Alangium tomentosum* Lamk.—*Alangium sundanum* Kurz.—*Alangium latifolium* Miq.

Sinh. Eepatta, Ruk-anguna; *Tam.* Adigolam, Alangi, Alinjil, An, Angolam, Angolavayiravan, Arulavam, Attigolam, Eginam, Eralinjil, Karikkolam, Karuppuvalinjil, Mul-anninchil, Oru, Sem; *Hindi* Akhaul, Akol, Akola, Anedhera, Ankora, Dhera, Kweli, Thailaankal; *Sans.* Ankola, Ankolaka, Ankota, Ankotaka, Ankotha, Bodha, Bhushita, Dirghakila, Dirghakitaka, Dridhakantaka, Gandhapyshpa, Ghalanta, Gudhapatra, Gudhavallika, Gunadhyaka, Guptasneha, Itikolam, Kankarola, Kathora, Kolaka, Kothara, Lambakarna, Madana, Neolishta, Nikochaka, Nikothaka, Pita, Pitasara, Ramatha, Rechi, Rochana, Sodana, Tamraphala, Vamaka, Vishaghna, Vishalatailagarbha.

A small, erect tree, occasionally with short, sharp, spinous branchlets, whitish bark and pubescent young parts; leaves simple, alternate, exstipulate, variable, 6—15 cm long, 2.2—4.8 cm broad, oblong-oval or oblong lanceolate, acute or rounded at base, more or less acuminate and obtuse at apex with 3—6 pairs of very oblique veins which are prominent beneath, glabrous above, pubescent on veins above and beneath; petioles 0.7—1.2 cm long, pubescent; flowers large, white, regular, bisexual, 2 cm across on densely pubescent pedicels 0.8—1.2 cm long, jointed near the top, in axillary fascicles of 1—3; sepals 6—8 fused into a calyx-tube adnate to the ovary, limb saucer-shaped, pubescent, segments triangular, shallow and acute; petals 6 or 7, valvate, 1.6—2.5 cm long, 0.2—0.25 cm broad, narrowly linear, reflexed, pubescent outside; stamens 20 or more, erect, epigynous, filament about 1 cm long, hairy at the base, anther 0.7—0.8 cm long, basifixed; ovary inferior, 1—locular with a single, pendulous ovule, style 1.6 cm long surrounded at the base by an epigynous disk, stigma large, 4-lobed; fruit a fleshy, nearly globose drupe, 1.5—1.7 cm diameter capped with the persistent calyx, finely pubescent, purplish red; seed solitary, oblong-ovate, 1.3—1.4 cm long, 0.8 cm broad.

Flowers in June and July.

ILLUSTRATIONS. Kirtikar and Basu, *Indian Med. Pl.*, pl. 487A. 1933; *Herb. Peradeniya*, drawing.

DISTRIBUTION. Occurs in East Africa, India, Ceylon, Malaya, Philippine Islands and South China. In Ceylon, it is common in the dry and intermediate regions. Jaffna, Polonnaruwa, Anuradhapura, Kurunegala, Laggala, Hanguranketa, Uma Oya, Dikwella (Uva Prov.), Colombo, etc.

India. Maisor and Carnatic, *G. Thomson*; Pen. Ind. Orient., *Herb. Wight* 1255; *Herb. Wight* 1256, *Kew Distribution* 1866-7. Ceylon *Thwaites C. P.* 760. North Central Prov., Anuradhapura, *Jayaweera* 2661, March 1965; Polonnaruwa, *Herb. Peradeniya*, Sept. 1885; *Alston* 576, May 1927. Central Prov., Hakkinda, *F. W. de Silva* 101, April 1926. Western Prov., *Curator*, Heneratgoda Bot. Gardens. Uva Prov., Uma Oya, *Herb. Peradeniya*, June 1881; Dikwella, *Herb. Peradeniya*, Sept. 1890.

COMPOSITION. Contains the alkaloid akharkantine, the seed alamarckine, root-bark alanginine, alangiums A and B and ankoline, and the bark lamarkine and bases.

USES. The leaves are used as a poultice to relieve rheumatic pains while the root bark is used in piles and as an anthelmintic and purgative. The stem bark is bitter and is used for the treatment of skin diseases and pyrexia. It is a suitable substitute for *Ipecacuanha*. Both bark and root are used as an antidote for cobra-bite poisoning.

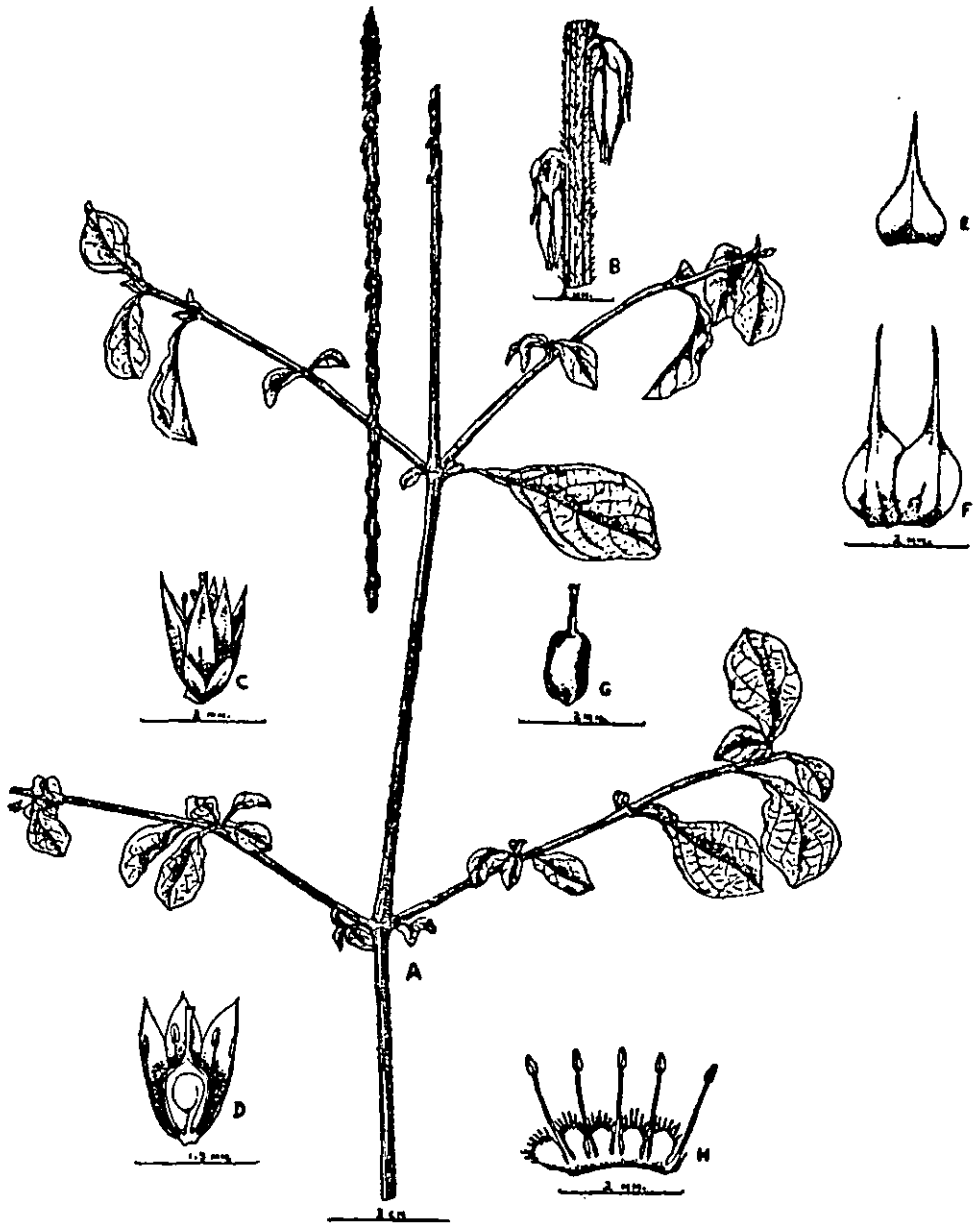


FIG. 19. *Achyranthes aspera*. A. branch with leaves and flower spike. B. portion of flower spike enlarged showing two reflexed flowers. C. lateral view of flower. D. longitudinal section of a flower showing the stamens, pistil and ovary with a pendulous ovule. E. bract. F. bractlets. G. pistil showing the ovary, style and stigma. H. stamens alternating with membranous staminodes.

4. AMARANTHACEAE

1. *Achyranthes aspera* Linn., Sp. Pl. 204. 1753. (Fig. 19).
Desmochaeta repens Llanos.

Engl. Prickly Chaff-flower; *Sinh.* Gaskaralheba, Karalsebo; *Tam.* Nayurivi, Shiru-kadaladi, *Hindi* Apang, Chichra, Chirchira, Chirehitta, Latjira; *Sans.* Adhoghanta, Adhvasalya, Aghamargava, Aghata, Apamarga, Apangaka, Chamatkara, Dhamargava, Durabhigraha, Durgraha, Kantarika, Kanti, Karkata-pippali, Katumanjirika, Kharamanjari, Kini, Kishaparni, Ksharamadhya, Kshuraka, Kubja, Malakanta, Mayuraka, Pandukantaka, Parakpushpi, Pratyakparni, Pratyakpushpi, Shaikharika, Shakhari, Sthalamanjari, Talakata, Vasira.

A herb 30—77 cm tall, stiff, erect with a few spreading branches, cylindrical, hairy, internodes 8—12.5 cm long, striate, somewhat reddish in colour; leaves simple, opposite, few, 2.5—7 cm long, 1.1—4.4 cm broad, obovate, tapering to base, acute, entire but undulate, softly and finely pubescent on both sides; petioles 0.5—2 cm long, hairy, channelled above; flowers small, greenish-white, regular, bisexual, nearly sessile, stiffly reflexed against the rachis densely crowded in slender, woolly pubescent, terminal spikes 30—45 cm long, bracts reflexed, ovate, 2.5—2.7 mm long, 1 mm broad, membranous with a very long, acute point; bractlets very sharply spinescent with a broad, membranous base, 3 mm long along with the spine, 0.7 mm broad, reddish, overlapping each other at the base opposite the bract; perianth 5, free, imbricate, 3.5—4 mm long, 0.7—1 mm broad, oblong-oval, acute, somewhat pubescent outside, glabrous inside with narrow, white, membranous margin, becoming hard and shining in the fruit; stamens 5, connate at base round the ovary with alternating staminodes; filaments very slender, membranous, 1.2 mm long, staminodes large, membranous, 1 mm long, 0.5 mm broad, truncate and fimbriate; ovary superior, obconical or cylindrical, 1.2 mm long, 0.5 mm broad, glabrous, 1-celled with a single, pendulous ovule from a basal funicle; style 0.7 mm long, stigma capitate; fruit small, oblong-cylindrical, truncate, nearly smooth, brown, enclosed in hardened perianth.

Flowers from October to December.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient, pl. 1780. 1852; Kirtikar and Basu, Indian Med. Pl., pl. 793. 1933; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs throughout India, Ceylon, Tropical Africa, Australia and America. In Ceylon, it is a very common weed in dry places in waste land and among grasses.

India. Nepal: *Wallich* 6924H; Silhet: *Wallich* 6924E; *Wallich* 6924G; Punjab: *T. Thomson*, 1000 ft. elevation; Gangetic Plain: *J. D. Hooker* and *T. Thomson*; Maisor and Carnatic, *G. Thomson*, Ceylon. Northern Prov., Feb. 1890 without collector's name; Eastern Prov., Batticaloa. *Thwaites* C. P. 2243; Fort Macdonald, *A. M. Silva*, March 1906. Central Prov., Peradeniya, Bot. Gard., *Jayaweera* 1073, Feb. 1954; *Jayaweera* 2600, May 1957; Western Prov., Ja-Ela, *Rajapakse*, Dec. 1913; Uva Prov., Ohiya, *A. M. Silva*, May 1906. Maldive Islands. *Didi* 160, 1896; Heddufuri, *Gardiner*, 1899—00. Indo-China. Hue and vicinity, *Squires* 80, Jan. - May 1927.

COMPOSITION. Contains an alkaloid. The leaves contain saponin and the fruit a large percentage of alkaline ash containing potash.

USES. The plant is used in the form of a decoction, as a diuretic in dropsical affections and as a laxative. The juice of the leaves relieves toothache. Internally it is taken for dysentery. The root is used for preparations in the treatment of bleeding piles and for retention of memory. The root bark made into a paste with water is applied to the eye for removing opacities in the cornea and on scorpion stings. The ash of the plant is given with bees' honey for coughs. The seed is used in the treatment of hydrophobia. In the Philippine Islands, a decoction of the leaves and roots is used as a diuretic.

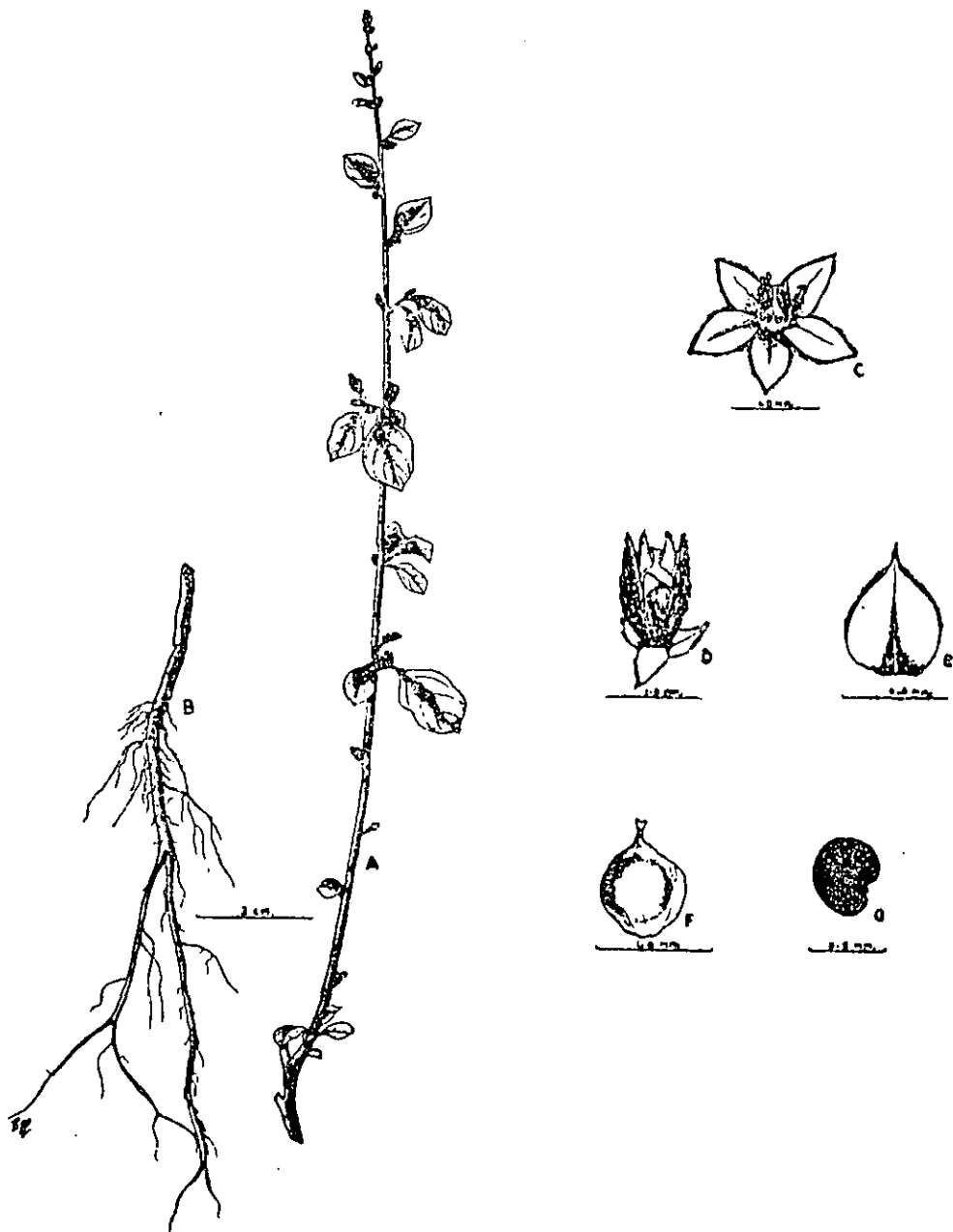


FIG. 20. *Aerva lanata*. A, branch with leaves and flower spikes, B, root. C, front view of flower. D, lateral view of a flower. E, bract. F, fruit. G, seed.

2. *Aerva lanata* (Linn.) Juss, in Ann. Mus. Par. 2 : 131. 1803. (Fig. 20).
Aerua lanata Linn.—*Aerua floribunda* Wight.—*Aerua brachiata* Walp.—*Illecebrum lanatum*
 Linn.—*Achyranthes villosa* Forsk.—*Celosia lanata* Blanco.

Sinh. Polpala, Polkudupala. *Tam.* Sirupulai. *Hindi* Gorkhabundi, Kapurijadi.
Sans. Atmabayda.

Annual herb, 60—75 cm tall, often woody at base ; stems green, erect or prostrate, with numerous, slender, cylindrical, more or less cottony, hairy branches ; leaves simple, alternate, 1.2—3.5 cm long, 0.9—2.5 cm broad, oval or spatulate-oval, tapering to base rounded or subacute at apex, entire, finally hairy pubescent above, whitish hairy cottony beneath ; petiole 0.4—1 cm long, hairy ; flowers greenish white, very small, regular, bisexual, sessile in dense, axillary heads or spikes, bracts shorter than sepals, 1 mm long, 0.5 mm broad, ovate, apiculate, membranous, hairy outside ; perianth 5 lobes, oblong to oblong-ovate, 1.2—1.5 mm long, apiculate, densely cottony, woolly outside with membranous margins ; stamens 5, connate at base with 5 interposed staminodes forming a cup round the ovary ; ovary superior, 1-locular with a solitary ovule pendulous from a basal funicle, style and bifid stigmas very short ; fruit indehiscent, somewhat flattish, 0.8 mm long, 0.6 mm broad, ovate with a membranous pericarp, enclosed in persistent cottony perianth segments ; seeds only one to a fruit and black in colour.

Flowers almost throughout the year.

ILLUSTRATIONS. Rheede, Hort. Mal. 10 : pl. 29 ; Burman Fl. Zely. pl. 60, f.1 ; Wight, Ic. Pl. Ind. Orient. pl. 723 and pl. 1776 bis f. A ; Kirtikar and Basu, Indian Med. Pl. pl. 792, 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs throughout India, Ceylon, Malaya, Java, Sumatra and in Tropical Africa. In Ceylon, it is a common weed in the mid and low-country especially in the Dry Zone both in waste and cultivated ground.

India. Upper Gangetic Plain *T. Thomson* ; *Wallich* 6909 *D.* Maisor and Carnatic, *G. Thomson*. Madras, Coimbatore, 1840 without collector's name. Pen. Ind. Or., *Herb. Wight* 2442, Kew Distribution 1866—1888. Ceylon. *Thwaites* C. P. 2253 ; Uva Prov., *Bibile, J. M. Silva*, Oct. 1922. *Moldive Islands* *Didi* 151, 1896 ; *Horsburgh Atoll, Gardiner*, 1899—1900 ; *Hulule, Gardiner* 72, 1899—1900 ; *Minikoi, Gardiner* 39, 1899 ; *Christopher*, 1898.

USES. A decoction of the plant is a reputed diuretic and considered of great value in lithiasis. The plant is also used for coughs and as a vermifuge for children. The roots are used in the treatment of headaches.

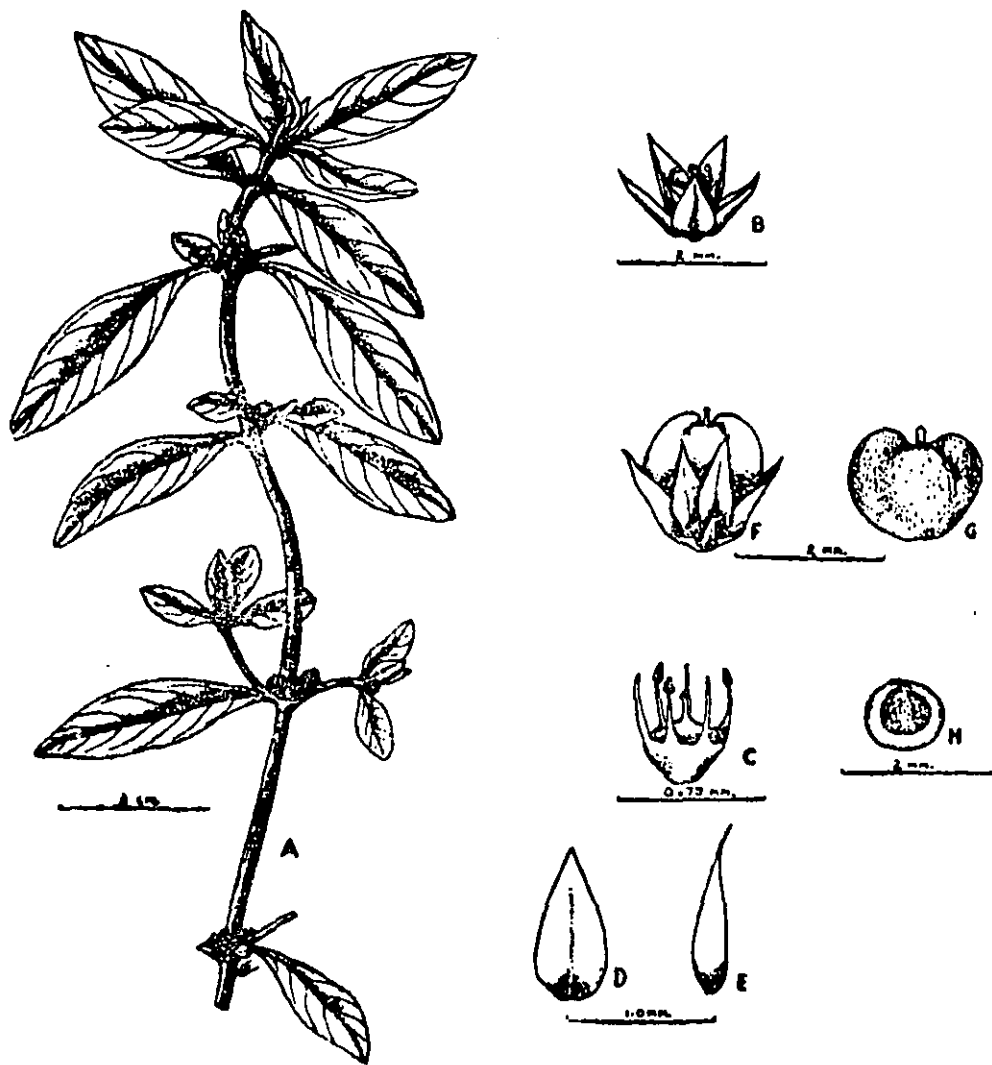


FIG. 21. *Alternanthera sessilis*. A. branch with leaves and flower heads. B. lateral view of a flower. C. flower with perianth removed showing 3 fertile stamens alternating with antherless staminodes, all united to form a cup round the ovary. D. bract, E. bractlet. F. fruit with persistent perianth. G. fruit with persistent style. H. seed.

3. *Alternanthera sessilis* (Linn.) R. Br., Prodr. 417—1810. (Fig. 21).

Alternanthera triandra Lamk.—*Gomphrena sessilis* Linn.—*Alternanthera denticulata* Wall.—*Alternanthera prostata* Don.—*Achyranthes triandra* Roxb.—*Illecebrum sessilis* Linn.—*Achyranthes villosa* Blanco.—*Illecebrum triandrum* Llenos.

Sinh. Mucunuwenna ; *Tam.* Ponnankani, Pounanganni ; *Hindi* Majriya ;
Sans. Shalingcha, Meenakshi, Paththera.

A prostrate herb with numerous, subquadrangular, glabrous stems, 15—60 cm long, often rooting at nodes ; internodes 1.5—7 cm long, younger ones with 2 opposite lines of hairs, often purplish red ; leaves simple, opposite, 1.5—5 cm long, 0.7—1.7 cm broad, varying in shape from linear to oblong-oval, nearly sessile, tapering to base, subacute, very faintly serrate, glabrous, veins 6—9 lateral pairs, prominent below ; flowers white, regular, bisexual in densely crowded, small, axillary heads, sometimes slightly spicate, bracts membranous, 0.7 mm long, 0.4 mm broad, ovate, acute, bractlets as long but narrower and cuspidate ; perianth segments 5, 1.6—1.8 mm long, 0.6—0.8 mm broad, oblong-ovate, scarious, acute ; stamens 3 ; filaments 0.5 mm long, with 3, alternating, antherless staminodes, all united at base to form a short cup round the ovary ; anthers 1-celled ; ovary superior, 0.5 mm long and as broad, glabrous, 1-locular with a single pendulous ovule from a basal funicle, style 0.2 mm long ; fruit flat, kidney-shaped, 2 mm long and as broad enclosed in the persistent perianth segments ; style persistent in the depression, 1-seeded ; seed round, 1.2 mm diameter, glabrous and shining, depressed at the hilum.

Flowers all the year round.

ILLUSTRATIONS. Rheedee, Hort. Mal. 10 : pl. 11 ; Wight, Ic. Pl. Ind. Orient. pl. 727. 1840—1843 ; Kirtikar and Basu, Indian Med. Pl. pl. 794, 1933 ; Herb. Peradeniya., drawing.

DISTRIBUTION. Occurs in humid places throughout the warmer parts of India, Ceylon and other tropical countries. In Ceylon, this plant is very common growing in wet places in the low-country especially around tanks and ponds.

India. Wallich 6921 c ; Punjab, etc., T. Thomson ; Upper Gangetic Plain T. Thomson and J. D. Hooker ; Assam. Simons ; Dehra Dun, King ; Maisor and Carnatic, G. Thomson ; Concan, etc., Stocks. **Ceylon.** Central Prov., Thwaites C. P. 2908 ; Peradeniya, Bot. Gard., Jayaweera 2872, Oct. 1966 ; Southern Prov., Tissa Tank, Dec. 1882 without collector's name. **Andaman Islands.** South Andamans, Ranguchang, King, May 1891 near sea coast. **Indo-China.** Hue and vicinity, Squires 39, Jan.-May 1927. **Philippine Islands.** Luzon ; La Union Prov., Lete 1, 1927. Alabat Island : Ramos and Edano 48331, Sept.-Oct. 1926. **French Guiana.** Herb. Sagot 480, 1857.

COMPOSITION. The vegetative and reproductive parts of this plant are said to contain traces of hydrocyanic acid.

USES. This plant is a popular pot herb, frequently eaten in Ceylon. It is a cholagogue laxative, and is useful in chronic congestion of the liver, biliousness and dyspepsia associated with sluggish liver. Owing to its diuretic and diluent properties it may be employed with advantage in acute and chronic pyelitis, cystitis, gonorrhoea, and strangury. It is also said to increase the flow of milk in nursing mothers. The expressed juice of the plant is given with cow ghee for the treatment of snake-bite. In West Tropical Africa it is used as a poultice for boils, abortifacient and remedy for indigestion, while in Madagascar it is often used as a galactagogue.



FIG. 22. *Amaranthus paniculatus*. A, terminal branch of a plant with leaves and inflorescences. B, male flower. C, female flower. D, pistil. E, seed.

4. *Amaranthus paniculatus* Linn., Sp. Pl. ed. 2, 1406. 76. (Fig. 22).

Amaranthus speciosus Sims. — *Amaranthus sanguineus* Linn. — *Amaranthus strictus* Willd. — *Amaranthus frumentaceus* Ham. — *Amaranthus farinaceus* Herb. Roxb. — *Amaranthus anacardana* Ham. — *Amaranthus flavus* var. *bracteatus* Linn. — *Amaranthus caudatus* Merr.

Sinh. Rana-tampala ; *Hindi* Chuamarsa, Ganhar, Kalgghasa ; *Sans.* Rahadri, Rajagiri, Rajashakini.

A tall annual, 1.2—1.8 m high with stout, grooved and striate, glabrous or slightly pubescent stems ; leaves simple, alternate, 5—15 cm long, 2.5—7.5 cm broad, elliptic-lanceolate, acute or acuminate, base cuneate, nerves slender, numerous, prominent beneath ; petioles 2.5—10 cm long ; flowers small, unisexual, monoecious or polygamous, numerous in dense, thyrsoid, gold-coloured or red spikes, the central spikes the longest ; bracteoles 0.3—0.5 cm long, acicular exceeding the sepals ; male flowers : perianth 5, segments membranous, equal or subequal, 2—2.5 mm long, 0.5 mm broad, oblong-lanceolate, acute, shortly awned ; stamens 5, filaments free, anthers 2-celled ; female flowers : perianth same as in the male flower ; ovary superior, 1.5—1.7 mm long, 1-locular with a single erect ovule ; styles 3, short ; fruit capsule 3 mm long, ovoid, narrowed at the tip, circumscissile above the middle ; seeds 1.2—1.5 mm long, 1 mm broad, subglobose, white, red or black.

Flowers in October.

ILLUSTRATIONS. Curtis, Bot. Mag. pl. 2227. ; Wight, Ic. Pl. Ind. Orient 2 : pl. 720. 1840—1843. Kirtikar and Basu, Indian Med. Pl. pl. 789, 1933.

DISTRIBUTION. Occurs as an escape or cultivated in India, Ceylon, Malaya, Tropical Asia, Africa and Philippine Islands.

India. Nepal, Wallich 6903 B, 1821. Sikkim ; cultivated, J. D. Hooker ; Serampore Gard., Voigt. *Ceylon.* Central Prov., Kandy, Herb. Peradeniya, cultivated.

COMPOSITION. The seeds contain carbohydrate and protein.

USES. The seeds and tender leaves are eaten in Iran and Iraq. Certain hill tribes in India and Africa use the grain as a staple food. Medicinally, the plant is used as a diuretic for strangury. It is given for scrofula and applied topically to scrofulous sores. It is also said to be useful in piles and purifies blood. The extract of the leaves relieves pains and congestion in the chest.

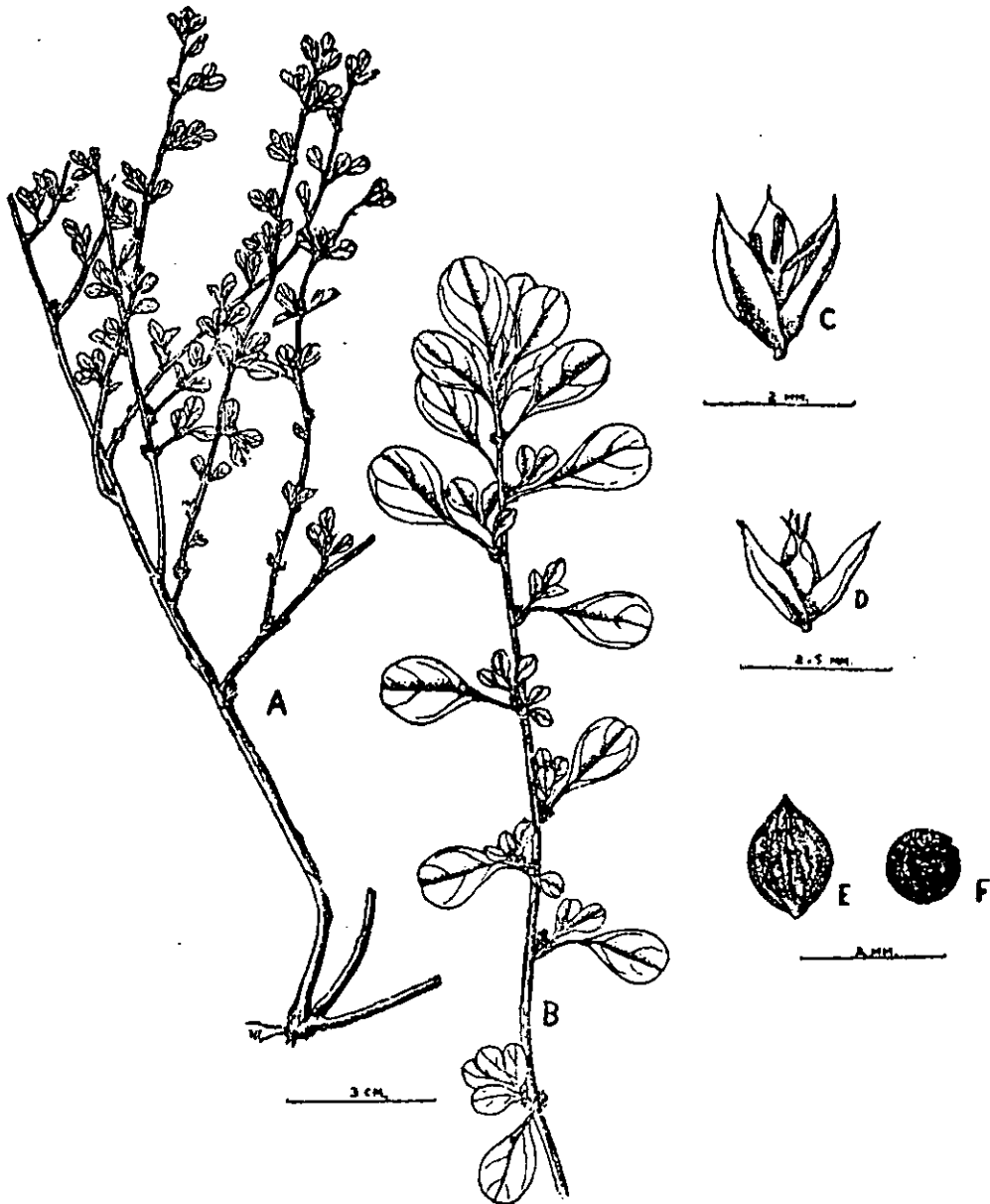


FIG. 23. *Amaranthus polygonoides*. A and B. branches from two forms of the herb showing leaves and clusters of flowers. C. male flower. D. female flower. E. fruit showing the wrinkled pericarp. F. seed.

5. *Amaranthus polygonoides* Linn., *Amoen*, Acad. 5 : 409. 1760. (Fig. 23).
Amaranthus polygamus Linn. — *Euxolus polygonoides* Thw.

Sinh. Walutampala ; *Tam.* Araikkirai, Punniyakam, Punniyaku ; *Hindī* Chumli sag ; *Sans.* Tanduleeya.

A prostrate, glabrous herb with many spreading branches ; leaves small, 0.7—1.5 cm long, 0.5—1 cm broad, obovate or obovate-lanceolate or spatulate, obtuse or rounded at apex, sharply apiculate, tapering to the petiole, stiff and glabrous ; petioles 0.3—1 cm. long, grooved on the upper surface ; flowers regular, small, unisexual, monoecious, 2 mm long, numerous in axillary clusters, bracts subulate, sharply acuminate ; sepals 3, lanceolate or oblong, 2 mm long, 0.8 mm broad, membranous, acuminate with an awn at the apex ; petals absent ; male flowers : stamens 3, versatile, filaments free, anther 0.7 mm long, staminodes absent ; female flowers : ovary superior, unilocular with a single basal ovule, styles 3 ; fruit a membranous, urceolate, indehiscent capsule, 1.5 mm long, 1.2 mm broad, tapering to a sharp point with deeply wrinkled and persistent sepals ; seed lenticular, 1 mm diameter, dark brown with raised border.

Flowers all the year round.

ILLUSTRATION. Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs throughout India and Ceylon and in all tropical countries. In Ceylon, it is a common weed growing in dry waste places and roadsides in the dry zone.

Ceylon. *Thwaites C. P.* 3643. North Central Prov., Galkulam, *Herb. Peradeniya.*, Aug. 1885. Southern Prov., Tissamaharama, *Herb. Peradeniya*, Dec. 1882.

USES. The root of this plant is believed to be efficacious in menorrhagia and is taken internally for gonorrhoea stopping muco-purulent discharge, scalding and general irritation. A paste of the root taken with rice water is excellent for menorrhagia.

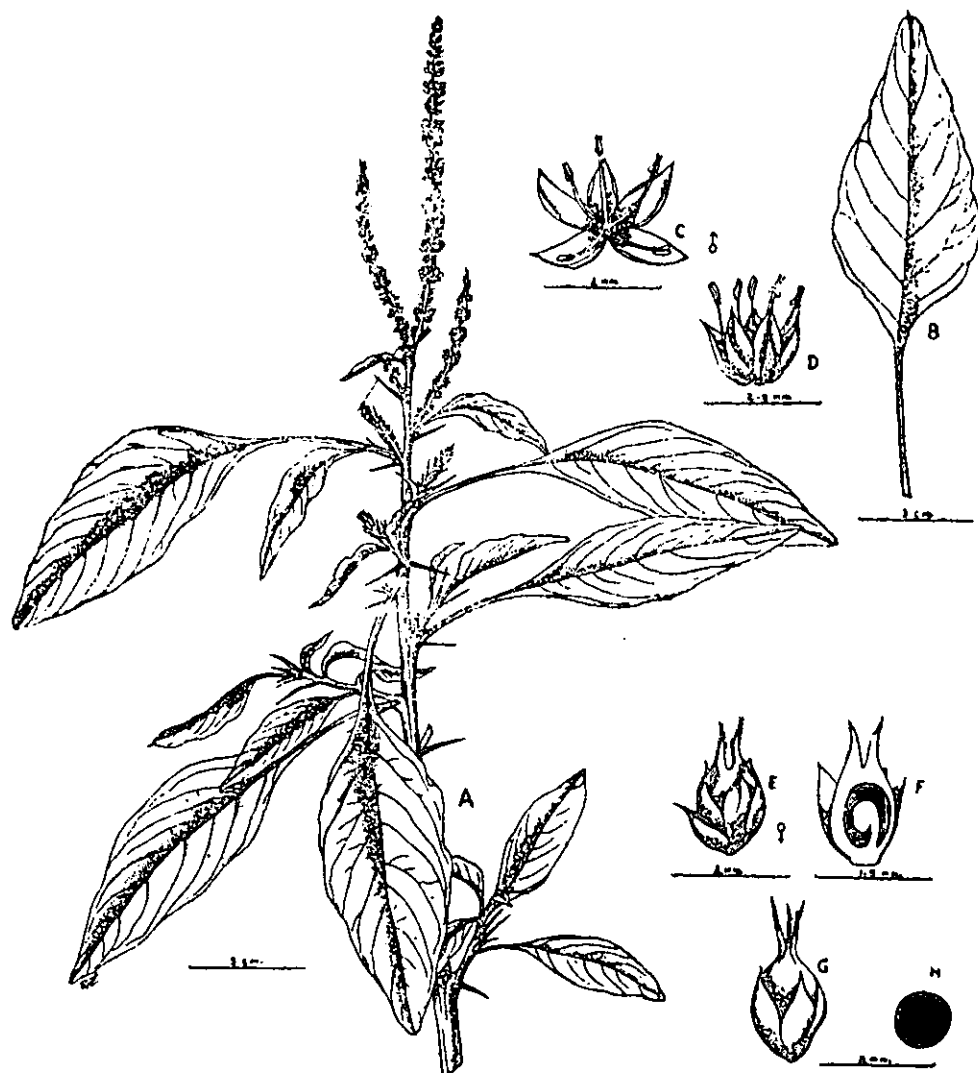


FIG. 24. *Amaranthus spinosus*. A. branch with leaves, spines and flower spikes. B. leaf. C. front view of male flower. D. lateral view of same. E. lateral view of female flower. F. longitudinal section of female flower showing the erect ovule. G. fruit with persistent perianth segments. H. seed.

6. *Amaranthus spinosus* Linn., Sp. Pl. 991. 1753. (Fig. 24).

Engl. Prickly Amaranth ; *Sinh.* Katu-tampala ; *Tam.* Mullukkirai, Mudkirai ; *Hindi* Cholai, Kantenatia ; *Sans.* Alpamarisha, Bahuvirya, Bhandira, Ghamasrana, Granthila, Kandakamarisha, Kandra, Meghanada, Pathyashaka, Sphurjathu, Sushaka, Svanitavhaya, Tandula, Tandulanama, Tanduleraka, Tandulibija, Tanduliya, Vira, Vishaghna.

An annual herb; stem 0.3—1.02 m tall, green, stout, glabrous and shining, much branched, cylindrical with a pair of very sharp divaricate spines in leaf axils at the base of the bud or branch; leaves simple, alternate, 3—8 cm long, 1.3—4.3 cm broad, ovate-lanceolate, tapering to the base, retuse at apex with a spine, entire, undulate, glabrous and dark green above, paler beneath, lateral veins 6—11 pairs, prominent beneath; petioles 1—6.5 cm long and glabrous; flowers regular pale green, unisexual, monoecious, very small, numerous, sessile, in dense clusters both axillary and terminal, interrupted spikes, male flowers fewer than female, mixed and maturing earlier; bracts 1—1.5 mm long, ovate, bristle pointed; perianth segments 5, ovate, 1.5—2.5 mm long, 0.7 mm broad, imbricate and bristle pointed; male flowers 2.5—3 mm across, stamens 5, distinct, spreading, free, filaments 2.5 mm long and without staminodes; female flowers: ovary superior, 1 mm long, 1—locular with a solitary erect ovule; styles 2 or 3 linear, spreading and hairy; fruit 1.2—1.5 mm long, very thin, circumscissile with persistent perianth segments; seeds orbicular 1 mm diameter, black and polished.

Flowers and fruits from September to December.

ILLUSTRATIONS. Willd., *Amaranth.*, pl. 4, f. 8; Herm., *Hort. Acad. Lugd.-Bat.*, pl. 33; Wight, *Ic. Pl. Ind. Orient.*, pl. 513. 1840-1843; Kirtikar and Basu, *Indian Med. Pl.*, pl. 788. 1933; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs as a weed in waste ground throughout India, Ceylon and other tropical countries. In Ceylon, it is very common on waste ground.

Ceylon. Eastern Prov., Trincomalee, *Thwaites C. P.* 2910; Central Prov., Peradeniya *Jayaweera* 340, Jan. 1951; *Jayaweera* 2873, Oct. 1966. **Malaya.** Penang, Bot. Gard., *Curtis* 245. **Maldiv Islands.** Male, *Gardiner*, 1899-00. **Indo-China.** Hue and vicinity, *Squires* 228, Jan.-May 1927. **Formosa.** *Oldham* 417, 1864. **Philippine Islands.** Luzon: La Union Prov., *Lete* 40, 1927.

COMPOSITION. Both vegetative and reproductive parts of the plant contain traces of hydrocyanic acid. The fresh tender leaves contain vitamin C and mucilage.

USES. The plant is used as a sudorific and febrifuge and is recommended for eruptive fevers. The leaves are considered a good emollient, lactagogue and a specific for colic. Externally, the bruised leaves are applied locally on eczema. The root is considered a specific for gonorrhoea as it is a mild diuretic and demulcent to the urinary tract. The young leaves are often eaten as a pot herb. In Ghana, an enema prepared from the plant is given for piles. In the Philippine Islands the plant is used as a sudorific, febrifuge and galactagogue while in Malaya and Mauritius, it is employed as a diuretic.

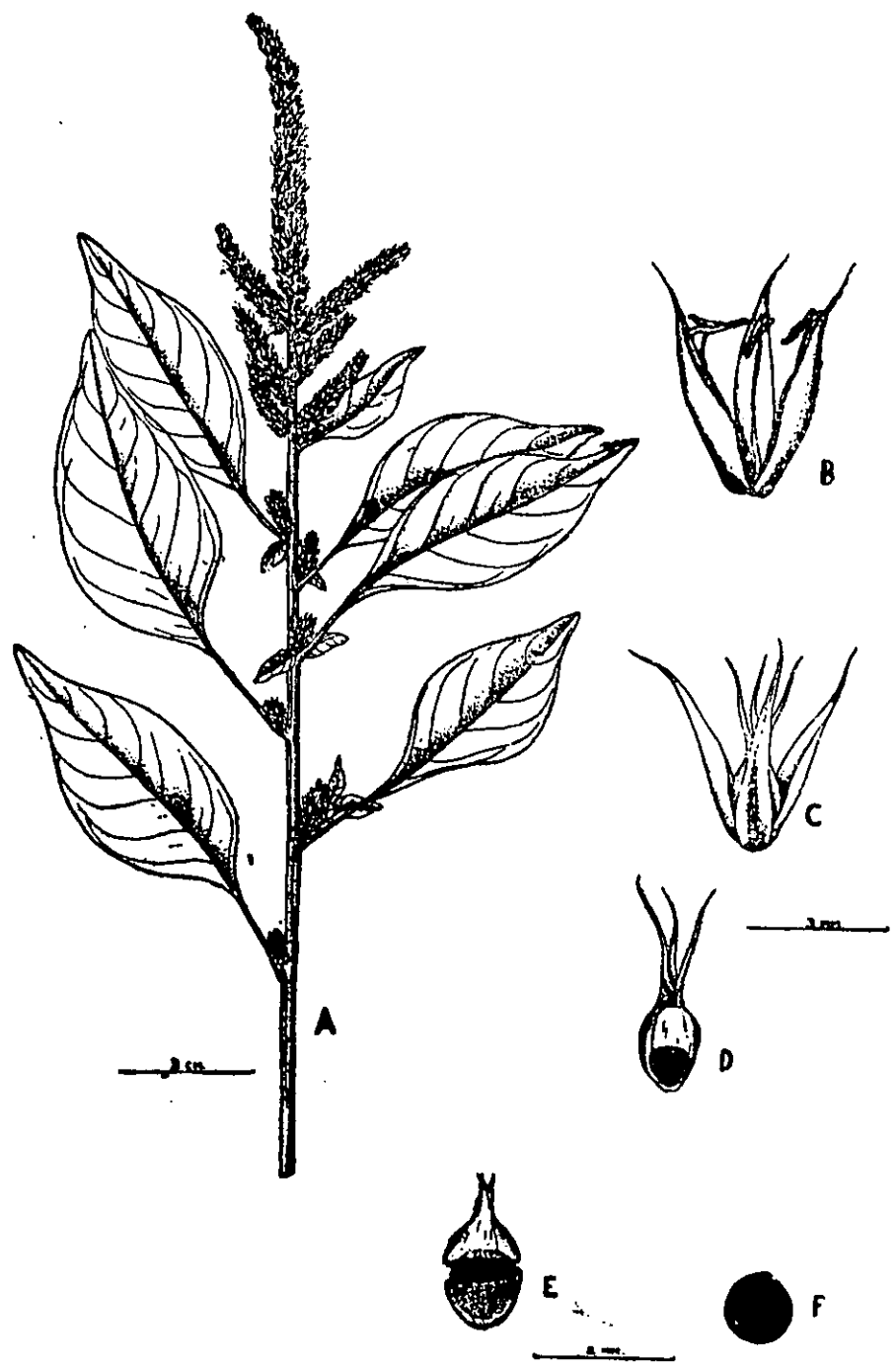


FIG. 25. *Amaranthus tricolor*. A. terminal portion of a branch with leaves and flower spikes. B. male flower. C. female flower. D. pistil showing the ovary with basal ovule and 3 styles. E. dehiscent fruit. F. seed.

7. *Amaranthus tricolor* Linn., Sp. Pl. 989. 1753. (Fig. 25).

Amaranthus gangeticus Linn.—*Amaranthus lanceolatus* Roxb.—*Amaranthus tristis* Linn.—*Amaranthus oleraceus* Roxb. (non Linn.)—*Amaranthus polygamus* Roxb. (non Linn.)—*Amaranthus lividus* Roxb.—*Amaranthus amboinicus* Herb. Ham.—*Amaranthus inamoenus* Willd.—*Amaranthus melancholicus* Linn.—*Amaranthus mangostanus* Linn.

Engl. Love-lies-bleeding, Red Cock's-comb ; *Sinh.* Sudu-tampala ; *Tam.* Arikkirai; Chirukirai ; *Hindi* Lalnatiya, Rajkiri ; *Sans.* Marisha.

A stout, erect, annual herb, 0.6—1.2 m high, often tinged purple, glabrous or slightly pubescent, grooved and striate ; leaves simple, alternate, variable, 5—15 cm long, 2.5—10 cm broad, rhomboid oval or lanceolate or deltoid-ovate, thin, glabrous, obtuse, bristle-pointed, often finely erose on the margin, much tapering to base and decurrent on long petioles, veins prominent beneath; petioles 2.5—9 cm long; flowers small, pale green, unisexual, monoecious in large axillary clusters and in long, branched, interrupted, drooping, terminal spikes ; bracts numerous, 4—5 mm. long, 0.5—1.5 mm broad, membranous with a long awn at apex ; sepals 3, 4—5 mm long, 1—1.2 mm broad, lanceolate, membranous with the apex continued into a long, filiform capillary awn; male flowers : stamens 3, distinct, free, filaments 3 mm long, anther 1.5 mm long, versatile, staminodes absent; female flowers : ovary superior, 1.5 mm long, obovoid, unilocular with a solitary, erect basal ovule; styles 3, filiform ; fruit capsule 2.5 mm long, ovoid, membranous, circumscissile about the middle, enclosed in persistent perianth segments ; seed solitary, 1.5 mm diameter, black, smooth and shining with a narrow raised border.

Flowers during April, July, and from October to December.

ILLUSTRATIONS. Willdenow, *Amaranth.*, *pl.* 6, *fig.* 11 ; *pl.* 7, *fig.* 14 ; Wight, *Ic. Pl Ind. Orient.* 2 : *pls.* 713 and 715, 1840—1843 ; Kirtikar and Basu, *Indian Med. Pl.* *pl.* 790 1933.

DISTRIBUTION. Occurs throughout Tropical America, Africa, Asia, India and Ceylon. In Ceylon it is a common weed in the low-country but always as an escape from cultivation.

India. *Wallich* 6899A ; *Wallich* 6899B without locality. *Ceylon.* Eastern Prov., Trincomalie, *Glenie* 2, April 1860 ; *Guneratnam*, July 1951 ; *Thwaites C. P.* 3629. Western Prov., Kalutara, *Gardner*.

USES. This plant is an astringent and is recommended for menorrhagia, diarrhoea, dysentery and haemorrhages from the bowels. Externally, it is used as a gargle in ulcerated conditions of the mouth and throat and as a wash and poultice for ulcers and sores.

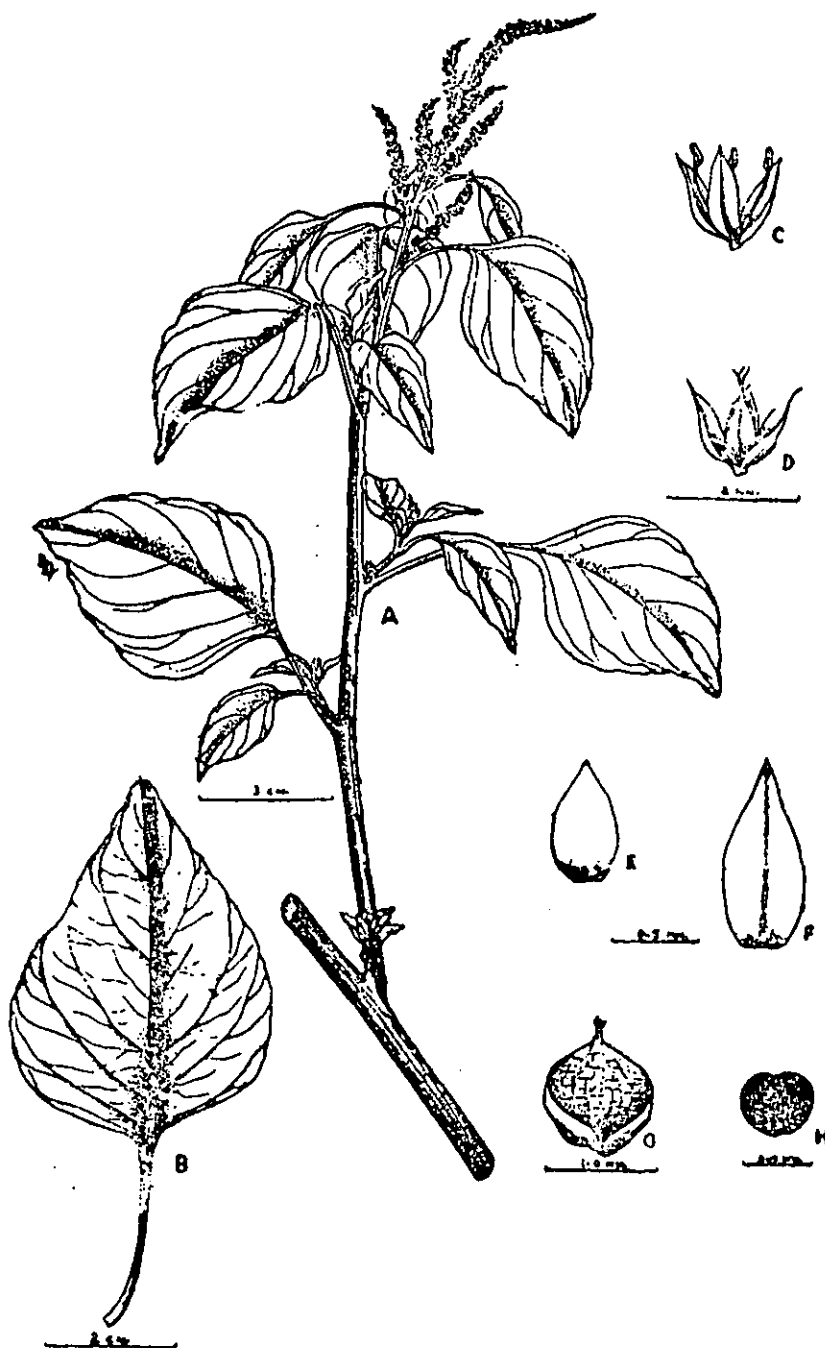


FIG. 26. *Amaranthus viridis*. A, branch with leaves and flowering spikes. B, leaf. C, male flower. D, female flower. E, bract. F, perianth segment. G, fruit. H, seed.

8. *Amaranthus viridis* Linn., Sp. Pl. 1405. 1753. (Fig. 26).

Amaranthus polystachyus Ham.—*Amaranthus fasciculatus* Roxb.—*Euxolus caudatus* Moq.—*Euxolus viridis* Moq.—*Albersia caudata* Boiss.—*Chenopodium caudatum* Jacq.—*Amaranthus gracilis* Desf.

Sinh. Kuratampala ; *Tam.* Araikkirai ; *Sans.* Tanduliya, Vishaghna.

A much branched, erect annual, stem 30—56 cm tall, cylindrical, glabrous and shining, purplish ; leaves simple, alternate, 3—6.3 cm long, 1.6—4.7 cm broad, ovate, truncate or acute at base, notched at apex with a spine at the base of the notch, glabrous on both sides, margin very finely and faintly serrate, reddish, veins 5—8 pairs, prominent below; petioles 0.8—5.4 cm long; flowers small, unisexual, monoecious, sessile in clusters on slender, tapering, interrupted, terminal and axillary paniculate spikes; bracts 0.5—1.5 mm long, 0.2—0.4 mm broad, ovate, acute, glabrous ; perianth 3, broadly oval, 1.2—1.5 mm long, 0.5 mm broad, subacute, membranous with a green keel ; stamens 3, distinct, free, opposite perianth segments, filaments 1—1.2 mm long, anthers 0.5 mm long, staminodes absent ; ovary superior, 0.5 mm tall, ovate, glabrous, 1—locular with a single erect basal ovule, styles 2 or 3 short ; fruit 1.5 mm long, compressed, rugose, glabrous, indehiscent with a membranous pericarp enclosed in persistent perianth leaves ; seed blackish, lenticular, 1 mm across, glabrous and shining.

Flowers from October to December.

ILLUSTRATIONS. Wight, *Ic. Pl. Ind. Orient. pl.* 717. 1840—1843 ; Jacq., *Ic. Rar. pl.* 344.

DISTRIBUTION. Occurs in all tropical countries including India and Ceylon. It is a very common gregarious weed in Ceylon along road-sides and waste ground.

India. Khasia ; *Garden Collector.* Assam : *Matley.* Maisor and Carnatic. *G. Thomson.* Ceylon. Central Prov., Kandy, *Alston,* Aug. 1928 ; Maturata, *A. M. Silva,* May 1906 ; Hatton, *Willis,* May 1906 ; Ambewela, *A. M. Silva,* March 1906 ; Peradeniya, *J. M. Silva,* July 1930 ; Pilimalalawa, *Jayaweera* 2879, Oct. 1966. Western Prov., Colombo, *Thwaites C. P.* 2911. Maldiv Islands. *Didi* 128, 1896 ; Minikoi, *Gardiner* 23, 1899—00.

COMPOSITION. Contains an alkaloid and is rich in calcium and iron. It is a good source of vitamins B and C. The powdered leaves yield a tannin, some reducing sugar and resin.

USES. This plant is a cholagogue, mild diuretic and demulcent to the urinary tract and is used with good results in chronic congestion of the liver, in irritable conditions of the bladder and in gonorrhoea when there is a burning sensation in passing water. It is largely employed as a haemostatic in haematuria, menorrhagia and bleeding from haemorrhoids. It is also used as an antidote for snake-bite, stings of wasps and bites of centipedes. The leaves are applied as a poultice to inflammations, boils and abscesses with beneficial effects. In Brazil, an infusion of the plant is used as a diuretic and galactagogue. The tender leaves are a popular vegetable.

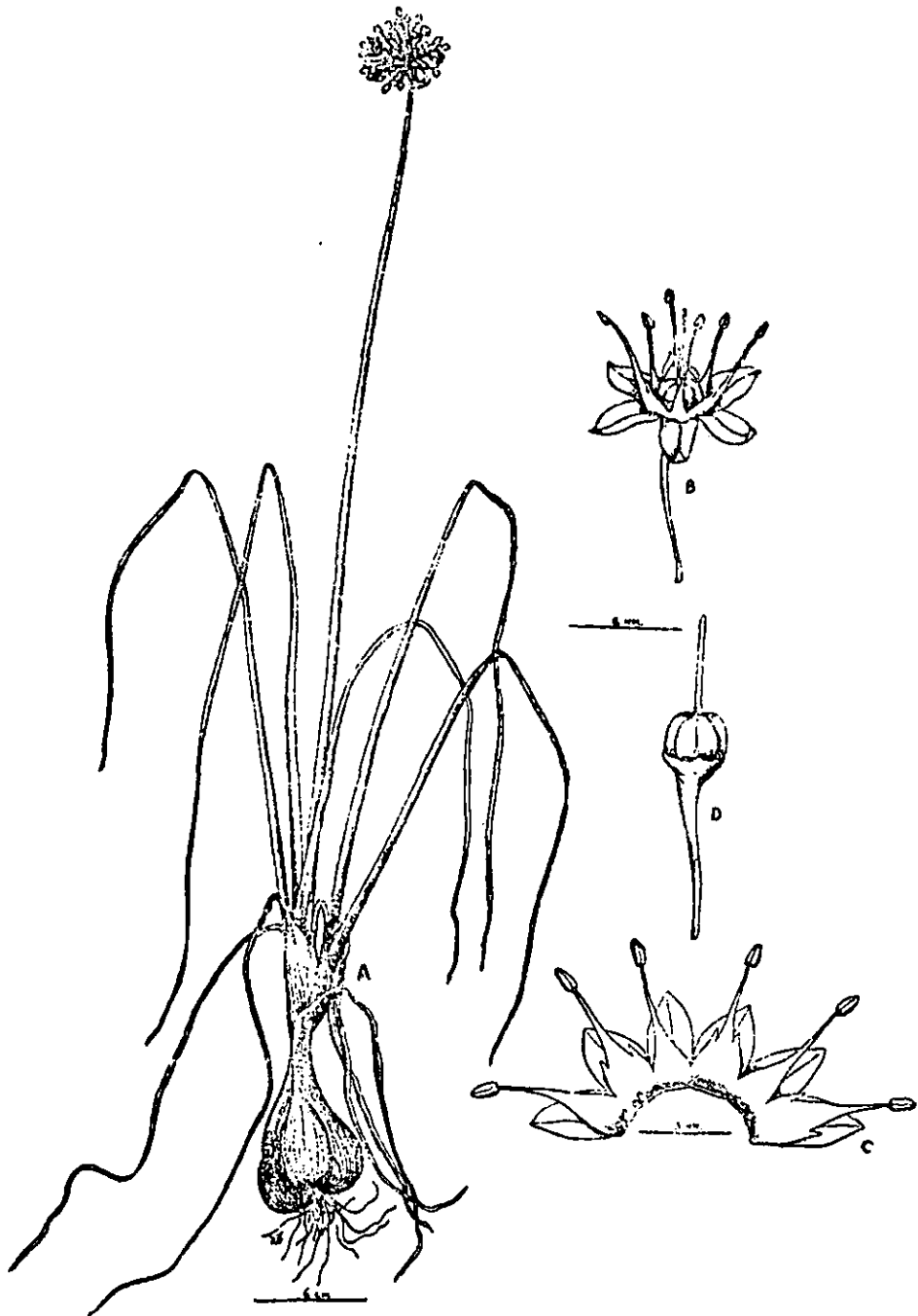


FIG. 27. *Allium ascalonicum*. A, plant with leaves, bulbs and flowers in an umbel. B, front view of flower C, perianth with the stamen ring spread out. D, pistil from side.

5. AMARYLLIDACEAE

1. *Allium ascalonicum* Linn., *Amoen. Acad.* 4 : 454. 1759. (Fig. 27).

Allium cepa Linn. var. *ascalonicum* (L) Backer.

Engl. Shallot, Red Onion ; *Sinh.* Ratu-lunu ; *Tam.* Irravengayam, Irulli ; *Hindi* Ekakandalasum, Gandana.

A perennial herb usually grown as an annual, 15—50 cm high with ovoid, red, subteranean bulbs, 1.5—2.5 cm diameter, with accessory bulbs giving off slender fibrous roots below; leaves 3—5 to a bulb, hollow, linear, 20—30 cm long, 0.4—0.8 cm broad, fistular, terete, glaucous, bases sheathing, papery, conical, fleshy above the stem forming the bulb; flowers regular, bisexual, white, 6 mm diameter, many in terminal, long-peduncled, rounded umbels 2.5—3.5 cm diameter, each subtended by 2, white, papery, ovate bracts at the neck; peduncles hollow, green, 40—60 cm long; pedicels pale green, 1.5—2 cm long; perianth 6, free in two rows, the outer segments oblong, 4.5 mm long, 2 mm broad and rounded at apex, the inner ones oblong-obovate, 3.5 mm long and 2 mm broad; stamens 6, the alternate stamens larger and expanded at the base of filaments and fused to the filaments of the smaller stamens forming a ring round the ovary and adnate to the perianth; filaments of larger stamens 4 mm long, 2.2 mm broad at the base and those of smaller stamens 3 mm long, bases not expanded; anther 1.6 mm long; ovary superior, 3-carpellary, 3-locular with two ovules in each loculus; style columnar, subulate, 1.5 mm long.

Flowers during March.

ILLUSTRATION. Kirtikar and Basu, *Indian Med.-Pl.* pl. 972, 1933.

DISTRIBUTION. Cultivated in many tropical countries including India, Ceylon, Malaya, Java and Philippine Islands. In Ceylon, it thrives best in the Jaffna peninsula.

Ceylon. Northern Prov., Point Pedro, *Jayaweera* 2956, Feb. 1968, cultivated. Central Prov., Peradeniya, *Herb. Peradeniya*, Jan. 1917, cultivated.

USES. Red onions are largely used as a condiment in the daily diet. The bulbs are useful as an anthelmintic, stomachic, tonic and for asthma. They are diuretic, carminative and aphrodisiac. They are also used for diarrhoea, choleraic attacks, headaches, amenorrhoea, inflammation and pains in the body, loins and the joints. A small piece of a bulb placed in the meatus cures earache. In Malaya, the juice of the bulbs with turmeric juice is a remedy for stomach ache in children. In tropical Africa, the juice is rubbed on the body in cases of fever. In Ghana, a mixture of the bulbs with palm oil and capsicums, heated in the sun, is given for fever.

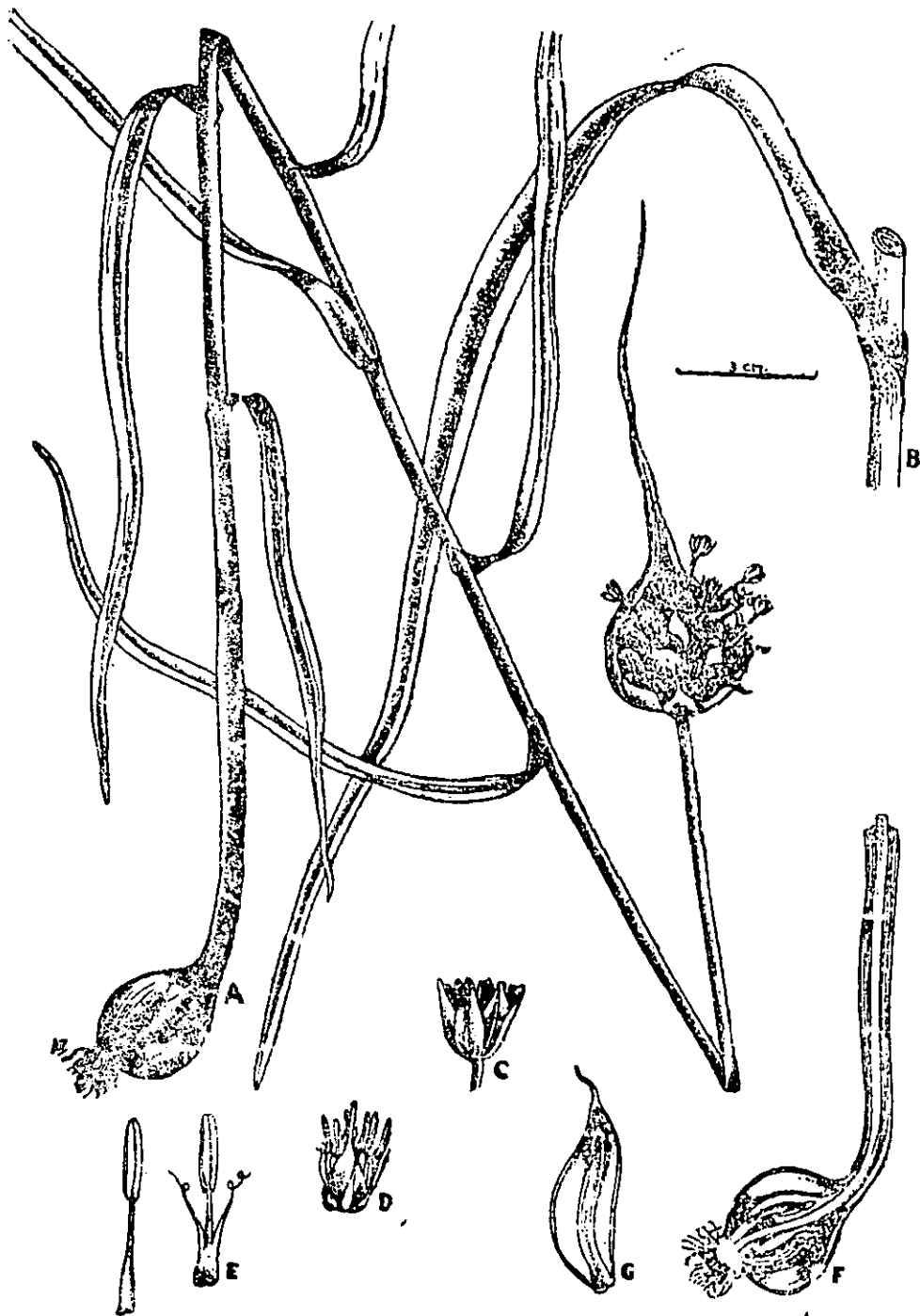


FIG. 28. *Allium sativum*. A, whole plant showing the basal bulb and terminal inflorescence bearing bulbils and flowers. B, leaf blade and part of the sheath. C, flower. D, flower with the perianth removed showing the stamens and pistil. E, inner stamen with filiform process on either side. F, vertical section of the base of the stem and bulb. G, vertical section of a bulbil. C—E, enlarged.

2. *Allium sativum* Linn., Sp. Pl. 296. 1753. (Fig. 28).

Porrum sativum Reichb.—*Allium ophioscorodon* Don.

Engl. Garlic ; *Sinh.* Sudu-lunu, Hela-lunu ; *Tam.* Vellavengayam, Vellaippundu ; *Hindi* Lahsan, Lasan ; *Sans.* Arishtha, Bhutabhna, Dirghapatraka, Grinjana, Katukanda, Lashuna, Mahakanda, Mahaushana, Mlechhakanda, Rahuchhishta, Rahutsrishta, Rasona, Rasonaka, Shuklakanda, Uragandha, Vatari, Yavaneshta.

A bulbous herb with a short, flat axis giving off slender very thin, papery scales which are enlarged and dilated below and bear at their axils large, oblong-ovoid, sessile bulbs pressed together with the outer ones curved to form collectively a lobed white tapering bulb; flowering stem terminal, solid from the centre of the bulb, 45—60 cm long, lower half surrounded by leaf-sheaths; leaves 7 or 8 all from the root-stock, each of which is continued upwards as a complete cylindrical membranous tube, obliquely truncate at the mouth with a short, annular ligule, blade broadly linear, flat, spreading, glabrous and bright glaucous green; flowers sparingly produced being often supplanted by purplish red, solid bulbils crowded to form a globular head about 2.5 cm diameter, covered by a bract tapering into a caducous, horn-like beak; flowers regular, bisexual, very long stalked, projecting beyond the bulbil; perianth 6, dirty-white, strongly imbricate in two rows and membranous; stamens 6, inserted at the base of the perianth leaves, filaments flat, dilated, those of the inner whorl very wide with a long, filiform process on either side; anther introrse, dorsifixed; ovary superior, globular, trigonous, 3-locular with a single persistent style.

ILLUSTRATIONS. Kirtikar and Basu, *Indian Med. Pl.* pl. 973, 1933; Bentley and Trimen, *Medicinal Plants*, pl. 280. 1880.

DISTRIBUTION. Garlic appears to have been cultivated in all parts of the world from the earliest times. It occurs in a semi-wild state in the Mediterranean regions. In Ceylon, it is cultivated in the up-country districts.

COMPOSITION. The bulb contains a volatile oil, alliin, allisin, allyl disulphide, allyl propyl-disulphide, inulin, choline and myrosinase.

USES. Garlic is widely used for flavouring dishes. Medicinally, it is a stimulant, carminative, anthelmintic, diaphoretic, diuretic and expectorant. It is a gastric stimulant and aids in the digestion and absorption of food. It has a special influence in controlling the bronchial and pulmonary secretions. As a diuretic, it is used in dropsy. Externally, as a liniment it is used in infantile convulsions, asthma, facial paralysis, gout and sciatica. With mustard, it is used for paralytic and rheumatic affections. Garlic is also employed as a specific for leprosy. In the Philippines, the bulbs are prescribed for high blood pressure.



PLATE I. *Crinum asiaticum*, showing leaf and flowering umbel.

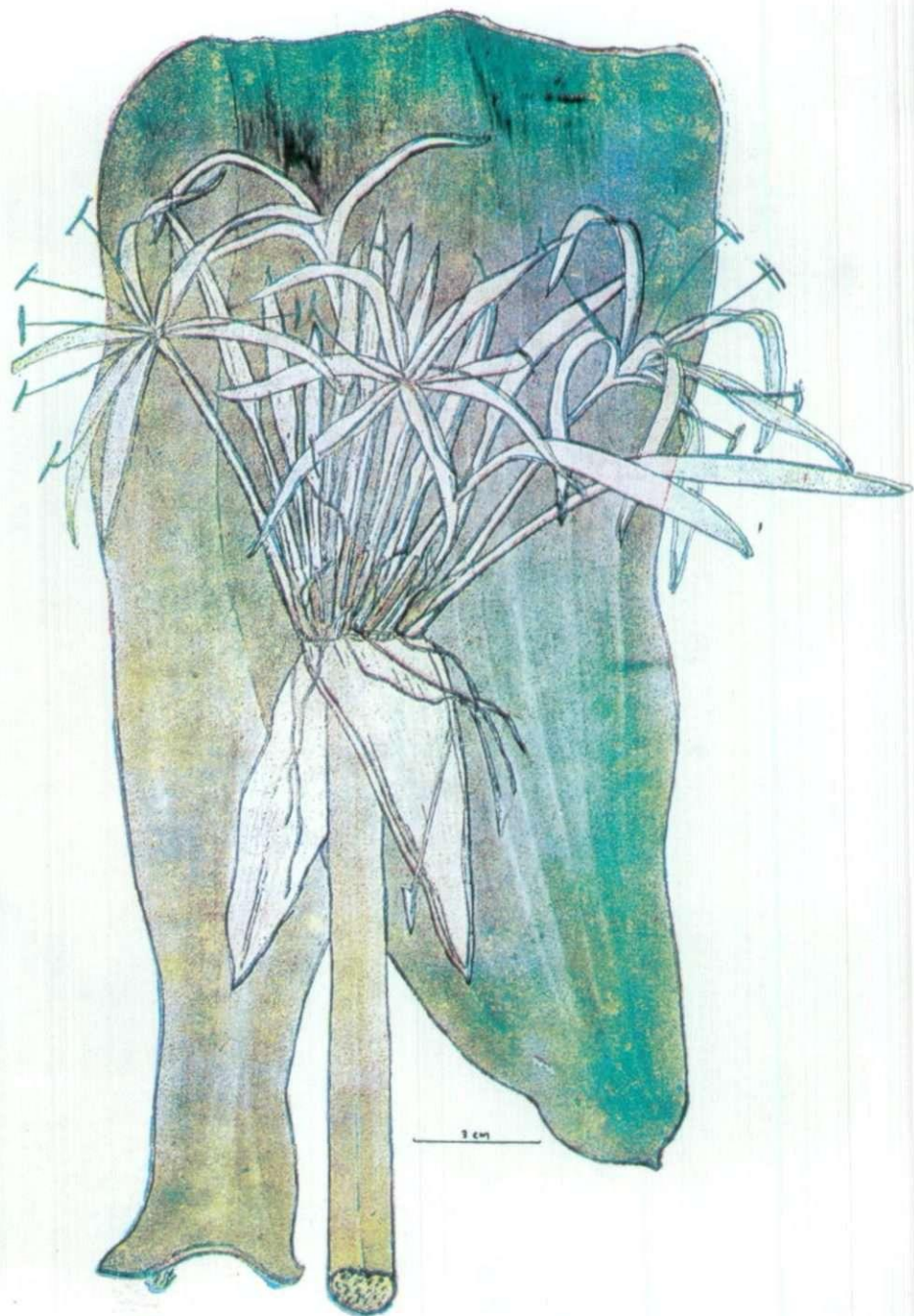


Plate 1 *Crinum asiaticum*

3. *Crinum asiaticum* Linn., Sp. Pl. 292. 1753. (Plate 1).

Crinum toxicarium Roxb.—*Amaryllis carnosus* Herb. Ham.—*Crinum giganteum* Blanco.—*Haemanthus pubescens* Blanco.

Sinh. Tolabo ; *Tam.* Vishamungil ; *Hindi* Chindar, Kanmu, Kanwal, Pindar ; *Sans.* Bala, Durdharsha, Dusaha, Jambati, Jambu, Kandashalini, Mahayogeshwari, Malaghni, Mota, Nagadamani, Nagapatra, Nagapushpi, Raktapushpi, Shrikanda, Vanakumari, Viphala, Vishamandala, Vishamardini, Vishapaha, Vishari, Vishavinashini, Vrikka, Vritta, Vrittapushpa.

A large bulbous herb, about 90 cm tall with a bulb 5-10 cm diameter, narrowed into a neck, 15—30 cm long, clothed in old leaf sheaths; leaves simple, 0.9—1.5 m long, 12.5—18 cm broad, linear-lanceolate, shortly acuminate, flat, narrowed into a sheathing base, thin, bright green with smooth margins; flowers large, white, scented, bisexual, umbelled on a stout, solid scape, arising from axils of old leaves; scape 45—90 cm long, 2.5 cm diameter, compressed; bracts 2, spathiform, 7.5—10 cm long, oblong, acute, papery, bracteoles filiform; umbel 10—50-flowered, somewhat bipartite with a tuft of bracteoles in the sinus; pedicels 0.6—2.5 cm long, perianth-tube greenish-white, 4—10 cm long, cylindric, slender; lobes 6, 5—6 cm long, 0.5—0.6 cm broad, shorter than the perianth-tube, linear, recurved or revolute. stamens 6, inserted on the throat of the perianth, filaments free, very slender, 3-3.5 cm long, shorter than perianth-lobes; anthers linear, dorsifixed, reddish, 1.2—1.8 cm long; ovary inferior, 1.5—3 cm long, oblong, 3-carpellary with a few ovules in each loculus, style filiform, stigma minute, subcapitate; fruit rarely produced, subglobose capsule, 2.5—5 cm diameter, 1 or 2-seeded, beaked by the fleshy base of the perianth, dehiscing irregularly.

Flowers from February to May.

ILLUSTRATIONS. Curtis, Bot. Mag. *pl.* 1073; Wight, Ic. Pl. Ind. Orient. *pls.* 2021—2; 1853; Loddiges, Bot. Cab. *pl.* 669; Kirtikar and Basu, Indian Med. Pl. *pl.* 957. 1933; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs especially along the coasts of India, Ceylon, Malaya, Western Polynesia, Philippine Islands, etc. It is very common in Ceylon along the sandy sea coast in the moist regions.

Ceylon. *Herb. Peradeniya*, 1882. Maldives. Horsburgh Atoll, *Gardiner*, 1899-1900.

COMPOSITION. The roots of this plant contain the alkaloids, crinamine and lycorine while the bulbs contain crinidine, haemanthamine, baconine and tannin. The seeds contain lycorine.

USES. The bulbs, leaves and roots of this plant have emetic properties. The bruised leaves warmed with castor oil form a useful application for repelling whitlows and other inflammations at the ends of toes and fingers and also used as fomentations on inflamed joints and sprains. The juice of the leaves with salt is used for earache and other ear complaints. According to Roberts, owing to diaphoretic and expectorant qualities of the plant, the bulbs are valuable in acute bronchitis, pneumonia, and fevers complicated with bronchitis and pneumonia. They are also used in treating chronic malarial fevers. In Java, the root is considered a good emetic while in Malaya it is used for treating fevers, lumbago, headaches and swellings.



FIG. 29. *Crinum bulbispermum*. A, bulb with long, vermiform roots. B, an inflorescence with a part of leaf in the background. C, flower opened out showing the stamens. D, longitudinal section of the flower. E and F, stamens. G, transverse section of ovary showing the ovules.

4. *Crinum bulbispermum* (Burm.) Milne-Redhead and Schweicherdt in Journ. Linn. Soc. Lond. Bot. 52 : 161. 1939. (Fig. 29).

Crinum latifolium Linn.—*Crinum ornatum* Herb.—*Crinum speciosum* Herb.—*Crinum speciosissimum* Herb.—*Crinum herbertianum* Wall.—*Crinum insigne* Schultes.—*Crinum wallichianum* Roem.—*Crinum linnaei* Roem.—*Crinum careyanum* Herb.—*Crinum moluccanum* Roxb.—*Crinum asiaticum* Wall.—*Crinum capense* Herb.—*Crinum longifolium* Thunb.—*Amaryllis zeylanica* Linn.—*Amaryllis insignis* Ker-Gawl.—*Amaryllis latifolia* L'Herit.—*Amaryllis bulbispermum* Burm.

Sinh. Goda-manel. *Tam.* Vishamungil. *Sans.* Chakrangi, Chakraoha, Dadhyani. Madhuparnika, Somavalli, Sudarshana, Vrishakarni.

A herb, about 1 m tall, with a very large bulb, 10—11 cm diameter, coated with bases of older leaves, bearing thick, stout, vermiform roots at the base; leaves simple, many, 78—92 cm long, 6—6.7 cm broad, oblong-linear, acuminate, flat, glabrous and shining, margin slightly scabrous and undulate; scape inserted on the neck of the bulb, 118.5 cm long, stout, tinged purple; bracts 8—10.5 cm long, 0.7—3.2 cm broad, outer ones broadly lanceolate, inner ones linear, umbel 10—20-flowered; flowers regular, bisexual, fragrant, pedicel 0.8—1 cm long, 0.8 cm broad, glabrous and shining; perianth 6, fused, tube 11—13.5 cm long, curved, cylindric, limb nodding, 11.5—13 cm long, funnel-shaped, segments 12—12.5 cm long, 3—3.5 cm broad, oblong-lanceolate, apiculate, glabrous, white with a purplish tinge outside along the middle; stamens 6, inserted in the throat of the perianth, filaments filiform, 7.5—8.5 cm long, tinged with light purple towards the apex, free and declinate, anthers linear, 1.2—1.8 cm long, versatile, articulating with the filaments about the middle; ovary inferior, cylindrical, 1.2 cm long, 0.8 cm broad, glabrous, 3-locular, 5 or 6-ovuled, style 22.5—23 cm long, glabrous, tinged with purple towards the upper half, stigma simple; fruit subglobose, 3.2—5 cm diameter, irregularly dehiscent.

Flowers from January to June and also in August.

ILLUSTRATIONS. Curtis, Bot. Mag. *pl.* 923 ; *pl.* 1171 ; *pl.* 2292 ; *pl.* 2217 ; *pl.* 2121 ; *pl.* 2466 ; Edward, Bot. Reg. *pl.* 579 ; *pl.* 1297 ; Andr., Bot. Rep. *pl.* 478 ; Wight Ic. Pl Ind. Orient *pl.* 2019 ; *pl.* 2020 ; Bury, Hexand. Pl. *pl.* 29 ; *pl.* 18 ; Wall., Pl. As. Rar. 2 : *pl.* 145 ; Rheede, Hort. Mal. 11 : *pl.* 39 ; Kirtikar and Basu, Indian Med. Pl., *pl.* 959. 1933.

DISTRIBUTION. Occurs throughout India, Burma and Ceylon and cultivated elsewhere. It is common in Ceylon in the low-country in marshy places; Jaffna, Anuradhapura, Polonnaruwa, Colombo, Matara, Tissamaharama, etc.

Ceylon. Northern Prov., Jaffna, Feb. 1890, without collector's name; between Anuradhapura, and Mihintale, Aug. 1885 without collector's name, flowers 4—8 in heads usually 5; Central Prov., Peradeniya, Bot. Gard., June 1887 without name of collector.

COMPOSITION. The bulb contains lycorine and other alkaloids and an organic acid.

USES. In India, the roasted bulbs of this plant are used as a rubifacient in rheumatism. They are crushed and applied on to piles and abscesses to cause suppuration. The juice of the leaf is used for earache.



FIG. 30. *Paneratum zeylanicum*, showing plant with bulb, leaves and a flower.

5. *Pancratium zeylanicum* Linn., Sp. Pl. 290. 1753 (Fig. 30).*Pancratium tiaraeflorum* Salisb.

Sinh. Wal-lunu.

A bulbous herb without a neck, bulb globose, 3.7—5 cm diameter ; leaves simple at the summit of the bulb, 8—12 bifarious, 15—32 cm long, 1.4—2.3 cm broad, linear-lanceolate, acuminate, thin and glossy green ; flowers fragrant, white, regular, bisexual, scape slender, 12—20 cm long, subterete, 1-flowered ; bract solitary, 3—4.5 cm long or as long as the corolla-tube, tubular at the base, pedicel very short ; perianth 6, petaloid, tube 2.5—4 cm long, throat broadly funnel-shaped, limb 5—7.5 cm across, segments lanceolate and as long as the tube ; stamens 6, inserted in the throat of the perianth, filaments united by a membrane to form a staminal cup which is toothed, filaments being much longer than the cup, 2.5—3 cm long, anthers dorsifixed, 0.5—0.6 cm long ; ovary inferior, 1.8—2 cm long, 3-locular with many ovules in each loculus on an axile placenta, style filiform, 8—10 cm long, stigma small ; fruit trigonous, loculicidally dehiscent, 3-valved and many seeded.

ILLUSTRATIONS. Edward, Bot. Reg. *pl.* 479 ; Curtis, Bot. Mag. *pl.* 2538. ; Salisbury Par. Lond. *pl.* 86. ; Herb. Peradeniya., drawing.

DISTRIBUTION. Occurs in tropical Asia. In Ceylon, it is common in grassy places in the low-country; Galle, Trincomalee, etc.

Ceylon. *Thwaites C. P.* 3211. Maldive Islands. Wiligili, *Gardiner*, 1899—1900.

USES. The bulb is macerated with ghee and applied externally to promote suppuration of boils.

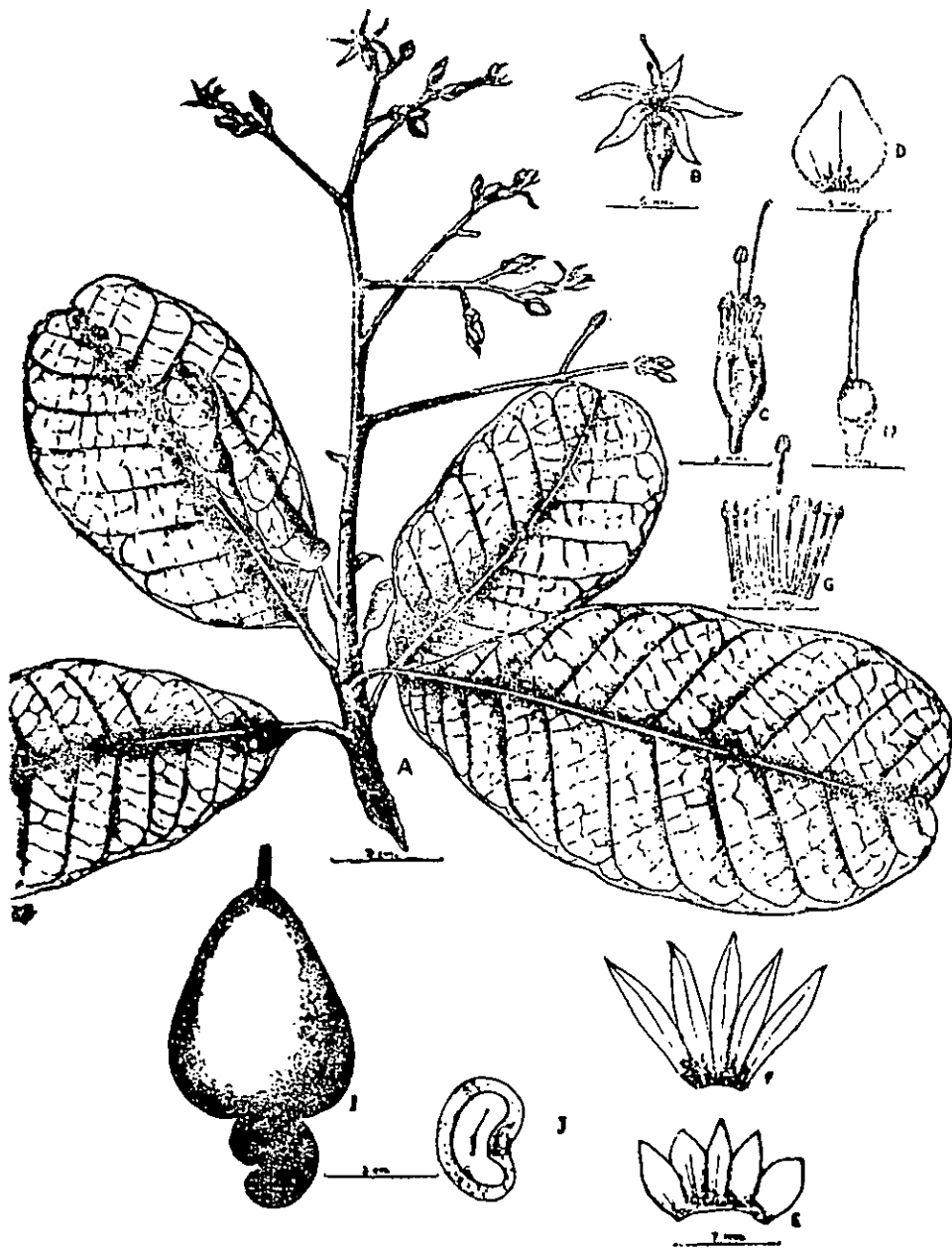


FIG. 31. *Anacardium occidentale*. A, branch with leaves and flowers. B, external view of a flower. C, flower with the corolla removed. D, bract. E, sepals. F, petals. G, stamens with one longer than the others. H, pistil consisting of an ovary with a hairy apex and lateral style. I, nut borne on a swollen pedicel. J, longitudinal section of nut showing the pericarp and one cotyledon.

6. ANACARDIACEAE

1. *Anacardium occidentale* Linn., Sp. Pl. 383. 1753. (Fig. 31).

Cassuvium reniforme Blanco.

Engl. Cashew Nut ; *Sinh.* Kaju ; *Tam.* Andima, Kallarma, Kottaimundiri, Mundiri, Saram, Sigidima, Tirigai, Uttumabalam ; *Hindi* Kaju ; *Sans.* Agnikrita, Arushkara, Guchhapushpa, Kajutaka, Parvati, Prithagabija, Sophara, Sophahara, Srigdhapitaphala, Upapushpika, Vrittapatra.

A medium-sized tree with crooked trunk and terete, glabrous branches ; leaves simple alternate, coriaceous, 8.5—24 cm long, 5.8—14.5 cm broad, oblong, obovate or elliptic, rounded, or somewhat retuse at apex, glabrous, firmly reticulately veined, base cuneate, margin wavy, lateral veins 10—15 pairs, prominent beneath ; petioles 1—2.5 cm long ; flowers small, regular, polygamous in terminal, bracteate panicles longer than leaves, peduncles lengthening with age ; bracts 6—8 mm long and as broad, broadly ovate, acute, puberulous outside and glabrous within, soon deciduous ; sepals 5 or 6, imbricate, 4—5.5 mm long, 1—2.7 mm broad, lanceolate or ovate, puberulous outside ; petals 5 or 6, linear-lanceolate, imbricate, incurved, greenish yellow with a red blotch in the middle, 12—12.5 mm long, 2 mm broad, deflexed from the middle, puberulous outside ; stamens 7—10, fused at the base round the ovary, one larger than the others and exerted beyond the recurved petals or all equal, filaments of shorter stamens, 3.5—4 mm long and that of the long stamen 8.5 mm long, hairy at the base ; ovary obcordate, 2 mm long with a hairy apex, 1-locular, glabrous, attenuated into a somewhat lateral style 7.5—8 mm long ; nut reniform 2.5 cm long on a swollen, fleshy, yellow or red pedicel, pericarp cellular, full of acrid oil, seed reniform, ascending, exalbuminous, testa membranous, cotyledons semilunar with a milky taste.

Flowers in November, and January to March.

ILLUSTRATIONS. Griffith, Notul. 4 : pl. 656, f. 3 euf ; *Beddome*, Flor. Sylvat. pl. 163. 1868—1873. ; Kirtikar and Basu, Indian Med. Pl. pl. 275. 1933 ; Herb. Peradeniya, drawing,

DISTRIBUTION. A native of tropical America, now naturalized and cultivated in the hotter parts of India and Ceylon. In Ceylon, it is commonly found in village gardens and waste lands along the sandy western coast of the Island and in the dry zone.

India. Nilghiris, *Schmid* ; Pen. Ind. Or. *Herb. Wight* 549, Kew Distribution 1866-7 ; Bot. Gard. Calcutta, cultivated, *Pierre*, 1863. Ceylon. Peradeniya, Bot. Gard., cultivated, *J. M. Silva* 195, April 1928 ; *Jayaweera* 253, Dec. 1957. S. Andamans. *Heinig* 432, March 1901 ; Car Nicobar, *King's Collector*, Feb. 1893. Brazil. Bot. Gard., *Baker* 65, June 1908.

COMPOSITION. The pericarp of the nut of this tree contains a toxic principle, cardol, anacardol, cardanol and anacardic acid. The kernels yield a fixed oil which contains linolic, palmitic, stearic and lignoceric acids and sitosterin. The exudation from the bark is a mixture of gum-arabic and bassorin.

USES. A decoction of the bark of this tree is used as a remedy for diarrhoea, syphilitic swellings of joints and for diabetes. The juice of the ripe receptacle is recommended for scurvy, uterine troubles and dropsy. The oil of the pericarp is useful as an anaesthetic in leprosy and psoriasis. It is a powerful vesicant, vermicide and insecticide. The non-toxic phenol, cardanol, separated from the oil, is used in the insulation of the ignition system in aeroplane engines. The kernel of the fruit is used extensively in the confectionary trade. The oil extracted is a mechanical and chemical antidote for irritant poisons.

In Goa, an alcoholic beverage is prepared from the ripe receptacles. The bark is used as a gargle in the treatment of aphthae, while the root is employed as a purgative in Africa. A cough remedy is prepared for children by infusing the young shoot and leaves in water. In the Congo, the bark is used as an arrow poison and the oral administration of the tincture of the bark is supposed to lower blood sugar level.

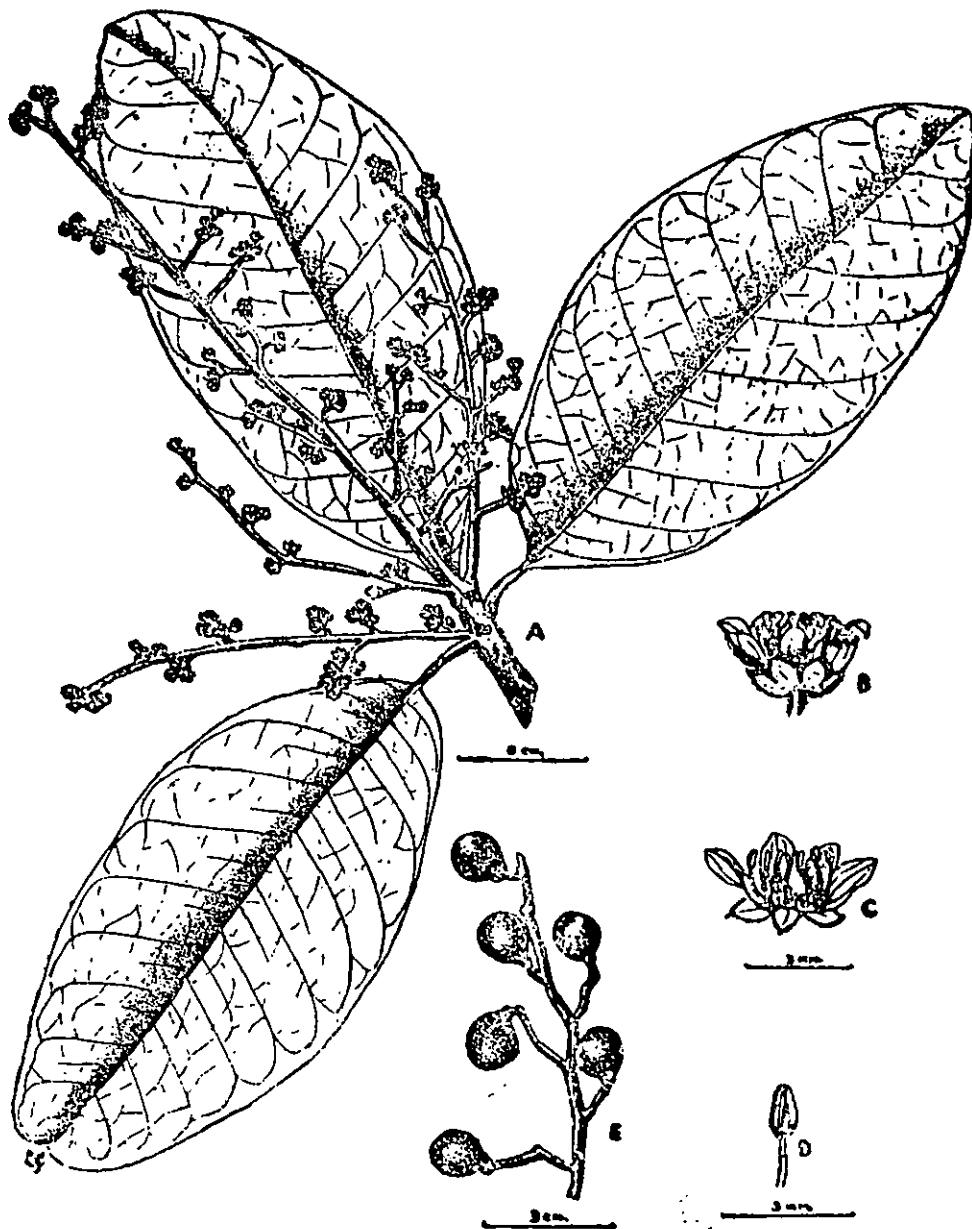


FIG. 32. *Buchanania lanzan*. A, branch with leaves and panicles. B, lateral view of a flower. C, lateral view with some of the petals and stamens removed to show the ovary. D, stamen. E, fruits.

2. *Buchanania lanzan* Spreng. in Schrader Journ. 4 : 234. 1809. (Fig. 32).

Buchanania latifolia Roxb.—*Spondias elliptica* Rottl.

Sinh. Piyala ; *Tam.* Ayma, Kattuma, Mudaikkai, Mudaima, Muraiyidam, Morala, Sarai ; *Hindi* Achar, Char, Paira, Piyal, Piyala, Piyar ; *Sans.* Akhatta, Bahulavalkala, Chara, Charaka, Dhanu, Dhanushpatta, Drusallaka, Hasannaka, Kharaskandha, Lalana, Mokshavirya, Pata, Piyalaka, Priyala, Rajadana, Sannakadru, Snehabija, Tapasapriya, Tapaseththa, Upavata, Viyala.

A tree, 12—15 m tall, with a straight trunk and young branches clothed with silky hairs ; leaves simple, alternate, entire, thickly coriaceous, 12.5—25 cm long, 6.2—12.5 cm broad, broadly oblong, obtuse, sometimes emarginate, glabrescent above, more or less villous beneath, reticulately veined, base rounded, nerves and veins impressed on the upper surface, main nerves 10—20 pairs; petioles 1.2 cm long; flowers small, 3.5—5 mm diameter, bisexual, sessile, greenish-white in terminal and axillary pyramidal, ferrugineo-pilose panicles which are shorter than leaves ; bracts small, caducous ; calyx short, obtusely 3-5-lobed, lobes short, broadly ovate, ciliate ; petals 4 or 5, 2.5 mm long, 1 mm broad, ovate-oblong, subacute ; disk fleshy, 5-crenate ; stamens 10, shorter than petals, filaments flattened, anthers about as long as filaments ; carpels 5, free, one perfect, conical, villous and the other four reduced to cylindrical filaments, seated in the cavity of the disk, style short, stigma truncate, ovule pendulous ; drupes obliquely lentiform, 0.8—1.2 cm long, black, stone hard, 2-valved.

Flowers from January to March.

ILLUSTRATIONS. Beddome, *Flor. Sylvat.* 1 : *pl.* 165. 1868-1873 ; Kirtikar and Basu, *Indian Med. Pl.*, *pl.* 276. 1933.

DISTRIBUTION. Occurs in the hot, drier parts of India, Burma, Yunnan, Cambodia, Cochin-China, Siam and Laos but not in Ceylon. It can, however, be cultivated in Ceylon.

India. Siwalik and Jaunsar, Lachiwala, *Gandhe* 35, March 1921. Malabar Concan, etc. *Stocks, Law* etc.; Pen. Ind. Orient. *Herb. Wight* 537 ; *Herb. Wight* 551, both Kew Distribution 1866-7 ; *Wallich* 983.

USES. The roots and leaves of this tree are ground and given mixed with butter-milk for diarrhoea. The gum mixed with goat's milk is given for intercostal pains and diarrhoea. The oil extracted from the kernels of the fruit is used as a substitute for almond oil and applied on glandular swellings of the neck. The kernel made into an ointment and applied for skin diseases. It is believed to cure pimples, prickly heat and itch.

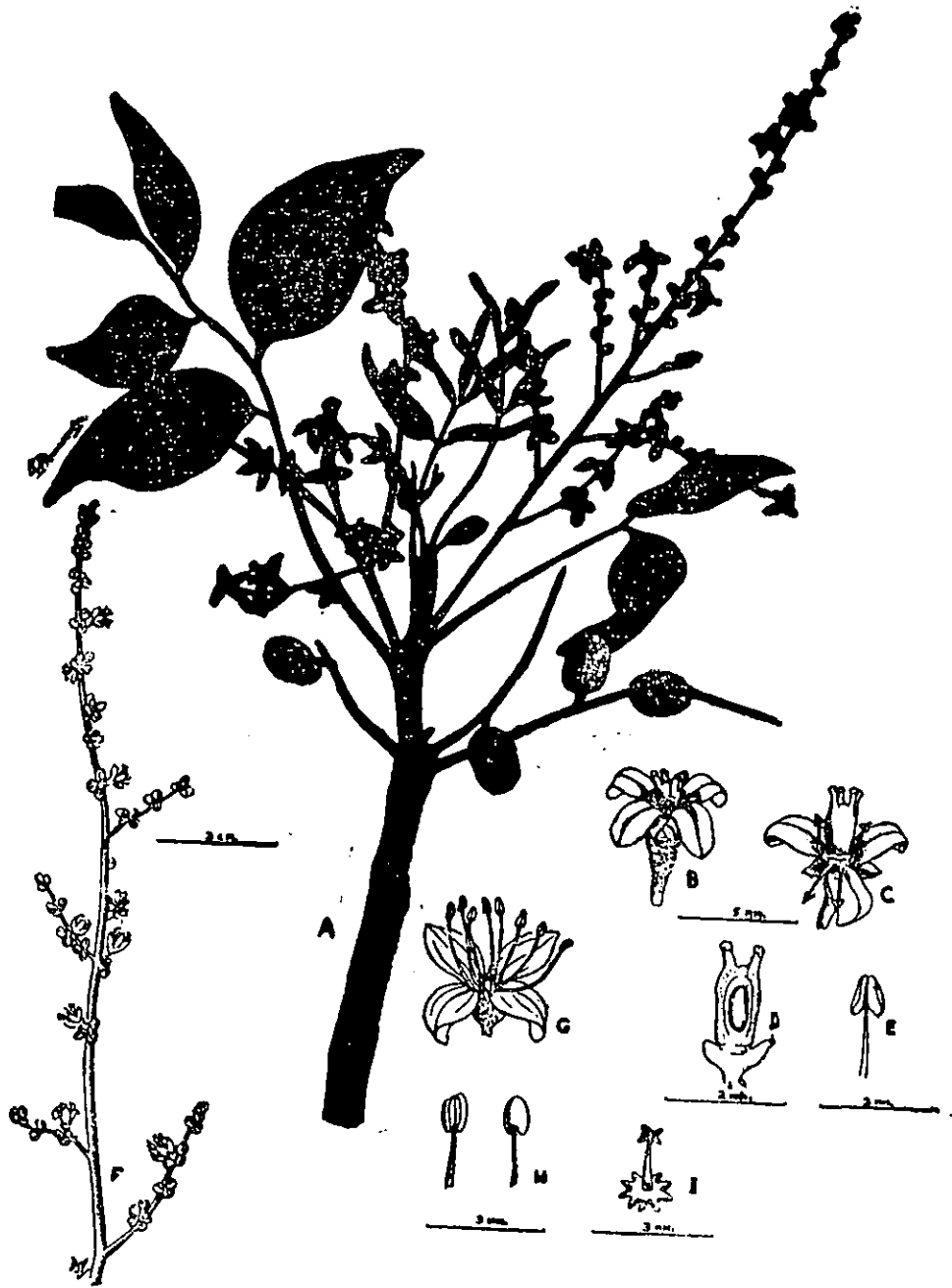


PLATE. II. *Lansea coromandelica*. A, branch from a female tree with leaves, flowering racemes and fruits. B, lateral view of female flower. C, same showing the disk, insertion of the staminodes and pistil. D, longitudinal section of ovary with pendulous ovule. E, staminode. F, panicle bearing male flowers. G, lateral view of male flower. H, fertile stamens. I, pistil of male flower with disk.

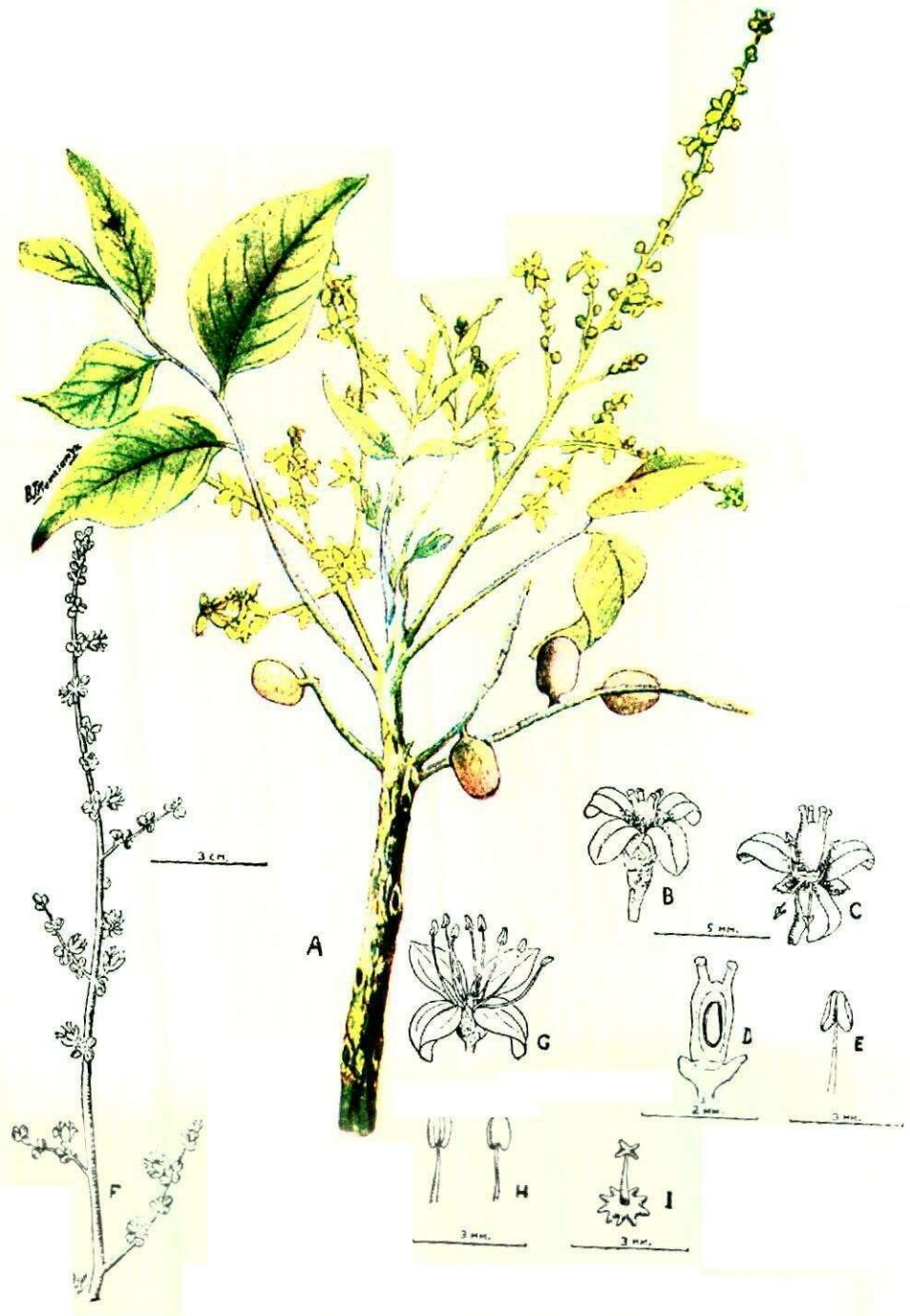


Plate II *Lannea Coromandelica* (Houtt.)

3. *Lannea coromandelica* (Houtt.) Merrill, Journ. Arn. Arb. 19: 353. 1938. (Plate II).

Lannea grandis Engl.—*Calenun grande* O.Ktze.—*Haberlia grandis* Dennst.—*Lannea wodier* (Roxb.) Adelb.—*Odina wodier* Roxb.

Sinh. Hik ; *Tam.* Anaikkarai, Appiriya, Odi, Udi ; *Hindi* Ginyan, Jhingan, Jingan, Kaimil, Kamlai, Kashmala, Kiamil, Kimul, Mohin, Moween, Moyen ; *Sans.* Ajasringi, Jhingi, Jhingini, Jingini, Jivala, Kvala, Manjari, Netraushadhi, Parvati, Pramodini, Suniryasa.

A deciduous tree, 23—32 m tall, with a thick, brown, rather smooth bark and nearly glabrous or finely stellate-puberulous young parts; leaves alternate, exstipulate, imparipinnate compound, rachis 15—25 cm long, cylindrical, glabrous, swollen at the base ; leaflets 5—13, shortly stalked or nearly sessile, 7.5—12.5 cm long, 3.5—4.5 cm broad, acute or rounded and often unequal at the base, more or less caudate-acuminate, entire or faintly crenate, glabrous, shining and deeply tinged with pink when young; flowers regular, pinkish-yellow, 4—5 mm across, unisexual, generally dioecious, nearly sessile in small clusters laxly arranged on elongated, slightly branched, stellate-pubescent axillary racemes or panicles appearing with young leaves on new shoots ; sepals 4, hairy, fused into a 4-lobed calyx, calyx segments 1 mm long ; petals 4, 2.5 mm long, 1.2 mm broad, imbricate, oblong-oval, obtuse, reflexed in female flowers ; stamens 8, inserted outside and beneath the disk, sterile and very small in the female flower ; disk annular, 8-lobed ; ovary superior, oblong, 2 mm long, glabrous, 1-locular with a single pendulous ovule, styles 4, very stout, distinct, divaricate, stigmas capitate, barren and reduced into 4 lobes in the male flower ; fruit a reniform-ovoid drupe, 1—1.2 cm long, obtuse, compressed, smooth, seed a very hard reniform stone.

Flowers between January and April, when it is bare of leaves.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient. 1 : pl. 60. 1838 ; Beddome, Flor. Sylvat. 1 : pl. 123. 1868—73 ; Kirtikar and Basu, Indian Med. Plants, pl. 278. 1938 ; Herb. Peradeniya drawing.

DISTRIBUTION. This is a common tree growing in the hotter parts of India, Ceylon, Burma and Andaman Islands. In Ceylon, it is common in the low-country in both dry and moist regions; Jaffna, Trincomalee, Ratnapura, etc.

India. Madras : *Cleghorn* 93. ; Pen. Ind. Orient., *Herb. Wight* 542 ; *Herb. Wight* 553, Kew Distribution 1866-67. Ceylon. *Thwaites C. P.* 1161.

USES. The bark of this tree is used as a lotion for ulcers and impetiginous eruptions. The gum beaten up with coconut milk is applied on sprains and bruises with beneficial results. In Burma, a decoction of the bark is used for toothache. The inner bark is used as a poultice on festering wounds, sores or boils, while the dried and powdered bark is often used as a tooth powder. The leaves are boiled and applied to local swellings, elephantiasis and pains of the body.

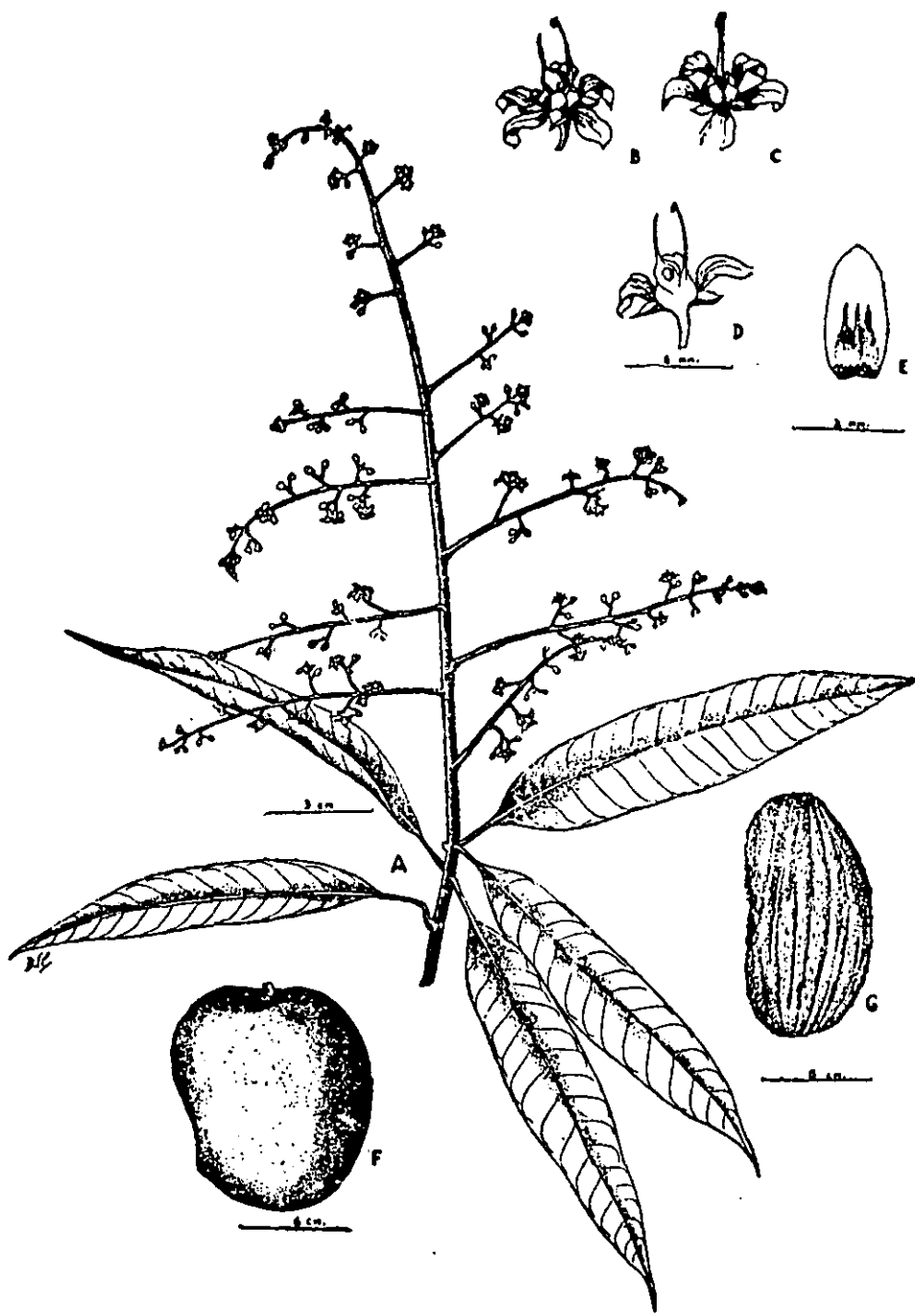


FIG. 33. *Mangifera indica*. A, branch with flower panicle. B, hermaphrodite flower showing a single stamen, ovary and staminodes. C, male flower with a single stamen and tumid staminodes. D, longitudinal section of a hermaphrodite flower. E, petal showing 3 ridges inside. F, fruit. G, seed.

4. *Mangifera indica* Linn., Sp. Pl. 200. 1753. (Fig. 33).*Mangifera domestica* Gaertn.

Engl. Mango ; *Sinh.* Amba ; *Tam.* Adishelarayam, Ambiram, Amiram, Iradam, Kachakkar, Kilimukkuma, Kogilosavam, Kokku, Maa, Madi, Madududam, Manga, Magandam, Malai, Mamagam, Mandi, Manmadamganai, Mattiyagandam, Mirudalagam, Omai, Palashiratta, Palerbatti, Pigubandu, Shedaram, Shegaram, Shudam, Shulli, Tema, Tevam, Tidalam ; *Hindi Am. Sans.* Alipriya, Amra, Atisairrabha, Bhramarapriya, Bhringabhishta, Chukralatamra, Chuta, Chutaka, Gandhabandhu, Kamanga, Kamaphala, Kamarasa, Kamashara, Kamavallabha, Kamayudha, Kameshta, Keshavayudha, Kireshta, Kokilananda, Kokilavasa, Kokilotsava, Koshi, Madadhya, Madhavadruma, Madhuduta, Madhukara, Madhuli, Madhvasa, Madirasakha, Mahanda, Manjari, Manmathalaya, Manmathavasa, Manodna, Modhakhya, Mrishulaka, Nilakapittha, Nriyapapriya, Parapushtamahotsava, Phalashreshtha, Phalotpatti, Pikapriya, Pikaraga, Pikavallabha, Priyambu, Rasala, Sahakara, Shatpadatilhi, Shareshta, Shukrapriya, Sidhurasu, Sripriya, Sumadana, Vanotsura, Vasantadru, Vasantaduta.

A large, spreading tree, about 15—20 m in height with a rough grooved bark and glabrous stems and branches; leaves simple, alternate, crowded at the ends of branches, 12—40 cm long, 4.5—13 cm broad, oblong or oblong-lanceolate, acute or acuminate, glabrous, shining, entire, margins undulate, base narrowed, petioles 1.7—4 cm long; flowers small, yellowish green, polygamous, monoecious with a pungent odour, arranged in large, many-flowered, pubescent panicles longer than leaves, pedicels short, thick and jointed; bracts small, ovate, pubescent, deciduous; calyx 4- or 5-partite, segments 1.5—2 mm long, 1—1.5 mm broad, ovate, imbricate and pubescent; petals 4 or 5, sometimes more being doubled, free, 2.5 mm long, 1.5 mm broad, oblong, subacute, reflexed, glabrous with 3 orange-coloured ridges on the inner face; disk fleshy, 5-lobed, alternate with petals; stamens 1—5 inserted inside between disk-lobes or on them, one, sometimes 2 fertile, others sterile slender tipped with a small gland, filament subulate, anther purple; ovary superior, sessile, 1-locular, oblique, glabrous with a pendulous ovule from a basal or lateral funicle, style lateral, stigma simple; fruit a large fleshy resinous drupe, 7.5—20 cm long with a compressed, fibrous stone inside; seed large, exalbuminous, ovoid-oblong, compressed, testa papery with plano-convex, often unequal and lobed cotyledons.

Flowers in October and fruits in April and May.

ILLUSTRATIONS. Rheede, Hort. Mal. 4 : pls. 1 & 2, 1678—1703; Beddome, Flor. Sylvat. pl. 162. 1868—1873; Gaertner, Fruct. 2 : pl. 100; Curtis, Bot. Mag. pl. 4510; Kirtikar and Basu, Indian Med. Pl. pl. 274. 1933.

DISTRIBUTION. Occurs in the Himalayas, Sikkim, Khasia, along Western Ghats, Burma and Ceylon. It is cultivated in South Africa and tropical America. In Ceylon, it is grown as a cultivated plant in almost every village garden though it is not a native of Ceylon.

India. Sikkim. T. Thomson, 1857; Dehra Dun, Dimri 34, March 1926; Chota Nagpore, Clarke 14089 A, April 1871; Pen. Ind. Or. Herb. Wight 548, Kew Distribution 1868—8. Ceylon. Eastern Prov., Batticaloa, Thwaites C. P. 1256; Nevill, March 1885; Central Prov., Ambagamuwa, Thwaites C. P. 2614; Peradeniya, Bot. Gard., Jayaweera 603, March 1951.

COMPOSITION. The leaves of this tree contain euxanthin acid, euxanthon, hippuric and benzoic acids, mangiferin and mangin while the bark contains tannin and the exudation from it yields resin and gum. The fruits, too, yield a resin which is said to contain mangiferene, mangiferic acid, resinol and maniferol. The fruits which are consumed contain saccharose, levulose, dextrose and citric, tartaric and malic acids in addition to vitamins A, B and C, ascorbic acid and carotene. The seeds possess a fixed oil with oleostearin, starch, gallic acid and tannin.

USES. The juice of the leaves of this tree is given for bleeding dysentery, while an infusion of the young leaves is prescribed for chronic diseases of the lungs, coughs and asthma. An infusion or expressed juice of the bark is used in menorrhagia, leucorrhoea, bleeding piles and haemorrhages of the lungs and intestines. A cold infusion of the barks of *Mangifera indica*, *Syzygium cumini* and *Terminalia arjuna* with bees' honey is given for bleeding from internal organs. A decoction of the dry flowers is used with beneficial effects on diarrhoea, chronic dysentery and gleet.



FIG. 34. *Pistacia integerrima*. A, branch with leaves and fruits. B, male panicle; C, male flower; D, female inflorescence. E, female flower.

5. *Pistacia integerrima* Stew. ex Brandis, For. Fl. 122. 1874. (Fig. 34).

Pistacia kinjok Stocks.—*Rhus integerrima* Wall.—*Rhus kakra singee* Royle.

Sinh. Kakulu-Sungu ; *Tam.* Kakkata-shringi ; *Hindi* Kakra, Kakar-singi ; *Sans.* Chakra, Chakrangi, Chandraspada, Ghosha, Karkatakhyā, Karkati, Kasavinashini, Kolira, Kulingi, Mahaghosha, Natangi, Navanga, Shikhari, Vakra, Vanamurdhaja, Vishanika.

A nearly glabrous, dioecious tree with pinnate leaves and fine pubescence along petioles and nerves when young ; leaflets opposite, 4 or 5 pairs, short-petioled, lanceolate from oblique base, entire, long-acuminate with 10—18, arcuate, lateral nerves, joined by reticulate veins ; flowers small, unisexual, apetalous in axillary panicles, male panicles short, compact, pubescent ; calyx 3—5-fid ; stamens 5—7, anthers large, oblong, obtuse, deep red ; female flowers in long, lax panicles, pedicels short ; calyx 4, linear, supported by two bracts shorter than sepals, sepals and bracts deciduous ; ovary superior, 1—locular with a pendulous ovule, style 3-fid nearly to the base with broad, recurved stigmas ; fruit a stony drupe somewhat broader than long, rugose, glabrous, grey when ripe.

ILLUSTRATIONS. Stewart in Brandis, For. Fl. *pl.* 22. 1874 ; Kirtikar and Basu, Indian Med. Pl., *pl.* 273. 1933.

DISTRIBUTION. Occurs in the hot slopes of Peshawar Valley and Salt Range and in the Western Himalaya from Indus to Kumaon, Pakistan, Afghanistan, Iran and Egypt. It is not a native of Ceylon.

Afghanistan. *Herb. Griffith* 1092, Kew Distribution 1861—62.

USES. The galls produced on the branches of this tree are used to prepare the drug which is an expectorant and tonic. It is used for asthma, phthisis and other respiratory ailments. The powdered galls fried in cow ghee are given internally for dysentery with good effect. They are also used in combination with other drugs for the treatment of snake-bite and scorpion stings.



FIG. 35. *Rhus succedanea*. A, branch with leaves and panicles. B, front view of a flower. C, fruits.

6. *Rhus succedanea* Linn., Mant. 2: 221. 1771. (Fig. 35).

Rhus acuminata DC.

Engl. Japan Wax Tree, Red Lac Sumach ; *Sinh.* Kakulu-sungu, Karkatakashringi, Kola-aralu ; *Tam.* Karkkadagachingi ; *Hindi* Kakarsing, Kakrasingi.

A medium-sized, deciduous tree with glabrous young shoots ; leaves alternate, imparipinnate compound, 30—60 cm long with a terete, glabrous rachis ; leaflets 7—15, the lateral opposite or sub-opposite, shortly stalked, the end one long-stalked, ovate-oblong, 7.5—15 cm, long, long-acuminate, entire, thin, membranous and shining ; flowers polygamous, 3.8 mm across, green-yellow in drooping, axillary panicles, bracts caducous ; male and female flowers on different trees ; calyx 5-parted, glabrous or nearly so, lobes ovate ; petals 5, equal, spreading, about three times as long as the calyx, oblong, obtuse with numerous, dark veins ; stamens 5, spreading ; disk 5-lobed ; ovary superior, 1-locular with a single pendulous ovule, styles 3, short, connate at the base ; fruit a globose drupe, 6—7.5 mm diameter, compressed, glabrous and shining, pale yellow or brown.

Flowers during May and June.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient 2 : pl. 560. 1840—1843 ; Kirtikar and Basu, Indian Med. Pl., pl. 273. 1933.

DISTRIBUTION. Occurs in the temperate Himalayan regions from Kashmir to Sikkim, Bhutan, Khasia hills in India, Japan, China and Java. It is not found in Ceylon.

India. Kashmir: *Clarke* 37220 A and C. Sept. 1876. Nepal. *Wallich* 992. Assam : *Konoma*, *Watt* 11601, May 1895. Ceylon. Peradeniya, Bot. Gard., *Alston* 28, cultivated.

USES. The fruit is used for the treatment of phthisis. The thorn-like excrescences on the branches are given to infants suffering from diarrhoea and dysentery with beneficial results.

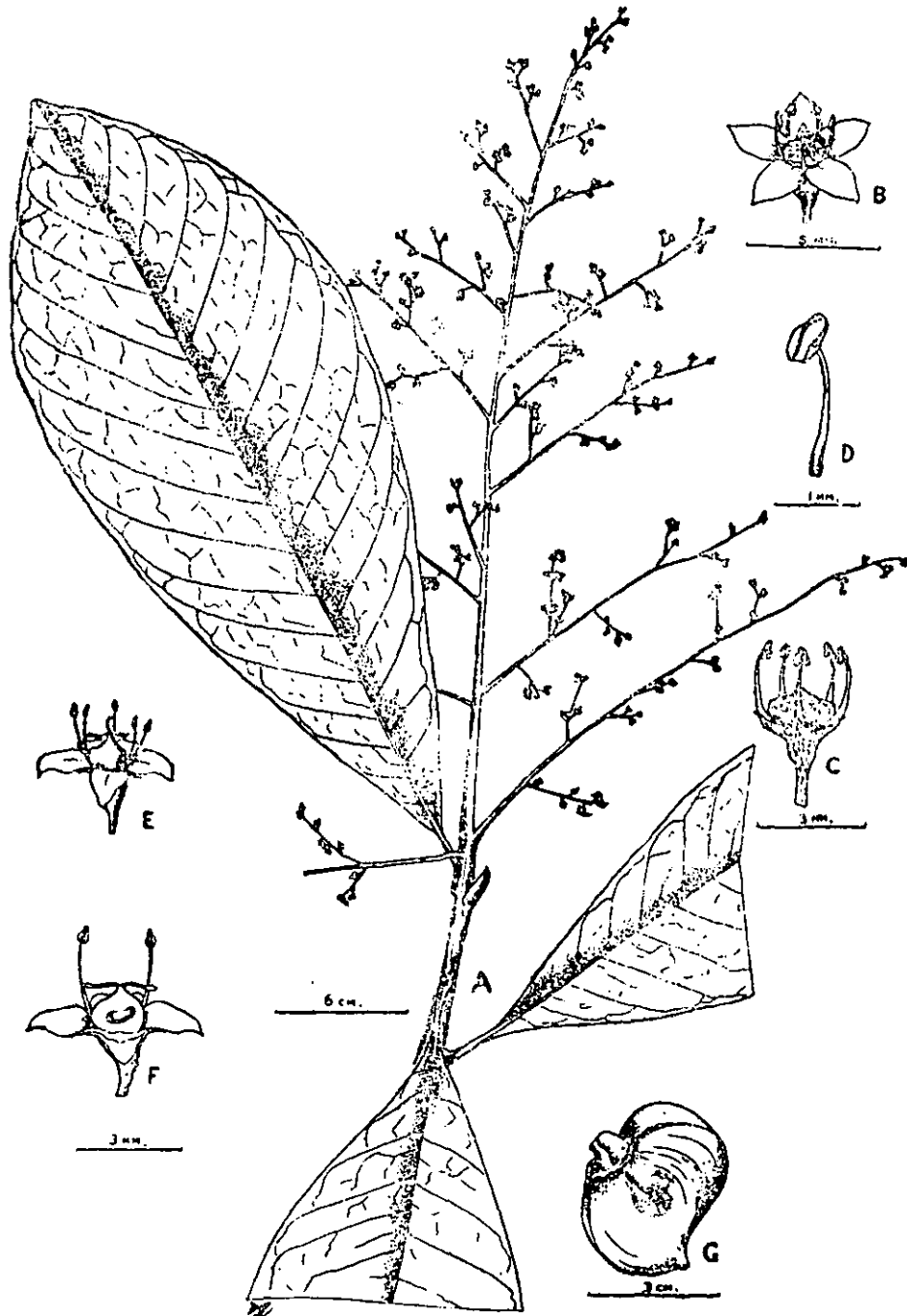


FIG. 36. *Semecarpus anacardium*. A, branch from a male tree with leaves and flowers in an erect panicle. B, front view of a male flower. C, male flower with the petals removed. D, stamen. E, lateral view of a female flower. F, longitudinal section of a female flower. G, fruit.

7. *Semecarpus anacardium* Linn. f., Suppl. 182. 1781. (Fig. 36).

Semecarpus latifolius Pers.—*Anacardium latifolium* Lamk.—*Anacardium officinarum* Gaertn.

Engl. Marking-nut Tree ; *Sinh.* Kiribadulla, Senkottan ; *Tam.* Erimugi, Kalagam, Kavaga, Pallam, Pallikkai, Pudanashanam, Se, Sengottai, Seran, Serangottai, Sinduram, Sombalam, Tagilima, Tembarai, Vingi, Virasagi ; *Hindi* Belatak, Bhela, Bheyla, Bhilawa, Bilaran ; *Sans.* Agnika, Agnimukhi, Anala, Antasatva, Arshohita, Arushkara, Avhala, Bhallataka, Bhalli, Bhallika, Bhutanashana, Bijapadapa, Dhanuvriksha, Krimighna, Kshatakshataru, Mahatikshna, Nirdahana, Prithakabija, Rakktahara, Shailabija, Shophanuta, Shothahrita, Snehabija, Sphotabijaka, Sphotahetu, Tapana, Vanhi, Vanhinama, Vatari, Virataru Vranakrita.

A tree about 28 m tall, with whitish-grey bark, attaining a circumference of about 3 m; leaves simple, alternate, entire, coriaceous, 11.5—38 cm long, 7—16.5 cm broad, obovate-oblong, rounded or mucronulate at apex, glabrous and dark green above, buff-green beneath with cartilaginous margins, base acute or sub-acute, main nerves 15—21 pairs, prominent on both surfaces; petioles 1.5—4.5 cm long; flowers small, 4.5—5 mm across, polygamous or dioecious, greenish-white, sub-sessile, fascicled in pubescent panicles, female panicles shorter than male, pedicels short, bracts lanceolate, pilose; calyx 5-or 6-fid, segments about 1 mm long and pilose outside; petals 5 or 6, imbricate, 2.5 mm long 1.5 mm broad, ovate, rounded; disk broad, annular; stamens 5 or 6; inserted at the base of the disk, imperfect in female flowers; ovary very rudimentary in male flowers and pilose; in the female, ovary subglobose, superior, pilose, 1-locular with a pendulous ovule, styles 3, stigmas subclavate; fruit a fleshy drupe, 2.5 cm long, obliquely ovoid or oblong, smooth and shining, black when ripe seated on a fleshy receptacle which is smooth and yellow when ripe.

Flowers during April and November.

DISTRIBUTION. Occurs in the tropical Himalayan tract in India, Khasia hills, Chittagong, Central India extending down to Madras State. It is cultivated in Ceylon.

India. Sikkim. *J. D. Hooker.* East Bengal. *Herb. Griffith* 1130/1, Kew Distribution 1861—2. Chota Nagpore, *Clarke* 24755 *B. F.*, Nov. 1874. Behar, *Clarke* 20745, Oct. 1873. Nilghiri and Kurg. *Hooker f. and T. Thomson.* Ceylon. Peradeniya Bot. Gard., cultivated, *Jayaweera* 2222, Nov. 1955; *Jayaweera* 2604, April 1958.

COMPOSITION. The sap of the bark contains the toxic principle cardol.

USES. The brown gum which exudes from the bark is regarded as a valuable medicine for scrofulous, venereal and leprous affections. The oil extracted from the nuts acts as a vesicant in rheumatism and sprains but this needs careful handling. The seeds are used, after the toxicity has been removed by boiling in water, in the preparation of cures for piles, boils in the rectum, urinary diseases, nervous debility, skin diseases, sexual debility and diseases of the liver and spleen. In Goa, the nut is used internally as a vermifuge and for asthma.

Recent work on the fruits of this tree at the Cancer Research Institute in Bombay has given clinical relief to cancer patients particularly to those unwilling to submit to surgery.



FIG. 37. *Semecarpus coriacea*. A. branch with leaves and inflorescence. B. side view of bisexual flower. C. flower with petals removed. D. stamen. E. fruit.

8. *Semecarpus coriacea* Thwaites, Enum. Pl. Zeyl. 76, 1858. (Fig. 37).

Sinh. Badulla ; *Sans.* Bhallataka.

A moderate-sized or large tree, with smooth, shining bark and thick ultimate branches with prominent leaf-scars ; leaves simple, alternate, closely placed, 10—16 cm long, 6—7 cm broad, obovate-oblong, entire, tapering to an acute or slightly rounded base, rounded or emarginate at apex, extremely coriaceous, lateral veins nearly horizontal, curved with the reticulations prominent beneath, petiole very short and stout ; flowers regular, pale green, polygamous, 0.7—1.2 cm across, glabrous in terminal, short, stout, much branched panicles ; calyx 5-lobed, lobes deciduous ; petals 5, distinct, imbricate, rather thick, ovate, 4 mm long, 2.5 mm broad, rounded at apex ; stamens 5, inserted outside the disk, filaments about 2—3 mm long, disk annular, faintly lobed ; ovary superior, 1-locular with a single pendulous ovule, styles 3, stigmas somewhat capitate ; fruit a compressed drupe, 1.8—2 cm long, 2.5—2.8 cm wide, strongly apiculate, receptacle small, 0.7—1 cm long and scarcely cupped.

Flowers during January, April and May.

ILLUSTRATION. Herb. Peradeniya, drawing.

DISTRIBUTION. Endemic to Ceylon and grows in the Central Prov., common in forests of the montane zone above 4,000 feet altitude ; Ramboda, Maturata, Nuwara Eliya and Hakgala.

Ceylon. Central Prov., *Thwaites C. P.* 313 ; Ramboda Pass, *Alston* 449, Jan. 1926 ; Hakgala, *A. M. Silva*, May 1906.

USES. The fruits are used as a substitute for the fruits of *Semecarpus anacardium* Linn. f.



FIG. 38. *Semecarpus gardneri*. A, branch with leaves and inflorescence. B, bisexual flower seen from above. C, fruits showing the drupes imbedded in cup-shaped enlarged receptacles.

9. *Semecarpus gardneri* Thwaites, Enum. Pl. Zeyl. 76 and 410. 1858. (Fig. 38).

Sinh. Badulla.

A moderate-sized or large tree with a finely grooved grey bark and glabrous young parts; leaves large, simple, entire, alternate, narrowly lanceolate-oblong, 15—32 cm long, 3.7—9 cm broad, acute or slightly rounded at the base, not decurrent on petiole, slightly acuminate, somewhat undulate, rather thick but not coriaceous, bright green and shining above, paler beneath. midrib very broad, lateral veins horizontal, conspicuous beneath; petioles 2.5—3.7 cm long, stout; flowers green, regular, polygamous, male flowers 0.6 cm across, bisexual flowers larger, in terminal and axillary, glabrous, slightly branched panicles 15—30 cm long; calyx 5-lobed, lobes free, 0.6 mm long, 1.2 mm broad, triangular, obtuse at apex, glabrous and deciduous; petals 5, distinct, imbricate, 3 mm long, 1.5 mm broad, oblong; stamens 5, inserted outside the disk which is broad, annular and faintly lobed; ovary superior, dome-shaped, 1.5 mm long, unilocular with a single pendulous ovule, styles 3, stigmas clavate; fruit a very oblique drupe, about 2.5 cm wide, apiculate on a large, swollen, wide receptacle which is formed by the enlarged, persistent calyx-tube and the disk, red when ripe.

Flowers during December.

ILLUSTRATION. Herb. Peradeniya, drawing.

DISTRIBUTION. A common endemic tree found growing in the moist low-country up to an altitude of about 3000 feet; Hewessa, Sinharaja Forest, Morawak Korale, Ambagamuwa, Ratnapura and Kandy.

Ceylon. *Thwaites C. P.* 1257. Sabaragamuwa Prov., Kuruwita, Demanhandiya. *Herb. Peradeniya*, Jan. 1892. Southern Prov., Morawak Korale, *Herb. Peradeniya*, March 1881.

USES. The fruits and seeds are used as substitutes for those of *Semecarpus anacardium* Linn. f.

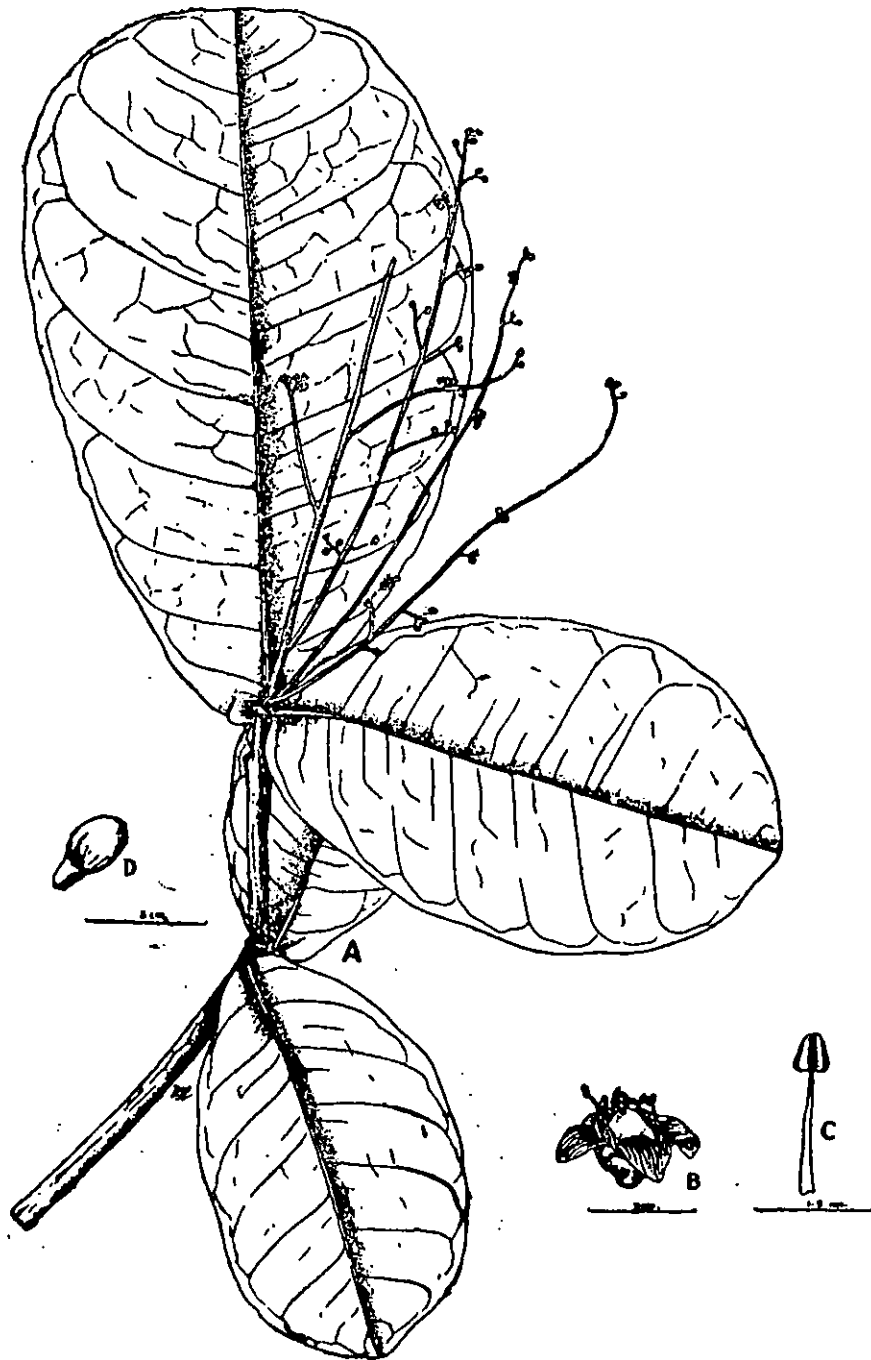


FIG. 39. *Semecarpus obovata*. A, branch with leaves and inflorescence. B, side view of a bisexual flower. C, stamen. D, young fruit.

10. *Semecarpus obovata* Moon, Cat. 22. 1824. (Fig. 39).

Sinh. Kalu-badulla.

A moderate-sized tree with a very smooth, whitish bark and glabrous young parts; leaves simple, opposite, entire, sessile, closely placed at the ends of branches, 7.5—18 cm long, 5—12 cm broad, obovate rotund, rounded at apex, subcordate at base, very coriaceous and stiff, glabrous, shining above, reticulations very prominent beneath; flowers regular, green, polygamous, 6.5—10 mm across in glabrous terminal panicles about 15 cm long; calyx 5-lobed, lobes free, 1 mm long, 1.5 mm broad, triangular, rounded at apex and deciduous; petals 5, distinct, 3 mm long, 1.8 mm broad, oblong-ovate, imbricate, rounded at apex; stamens 5, inserted outside the disk, filaments 2 mm long; disk annular, faintly lobed; ovary superior, broadly conical, about 2 mm long, unilocular with a single pendulous ovule, styles 3, stigmas capitate; fruit an oblong-ovoid drupe, 1.2 cm long, apiculate, receptacle narrower than the fruit.

Flowers during September and October.

ILLUSTRATION. Herb. Peradeniya, drawing.

DISTRIBUTION. A rare, endemic species growing in the moist low-country; Kalutara, Ratnapura, Galle, etc.

Ceylon. *Thwaites C. P.* 3339, without exact locality.

USES. The fruits and seeds are used as substitutes for those of *Semecarpus anacardium* Linn. f.

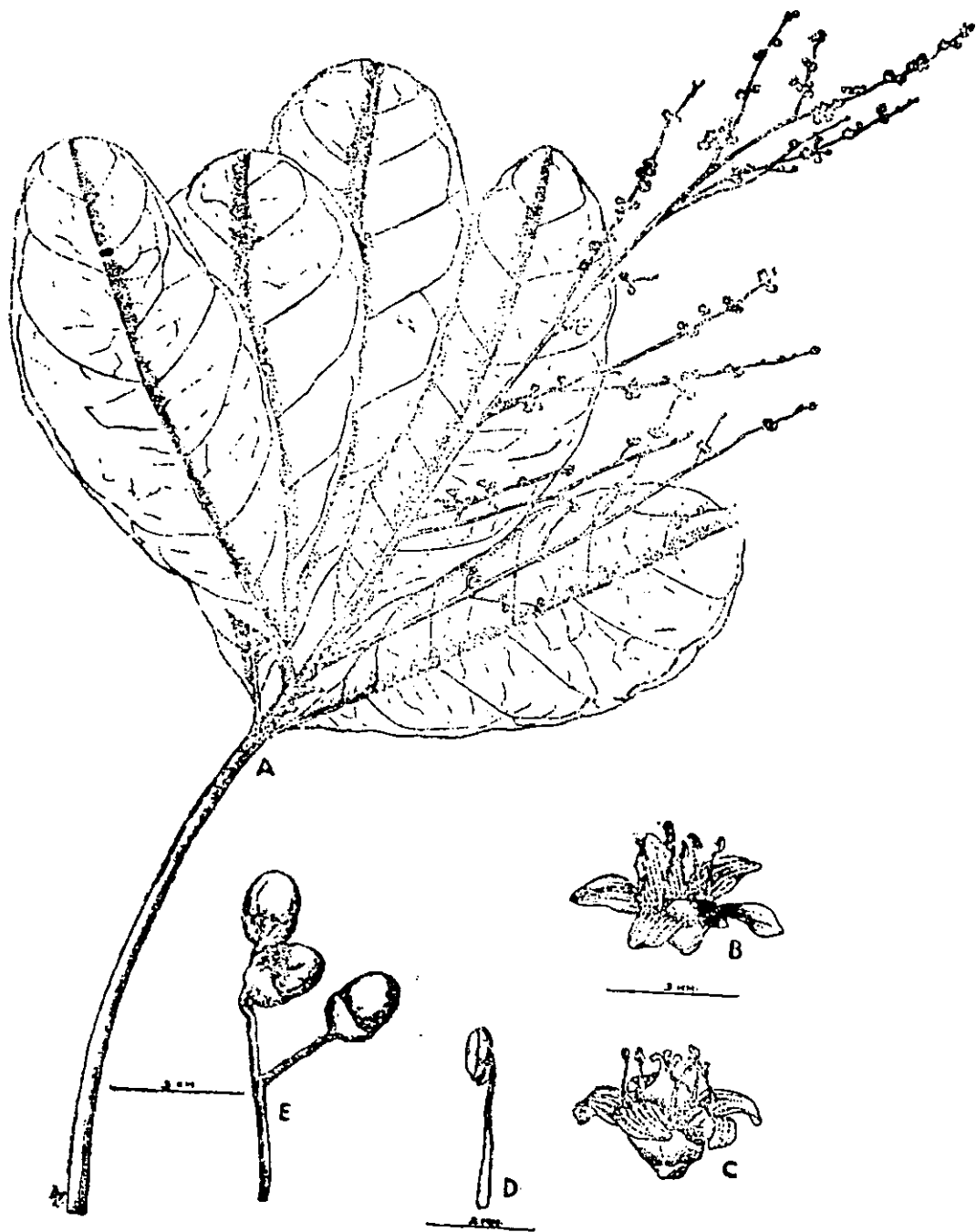


FIG. 40. *Semecarpus obscura*. A, branch with leaves and male inflorescence. B, male flower. C, bisexual flower. D, stamen.; E, fruits.

11. *Semecarpus obscura* Thwaites, Enum. Pl. Zeyl. 76. 1858. (Fig. 40).

Semecarpus oblongifolia Thw.

Sinh. Badulla.

A moderate-sized or large tree, glabrous throughout; leaves simple, entire, rather crowded at the ends of branches, 10—20 cm long, 2.5—6 cm broad, oblong or obovate-oblong, tapering at base and decurrent on petiole, rounded or obtuse at apex, coriaceous with a narrow cartilaginous margin, shining above, lateral veins nearly horizontal and with the intermediate reticulations prominent beneath; petioles variable 0.6—1.8 cm long; flowers regular, pale green, polygamous, 5—8 mm across, panicles terminal, of male 10—20 cm long; of bisexual much shorter, slender, much branched; calyx 5-lobed, lobes free, 1 mm long and as broad, rounded at apex; petals 5, free, imbricate, 2.5—4 mm long, 1—1.5 mm broad, oblong, rounded at apex; stamens 5, inserted outside the disk, versatile; filaments 2.4 mm long; anther 1 mm long; ovary rudimentary in the male, in the bisexual flower superior, globose, 1.5 mm long, 1-locular with a single pendulous ovule; styles 3 and stigmas clavate; fruit an ovoid drupe, 1.2—1.8 mm long, slightly compressed, more or less oblique with a cup-shaped receptacle 6—10 mm long.

Flowers during February and March.

ILLUSTRATIONS. Herb. Peradeniya, drawing.

DISTRIBUTION. A rather common endemic tree growing in the low-country, chiefly in the dry and intermediate regions of Ceylon; Batticaloa, Medamahanuwara, Maturata, Madugoda, Laggala, Uma Oya, Deltota, etc.

Ceylon. *Thwaites C. P.* 1258 in part; *Thwaites C. P.* 2256 without distinct locality; Eastern Prov., Batticaloa, *Nevill*, March 1885; Central Prov., Laggala, Kalupahana, *Herb. Peradeniya*, Sept. 1887; between Nugatenna and Madugoda, *Alston* 473, June 1926.

USES. The fruits and seeds are used as substitutes for those of *Semecarpus anacardium* Linn. f.

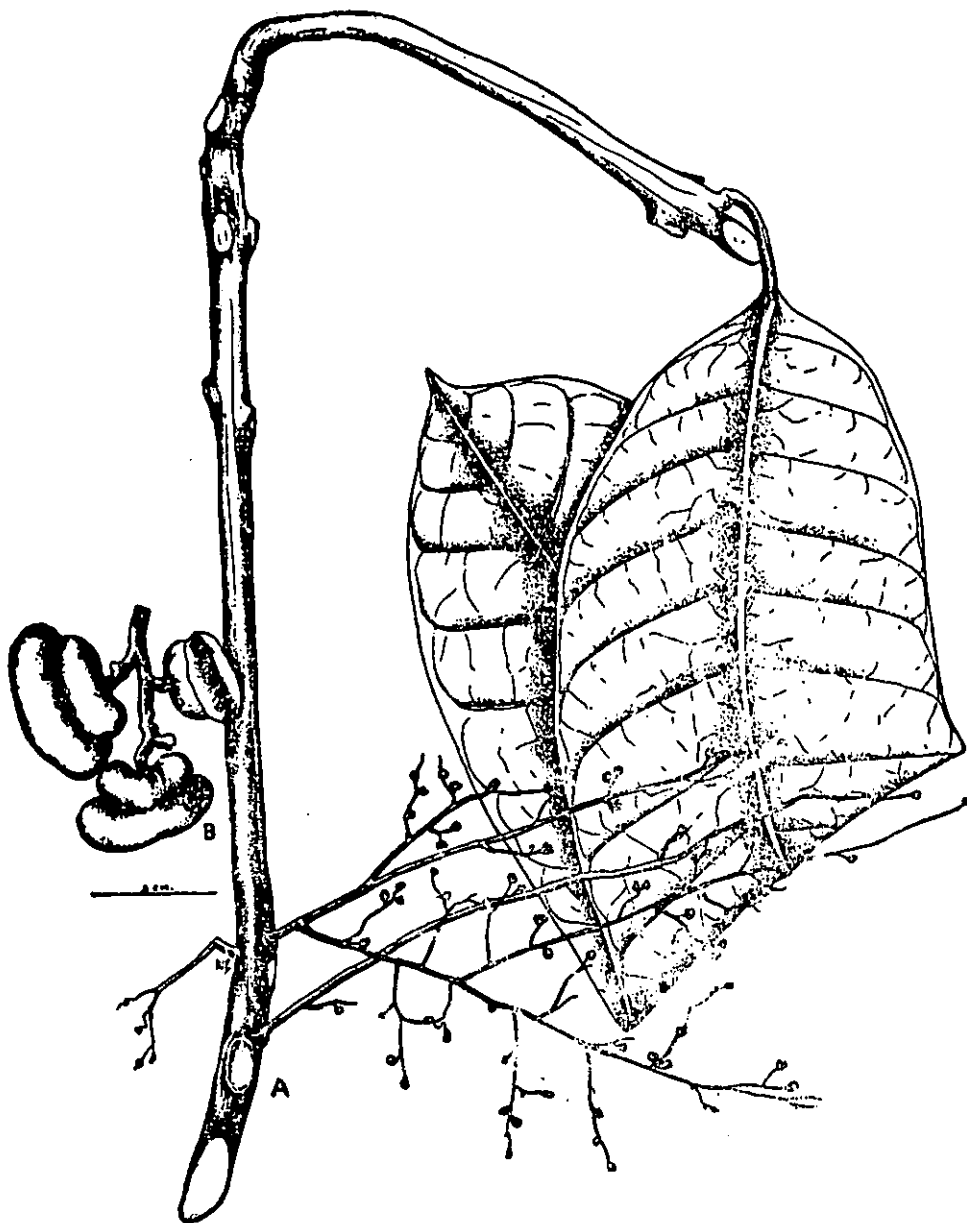


FIG. 41. *Senecarpus subpeltata*. A, branch with axillary panicles. B, fruits.

12. *Semecarpus subpeltata* Thwaites Enum. 75. 1858. (Fig. 41).

Sinh. Maha-badulla.

A large tree with a smooth bark, very prominent leaf-scars and glabrous young parts; leaves simple, alternate, entire, very large, 23—38 cm long, lanceolate-oblong, rounded and peltate at base, suddenly and shortly acuminate with a marginal vein close to the edge, very coriaceous, glabrous and shining, lateral veins horizontal; petioles 3.7 cm long and very thick; flowers regular, small, polygamous, sessile, articulated in glabrous, spreading panicles 15—20 cm long, arising from axils of fallen leaves; calyx 5-lobed, lobes free, deciduous; petals 5, distinct, imbricate; stamens 5, inserted outside the disk, disk broad, annular, faintly lobed; ovary superior, 1-locular with a single pendulous ovule; styles 3, stigmas clavate; fruit a much depressed drupe, 1.2 cm long and 3 cm broad, striate; receptacle large, broad and cupped.

Flowers, during March, the panicles coming off from the old wood in axils of fallen leaves.

ILLUSTRATION. Herb. Peradeniya drawing.

DISTRIBUTION. A rare, endemic species found in forests of moist low-country between Ratnapura and Galle; Kuruwita Korale, Hiniduma Kanda, Singharaja Forest, etc.

Ceylon. *Thwaites C. P.* 3004, locality unknown.

USES. The fruits and seeds of this tree are used as substitutes for those of *Semecarpus anacardium* Linn. f.

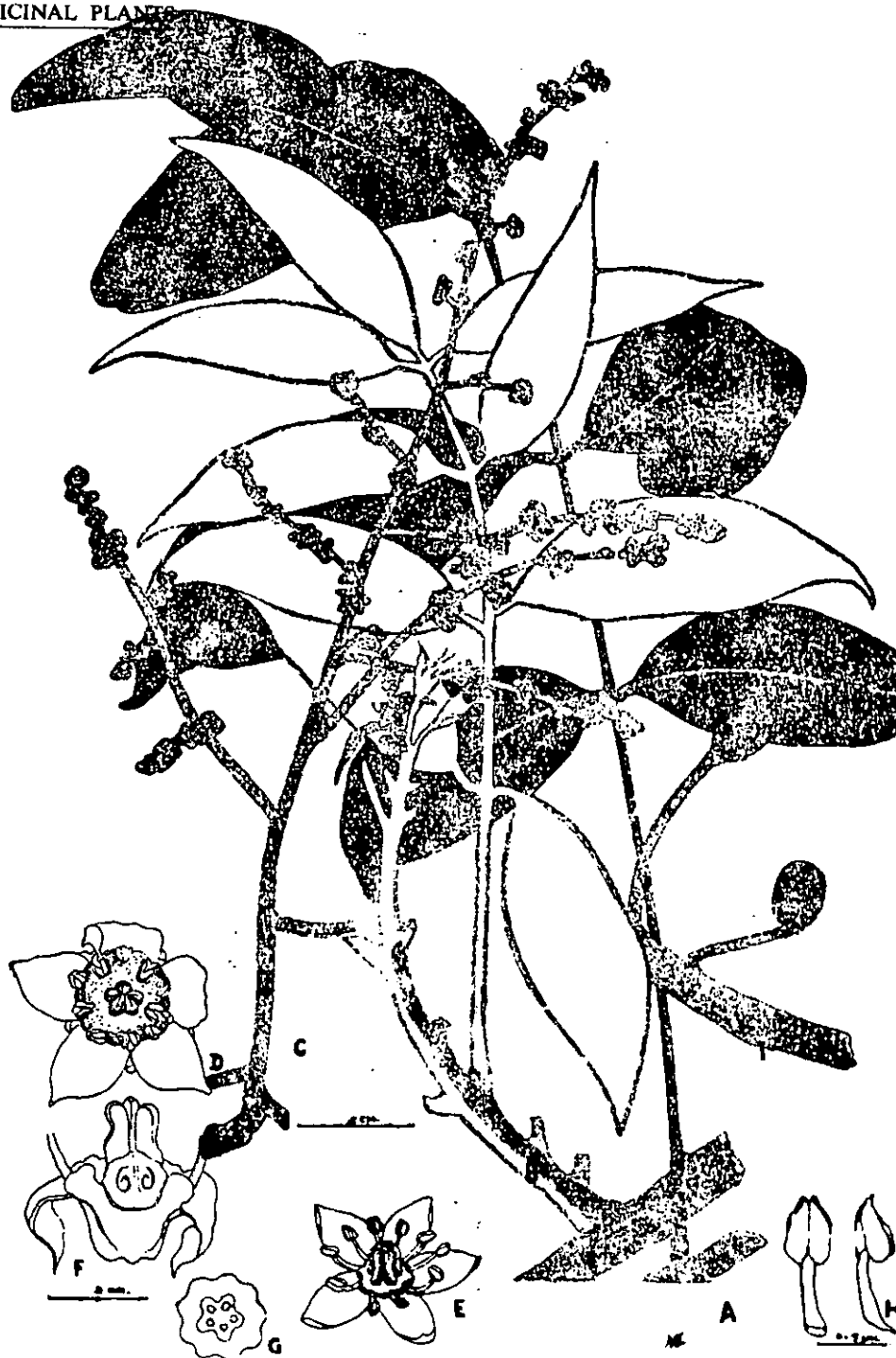


PLATE III. *Spondias pinnata*. A, mature leaf. B, young leaf. C, inflorescence. D, flower viewed from above. E, lateral view of flower. F, longitudinal section of flower showing the embedded ovary. G, transverse section of ovary. H, stamens. I, young fruits.

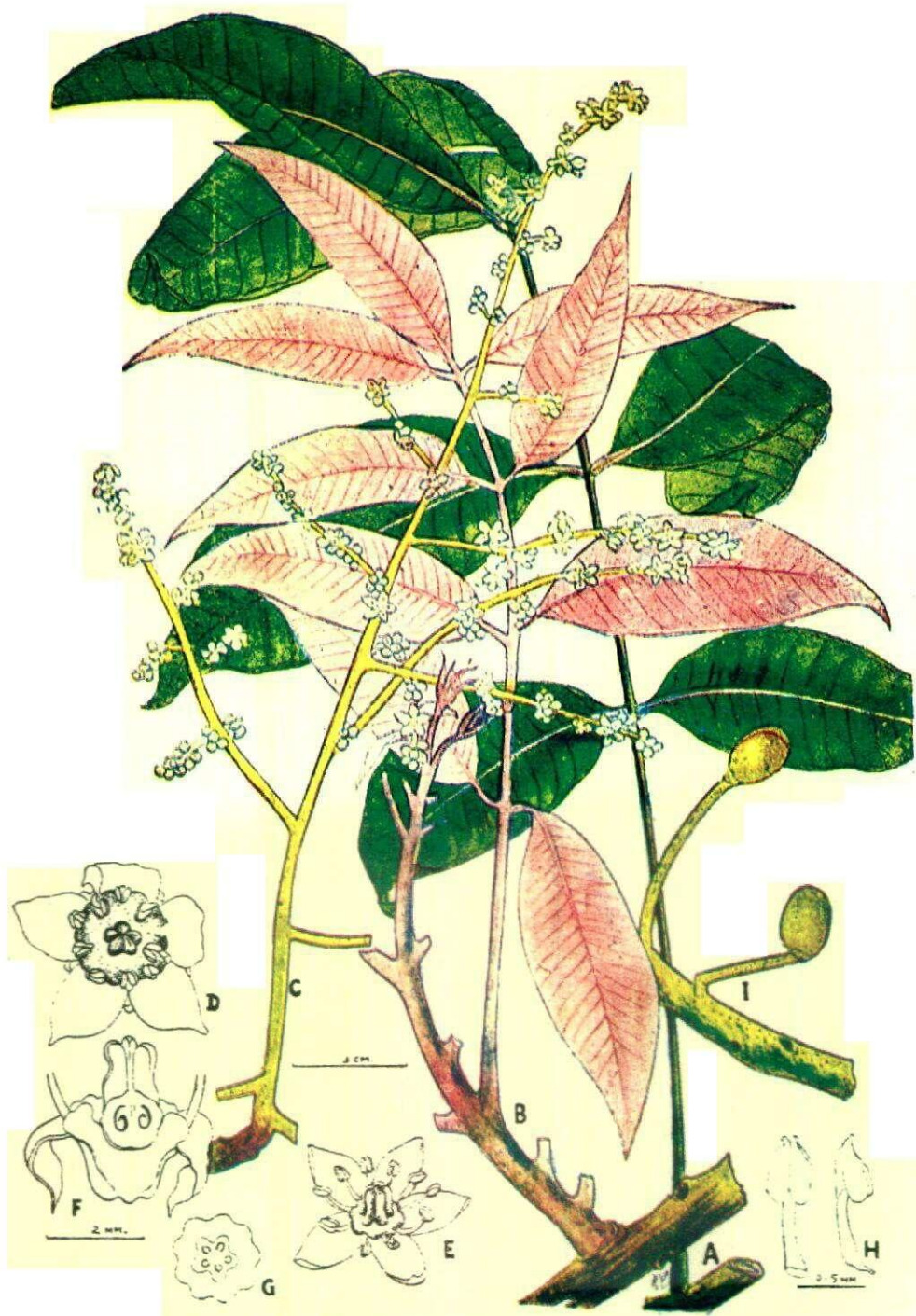


Plate III *Spondias pinnata*

13. *Spondias pinnata* Kurz in Pegu Rep. 44. 1875. (Plate III).

Mangifera pinnata Linn. f.—*Spondias mangifera* Willd.—*Spondias amara* Lamk.—*Evia amara* Comm.

Engl. Bile Tree, Indian Hog Plum, Traveller's Delight, Wild Mango; *Sinh.* Embarella. *Tam.* Ambalam, Ambiram, Egin, Eginam, Ibagam, Kattuma, Kattumagirangai, Malai, Mambulichi, Marima, Nalini, Pulima, Pullipullama, Sinsam, Sudam; *Hindi* Amara, Ambodha, Ambra, Amra. *Sans.* Advagabhogya, Ambarataka, Ambarisha, Amlavataka, Amrata, Amrataka, Bhiringiphalla, Kapichuda, Kapichuta, Kapipriya, Kapitana, Madhuram-laka, Markatamra, Pitana, Pitanaka, Rasadhya, Tanukshiri, Tungi, Varshapaki.

A small or moderate-sized, deciduous tree, with a straight trunk, pale bark and glabrous young parts; leaves large, imparipinnate compound, 30—45 cm long, rachis thickened at base, cylindrical, striate, glabrous; leaflets 3—5 pairs and a terminal one, opposite or alternate, articulated, very shortly stalked, 7.5—15 cm long, oval or oblong-oval, rather unequal at base, acuminate, entire, glabrous, thin, lateral veins numerous, horizontal veins joined by a strong intramarginal vein; flowers regular, pale pinkish green, polygamous, 4—6 mm across, sessile, in small clusters on the spreading branches of stout, erect, pyramidal, glabrous terminal panicles appearing before the young leaves; calyx 5-fid, teeth minute, triangular, deciduous; petals 5, valvate, 2 mm long, 1.5 mm broad, acuminate, reflexed; disk 10—crenate; stamens 10, inserted outside and beneath the disk; ovary superior, partly immersed in the disk, 5-loculed with a single pendulous ovule in each loculus, styles 5, distinct, short; fruit an ovoid edible drupe, about 5 cm long, smooth, yellow with a firm flesh and milky juice, stone woody and fibrous.

Flowers in January.

ILLUSTRATIONS. *Beddome, Flora Sylvatica 1: pl. 169. 1868-73; Kirtikar and Basu, Indian Med. Pl., pl. 281. 1933; Herb. Peradeniya, drawing.*

DISTRIBUTION. Occurs throughout India, Ceylon, Burma and the Andaman Islands. It is common in Ceylon, often planted in the moist low-country.

India. Sikkim: *J. D. Hooker. Maisor and Carnatic: G. Thomson. Ceylon. Thwaites C. P. 1263.*

USES. The bark of this tree is used for treating dysentery. Among certain Indian tribes, the bark ground into a paste with water is rubbed for both articular and muscular rheumatism. The juice of the leaves is used for earache. The fruit is an antiscorbutic and the acidic and astringent pulp is used for bilious dyspepsia.

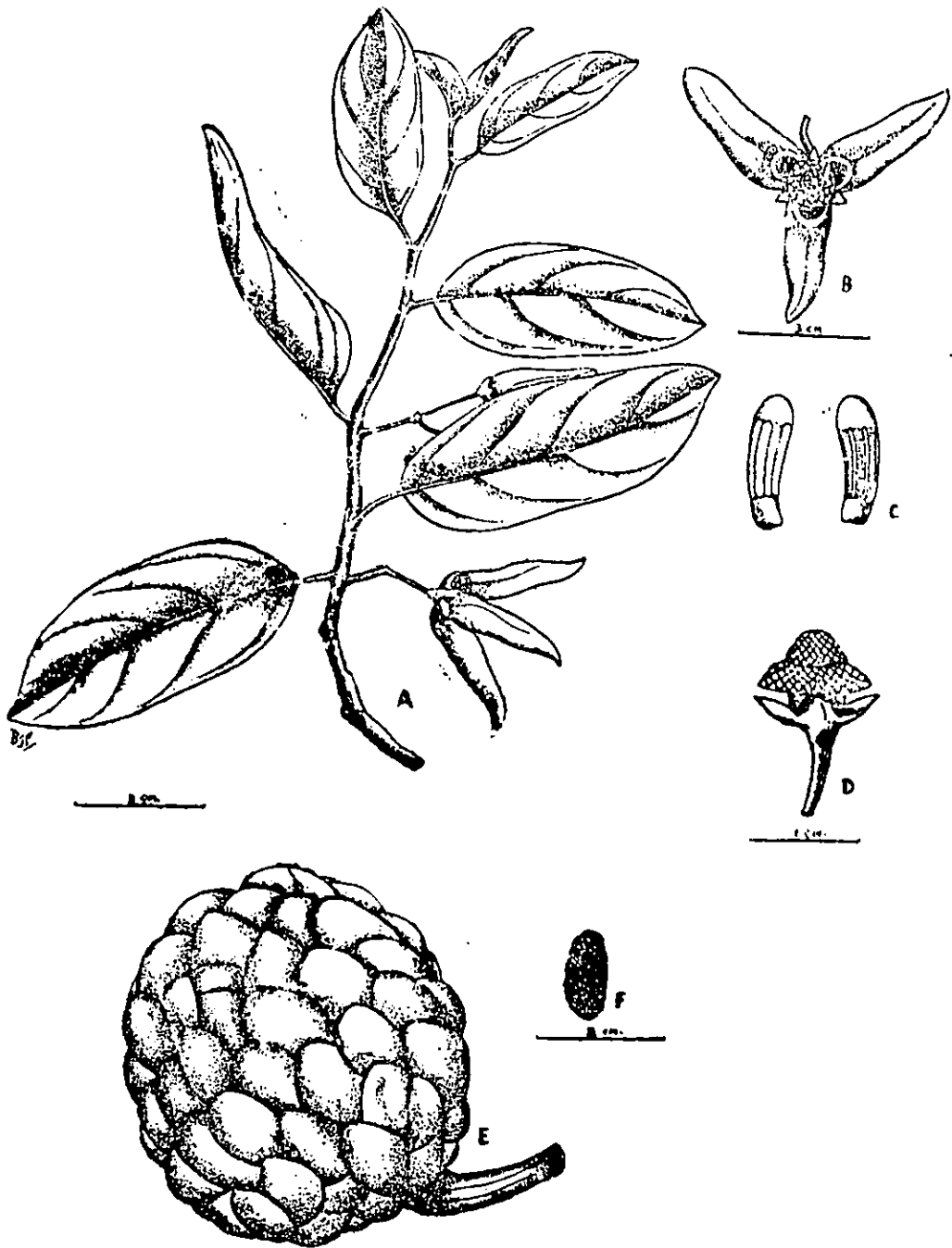


FIG. 42. *Annona squamosa*. A, branch with leaves and flowers. B, flower viewed from above. C, stamens. D, flower with corolla removed. E, fruit. F, seed.

7. ANNONACEAE

1. *Annona squamosa* Linn., Spl. Pl. 537. 1753. (Fig. 42).

Engl. Sugar Apple, Sweet Sop ; *Sinh.* Anoda, Atta ; *Tam.* Atta, Sitapalam ; *Hindi* At, Atasitaphal. Shariphal, Sitaphal ; *Sans.* Agrimakhya, Atripya, Bahubijaka, Gandagatra, Krishnabija, Sitaphala, Subha, Suda, Vaidehivallabha.

A small tree, about 7 m high ; leaves simple, alternate, exstipulate, 3.7—7.5 cm long, 1.8—3.7 cm broad, oblong-lanceolate or elliptic, obtuse or subacute, entire, pellucido-punctate, glabrous above, glaucous and pubescent beneath when young, lateral nerves 8-11 pairs ; petioles short ; flowers solitary, bisexual, leaf-opposed, or 2—4 on short extra-axillary branchlets ; pedicels short, bracts below the middle ; sepals 3, minute, valvate, triangular, pubescent ; petals 6, valvate in 2 series, the exterior fleshy, concave at base, 2.5 cm long, 0.6 cm broad, the inner minute or sometimes wanting ; stamens many, the produced connectives ovoid on top ; ovaries many, connate, superior, ovules 1 to each carpel, erect, style oblong ; fruit globular, cordate-ovoid or conical, 6-9 cm in diameter, yellowish-green, glaucous, comprised of loosely cohering rounded pistils that fall apart quite easily, the pulp white, sweet, soft and juicy, having a very mild agreeable flavour ; seeds brownish-black and smooth.

Flowers from May to July.

ILLUSTRATION. Kirtikar and Basu, Indian Med. Pl., pls. 30 and 30A. 1933.

DISTRIBUTION. A native of tropical America and West Indies and is frequently cultivated in India, Ceylon and other tropical Asiatic countries.

India. Calcutta, Bot. Gard. Cultivated ; Pen. Ind. Orient., *Herb. Wight*. Ceylon. Peradeniya, *Herb. Peradeniya*, May 1895. Maldive Islands. Male, *Christopher*, 1888 ; *Didi* 88, 1896. Cuba. Santiago de las Vegas, *Baker* 94, May 1906.

COMPOSITION. The leaves and seeds of this tree contain an alkaloid. The seeds in addition contain a neutral resin and a fixed oil with an irritant poison. The bark contains the alkaloid anonaine. Hydrocyanic acid has also been found in the leaves, bark and roots.

USES. Applied externally the leaves, unripe fruit and the seeds of this tree possess vermifugal and insecticidal properties. The seeds, crushed into a paste with water, are applied to the scalp to destroy lice or used as an abortifacient if applied to the os uteri in pregnant women. The bruised leaves or the ripe fruit, applied with salt, induce or hasten suppuration of malignant tumors. The unripe fruit is given for diarrhoea, dysentery and atonic dyspepsia. The root and bark are strong purgatives. The ripe fruit is frequently eaten.

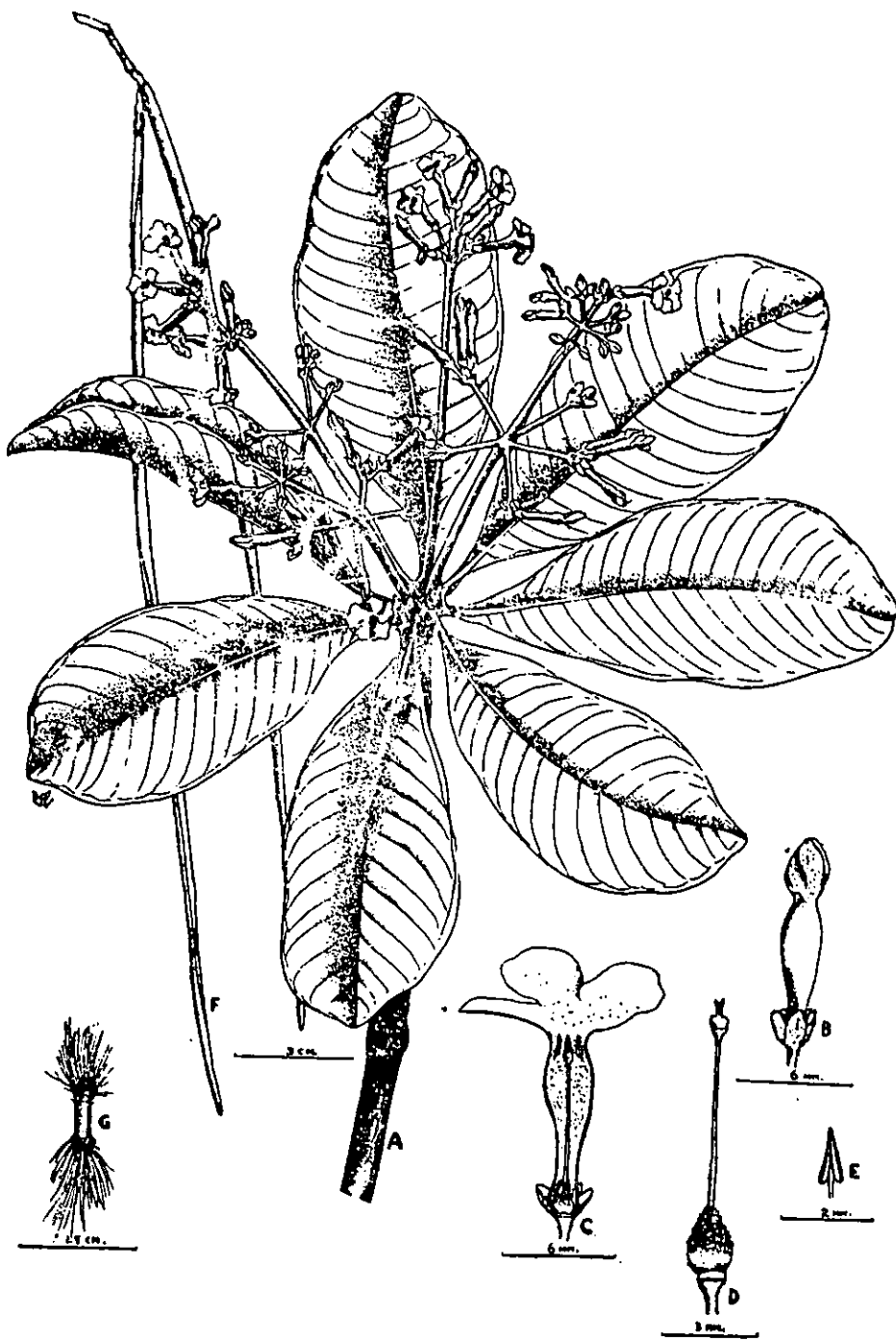


FIG. 43. *Alstonia scholaris*. A, branch with leaves and panicles. B, flower bud. C, longitudinal section of a flower. D, pistil. E, stamen. F, fruit. G, seed.

8. APOCYNACEAE

1. *Alstonia scholaris*: (Linn.) R.Br. in Mem. Wern. Soc. 1 : 76. 1811. (Fig. 43).

Echites scholaris Linn.—*Echites pala* Ham. ex Spreng.—*Nerium tinctorium* Perr.—*Alstonia cuneata* Wall.

Sinh. Rukkattana ; *Tam.* Elilappalai, Maranallari, Mukkanbalai, Palai, Vadirasi ; *Hindi* Chatiun, Saitankajhad, Satiun, Satni, Satwin ; *Sans.* Ayugmachchhada, Ayugmaparna, Ayukachcada, Bahuparna, Brihativaka, Chatraparna, Dalgandhi, Devavriksha, Gandhiparna, Grahanasha, Grahanashana, Grahashi, Guchhapushpa, Jivani, Kshatrya, Madagandha, Munichhada, Palagaruda, Payasya, Saptachhada, Saptaparna, Sarada, Shalmalipatraka, Sharada, Sharadipushpa, Shirarujam, Shuktiparna, Sringiritika, Suparnaka, Sutipatra, Vidha, Vinada, Vinyaka, Vishalatvaka, Vishamachhada, Yugmaparna.

A tall tree, 13—26 m high with an erect trunk, grey bark and copiously lenticellate, glabrous and whorled branches ; leaves simple, whorled, usually 5—7 in a whorl at the end of a year's growth, 8.7—16.2 cm long, 3—5.5 cm broad, oblong or obovate-lanceolate, acute at base, obtuse, rounded or emarginate at apex, very faintly crenate, glabrous, bright green and shining above, paler with a white "bloom" beneath, rather thick, lateral veins numerous, slender, not prominent, petioles very short with a blunt hooked fleshy process on the upper surface at the base ; flowers greenish-white, regular, bisexual, nearly sessile in small, cymose clusters, terminating whorls or umbellate branches of erect, pubescent panicles which are 7.5—10 cm long ; bracts ovate, pubescent ; sepals 5, segments imbricate, pubescent ; petals 5, fused into a cylindrical, wide corolla-tube, 6 mm long, pubescent, hairy within about 2/3 way down, lobes truncate, overlapping to the left, convolute ; disk absent ; stamens 5, inserted in the upper part of the corolla-tube, alternating with its lobes ; anthers distinct, pointed, introrse, dehiscent longitudinally ; ovary superior, 2-carpellary, carpels distinct, hairy ; style single, filiform, thickened at the summit ; fruit follicles 30—45 cm long, very slender, cylindrical, pendulous, becoming completely everted after dehiscence ; seeds numerous, oblong, flat with a fringe of hair at both ends.

Flowers during April.

ILLUSTRATIONS. Wight, *Ic. Pl. Ind. Orient. pl.* 422. 1840—1843 ; Bentley and Trimen, *Medicinal Plants, pl.* 173. 1880 ; Kirtikar and Basu, *Indian Med. Pl. pl.* 606B. 1933 ; Herb. Peradeniya, drawings.

DISTRIBUTION. Grows in the drier parts of India, Burma, Ceylon, Malaya Java, Philippine Islands, New Guinea and West Tropical Africa.

India. Siwalik and Jaunsar Div., Nakranda Swamp, *Hassan* 85, April 1921. Bengal : *J. D. Hooker. Pen. Ind. Or., Herb. Wight* 1870. Kew Distribution 1866—7. Assam. *Simmons* Ceylon. Peradeniya, Bot. Gard., cultivated. *Thwaites C. P.* 1840 ; *Jayaweera* 41, July 1950. Malay Peninsula. *King's Collector* 7952. Singapore. *Cantley* 86, 1882. Philippine Islands. Luzon : Union Prov., Bauang, *Elmer* 5640, Feb. 1904.

COMPOSITION. The bark contains the alkaloids, alstonine, ditamine, echitamidine, echitamine, echitenine and porphyrine.

USES. In the Philippines, the bark is used as a remedy for fevers, chronic diarrhoea, and dysentery. It is a tonic and febrifuge and is believed to be an emmenagogue, anticholeric and vulnerary. In India, the bark is well known as an astringent tonic, anthelmintic, alterative, antiperiodic, and a domestic remedy for chronic diarrhoea and dysentery. The tender leaves roasted and powdered are applied as a poultice to ulcers with foul discharge with beneficial results. In Malaya, a decoction of the leaves is drunk for beriberi and given for congestion of the liver. The milky juice is applied to ulcers and rheumatic pains. It is also used for toothache and earache. In Java, the bark is used as a stomachic and in mixtures for various ailments including fevers and diabetes. It is used for enemas for haemorrhoids. The bark along with other ingredients is also prescribed for snake-bite.

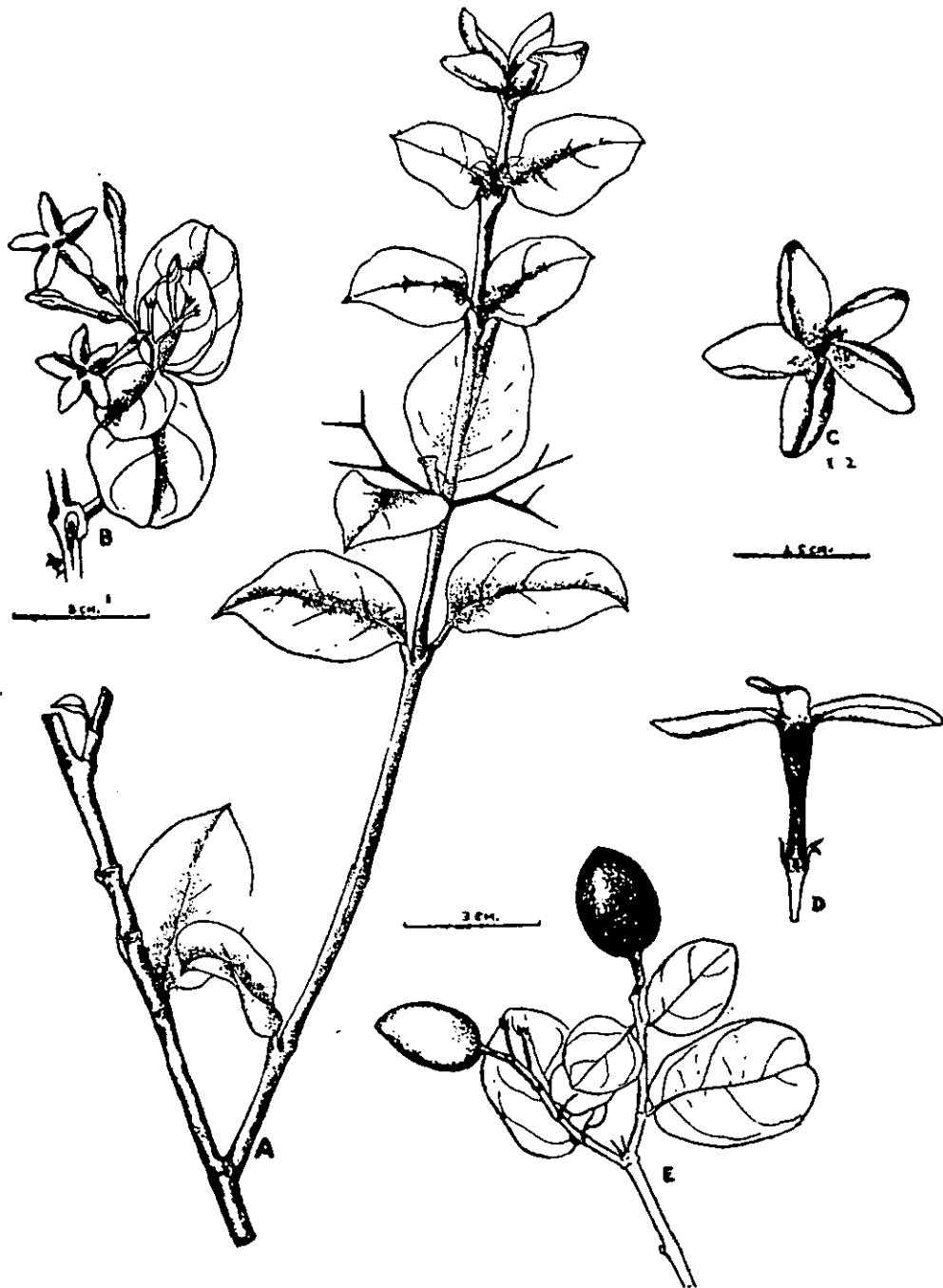


FIG. 44. *Carissa carandas*. A, branch with leaves and spines. B, branch showing a cluster of flowers. C, flower viewed from above. D, longitudinal section of a flower. E, branch showing fruits.

2. *Carissa carandas* Linn., Mant. 1 : 52. 1767. (Fig. 44).

Engl. Ceylon Damson ; *Sinh.* Mahakaramba ; *Tam.* Kala, Kalakkay, Perungala, Perunkila ; *Hindi* Garinga, Gotho, Karaunda, Karonda, Karondi, Karunda, Karrona, Timukhia ; *Sans.* Avighna, Bahudala, Bolekarambuka, Dimdima, Dridhakantaka, Guchhi, Jalipushpa, Kanachuka, Kantaki, Karamarda, Karamardaka, Karamla, Karamlaka, Krishna-pakaphala, Krishnaphala, Kshiraphala, Kshiri, Mahakaramba, Pakakrishna, Pakaphala, Panimarda, Phalakrishna, Supushpa, Sushena, Vanalaya, Vanekshudra, Vasha.

A small tree or a large shrub, with numerous, divaricate branches and very sharp horizontal spines, often branched ; leaves simple, opposite, oblong-oval or oblong-lanceolate, 2.5—6.2 cm long, subacute at base, obtuse at apex, glabrous, thin ; flowers regular, bisexual in threes, shortly stalked in clusters at the ends of short, axillary and terminal peduncles ; bract small, linear ; sepals 5, fused, puberulous, segments linear or lanceolate, acute and ciliate ; petals 5, fused into a corolla-tube, lobes oblong-lanceolate, acute, spreading, contorted, overlapping to the right ; stamens 5, distinct, inserted in the corolla-tube, included ; ovary superior, 2-locular ; style simple ; stigma conical ; fruit a smooth, ovoid, bluntly pointed, reddish-purple berry, 1.8—2.5 cm long with four seeds.

Flowers during March.

ILLUSTRATIONS. Roxburgh, Pl. Corom. 1 : pl. 77. 1795 ; Wight, Ic. Pl. Ind. Orient. pl. 426. 1840—1843 ; Kirtikar and Basu, Indian Med. Pl., pl. 601. 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs in the drier sandy and rocky soils throughout India, Ceylon, Burma and Malaya. It is rare in Ceylon, being found in Jaffna, Kurunegala and other dry districts.

India. Maisor and Carnatic. *G. Thomson.* Pen. Ind. Or., *Herb. Wight* 1850. Kew Distribution 1866—67. Ceylon. Northern Prov., Jaffna, *Thwaites C. P.* 1823.

COMPOSITION. The bark contains an alkaloid. The roots contain traces of a volatile oil, salicylic acid and an alkaloid.

USES. In India, the leaves are used for diarrhoea, earache, soreness of the mouth and throat and syphilitic pains. A decoction of the leaves is often used at the commencement of remittent fevers. The root has a reputation of being a bitter stomachic and used as a remedy for itch along with other ingredients. The ripe fruit possesses antiscorbutic properties.

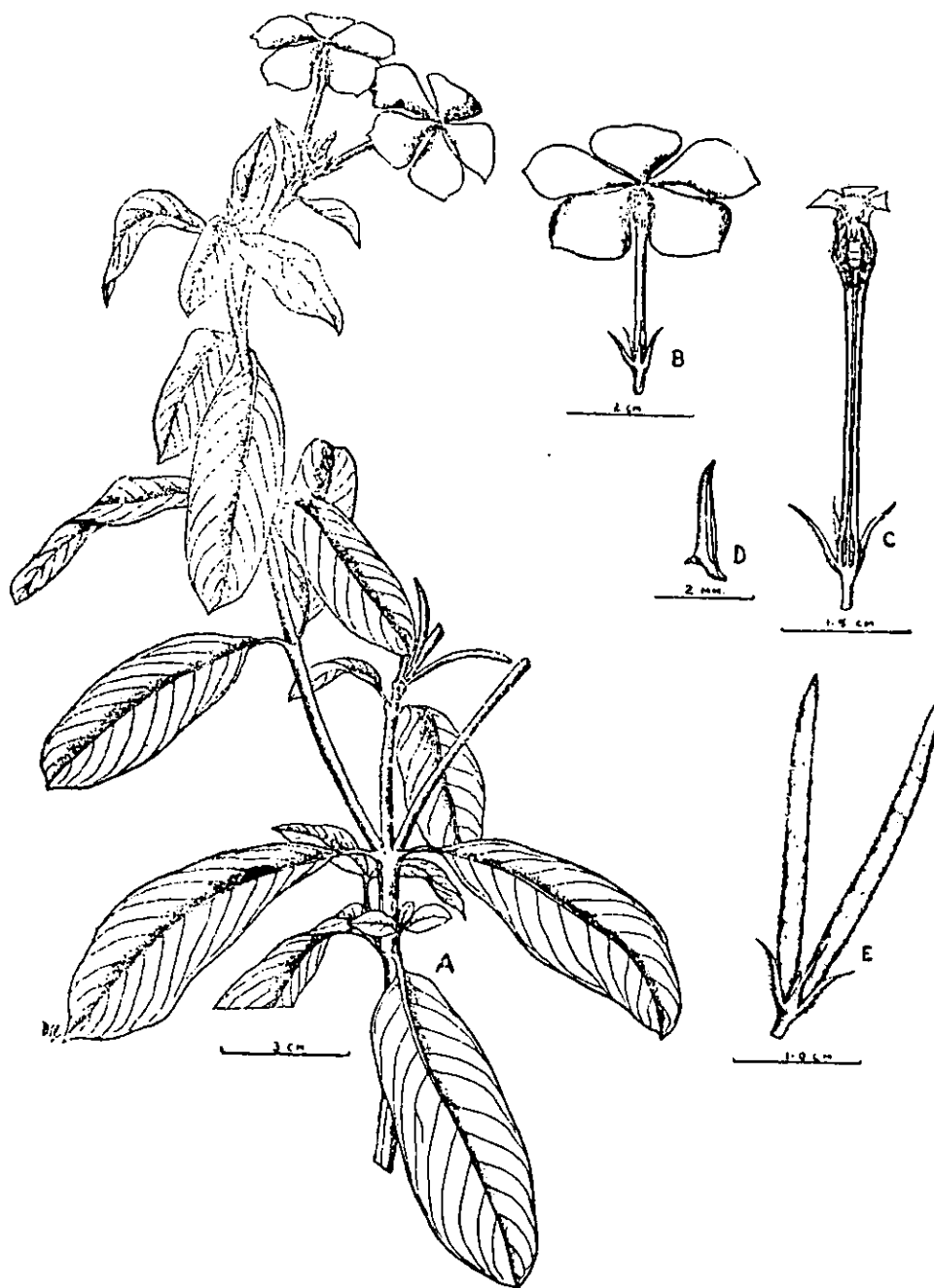


FIG. 45. *Catharanthus roseus*. A, a branch with leaves and flowers. B, side view of a flower. C, longitudinal section of a flower with the corolla lobes removed showing the stamens and the pistil. D, stamen. E, fruit follicles.

3. *Catharanthus roseus* (Linn.) G. Don, Gen. Syst. 4: 95. 1837. (Fig. 45).

Lochnera rosea (Linn.) Reichb.—*Vinca rosea* Linn.—*Ammocallis rosea* Small.

Engl. Madagascar Periwinkle, Rose Periwinkle. Sinh. Mini-mal, Sohon-mal.

A hardy sub-shrub, 49—153 cm tall, spreading, pubescent; internodes 1.2—3 cm long, cylindrical, slightly swollen at the nodes; leaves simple, entire, opposite, decussate, 4—4.8 cm long, 2—3 cm broad, oblong, sharply mucronate, slightly tapering towards the base, pubescent on both surfaces with 7—10 pairs of lateral veins, prominent below; petioles 4-5 mm long, hairy, 2-glandular at base; flowers regular, bisexual, large, about 4 cm across, sessile, axillary, often a pair to an axil of one leaf of each node towards the ends of branches; sepals 5, free, linear, 4.5—4.7 mm long, 1.1 mm broad at the base, hairy without glands; corolla-tube 2.7—2.8 cm long, narrow, cylindrical, swollen towards the further end and slightly protruding into 5 knobs inside which the stamens are lodged, hairy outside, glabrous inside except above and below the stamens, lobes 5, rotate, purplish-pink with a dark-pink eye or white with a pink-eye, each lobe 1.9—2.1 cm long and as broad, obovate, rounded at apex, glabrous except at the narrow base on both sides; stamens 5, almost sessile, included; anthers 2.5 mm long, pointed enclosing the stigma; ovary superior, of 2 distinct carpels subtended by a pair of yellowish-green, triangular glands as tall as the ovary, 2 mm high and hairy; style 2.1 cm long, stigma 1.5 mm long, dumb-bell shaped; fruit of 2 distinct follicles, hairy, cylindrical, 2.5 cm long, dehiscing along the ventral suture of each follicle; seeds 2 mm long, lobulate.

Flowers throughout the year.

ILLUSTRATIONS. Nicholson, Dict. Gard. 4: pl. 174.; Kirtikar and Basu, Indian Med. Pl., pl. 604A. 1933; Herb. Peradeniya, drawing.

DISTRIBUTION. The country of origin of this species is unknown. It is naturalized in all tropical countries confined mainly to the sea coast. In Ceylon, it grows along the sea coast, from Colombo to Matara and also inland usually on waste ground and cemeteries.

S. America. Central Paraguay, *Morong* 802, Colombia University Distribution 1888—1890. Cuba. Santiago de las Vegas, *Baker* 3, April 1907. "One of the commonest ornamentals in Cuba, used as a border plant about houses and shrubbery, becoming 2—3 feet high and very thick. Flowers commonly white but branches often occur which bear pinkish or purplish flowers." Navassa Island. *Rehder* 9, Jan. 1930, "low shrub with pink flowers, 1—2 feet high." Arn. Arb. Distribution. Ceylon. Central Prov., Peradeniya, Bot. Gard. Aug. 1887, without name of collector, "flowers white, pink or white with red centre", cultivated; *Jayaweera* 694, Jan. 1954, cultivated. Maldivé Islands. Male, *Gardiner* 1899—1900; *Didi* 170, 1896. Seychelle Islands. *Neville*, 1867. Indo-China. Hue and vicinity, *Squires* 84, Jan.—May 1927.

COMPOSITION. The plant above ground contains vindoline, vindolinine, virosine, catharanthine, leurosine, lochnerisine and perivine while the roots contain tetra-hydroalstonine, vincalucoblastine, vincamine, vinceine, δ — yohimbine, ajmalicine, akuammine, alstonine and reserpine. The root bark contains lochnerine and serpentine. The leaves contain vinceine which is also found in the roots, a volatile oil which contains aldehydes, sesquiterpenes, furfural, lochnerol and sulphur-containing compounds.

USES. A decoction of the leaves of this plant is given for diabetes and that of the root is an effective emmenagogue and antidysenteric. In Madagascar, the root is used as a purgative vermifuge, depurative, haemostatic and a remedy for toothache. In Queensland, Philippines Natal and other parts of South Africa the leaf is used as a remedy for diabetes, and for rheumatism in Transvaal. It is said to be an ideal purgative for chronic constipation but its effect on diabetes is controversial.

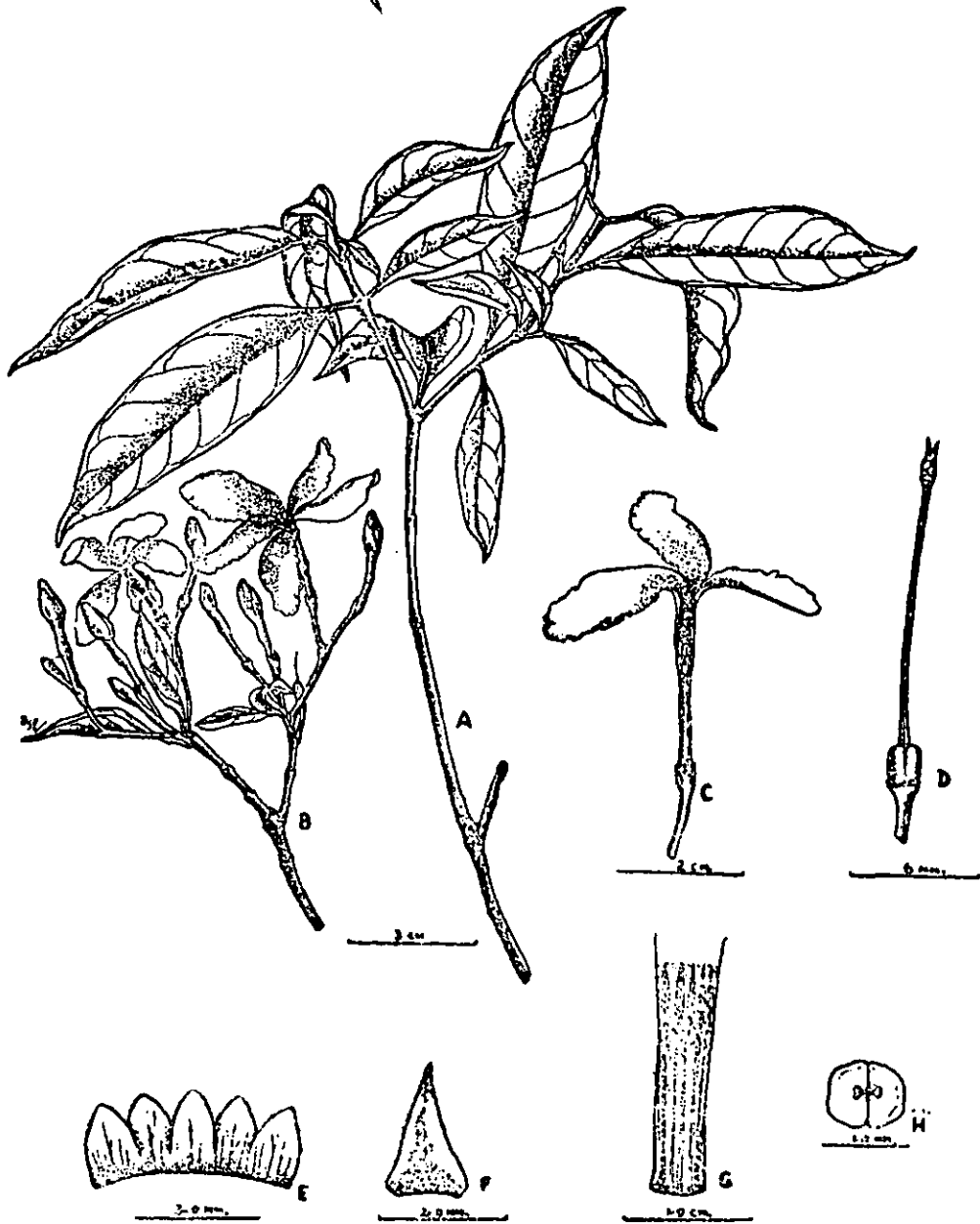


FIG. 46. *Erytania divaricata*. A, a branch with leaves. B, inflorescence. C, longitudinal section of a flower showing pistil and stamens. D, pistil of a flower showing the ovary, style and bifid stigma. E, sepals spread out. F, bract. G, portion of corolla-tube spread out showing the insertion of the stamens. H, transverse section of an ovary.

4. *Ervatamia divaricata* (Linn.) Burkill in Rec. Bot. Surv. India, 10: 320. 1925. (Fig. 46)

Nerium divaricatum Linn.—*Nerium coronarium* Jacq.—*Tabernaemontana coronaria* Willd.—*Tabernaemontana divaricata* R. Br. ex Roem. & Schult.—*Ervatamia coronaria* Stapf.—*Jasminum zeylanicum* Burm.

Engl. Crape-Jasmine, Wax Flower. *Sinh.* Wathu-sudda. *Tam.* Adukkumandiyavattai, Kuruduppalai, Nandiyavarttam, Pattidai, Perunandiyavattam, Valamburi. *Hindi* Chandni, Chandui, Sugandabala, Taggai, Taggar. *Sans.* Ashvuthabheda, Gajapadapa, Kshayataru, Kshiri, Nandi, Nandivriksha, Nandyavarta, Prarohi, Sthalivriksha, Tagara, Taravata, Vanaspati, Vishunupriya.

A perennial shrub, 1—2 m tall, dichotomously branched, bark smooth and pale grey, branchlets marked with scars of fallen leaves, young parts glabrous and shining; leaves opposite, oblong to lanceolate, 6—13.5 cm long, 2—4 cm broad, acuminate, short-petioled, dark green above, paler beneath; petioles 0.5—1 cm long; flowers large, regular, bisexual, fragrant, waxy-white with a yellowish base in apparently terminal cymes, arising from the axils of the terminal pair of leaves just above the bifurcation of branchlets; peduncle 2.5—3 cm long, glabrous; bracts lanceolate, adpressed, 2—2.5 mm long, 1.5 mm broad, glabrous but ciliate along margin; sepals 5, fused at base into a short tube, lobes 3 mm long, 1.5 mm broad, ovate, rounded at apex, ciliate along margin, imbricate; corolla 5 cm diameter, tube 2—2.3 cm long, cylindrical, swollen in the middle, glabrous outside, inside hairy towards the middle and between stamens, lobes 5, strongly overlapping to left, falcate-oblong, 2.5 cm long, 1.5 cm broad, crisped at the margin; stamens 5, adnate to corolla-tube, filaments short, hairy; anthers distinct, basifixed, acute, 2.5 mm long, included in the middle of tube, disk absent; ovary superior, yellow, 1 mm long, of 2 distinct carpels with parietal placentas; styles 2, distinct at base, fused at the top, 1.1 cm long; stigma 1.5 mm long, bifid with a collar below; fruit-follicles in pairs, 5 cm long, oblong, with curved beaks.

Flowers throughout the year.

ILLUSTRATIONS. Curtis, Bot. Mag. *pl.* 1861; Loddiges, Bot. Cab. *pl.* 406; Jacq. Coll. 1: *pl.* 52; Wight, Ic. Pl. Ind. Orient. *pl.* 477. 1840—1843; Burmann f., Fl. Ind. *pl.* 39. 1765; Kirtikar and Basu, Indian Med. Pl., *pl.* 609. 1933.

DISTRIBUTION. Cultivated throughout India, Burma and Ceylon and naturalized in the tropics. In Ceylon, it is a plant commonly found cultivated around houses in the mid and low-country. It thrives in the dry zone and along the coast. The flowers are extensively used for temple offerings.

Ceylon. Central Prov., Peradeniya, Bot. Gard., cultivated. Sept. and Dec. 1887 without collector's name; *Jayaweera* 714, April 1951. Malaya. Perak: Larut, *Kunstler* 5. 153, Nov. 1883.

COMPOSITION. The bark of this plant contains coronarine and tabernaemontanine whilst the stems and leaves too, contain alkaloids. The milky juice consists of caoutchouc and resin.

USES. The root of this plant is a local anodyne. It is anthelmintic and is commonly chewed for relief from toothache. Made into a paste with water and mixed with lime juice it is applied to remove opacities of the cornea and for other eye diseases. The milky latex is applied to the eye to cure ophthalmia. Mixed with oil and applied on the head it relieves pain in the eyes and the burning sensation in sore eyes. It is also used for skin diseases.

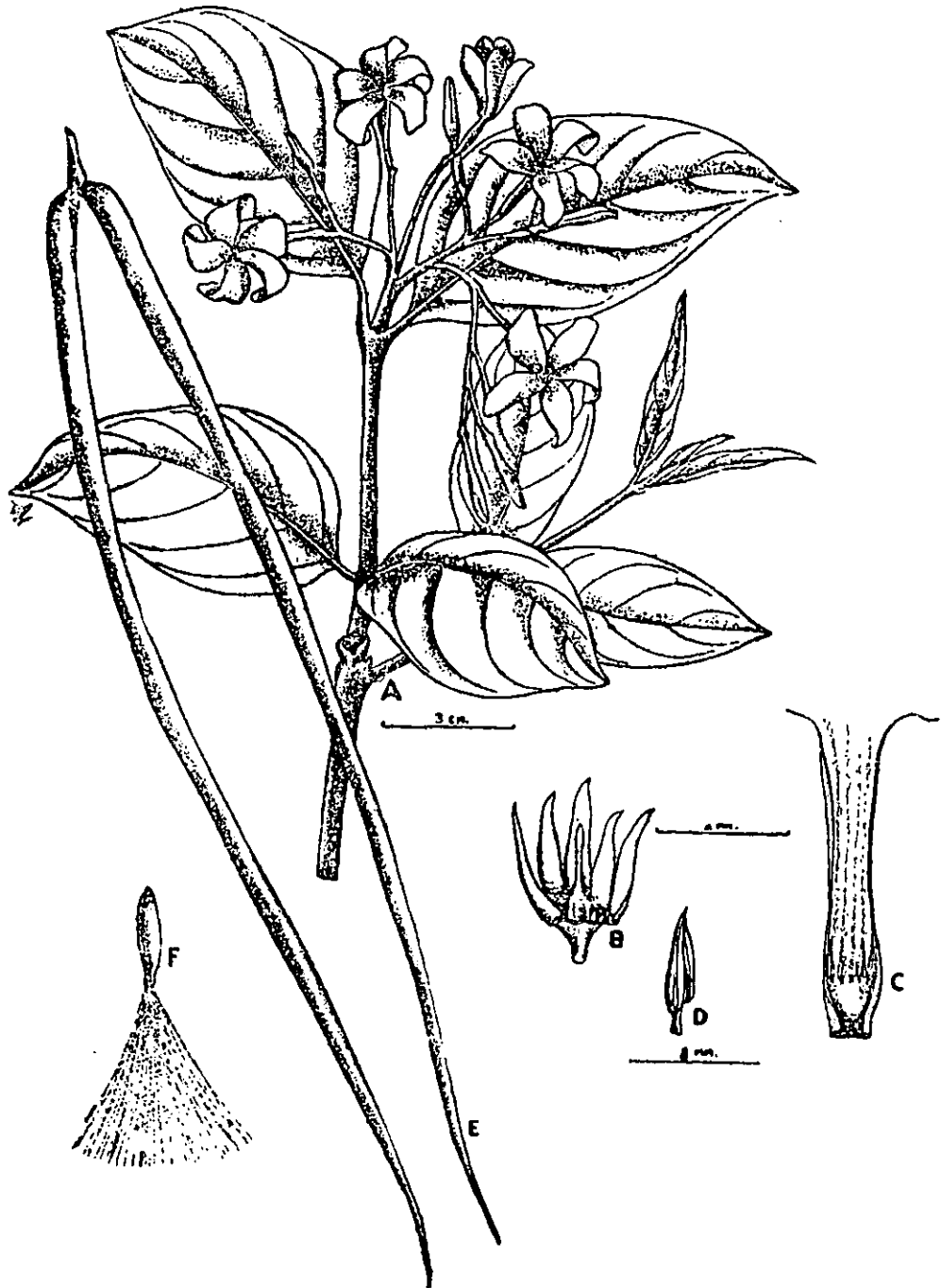


FIG. 47. *Holarrhena antidysenterica*. A, branch with leaves and flowers. B, flower with the corolla removed showing the pistil and the calyx. C, corolla-tube opened showing the insertion of the stamens. D, stamen. E, fruit with diverging follicles. F, seed with coma.

5. *Holarrhena antidysenterica* (Roxb.) Wall., cat. No. 1672, 1828. (Fig. 47).

Holarrhena codaga G. Don — *Holarrhena pubescens* Wall. — *Holarrhena malaccensis* Wight. — *Echites antidysenterica* Roxb. — *Wrightia antidysenterica* Grah.

Sinh. Kiriwalla ; *Tam.* Erukkalaipalai, Indrabam, Kasappuveppalai, Kalingam, Kirimalligai, Kudagappalai, Kudasam, Kudasappalai, Kulappalai, Palai, Vattagam, Veppalai ; *Hindi* Dhudi, Hat, Karchi, Kari, Karra, Kaura, Kaureya, Karvandarjau, Kora, Kura, Kureya, Kuar ; *Sans.* Girimallika, Indra, Indradu, Indrayava, Indrayavaphala, Kahi, Kalinga, Katuka, Kauta, Kautaja, Kita, Kshiri, Kutaja, Mahagandha, Mallikapusha, Pandura, Panduradruma, Pravrishenya, Pravrishya, Raktanashaka, Sangrahi, Shakra, Shakrapadapa, Shakraparyaya, Shakrashana, Shakravhaya, Shukrashakhi, Tiktaka, Vanatikta, Varatikta, Vatsaka, Vrikshaka, Yavaphala.

A small, pubescent tree with a pale bark ; leaves nearly sessile, simple, opposite, 10—20 cm long. 5—11 cm broad, broadly ovate to elliptic or ovate-oblong, obtuse or obtusely acuminate, pubescent on both sides, base obtuse, main nerves 10—14 pairs, conspicuous, petioles 3 mm long ; flowers regular, bisexual, white, inodorous in terminal corymbose cymes, pedicels 1.5—2 cm long, slender, bracts small, lanceolate, pubescent and ciliate ; sepals 5, fused at the base and overlapping, glandular inside, lobes 2.5—3 mm long, lanceolate, acute and ciliate ; petals 5, fused into a corolla-tube 0.8—1.2 cm long, puberulous outside, slightly inflated near the base over the stamens, mouth not closed by a ring of hairs, throat hairy inside, lobes oblong, 1.2 cm long, 0.5 cm broad, rounded at apex, more or less pubescent ; stamens 5, inserted near the base of the corolla-tube, included, filaments short, anthers lanceolate ; disk absent ; ovary superior, 2-carpellary, carpels distinct, ovules many in each carpel, style short, stigma slightly thickened ; fruit follicles 2, elongate, diverging, 20—35 cm long, cylindrical, often dotted with white spots ; seeds linear-oblong, tipped with spreading, deciduous coma.

ILLUSTRATIONS. Wight, *Icon. Pl. Ind. Orient. pls.* 1297, 1298 and 439. 1840—1848 ; Kirtikar and Basu, *Indian Med. Pl.*, pl. 607. 1933.

DISTRIBUTION. Grows along the Western Ghats in India in the drier forests up to Travancore, and Malaya. It is not native to Ceylon.

India. Himal. Bor. Occ. *T. Thomson* ; N. W. Himalaya *Griffith*. Sikkim. *J. D. Hooker*. Siwalkik and Jaunsar Div. Dehra Dun. *Guvola* 73 ; March 1926 ; *Singh* 77 ; *D. W. D. Silva* 1921. Assam. *Simons* ; *Masters* ; *Jenkins*. Malabar, Concan, etc., *Stocks, Law* etc. ; Yellowpore, *Talbot* 130, March 1882. East India Co., *Herb. Falconer*, Kew Distribution 1866—7. **Ceylon.** Peradeniya, Bot. Gard., cultivated, *Herb. Peradeniya*, **Upper Burma.** Kachin Hills, *Mokin*, 1897.

COMPOSITION. The bark contains the alkaloids conamine, conarrhimine, conessidine, conessimine, conessine, conimine, konkurchine, konkurchinine, holarrhenine, holarrhine, holarrhessimine, holarrhidine, holarrhimine, isoconessimine, kurchamine, kurchine, lettocine, monomethyl-holarrhimines I and II, norconessine, tetramethyl holarrhimine, trimethyl konkurchine, etc.

USES. The bark is chiefly used in India for fever, diarrhoea and dysentery. Ground into a paste, it is rubbed over the body in cases of dropsy. It is a useful substitute for emetine for the treatment of amoebiasis.

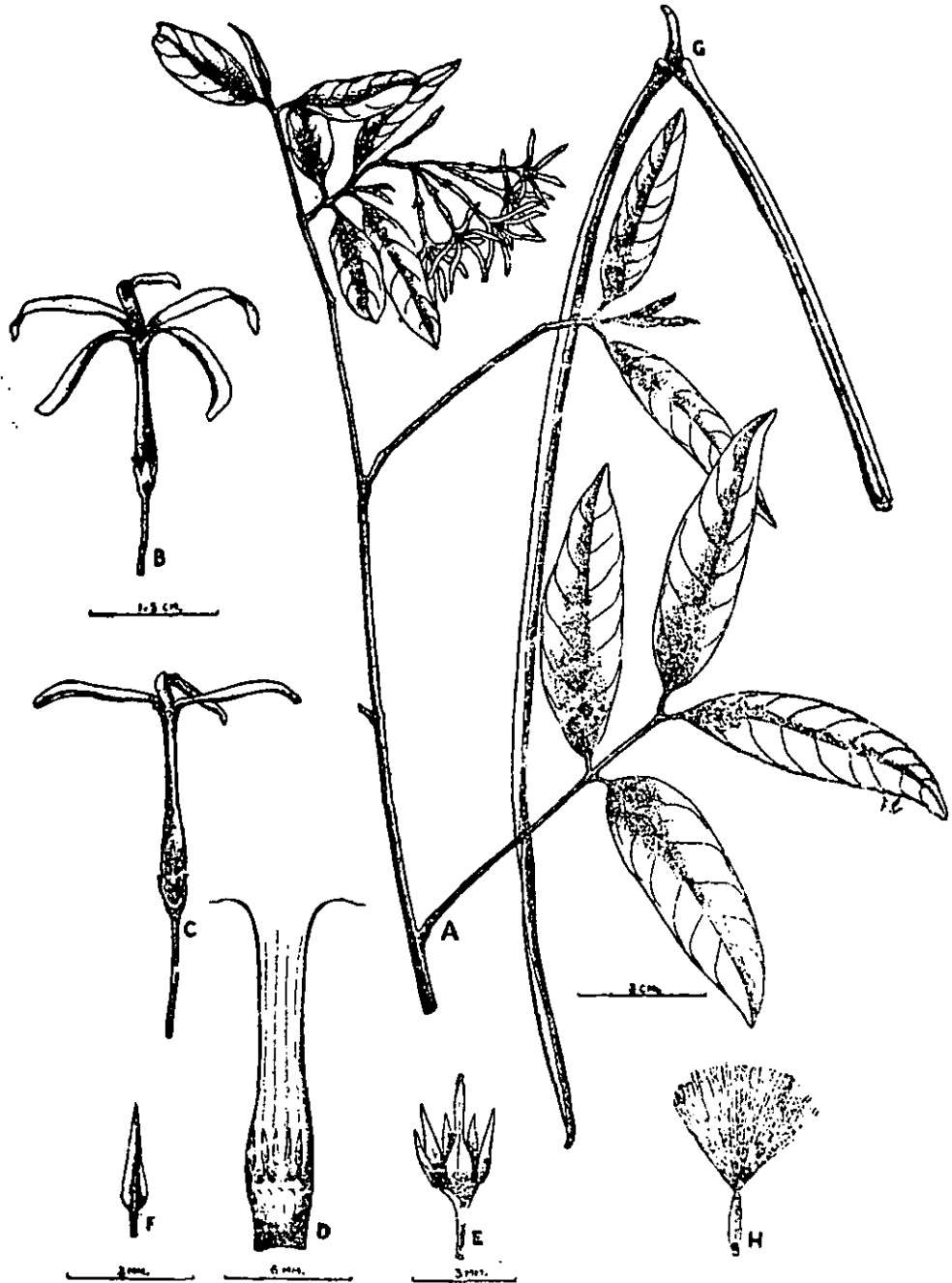


FIG. 48. *Holarrhena nitida*. A, branch with flowers. B, flower. C, longitudinal section of a flower showing the stamens and the pistil. D, corolla-tube opened out showing the stamens. E, flower with corolla removed showing the calyx and the pistil. F, stamen. G, fruit carpels. H, seed with coma, magnified.

6. *Holarrhena mitis* (Vahl.) R. Br. in Mem. Wern. Soc. 1: 62. 1811. (Fig. 48).*Carissa mitis* Vahl. - *Echites lanceolata* Moon.

Sinh. Kirimawara, Kiri-walla, Kelinda.

A tall, slender tree with a whitish, rather smooth bark and slender drooping branchlets which bear a smooth, purplish bark and glabrous young parts; leaves simple, opposite, 3.5—8.7 cm long, 1.2—2.5 cm broad, on short petioles, oblong-lanceolate, acute at base, acuminate, obtuse, glabrous, thin, usually curved; flowers regular, bisexual, white and sweet-scented, 2—3 cm across, on long, slender, pubescent pedicels grouped into short, lax, corymbose or paniculate cymes, bracts small, acicular; sepals 5, fused into a short calyx-tube at the base, segments 1.5—2 mm long, very acute, pubescent; petals 5, fused into a narrow pubescent tube of about 1 cm in length, segments strap-shaped, obtuse, overlapping to the left; stamens 5, inserted at the base of the corolla-tube, anthers very acute; ovary superior, of 2 distinct carpels with numerous ovules inside; fruit-carpels follicular, 30—45 cm long, linear, cylindrical, smooth and many seeded; seeds narrow, coma copious at one end, reddish and twice as long as the seed.

Flowers in April.

ILLUSTRATIONS. Vahl, *Symb. Bot.* 3: pl. 59. 1790; Herb. Peradeniya, drawing.

DISTRIBUTION. A rather rare, endemic species growing chiefly in the dry regions of the low-country up to 1500 feet altitude above sea-level. Mirigama, Kitulgala, Madulkelle, Habarana, Sigiriya, Negombo, Ratnapura, etc.

Ceylon. *Thwaites C. P.* 756. Eastern Prov., Gunner's Quoin (Dimbula-gala), Kosgaha Ulpotha, *Nevill* 493, Oct. 1893, a large shrub called by the Veddas "Genudena-mal" (maidens' gift). Central Prov., Peradeniya, Bot. Gard., cultivated, *J. M. Silva* 176, April 1926; *Jaya-weera* 548, April 1953; *Jayaweera* 2464, May 1964; *Worthington* 4625; (BM) *Worthington* 4539 (BM). Western Prov., *Macrae* 52 (BM, K); *Thwaites C. P.* 757; *Walker* 1039 (K)

USES. This tree is a suitable substitute for *Holarrhena antidyenterica*. The wood and bark are used for fevers and dysentery. The bark is valued as an antiperiodic.

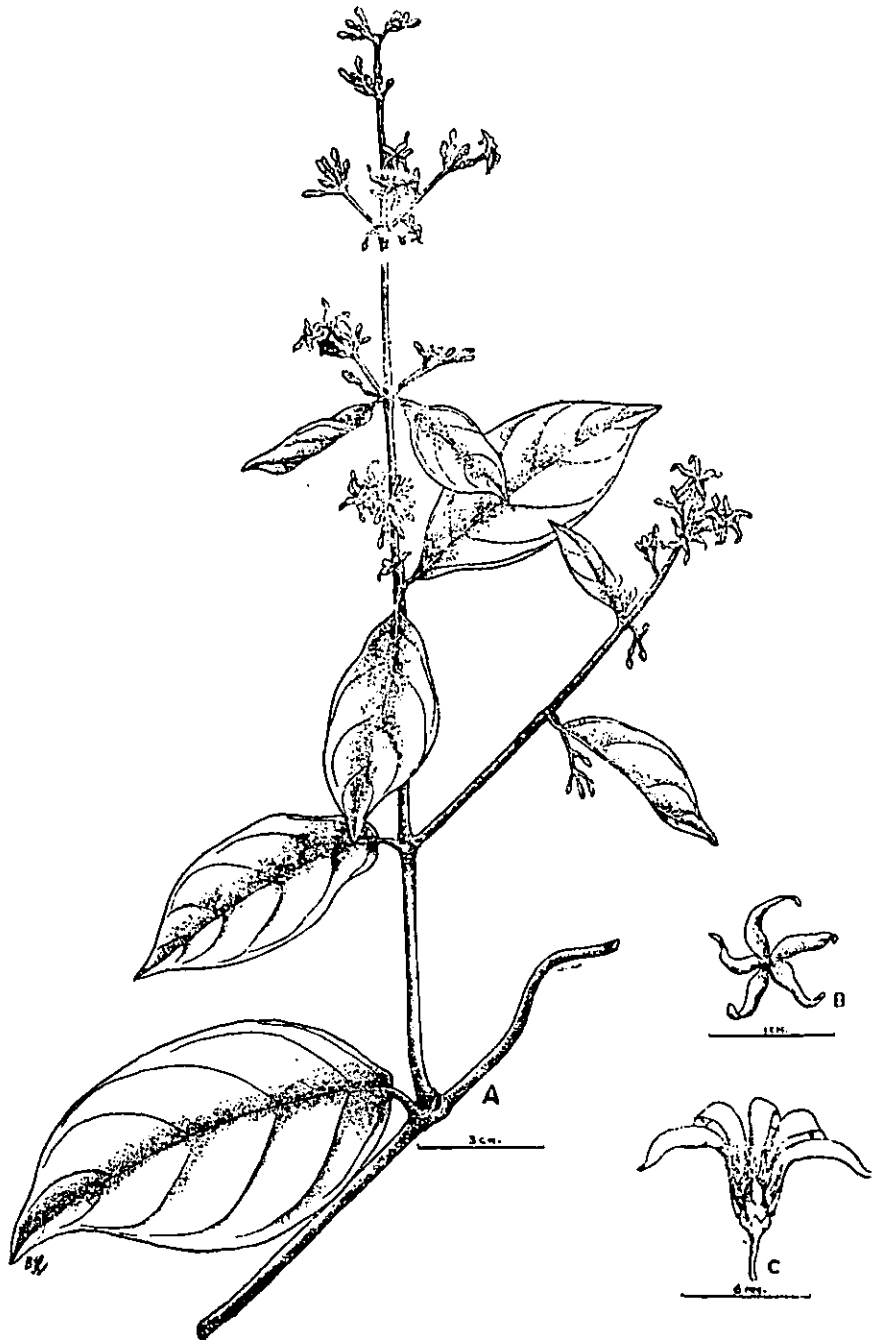


FIG. 49. *Ichnocarpus frutescens*. A, a twig with leaves and inflorescences. B, frontal view of flower. C, a flower opened out showing the different parts of the flower.

7. *Ichnocarpus frutescens* (Linn.) Ait. f., Hort. Kew ed. 2, 2 : 69. 1811. (Fig. 49)

Ichnocarpus radicans Wall.—*Ichnocarpus dasycalyx* Miq.—*Ichnocarpus leptodictyus* F. Muell.—*Echites frutescens* (L.) Roxb.—*Apocynum frutescens* Linn.

Sinh. Geta-Kiriwel, Kiriwel, Maha-iramusuwel ; *Tam.* Udargodi ; *Hindi* Dudhi, Kalidudhi, Siamalata ; *Sans.* Ananta, Bhadra, Chandana, Chandanagopa, Chandanasariva, Chindhaharini, Dirghamula, Dridhabhandini, Gopa, Gopalli, Gopavadhu, Gopi, Gopini, Kalaghantika, Kalapeshi, Krishna, Krishnamuli, Krishnashariva, Krishnavalli, Mahashyama, Masuravidala, Palindi, Sariva, Shariva, Shyama, Shyamalata, Subhadra, Utpalasariva.

A large, much branched, twining shrub with long, slender, whip-like, finely fulvous-tomentose branchlets ; leaves simple, opposite, 3.7—7.5 cm long, 2—3.8 cm broad, ovate-oval, rounded at base, acute, glabrous above, slightly hairy and paler beneath, petioles very short ; flowers greenish-white or yellow, numerous, regular, bisexual, in axillary and terminal, rusty-pubescent, trichotomous, pedunculate cymes ; pedicels short, often three together, rusty-pubescent ; sepals 5, very small, acute, hairy, fused half-way without glands inside ; petals 5, fused into a tube, narrow below and inflated above, villous at the mouth, lobes undulate, about 5 mm long, more or less hairy above, ciliate, much overlapping to the right ; stamens 5, inserted in the wide part of the corolla-tube, anthers sagittate, conniving over and adhering to the stigma ; disk free, 5-lobed ; ovary superior, carpels 2, distinct, style short, stigma truncate ; fruit follicles 10—15 cm long, spreading, very slender, cylindrical, at first rusty-pubescent, afterwards glabrous, dehiscent ; seeds linear, many, 2.5 cm long, black, not compressed and not beaked, coma 3.7 cm long, scanty, white.

Flowers in December.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient. 2 : pl. 430. 1840—43 ; Kirtikar and Basu, Indian Med. Pl., pl. 617. 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Grows in India, Ceylon, Burma, China, Java and Australia. In Ceylon, it occurs in the low-country below 3000 feet altitude especially in the dry districts. Kekirawa, Kurunegala, Kandy, Hantane, Colombo and Ranna.

India. Siwalik and Jaunsar Div., Dehra Dun, Bindal Nallah and Kalsi, *Singh* 75 ; Kalsi, *Dimri* 70, March 1926 ; Lachiwala, *Aziz* 79, 1920—21. Silhet ; *J. D. Hooker*. Maisor and Carnatic, *G. Thomson*. Pen. Ind. Or., *Herb. Wight* 1881, Kew Distribution 1866—7. **Ceylon.** *Thwaites* C. P. 1863. North Central Prov., Kekirawa, *Herb. Peradeniya*, Aug. 1885. Central Prov., Kandy, *Alston*, Oct. 1926. Uma Oya, Bolagandala Village, *J. M. Silva*. 272. Dec. 1927 ; Kathiveli, *Alston* 566, May 1927. Southern Prov., Ranna, *Alston* 1289, March 1929. **Malay Peninsula.** Perak : *King's Collector* 10986, Sept. 1886. **Burma.** Nimbu Dist., *Mokin* 509, Nov. 1902.

USES. The stalks and leaves are used in the form of a decoction for fevers. It appears to be a good substitute for Sarsaparilla (*Hemidesmus indicus*).



FIG. 50. *Nerium oleander*. A, branch with leaves and inflorescence. B, flower of the double-petalled form. C, a flower of the single-petalled form. D, longitudinal section of a flower. E, corolla spread out showing its appendages; stamens and appendages of anthers. F, corolla-tube spread out showing the style and stigma, coherent anther and their appendages. G, fruit. H, seed.

8. *Nerium oleander* Linn., Sp. Pl. 209. 1753. (Fig. 50).

Engl. Oleander ; *Sinh.* Alariya, Kaneru ; *Tam.* Agam, Alari, Alarida, Arali, Asuvabari, Irattaichegappayalari, Irattaichivappalari, Urattavellaiyalari, Kanaviram, Karaviram, Kaviram, Katturepatta, Kayiram, Sevvalari, Vellalari, Vellaiyalari ; *Hindi* Karber, Kanel, Kaner, Kuruvira ; *Sans.* Asvamaraka, Chandata, Hayamaraka, Karavira, Pratihasa, Virahuha, Vishavrykshanka.

Erect, glabrous shrub, 1.5—3 m in height, containing a sticky, resinous juice ; leaves simple, in whorls of 3, 10—15 cm long, linear-lanceolate, coriaceous, acuminate, tapering to a short petiole, dark green and shining above, paler beneath, midrib stout, nerves numerous spreading horizontally ; flowers regular, bisexual, white, red or pink, single or double, fragrant, 4—5 cm in diameter, in terminal racemose cymes ; calyx 5-partite, lobes 4.5 mm long, lanceolate, tomentose with many glands inside near the base ; petals 5, fused into a funnelliform corolla, lobes spreading twisted to the right with 5 or 6 appendages to each, tube cylindrical ; stamens 5, attached to the throat of the corolla, included, filaments hairy, very short, anthers sagittate with long appendages at the apex, connivant around the stigma and adhering to it ; disk absent ; ovary superior of two, free carpels with many ovules in each carpel, style filiform, stigma dilated ; fruit of 1 or 2 follicles, each 15—23 cm long and rigid ; seeds 1.3 mm long tipped with coma of light brown hairs.

ILLUSTRATION. Macmillan, H. P. Tropical Planning and Gardening p. 110. 1956.

DISTRIBUTION. A native of Asia Minor and now naturalized in Ceylon. Cultivated especially along the coast and in the dry regions.

Ceylon. Peradeniya, Bot. Gard., cultivated, *F. W. de Silva*, June 1930 ; *Jayaweera* 2962, Aug., 1968.

COMPOSITION. The aerial parts of the plant contain an alkaloid, while the roots do not contain any. In addition, the plant contains the glucosides oleadriin, neriin, 1-strophanthin, folinerin, rosagenin, cornevin, oleadriin-6, oleadriin-4, desacetyl-oleadriin, pseudocuranine, neriin D, neriin F, neriin E, adynerin and isoadynerin together with hydrocyanic acid. The flower contains a volatile oil. An antibiotic, oleandomycin, has been isolated, effective against germs which have become resistant to penicillin and other antibiotics.

USES. All parts of this plant are poisonous. Cases of poisoning have occurred by eating meat cooked with the wood and drinking water in which the leaves and flowers have fallen. The bark of the root is applied externally as a paste in cases of ringworm, leprosy, eruptions of the skin, boils and haemorrhoids. It is also prescribed for asthma. The leaves and bark are used externally for eczema, as an insecticide and internally for epilepsy. An infusion of the plant acts as a diuretic and heart-tonic which can take the place of digitalis. In India and Philippine Islands, *Nerium odorum* Soland is used as a substitute as its action is the same as this plant.

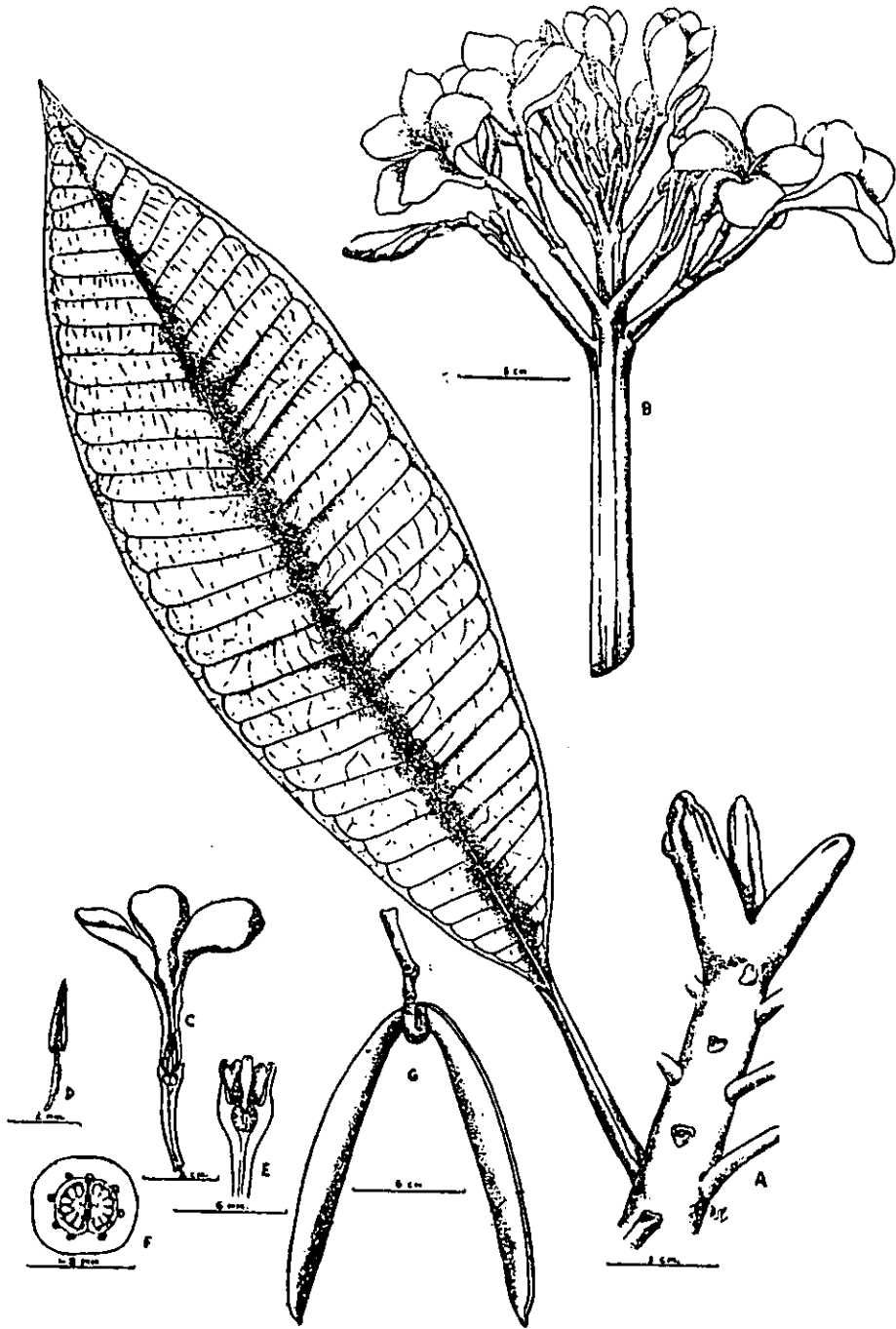


FIG. 51. *Plumeria acuminata*. A, top portion of a branch with a leaf. B, inflorescence. C, longitudinal section of a flower. D, stamen. E, same as C in longitudinal section with corolla and stamens removed. F, transverse section of an ovary. G, fruit follicles.

9. *Plumeria acuminata* Ait. f., Hort. Kew, ed. 2, 2 : 70. 1811. (Fig. 51).

Plumeria acutifolia Poir.—*Plumeria alba* Blanco.

Engl. Frangipani, Temple Tree ; *Sinh.* Araliya ; *Tam.* Ilattalari, Kallimandarai, Kuppiyalari, Navillavalari, Perungalli ; *Hindi* Chameli, Goburchamp, Golainchi, Gulachin ; *Sans.* Devaganagalu, Gosampige.

A small, deciduous tree, 3—8.5 m in height, with a crooked trunk, thick, fleshy branches and an abundance of sticky, milky latex ; bark smooth, papery, grey, shining, peeling off constantly in small flakes ; leaves simple, alternate, spirally arranged at the ends of branches, oblong-lanceolate to oblanceolate, 18—29 cm long, 5—9 cm broad acute at both ends, glabrous on both surfaces, dark green above, paler beneath with numerous, parallel, lateral veins, prominent below, joining in an intra-marginal vein ; petioles stout, 3—5.5 cm long, cylindrical, channelled and reddish above ; flowers large, regular, bisexual, numerous, fragrant, 6—7 cm across, tinged pink outside, inside white with a yellow centre, borne in compound, peduncled cymes ; peduncles 9.5—12 cm long, stout, reddish ; pedicels 2—2.7 cm long, glabrous, reddish ; sepals connate into a cup-shaped, short calyx with rather inconspicuous apices ; petals 5, fused into a narrow corolla-tube at the base, limb expanded into 5 convolute segments, lobes 3.5—4 cm long, 2—2.5 cm broad, yellow at base and fringed with white ; stamens 5, free, inserted at the base of the corolla-tube, included, filaments 1 mm long and hairy, anthers sagittate, 2—2.2 mm long ; ovary of 2 partly inferior carpels, 1.5 mm long, style 0.2 mm and the bilobed stigma 2 mm long ; fruit consists of two leathery follicles, each 20—26 cm long, 2.8—3 cm diameter, smooth, lenticelled, pointed at the apex ; seeds large, numerous, 1.5 cm long and winged at the base.

Flowers almost throughout the year.

ILLUSTRATIONS. Curtis, Bot. Mag. *pl.* 3952 ; Edward, Bot. Reg. *pl.* 114 ; Wight, Ic. Pl. Ind. Orient. *pl.* 471. 1840—1843 ; Kirtikar and Basu, Indian Med. Pl., *pl.* 604. 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Only found in cultivation. Naturalized in many warmer parts of India, Ceylon and Philippine Islands. It is a native of Mexico. In Ceylon, it is found planted near Buddhist temples in the low-country.

Ceylon. Central Prov., Peradeniya, Bot. Gard., Nov. 1901, cultivated, without collector's name. Maldiv Islands. Veimandu : Gardiner, 1899—1900 ; Didi 26, 1896.

COMPOSITION. The stems contain an alkaloid. The bark contains the glucosides, plumerid and agoniadin. The latex consists of resins, caoutchouc and calcium salts of plumeric acid, cerotinic acid and lupeol. The leaves contain a volatile oil.

USES. A decoction of the bark of this tree is used as a purgative, emmenagogue and febrifuge. The bark is first a purgative and a diuretic. In Puerto Rico, it is used as a powerful antitherpetic and the root bark as a remedy for gonorrhoea and venereal sores. In India it is used for the same diseases and also to procure abortion. In Java, a decoction of the bark is given for gonorrhoea, dropsy and dysuria due to venereal diseases. The latex is used for toothache and for the treatment of itch and the leaf for boils, bronchial diseases and as a vermifuge in Ceylon. In Persia, the bark is used for inflammations of vagina and urethra due to venereal disease. The warmed leaves are used as a poultice to dispel swellings. An infusion or extract of the leaves is supposed to be effective for asthma.

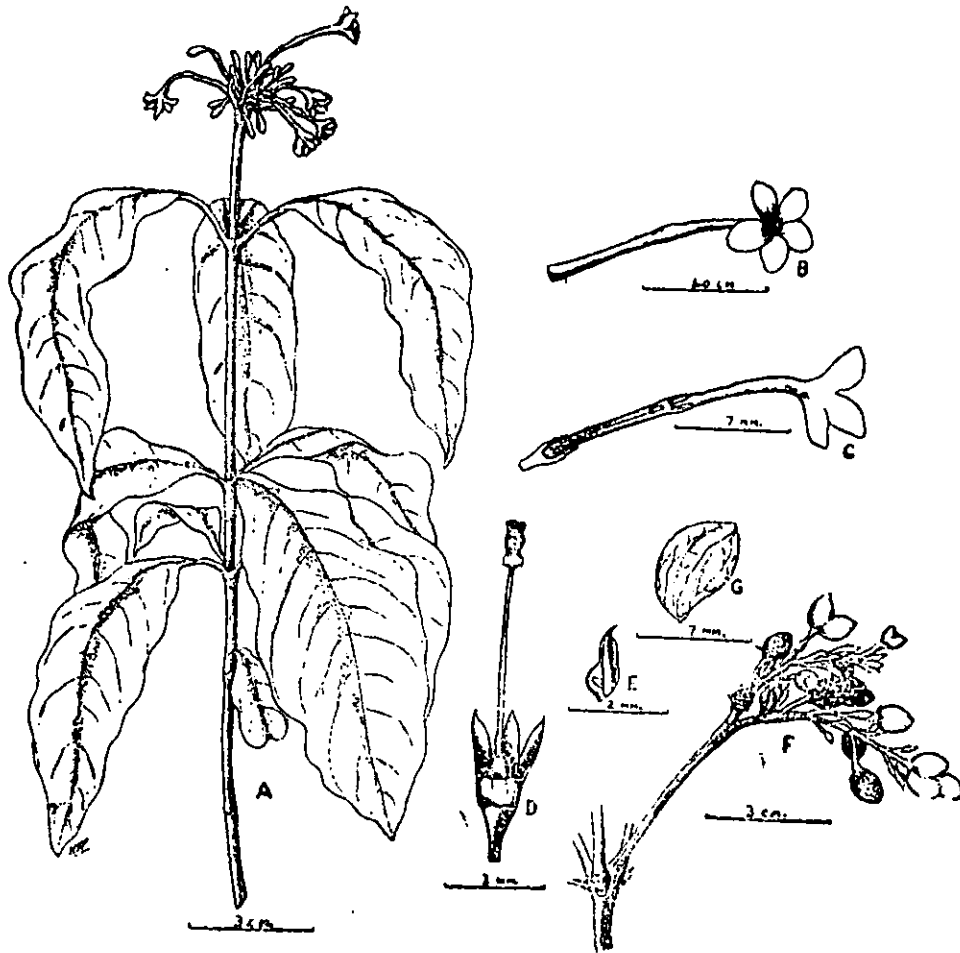


FIG. 52. *Rauwolfia serpentina*. A, a branch with leaves and flowers. B, lateral view of a flower. C, longitudinal section of a flower showing insertion of stamens and pistil. D, flower with the corolla removed showing the sepals and pistil. E, stamen. F, fruits. G, seed.

10. *Rauvolfia serpentina* (Linn.) Benth. ex Kurz, For. Fl. Brit. Burma 2: 171. 1877. (Fig. 52).

Ophioxylon serpentinum Linn.—*Ophioxylon trifoliatum* Gaertn.—*Ophioxylon observum* Miquel.—*Tabernaemontana cylindracea* Wall.

Sinh. Ekaweriya, Rat-ekaweriya. *Tam.* Sovannamilbori. *Hindi* Chhotachand, Harkaichandra, Nai, Nakulikanda. *Sans.* Ahibhuka, Ahilata, Ahimardani, Bhadra, Bhujangakshi, Chandrasura, Chandrika, Charmahantri, Gandhanakuli, Ishwari, Karavi, Mahaahigandha, Mahasugandha, Nagagandha, Nagasugandha, Nakuladhya, Nakuleshta, Nakuli, Nandani, Patalaganda, Pashumahanakarika, Phanihantri, Raktapatrika, Sarpagandha, Sarpakshi, Sarpangi, Sarvagandha, Sugandha, Surasa, Surpadini, Suvaha, Vasara, Vasupushpa, Vishamardani, Vishamardanika, Vishanashini, Vyalagandha.

A herbaceous perennial with a long, vertical, yellowish, somewhat tuberous, nodular rootstock and simple, woody stems, 30—60 cm high; leaves in whorls of 3, exstipulate, confined to the ends of branchlets, 7—13.5 cm long, 2.3—5 cm broad, lanceolate, tapering to both ends, undulate, glabrous, thin, light green, lateral veins 7—11 pairs, petioles 5—8 mm long; flowers regular, bisexual, 1.3 cm diameter, on short pedicels 8 mm long, in rather close, irregular corymbose cymes, peduncle terminal, erect, glabrous, 1.5—3.5 cm long, bracts small, 2.5—3 mm long, 1 mm broad, filiform; calyx segments 5, free, 3—3.5 mm long, 1—1.5 mm broad, linear, glabrous, acute or subacute; corolla segments fused into a long, glabrous tube, about 2 cm long, pink, dilated 1.2 cm from base at insertion of stamens, above this corolla-tube bent and of a lighter shade of pink, lobes 5, white or bright red, 6 mm long, 4 mm broad, oblong, rounded, convolute, contorted, overlapping anti-clockwise; stamens 5, inserted above the middle of the corolla-tube, versatile, filaments very small, 0.2 mm long, and curved, anthers 1.5 mm long, pointed; disk prominent, annular; ovary superior, 0.5 mm long, glabrous, 2 carpellary, each with 2 collateral ovules, style 9.5 mm long, glabrous, stigma apparatus 0.7 mm long, truncate, excavated beneath, bifid at the apex; fruit about 7 mm long, carpels slightly connate, broadly ovoid, apiculate, shining, blackish purple.

Flowers from March to May and November.

ILLUSTRATIONS. Rheede, Hort. Mal. pl. 47. 1675—1703.; Burmann, Fl. Zeyl. pl. 64. 1765.; Curtis, Bot. Mag. pl. 784; Gaertn. Fruct. 2: pl. 109. f. 2. 1791.; Wight, Ic. Pl. Ind. Orient., pl. 849. 1843—1845.; Kirtikar and Basu, Indian Med. Pl., pl. 602 A. 1933; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs in the tropical regions of India, Ceylon, Burma, Andaman Islands and Java. In Ceylon, it grows commonly in shady places among grass and as an undershrub in moist areas up to 2000 feet altitude.

India. Khasia, *J. D. Hooker and T. Thomson*, 0—4000 feet; Dehra Dun, *Kapur* 76 without date of collection. Assam: *King's Collector*, Feb. 1891; *Jenkins* without date of collection. Malabar and Concan: *Stocks, Law*, etc.; Quilon, June 1836, without collector's name, Herb. Wight Prop.; Pen. Ind. Or., *Herb.*, *Wight* 1856, Kew Distribution 1866—8. *Ceylon.* Central Prov., Gannoruwa, *de Mel* 9877, July 1932, bund of paddy fields; *Jayaweera* 906, Nov. 1953, flowers white tinged violet, calyx bright red; Peradeniya *Thwaites C. P.* 1836; *Walker* 110, Herb. Wight Prop.; Bot. Gard., *Jayaweera* 2248, Nov. 1955, cultivated. Western Prov., Hanwella, *Alston* 883, Aug. 1927, in open places, buds and calyx vermilion, fruit dark purple, flowers white. *Burma.* Thanbyn Zayat, *Bayly*, May 1955; Winyaw arca, Chyungkhun jungle, *Baum*: *Kawkareik, Baum*, May 1955, a shrub, flowers white tinged with violet, calyx bright red.

COMPOSITION. The root contains the alkaloids, ajmalicine, ajmaline, ajmalinine, alkaloids A, C and F, alloyohimbine, chandrine, 3-epi- α -yohimbine, isoajmaline, isorauhimbine, isoyohimbine, 11-methoxy- δ -yohimbine, methylreserpatc, neoajmaline, papaverine, rauhimbine, raupine, rauwolfisine, rauwolscine, rescinnamine, reserpiline, reserpine, reserpinine, reserpoxidine, sarpagine, serpine, serpinine, serpentine, serpentinine, thebaine, yohimbine, γ -yohimbine, δ -yohimbine, etc. The seed also contains alkaloids.

USES. In India, a decoction of the root of this plant is given to increase uterine contraction in child-birth. In Java, it is used as an anthelmintic. The juice of the leaves is used on the eyes to remove opacities of the cornea both in India and Java. In certain parts of India it is used as a snake-bite remedy. In Ceylon the root is used in fever, cholera, blood pressure, etc. and also in snake-bite remedies.

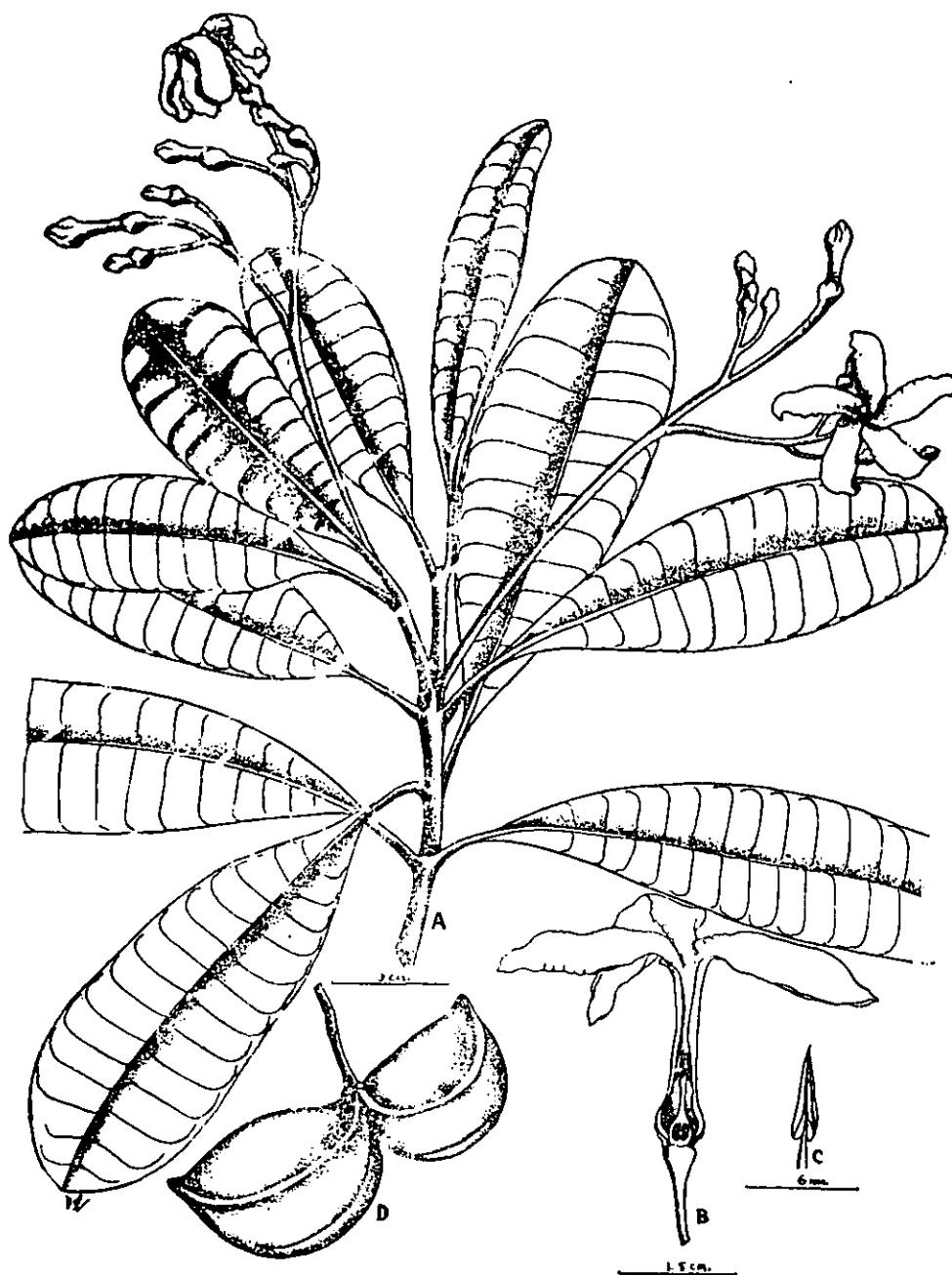


FIG. 53. *Rejoua dichotoma*. A, branch with leaves and flowers. B, longitudinal section of a flower. C, stamen. D, fruit.

11. *Rejoua dichotoma* (Roxb.) Gamble, Fl. Madras 812. 1823. (Fig. 53).

Tabernaemontana dichotoma Roxb.—*Ervatamia dichotoma* (Roxb.) Blatter—*Cerbera dichotoma* Lodd.—*Cerbera manghas* Linn.—*Tanghinia dichotoma* G. Don.

Engl. Eve's Apple, Forbidden Fruit ; *Sinh.* Divikaduru ; *Tam.* Kandalaiappalai, Kattalavi, Palai.

A small, dichotomously branched tree with a pale grey, smooth bark and branchlets with scars of fallen leaves; leaves numerous, simple, opposite, 10—17.5 cm long, 3.5—4.5 cm broad, lanceolate-oblong tapering to the base, suddenly and shortly-acuminate, obtuse, stiff and coriaceous, dark-green above, paler beneath, lateral veins numerous, horizontal, parallel, depressed above, prominent beneath, petioles 1.5—3.5 cm long; flowers regular, bisexual, white, sweet-scented with the throat and tube yellow, 3.5—7.5 cm across, few on very long pedicels, cymes in axils of the terminal pair of leaves, peduncles 5—15 cm long, stout, glabrous, bracts small, ovate, fleshy, adpressed; sepals 5, fleshy, segments imbricate, glabrous and rounded; petals 5, fused into a tube 1.8—2.5 cm long, lobes white, 3 cm long, 1 cm broad, falcately twisted, often crisped at margin overlapping to the left; stamens 5, inserted below the middle of the corolla-tube, distinct, anthers nearly sessile, acute; disc absent; ovary superior, 3 mm long, 2-carpellary, glabrous, style short, clavate and stigma bifid; fruit about 5 cm long, fleshy, pendulous, horizontally divaricate or reflexed, broadly ovoid, blunt, flat on the dorsal surface, rounded on the ventral side, smooth, orange-yellow, dehiscent along the ventral suture; seeds 1.8 cm long, finely striate, surrounded by a coat of crimson pulp.

Flowers during April and May.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient. *pl.* 433, 1840—1843; Edward's Bot. Reg. *pl.* 53, 1841; Loddiges Bot. Cab. *pl.* 1516; Kirtikar and Basu, Indian Med. Pl., *pl.* 608. 1933; Herb. Peradeniya, drawing.

DISTRIBUTION. Commonly found in the warmer parts of Ceylon and in the moist low-country but not in India.

Ceylon. Central Prov., Ambagamuwa *Thwaites C. P.* 2834; Peradeniya, *Jayaweera* 41, July 1950; Sabaragamuwa Prov., Kuruwita Kanda, Demanhandiya, *Herb. Peradeniya*, Jan. 1892.

COMPOSITION. The bark contains an alkaloid.

USES. The bruised fresh bark and leaves are applied to wounds for snake-bite and centipede bites. They are antiseptic and employed in the treatment of ulcers and fistulae. The seeds are purgative and are said to be narcotic and poisonous, producing delirium and other symptoms similar to *Datura* poisoning. The juice of the root is used for eye infections and the root itself relieves tooth-ache.

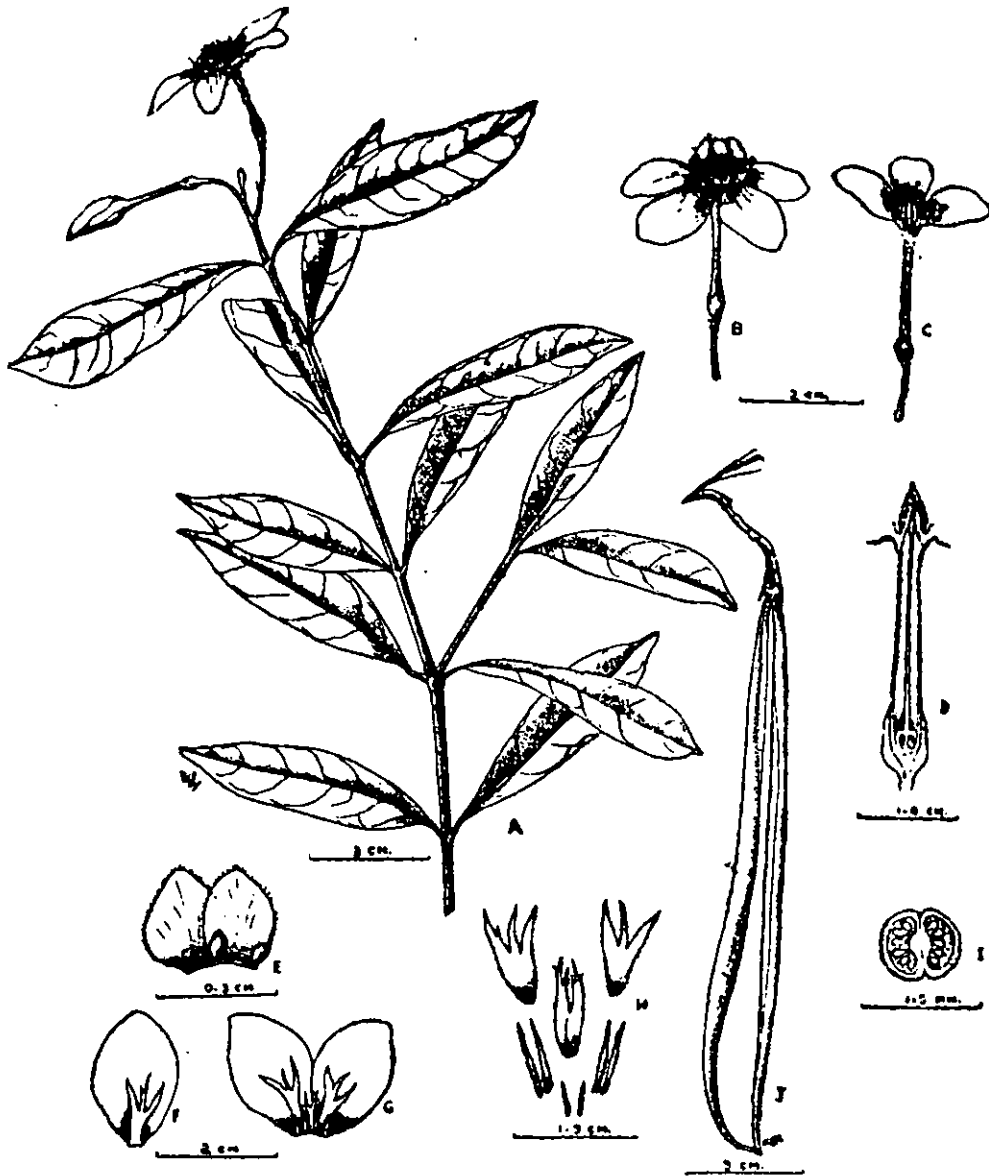


FIG. 54. *Wrightia antidysenterica*. A, branch with leaves and flowers. B, lateral view of flower. C, longitudinal section of flower. D, longitudinal section of corolla-tube showing connate anthers. E, sepals with brown scales within. F, corolla lobe with trifold coronal scale. G, two corolla lobes showing all coronal scales. H, coronal scales shown separately. I, transverse section of ovary. J, fruit follicles united at apex.

12. *Wrightia antidysenterica* (Linn.) R. Br. in Mem. Wern. Soc. 1 : 73. 1811. (Fig. 54).

Nerium antidysentericum Linn.—*Nerium zeylanicum* Linn.—*Wrightia zeylanica* R. Br.

Sinh. Wal-idda, Sudu-idda.

A slender shrub, 1—2 m tall, with erect branches, young parts puberulous ; leaves simple, opposite, 3—6.5 cm long, 1.7—3.5 cm broad, lanceolate or oval-lanceolate, acute or subacute at base, sharply acuminate at apex, glabrous, entire, rather thick with about 10 pairs of lateral veins, petioles 2.5—4 mm long, thick, puberulous ; flowers regular, bisexual, rather large, 3.5 cm diameter; on pedicels 8—9 mm long, few, in erect, glabrous, shortly stalked cymes ; sepals 5, free, imbricate, 3—3.5 mm long, 1.5—2 mm broad, oval-oblong, puberulous outside, obtuse at apex with brown scales within ; corolla-tube 1.7—2 cm long, glabrous outside, ciliate within, lobes 5; convolute, contorted in bud, 1.8 cm long, 1.3 cm broad, obovate-oval, obtuse, coronal scales 30 in 4 rows, the outermost row of 5 the largest, adnate to corolla lobes and deeply trifid; second row of 5 shorter, alternating with corolla lobes, 2 or 3-fid, third row of 10 in pairs, short, erect, opposite petals, the innermost row of 10 in pairs, very short, erect, acicular, opposite stamens, all scales white and hairy ; stamens 5, filaments adnate to corolla-tube, anthers 5 mm long, sagittate, connate into a much exerted tube, glabrous outside, ciliate within ; ovary superior, of 2 distinct carpels, 1.5 mm long, style and stigma 2.1 cm long, stigma fused to the inside of the anther cone, placentation axile ; fruit follicles distinct except at the points, 10—14 cm long, linear, cylindrical, glabrous, dehiscent, seeds 1 cm long with a white coma; 1.8 cm long.

Flowers throughout the year.

ILLUSTRATIONS. Burmann, Thes. Zeyl. pl. 12, f. 2, and pl. 77, 1737.

DISTRIBUTION. Endemic to Ceylon, very commonly found in open ground in the low-country, especially near the sea.

Ceylon. Central Prov., Peradeniya, Bot. Gard., *Jayaweera* 525, April 1953 ; Western Prov., Gampaha, Bot. Gard., cultivated *Jayaweera* 1816, Oct. 1961, ; Kalutara, *Macrae* 125. (BM,K) ; *Schiffner* 2421 (BM). Southern Prov., Galle, *Gardner* 557 (BM,K) ; Hiniduma, *Huber* 63 (US). Locality unknown : *Thwaites C.P.* 1825 (BM,K).

USES. This plant is used in treating tonsillitis and bronchial diseases. The flowers are used for snake-bite cures, especially for that of the Russel's Viper.

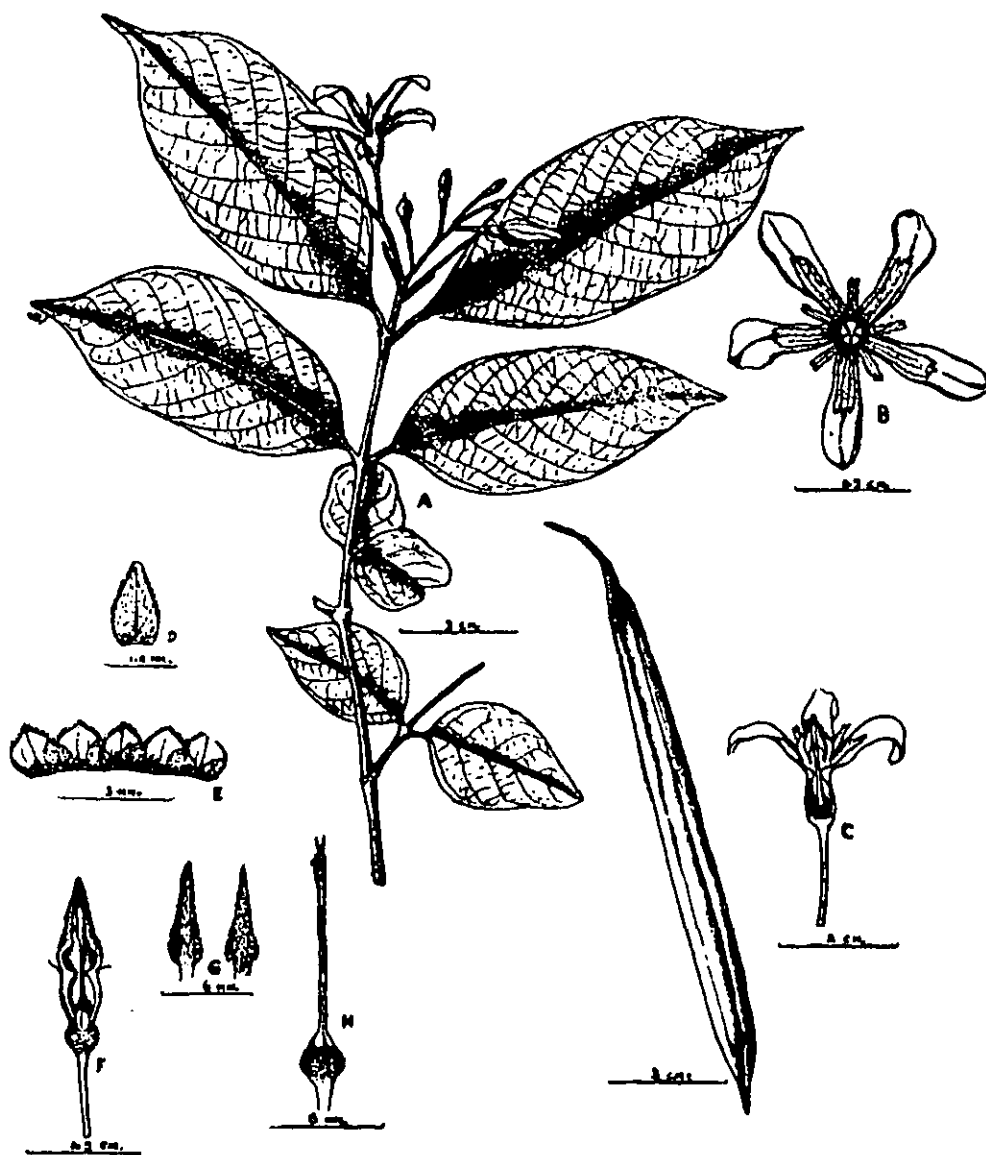


FIG. 55. *Wrightia tomentosa*. A, branch with leaves and flowers. B, flower dorsal view showing corolla with coronal scales. C, longitudinal section of flower. D, bract. E, sepals with scales. F, longitudinal section of corolla-tube showing connivent anthers over the stigma and pistil. G, stamens. H, pistil. I, fruit.

13. *Wrightia tomentosa* Roem. and Schultes, Syst. 4: 414. 1819. (Fig. 55).

Nerium tomentosum Roxb.—*Wrightia pubescens* Roth.

Tam. Palmankai, Palai, Sonaivetpalai, Tondambalai, Vetpalai ; *Hindi* Daira, Dharauli, Dudhi.

A small tree, about 15 m tall with yellow-grey, smooth, furrowed bark, divaricate, opposite branchlets and reddish tomentose young parts ; leaves simple, opposite, 6.5—12 cm long, 3—6.2 cm broad, lanceolate, oval or oblong, acute or obtuse at base, slightly acuminate and obtuse at apex, hairy on both sides, paler beneath, venation finely reticulate, pellucid, prominent beneath with 9—11 pairs of veins ; flowers regular, bisexual, large, yellowish, about 4 cm diameter in shortly stalked, rather dense, terminal, biparous cymes, pedicels 1—1.5 cm long, tomentose ; bracts very small, 1—1.2 mm long, 0.7 mm broad, triangular, hairy outside ; sepals 5, fleshy, fused at base, lobes 1.2 mm long, 1.0 mm broad, stumpy, incurved, hairy outside, inside with scales ; petals fused into a barrel-like corolla-tube 0.6 cm long and 0.45 cm broad, glabrous on both sides and moist and shining inside, lobes 5, spread out, 2.3 cm long, 1 cm broad, oblong-ovate, overlapping to the left, thick, fleshy, obtuse, margin revolute ; coronal scales in two whorls, hairy, outer whorl of 5, 3-fid fused to corolla lobes along their length, inner whorl also of 5, free, 2-fid, alternating with corolla lobes, coronal scales connate with corolla-tube, inner scales 5—6 mm long, 1 mm broad, linear, opposite stamens ; stamens 5, filaments short, 1.5 mm long, anthers sagittate, 6.5—7 mm long, connivent into a cone over the stigma, hairy on both sides ; ovary superior, oblong, 2 mm long, 1.5 mm broad, glabrous, of 2 carpels, 2-locular and axile placentation, style 7—7.5 mm long, grooved lengthwise, scantily hairy along grooves, stigmas bilobed, 2 mm long with a pair of glandular hairy flaps at the base ; fruit-carpels connate into a cylindrical fruit, 15—20 cm long, 1.5—2.5 cm broad, blunt with two, faint, vertical grooves, hairy, ultimately separating ; seeds linear, over 1.2 cm long, coma white, 3.5—5 cm long.

Flowers almost throughout the year, but in profusion from January to April.

ILLUSTRATIONS. Wight, Ill. pl. 154, 1940 ; Wight, Ic. Pl. Ind. Orient. pl. 443. 1840—1842 ; Kirtikar and Basu, Indian Med. Pl., pl. 612. 1933 ; Worthington, Ceylon Trees, pl. 334. 1959.

DISTRIBUTION. Occurs in India, Ceylon, Burma and Penang. In Ceylon, it is rather rare and grows in the jungles in the low-country. Ambagamuwa, Kadugannawa, Heneratgoda and Batticaloa.

Ceylon. *Thwaites* C. P. 2619 ; Eastern Prov., *Herb., Peradeniya*, Aug. 1885 ; Batticaloa, *Walker* 205, 1885 ; Western Prov., Heneratgoda, *Herb. Peradeniya*, April 1883 ; Southern Prov. Hambantota : Ruhuna National Park. *Comanor* 1044 (BISH).

USES. In India, the bark and the root-bark of this tree are used as cures for snake-bite and scorpion stings. A preparation from the bark is also given for menstrual and renal complaints.

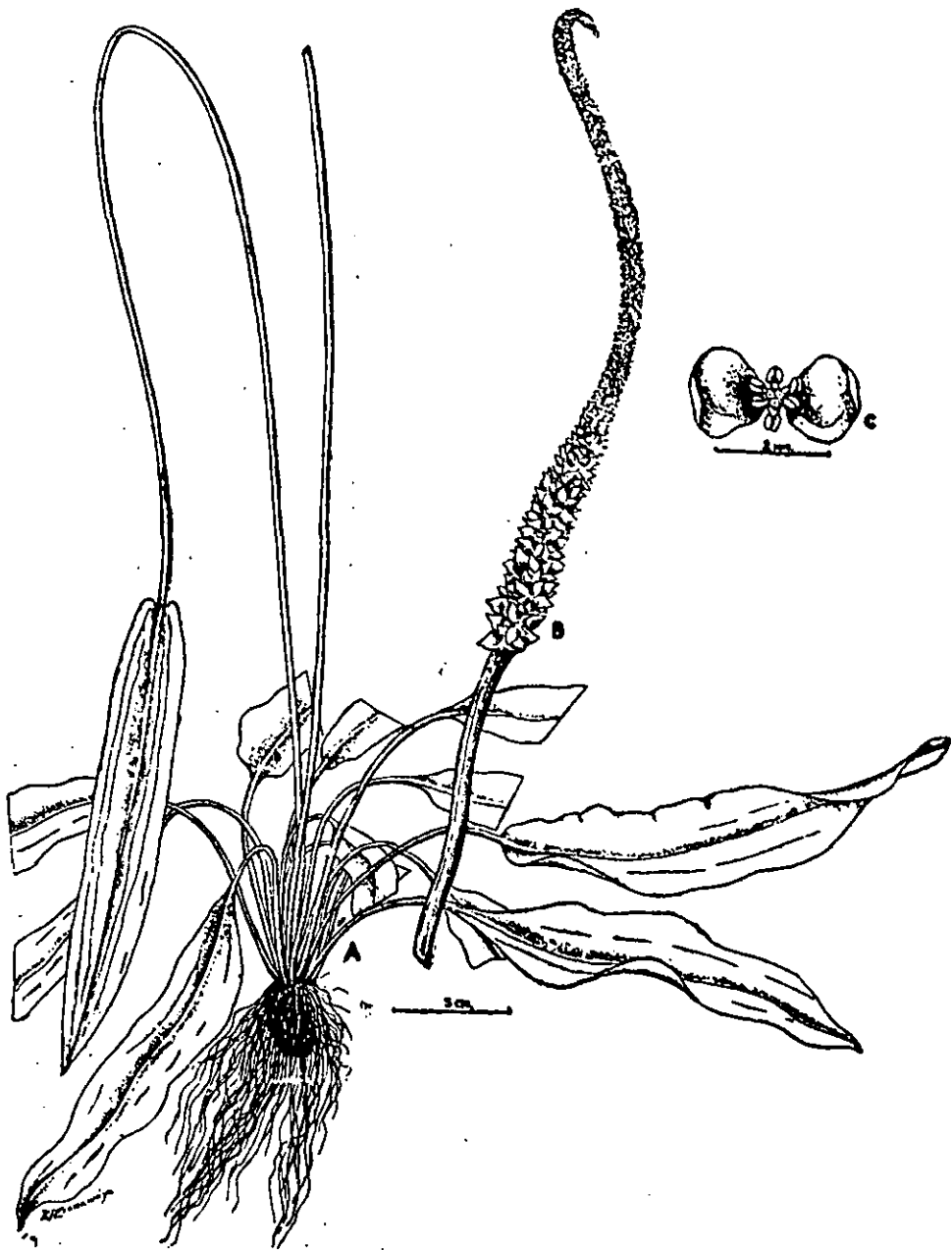


FIG. 56. *Aponogeton crispus*. A, plant with tuber and leaves. B, spike with flowers. C, flower, front view.

APONOGETONACEAE

1. *Aponogeton crispus* Thunb., Nov. Gen. 1 : 73. 1784. (Fig. 56).

Aponogeton undulatum Roxb.—*Ouvirandra undulata* Edgew.—*Spathium undulatum* Edgew.

Sinh. Kekatiya ; *Sans.* Kasira.

A submerged, fresh-water herb with a tuberous, subspherical, stoloniferous rootstock ; leaves long-petioled, 30—90 cm long, oblong to linear-oblong, linear or lanceolate, apex rounded or acute, all submerged, membranous, translucent, undulate, base cuneate, 2-lobed or cordate, 5-9-veined, cross venules conspicuous, petioles compressed shorter or longer than the blade : scape-bearing one floating or emerged spike enclosed in a calyptriform, membranous sheath much longer than the leaves, terete, thickening upwards ; flowers bisexual, in a solitary spike which is 7.5—12.5 cm long, rachis stout, elongating in fruiting ; perianth segments 2, 0.4 cm long, obovate-spathulate, much longer than the stamens, white, petaloid, caducous ; stamens 6, filaments spreading, persistent, unequal, subulate, hypogynous, anthers oblong ; ovary superior, 3-carpellary, narrowed into a very short style ; fruit-follicles 6-8 mm long, 1 or 2-seeded, oblong, beaked, smooth.

Flowers during February and May.

ILLUSTRATIONS. Edgeworth in Hook. Lond. Journ. Bot. 3 : *pl.* 18. 1844 ; Calc. Journ. Nat. Hist. 3 : *pl.* 15. 1843 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs in India, Ceylon and Australia. In Ceylon, it commonly grows in running water and is found upto 6500 feet altitude.

Ceylon. *Thwaites C. P.* 2306, Feb. 1855 ; Delgoda river, *F. Lewis and J. M. Silva.* March 1919 ; Kellesse, *Thwaites C. P.* 3381, May 1855 ; Opatha, *Herb. Peradeniya*, March 1881 ; Sita Eliya, *A. M. Silva*, Oct. 1906.

USES. The tubers are used as a cholagogue, diuretic and diluent. They are useful in acute and chronic pyelitis, cystitis, gonorrhoea and strangury. They have anti-rheumatic properties and are much valued in acute and chronic rheumatism.

The tubers are boiled and eaten during times of famine.

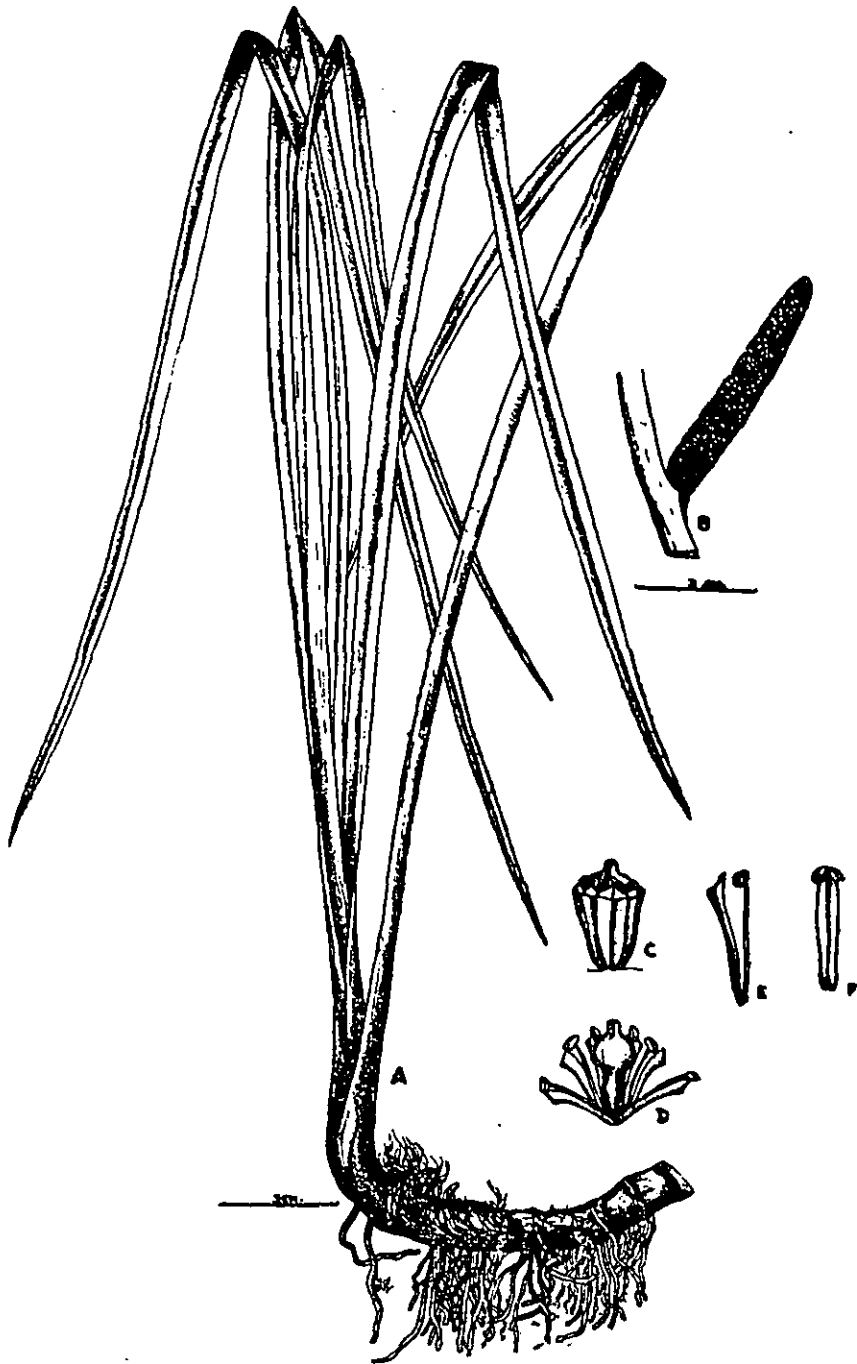


FIG. 57. *Acorus calamus*. A, plant showing the rhizome and leaves. B, inflorescence. C, flower lateral view. D, flower with the perianth and stamens spread out. E, perianth lobe and stamen from side. F, stamen from front showing the filament and anther. C-F, enlarged.

10. ARACEAE

1. *Acorus calamus* Linn., Sp. Pl. 324. 1753. (Fig. 57).

Acorus griffithii Schott — *Acorus nilaghiensis* Schott — *Acorus belangeri* Schott — *Acorus casia* Bertol.

Engl. Cinnamon Sedge, Sweet Flag; *Sinh.* Wadakaha; *Tam.* Vashambu; *Hindi* Bach, Ghorbach, Gorbach; *Sans.* Bhadra, Bhutanashini, Bodhaniya, Galani, Golomi Ikshuparni, Jalaja, Jatila, Kanga, Kshudrapatri, Lomasha, Mangalya, Rakshoghni, Shadagrantha, Shataparvika, Schlesmaghni, Smarani, Tikshna, Tikshnapatra, Ugra, Uragandha Vacha, Vijaya.

An aromatic, marshy herb with a stout creeping and branching rootstock; leaves simple, distichous, ensiform, 90—180 cm long, 1.6—3.7 cm broad, bright-green, acute, thickened in the middle, margin wavy, sheaths equitant, nerves parallel; spathe formed from the ensiform, elongate, acuminate summit of the leaf-like stem, 15—75 cm long; spadix sessile, cylindrical, 5—10 cm long, 1.2—1.8 cm diameter, obtuse, slightly curved, green, densely clothed with bisexual flowers; perianth of 6 lobes, oblong-obovate, acute, scarious, thicker at the top and bent inward; stamens 6, opposite to and as long as the perianth leaves, filaments linear and flat, anthers reniform, yellow, cells confluent above, exserted; ovary superior, conical, 2 or 3-chambered, stigma sessile, minute, ovules pendulous from the top of the loculi, orthotropous; fruit a 3 or more-seeded berry, turbinate, prismatic, top pyramidal, indehiscent.

ILLUSTRATIONS. Bentley and Trimen, *Medicinal Plants*, pl. 279. 1880; Kirtikar and Basu, *Indian Med. Pl.* pl. 1008. 1933.

DISTRIBUTION. Grows in marshes throughout India, Ceylon, Philippine Islands and North Temperate regions of Asia, Europe, North America, China, Japan and Southern Russia. In Ceylon, it is cultivated locally as a medicinal herb.

India. Sikkim: *Prain's Collector*, April 1902. Khasia: *J. D. Hooker and T. Thomson*, Ceylon. Peradeniya, Bot. Gard., cultivated, *Jayaweera* 635, Sept. 1965; *Jayaweera* 2314. Dec. 1955; Hakgala, *A. de Alwis*, Aug. 1910. Maldive Islands. *Didi* 15, 1896. China. Hong Kong: *Hance* 973.

COMPOSITION. The rhizome contains an alkaloid, mainly choline, bitter glucosides acorin and calamine A, an essential oil, calamol, and a resin, gum, starch and tannin. The essential oil is said to contain asarone, palmitic and heptonic acids, ester of palmitic acid with some pinene, camphene, asaraldehyde, eugenol, calamene, calamerol and calameon.

USES. Calamus oil is used for preparation of aromatic cordials, liquors, flavouring beer and making perfumes. Medicinally, the rhizome is a stomachic and carminative, in small doses. In larger doses, it is an emetic. It is a remedy for flatulence, colic, dyspepsia and intermittent fevers. It is used for bowel complaints and dysentery in children, bronchial affections, asthma, etc. It is also used as a remedy for internal haemorrhages, intestinal ulcerations, rheumatism and nerve diseases.

In Ceylon, an infusion of the rhizome is given for dyspepsia, flatulence, choleraic diarrhoea in children, cough, fever, and with other ingredients for abdominal colic, dropsy, piles, asthma and anaemia. It is an antidote for several poisons. In U.S.A., the rootstock is often eaten raw for relief from indigestion. In Brazil, it is regarded as an anthelmintic, while in the Philippines it is used as a stimulant, carminative and applied as an embrocation for rheumatism. The powdered rhizome is an insecticide and is used in the preparation of toilet powders.

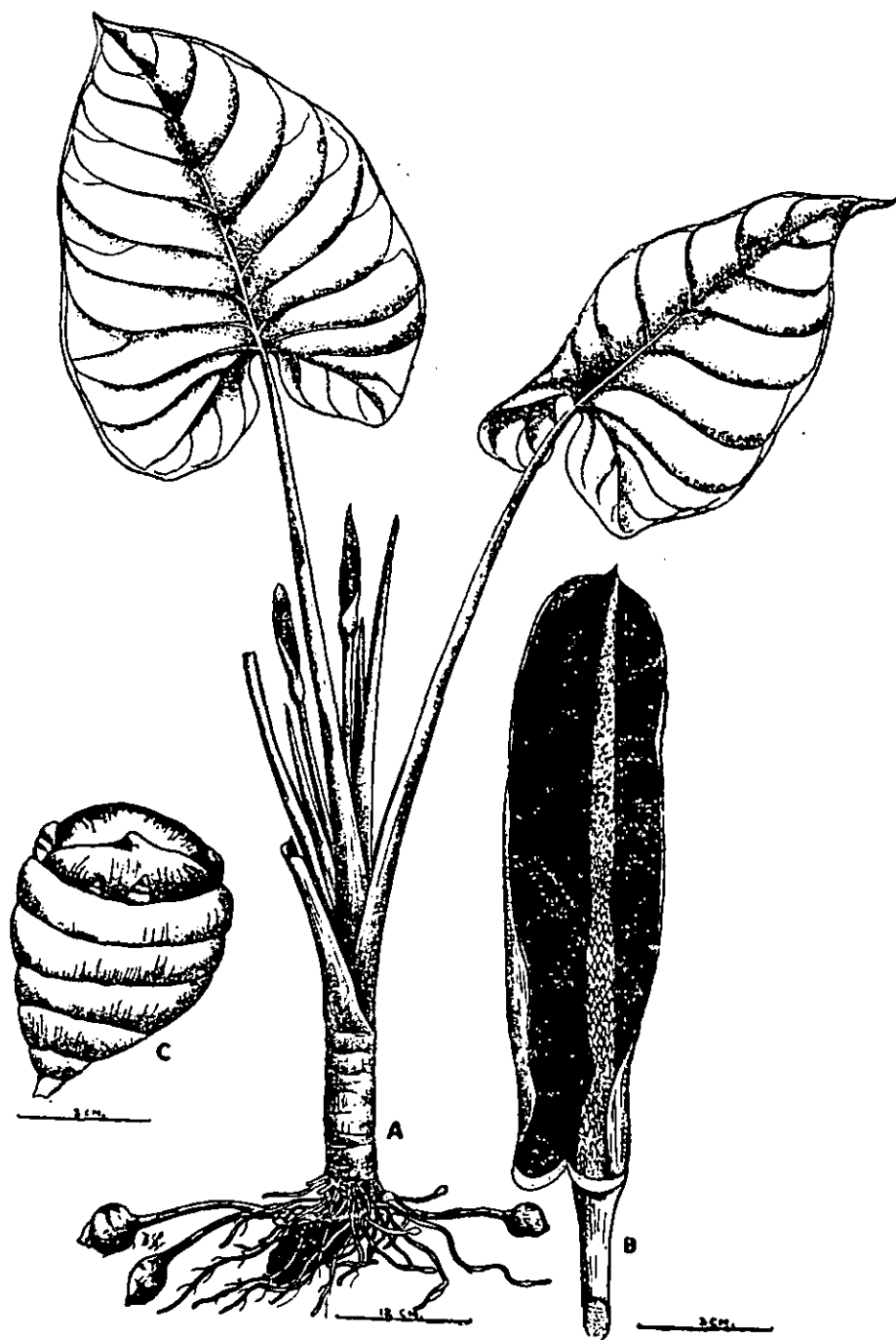


FIG. 58. *Alocasia indica*. A, plant with leaves, tubers and inflorescences. B, inflorescence with the spathe opened out. C, tuber.

2. *Alocasia indica* (Roxb.) Schott in Oestr. Bot. Wochenbl. 410. 1854. (Fig. 58).

Colocasia indica Kunth — *Arum indicum* Roxb.

Sinh. Desa-ala, Rata-ala ; *Hindi* Mankanda ; *Sans.* Brihachhada, Chhatrapatra, Mahapatra, Mana, Manaka, Sthalapadma, Vistirnaparna.

A robust herb with bright green, large, triangular-sagittate, slightly repand leaves with strongly marked, whitish midrib and 6—8, strong, pale, secondary nerves ; petioles as long as or longer than the leaves, round and tapering upwards ; peduncles several, 10—20 cm long ; spathes with rather slightly offensive smell, 20—30 cm long, of a pale greenish-yellow inside and out, tube oblong-ovoid 3.8—5 cm long, spadix shorter than the spathe ; female inflorescence yellow, narrowly ovoid, about 2.5 cm long ; fertile male inflorescence white, 3.8—5 cm long, appendix conoid rugulose, 10—12.5 cm long and 7.5—10 mm broad ; male flowers of densely packed anthers with immersed cells opening by terminal slits ; female flowers of crowded, globose, 1-chambered ovaries with obovoid pistils and sessile, 3—4-lobed stigmas ; berry red, 7.5—10 mm diameter.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient. 3 : pl. 794. 1843—1845 ; Kirtikar and Basu, Indian Med. Pl., pl. 1003. 1933.

DISTRIBUTION. A much cultivated species in the tropics, including India and Ceylon.

Maldivé Islands. *Didi* 110. 1896.

USES. Medicinally, the plant is regarded as useful in treating anasarca. As a food, the tubers boiled and eaten frequently act as a mild laxative and diuretic and are beneficial for piles and chronic constipation. The ash of the rootstock mixed with honey is used for cases of aphthae.

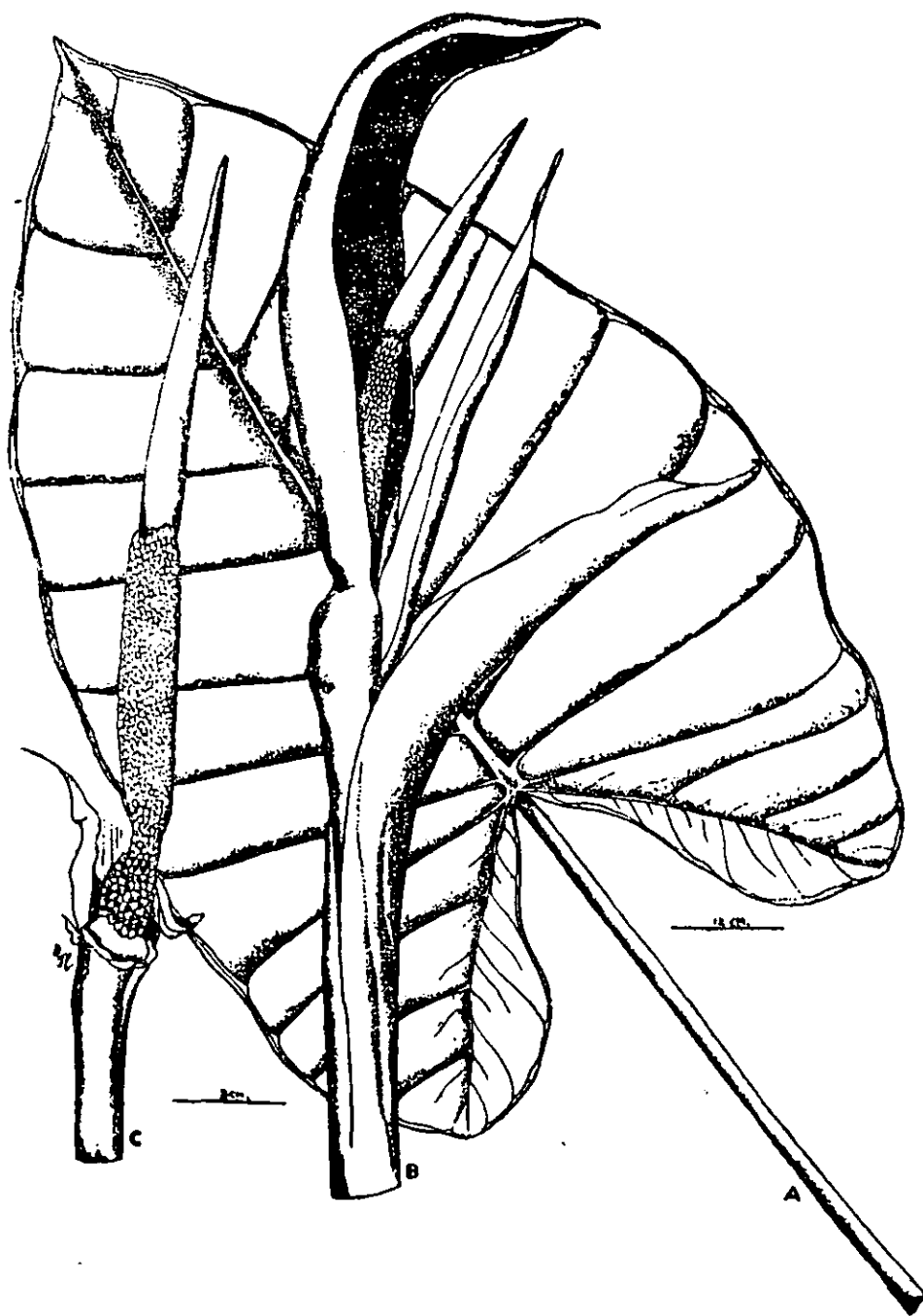


Fig. 59. *Alocasia macrorrhiza*. A, leaf. B, inflorescence with spathes and spadix. C, inflorescence with the spathes removed showing the spadix containing male and female parts.

3. *Alocasia macrorrhiza* (Linn.) Schott in Oestr. Bot. Wochenbl. 409. 1854. (Fig. 59).

Alocasia odora C. Koch—*Alocasia commutata* Schott—*Colocasia macrorrhiza* Schott—*Colocasia odora* Brongn.—*Colocasia odorata* Hook.—*Colocasia mucronata* Kunth—*Caladium macrorrhizon* Br.—*Caladium odorum* Lindl.—*Caladium odoratissimum* C. Koch—*Caladium glycirrhizum* Fraser—*Philodendron peregrinum* Kunth—*Arum macrorrhizon* Linn.—*Arum peregrinum* Linn.—*Arum odorum* Roxb.—*Calla maxima* Blanco—*Arum grandiflorum* Blanco—*Calla badian* Blanco—*Alocasia indica* Naves.

Sinh. Habarala; *Tam.* Parum sembu; *Hindi* Alu; *Sans.* Gajakarna, Hastikarna.

A large herb; rootstock tuberous, creeping and ascending, 60—90 cm high, annularly scarred; leaves simple, large, very stoutly and long petioled, 60—120 cm long, 15—45 cm broad, peltate, broadly sagittately ovate, margins sub-undulate, basal lobes rounded and incurved, midrib stout, penniveined with two strong basal veins descending into the basal lobes, petioles 60—120 cm long; spathes 2 or more together, stoutly peduncled, 15—30 cm long, odorous, tube 7.5—10 cm long, narrowly ellipsoid, limb narrowly cymbiform, top hooded and cuspidate, pale green, sometimes spotted or streaked with red; spadix nearly as long as the spathe, appendage nearly as long as the flowering portion, smooth, sinuously sulcate, pale yellow or greenish; male and female parts of the inflorescence distant, separated by neuters; male flowers of densely packed, connate, 8—10 celled masses of anthers; female flowers crowded, globose, ovary incompletely 4-locular, stigma subsessile, pulvinate, ovules few, erect; fruit, berries about 2 cm diameter.

Generally in flower during February.

ILLUSTRATIONS. Lindley, Bot. Reg. *pl.* 641. 1822; Hooker in Curtis Bot. Mag. *pl.* 3935. Wight, Ic. Pl. Ind. Orient. 3: *pl.* 797. 1843—1845.

DISTRIBUTION. Grows in all tropical countries including India, Ceylon, Malaya and Philippine Islands. In Ceylon, it is a common herb in all village gardens.

Ceylon. Central Prov., Peradeniya, *Herb. Peradeniya*, May 1887; *Thwaites C. P.* 3725; Getambe, *Alston* 796, Aug. 1926; Kandy, *Alston*, Aug. 1928.

COMPOSITION. The stems, leaves and petioles contain stinging crystals of calcium oxalate (raphides) which are destroyed on boiling or roasting. Hence the starch in the stem can be used as a source of food.

USES. The acrid juice of the leaf of this plant gives instant relief to stings of the giant nettle (*Laportea*). The chopped up leaves and roots are used as an application on painful joints. The cut surface of the stem is smeared with lime and water and applied for dog bites. The tender leaves are eaten as a vegetable and the dried stems along with other ingredients are given for piles and chronic fevers.



FIG. 60. *Amorphophallus campanulatus*. A, plant with corm and leaves. B, inflorescence showing spathe opened out exposing the spadix.

4. *Amorphophallus campanulatus* (Roxb.) Blume ex Decne 3 : 366. 1834. (Fig. 60).

Amorphophallus chatty André—*Amorphophallus virosus* N. E. Br.—*Candarum roxburghii* Schott—*Arum campanulatum* Roxb.—*Arum decurrens* Blanco—*Amorphophallus decurrens* Kunth—*Dracontium polyphyllum* Willd.

Sinh. Kidaran, Wal-kidaran ; *Tam.* Karunaikkalang, Karunaikkilangu. *Hindi* Kanda, Ol, Zaminkand ; *Sans.* Arsaghna, Arshoghna, Bahukanda, Durnamari, Kanda, Kandala, Kandarha, Kandashurana, Kandi, Kandula, Kandvardhana, Kanthalla, Olla, Rutchyakanda, Sthulakandaka, Sukandi, Suvitra, Tivrankantha, Vatari, Wanasurana, Wajira Kandhu.

A tuberous herb ; tuber depressed-globose, 20—25 cm diameter, bulbiferous, dark brown ; leaves 1 or 2, appearing long after flowers, 30—90 cm broad ; segments spreading, simple or forked ; leaflets 5—12.5 cm long, of variable width, sessile, obovate or oblong, strongly many-veined, with green edges ; petioles 60—90 cm long, stout, warted, dark green with paler patches ; flowers male and female, contiguous without neutral flowers in the spadix which is enclosed in a broad, campanulate spathe ; spathe 15—25 cm broad and as deep, margin recurved, undulate and crisped, strongly and closely veined, greenish-pink externally, base within purple, rough and warted ; spadix as long as the spathe, appendage globose or shapeless, sinuously lobulate, dark red purple and spongy within ; male part of the inflorescence towards the top, about 7.5 cm long, 2.5—5 cm diameter, anthers densely crowded, sessile, pale yellow, opening by apical pores ; female part lower down, 7.5 cm long and up to 6.2 cm diameter, ovaries densely crowded, sessile ; styles 1.2 cm long, stout, ascending, purple ; stigmas large, 2 or 3-lobed ; fruit berries red, 2 or 3-seeded.

Flowers between December and March and the flowers are malodorous especially, towards evening.

ILLUSTRATIONS. Curtis, Bot. Mag. *pl.* 6978 ; Roxburgh, Pl. Corom. 3 : *pl.* 272. 1819 ; Wight, Ic. Pl. Ind. Orient. 3 : *pls.* 782 and 785. 1843—1845 ; Kirtikar and Basu, Indian Med. Pl., *pl.* 999. 1933.

DISTRIBUTION. Largely cultivated throughout the plains of India, Ceylon, Malaya to Polynesia. In Ceylon, it is found commonly in the moist low-country up to 2000 feet altitude, especially near the coast ; extremely abundant between Galle and Matara.

Ceylon. Southern Prov., Galle, *Thwaites C. P.* 2823 ; *Beliatta, Simpson* 9964. Aug. 1932.

COMPOSITION. The tuber contains an alkaloid, fat, protein and carbohydrates.

USES. The corm is used externally to relieve pain in acute rheumatism. With other ingredients, it is used for preparations for the treatment of piles, acute dyspepsia, abdominal colic, elephantiasis, skin and blood diseases, fistula, glandular swellings in the neck, urinary diseases and dropsy. The root is used for boils and ophthalmia. The corm, as well as the roots, are useful for haemorrhoids. The crushed seed relieves tooth-ache.

The corm is eaten during periods of food scarcity.

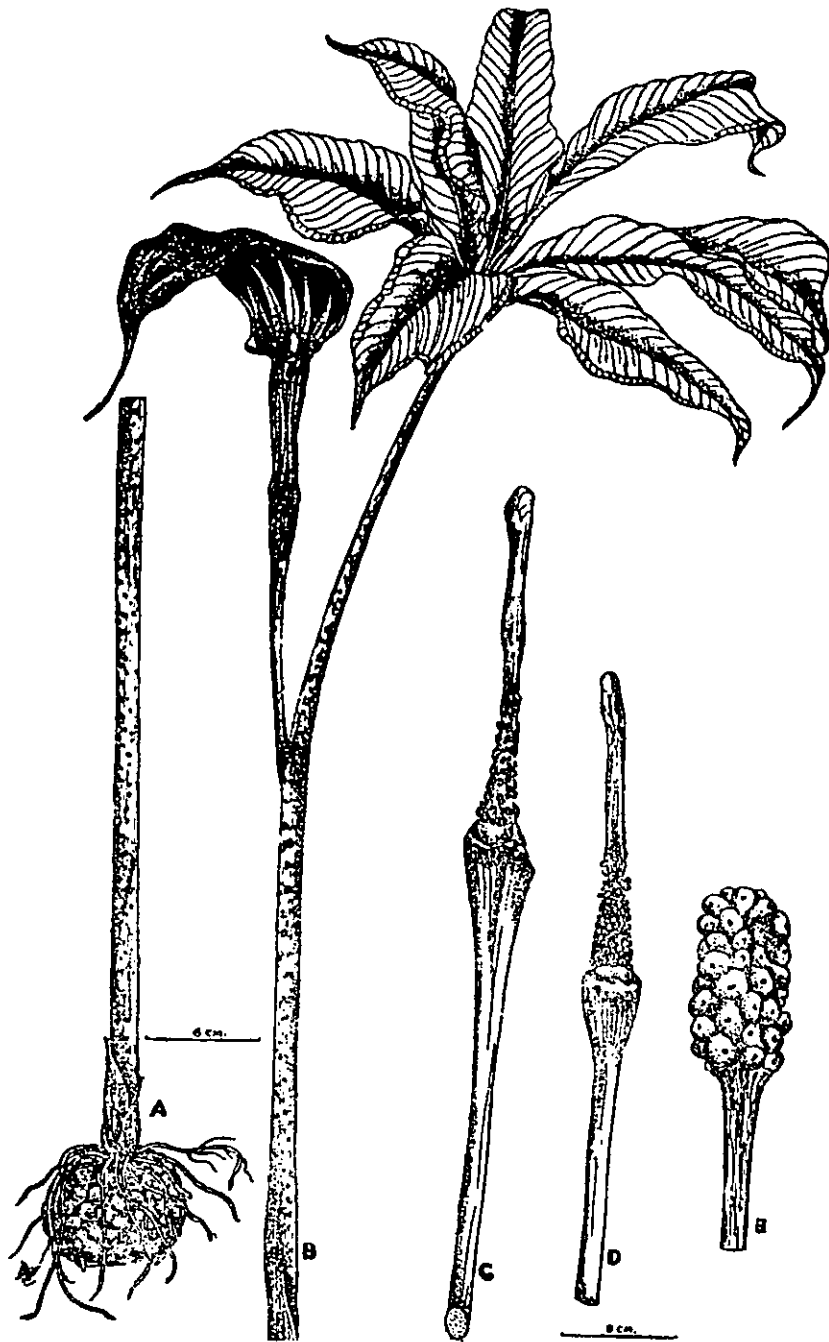


FIG. 61. *Arisaema leschenaultii*. A, lower portion of the stem with tuber and roots. B, upper portion of the stem with the leaf and spathe. C and D, spadices with the spathes removed. E, fruits on the lower part of the spadix.

5. *Arisaema leschenaultii* Bl. Rumph. 1: 93. 1835. (Fig. 61).

Arisaema papillosum Steud. ex Schott—*Arisaema erubens* Dalz. and Gibs.—*Arisaema huegelli* Schott.

Sinh. Wal-kidaran.

Monoecious or dioecious tuberous herb ; tuber globose, about 5 cm diameter ; roots from the upper side of the tuber ; stem about 15 cm long, clothed with long mottled sheaths ; leaf solitary ; petiole stout, 30—60 cm long, pale green, mottled and banded with red and brown ; leaflets 5—11, whorled, 10—15 cm long, 3.8—6.3 cm broad, subsessile, lanceolate, caudate-acuminate, dark green above, paler beneath, base tapering, midrib stout ; spathe emerging from the sheath of the petiole, very shortly peduncled, 15—45 cm long, dark green, externally striped with pale green or dull purple, very dark green within ; tube as long as the limb, narrow, ribbed, erect, gradually dilated into the slightly decurved, ovate-lanceolate, acuminate, cymbiform limb which terminates in a straight, obtusely acuminate tip of variable length ; spadix about 7.5 cm long, gradually passing into a very narrowly clavate, pale green, smooth appendage with a rounded, sometimes verrucose tip ; in monoecious flowers, the male inflorescence is above the female inflorescence with few neutrals, male inflorescences of many, stipitate, connate stamens ; anthers 3—4 oblong or subglobose, sessile dehiscent by short vertical slits ; female inflorescence of many 1-loculed ovaries at the base of the spadix, styles short, stigmas disciform ; fruit a 1-seeded berry.

ILLUSTRATIONS. Curtis, Bot. Mag. pl. 5496 ; Kirtikar and Basu, Indian Med. Pl. pl. 996. 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs in India along the Western Ghats from Concan Southwards. In Ceylon it is commonly found in shady places in the montane region.

Ceylon. Central Prov., Pitakande, Kalugammana, *J. M. de Silva*, Feb. 1927 ; Nuwara Eliya, *Thwaites C. P.* 546 ; Horton Plains, *Willis*, Jan. 1906 ; Sita Eliya, *Willis*, March 1906 ; Hakgala, *J. M. de Silva*, May 1911 ; *F. W. de Silva* ; *Willis*, March 1906 ; *A. M. Silva*, March 1906.

USES. The tubers are used for the same diseases as *Amorphophallus campanulatus* tubers are employed. They are used for piles, haemorrhoids, dyspepsia, abdominal colic, fistula, urinary and skin diseases.



FIG. 62. *Colocasia esculenta*. A, plant showing leaves and inflorescence. B, portion of the stem showing the tubers. C, inflorescence with the spadix inside. D, inflorescence with the spathe removed showing the male and female sections of the spadix.

6. *Colocasia esculenta* (Linn.) Schott, Melet. 1 : 18. 1832. (Fig. 62).

Arum esculentum Linn.—*Colocasia antiquorum* Schott—*Colocasia acris* Schott—*Colocasia nymphaeifolia* Kunth—*Colocasia fontanesii* Schott—*Colocasia pruinipes* Koch and Bouché—*Colocasia euchloa* C. Koch and Lindl.—*Caladium acre* Br.—*Caladium nymphaeifolium* Vent.—*Arum nymphaeifolium* Roxb. and Grah.—*Arum colocasia* Linn.—*Arum peltatum* Lam.—*Calla gaby* Blanco—*Caladium colocasia* W. F. Wight—*Caladium violaceum* Desf.—*Caladium esculentum* Vent.

Engl. Taro ; *Sinh.* Gahala, Kandala, Tadala ; *Tam.* Shamakkilangu, Shemakalengu ; *Hindi* Arvi, Arwi, Ashukachu, Auri, Avois, Ghoya, Ghuiya, Ghuya, Ghwiya, Gorikachu, Kachu. *Sans.* Kachchi, Kachu, Kachwi.

A large herb with no stem above ground, but the base slightly swollen, arising from a tuberous rhizome, giving off sheathed, bulbiferous suckers ; leaves simple, large, 15—48 cm long, ovate-cordate or hastate, dark ashy-green, bifid halfway from the base to the insertion of petiole, basal lobes rounded ; petioles 90—120 cm long, inserted at the base of the lamina and divided into 5 or 7 stout veins radiating from the top and sheathed at the base ; spathes usually solitary, stoutly peduncled, 20—30 cm long, narrow, erect, green, tube 5—7.5 cm long, oblong, lamina lanceolate, acuminate, convolute ; spadix shorter than the spathe, appendage cylindric or subulate, male and female parts of the inflorescence each about 3.2 cm long, separated by flat, oblong neuters ; male flowers densely packed, anthers cubical with immersed cells opening by terminal slits ; female flowers crowded, globose, ovary 1-locular with many parietal ovules, style very short, stigma discoid ; fruit berries oblong.

ILLUSTRATIONS. Wight, *lc. Pl. Ind. Orient.* 3 : *pl.* 786. 1843—1845 ; Kirtikar and Basu, *Indian Med. Pl.*, *pl.* 1002. 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Cultivated throughout the tropics including India and Ceylon. It is a common herb in Ceylon, grown in most village gardens for its tuberous suckers which are eaten.

Ceylon. *Thwaites C. P.* 3724 ; Central Prov., Peradeniya, *Alston* 798 ; Hakgala, Bot. Gard., *Alston*, May 1926.

COMPOSITION. The corms have a high starch content and protein. The *Colocasia* starch contains amylase and the mucilage contains d-galactose, l-arabinose and uronic acid. The leaves and petioles are used as leafy vegetables and are good sources of calcium, phosphorus and iron. The whole plant is a source of vitamin B.

USES. Besides being a starchy food, the tubers of this plant are laxative, diuretic, lactagogue and styptic. The pressed juice of petioles is used to arrest arterial haemorrhage. It is also used for earache and otorrhoea and also as an external stimulant and rubefacient. The juice of the corm is used in cases of piles and as an antidote for stings of wasps and insects. The ash of the tuber mixed with honey is applied for aphthae in the mouth.



FIG. 63. *Cryptocoryne spiralis*. Plant with vermiform roots, leaves and spathe.

7. *Cryptocoryne spiralis* (Retz.) Fischer ex Wydler in *Linnaea* 5: 438. 1830. (Fig. 63).

Ambrosinia spiralis Roxb. — *Arum spirale* Retz.

Sinh. Athi-udayan ; *Tam.* Nattativadayam.

An aquatic herb with a tuberous, soboliferous rootstock and vermiform roots; leaves simple, radical, 7.5—20 cm long, 0.8—1.6 cm broad, linear-lanceolate, acuminate or acute, narrowed from the middle to both ends, nearly parallel-veined, base narrowed into a short, stout petiole; spathe subsessile, 7.5—12.5 cm long, closed below with a transverse septum below the mouth, tube very short, obconical, limb linear-lanceolate, at first twisted, greenish externally, within dark purple, and transversely lamellate; male flowers at the top of the small spadix, sessile, 2-celled; female flowers in a single whorl round the base of the spadix, separated from the males by a few neuters, appendix short; ovaries oblong, narrowed into short, outward-bent styles; stigmas broadly elliptic.

ILLUSTRATIONS. Wight, *lc. Pl. Ind. Orient.* 3: *pl.* 773. 1843—1845; Curtis, *Bot. Mag.* 48: *pl.* 2220. 1821; Loddiges, *Bot. Cab. pl.* 525.

DISTRIBUTION. Occurs in the Deccan Peninsula, Bengal and Ceylon.

USES. In combination with other drugs, this plant is given in decoctions as a remedy for infantile vomiting and cough, and for abdominal complaints and fever in adults.

The plant is considered a substitute for *Ipecacuanha*.



FIG. 64. *Lasia spinosa*. A, aerial portion of a plant with a part of the rhizome and leaves. B, young spathe. C, older spathe showing the spadix at the time of dehiscence of the pollen. D, surface view of the flowers. E, lateral view of a flower showing the perianth segments, stamens and pistil.

8. *Lasia spinosa* (Linn.) Thwaites, Enum. Pl. Zeyl. 336. 1864. (Fig. 64.).

Dracontium spinosum Linn. — *Lasia aculeata* Lour. — *Lasia heterophylla* Schott — *Lasia zollingeri* Schott — *Lasia jenkinsii* Schott — *Lasia hermanni* Schott — *Lasia desciscens* Schott — *Lasia roxburghii* Griff. — *Pothos lasia* Roxb. — *Pothos heterophylla* Roxb. — *Pothos spinosa* Ham.

Sinh. Kohila. Kohowila ; *Tam.* Kohila ; *Sans.* Abhiru.

A stout, spiny, marshy plant with a creeping, spiny rootstock 2—3 cm diameter; leaves simple, long-petioled, 15—45 cm long, 5—32 cm broad, rigidly coriaceous, young leaves hastate or sagittate, old ones pinnatifid with lanceolate acuminate segments, glabrous above, costate, strongly penniveined and spinous beneath ; petioles 24—70 cm long, terete, spiny, bases sheathing ; spathe 20—35 cm long, spirally twisted above the spadix and about 1.3 cm in diameter, yellowish-brown with yellow margin, open at base only when pollen is discharged and closing afterwards ; spadix 3 cm long, 0.9 cm diameter, cylindrical, blunt at apex, orange-red in colour, densely clothed in bisexual, sessile flowers ; perianth segments 4 or 5, each 2 mm long, 1.5 mm broad, concave, dorsally hooded and dull pink ; stamens 4 or 5, filaments very broad, 1.5 mm long, 1 mm broad, opposite and appressed on perianth segments, anther cells oblong, divaricate below ; ovary superior, short, columnar, 1.7 mm long, 1.5 mm broad, green, 1-locular with a solitary ovule pendulous from the top, stigma large sessile ; fruit not seen.

Frequently cultivated in marshy areas in the villages for the sake of its young leaves and rhizomes. It is in flower from October to December.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient. *pl.* 777. 1843—1845 ; Kirtikar and Basu, Indian Med. Pl., *pl.* 1007. 1933 ; Herb. Peradeniya drawing.

DISTRIBUTION. Occurs in marshy places in tropical India, Burma, Ceylon, Malay Peninsula and China. In Ceylon, it is commonly cultivated in the moist low-country for its young leaves and rhizomes which are eaten.

India. Bengal, *J. D. Hooker* and *T. Thomson*, **Ceylon.** *Thwaites C. P.* 2978 ; Central Prov., Peradeniya, Bot. Gard., cultivated, *Jayaweera* 1701 Oct. 1957 ; *Jayaweera* 2616, Nov. 1958. **Burma.** Pegu : *Kurz* 253.

USES. The leaves, stems and roots are used as a common remedy for piles.

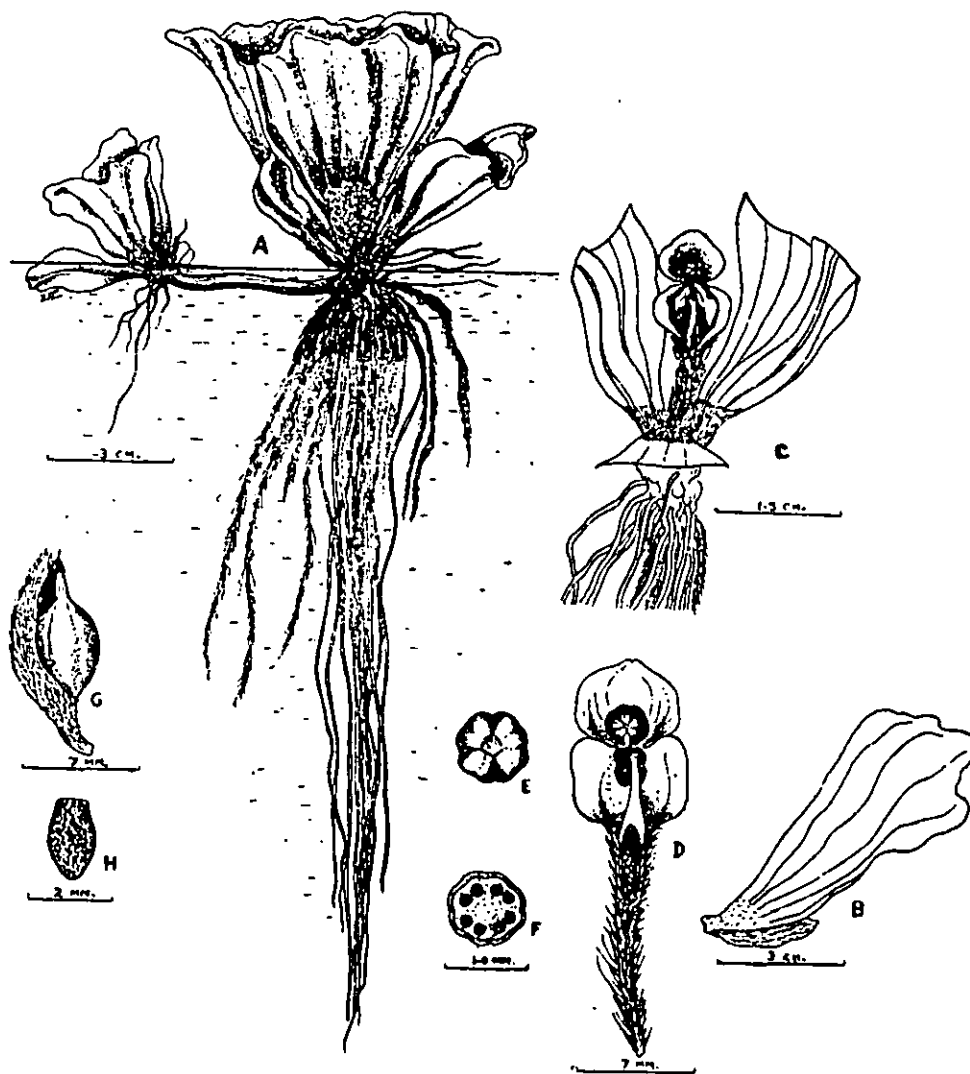


FIG. 65. *Pistia stratiotes*. A. plant with offset floating on the surface of water. B. leaves with a stipular sheath. C. plant showing the inflorescence. D. inflorescence showing 5 connate groups of anthers and pistil with basi-parietal oblique placentation. E. view of a group of anthers from top. F. transverse section of a group of anthers. G. fruit with the spathe. H. seed.

9. *Pistia stratiotes* Linn., Sp. Pl. 963. 1753. (Fig. 65).

Pistia cumingii Klotz.—*Pistia stratiotes* Linn. var. *cuneata* Engl.

Engl. Water-Lettuce ; *Sinh.* Diyaparandella ; *Tam.* Agasatamarai ; *Hindi* Jalkhumbi, Jalkhunbi, Takapana ; *Sans.* Akashamuli, Ashakumbhi, Daladhaka, Jala-vaikala, Khali, Khamulika, Kumbhika, Kumuda, Kutrina, Paniyaprishthaja. Parni, Prashni, Shvetaparna, Varimuli, Variparni.

A floating, gregarious, monoecious herb with an inconspicuously contracted stem covered with the narrowed bases of leaves and producing tufted root fibres clothed with fibrillae ; leaves simple, obovate-cuneate or wedge-shaped, 7.5—9 cm long 5—6 cm broad, sessile in a close spiral, puberulous on both surfaces, densely hairy on the upper surface towards the base, rounded or retuse, somewhat undulate along outer margin ; veins 5—7, prominent below, flabellately disposed, converging within the margin ; stipular sheaths membranous, transparent, about 1.5 cm long and as broad ; inflorescence 2.2 cm long, spathe 1.2 cm long, white, obliquely campanulate, gibbous, closed below and fused with the peduncle, hairy outside and contracted in the middle ; spadix adnate to the back of the spathe tube, free above ; male inflorescence a stalked whorl of 4 or 5 connate groups of anthers near the top of the spadix, each group consisting of 4 anthers fused together ; female inflorescence consists of a single pistil 6 mm long, adnate to the spathe obliquely at the base, ovary oblong, 1-locular, style conical with an obtuse stigma, ovules few, crowded on a basi-parietal, oblique placenta ; fruit ovoid, 6 mm long, with persistent style and spathe, bursting irregularly ; seeds 4—13, rugose, 2.5 mm long, 1.2 mm broad, cylindrical and truncate at apex.

Flowers during September.

ILLUSTRATIONS. Curtis, Bot. Mag. pl. 4564 ; Rheede, Hort. Mal. pl. 32. 1678—1703 ; Griffith, Ic. Pl. Asiat. pl. 261, pl. 262 ; Roxburgh, Pl. Corom. 3 : pl. 269. 1819 ; Kirtikar and Basu, Indian Med. Pl., pl. 993. 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Generally found in the tropics including Ceylon, India and Philippine Islands. In Ceylon, it occurs commonly in the moist low-country in clear still water. Sometimes it is found growing in brackish waters along the coast.

India. Bengal, *J. D. Hooker* and *T. Thomson* ; Calcutta, Bot. Gard. cultivated. Ceylon. North Central Prov., Tissa Wewa, *Senaratne*, Nov. 1955 ; Central Prov., Uda Hewaheta. *Jayatileka*, Oct. 1935 in rice fields ; Kandy, *Thwaites C. P.* 3334. Peradeniya, Bot. Gard., *Jayaweera* 2869, Sept. 1966, cultivated.

COMPOSITION. The leaves contain stinging crystals of calcium oxalate while the plant as a whole contains salts of potassium, sodium, magnesium, iron, aluminium, lime and silicic acid.

USES. Owing to its high potash content, it acts as a diuretic and is prescribed for gonorrhoea. The plant is cooling and demulcent, and given for dysuria. The roots are laxative and emollient. The leaf made into a poultice is applied on haemorrhoids. With coconut milk and rice, it is given for dysentery and in rose water and sugar for coughs and asthma. The ash of the plant is applied on ringworm infections. In China, the whole plant is used for boils, syphilitic eruptions and many skin diseases.

It is believed to destroy bed bugs most effectively. In Africa, the ash of the plant is used as a source of salt.

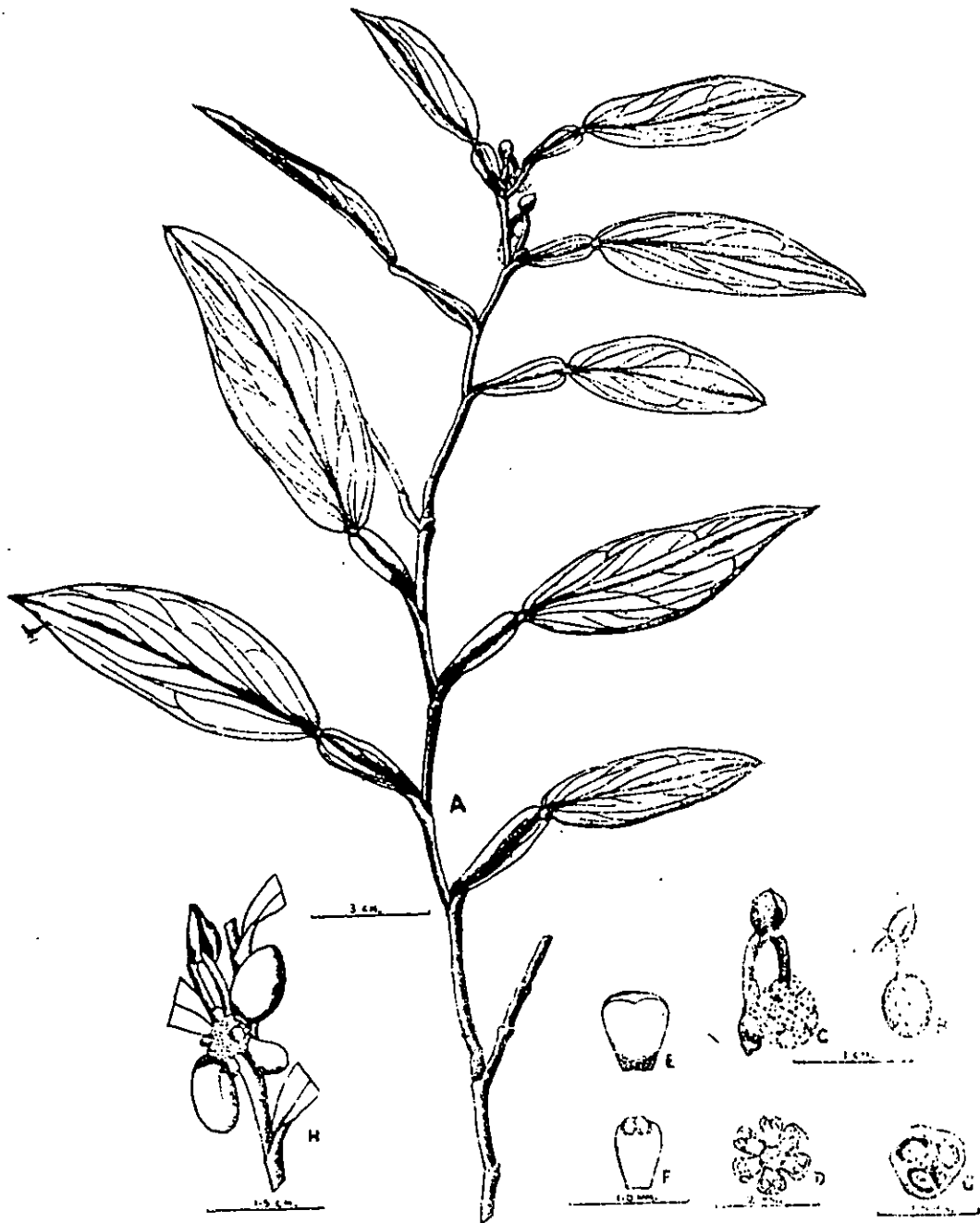


FIG. 66. *Pothos scandens*. A, branch with leaves and inflorescences. B, young inflorescence. C, mature inflorescence showing bracts and spathe. D, front view of a flower. E, perianth segment. F, stamen. G, transverse section of an ovary. H, mature spadix with fruits.

10. *Pothos scandens* Linn., Sp. Pl. 968. 1753. (Fig. 66).

Pothos exiguiflorus Schott — *Pothos cognatus* Schott — *Pothos falax* Schott — *Pothos decipiens* Schott — *Pothos roxburghii* de Vries.

Sinh. Pota-wel.

A perennial herb climbing by means of aerial roots ; stems green, 1 cm diameter, terete, smooth, branched and leafy, clothing the trunks of trees like ivy, internodes 1.5—6.5 cm long ; leaves simple, alternate, distichous, 5—13 cm long, 2—4.5 cm broad, oblong or lanceolate, acute, acuminate or apiculate, bright green, rounded at base, petioles winged, 2.5—7 cm long, 0.9—1.5 cm broad, veins inconspicuous with a midrib and two pairs of lateral veins almost parallel to the margin with parallel, intercostal, reticulate venules ; flowers regular, bisexual embedded in a globular spadix with a cymbiform spathe ; spathe 0.7—0.9 cm long, brownish to reddish-green, peduncle 0.7—0.9 cm long, glabrous, clothed at base with 5 or 6 imbricating reddish-green bracts ; spadix 0.8—1.1 cm long, stalked, reddish or purple with a yellowish, globose head, inflorescence as long as or longer than the stipe ; perianth segments 6, free, valvate, 0.5 mm long, 0.7 mm broad, oblong-pandurate, narrowed at base with the tips curved inwards ; stamens 6, opposite perianth segments, filaments 1 mm long, 0.5 mm broad, anthers basifixed at apex, cells divaricate, slits extrorse ; ovary superior, somewhat hexagonal, 0.7 mm long and as broad, truncate, 3-locular with a single ovule in each loculus, stigma minute lobulate ; fruits scarlet, oblong berries, 1.2—1.6 cm long, only a few ripening.

Flowers from February to April and September to October.

ILLUSTRATIONS. Rheedee, Hort. Mal. 7 : pl. 40 ; Hooker, Ic. Pl. pl. 175 ; Edward, Bot. Reg. pl. 133 ; Schott, Aroid. I : pl. 33 ; Wight, Ic. Pl. Ind. Orient. pl. 776. 1843—1845 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs in India, Ceylon, Burma, Malaya, China, Andaman and Nicobar Islands. In Ceylon, it is found very commonly, climbing on to trunks of trees in the low-country.

India. Wallich 4435, without locality. Assam : Chatterjee 191/95, May 1902 ; Yellapore, Talbot, 1882 ; Pen. Ind. Orient. Herb. Wight 2777, Kew Distribution 1866—8. Ceylon. Central Prov., Hantana, Thwaites C. P. 2321 ; Peradeniya, Bot. Gard., J. M. de Silva, March 1926 ; Jayaweera 1872, Nov. 1961 ; Jayaweera 2870, Oct. 1966.

USES. In Ceylon, the bruised stems and leaves of this plant are mixed with ox urine and applied to the wounds for snake-bite and an aqueous extract of the fresh stems and leaves given internally. An oil prepared with the fresh leaves is used as a dressing for wounds and ulcers. Internally, it acts as a cholagogue, diaphoretic and diuretic and useful in congestion of the liver, rheumatic fever and for chronic malarial fevers. In Malaya, the powdered leaves are applied on the body for small-pox. The stems cut up and mixed with camphor are smoked (like tobacco) for asthma.

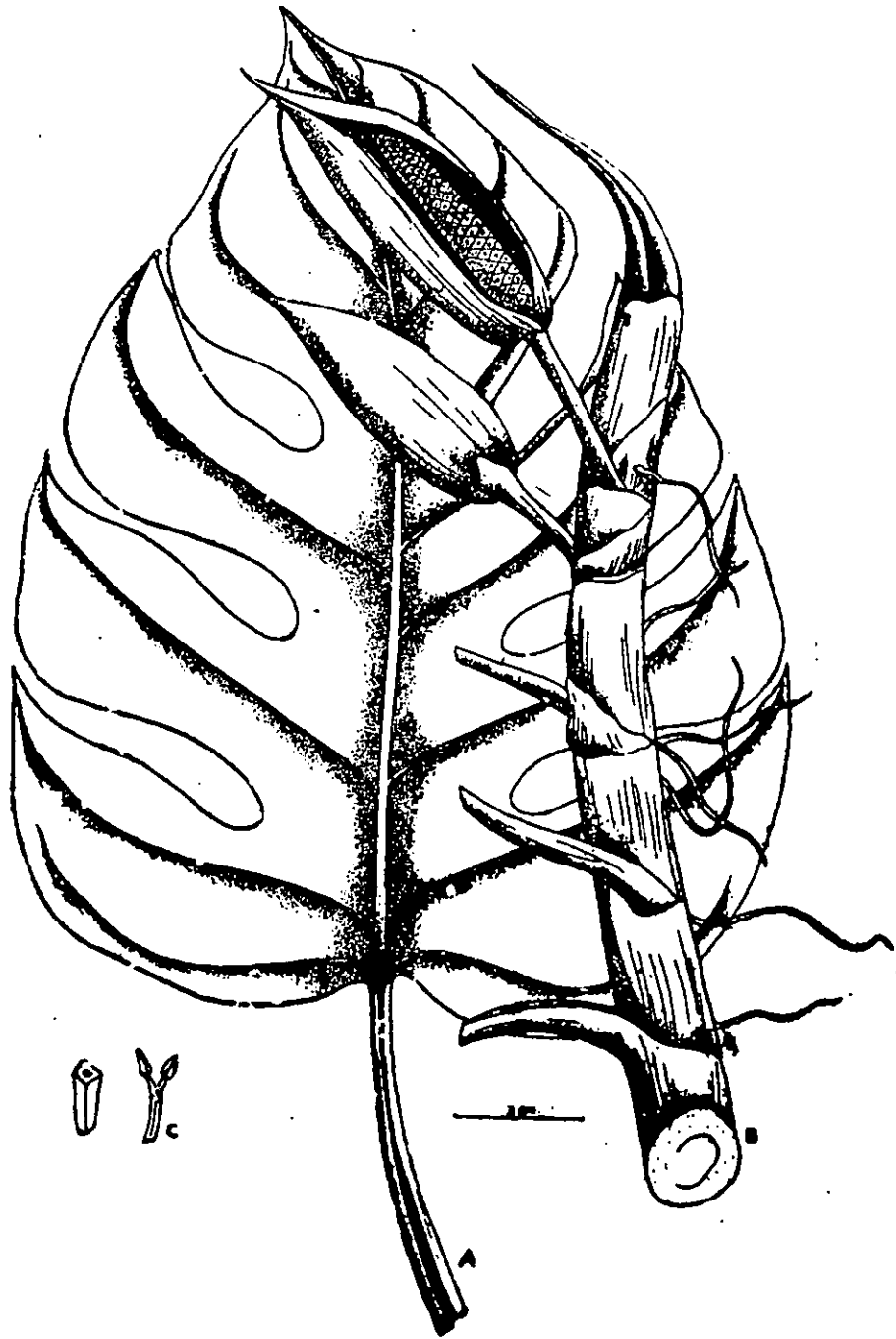


FIG. 67. *Rhapsidophora laciniata*. A, leaf. B, stem with aerial roots and inflorescences. C, a bifid stamen and an ovary.

11. *Rhaphidophora laciniata* (Burm. f.) Merr. in Phil. Journ. Sc. 19 : 342. 1921. (Fig. 67).

Polypodium laciniatum Burm. f.—*Rhaphidophora pertusa* Schott—*Scindapsus pertusus* Schott—*Scindapsus peepla* Thw.—*Pothos pertusa* Roxb.—*Dracontium pertusum* Willd.

Sinh. Dada-kehel ; *Tam.* Ilattimaravalai.

A lofty climber, climbing by means of aerial roots to the highest tree trunks ; stem cylindric, 3.7 cm diameter, green, smooth, leafy for the greater part of its length ; leaves simple, large, 20—45 cm long, 15—25 cm broad, distichous, broadly ovate or ovate-cordate, cuspidate, dark green, entire or sparingly lobed, primary veins 5—8 pairs, connected by anastomosing veinlets, petioles as long as the blade, deeply channelled, basal sheaths 4 or 5, oblong, obtuse, brown ; spathe axillary, shortly and stoutly peduncled, 12.5—17.5 cm long, ovate-oblong or cylindric, cymbiform, acuminate or cuspidate, yellow ; spadix sessile, shorter than the spathe, very stout, cylindric, 1.6 cm long, rounded at the top and densely clothed with closely packed, bisexual, hexagonal flowers ; perianth absent ; appendage absent ; stamens 8, filaments very stout, sometimes bifid, anther small ; ovary 6-gonous, stigma linear, raised on a short stout style, ovules many on parietal placentas ; fruits many-seeded, confluent berries.

Flowers during March.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient. 3 : pl. 781. 1843—1845 ; Kirtikar and Basu, Indian Med. Pl., pl. 1006. 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs in the Deccan Peninsula in India, Ceylon and in the Malay Islands. In Ceylon, it is found climbing on trunks of large trees in the moist low-country. It is somewhat rare.

Ceylon. Thwaites C. P. 3657 ; Western Prov., Colombo, *Herb. Peradeniya*, Nov. 1882. *Maldive Islands.* Gardiner, 1899—1900.

USES. The sap of this plant is given with black pepper to people bitten by the Russel's Viper.

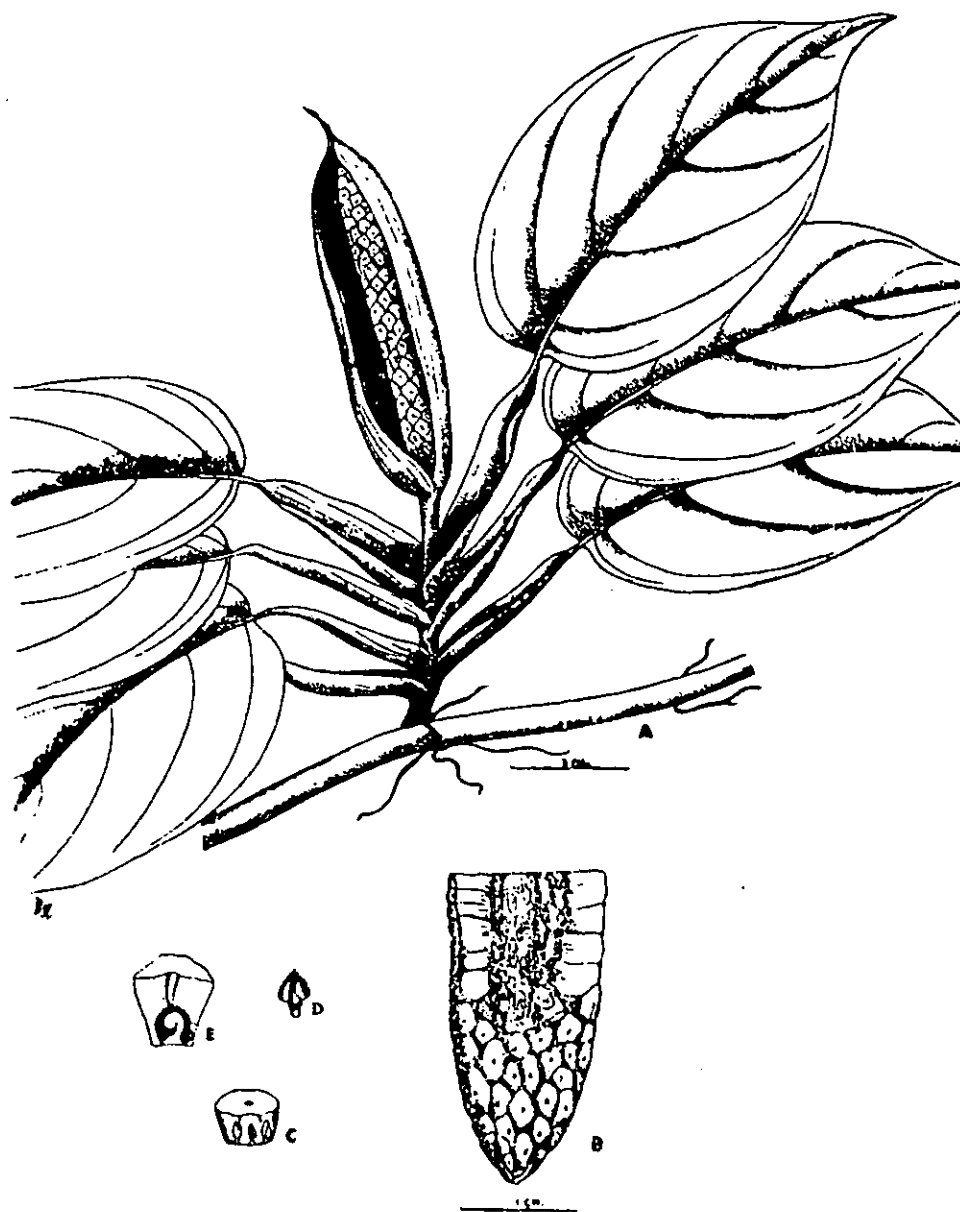


FIG. 68. *Scindapsus officinalis*. A, portion of a plant with leaves and terminal inflorescence. B, portion of the spadix showing the distribution of the flowers. C, naked bisexual flower. D, stamen. E, longitudinal section of ovary, enlarged.

12. *Scindapsus officinalis* Schott, Melet. 1 : 21. 1832. (Fig. 68).

Pothos officinalis Roxb.—*Calla ovata* Herb. Ham.

Sinh. Gaja-tippili, Eth-wagapul. *Tam.* Anaittipili. *Hindi* Braipipli, Gajapipal, Gajapipli, Maidah, Pippaljhanca; *Sans.* Chavyaphala, Chhidravaidehi, Dirghagranthi, Gajakrishna, Gajapippali, Gajavha, Ibhakana, Ibhoshana, Kapivalli, Karipippali, Kolavalli, Kunjarapippali, Shreyasi, Tejasi, Vartuli, Vashira.

Stout, climbing plant with the stem about 1 cm in diameter; leaves simple, alternate, distichous, dark green, 12.5—25 cm long, 6.3—15 cm broad, ovate, elliptic-ovate or nearly orbicular, caudate-acuminate, base rounded or slightly cordate; petioles 7.5—15 cm long, broadly-winged; peduncle solitary, terminal; spathe about 10—15 cm long, oblong, sub-cylindrical, slender-beaked, green outside, yellow within; spadix equalling the spathe, greenish-yellow; flowers bisexual, perianth absent, stamens 4—6 with short filaments and terminal anthers; ovary unilocular with a single basal ovule, stigma elongate; fruiting spadix about 23 cm long, berries few, fleshy.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient. 3: pl. 778. 1843—1845; Kirtikar and Basu, Indian Med. Pl., pl. 1005. 1933.

DISTRIBUTION. Occurs in the tropical Himalaya from Sikkim eastwards, Bengal, Burma and in the Andaman Islands. It is not a native of Ceylon but it can be cultivated. Fruits of *Piper chavya* (Siviya) are used as a substitute in Ceylon.

COMPOSITION. The fruits contain minute traces of an alkaloid

USES. The dried fruit is a stimulant, diaphoretic and anthelmintic. It is useful for diarrhoea, asthma and other bronchial diseases. The fruit is applied externally for rheumatism.



FIG. 69. *Typhonium trilobatum*. A, plant with a leaf, tuber and inflorescence. B, spathe and spadix with male, female flowers, neuters in between and a conical appendage on top. C, conical appendage opened out showing a fibrous tissue on a purplish-red background. D, external view of female flower. E, longitudinal section of female flower showing the basal ovule. F, external view of male flower consisting of a single anther. G, filiform neuter.

13. *Typhonium trilobatum* (Linn.) Schott in Wien. Zeitschr. 3 : 72. 1829. (Fig. 69).

Typhonium orixense Schott — *Typhonium siamense* Engl. — *Typhonium triste* Griff. — *Arum trilobatum* Linn. — *Arum orixense* Roxb. — *Arum pumilum* Lamk. — *Arisaema pumilum* Blume.

Sinh. Panuala ; *Tam.* Karkarunaik-kilhangu, Karunaikkil-hangu.

Tuberous, monoecious, stemless herb with subglobose tubers, 2—4 cm diameter ; leaves 2—4, simple, glabrous, long-petioled, hastately 3-lobed with a bilobed base, the central lobe broadly ovate, 9—15 cm long, 6.5—11 cm broad, acuminate, lateral lobes smaller, dolabriform, 8.5—14.5 cm long, 5—9.5 cm broad, acuminate ; petioles 12—28 cm long, purplish-brown, bases sheathing, pale white ; flowers naked without perianth, unisexual, male and female flowers in the same inflorescence separated from each other by filiform tortuous neuters ; spathe peduncled, constricted above the short convolute persistent tube, 11—24 cm long, peduncle 1.5—4.3 cm long, tube 3—5 cm long, oblong and expanded into a broadly ovate, caudate limb, 10—21 cm long, 6.5—10 cm broad, dull red purple within, paler externally ; spadix 8—13 cm long, sessile, erect, female part 7—10 mm long with long, filiform neuters immediately above and finally the male part with a bare portion in between, bare portion 1.4—2.8 cm long and the male portion 1.3—1.4 cm long ; above the male portion is a slender, conical, blunt, shortly stipitate, purplish-red, hollow appendage 4.5—7.5 cm long inside which is a loose fibrous tissue ; male flowers numerous, each consisting of a single, didynamous, 2-celled anther, 0.7 mm long, 0.5 mm broad ; neuters more tortuous, whitish filaments ; female flowers numerous, each consisting of a naked ovary, 1.5 mm long, 1 mm broad, 1-locular, 1-ovuled and basal placentation ; style absent, stigma sessile and reddish in colour.

Flowers in April, July and August.

ILLUSTRATIONS. Schott, *Aroid. I* : *pl.* 16 ; Wight, *lc. Pl. Ind. Orient.* *pl.* 801. 1843—1845 ; Loddiges, *Bot. cab.* *pl.* 442 ; Ander., *Bot. Rep.* *pl.* 356 ; Edward, *Bot. Reg.* *pl.* 450 ; Griffith, *lc. Pl. Asiat.* *pl.* 50.

DISTRIBUTION. Occurs in India, Ceylon, Burma, Malay Peninsula, Siam, Tonkin, Java and Borneo. In Ceylon, it is commonly found in damp places in the low-country.

India. Lower Bengal, *Seedhouse Malters*, June 1896, very common. Ceylon. Central Prov., *Bot. Gard.* May 1908 without name of collector ; *Jayaweera* 1049, Jan. 1954.

USES. The corms of this herb are exceedingly acid and are used in poultices applied externally to the bites of venomous snakes. The acid principle disappears on boiling and may be eaten for relaxation of bowels by patients suffering from haemorrhoids. The boiled corms are also eaten with bananas for stomach complaints.

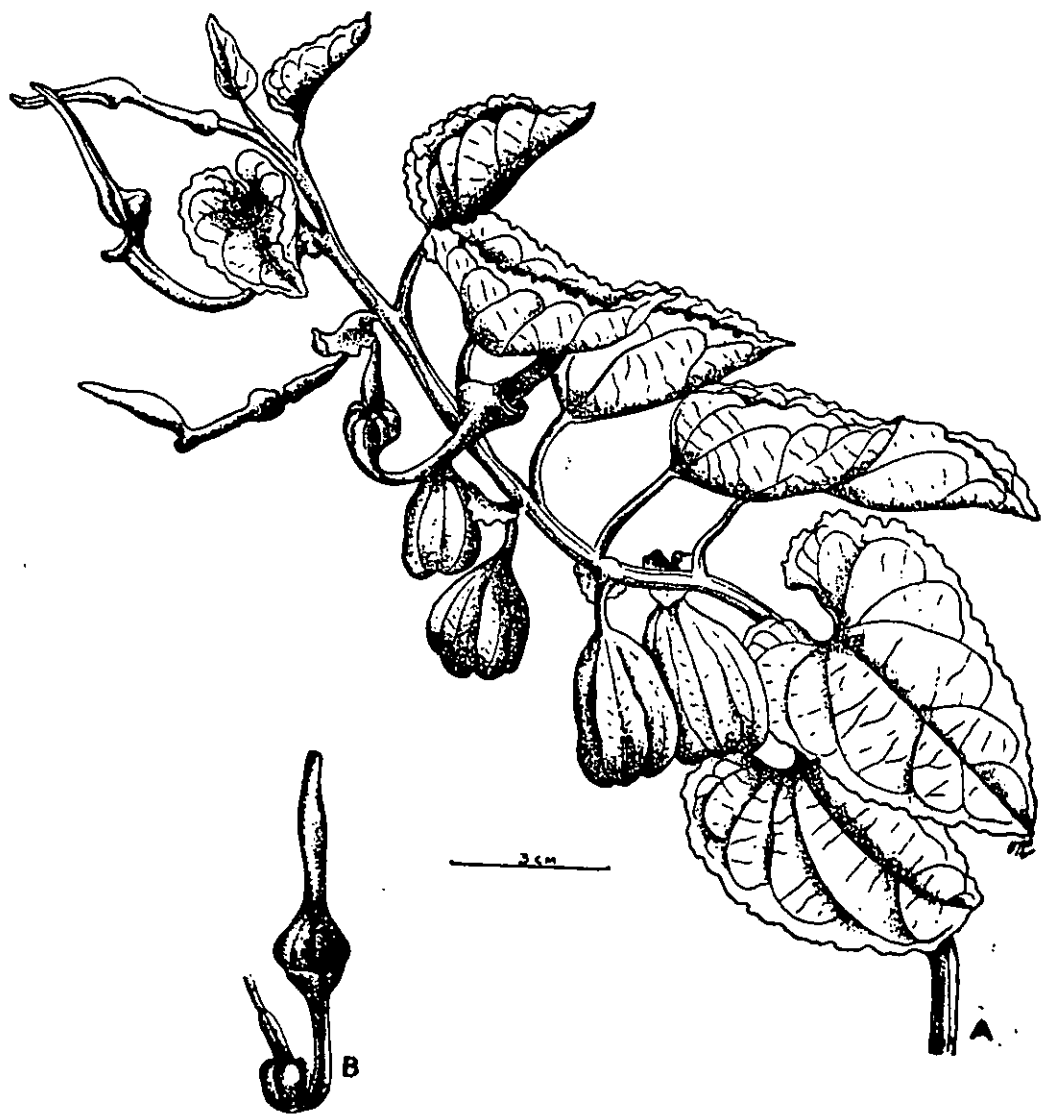


FIG. 70. *Aristolochia bracteolata*. A, branch with leaves, flowers and fruits. B, flower bud.

11. ARISTOLOCHIACEAE

1. *Aristolochia bracteolata* Lam., *Encycl. Mett.* 1 : 258. 1783. (Fig. 70).

Aristolochia bracteata Retz.— *Aristolochia mauritiana* Pers. — *Aristolochia kotschy* Hochst. ex A. Rich. — *Aristolochia maurorum* Klotzsch. — *Aristolochia abyssinica* Klotzsch.

Sinh. Sapsanda ; *Tam.* Aduthinnappalai, Adutintappalai ; *Hindi* Gandan, Gandati, Kidamari, Kirama, ; *Sans.* Bhringi, Dhumpatra, Gridhrani, Gridhrapatra, Kitakaha, Kitamari, Kitari, Krimighni, Shrimalapatra, Shymbahuva, Sulabha.

A weak, prostrate, perennial herb with slender, branched, glabrous stems ; leaves simple, alternate, 1.2—5 cm long and as broad, reniform or broadly ovate, deeply cordate at base, rounded but often apiculate at apex, minutely crisped on margin, glabrous, glaucous beneath ; petioles 1.2—1.8 cm long ; flowers irregular, bisexual, solitary, axillary on longish pedicels carrying a large, sessile, orbicular or subreniform bract at the base ; perianth 1.2 cm long, inflated, base ovoid, tube cylindrical with a trumpet-shaped mouth, lip oblong, obtuse as long as the tube, dark purple with revolute margins, pilose within ; stamens 6, anthers sessile in a circle round the style ; ovary inferior, long, 6-locular with numerous ovules, style short, 6-lobed ; fruit capsules oblong-ovoid, 3.7 cm long, glabrous, 12-ribbed, dehiscing septicidally through the placentas into 6 valves ; seeds large, 6 mm long, deltoid with a slightly cordate base.

Flowers during January and September.

ILLUSTRATIONS. Kirtikar and Basu, *Indian Med. Plants*, 3 : pl. 820A. 1933 ; *Herb. Peradeniya*, drawing.

DISTRIBUTION. Occurs in India, Ceylon, Arabia and tropical Africa. In Ceylon, it is rather common in the dry sandy regions of Jaffna, Mannar, Puttalam, Trincomalee, Batticaloa, Anuradhapura and Tangalle.

Ceylon. *Thwaites C. P.* 2256 ; North Central Prov., Anuradhapura, Giant's Tank, *Simpson* 9331, March 1932 ; Southern Prov., Tangalle, *Alston* 1412, March 1927, not climbing, leaves glaucous, flowers purple with cream spots in the throats, found near seashore.

USES. Every part of this plant is very bitter. For the treatment of gripe with purging, two fresh leaves are crushed in water and given once every 24 hours. The leaves are applied to the naval for constipation in children and also given internally with castor oil as a remedy for colic. The root and leaf yield a thick, yellowish juice which is mixed with boiled milk and given for syphilis and combined with opium is used in treating gonorrhoea. The bruised leaf mixed with castor oil is applied for obstinate cases of eczema. A decoction of the root followed by castor oil is given as treatment for roundworms.

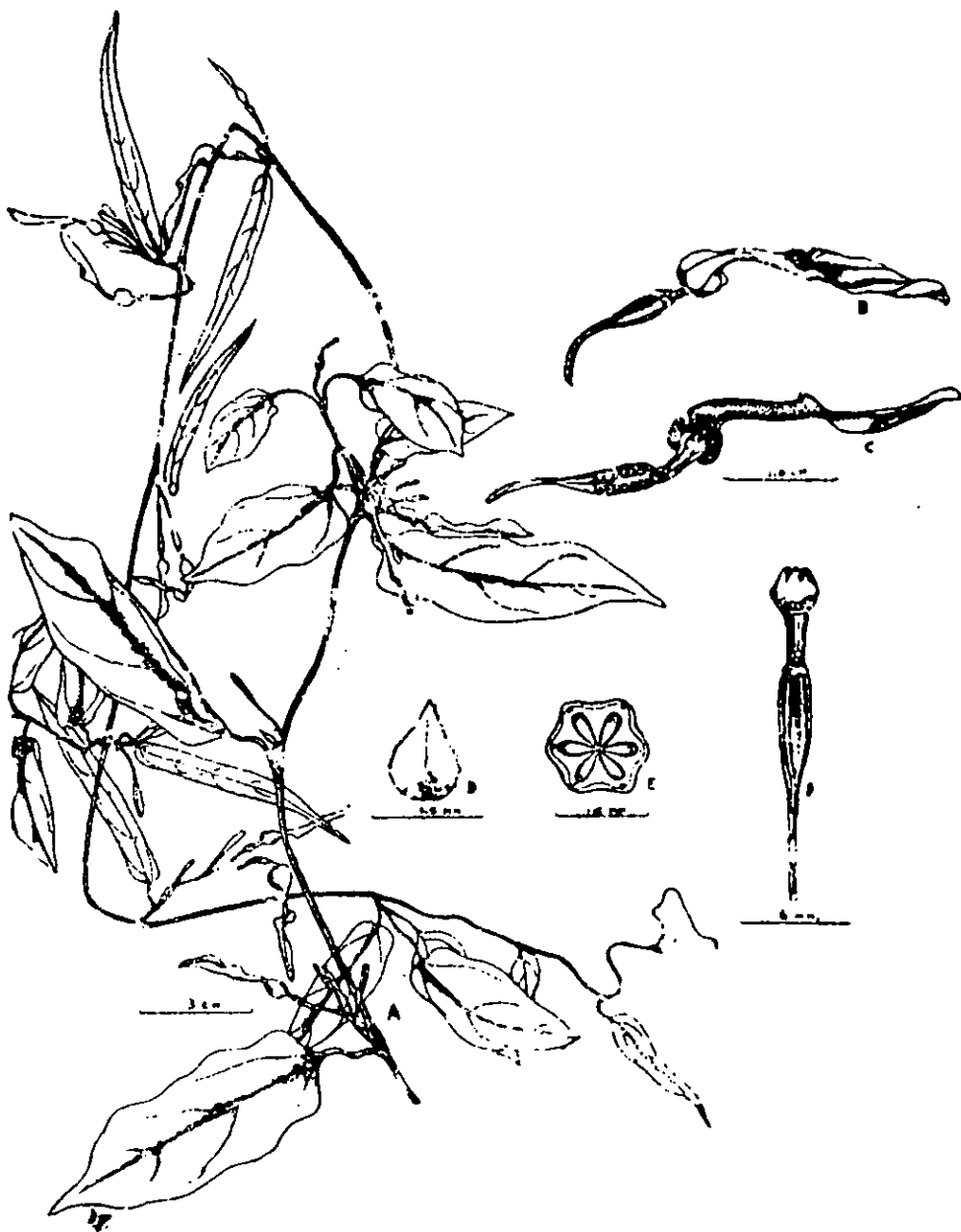


FIG. 71. *Aristolochia indica*. A, portion of the plant with leaves and flowers. B, lateral view of a flower. C, longitudinal section of a flower showing the pilose corolla-tube. D, bract. E, transverse section of ovary. F flower with corolla removed showing the column with sessile anthers.

2. *Aristolochia indica* Linn. Sp. Pl. 960. 1753. (Fig. 71).

Aristolochia lanceolata Wight — *Aristolochia mysorensis* Fisch. — *Aristolochia pandurata* Wall.

Engl. Indian Birthwort; *Sinh.* Sapsanda; *Tam.* Adagam, Isadesatti, Isura, Isuraver, Isuramuli, Iyavari, Karudakkodi, Kirtikkodi, Neya, Perumarindu, Perumaruntu, Perunkilangu, Sarsugadi, Talaichuruli; *Hindi* Ishormul; *Sans.* Ahigandha, Arkamula, Ishvara, Ishvari, Nakuleshtha, Nakuli, Sunanda, Rudrajata.

A very long, slender, twining, perennial herb with ridged, purplish green to ash green, glabrous stems; leaves simple, alternate, variable, 4—8.5 cm long, 1—4.5 cm broad, linear-lanceolate to oblong-ovate, truncate or subacute at base, acuminate, acute, entire but somewhat undulate, glabrous and dark green above, paler beneath, petioles 0.6—1.8 cm long; flowers irregular, bisexual in axillary corymbs, pedicels slender, 1 cm long and glabrous; bracts 2.2—2.5 mm long, 1.5 mm broad, ovate, acuminate, scantily hairy; perianth 3.2 cm long inflated into a globose base, 5 mm diameter, then bent at right angles and suddenly narrowed into a cylindrical tube, 1 cm long and expanded into a trumpet-shaped mouth, one side produced into an oval lip, 1.7 cm long, 0.8 cm broad, brownish purple with the base pilose and margin recurved, corolla-tube and mouth pilose inside, glabrous and greenish-white outside; stamens 6, filaments absent, anthers sessile placed in a circle round the style; ovary inferior, 6 mm long, 6-locular with numerous ovules, style short, 6-lobed, lobes short and pointed; fruit capsule pendulous, globose-oblong with a slender base dehiscing septically through placentas into 6 valves, remaining attached to summit; seeds flat, winged.

Flowers from September to January.

ILLUSTRATIONS. Rheede, Hort. Mal. 8: pl. 25; Wight, Ic. Pl. Ind. Orient. pl. 1858. 1852; Griffith, Ic. Pl. Asiat. pl. 529; Kirtikai and Basu, Indian Med. Pl. pl. 820 B. 1933; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs throughout the Western Peninsula in India and in Ceylon. In Ceylon, it is commonly found in the moist regions up to an altitude of 3000 ft. Jaffna, Matale, Hantane, etc.

Ceylon. *Thwaites* C. P. 2258; Northern Prov., between Jaffna and Kankasanturai, Feb. 1890, without collector's name; Central Prov., Peradeniya, Bot. Gard., cultivated, *Jaya-weera* 2317, July 1955; *Jaya-weera* 2590, Oct. 1957.

COMPOSITION. The roots of this plant contain the alkaloid aristolochine and isoaristolochic acid.

USES. The bitter root of this herb is used as a stimulant, tonic and emmenagogue and is used for treating intermittent fevers, diarrhoea, dropsy and other affections. The powdered root with honey is given for dropsy, leucoderma, tonsillitis and chronic dyspepsia. The fresh leaves ground with water are applied in acute and chronic rheumatism. The bruised roots are applied to bites of centipedes and scorpion stings. The plant is also used as an antidote for cobra poison. In Bombay, it is prescribed for bowel complaints in children.

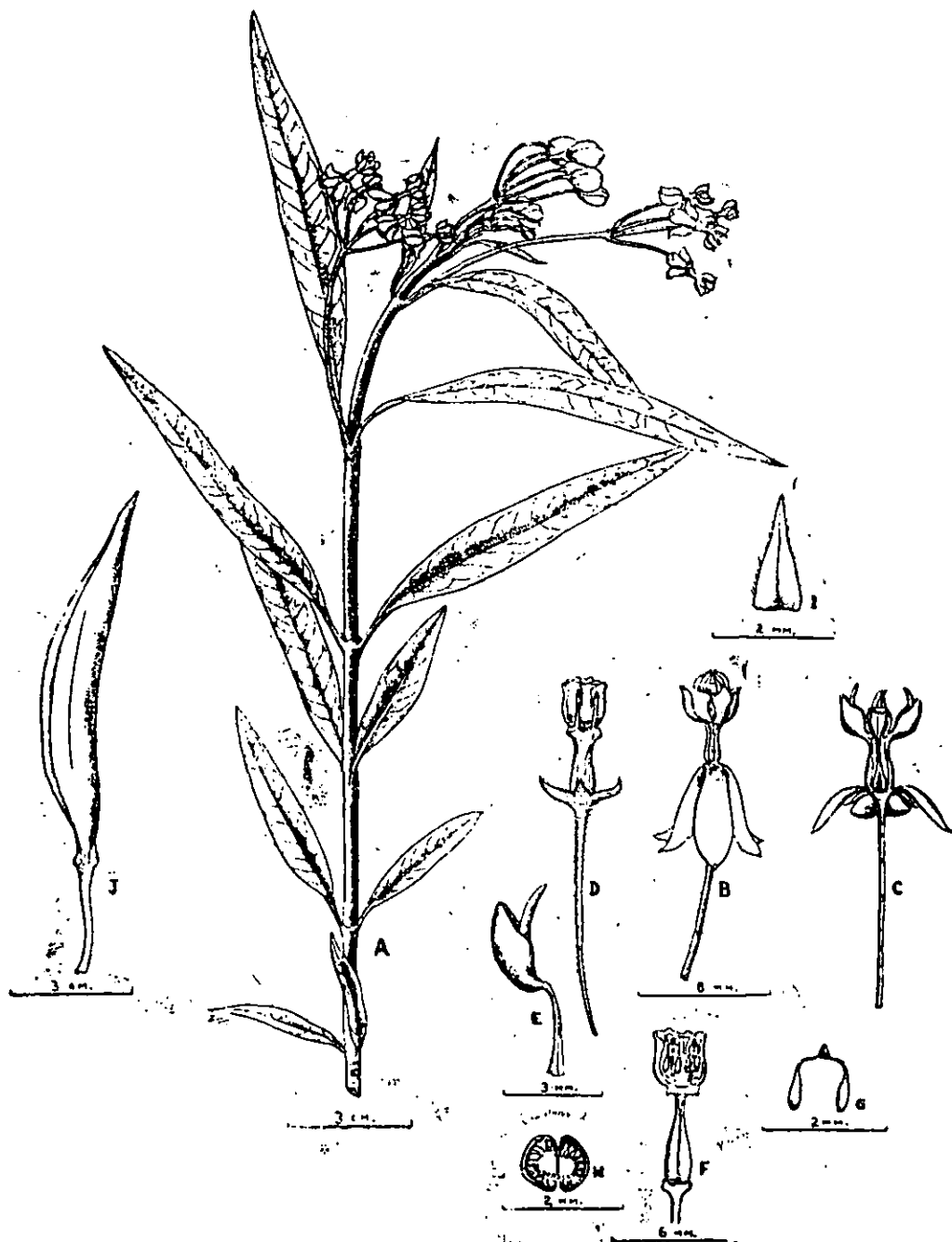


FIG. 72. *Asclepias curassavica*. A. branch with leaves and inflorescences. B. lateral view of a flower. C. longitudinal section of a flower showing the coronal processes, column and ovary. D. flower with the corolla and coronal processes removed. E. coronal process. F. ovary with the column. G. stamen. H. transverse section of ovary. I. bract. J. fruit.

12. ASCLEPIADACEAE

1. *Asclepias curassavica* Linn. Sp. Pl. 215. 1753. (Fig. 72).

Asclepias syriaca Blanco

Engl. West Indian Ipecacuanha. *Sinh.* Kankumbala. *Hindi* Kakatundi.

An erect undershrub, 0.9—1.2 m tall; leaves simple, opposite, decussate, confined mostly to the ends of branches, 5—10.5 cm long, 1.3—2 cm broad, lanceolate, narrowed at both ends, scantily hairy but densely on the margin, venation reticulate with midrib prominent on the lower surface; petioles 5—8 mm long, hairy and grooved along the upper surface; flowers regular, bisexual, orange-red with an orange-yellow corona, 1.3 cm diameter, in inter-axillary. 8—9 flowered umbels confined to the ends of branches; peduncles 2—3 cm long, stout, tomentose, pedicels 1.2 cm long and hairy; bracts 1.5—2 mm long, 0.4 mm broad, linear and hairy; sepals 5, free, 2.5 mm long, 1 mm broad, lanceolate, hairy outside and blunt at apex; petals 5, valvate, 8—8.5 mm long, 3.2—3.5 mm broad, oblong-lanceolate, reflexed in open flower; corona of 5 erect processes, adnate to the stipe of the staminal column; stamens 5, fused into a staminal column round the style, anthers with membranous inflexed tips, pollen masses solitary in each cell, pendulous, flattened, waxy; ovary superior, 1.5 mm long, ovate, 2-locular with 2 distinct styles, stigma depressed, 5-angled and fused with the anthers; fruit follicles solitary, erect, 5—7.5 cm long, 7.5—10 mm broad, tapering at both ends, pericarp thin; seeds ovoid, 5 mm long, dark brown with a coma, 3 cm long.

Flowers almost throughout the year.

ILLUSTRATIONS. Edward, *Bot. Reg. pl.* 81. : Kirtikar and Basu, *Indian Med. Pl. pl.*, 622 B. 1933.

DISTRIBUTION. This plant is a weed introduced from West Indies into the tropics. It flourishes in India, Ceylon, and throughout the Philippine Islands. In Ceylon, it is rather common in open waste places, particularly along the sea coast.

India. North Canara : *Talbot*, 1881, this species is found only on the banks of rivulets and streams in N. Canara, flowers at various times. *Pen. Ind. Orient., Herb., Wight* 1909, *Kew Distribution* 1966—7. **Ceylon.** Talawakelle, *Willis*, May 1906; Peradeniya, *Bot. Gard.* Dec. 1903 without collector's name; Ruanwella, *F. W. de Silva* 9832, July 1932, medicinally used for boils; Hommathawa, *J. M. Silva*, Feb. 1929; Kumbukin, *Alston*, March 1928. **Penang.** *Curtis* 344, Nov. 1885. **Indo-China.** Hue and vicinity, *Squires* 311, Jan.-May 1927. **China.** Kwantung: Hong-Kong, *Chun* 5086, Oct. 1927; *Tak* 57, Dec. 1927. **S. America.** Central Paraguay, *Morong* 47, New York Distribution 1888—1890; Lower Orinoco, *Rushby and Squires* 26, April 1886. **Mexico;** Jalisco, Boranca, *Palmer* 138, June 1886.

COMPOSITION. The leaves of this plant contain an alkaloid. The plant contains a glucocidal compound called asclepiadin and the roots contain curassavine which is identical in therapeutical value to digitalin. The roots also contain vincetoxin which closely resembles emetine in its physiological action.

USES. This plant is used as an emetic in the West Indies, Philippines and Guiana. In Central America, the whole plant including the roots, is considered to possess depurative properties and is used as a haemostatic. The root is a remedy for piles and gonorrhoea. The extracted juice of the leaves is used to expel intestinal worms. In Ghana, the powdered leaves and flowers are used for treating sores and wounds. The plant is also recommended for pulmonary tuberculosis (phthisis).

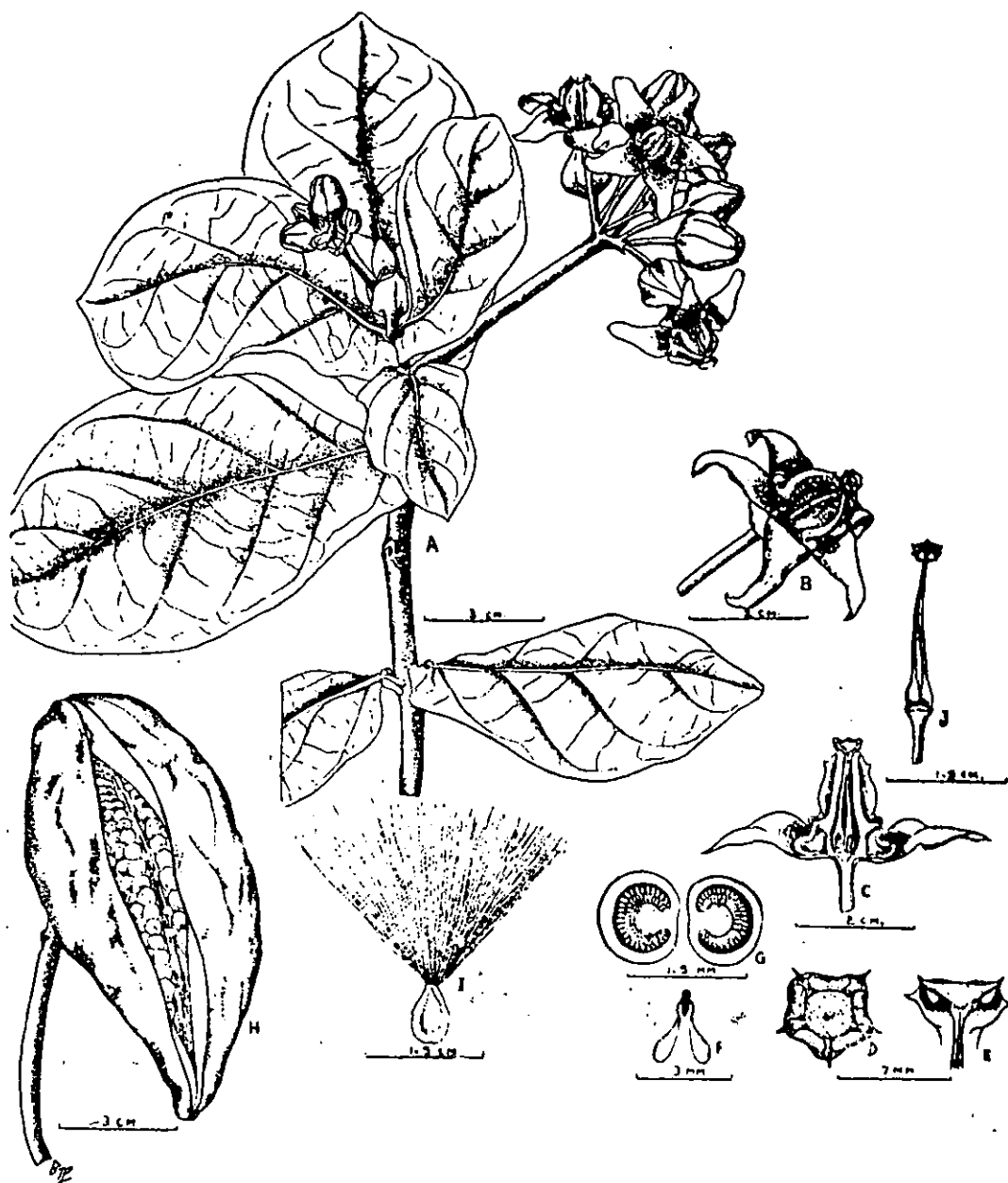


FIG. 73. *Calotropis gigantea*. A, branch with leaves and inflorescence. B, lateral view of a flower. C, longitudinal section of a flower showing the coronal processes and ovary. D, column, seen from top. E, longitudinal section of the column showing the stamens. F, stamen. G, transverse section of ovary. H, fruit showing seeds. I, seed with pappus. J, pistil showing the carpels, styles and the column.

2. *Calotropis gigantea* (Linn.) Ait., f. Hort. Kew ed. 2, 2: 78. 1811. (Fig. 73).*Asclepias gigantea* Linn.

Sinh. Elawara, Muduwara, Wara; *Tam.* Arkkam, Arukkam, Arulagam, Ahgaram, Alagar, Aruchunam, Errukalai, Erukkam, Erukkku, Manakkovi, Mandarasu, Mirugusayidagam, Nubam, Sadabadam, Sadabudam, Sevverukku, Siyam, Suriyam, Suvedagusuman, Udumbaram, Urkkovi, Vellerukku; *Hindi* Ag. Ak. Akan, Akond, Ark, Lalak, Lalmadar, Madar, Mudhar, Safedak. *Sans.* Aditya, Aharbandhava, Aharmani, Aharpati, Arka, Aryama, Asphota, Asphotaka, Bhanu, Bhaskara, Divakar, Ganarupa, Haridashva, Himarati, Jambhala, Kharjjughna, Kirtanuphala, Kshiradala, Kshirakandaka, Kshiranga, Kshiraparni, Mandara, Prabhakara, Pratapa, Puchhi, Ravi, Sadapyshpa, Sadasuma, Saptashva, Savita, Shitapushpaka, Shukaphala, Sunu, Suryavgha, Tulaphala, Ushnarashmi, Vasuka, Vibhakara, Vibhavasva, Vikarttana, Vikorana, Vikshira, Vivasvana, Vivaswana.

An erect, spreading shrub, reaching a height of about 3 m with a yellowish-white, furrowed bark and stout, cylindrical branches more or less covered with a very fine, adpressed, cottony pubescence, stems and leaves containing a milky latex; leaves simple, opposite, decussate, nearly sessile, large, 7—17 cm long, 6—11.5 cm broad, oval-oblong or slightly obovate-oblong, cordate at base, obtuse at apex, thick, glaucous, green, covered with a very fine, deciduous, cottony tomentum; flowers regular, bisexual, large on long, stout pedicels, 1.9—2.5 cm long, cymes bifurcate, irregularly subumbellate, peduncles stout, 7—10 cm long, arising from between leaves (not axillary) covered with tomentum; bracts small, 5 mm long, 2 mm broad, acuminate hairy on both surfaces, deciduous; sepals 5, free, imbricate, 4 mm long, 3 mm broad, ovate, acute, cottony; corolla rotate, 3.5—4.5 cm diameter, whitish-purple or white, petals 5, fused, valvate, lobes very deep, spreading and twisted, corolla-tube 9 mm long, somewhat flat, lobes 1.6 cm long, 1.0 cm broad, triangular-oblong, revolute at margin; coronal processes very large, erect, compressed, standing out as wide buttresses from the column with a large thick curved spur at the base; column very large, conspicuous; stamens 5, filaments completely connate, pollen masses one in each cell, pendulous; ovary superior, of two distinct carpels, 3 mm long, styles 2, together with the stigma 1.2 cm long, stigma large, flat on top, sharply 5-angled, star-shaped, 5 mm across; fruit follicles 8.5—10 cm long, 4—4.5 cm broad, somewhat inflated and cylindrical, tapering to the apex, thick, somewhat corrugated, splitting ventrally; seeds very numerous, ovate, compressed with long coma.

Flowers throughout the year.

ILLUSTRATIONS. Wight, *Ill. Ind. Bot.* pl. 155, pl. 156A; Griffith *lc. Pl. Asiat. pls.* 397, 398; Edward, *Bot. Reg.* pl. 58; Curtis, *Bot. Mag.* pl. 6862; Kirtikar and Basu, *Indian Med. Pl.* pl. 621 A, 1933; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs throughout India, Ceylon, Singapore, Malay Islands and S. China. In Ceylon, it is very commonly found often gregarious in waste ground and roadsides, abandoned chenas, etc., in the low-country.

India. Lahore, May 1845 without collector's name. **Ceylon.** *Thwaites C. P.* 1831; Sabaragamuwa Prov., Ratnapura, *John Singho* without date, flowers white; Uva Prov., Kurundu Oya, Lower Badulla Road, July 1890 without collector's name, flowers white; *Senaratne*; Sept. 1952 without locality, flowers white; Central Prov., Peradeniya, *Bot. Gard.*, *Jayaweera* 861, July 1952, cultivated. **Maldivé Islands.** *Hulule Gardiner* 78, 1899—1900.

COMPOSITION. The root bark of this plant contains a yellow bitter resin and two substances resembling alban and fluavil of Gutta-percha. The latex yields a bitter principle, calotropin, (which is identical with mundarin), proteinase and calosterol.

USES. The bark, root and the dried latex of this shrub are used in skin diseases, leprosy and secondary syphilis. The root bark is a good substitute for Ipecacuanha in the treatment of dysentery. It is also useful in the treatment of enlargement of abdominal viscera, intestinal worms, ascites, anasarca, etc. The pulverized root made into an ointment is used for treatment of ulcers. The milky juice is recommended for ringworm of the scalp, sinus troubles, anal fistula, piles, tooth-ache and with honey for apthae in the mouth. In Ceylon, the powdered root bark of old plants mixed with other ingredients is used in the treatment of jaundice, elephantiasis of the leg and scrotum and the extracted juice of the leaves in eczema and skin diseases. The root of the white flowered form is a specific in the treatment of snake bites.

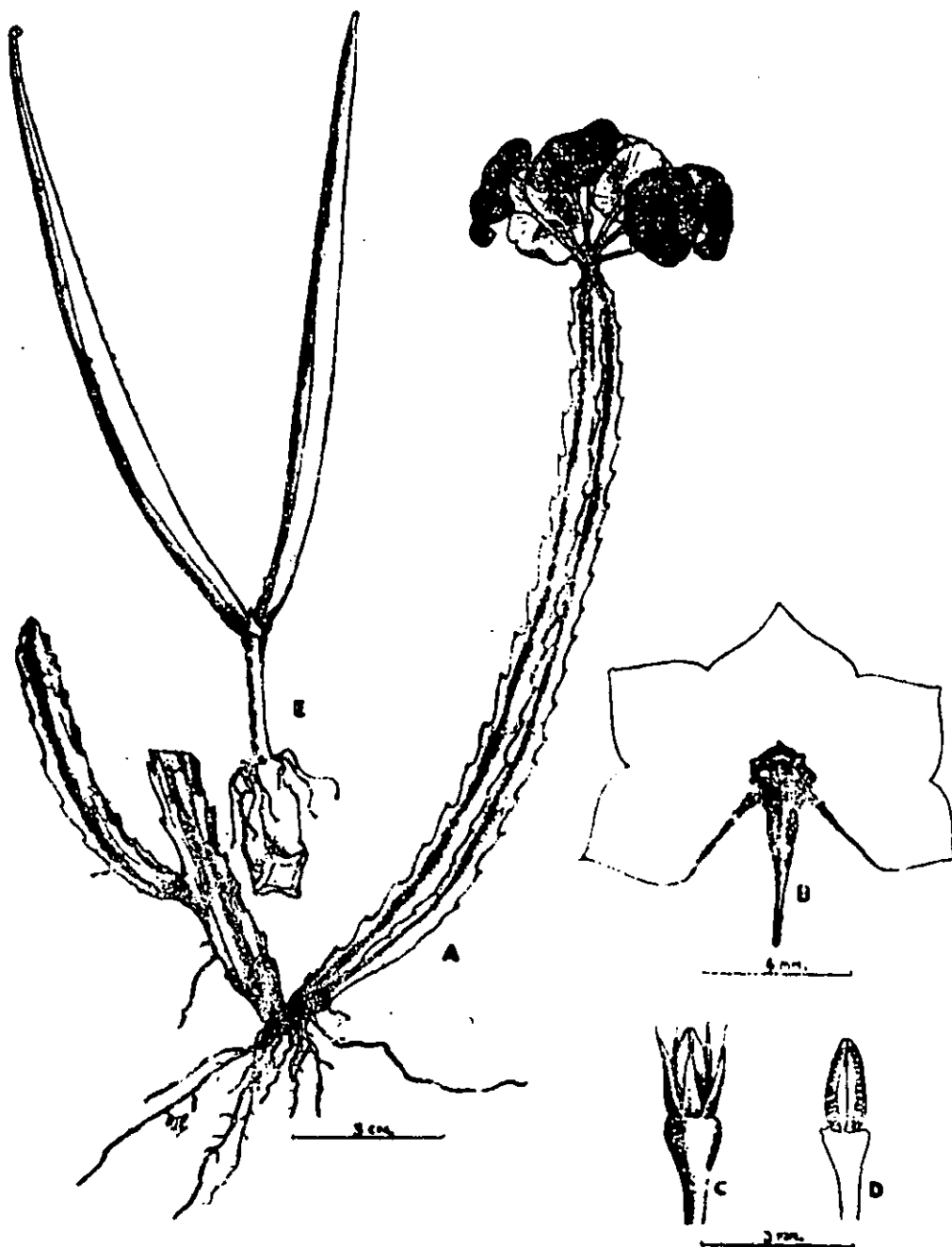


FIG. 74. *Caralluma umbellata*. A, plant with inflorescence. B, flower with corolla opened out. C, flower with the corolla and column removed showing the calyx and pistil. D, longitudinal section of ovary. E, fruit.

3. *Caralluma umbellata* Haw., Syn. Pl. Succ. 47. 1812. (Fig. 74).

Caralluma campanulata N.E. Br. — *Stapelia umbellata* Roxb. — *Boucerosia umbellata* W. and A. — *Boucerosia campanulata* Wight.

Sinh. Weluk.

A perennial herb with fleshy, succulent, erect stems, 15—30 cm long, about 1.2 cm diameter, smooth, sharply quadrangular, edges undulate-serrate; leaves minute at the serratures, oval, slightly ciliate, succulent, soon falling; flowers regular, bisexual, large, 6—12 in a sessile terminal umbel, peduncle short, glabrous, bracts small, linear; sepals 5, linear, acuminate, slightly ciliate; corolla deep red-purple, rotate, star-like, flat, lobes 5, shallow, broadly triangular, surface densely velvety; column depressed, coronal processes 10, falcate, closely folded over the anther; stamens 5, adnate, short, pollen-masses one in each cell; ovary superior, of 2 distinct carpels, styles 2, stigma 1, united with the stamens, 5-angled; fruit follicles long, linear, 10—11 cm long, glabrous, divaricate; seeds flattened, winged, comose.

Flowers during January and June.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient. 4: pl. 1287. 1848; Curtis, Bot. Mag. 119: pl. 7274. 1893.

DISTRIBUTION. Rare endemic species found growing on rocks in the intermediate regions. Kurunegala, Dambulla, etc.

Ceylon. North Western Prov., Kurunegala, *Thwaites C. P.* 2861, June 1953; *Herb. Peradeniya*, Aug. 1883; Thoragasyaya, *J. M. Silva*. Jan. 1928. Central Prov., Peradeniya, Gard., cultivated, *Jayaweera* 1436, Aug. 1955.

USES. A poultice prepared by grinding the plant and boiling it with coconut milk is applied to draw out broken pieces of thorns or spikes from the body. It is also used as an ingredient for the preparation of medicinal oils used for treating dislocation of bones.

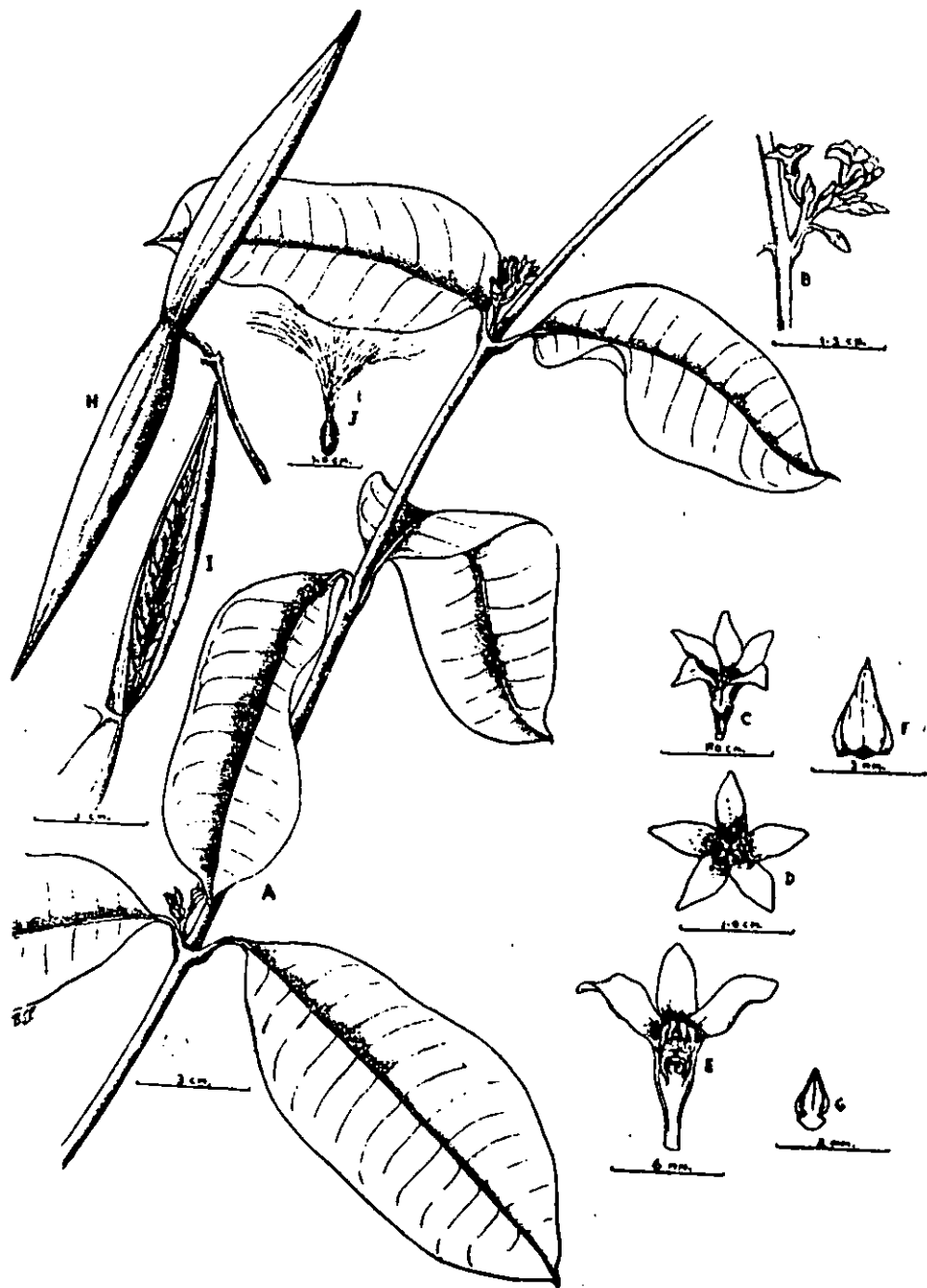


FIG. 75. *Cryptolepis buchananii*. A, branch with leaves and axillary inflorescences. B, cymose inflorescence. C, lateral view of a flower; D, front view of a flower. E, longitudinal section of a flower. F, bract. G, stamen. H, fruit follicles. I, dehiscent follicle. J, seed.

4. *Cryptolepis buchananii* Roem. and Schult., Syst. 4 : 409. 1819. (Fig. 75).

Cryptolepis reticulata Wall. — *Nerium reticulatum* Roxb. — *Echites reticulata* Roth. — *Echites cuspidata* Heyne.

Sinh. Welrukkattana Hind. Dudhi, Karanta.

A large, twining, shrubby climber with glabrous, cylindrical branches dilated at nodes, older branches lenticelled ; leaves simple, opposite, exstipulate, 6.5—12 cm long, 3—6 cm broad, oval-oblong, subacute at base, very suddenly narrowed into a short, mucronate apex, quite glabrous, dark green above, paler beneath, entire with numerous, fine, horizontal, parallel, lateral veins united into an intra-marginal vein ; petioles 0.7—1.5 cm long and stout ; flowers small, greenish-yellow, 1—1.4 cm across on glabrous pedicels about 4 mm long, arranged in short, paniculate, axillary cymes, about 1.5 cm long ; bracts small, 3 mm long, 2 mm broad, ovate, mucronate with scarious margins, buds pointed, contorted ; calyx glabrous, segments 5, free, imbricate, 2 mm long, 1.5 mm broad, oval, subacute with scabrid margins ; corolla fused, tube short about 2 mm long, with 5, fleshy, spatulate scales above the middle, lobes 5, linear-oblong, 5—6 mm long, 3 mm broad, convolute and contorted, rounded at apex ; stamens 5, inserted at the base of the corolla-tube, filaments short and broad, very slightly connate at base, anthers small, tips acuminate, connivent above the stigma ; ovary superior, of 2 distinct carpels, styles 2, very short, stigma flat united with the anthers ; fruit-follicles 2, divaricate, 7.5—8.5 cm long, terete, tapering towards a blunt apex, somewhat compressed, glabrous ; seeds brownish-black, 6 mm long, 2 mm broad, flat, compressed, ovate with a pappus or coma, 3.5 cm long at the narrow end.

Flowers in March and May to September.

ILLUSTRATIONS. Rheede, Hort. Mal. 9 : pl. 11. 1689 ; Falconer, Trans. Linn. Soc. 19 : pl. 5 ; Wight, Ic. Pl. Ind. Orient. pl. 494. 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs throughout India extending eastwards to Burma and China and southwards to Ceylon. In Ceylon, it is rather common in the low-country up to 3000 ft. altitude.

India. Behar, *J. D. Hooker*, 1000ft. elevation ; Courtallam, *Arnott*, April 1835, Herb. Wight Prop. Assam. *Jenkins* without locality and date of collection. Ceylon. *Thwaites* C. P. 2548 ; Central Prov., Peradeniya, Bot. Gard., *Jayaweera* 872, March 1952, cultivated ; Uva Prov., Koslanda, *J. M. Silva*, March 1927 ; Ella Pass, Sept. 1890, without name of collector.

USES. This plant is used to cure rickets in children. Combined with other ingredients, it is given to women to promote the secretion of milk.

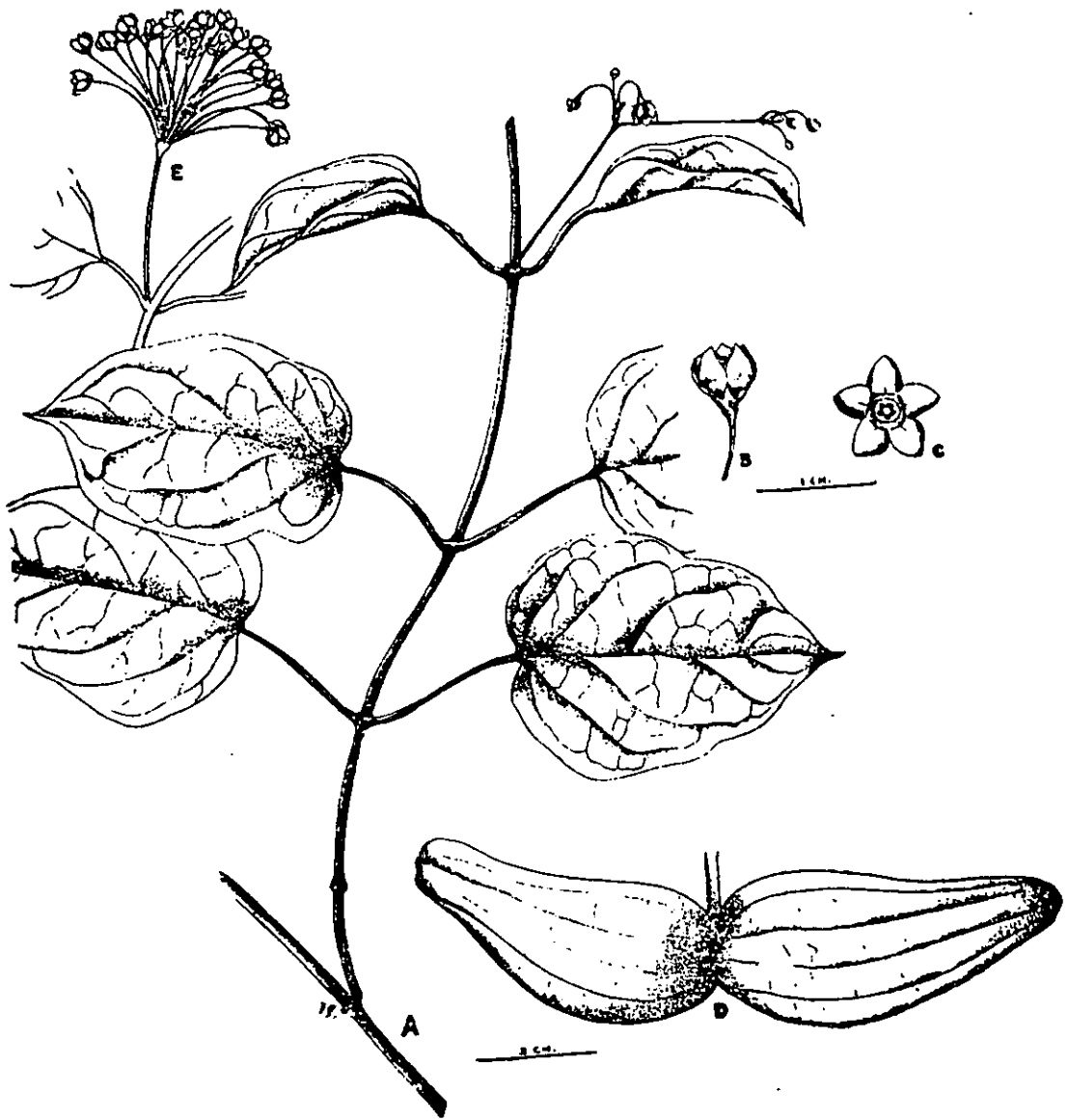


FIG. 76. *Dregea volubilis*. A, branch with leaves and inflorescence. B, lateral view of flower. C, dorsal view of flower D, fruit follicles. E, inflorescence.

5. *Dregea volubilis* (Linn. f.) Hook. f., Fl. Brit. India 4 : 46. 1883. (Fig. 76).

Hoya viridiflora Br. — *Asclepias volubilis* Linn. f. — *Apocynum tiliacifolium* Lamk. — *Wattakaka viridiflora* Hassk. — *Marsdenia volubilis* T. Cooke — *Dregea viridiflora* F. — Vill.

Sinh. Kiri-anguna, Titta-anguna : *Tam.* Kamal, Kodippalai, Kudasappalai, Kurinja, Kurinjakkirai, Palaikkodi, Singittam, Sivandi, Vanadittam ; *Hindi* Nakchhikni ; *Sans.* Hemajivanti, Hemakshiri, Hemalata, Hemapurna, Hemavalli, Hemavati, Hemavha, Himashraya, Madhumalati, Saumya, Sujivanti, Sumangala, Suparnika, Svarnajiva, Svarnajivantika, Svarnalata, Svarnaparna, Trinagranthi.

A very large, twining shrub with long, glabrous branches ; leaves simple, opposite, 7.5—11.2 cm long, 3.5—6.5 cm broad, broadly ovate, rounded or subcordate at base, suddenly acuminate, acute, paler beneath ; petioles 1.5—3.5 cm long ; flowers numerous, regular, bisexual, green or yellowish green, sweet scented, in lateral, drooping, umbellate cymes, peduncles arising from between the petioles, 2.5—5 cm long, slender, puberulous ; pedicels very slender, 6—25 mm long ; sepals 5, free imbricate, lanceolate, acute, glabrous ; petals 5, fused, rotate, contorted, lobes 5 mm long, broadly oval, obtuse, veined, overlapping to the right ; corona-lobes large, fleshy, adnate to the upper part of the column with a fleshy tooth projecting inwards over the anthers ; anther tips membranous, broadly ovate-oblong, obtuse ; pollen masses oblong, attached to the pollen carriers by very short caudicles ; ovary superior, of two distinct carpels, enclosed in the staminal tube with numerous ovules, styles 2, stigma 1, united with the anthers and 5-angled ; fruit follicles 7.5—10 cm long, slightly tapering to a blunt point, cylindrical, shallowly grooved, glabrous and dull yellow.

Flowers during March and April.

ILLUSTRATION. Wight, Ic. Pl. Ind. Orient. 2. : pl. 586. 1840—1843 ; Kirtikar and Basu, Indian Med. Plants, pl. 629 A. 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs in Bengal, Assam, Deccan, Madras and from Concan southwards in India, Ceylon, Java and Philippine Islands. It is rather common in Ceylon upto about 3000 feet altitude.

India. Maisor and Carnatic, *G. Thomson*. Pen. Ind. Or., *Herb. Wight* 1922, Kew Distribution 1866—7. East India Co., *Herb. Falconer*, Kew Distribution 1865. Ceylon. Northern Prov., Jaffna, *Walker*, Dec. 1894. Central Prov., Hantane, *Gardner* 564 (BM. K) ; Hantane, *Herb. Peradeniya*, April 1885. Uva Prov., Namunukula, *Willis*, April 1907. Locality unknown : *Thwaites* C. P. 6384 (BM) Burma. Upper Burma. *Huk*, Oct. 1890.

COMPOSITION. The plant and seeds contain an active principle.

USES. The roots and young stalks of this plant are considered to have emetic and expectorant properties. The leaves are used, ground into a paste, as an application on boils and abscesses.

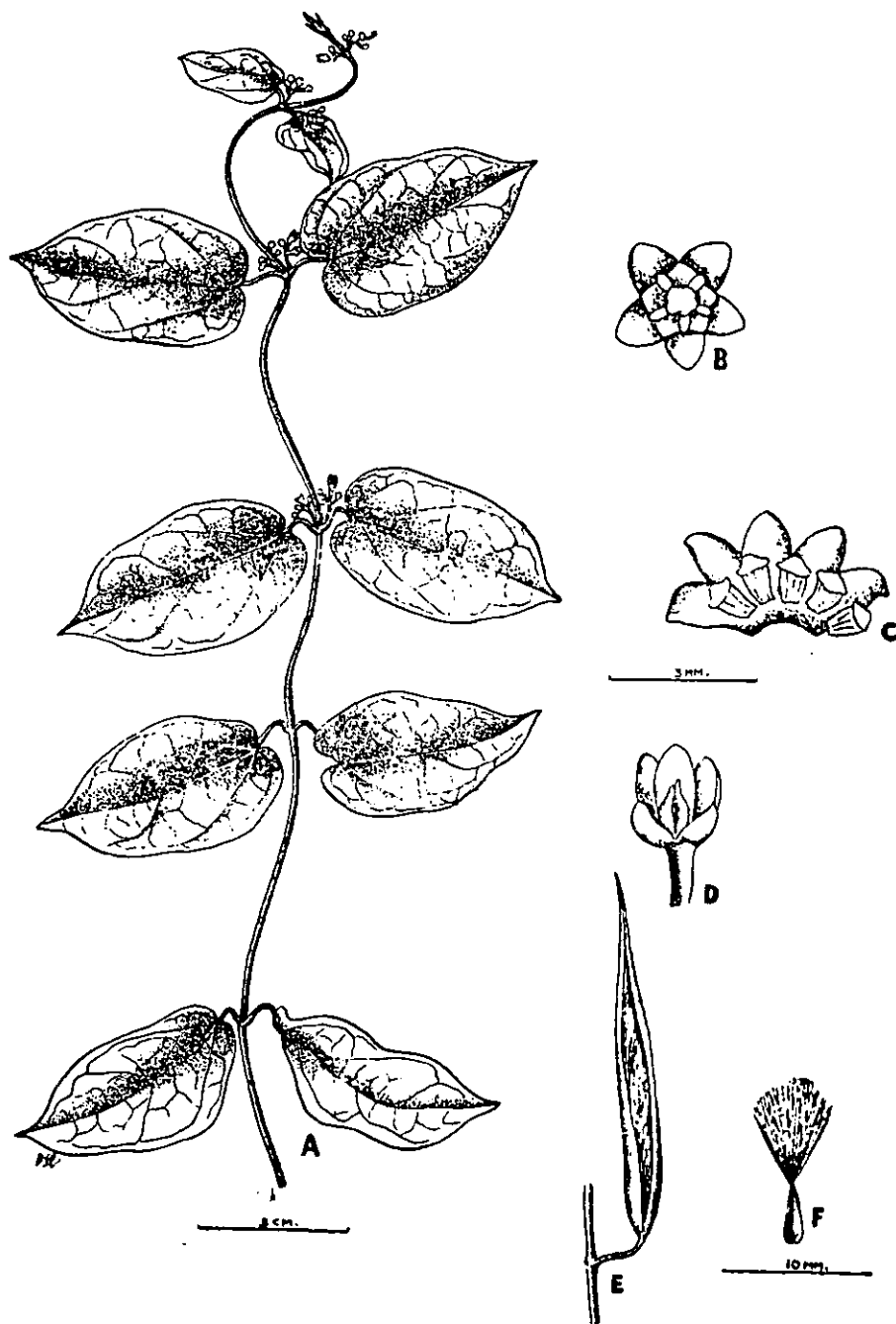


FIG. 77. *Gymnema sylvestre*. A, branch showing leaves and axillary cymes. B, dorsal view of flower. C, corolla spread out showing the corona. D, flower with petals removed showing the carpels. E, fruit. F, seed.

6. *Gymnema sylvestre* (Retz.) R. Br. ex Schult. Syst. Veg. 6 : 57. 1820 ; (Fig. 77).
Gymnema melicida Edgew. — *Periploca sylvestris* Retz. — *Asclepias geminata* Roxb. — *Gymnema geminatum* R. Br.

Engl. Small Indian Ipecacuanha ; *Sinh.* Bin-nuga, Masbedde, Muva-kiri-vel ; *Tam.* Adigam, Amudupushpam, Ayagam, Kogilam, Shagasharam, Shirukurinja, Sirukurinja ; *Hindi* Chhotadudhilata, Gurmar, Medhashingi, Merasingi, Meshasingi ; *Sans.* Ajaballi, Ajaghandini, Ajashringi, Ajashringika, Akshibheshaja, Anyada, Avartini, Bahalchakshu, Bishani, Bisharni, Chakrashreni, Chakshu, Chakshrbahala, Chakshushya, Grihadruma, Karnika, Kshinavartta, Maurvi, Medashringi, Medhashingi, Medhashringi, Meghaballi, Mendhashingi, Mesharingi, Meshashringi, Meshashringi, Meshavalli, Meshavishanika, Nandivruksha, Netraushadhi, Putrashringi, Sarpadanshtrika, Sarpadarushtrika, Tiktadughdha, Vartika, Vishani, Vishanika, Vrikshikali.

A large, woody, much-branched, twining perennial, climbing over the tops of high trees ; young stems and branches cylindrical, slender, softly and shortly hairy ; leaves simple, opposite, rather small, 3—5 cm long, 1.3—3.4 cm broad, ovate, rounded at base, shortly acuminate, more or less pubescent on both sides, especially on veins beneath, petioles 0.6 cm long and hairy ; flowers small, regular, bisexual, on rather long, slender, hairy pedicels grouped in nearly sessile cymes, peduncle densely pubescent shorter than petioles arising from between them ; bracts minute, hairy ciliate ; sepals 5, almost separate, hairy ; petals 5, fused into an urceolate yellow corolla about 4 mm in diameter, lobes about as long as the tube, acute, recurved, slightly contorted, glabrous ; corona of 5 processes inserted on the corolla-tube, alternate with its lobes, fleshy, blunt, produced downwards as double ridges in the tube ; column small ; stamens 5, connate, anthers with membranous tips, pollen masses one in each chamber, erect, pedicellate, not compressed, no staminal corona ; ovary superior, of two distinct carpels, stigma ovoid and prominent ; fruit-follicles small, 5.5—7 cm long, one usually suppressed, slender, tapering, smooth, terete ; seeds comose.

Flowers from November to February and in June.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient. 2 : pl. 349, 1840—1843 ; Kirtikar and Basu. Indian Med. Pl., pl. 626. 1933.

DISTRIBUTION. Occurs in South India, Ceylon and in tropical Africa. In Ceylon, it is rather common in the low-country especially in the dry and intermediate regions.

India. N. Canara, *Talbot*, July 1883. Maisor and Carnatic : *G. Thomson*. Malabar, Concan, etc. *Stocks, Law, etc.* Pen. Ind. Or. *Herb. Wight* 1919, Kew Distribution 1866—67. **Ceylon.** North Central Prov., Anuradhapura, *Herb. Peradeniya*, Dec. 1881. Uva Prov., Uma Oya, Bolagandewela, *J. M. Silva* 249, Dec. 1927 ; Ekiriyankumbura, *Herb. Peradeniya*, Jan. 1888 ; Wellawaya, *Alston A.* 32, Jan. 1928. Locality unknown : *Thwaites C. P.* 1844 (K) ; *Walker* 1470 (K).

COMPOSITION. The leaves and fruits of this plant contain an alkaloid. The leaves contain gymnemin, a resin, hentriacontane, pentatriacontane, tartaric acid and anthraquinone. Also the plant contains 1—quercitol.

USES. The fresh leaves of this climber reduces blood sugar acting indirectly through the stimulation of insulin secretion by the pancreas. They also stimulate the circulatory system and increase urine secretion. In West Africa, India and Australia the root is used as a remedy for snake-bite. The root also contains emetic and expectorant properties. The rootbark is used for treating diseases of the eye.

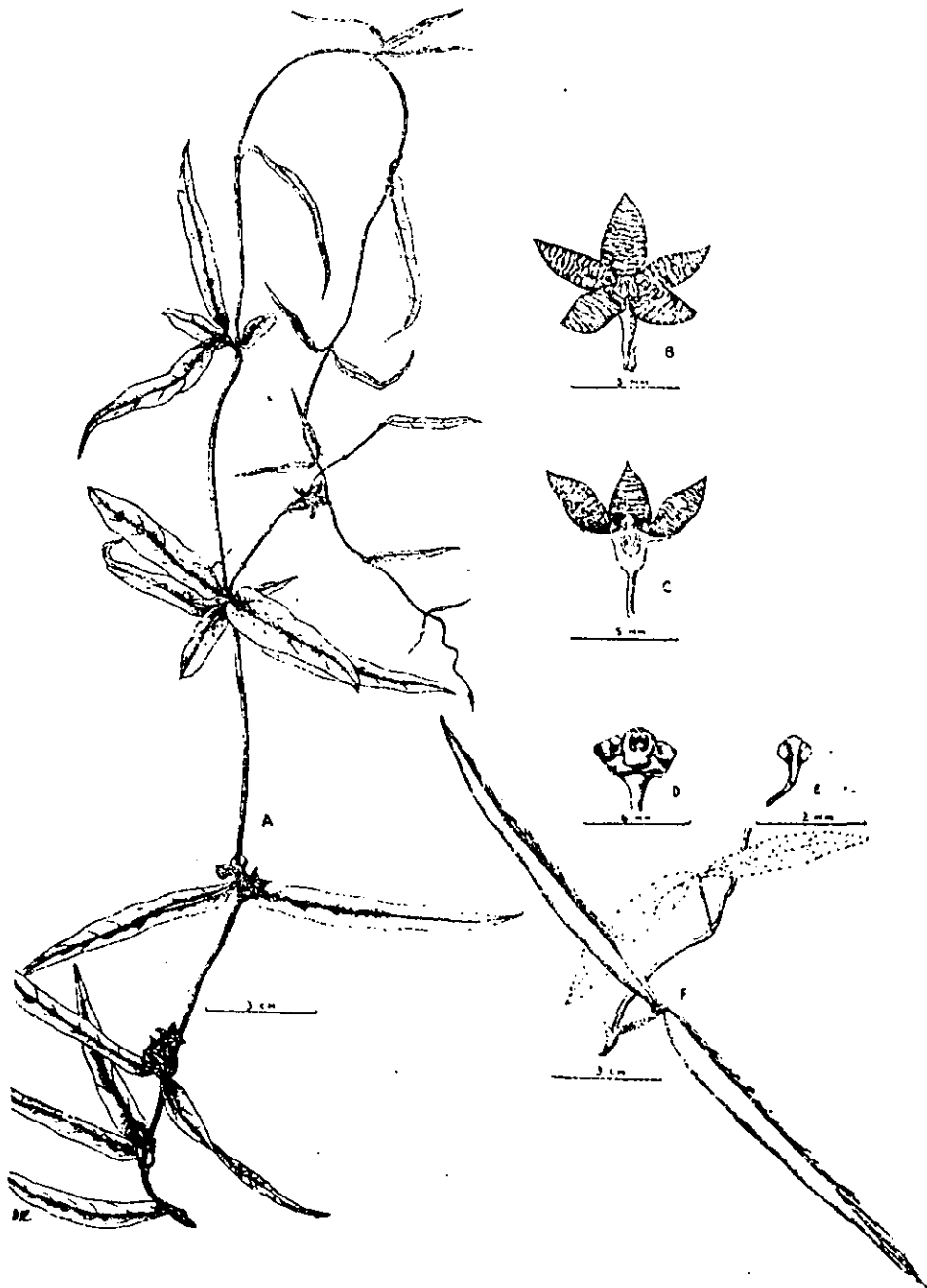


FIG. 78. *Hemidesmus indicus*. A, branch with leaves and flowers. B, front view of flower. C, longitudinal section of flower. D, lateral view of the column. E, stamen. F, fruit of two divaricated carpels.

7. *Hemidesmus indicus* (L) R. Br. in Mem. Wern. Soc. 1 : 56. 1809. (Fig. 78).

Periploca indica Linn. — *Periploca emetica* Retz. — *Asclepias pseudo-sarsa* Roxb. — *Hemidesmus wallichii* Miq.

Engl. Indian Sarsaparilla; *Sinh.* Iramusu; *Tam.* Arakkam, Aritinviyachi, Aruninam, Kananusari, Kiruttinavalli, Nannari, Pargodi, Sasbam, Saribam, Sirunannari, Urgadam; *Hindi* Hindisalsa, Janglichanbelli, Magrabu; *Sans.* Ananta, Anantamula, Asphota, Bhadra, Bhadravalli, Bhadravallika, Dhavalashariva, Gopa, Gopakanya, Gopavadhu, Gopavalli, Gopi, Karala, Kashthashariva, Krishodari, Lata, Nagajivha, Pratanika, Rakitasariva, Sariva, Sharada, Shariva, Shyama, Sugandha, Sugandhi, Utpalashariva.

Perennial, semi-shrubby twiner with a woody rootstock and numerous, very long, prostrate or ascending, whip-like stems, slightly twining, cylindrical, thickened at nodes, pubescent and purplish when young, later becoming corky and lenticelled with a milky latex in the older stems, internodes 1.5—7.2 cm long; leaves simple, opposite, exstipulate, very variable from oblong-oval to linear, 3.7—6.5 cm long, 3.5—8 mm broad, acute or rounded at base, subacute or retuse at apex, apiculate, slightly pubescent on upper surface and on veins below, dark green on the upper surface with a white streak along the midrib, paler beneath, margin somewhat revolute, veins reticulate, pellucid; petioles very short, 1—2 mm long, purplish and hairy when young; flowers regular, bisexual on very short pedicels crowded in axillary cymes; bracts numerous, imbricated, 2 mm long, 1 mm broad, ovate, acute, pubescent; calyx, segments 5, free, imbricate, ovate, 2 mm long, 1 mm broad, acute, slightly ciliate; corolla 1.2 cm diameter, rotate, thick, dark purple, very deeply 5-lobed, lobes ovate, 5 mm long, 3 mm broad, acute, wrinkled within, green outside; stamens 5, inserted at the base of the corolla in front of very prominent ridges arising between corolla lobes, filaments quite distinct, 0.7 mm long, slender, anthers very small, connective prolonged covering over the stigma, pollen masses granular, 2 in each cell, free from the stigma; ovary superior, about 1 mm long, of two distinct carpels, stigma round, flat on top with 5 depressions at the edge, dark purple with a yellowish centre, 1 mm diameter, corpuscles with hooded appendages and numerous ovules; fruit of 2, distinct, divaricated follicles, linear, falcate, terete, smooth, 10—12.5 cm long, dehiscing along the ventral suture; seeds oblong with long coma.

Flowers in February and March.

ILLUSTRATIONS. Rheede, Hort. Mal. 10 : pl. 34; Burman, Thes. Zeyl. pl. 83, f. 1. 1737; Wight, Ic. Pl. Ind. Orient. 2 : pl. 594. 1840—1843; Delessert, Ic. Selv. 5 : pl. 55; Bentley and Trimen, Med. Pl., pl. 174. 1880; Kirtikar and Basu, Indian Med. Pl., pl. 618 A. 1933; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs in the northern parts of India extending eastwards as far as Bengal and Sikkim and southwards to Travancore and Ceylon. In Ceylon it is very common in the low-country up to 2,500 feet or higher, in grassy places.

India. Chota Nagpore, Parasnath, *T. Thomson*, Nov. 1858; Calcutta *Prair*, Nov. 1900, cultivated. Malabar, Concan, etc. *Stocks, Law*, etc. Ceylon. Northern Prov., Jaffna, Pallaraynkaddu, Feb. 1890 without collector's name; *Thwaites C. P.* 1864; *Thwaites C. P.* 183. Central Prov., Peradeniya, Bot. Gard. cultivated, *Jayaweera* 841, Dec. 1951; *Jayaweera* 2599, May 1957.

COMPOSITION. The root of this plant contains a volatile oil and hemidesmine.

USES. The root is a substitute for sarsaparilla. It is believed to be a demulcent, alterative, diaphoretic, diuretic and tonic. It is used in treating loss of appetite, fever, skin diseases, syphilis, leucorrhoea and inflammation of urinary passages. A liquid extract of it is given as a tonic for skin diseases and as an alterative in chronic rheumatism. In Ceylon, the root is used along with other ingredients in the treatment of fever, carbuncles, fistula, urinary diseases, blood and skin diseases, blood tumours, syphilis and acute rheumatism. A decoction of the root bark with milk and sugar is a good alterative tonic for cough and diarrhoea in children and for cases of gravel and strangury. The plant is used in the preparation of snake-bite cures.

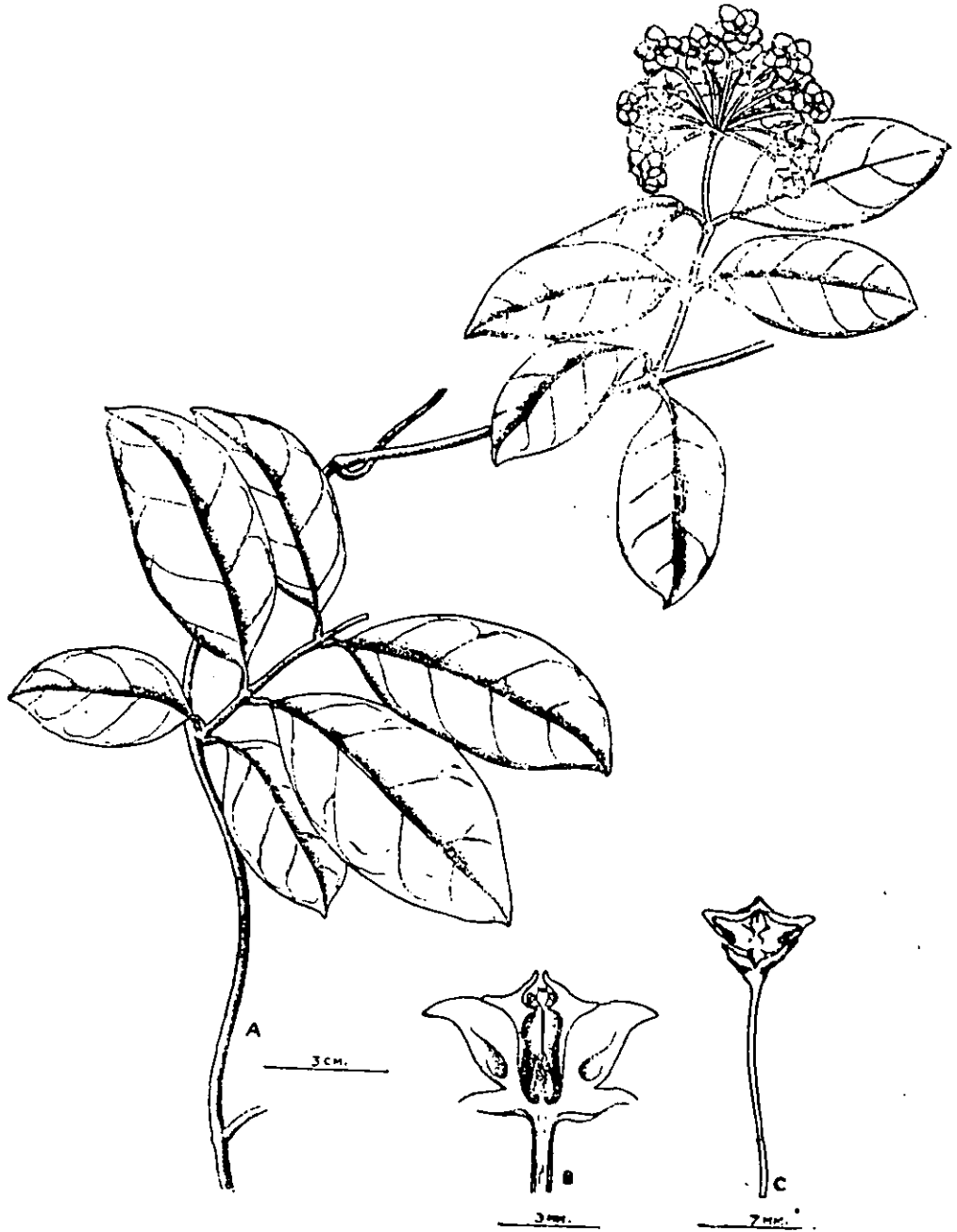


FIG. 79. *Hoya ovalifolia*. A, branch with leaves and an umbel of flowers. B, longitudinal section of a flower showing the pistil and the column. C, flower from side with the corolla removed.

8. *Hoya ovalifolia* Wight & Arn. in Wight, Contrib. Bot. India, 37. 1834. (Fig. 79).

Sinh. Gonuke

A twining shrub with rather stout, glabrous stems thickened at the nodes ; leaves 4—7.5 cm long, 2.5—3.5 cm broad, oval, slightly tapering or rounded at the base, shortly acuminate, acute, thick, glabrous, paler beneath, petioles 2—4 mm long and stout ; flowers regular, bisexual in axillary umbels, pedicels 1.5—1.7 cm long, glabrous, peduncle stout, stiff and as long as leaves ; calyx segments 5, small, acute, glabrous ; corolla rotate, fleshy, about 8 mm across, glabrous, lobes 5, broad, subacute, valvate, column large and prominent, coronal processes spreading stellately, ovate, pointed, thick, horny, shortly spurred at the base and adnate to the stamens ; stamens 5, connate, anther membranous, covering over the top of the stigma ; fruit not seen.

Flowers during March.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient. 3 : pl. 847. 1843—1845 ; Herb. Peradeniya, drawing.

DISTRIBUTION. This shrub grows in the moist forests of South India and Ceylon. It is very rare in Ceylon and is confined to the low country forests of the Kitulgala and Ambagamuwa districts.

Ceylon. Kitulgala, *Thwaites* C. P. 2670 ; North Central Prov., Ritigala, *Willis*, March 1905 ; Ellaboda, Kande, *F. Lewis & J. M. Silva*, March 1919. Central Prov., Ma Oya, *Worthington* 6574. Southern Prov., Galle, *Walker* 1714 (K).

USES. This plant is used as a specific in the treatment of fractures. Since the genuine plant is not readily available, other species of *Hoya* are used as substitutes.

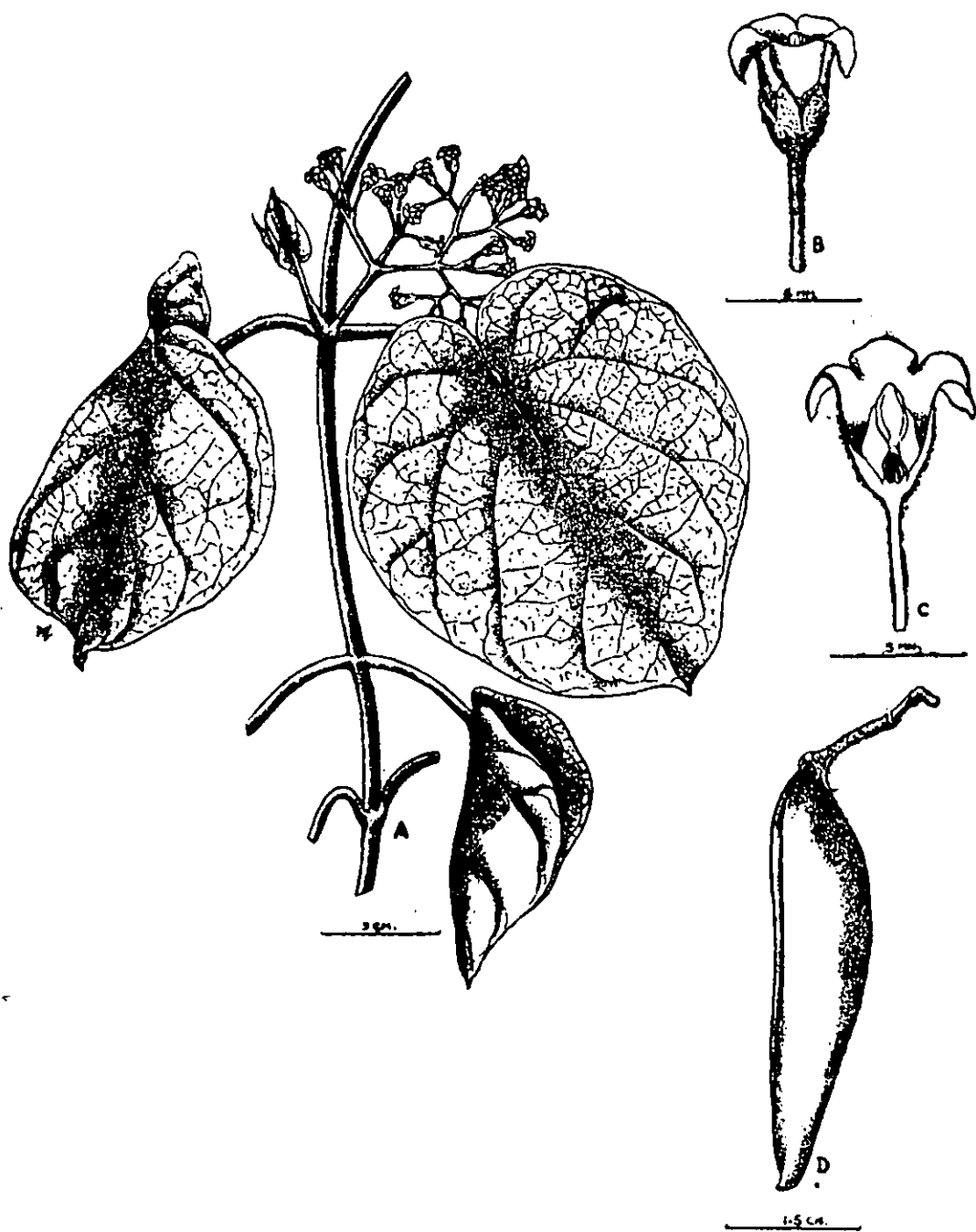


FIG. 80. *Marsdenia tenacissima*. A, branch with leaves and flowers. B, side view of flower. C, longitudinal section of flower. D, fruit.

9. *Marsdenia tenacissima* (Roxb.) Moon, Cat. 21. 1824. (Fig. 80).

Asclepias tenacissima Roxb. — *Asclepias tomentosa* Herb. Madr. — *Gymnema tenacissima* Spreng.

Sinh. Muruva-dul ; *Sans.* Tejowapi.

A large, shrubby, twining plant with very stout, bluntly angular, densely velvety and hairy branches ; leaves simple very large, opposite, 15—17.5 cm long and nearly as wide, deeply cordate with rounded lobes at base, shortly acuminate, acute, softly velvety on both sides or nearly glabrous above ; petioles 7.5 cm long, softly hairy ; flowers greenish yellow, regular, bisexual, numerous in large, panicle, axillary cymes, pedicels long and hairy ; sepals 5 almost distinct, oblong, hairy ; petals 5, fused into a sub-campanulate corolla, velvety outside, lobes as long as the tube, oblong, obtuse spreading, contorted ; stamens 5, connate, anthers with inflexed tips, pollen masses one in each chamber, stalked, oblong, erect ; corona staminal, of 5, flat, erect scales, adnate to the back of the anthers ; ovary superior, of 2 distinct carpels, stigma large, convex ; fruit-follicles 15 cm long, tapering to a point, smooth, fusiform ; seeds with long coma.

Flowers during June and July.

ILLUSTRATIONS. Roxburgh, Pl. Corom. 3 : pl. 240. 1819 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Found in India, Ceylon, Burma and Timor. It is rare in Ceylon and is confined to the dry and intermediate country. Kurunegala, Uma Oya, Ekiriyankumbura, etc.

India. Chittagong, *Herb. Wight*. **Ceylon.** Locality unknown : *Thwaites C. P.* 2860 (BM,K) ; *J. M. Silva* ; *Walker 57 B* ; North Western Prov., Kurunegala, *Herb. Peradeniya*. Uva Prov., Ekiriyankumbura, *Herb. Peradeniya*.

USES. The stem of this plant yields a very strong, silky fibre and a milky juice containing caoutchouc. A decoction of the leaves is given for flatulence and as a remedy for gonorrhoea.

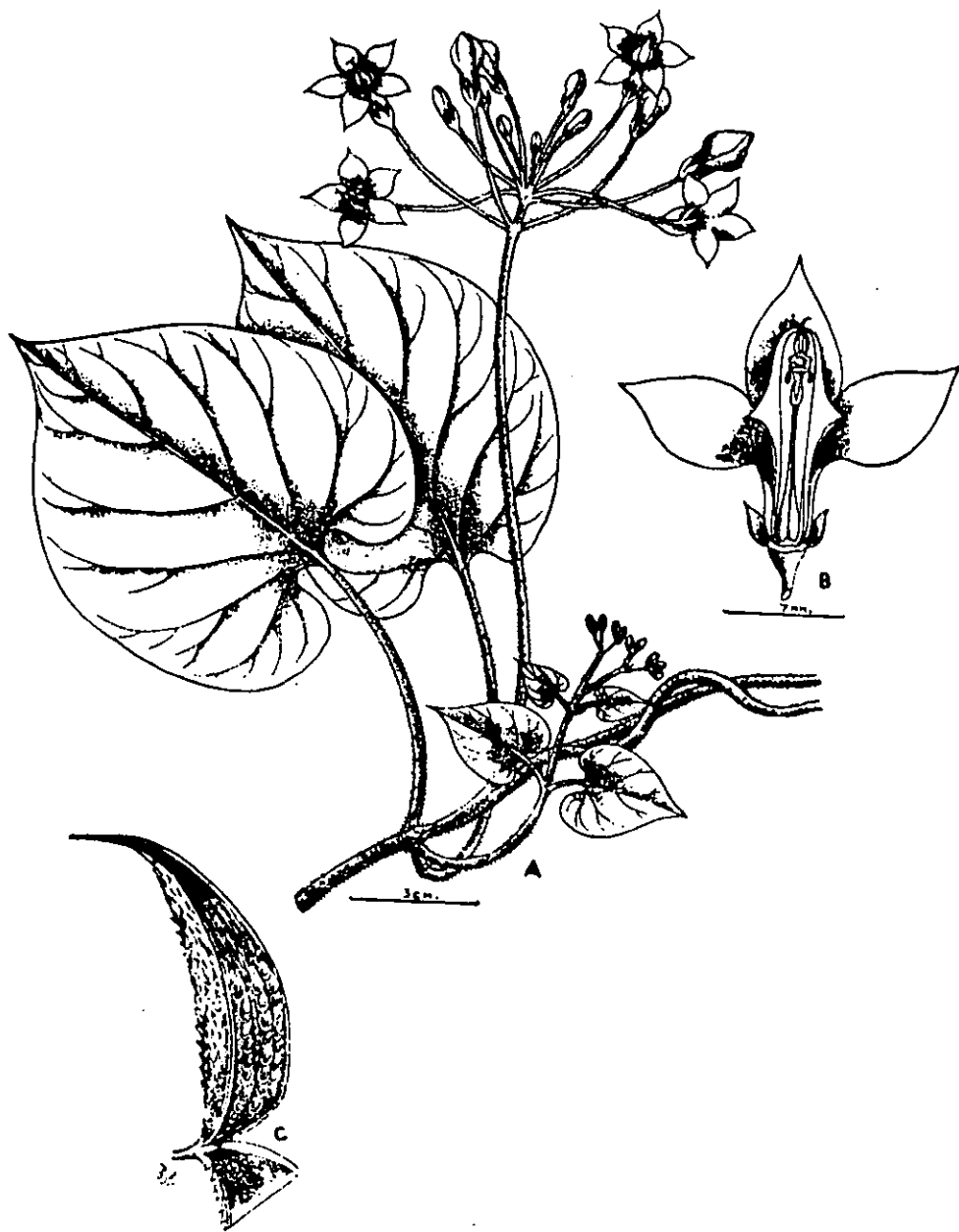


FIG. 81. *Pergularia daemia*. A, branch with leaves and inflorescence. B, longitudinal section of flower. C, fruit.

10. *Pergularia daemia* (Forsk.). Chiov., Result. Sc. Miss. Stefan-Paoli Somal. Ital. 1 : 115. 1916. (Fig. 81).

Pergularia extensa N. E. Br.—*Daemia extensa* R. Br.—*Daemia cordifolia* K. Sohum—*Cynanchum extensum* Jacq. — *Cynanchum cordifolium* Retz. — *Cynanchum echinatum* Thunb. — *Asclepias echinata* Roxb. — *Asclepias daemia* Forsk. — *Raphistemna ciliatum* Hook. f. — *Gomphocarpus volubilis* Moon.

Sinh. Meda-hangu ; *Tam.* Achanimuli, Anjanimuli, Kudagaram, Nandamani, Sidavaram, Siriyattini, Siyachini, Uttamadalai, Uttamagani, Uttamakam, Uttamani, Velipparrutti ; *Hindi* Jutuk, Sadowani, Utran ; *Sans.* Chandaladugdika, Uttaravarnui, Vishanika, Yugaphala, Yugmaphala, Yugmaphalika.

A perennial, twining herb, foetid when bruised and with milky juice ; stems more or less hispid with short, spreading hair and minute prickles ; leaves simple, opposite, thin, 5—10 cm long and nearly as broad, deeply cordate at base with rounded lobes, acute, slightly hairy on both sides, ciliate ; flowers regular, bisexual on long, slender, pubescent pedicels, cymes at first corymbose, afterwards racemose, peduncles coming off from between bases of petioles, much longer than leaves, bracts linear and acute ; sepals 5, lanceolate, acute, slightly ciliate ; petals 5, fused into a broadly funnel-shaped corolla, about 1.8 cm in diameter, tube short, lobes ovate, contorted, acute, hairy above, ciliate, concave, spreading ; column large, prominent, stamens with long connate filaments, corona shortly tubular, crenate-lobed and with 5, large, vertical, adnate processes, spurred at base and without subulate points, prolonged over the stigma ; pollen masses one in each chamber, pendulous, slightly compressed ; ovary superior, of two distinct carpels, stigma flat on top ; fruit-follicles 5—6.2 cm long, reflexed, long-beaked, echinate with soft spines ; seeds with long coma.

ILLUSTRATIONS. Hooker fil., Bot. Mag. *pl.* 5704 ; Wight, Ic. Pl. Ind. Orient. *pl.* 596. 1840—1843 ; Kirtikar and Basu, Indian Med. Pl. *pl.* 623. 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. This herb is found in tropical Africa, Afghanistan, India, and Ceylon. In Ceylon, it is rather common especially in the dry districts. Jaffna, Uma Oya, Anuradhapura, Haragama, Hanguranketa, etc.

Ceylon. Thwaites C. P. 1841, locality unknown ; North Central Prov., Anuradhapura, Alston 1291, March 1927, flowers pale green and climbing over shrubs ; Huber 10 (US). Eastern Prov., Batticaloa, Huber 20 (US) ; Trincomalie Huber 55 (US). Southern Prov., Hambantota, Ruhuna National Park, Huber 33 (US).

COMPOSITION. This plant yields a bitter glucoside. The leaves and roots contain the alkaloid daemine while the leaf contains vitamin C in addition.

USES. The entire plant is valuable as an emetic for infants and for infantile diarrhoea. The juice of the leaves is used in the treatment of catarrhal ailments, asthma and applied externally on rheumatic swellings. A decoction of the leaves is given as an anthelmintic. The root bark is a purgative and used in rheumatic diseases. The root is also used as a snake-bite remedy. In Ghana, the juice of the leaves is squeezed into the eyes as a cure for sore eyes. In Central Africa, the plant is used as a fish poison.

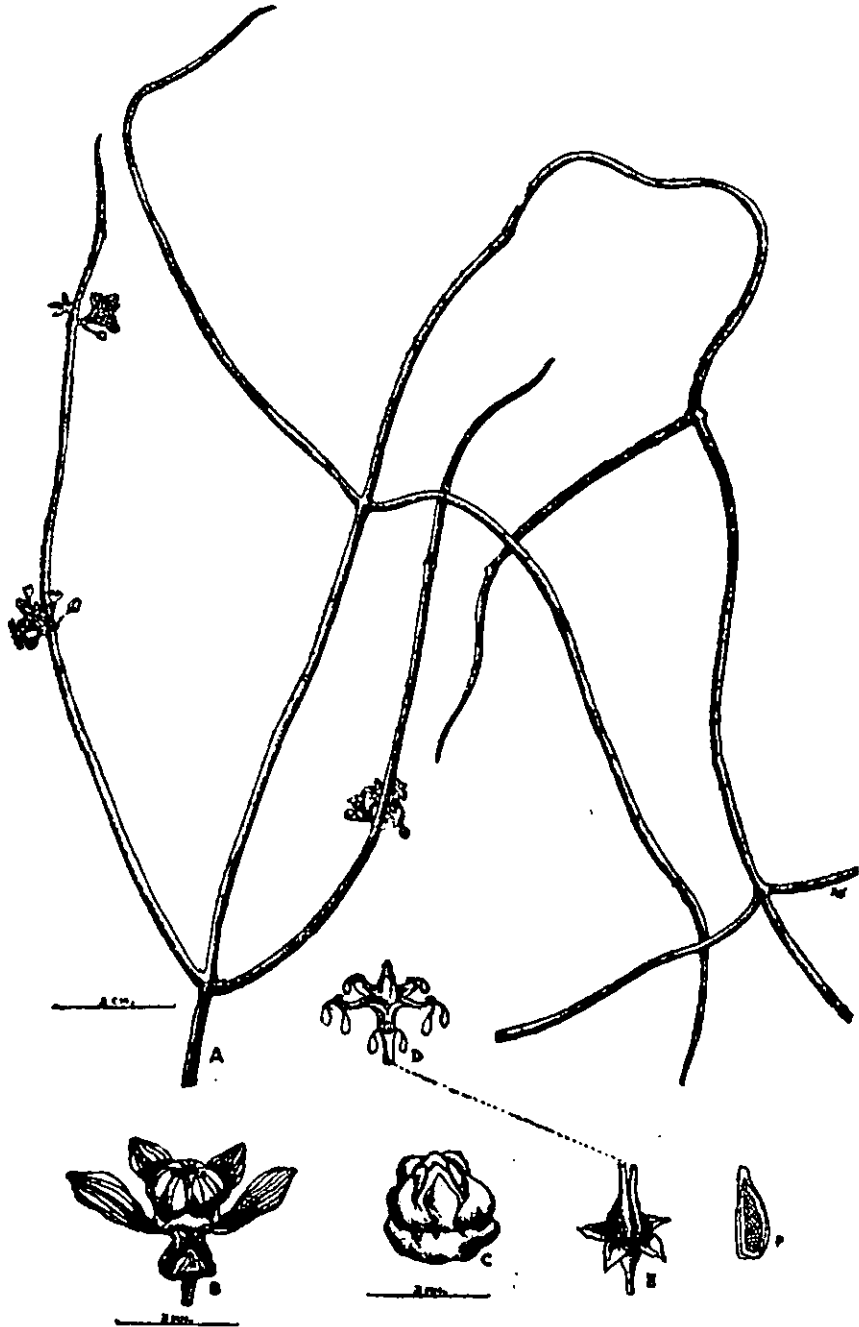


FIG. 82. *Sarcostemma brunonianum*. A, stem of the plant with flowers in umbellate cymes. B, side view of a flower. C, lateral view of the staminal crown. D and E, pistil with stamens. F, longitudinal section of ovary (enlarged).

11. *Sarcostemma brunonianum* W. & A., Contrib., Bot. India, 59. 1834. (Fig. 82).

Sarcostemma viminale Moon.

Sinh. Muwakiriya ; *Tam.* Kodikkalli ; *Sans.* Mahagulma, Somalata.

A leafless, perennial herb, often semi-shrubby at the base ; stems very long, slender, cylindrical, jointed, fleshy, glabrous, dark green, scrambling over other plants but scarcely twining ; flowers regular, bisexual, small, pale green, in umbellate cymes at the nodes, pedicels about 6 mm long and puberulous ; sepals 5, small, acute, pubescent ; petals 5, fused into a rotate corolla, about 1.2 cm diameter, lobes 5 mm long, 2 mm broad, oblong-oval, obtuse or subacute, margin revolute, contorted ; column somewhat depressed, about 2 mm across ; stamens 5, connate, filaments very short, anthers broad, tip short, inflexed ; pollen masses one in each chamber, narrow, pendulous ; corona annular, lobed with five, large, erect, fleshy, acute processes adnate to and nearly concealing the anthers ; ovary superior, 0.7 mm long of 2 distinct carpels, stigma bluntly conical ; fruit-follicles about 8—9 cm long, linear, gradually tapering to a sharp point, glabrous ; seeds comose.

Flowers during July and August.

ILLUSTRATIONS. Wight, Ic. Pl. Ind. Orient. 4 : pl. 1282. 1848 ; Hooker, Bot. Mag. 98 : pl. 6002. 1872 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Found in South India and Ceylon. In Ceylon, it is very common in the dry and desert regions of the low-country. Dambulla, Batticaloa, Trincomalie, Hanguranketa, etc.

Ceylon. Eastern Prov., *Thwaites C. P.* 1830. Central Prov., between Haragama and Hanguranketa, *J. M. Silva*, Oct. 1921. Southern Prov., Ruhuna National Park, *Comanor* 374. (BISH). Burma. Salim Road, *Mokim* 270, Sept. 1902.

USES. The stem is used in the treatment of fractures. Internally, the plant acts as a stomachic tonic, cholagogue laxative and diuretic. It stimulates the appetite, improves digestion and tones up the system. It is useful in anorexia, atonic dyspepsia, neurasthenia and general debility. It is often used as a galactagogue. As a cholagogue laxative and diuretic it is useful in cardiac and hepatic dropsy. It is also frequently employed in the treatment of haemorrhoids.

This is believed to be the Soma plant of the Vedic Brahmins. A wine made out of its juice, fermented with barley and cow ghee, is drunk at mealtimes.

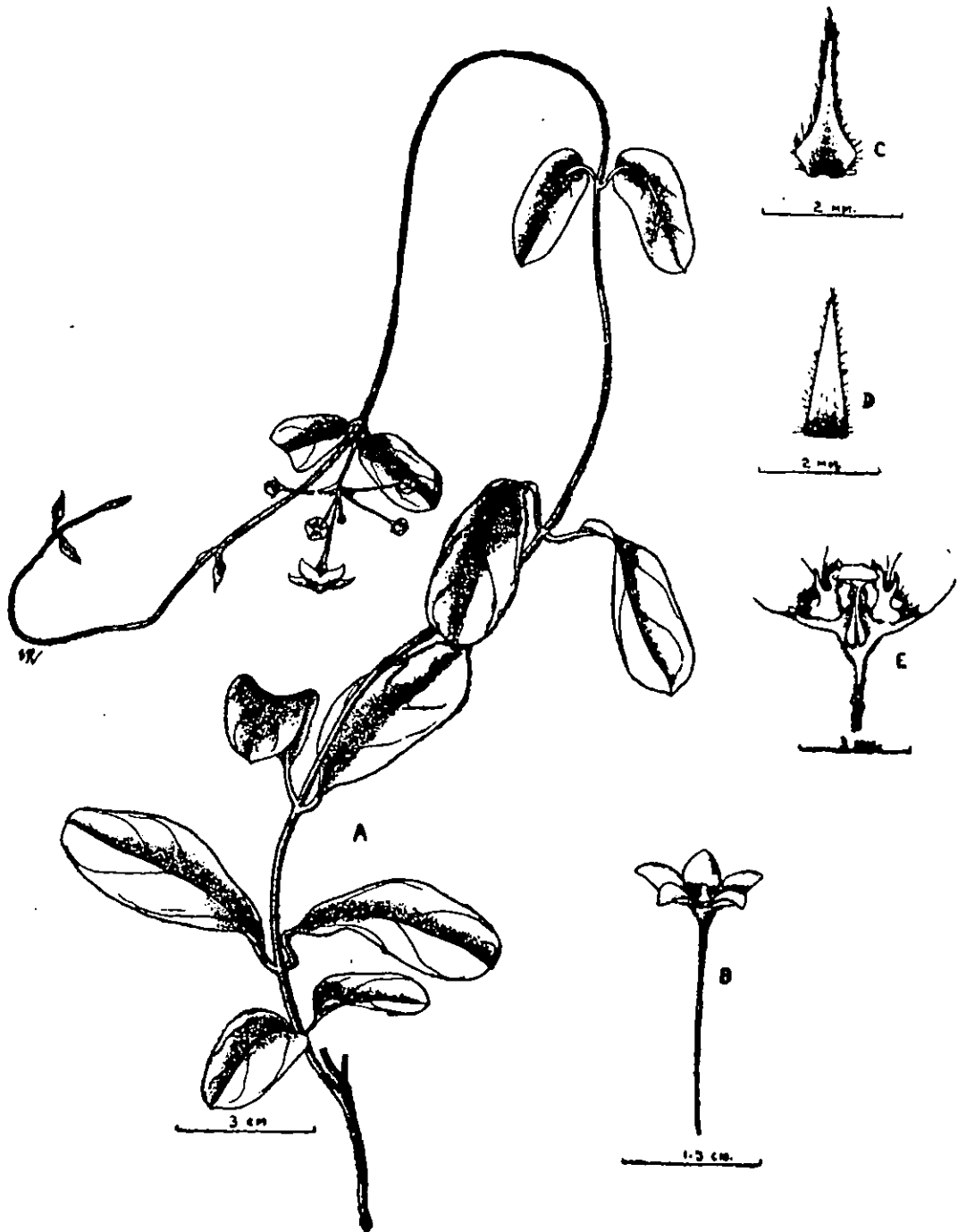


FIG. 83. *Tylophora indica*. A, branch with leaves and an inflorescence. B, lateral view of a flower. C, bract. D, sepal. E, longitudinal section of the column showing the coronal processes and ovary.

12. *Tylophora indica* (Burm. f.) Merr. in Phil. Journ. Sc. 19 : 373. 1921. (Fig. 83).

Cynanchum indicum Burm. f. — *Asclepias asthmatica* Linn. f. — *Tylophora asthmatica* W. & A. — *Tylophora pubescens* Wall. — *Asclepias vomitoria* Koen. — *Cynanchum vomitorium* Lamk. — *Cynanchum viridiflorum* Sims. — *Cynanchum ipecacuanha* Willd. — *Hoya planiflora* Wall. *Hoya hirsuta* Moon.

Engl. Vomiting Swallow-wort. *Sinh.* Bin-nuga. *Tam.* Kagittam, Kagittiram, Kaludaippalai, Kodagam, Kondachani, Kuravaram, Kurinja, Nacharuppan, Nacharupaynjan, Nalpalai, Nanjaruppan, Nayppalai, Nirkkurinja, Peyppalai, Sarangam, Unmattadi. *Hindi* Antamul, Janglipikvan. *Sans.* Antrapachaka, Antri, Moolinee.

Semi-shrubby, twining perennial with very long, hairy stems and many, long, fleshy roots; leaves simple, opposite without stipules, 2.5—7 cm long, 1.5—5 cm broad, oblong-oval or rotundate, cordate at base, apiculate, scantily hairy above, densely pubescent beneath, petioles 0.5—1.1 cm long and hairy; flowers regular, bisexual, long-pedicelled in umbels or branched umbels at the ends of hairy peduncles arising from the axils of one of the two leaves at each node; peduncle 1—1.3 cm long, slender, green turning reddish, pedicels 1.7—2.1 cm long, reddish and hairy; bracts 1—2.2 mm long, 0.3—0.5 mm broad, linear or subulate and hairy; sepals 5, distinct, 2.5 mm long, 0.5 mm broad, lanceolate and hairy outside; petals 5, fused into a rotate corolla, 1—1.2 cm diameter, lobes 4 mm long, 3 mm broad, ovate, obtuse or subacute at apex, purple or greenish purple and hairy on the upper surface; column prominent; stamens 5, connate, filaments short, anthers small with a short, inflexed tip, pollen masses minute, one in each cell, coronal processes adnate to the back of the stamens; ovary superior of 2 distinct carpels, 1 mm tall, stigma 5-angled, not exerted; fruit-follicles, 5—8.5 cm long, divaricate, slender, fusiform, glabrous; seeds broadly oval, 0.5 cm long with coma 1.8 cm in length.

Flowers from September to February.

ILLUSTRATIONS. Curtis, Bot. Mag. pl. 1299; Wight Ic. Pl. Ind. Orient. pl. 1277. 1848; Bentley and Trimen, Med. Pl., pl. 177. 1880; Kirtikar and Basu, Indian Med. Pl., pl. 618 B. 1933; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs in the plains of India, Burma, Ceylon, Malaya and Mauritius. In Ceylon, it is rather common in the hot, moist, low-country up to 4,000 feet altitude.

India. Nilghiri Mountains, *Schmidl.* 1818—1835. Pen. Ind. Or., *Herb. Wight* 1916, Kew Distribution 1866—7. Ceylon. Northern Prov., Jaffna District, on the way to Chavakachcheri, *Trimen's collector*, Feb. 1890. Eastern Prov., Trincomalie, *Thwaites C. P.* 1857. Central Prov., Hewaheta, Sept. 1883 without collector's name; Haputale, *Thwaites C. P.* 369; Palawatta, *Trimen's collector*, Oct. 1894; Peradeniya, Bot. Gard., *Jayaweera* 2225, July 1957, cultivated; *Jayaweera* 1687, May 1955. Southern Prov., Deyandara, *Trimen* 42, Feb. 1881; Galle, Heyari Reservoir, *Alston* 1293, Aug. 1926; Hambantota, Ruhuna National Park, *Huber* 31 (US); *Mueller-Dombois and Cooray* 67121056 (BISH). Locality unknown, *Fraser* 3 (BM); *Gardner* 575 (K); *Walker* 1130 (K.) **Burma.** Mokim 532, Nov. 1902.

COMPOSITION. The leaves, stems and roots contain the alkaloids tylophorine and tylophorinine.

USES. A decoction of the leaves and roots is given as a remedy for dysentery, asthma, coughs and incipient tuberculosis. The powdered roots or expressed juice of the leaves with cows' milk is given as an emetic. A paste of the root with water is applied on the forehead for neuralgia and headache.

The root is a good substitute for *Ipecacuanha*.



FIG. 84. *Tylophora flava*. A, branch with leaves and flowers. B, column and coronal processes from above. C, same from side. D, fruit showing divaricate follicles. B and C, enlarged.

13. *Tylophora flava* Trimen in Journ. Bot. 23: 239. 1885. (Fig. 84).
Cynanchum flavens Thunb. — *Tylophora asthmatica* (L. f.) var. *glabra* Decne.,

Sinh. Mudu-binnuga.

A straggling or twining, semi-shrubby, prostrate, perennial herb with glabrous stems; leaves simple, opposite, 5.6—10 cm long, ovate or ovate-oblong, more or less cordate at base, suddenly acuminate, acute, quite glabrous, thick and fleshy, glaucous, yellowish-green with paler veins, petioles about 0.6 cm long and glabrous; flowers regular, bisexual, large, numerous, greenish-yellow with crimson centre, in 2 or 3 nearly sessile umbels at the ends of short peduncles, cymes glabrous; sepals 5, nearly distinct, narrowly lanceolate, glabrous; petals 5, fused into a rotate corolla, 1.5 cm diameter, lobes shallow, ovate-oblong, subacute, slightly contorted; column small, stamens 5, connate, filaments short, anthers very small with short, inflexed tips, pollen masses minute, erect; coronal processes adnate to the back of stamens, thick and fleshy, broad at the base, tapering into triangular, in-curved, free points; ovary superior, of two distinct carpels, stigma 5-angled, not exerted; fruit-follicles over 7.5 cm long, divaricate, linear, cylindrical; seeds flat with long coma.

ILLUSTRATIONS. Trimen, Hand-book, Flora of Ceylon, *pl.* 62. 1895; Herb. Peradeniya drawing.

DISTRIBUTION. A rare endemic species growing along the sandy seashore especially along the west coast South of Colombo. Trincomali, Negombo, Colombo, Hambantota, etc.

Ceylon. Eastern Prov., Trincomali. *Alston* 526, May 1927, growing on the beach among *Ipomoea pes-caprae*. Western Prov., Colombo. *Herb. Peradeniya*, Aug. 1883. Southern Prov. Galle District, between Bentota and Induruwa. *Huber* 15 (US).

USES. This plant has the same action as *Tylophora indica*. A decoction of the leaves and roots is given for dysentery, indigestion, asthma, coughs, etc. It is an useful emetic, expectorant and diuretic.

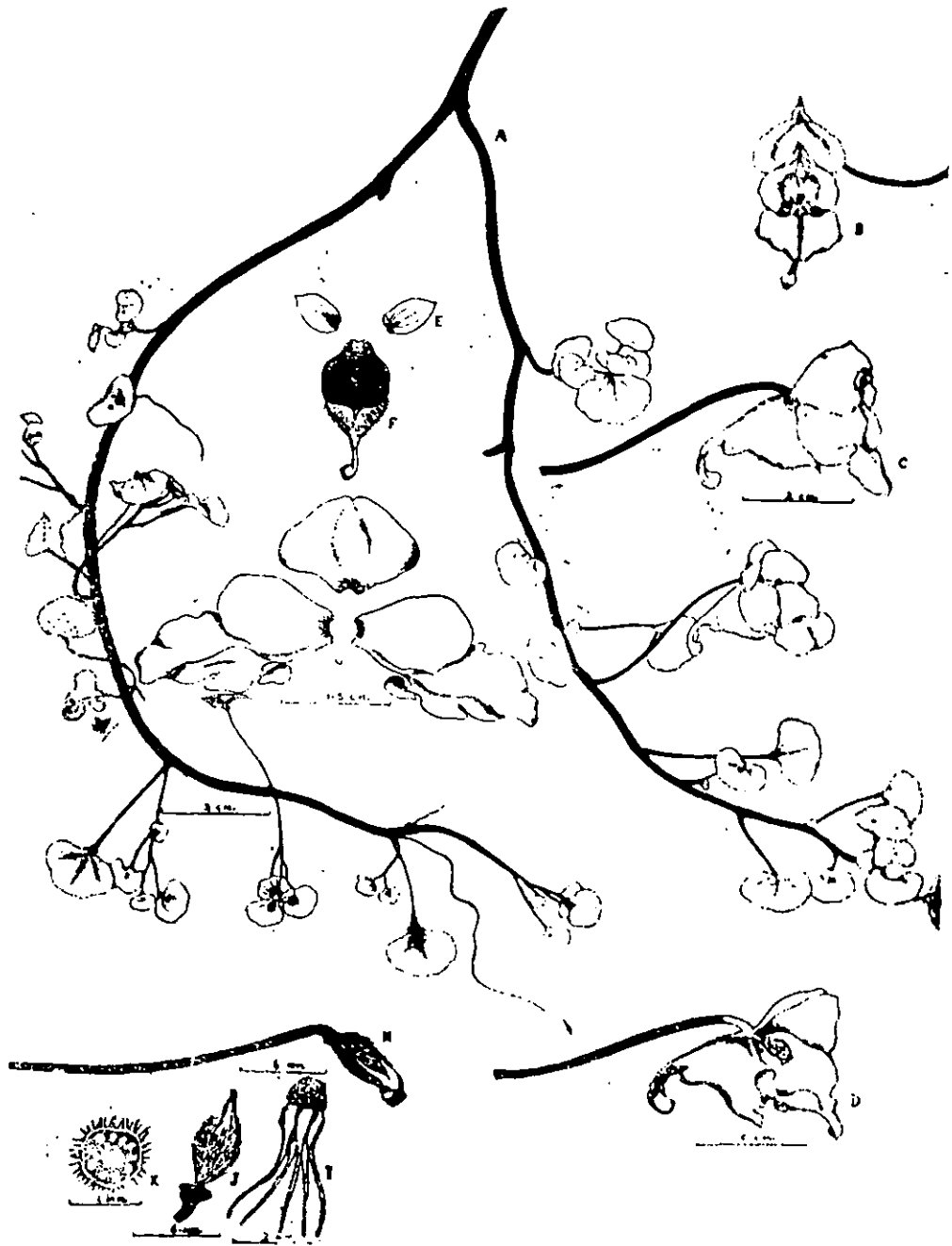


FIG. 85. *Impatiens repens*. A, branch with leaves and a flower. B, front view of flower. C, lateral view of flower. D, longitudinal section of flower. E, lateral sepals; F, third sepal modified into a saccate spur. G, petals. H, ovary with stamens outside. I, stamens fused at top. J, young fruit. K, transverse section of ovary.

13. BALSAMINACEAE

1. *Impatiens repens* Moon, Cat. 18, 1824. (Fig. 85).

Sinh. Gal-demata.

A prostrate, somewhat succulent, perennial herb with zigzag branches and glabrous, red stems rooting at nodes; leaves simple, alternate, ovate-reniform, 0.8—1.4 cm long, 1.1—1.7 cm broad, broader than long, truncate or subcordate at base tapering into the petiole, sparingly spinous, crenate with two lowest teeth filiform, dark green and hairy above, reddish green and glabrous beneath; petioles 1—2.8 cm long, bright red; flowers irregular, bisexual, large, solitary, 3.8 cm long, 3 cm across vertically, pedicel 4—5 cm long, glabrous but hairy towards the apex and reddish in colour; sepals 3, distinct, imbricate, the two lateral ones small, oblong ovate, acute, glabrous, the third sepal forming a saccate lip, 2 cm long, 1.1 cm broad, 1.4 cm deep, narrowing down to a curved spur about 1 cm long, inflated at the tip and containing nectar, bright yellow, very hairy outside, glabrous inside with reddish markings at the base, apex acute; petals 3, bright yellow, standard 1.8 cm long, 2.5 cm broad, emarginate at apex, keeled and hairy at the back, wings 3 cm long, 2 cm broad, deeply bilobed, obliquely truncate with a raised edge in the centre and an oblong process projecting from the inner side; stamens 5, filaments 5 mm long running round the ovary, fusing above the style and stigma, anthers 2 mm long, fused into a cap over the stigma; ovary superior, 5 mm long, hairy, 5-locular with many uniseriate ovules in each loculus, stigmas sessile, 1 mm long; fruit a 5-valved, very hairy fleshy capsule, dehiscing elastically, the valves separating from the seed-bearing axis, seed without endosperm.

Flowers almost throughout the year.

ILLUSTRATIONS. Wight, *Ill. Ind. Bot.* pl. 61; Hooker, in *Curtis Bot. Mag.* pl. 4404.

DISTRIBUTION. Endemic to Ceylon. It occurs in the Southern and Central parts of the island up to an elevation of 3000 feet or more growing on rocks in moist places. Four Korales, Sitawaka, Ruwanwella, Alagala, Yatiyantota, Ambepussa, Bambarabotuwa, etc. It is rather rare.

Ceylon. Sabaragamuwa Prov., Sitawaka, *Thwaites C. P.* 2790. Central Prov., Peradeniya, Bot. Gard., cultivated, *Jayaweera* 280, Nov. 1950; *Jayaweera* 2270, Oct. 1960.

USES. This plant is used in the treatment of epilepsy. It is eaten as a vegetable for piles and haemorrhoids. It is given both internally and applied on the head, externally for the treatment of insanity.



FIG. 86. *Bambusa arundinacea*. A, stem of a lateral branch with recurved spines. B, branch with leaves. C, part of an inflorescence showing the spikelets. D, mature spikelets with flowers.

14. BAMBUSACEAE

Bambusa arundinacea (Retz.) Willd., Sp. Pl. 2 : 245. 1799. (Fig. 86.)

Bambusa arundo Klein ex Nees — *Bambusa neesiana* Arn. ex Munro — *Bambusa orientalis* Nees — *Bambusa pungens* Blanco — *Bambusa spinosa* Roxb. — *Arundo bambos* Linn. — *Bambusa arundinacea* Willd. var. *orientalis* Gamble. — *Bambos arundinacea* Retz. var. *orientalis* G. Camus.

Engl. Spiny Bamboo ; *Sinh.* Katu-una ; *Tam.* Ambal, Ambu, Aril, Bongu, Iraivarai, Kalai, Kambul, Kilai, Kisagam, Kuluaimugil, Masukkaram, Miruttusam, Mudangal, Mulai, Mullumungil, Mundlaveduru, Mundul, Mungil, Nadimungil, Nedil, Netti, Paladam, Panai, Pandil, Pasy, Perumugil, Perubarai, Sabam, Sanagi, Sey, Tandu, Tattai, Tulai, Tumbu, Valai, Vannigaruppam, Varaimungil, Vedir, Velam, Venu, Veral, Vey, Veyal, Vindil ; *Hindi* Bans, Kantabans, Kattang, Magarbans, Malbans ; *Sans.* Bahupallava, Brihattrina, Dhanurdruma, Dhatushya, Dridhagranthi, Dridhakanda, Dridhapatra, Duraruha, Kamatha, Kantaki, Kantalu, Karmmara, Kichaka, Kilati, Kishkuparva, Kushirandhra, Mahabala, Maskara, Mrityubija, Navagragandha, Pnalantaka, Purvayoni, Pushpaghataka, Shataparva, Shatpadalaya, Suparva, Suparvan, Tajana, Tejana, Trinadhvaja, Trinaketu, Trinaketuka, Tvachisara, Tvakasara, Vadaniya, Vansha, Vanya, Venu, Yavaphala.

A perennial tree with many stems tufted on a stout rootstock ; stems branching from the base, 24—30 m high, 15—17.5 cm diameter, graceful, curving ; nodes prominent, (the lowest rooting), the lower emitting horizontal, almost naked shoots, armed at the nodes with 2 or 3 stout, recurved spines sometimes 2.5 cm long ; internodes up to 45 cm long ; walls 2.5—5 cm thick ; stem sheaths coriaceous, variable in shape, up to 30—38 cm long, 23—30 cm wide, striate, with rounded tip and plaited margins, when young orange-yellow streaked with green or red and thickly ciliate with golden hairs, blade up to 10 cm long, triangular, acuminate, glabrous outside, densely hirsute inside, the margins decurrent, thickly ciliate ; ligule short, narrow, entire or fringed with pale hairs ; leaves 18—20 cm long, 2.5 cm broad, linear or linear-lanceolate, tip stiff, glabrous or puberulous beneath, one or both margins scabrous, base rounded, ciliate, midrib narrow, nerves 4—6 with 7—9 intermediate and a few transverse pellucid glands ; leaf-sheath ending in a thick callus and short bristly auricle ; inflorescence an enormous panicle occupying the whole stem ; branchlets bearing loose clusters of pale, suberect, lanceolate, acute, glabrous spikelets, 1.3—2.5 cm long and 5 mm broad ; involucre glumes 2 or 0, ovate-lanceolate, acute or mucronate, 5—8 mm long, many-nerved, empty ; floral glumes 3—7, uppermost 1—3 male or neuter ; palea subacute with 2 ciliate keels ; lodicules 3, ovate or subacute, hyaline, ciliate, 1—3 nerved, stamens 6, filaments slender, free, anthers obtuse, yellow ; ovary superior, 1—loculed with a single basal ovule, tip hairy, style short, grain 5—8 mm long, smooth, beaked by the style base, grooved on one face.

Flowers in January, when it is about 30 years old.

ILLUSTRATIONS. Roxburgh, Pl. Corom. 1: pl. 79. 1795 ; Kirtikar and Basu, Indian Med. Pl., pl. 1024. 1933.

DISTRIBUTION. Grows in India, Burma and Ceylon. In Ceylon, it is common along river banks in the warmer parts of the island.

India. Khasia, *J. D. Hooker and T. Thomson*. East Bengal, Chittagong, *J. D. Hooker and T. Thomson*. Assam. *Jenkins*. Calcutta, cultivated, *Herb. Bot. Gard.*, Feb. 1902 ; *Herb. Bot. Gard.*, Feb. 1904 ; *T. Thomson*. Madras. *Gamble* 20763, July 1889 ; *Gamble* 21353 Sept. 1889 ; *Gamble* 20809, Sept. 1889 ; *Gamble* 20860, Aug. 1889. Ceylon. Central Prov., *Thwaites C. P.* 3320 ; Peradeniya, *Bot. Gard.*, *Alston* ; Ambagamuwa, *Thwaites C. P.* 3252 ; Aluth Oya, *Herb. Peradeniya*, Sept. 1885.

USES. The leaves of this bamboo are used as an emmenagogue. With black pepper and salt they check diarrhoea in cattle. A decoction of the leaf bud and young shoot is given for leprosy, fever, haemoptysis and threadworms in children. The tender parts of the young shoot made into a paste is most effective in dislodging worms in ulcers. The bamboo camphor, (a deposit in the nodes of female bamboo plants), is largely used for cough, asthma and is used in numerous prescriptions for lung diseases.

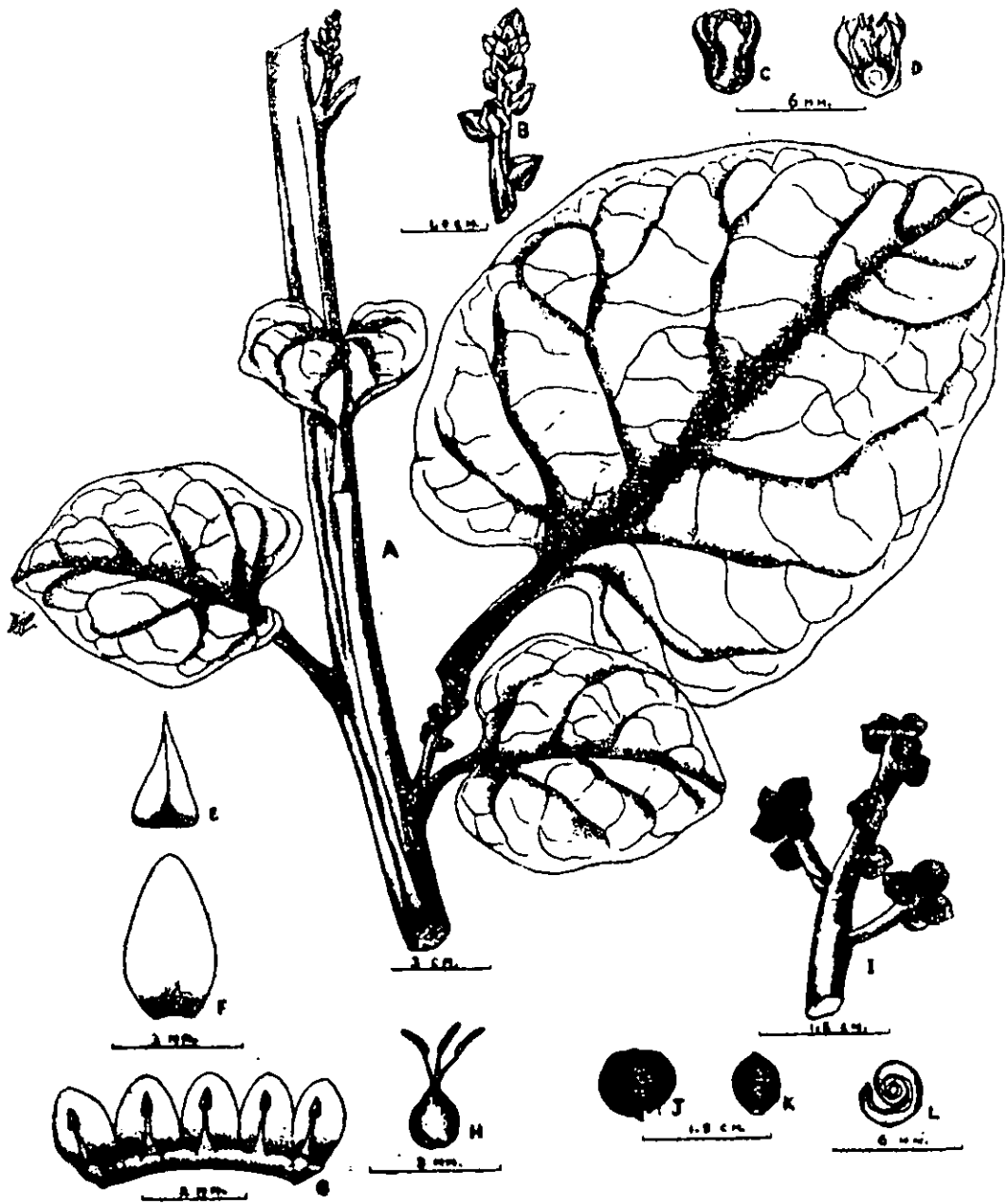


FIG. 87. *Basella alba*. A. branch with leaves and spikes. B. spike. C. external view of a flower. D. longitudinal section of a flower showing the stamens and the pistil. E. bract. F. bractlet. G. corolla spread out showing epipetalous stamens. H. pistil showing the ovary, styles and stigmas. I. young fruits. J. mature fruit. K. seed. L. coiled embryo.

15. BASELLACEAE

Basella alba Linn. Sp. Pl. 272. 1753. (Fig. 87).

Basella rubra Linn. — *Basella canalifolia* Ham. — *Basella nigra* Lour. — *Basella cordifolia* Lamk. — *Basella ramosa* Jacq. f. — *Basella japonica* Burm. — *Basella lucida* Linn. — *Basella crassifolia* Wight

Engl. Indian Spinach; *Sinh.* Niviti, Rat-niviti; *Tam.* Pasalai, Shivappuvaslakkira,, Vaslakkirai; *Hindi* Bonpoi, Lalbachlu, Myalkibhaji, Poi, Poikivel, Sufedbachla; *Sans.* Apodika, Kalambi, Madushaka, Mohini, Pichhila, Pichchilachhada, Potaki, Putika, Upodakii, Upodika, Upoti, Valipodaki, Vishala, Vishvatulasi, Vrishchikapriya.

Perennial, straggling, succulent climber with very long, slender, glabrous, much branched succulent stems; leaves simple, alternate, 10—18 cm long, 6.5—17 cm broad, broadly ovate, subcordate or obtuse at base, subacute or emarginate with a bristle in the middle at apex, entire, thick, brittle, glabrous and shining; petioles 2.5—5 cm long, thick, somewhat winged; flowers regular, bisexual, few, sessile, about 4 mm long in short, lax, pedunculate spikes; bracts 2 mm long, 1—1.5 mm broad, lanceolate-ovate, acuminate and adnate, bractlets pale pinkish-white longer than perianth, 4—4.5 mm long, 3 mm broad, oblong-ovate, obtuse; perianth segments 5, pink, 2—2.5 mm long, 1—1.5 mm broad, broadly oval, obtuse, incurved; stamens 5, included, epipetalous, anthers small, versatile; ovary superior, 1 mm long, 1-loculed with a single basal ovule, styles 3, erect, stigmas clavate; fruit a membranous, somewhat globose utricle completely enclosed in enlarged, fleshy, persistent perianth segments which turn purple; seed nearly globose, about 5 mm long, embryo coiled in a flat spiral.

Flowers from September to December.

ILLUSTRATIONS. Lamk., *Ill. pl.* 215. f. 1; Gaertn., *Carp. pl.* 126; Wight, *Ic. Pl. Ind. Orient. pl.* 896. 1843—1845; Jacq. f., *Eclog.* 2: *pl.* 161; Reichb., *Hort. pl.* 61; Rheede *Hort. Mal.* 7: *pl.* 24; Kirtikar and Basu, *Indian Med. Pl.*, *pl.* 802. 1933.

DISTRIBUTION. Occurs in India, Ceylon, Malaya, Philippine Islands, tropical Asia and Africa. In Ceylon, it is rather rare in forests and shady places, confined to the dry regions of the North Central, North-Western and Southern Provinces.

India. Wallich 6961 H; Plan Ganget. Inf., T. Thomson and J. D. Hooker. Ceylon North Central Province, Giant's Tank Simpson 9378, March 1932; Central Prov., Peradeniya Bot. Gard., Jayaweera 1052, Jan. 1954, cultivated; Southern Prov., Tissamaharama, Dec. 1882, without collector's name. Japan. Nagasaki, Maximowicz, 1863.

COMPOSITION. The entire plant is an excellent source of calcium, iron and vitamins A, A₁, B, B₁, and C. The leaves contain saponin.

USES. The cultivated forms of this plant are used as a popular leafy vegetable. Medicinally, the roots are used as a poultice to reduce swellings. The plant is a demulcent, diuretic and emollient. The leaves macerated into a pulp are used on boils, ulcers and abscesses to hasten suppuration. With butter it is a soothing application on burns and scalds. A decoction of the leaves is a good laxative for pregnant women and for children.

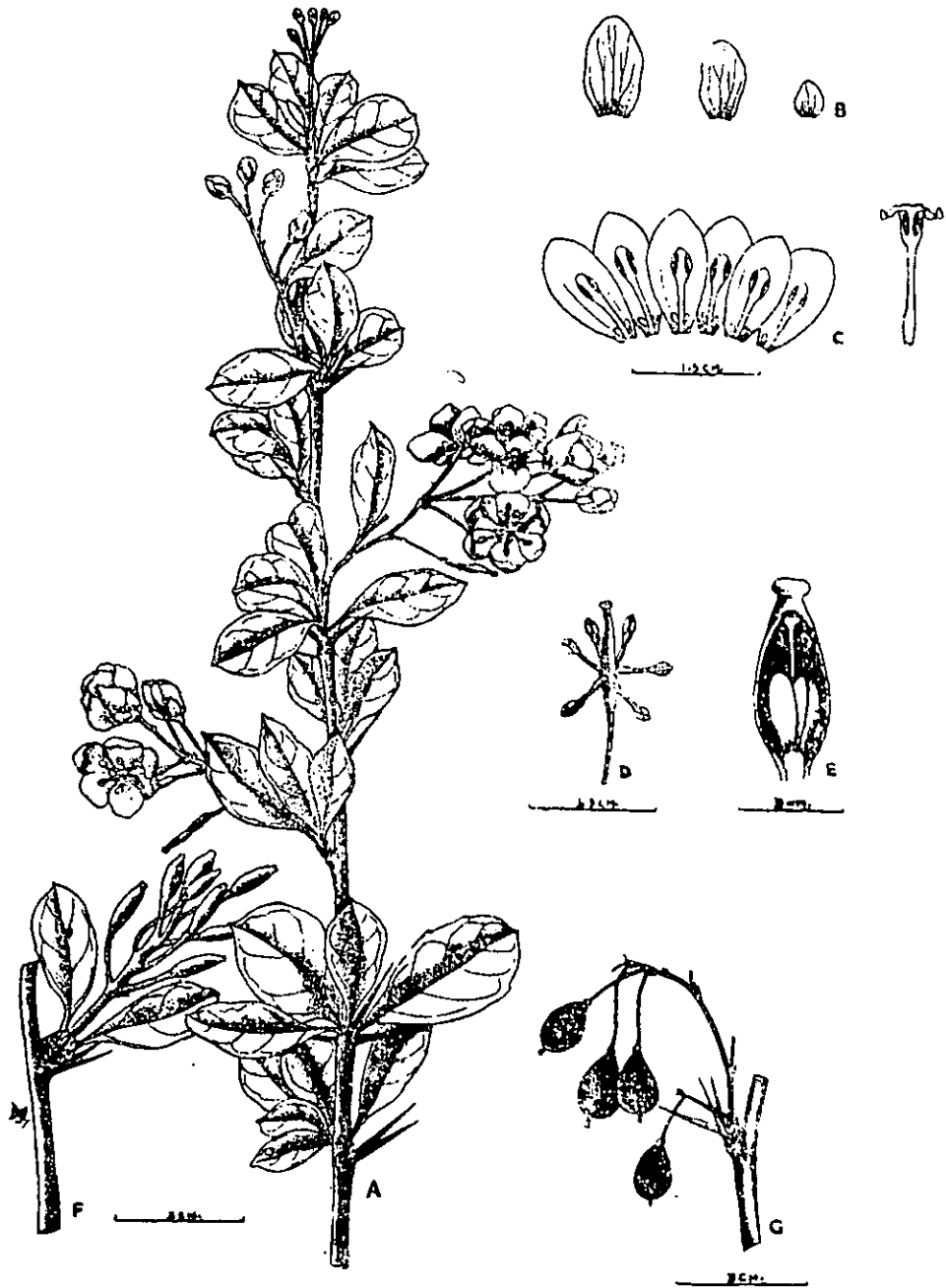


FIG. 88. *Berberis aristata*. A, branch with fascicles of leaves, spines and flowers. B, sepals. C, petals opened out with stamens and nectarial glands; also a stamen showing the dehiscence of anther. D, flower with calyx and corolla removed. E, longitudinal section of ovary. F, branch with young fruits. G, branch with mature fruits.

16. BERBERIDEAE

Berberis aristata DC., Syst. 2 : 8. 1821. (Fig. 88).

Berberis aristata Var. *floribunda* Hook. f. and Th. — *Berberis petiolaris* Wall. — *Berberis affinis* Don — *Berberis ceratophylla* Don — *Berberis coriaria* Royle ex Lindl. — *Berberis umbellata* Lindl. — *Berberis tinctoria* Leschen — *Berberis chitria* Ham.

Engl. Indian Barberry, Tree Tumeric ; *Sinh.* Rasandun ; *Tam.* Mullukala, Mullukulapattai, Usikkala ; *Hindi* Chitra, Chotra, Darhald, Kashmal, Kashmar, Rasvat ; *Sans.* Daruharidra, Darvi, Kata, Katankati, Kateri, Pitadaru, Suvarnavarna.

An erect, much branched shrub, 2—3 m tall with a pale, smooth bark and glabrous, elongated twigs ; leaves simple or transformed into 3-fid spines in fascicles of 3—6, lanceolate or obovate-lanceolate, 3.8—10 cm long, 1.5—3.3 cm broad, strongly mucronate, tapering to the base, thick with prominent reticulate veins, entire or with a few spinous teeth, petioles very short or absent ; flowers regular, bright yellow, in drooping corymbose racemes or panicles arising from leaf fascicles ; pedicels 8 mm long, glabrous ; bracts 3, small just beneath the calyx resembling an outer calyx, glabrous ; sepals 6 in two rows, imbricate, oval, obtuse, spreading, concave, petaloid, the inner two twice as long as the outer ones ; petals, 6, distinct in two rows, imbricate, longer than sepals, obtuse, erect, concave, equal, tapering to the base where there are two small nectarial glands ; stamens 6, distinct or slightly connate to base petals, anthers innate, blunt, 2-celled, opening by two upwardly recurved lids ; ovary superior, unicarpellary, smooth, style short, thick, stigma peltate, ovules few, basal, erect ; fruit fleshy, indehiscent, purple with a white "bloom", fusiform or obovoid, 2-seeded berry, 1.2 cm long with persistent style.

Flowers from April onwards.

ILLUSTRATIONS. Curtis, Bot. Mag. 52 : pl. 2549. Bentley and Trimen, Med. Pl., pl. 16. 1880 ; Kirtikar and Basu, Indian Med. Pl., pl. 44. 1933 ; Herb. Peradeniya., drawing.

DISTRIBUTION. Grows in the Himalayan regions and Nilghiris above 6000 feet altitude in India, and in the Upper Montane range in Ceylon. It is very common in open bushy places at Nuwara Eliya, Horton Plains and Hakgala.

India. Simla : Thomson, Pen. Ind. Or., Herb. Wight 50, Kew Distribution 1866—7. Ceylon. Central Prov., Nuwara Eliya, Thwaites C. P. 2405 ; Horton Plains, Simpson 9524, April 1932 ; Hakgala, Stockdale 38, Oct. 1920 ; Alston 37 ; Hakgala, Bot. Gard., cultivated, Silva 145, April 1920.

COMPOSITION. The bark contains the alkaloids, berberine and palmatine.

USES. A decoction of the roots and bark is given for jaundice, diarrhoea, malarial fever and painful micturition due to bilious or acrid urine. Externally, it is used in all ailments of the eye, skin diseases and for cleaning ulcers. In Ceylon it is used along with other ingredients for dysentery, abdominal colic, nervous diseases, blood and skin diseases and menorrhagia with copious discharges from the womb.

This species has since been divided into three distinct species, namely *B. tinctoria* Leschen, *B. wightiana* Schneider and *B. ceylanica* Schneider, but all three are used medicinally for the same diseases.

17. BETULACEAE

Betula utilis D. Don, Prodr. Fl. Nep. 58. 1825.

Betula bhojpattra Wall. — *Betula jacquemontii* Spach — *Betula bhojpattra* var. *jacquemontii* Regel.

Sinh. Bhujapatra ; *Hindi* Bhajpattra, Bhujpatar, Bhujapattra ; *Sans.* Bahulavalkala, Bahupata, Bahuwaka, Bhurja, Bhurjapatra, Bhurjapatraka, Bhutaghna, Bindupatra, Charmi, Charmmadruma, Chhadapatra, Chhatrapatra, Chitratvaka, Dalanismoka, Mriducharmi, Mridupatra, Mridutvaka, Padmaki, Putrapushpaka, Rakshapatra, Shailendrastha, Shitri, Sthirachhada, Sucharma, Valkadruma, Vichitraka, Vidyadala.

A small deciduous tree or shrub with a horizontally lenticelled bark peeling off in papery layers, inner bark pink ; branches dotted with yellow resinous exudations, young shoots, leaves and petioles silky, soon becoming glabrous ; leaves 5—10 cm long, ovate, acute, irregularly serrate, base broadly cuneate or rounded, sticky with yellow resinous scales when young, petioles 1—2 cm long ; flowers unisexual in separate catkins or spikes ; male catkins 5—7.5 cm long, pendulous, grouped at the tips of long shoots ; flowers in groups of 3, bracts peltate, perianth 2—4—partite ; stamens 2, filaments minutely forked, anthers glabrous except at the tip, anther cells separated ; female spikes 2.5—5 cm long, 1.2—1.5 cm diameter, solitary, erect, terminating dwarf shoots ; flowers in groups of usually 3, bracts imbricate, bracteoles 2, adnate to the bract appearing as 3-lobed, ultimately falling off, perianth absent ; ovary compressed, 2-loculed, styles 2, slender, stigma terminal ; nuts minute, flattened, winged on both sides.

Flowers during April and May.

ILLUSTRATION. Kirtikar and Basu, Indian Med. Pl. pl. 911 B. 1933.

DISTRIBUTION. Occurs in the temperate Himalayan regions from Kashmir to Sikkim, Bhutan, Japan and Afghanistan.

I have not seen any specimens of this species.

USES. A decoction of the bark of this tree is used to wash wounds. An infusion of it is prescribed as a carminative for hysteria. In Malaya, the plant is used for jaundice and bilious fevers. In Ceylon, the bark along with the bark of *Alstonia scholaris* and other ingredients is used for catarrhal fevers.

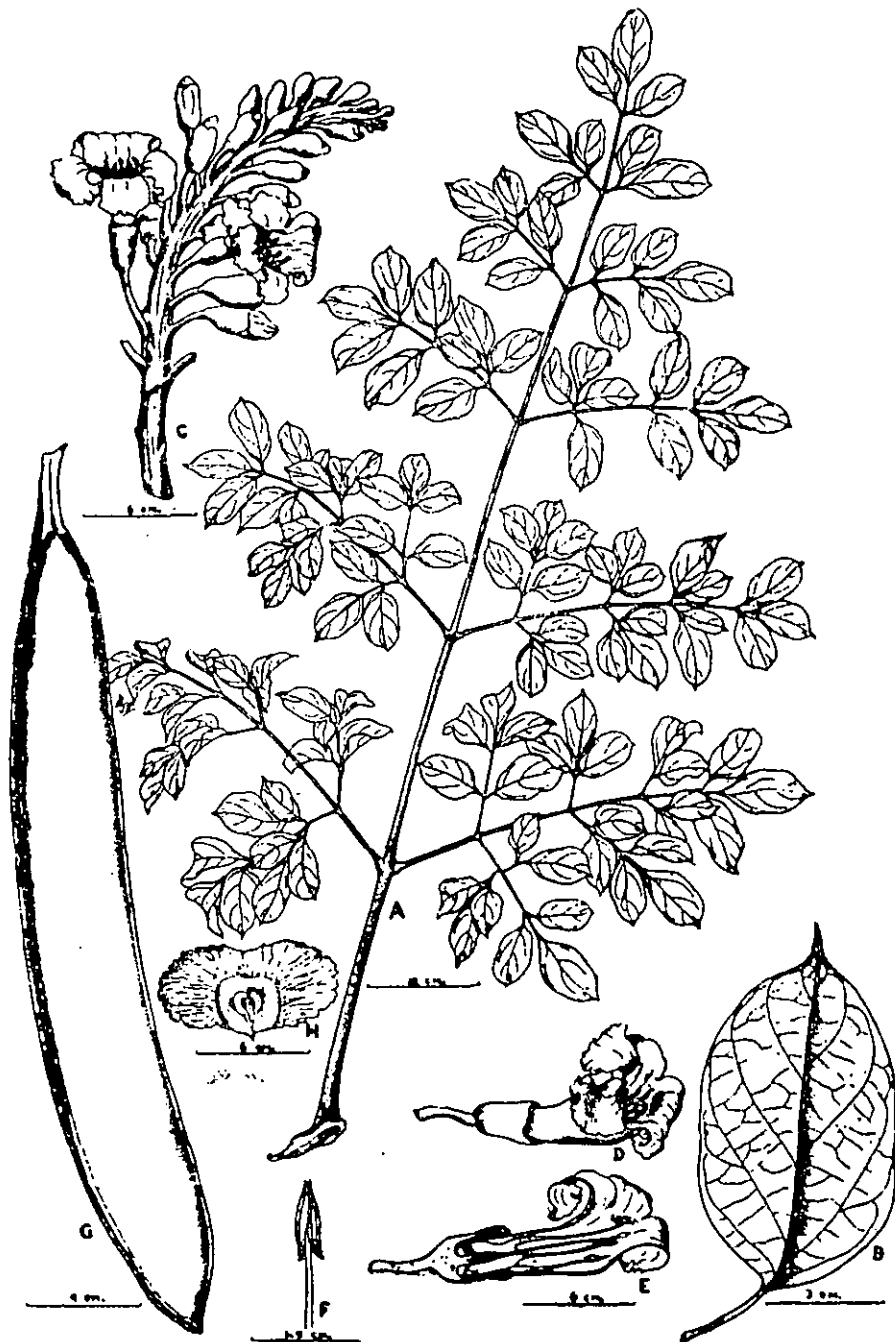


FIG. 89. *Oroxylum indicum*. A, compound leaf. B, leaflet. C, inflorescence. D, flower lateral view. E, longitudinal section of flower. F, stamen. G, fruit. H, seed.

18. BIGNONIACEAE

1. *Oroxylum indicum* (Linn.) Vent., Dec. Gen. Nov. 8. 1808. (Fig. 89).

Bignonia indica Linn. — *Bignonia pentandra* Lour. — *Spathodea indica* Pers. — *Calosanthes indica* Blume

Engl. Indian Trumpet Flower ; *Sinh.* Thotila ; *Tam.* Achi, Arandai, Arulandai, Palaiyudaichi, Pana, Peyarulandai, Pudabudham, Vangam ; *Hindi* Arlu, Assarsauna, Kharkath, Pharkhat, Pharra, Pharri, Sauna, Shyona, Ullu ; *Sans.* Advantashatrava, Arala, Araluka, Aratu, Bhalluka, Bantuka, Bhutapushpa, Bhutataka, Dirghavrinta, Dirghavintaka, Kandarpa, Katambhara, Katanga, Katvanga, Kurkata, Kutannata, Mandukaparna, Mayurajangha, Nata, Padavriksha, Paripadapa, Patrorna, Prithushimba, Priyajiva, Priyajivi, Putivriksha, Ruksha, Shallaka, Shona, Shoshana, Shukanasa, Shyonaka, Svarnavalkala, Tuntaka, Vatu, Vishanut.

A small tree, about 10—12 m in height, branched only at the top, bark thick, greyish with numerous large, corky lenticels ; leaves very large, $\frac{1}{2}$ — $1\frac{1}{2}$ m long, tri- or quadri-pinnately compound with opposite pinnae, rachis very stout, cylindrical with corky lenticels, swollen at points of union of the pinnae, primary pinnae about 5 pairs, secondary pinnae too branched likewise, ultimate leaflets numerous, shortly petiolate, 6—13 cm long, 4—8.5 cm broad, broadly oval or rotundate, the terminal ones somewhat rhomboid, rounded or acute at base, suddenly and shortly caudate-acuminate at apex, glabrous, paler beneath ; flowers large, 10—12 cm long and as much across purplish yellow but darker purple outside, on glabrous, very stout pedicelled, very large racemes, 30—55 cm long, peduncle very stout, branch-like, bracts fused with the pedicel ; calyx 3.3 cm long, 2.7 cm across at the top, campanulate, glabrous ; corolla large somewhat 2-lipped, petals 5, fused, corolla-tube 6.5 cm long, 4 cm diameter, lobes much crumpled, obovate-rounded, recurved, crisped, covered with papillose hairs on both sides ; stamens 5, inserted $\frac{1}{3}$ way up the corolla-tube, filaments unequal, 3.5—5.5 cm long, cottony at the base, posterior one the shortest, anther cells long, distinct, pendulous from the top of the filament, disc large, cushion-like ; ovary superior, oblong, compressed, 1.7 cm long, 0.5 cm broad, glabrous, 2-carpellary with numerous ovules in each loculus, style 4.5—5 cm long, purple and stigma with 2 large leafy blades ; fruit-capsule 60—72 cm long 8.5—9.5 cm broad, tapering to both ends, flat 2-valved, valves semi-woody and thin ; seeds numerous oval, flat, winged, wing extending all round except at base, 4 cm long, 7 cm broad from end to end of wing.

Flowers during July and August.

ILLUSTRATIONS. Rheedee, *Hort. Mal.* 1 : pl. 43 ; Wight, *lc. Pl. Ind. Or.* pl. 1337 and 1338. 1848 ; Dalz. & Gibs., *Bureau Monogr. Bign. Pl.* 9 ; Kirtikar & Basu, *Indian Med. Pl.* pl. 704. 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Occurs throughout India except in the drier Western regions, Burma, Malaya, Indo-china and Ceylon. In Ceylon, it is common in the moist low-country below 2000 feet elevation.

India. *J. D. Hooker & T. Thomson.* Ceylon. Peradeniya, *Bot. Gard.*, 1882, without name of collector ; *Jayaweera* 2500, July 1964 ; *Jayaweera* 2939, Aug. 1967.

COMPOSITION. The bark contains an alkaloid.

USES. The root is considered to be an astringent and tonic and is useful for diarrhoea and dysentery. It is diaphoretic and employed in the treatment of rheumatism, otorrhoea and piles. The seeds have a purgative action.

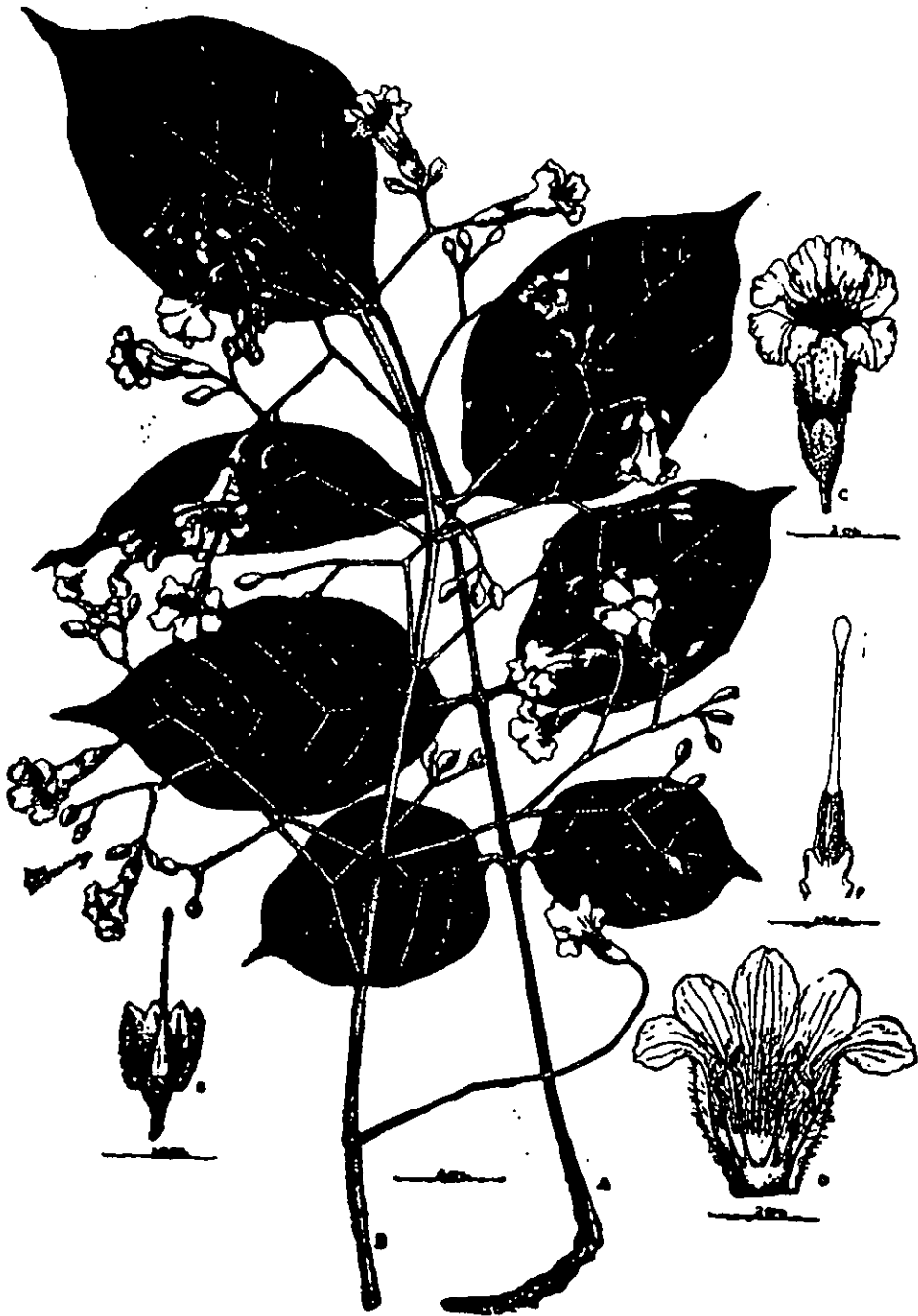


FIG. 90. *Stereospermum suaveolens*. A, compound leaf, B, inflorescence. C, front view of flower. D, corolla opened and spread out showing the epipetalous stamens. E, flower with corolla removed and calyx-tube spread out showing the pistil. F, longitudinal section of pistil through the ovary.

2. *Stereospermum suaveolens* (Roxb.) DC., Prodr. 9 : 211. 1845. (Fig. 90).

Bignonia suaveolens Roxb. — *Tecoma suaveolens* G. Don — *Heterophragma suaveolens* Dalz. & Gibs.

Sinh. Palol ; *Tam.* Ambu, Ambuvagini, Appu, Padiri, Pumbadiri, Pyuppadiiri ; *Hindi* Pad, Padal, Padaria, Padiala, Pandri, Paral, Parur, Pur, Purula ; *Sans.* Abhipriya, Alivallabha, Ambuasani, Ambuvasi, Amova, Kachasthali, Kalavrinti, Kamaduti, Karbura, Krishnavrinta, Kokila, Kuberaksh^h, Kumbhi, Kumbhika, Madhuduti, Patala, Patali, Phaleruha, Sthali, Sthiragandha, Supushpika, Tamrapushpi, Toyadhivasini, Toyapushpi, Vasantaduti.

A deciduous tree, 10—20 m tall with the young parts viscous-hairy; leaves opposite, imparipinnate, 30—60 cm long ; leaflets 3 or 4 pairs and an odd one, broadly elliptic, 7.5—15 cm long, 5—7.5 cm broad, usually acuminate, often serrulate rough above, pubescent beneath, base usually rounded or unequal-sided, main nerves 6—8 pairs with reticulate venation between; flowers irregular, bisexual, very sweetly fragrant, in large, lax, trichotomous, viscidly-hairy, terminal panicles ; bracts absent ; calyx gamosepalous, campanulate, viscidly-hairy, 2—5 lobed, lobes short and broad ; corolla gamopetalous, infundibuliform, 2.5—3.7 cm long, dull purple, pubescent outside, bearded inside on the lower half, glabrous on the upper side, limb obliquely 2-lipped, 5-lobed, lobes rounded, crisped-crenate, the lower 3 lobes longer than the upper 2 ; stamens 4, didynamous included, filaments without a tuft of hairs at the base, anther glabrous, cells much divergent ; disc cupular, fleshy ; ovary superior, 2-carpellary subsessile, elongate, 2-locular with many, horizontal ovules ; capsules 30—60 cm long and straight, 2 cm broad, terete, somewhat rough with thick and hard valves ; seeds 3 cm long with a long membranous wing at each end.

Flowers from March to April.

ILLUSTRATIONS. Wight, Ic. P. Ind. Orient. 4 : pl. 1342. 1848 ; Kirtikar and Basu, Indian Med. Pl., pl. 708. 1933.

DISTRIBUTION. Grows in India from Himalayas to Travancore mostly confined to the drier localities. It is cultivated in Ceylon.

Ceylon. Central Prov., Peradeniya, Bot. Gard., Appuhamy, March 1953 ; Jayaweera, 1667, March 1957 ; Jayaweera 2665, April 1965. Western Prov., Bentota, Thwaites C. P. 1960. Uva Prov., Nilgala, Kahataeta-hela, Herb. Peradeniya, Jan. 1888.

USES. The root bark is an ingredient in "Dasamula". It is regarded as cooling, diuretic and tonic. The flowers rubbed with honey are given for hiccough. In the form of a confection, they are taken as an aphrodisiac in Tanjore.

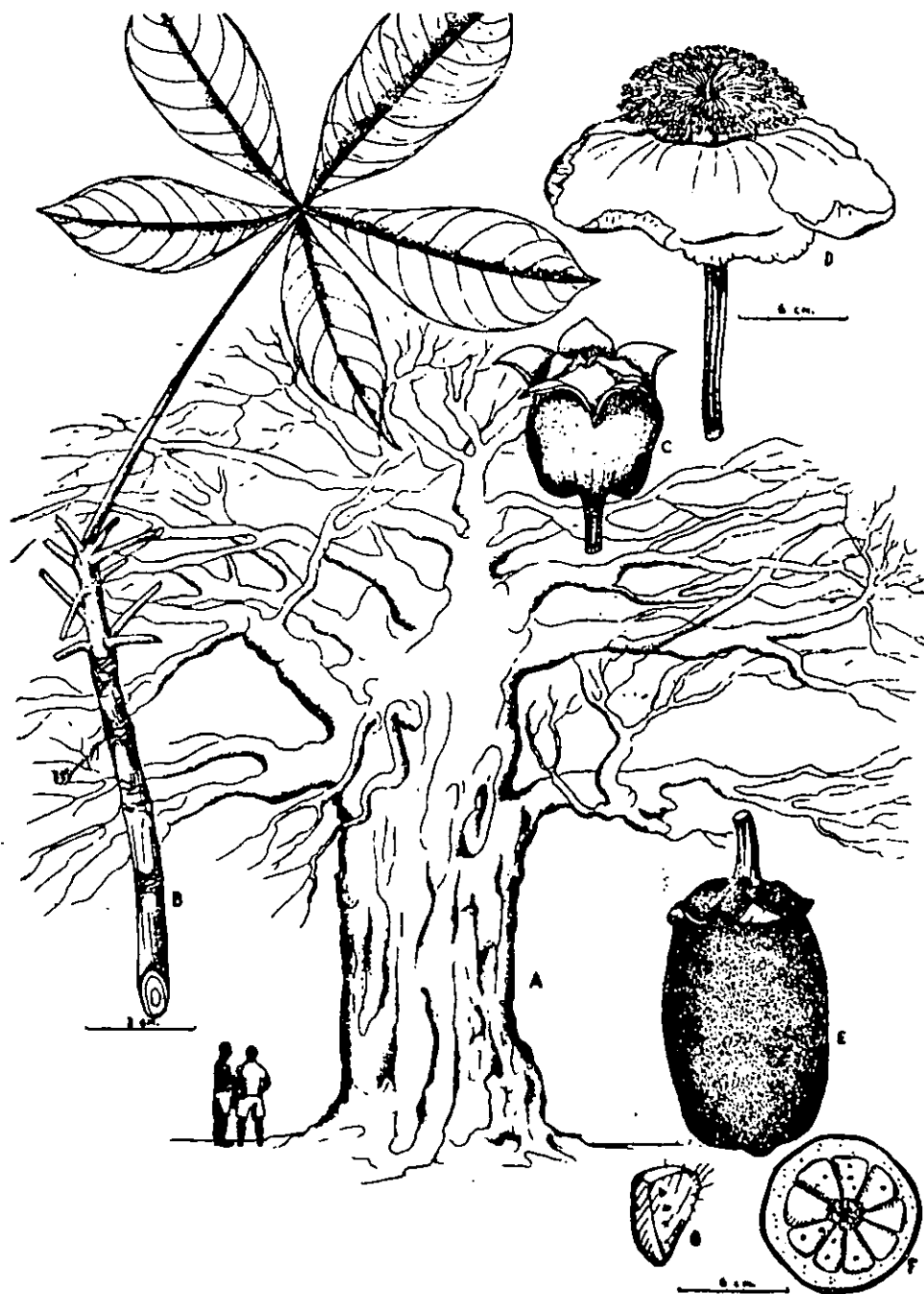


FIG. 91. *Adansonia digitata*. A, large, gnarled tree. B, branch with a leaf. C, flower bud. D, mature flower. E, fruit. F, transverse section of a fruit. G, seed surrounded by pulp.

19. BOMBACACEAE

1. *Adansonia digitata* Linn. Sp. Pl. 1190. 1753. (Fig. 91.)

Baobabus digitata O. Ktze.

Engl. Baobab Tree, African Calabash, Monkey Bread, Cream of Tartar Tree ; *Fam.* Anaippuli, Papparappuli, Perukku, Puri ; *Sans.* Chitrالا, Choramli, Dirghadandi, Gandhabahula, Gopali, Gorakshi, Panchaparnika, Sarpadandi, Sudandika.

A very large tree with a smooth, pinkish-grey bark; leaves alternate, palmate compound, deciduous ; petioles 7—14 cm long, green, glabrous, somewhat grooved ; leaflets 5 or 6 basal pair the smallest and the apical one the largest, 7—13 cm long, 2.5—5 cm broad, lanceolate to obovate, dark green on the upper surface, paler beneath with entire margin and acuminate-acute apex ; stipules intrapetiolar, triangular, dark brown, about 2 mm long and as broad at the base and hairy outside; flowers solitary, pedicelled, pendulous, bracteate ; calyx 5-cleft, thick, cup-shaped, pilose ; petals 5, large, waxy white, recurved with crenate margins adhering to the staminal column ; stamens numerous, filaments fused into a staminal column, anthers reniform ; ovary superior, 5—10 chambered with numerous ovules in each chamber, style long and erect dividing into as many stigma lobes as there are chambers ; fruit an indehiscent, woody, velvety capsule, 10—30 cm long.

Flowers from October to December and fruits from April to August.

ILLUSTRATIONS. Schum. in Engl. and Prantl. Pflanzenf. 5(3) part 6 : pl. 28 ; Watt. J. M. and M. G. Breyer-Brandwijk, Med. and Poisonous Plants of South and Eastern Africa pl. 49 ; Palgrave, O.H.C., Trees of Central Africa, pls. on pps. 51—53.

DISTRIBUTION. Grows in the dry, arid regions of Northern and Southern Rhodesia, Nyasaland and cultivated in various parts of India and Ceylon. In Ceylon, it has been planted in Mannar, Batticaloa and Peradeniya.

Ceylon. *Thwaites C.P.* 1141.

COMPOSITION. The bark contains a crystalline bitter principle, adansonin, which has a strophanthus-like action and the fruit, free tartaric acid, potassium bitartrate, pectic substances, proteins, sugars, citric acid and a bitter principle. The fruit pulp has a high ascorbic acid content. The leaf abounds in mucilage and contains sodium chloride, potassium acid tartrate and tannin. The soft, oily kernel of the seed contains a fixed oil.

USES. The leaves are considered an emollient, diuretic and a febrifuge. In Ghana, the bark is used as substitute for quinine in cases of fever. The pulp of the fruit is given for pestilential fevers and as an astringent in diarrhoea and dysentery. In Southern Rhodesia, the leaf is eaten as a vegetable while in Central Africa it is used as a diaphoretic against fevers. The seed is a remedy for dysentery. In Messina, the powdered seed is given for hiccough in children.

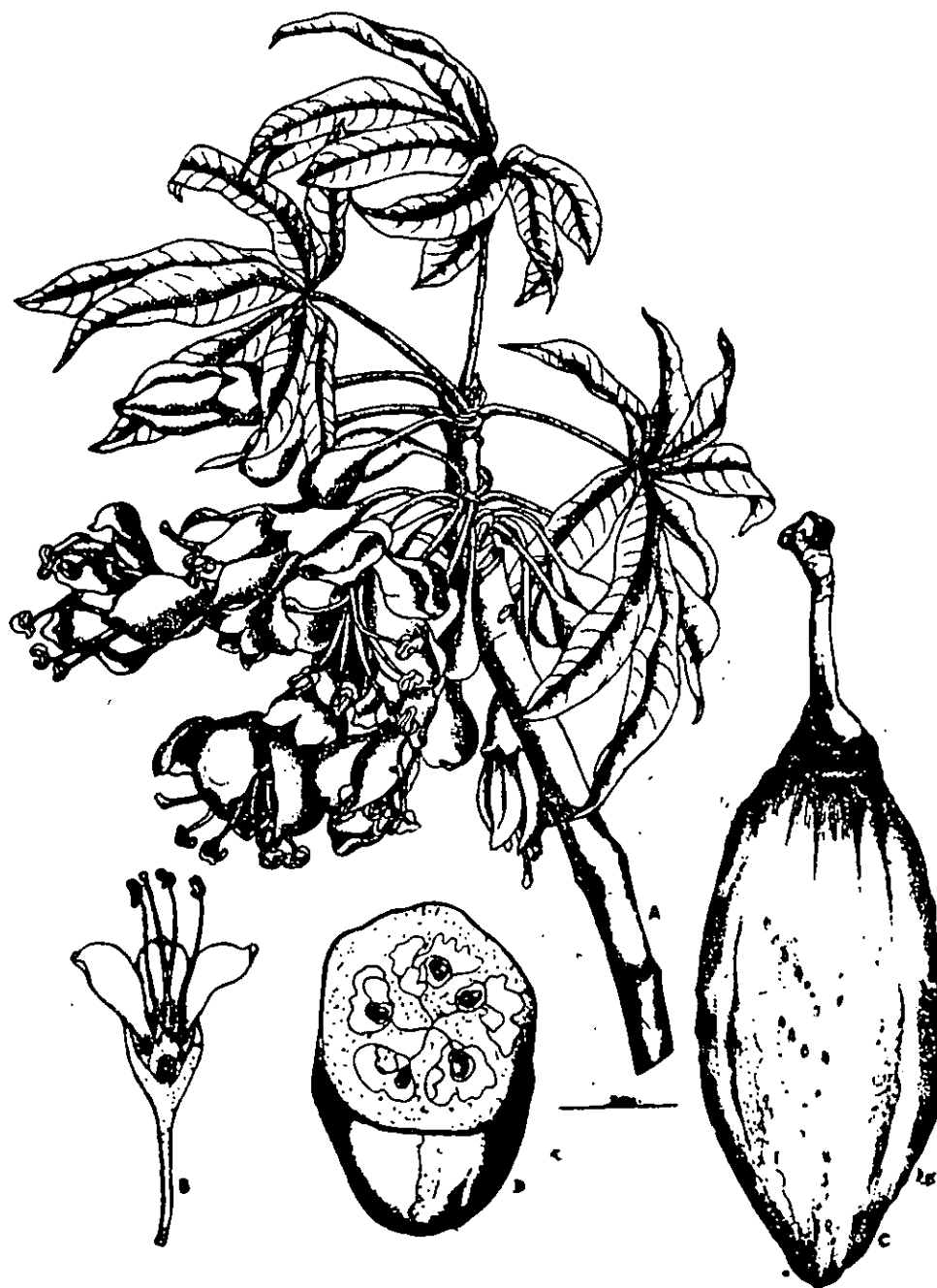


FIG. 92. *Ceiba pentandra*. A, twig with leaves and flowers. B, longitudinal section of a flower. C, fruit. D, transverse section of a fruit.

2. *Celba pentandra* (Linn.) Gaertner, *Fruct.* 2 : 244. 1791. (Fig. 92).

Bombax pentandrum Linn. — *Eriodendron pentandrum* Kurz — *Eriodendron anfractuosum* DC. — *Ceiba anfractuosa* Maza — *Bombax orientale* Spreng. — *Eriodendron orientale* Steud.

Engl. Kapok, White Cotton Tree ; *Sinh.* Imbul, Kottapulung, Pulung, Pulunimbul ; *Tam.* Ilavam, Karukkanam, Panji ; *Hindi* Hattian, Katan, Safedsemal ; *Sans.* Chirayu, Kutashalmali, Kutsitashalmali, Moch, Rochana, Salmali, Shvetasalmali, Sthirayu.

A tall tree with a smooth, greenish-white, glabrous bark and horizontal primary branches in whorls of three ; leaves alternate, digitate or palmate, closely placed on long petioles ; leaflets 5 or 7 on short winged stalks, 7.5—17 cm long, 1.5—5 cm broad, lanceolate, acute at the base, acuminate at apex, entire, glabrous, paler beneath ; stipules 0.5—1.2 cm long, linear-filiform, deciduous ; flowers regular, bisexual, creamy white, 3.7—5 cm diameter, in axillary clusters of 2—14, appearing with the young leaves at the ends of branches, drooping, pedicels 3.5 cm long, bracteoles absent ; sepals 5, fused into a tubular-campanulate, 5-lobed calyx, about 1.2 cm long, lobes shallow, glabrous outside, appressed hairy at the base within ; petals 5, slightly connate at base, convolute, 4 cm long, 1.8 cm broad, obovate-oblong, spreading, rounded at apex, densely tomentose outside and nearly glabrous within ; stamens 5, filaments 3.5 cm long, connate at the base into a fleshy tube adnate to the corolla, longer than petals, erect, anthers large and sinuous ; ovary superior, globular, glabrous, 5-locular with numerous ovules in each loculus, stigma obscurely 5-lobed ; fruit-capsule 8.8—10 cm long, surrounded at the base with a persistent calyx, ovoid-fusiform, blunt, dehiscent from base upwards by 5 septifragal valves, loculi densely lined with long, silky hair which is deciduous, seeds glabrous, blackish, each surrounded by a copious mass of cotton.

Flowers from January to March.

ILLUSTRATIONS. Wight, *lc. Pl. Ind. Orient.* 2 : pl. 400. 1843 ; Beddome, *Fl. sylvat.* 2 : Anal. Gen. pl. 4. 1868—73 ; Kirtikar and Basu, *Indian Med. Pl.*, pl. 143. 1933.

DISTRIBUTION. Probably a native of Malaya and found in the tropics. In Ceylon, it is very common in the low-country nearly always planted as fence posts along boundaries.

Ceylon. Peradeniya, *Thwaites C. P.* 1138.

COMPOSITION. The oil extracted from the seed consists of a mixture of fatty acids, The root, stem and flowers contain hydrocyanic acid and the bark contains tannin. The young leaves are eaten as a leafy vegetable and are a good source of calcium and iron.

USES. The fibre from the pods is extensively used for stuffing pillows, mattresses and for making life-preservers, etc. The oil extracted from the seeds is used for the manufacture of soap and the fresh oil-cake is a valuable stock feed. Medicinally, the root is used in the form of a decoction for chronic dysentery, diarrhoea, ascites, anasarca and also as the chief ingredient for preparation of aphrodisiac medicines. The taproot of the young plant is useful for gonorrhoea and dysentery. The gum is a useful styptic given for diarrhoea, dysentery, menorrhagia, and incontinence of urine in children. In Malaya, the bark is used as a diuretic and for asthma and colds, while in Java it is used for dissolving stones in the bladder. The leaves are beneficial for coughs, intestinal catarrh and urethritis. The unripe fruit is a demulcent and an astringent, while a decoction of the flowers is given for constipation. In West Africa, the leaf is used for gonorrhoea.

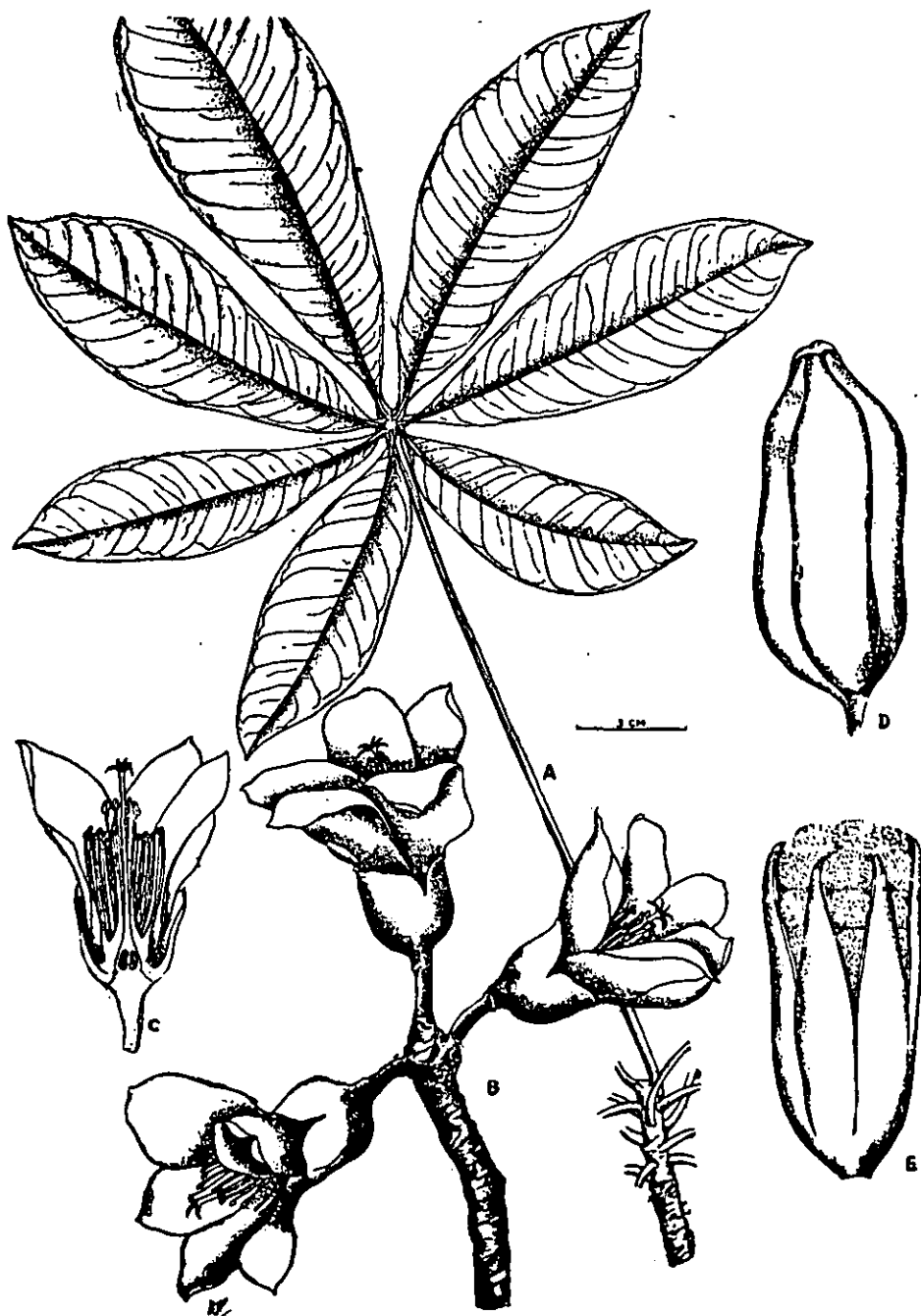


FIG. 93. *Salmalia malabarica*. A, leaf, B, open flowers on a twig. C, longitudinal section of flower. D, fruit. E, dehiscent fruit.

3. *Salmalia malabarica* (DC.) Schott & Endl., Melet. Bot. 25. 1832. (Fig. 93).

Gossampinus malabaricus (DC.) Alston — *Gossampinus heptaphylla* (Houtt.) Bakh. — *Bombax ceiba* Linn. — *Bombax heptaphylla* Houtt. — *Gossampinus rubra* Ham. — *Bombax malabaricum* DC.

Engl. Red Silk-cotton Tree ; *Sinh.* Katu-imbul ; *Tam.* Agigi, Ilavam, Ilavu, Kongu, Malilvam, Mullilavu, Pongar, Pulai, Purami, Sallagi, Samani, Sanmali, Selavagu, Sittan, Surabu ; *Hindi* Kantisembal, Pagun, Ragatsemal, Ragatsembal, Semal, Semul, Semur, Shimbhal, Simal, Somr ; *Sans.* Apurani, Bahuvirya, Chirayu, Chirjivi, Dirghadruma, Dirghapadapa, Dirghayu, Duraroha, Kadala, Kalpavriksha, Kantakadruma, Kantakari, Kantakashtha, Kukkutavandaka, Kukkutti, Mahavriksha, Mocha, Mochani, Nirgandhapushpi, Nissara, Pnachaparni, Pichhala, Purani, Raktapushpa, Raktotpala, Ramyapushpa, Salmili, Shalmali, Shalmalini, Shimulu, Sthirayu, Sthulaphala, Tulavriksha, Tulini, Tuliphala, Yamadruma.

A very large, tall, deciduous tree with a straight, erect, buttressed trunk with wide spreading branches at the top ; bark whitish, smooth set with broad based, conical, hard, sharp prickles, young parts glabrous; leaves large, spreading, digitate, almost palmate, stipulate, deciduous; petioles longer than leaflets, glabrous, cylindrical ; leaflets 3—7, lanceolate oval, 10—20 cm long, middle one largest, on short stalks, acute at base, acuminate, acute at apex, glabrous; stipules small, triangular, acute and deciduous; flowers regular, bisexual, large, bright pinkish red, 7.5—11 cm diameter on short, stout, deflexed pedicels, solitary in axils of the previous year's fallen leaves towards the ends of branches before the appearance of new leaves, bracteoles absent ; calyx very thick, cup-shaped, obtusely 2 or 3-lobed, glabrous outside, silky hairy within, wholly deciduous ; petals 5, distinct, 5—7.5 cm long, obovate-oblong, thick, obtuse, convolute and adnate to the base of the calyx, recurved above, covered with finely and densely stellate hairs outside, stellate pilose within, deciduous with the calyx ; stamens 55—60, inserted at the base of the calyx, connate at the very base and adnate to the petals and then combined into 5 bundles and a central bundle forming a tube round the ovary and the base of the style, innermost stamens of the central bundle being longer with larger sinuate anthers, others reniform, base of bundles pink, anthers brown ; ovary superior, conical, glabrous, 5-carpellary, 5-locular with numerous ovules in each loculus, style a little longer than the stamens, stigmas 5, spreading, recurved ; fruit a loculicidally dehiscent 5-valved, fusiform capsule, 8—10 cm long, valves lined with cottony hairs ; seeds ovoid, about 6 mm long, smooth, glabrous, embedded in the cottony wool.

Flowers during January and February.

ILLUSTRATIONS. Beddome, Flor. Sylvat. 1 : pl. 82. 1868—73 ; Roxburgh, Pl. Corom. 3 : pl. 247, 1819 ; Kirtikar and Basu, Indian Med. Pl. pl. 142, 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Grows in the hotter forest regions of India, Ceylon, Malaya, China, Java and Sumatra. In Ceylon, it is common in the low-country up to 2500 feet altitude, often planted.

Ceylon. Central Prov., Hantane, *Thwaites C. P.* 545. China. Hainan, Chin Shan, *Fung* 20176, May 1932.

COMPOSITION. The gum from the bark contains catechuic, tannic and gallic acids besides sugar and salts of calcium and magnesium. The seeds contain oil.

USES. The roots are considered astringent, restorative, alterative and aphrodisiac. The tap-root of the young plant is a demulcent, tonic, diuretic and an aphrodisiac. It is also used for treatment of gonorrhoea, dysentery and impotency. Externally, it is applied on rheumatic swellings with beneficial results. The bark is also a demulcent, diuretic and tonic and also used externally on inflammations and eruptions. The gum of the bark is given for dysentery and diarrhoea with good results. The leaves are ground into a paste and applied on skin eruptions. Flowers are laxative and diuretic while the dry young fruits are used in chronic inflammation and ulceration of the bladder and kidneys including strangury and forms of dysuria. The fruit is also used for weaknesses of the genital organs. Seeds are used for the treatment of gonorrhoea, cystitis and catarrhal affections. The powdered leaf with gingelly oil is given for urinary diseases.

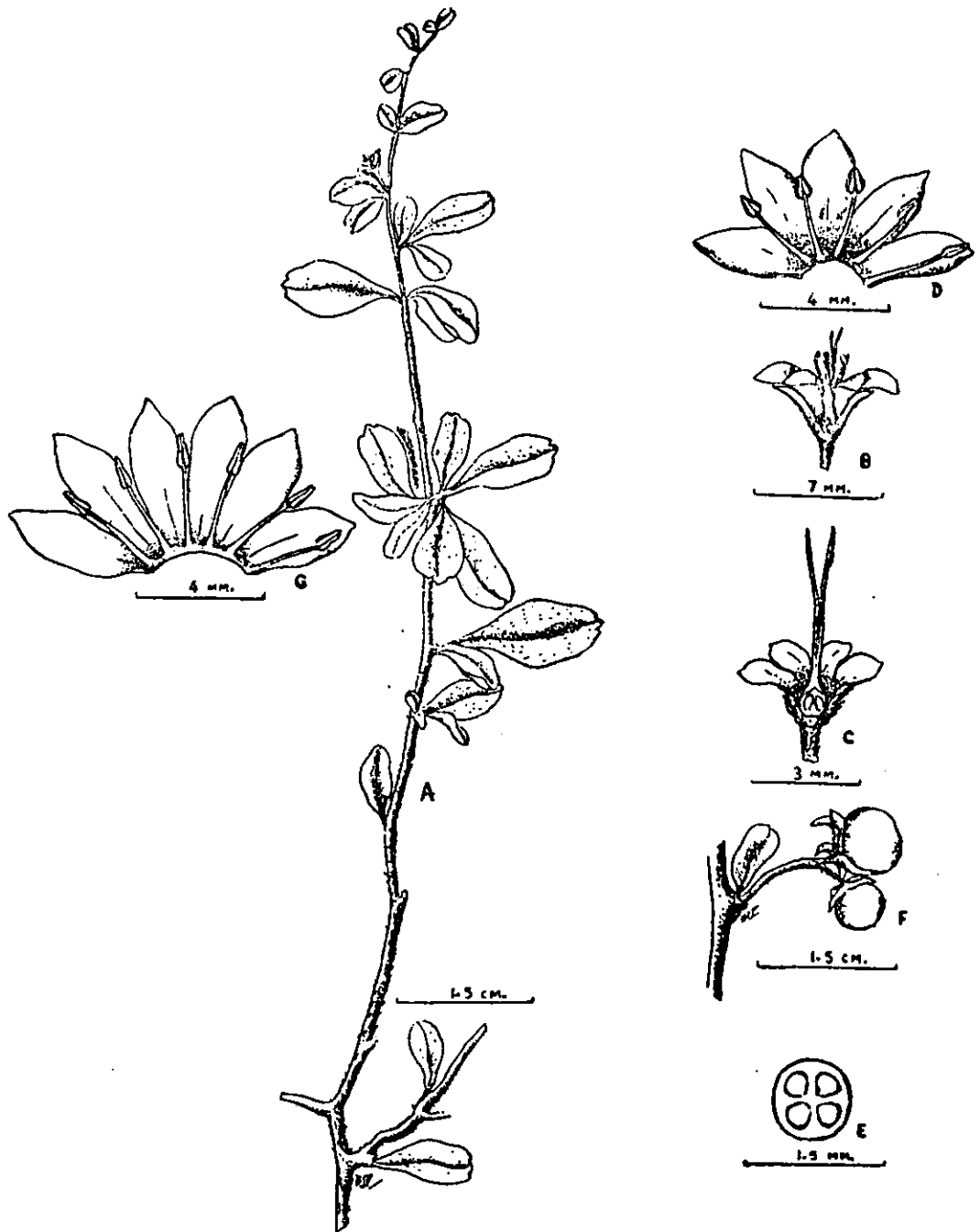


FIG. 94. *Carmona microphylla*. A, branch with leaves. B, external view of a flower. C, longitudinal section of a flower. D, corolla spread out with epipetalous stamens. E, transverse section of an ovary. F, fruits. G, corolla of a 6-merous flower spread out.

20. BORAGINACEAE

1. *Carmona microphylla* (Lamk.) G. Don, Gard. Dict. 4: 391. 1838. (Fig. 94.)
Ehretia microphylla Lamk. — *Ehretia buxifolia* Roxb. — *Ehretia heterophylla* Spreng. —
Cordia retusa Vahl — *Cordia coromandeliana* Koenig and Retz. — *Carmona heterophylla* Cav.

Engl. Ceylon Boxwood ; *Sinh.* Hintambala ; *Tam.* Kattuvettilai, Kuruvingi ;
Hindi. Pala.

A shrub, 1—1.3 m tall with numerous, slender, divaricate branches with a reddish brown cracked bark ; leaves simple, small, 0.7—2.8 cm long, 0.6—1.5 cm broad, sessile, fasciculate on suppressed branchlets, obovate-cuneate, acute at base, truncate with a few, obtuse crenations at apex, entire, dark green and rough on the upper surface with short, bristly hairs, developing a white spot at the base of each when dry, paler below with a few hairs on veins ; flowers white, regular, bisexual, 0.8—1 cm across, solitary or two together, axillary on very short pubescent pedicels which are 0.3—0.7 cm long ; calyx segments 5 or 6, oblong-spathulate, 3—3.5 mm long, 1—2 mm broad, hairy and acute ; corolla campanulate—rotate, lobes 5 or 6, each lobe 4 mm long, 2.5 mm broad, ovate, subacute or rounded ; stamens 5 or 6, epipetalous, exerted, filaments 2 mm long ; ovary superior, 1 mm long, 4-locular with a single ovule in each loculus, styles 2, 3.5—4 mm long, fused at the base above ovary for a short distance, with or without a few bristly hairs ; fruit a small globose, scarlet, 1-seeded drupe, broader than long 0.7 cm across with persistent calyx and styles ; seed ovate, apiculate, rugose-reticulate, 4.5 mm long, 3.5 mm broad.

Flowers in February, June to August and in November.

ILLUSTRATIONS. Roxb., Pl. Corom. 1 : pl. 57. 1795 ; Kirtikar and Basu, Indian Med. Pl., pl. 650B. 1933 ; Herb. Peradeniya drawing.

DISTRIBUTION. Occurs in India, Ceylon, South China, Formosa, Malaya and Philippine Islands. In Ceylon, it is a common shrub on the borders of jungles in dry and intermediate districts.

India. Maisor & Carnatic, *G. Thomson*, **Ceylon.** *Thwaites C. P.* 1885, in Jaffna and Kundasale ; Eastern Prov., Trincomalie, *Nevill*, March 1892 ; Central Prov., Kandy, *Alston* 1299, June 1926 ; Uma Oya, *J. M. Silva* 263, Dec. 1927 ; Peradeniya, Bot. Gard., cultivated, *Jayaweera* 1349, Feb. 1955 ; *Jayaweera* 2253, May 1957. **Philippine Islands,** Luzon : Benguet Prov., Sablan, *Elmer* 6167, April 1904.

COMPOSITION. The bark of this plant contains a glucoside.

USES. In South India the root of this plant is used for cachexia and syphilis and as an antidote for vegetable poisons. A decoction of the leaves is used to cure diarrhoea accompanied with discharge of blood and also for cough. The leaves are used for the same ailments in the Philippine Islands.

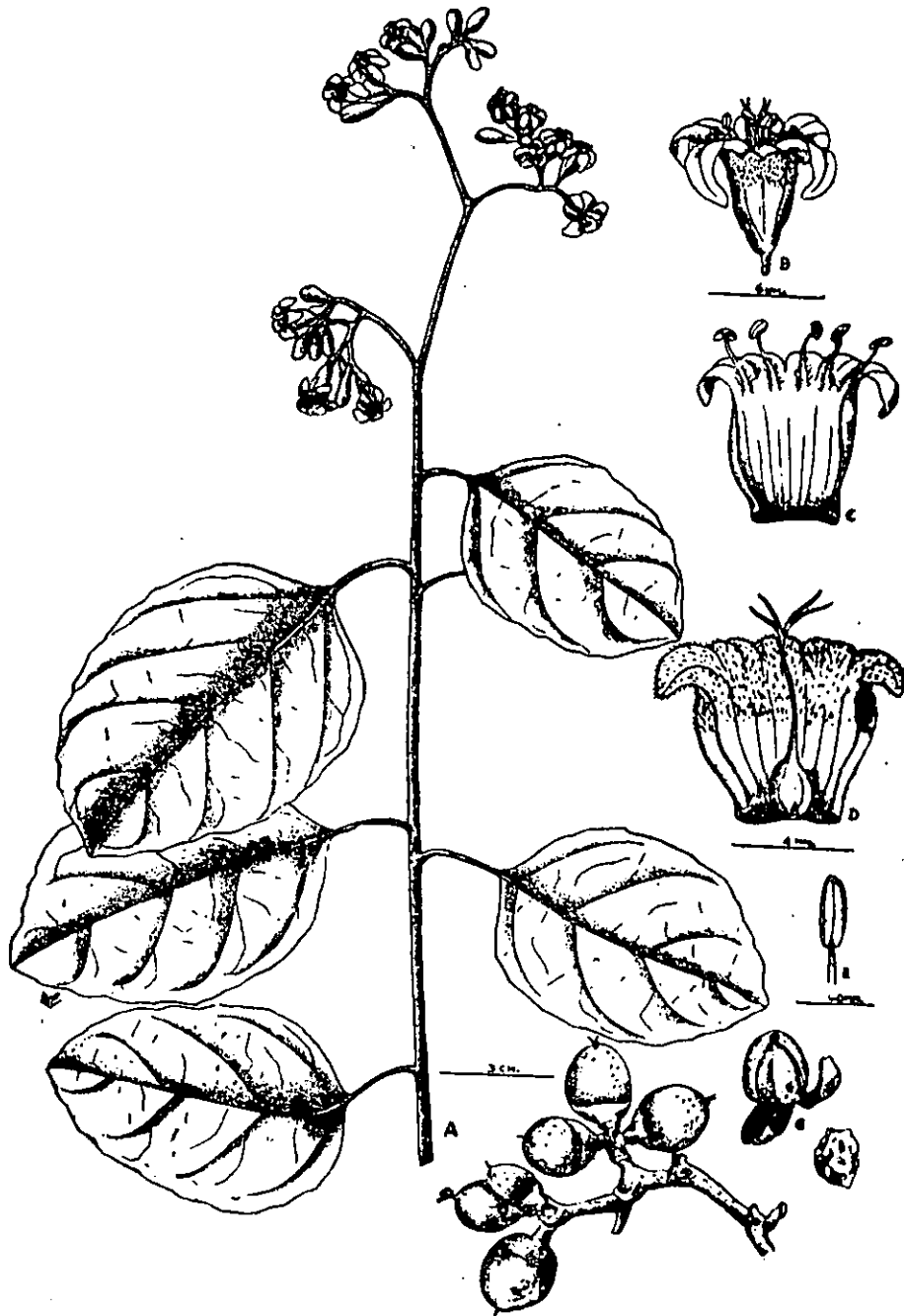


Fig. 95. *Cordia dichotoma*. A. branch with leaves and flowers. B. flower from side. C. corolla of a flower spread out showing epipetalous stamens. D. calyx spread out and pistil. E. stamen. F. fruits. G. fruit with pericarp opened out. H. seed.

2. *Cordia dichotoma* Forst. f., Prodr. 18. n. 110. (Fig. 95).

Cordia obliqua Willd. — *Cordia myxa* Thw. non Linn. — *Cordia myxa* var. *obliqua* Trim. — *Cordia sebestena* Blanco — *Cordia blancoi* Vidal — *Cordia blancoi* var. *mollis* Merr. — *Cordia leschenaultii* DC. — *Cordia latifolia* Roxb.

Engl. Sebesten Plum ; *Sinh.* Lolu, Lotu ; *Tam.* Naruvili, Selu, Sirunaruvili, Vallagu, Vidi, Viri, Virisu, Viriyan ; *Hindi* Bhairala, Bhokar, Chhotalaslasa, Chhotalasora, Gondi, Guslasah, Lasora, Lasura, Lessora, Rasalla ; *Sans.* Bahuvaraka, Bhukampadaruka, Bhukarbudara, Bhuselu, Bhutadruma, Kshudrashleshmataka, Laghupichhila, Laghushelu, Laghushita, Laghushleshmataka, Madhubhutadruma, Sukshmaphala.

A small tree with slender, glabrous twigs and pubescent buds ; leaves simple, alternate, 6—10.5 cm long, 4—7.5 cm broad, broadly oval or elliptic-ovate, rounded at the base, obtuse or subacute at apex, entire or more or less coarsely sinuate-serrate in the upper half, glabrous on both sides, thin ; petioles 1.7—4.3 cm long and slender ; flowers regular, bisexual, white, in lax, divaricate, branched corymbs, pedicels short ; sepals 5, fused into a tubular-campanulate, glabrous calyx, pubescent within, segments very shallow, about 1.5 mm long ; petals 5, fused into a funnel-shaped corolla, corolla-tube 4 mm long, segments 3.5 mm long, 2 mm broad, oblong, recurved ; stamens 5, hairy, inserted in the throat of the corolla ; ovary superior, globular, glabrous, 4-locular with a single ovule in each loculus, style terminal, deeply divided, the branches again bipartite and linear ; fruit a globular-ovoid drupe, 1.8 cm long, with a nearly truncate, persistent calyx, stone 1-locular by abortions.

Flowers in June, July and December.

ILLUSTRATIONS. Kirtikar and Basu, Indian Med. Pl, pl. 646. 1933 ; Herb. Peradeniya, drawing.

DISTRIBUTION. Grows in the warmer parts of India, Ceylon, Malaya, S. China, Java, Formosa, New Guinea, Philippine Islands and tropical Australia. In Ceylon, it is commonly found in the low country up to 2000 feet altitude chiefly in the dry regions. Kurunegala, Kandy and Polonnaruwa.

India. Sylhet; *Clarke* 8394, March 1869. Bengal, *Clarke* 26192, April 1875. Assam, *Masters*. North Canara, *Talbot* 91, March 1882. Maisor and Carnatic, *G. Thomson*. Pen. Ind. Or., *Herb. Wight* 2041, Kew Distribution 1866—7. Ceylon. North Central Prov., between Polonnaruwa and the river, *J. M. Silva*, March 1905 ; Kurunegala, *Thwaites* C. P. 3650, 1866. **Sumatra.** East coast, *Yates* 1665. **Philippine Islands.** Luzon, Tayabas Prov., *Ramos & Edano* 45299, May-June 1925.

COMPOSITION. The fruit contains sugar and gum and the bark contains, (besides tannin), a principle allied to "Cathartin".

USES. The juice of the bark with coconut milk relieves severe colic. In Java, the bark is given for dysentery together with pomegranate rind. The mucilage in the fruit is used for treating coughs and diseases of the chest, uterus, urethra, etc. In larger doses, it is given for bilious ailments as a laxative. It is also used in gonorrhoea. Externally the moistened bark is applied on boils and tumors. In the Philippines, it is used for headache and stomach ache. In powder form, it is used as a cure for ulcers in the mouth. An infusion of it is used as a gargle. The kernels of the fruit are powdered, mixed with oil and applied on ringworm.

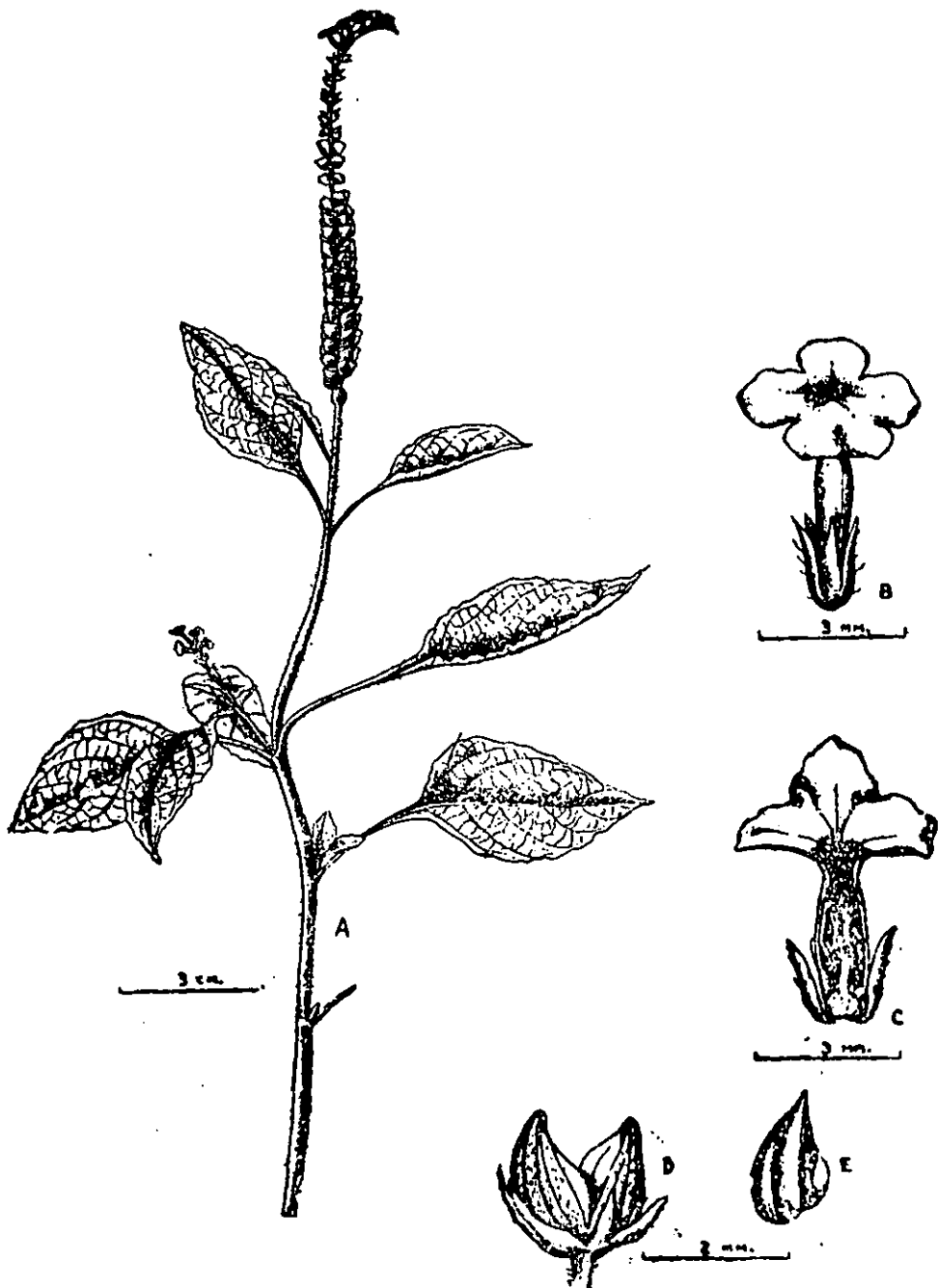


FIG. 96. *Heliotropium indicum*. A, branch with a terminal inflorescence. B, external view of flower. C, longitudinal section of flower showing the stamens and pistil. D, bilobed fruit. E, 1-seeded pyrene with empty cavity on the inner side.

3. *Heliotropium indicum* Linn. Sp. Pl. 130. 1753. (Fig. 96).

Heliotropium anisophyllum Beauv. — *Heliotropium parviflorum* Blanco — *Tiaridium indicum* Lehm. — *Tiaridium anisophyllum* G. Don — *Heliohytum indicum* DC. — *Heliohytum velutinum* DC.

Sinh. Et-setiya, Et-honda ; *Tam.* Dimbiya, Telkodukku, Telmunai ; *Hindi* Hattajurie, Hattasura, Siriari ; *Sans.* Bhurundi, Hastishundi, Hatisunada, Srihastini.

A coarse, annual herb. 30—60 cm tall, stems stout, erect with ascending branches, hispid with long spreading hairs, internodes 3—6 cm long, hispid ; leaves simple, often subopposite, 3.5—6 cm long, 1.8—3.5 cm broad, ovate or ovate-oval, often unequal sided, rounded and suddenly contracted to a decurrent base, acute or subacute at apex, somewhat crenate and undulate at the margin, bristly hairy on both sides with longer hairs on prominent veins beneath ; petioles 1—2.5 cm long, winged, bristly hairy ; flowers numerous, small, regular, bisexual in two rows, along simple, very long, terminal scorpioid cymes, peduncle stout, 1.5—2 cm long, bristly hairy ; sepals 5, free, 1.5—1.7 mm long, 0.5 mm broad, linear-ovate, acute with a few long bristly hairs ; corolla tube longer than sepals, narrowed upwards 4—4.5 mm long, bristly outside, limb rotate, spreading, 4 mm across, lobes 5, shallow, imbricate, purplish-blue ; stamens 5, included in the corolla-tube, almost sessile, inserted less than half way up the tube, anthers 0.5 mm long ; ovary superior, 4-locular with a single ovule in each loculus, pistil 1 mm long, style very short broadening towards the stigma and flat on top ; fruit 2.5 mm long, 3.5 mm broad, deeply bilobed, hispid, each lobe bluntly 4-ribbed, produced above into a short, blunt, bidentate beak, containing 2, angular, beaked, very hard, 1-seeded pyrenes which have each a large empty cavity on the inner side.

Flowers from March to July.

ILLUSTRATIONS. Curtis, Bot. Mag. pl. 1837 ; Beauv., Fl. Ow. et Ben. 2 : pl. 96 ; Wight, Ill. pl. 171 (*Tiaridium indicum*) ; Chamisso in Linnea, pl. 5. f. 2. 1829 ; Fresen in Mart. Fl. Bras. fasc. 22, pl. 10. f. 4 ; Kirtikar and Basu, Indian Med. Pl., pl. 651A. 1933 ; Herb. Peradeniya., drawing.

DISTRIBUTION. Occurs throughout India, Ceylon, Malaya, tropical Africa and tropical America. In Ceylon, it is a very common roadside weed in the low country. Peradeniya, Ratnapura, Bintenne, etc.

India. Bengal : Clarke 16944A, Feb. 1872 ; J. D. Hooker and T. Thomson. Misor & Carnatic : G. Thomson. Malabar, Concan, etc. Stocks, Law, etc. Pen. Ind. Orient., Herb. Wight 2065, Kew Distribution 1866—7. Ceylon. Eastern Prov., W. R. C. Paul, Oct. 1952, a common weed ; Thwaites C. P. 1893. Brazil. Herb. Hance 552.

COMPOSITION. Contains an alkaloid, tannin and an organic acid.

USES. In India, the leaves of this herb are used on boils and ulcers. The juice of the leaves is applied on sores, gum-boils and pimples on the face. A decoction of flowers and leaves is used as a gargle to cure sore-throat. In Cambodia, the flowers are considered emmenagogue in small doses and an abortifacient in higher doses. Externally, plasters of the leaves and roots are applied for ringworm and rheumatism. In Ceylon, the plant is used for rheumatism and bronchial diseases. The Mexicans use a decoction of the roots as a cure for coughs and asthma. In Ghana, the leaves are used to cure gonorrhoea and erysipelas, and as a local application on boils, sores and stings of insects. The boiled leaves mixed with clay are used by Ashanti women to prevent abortion.

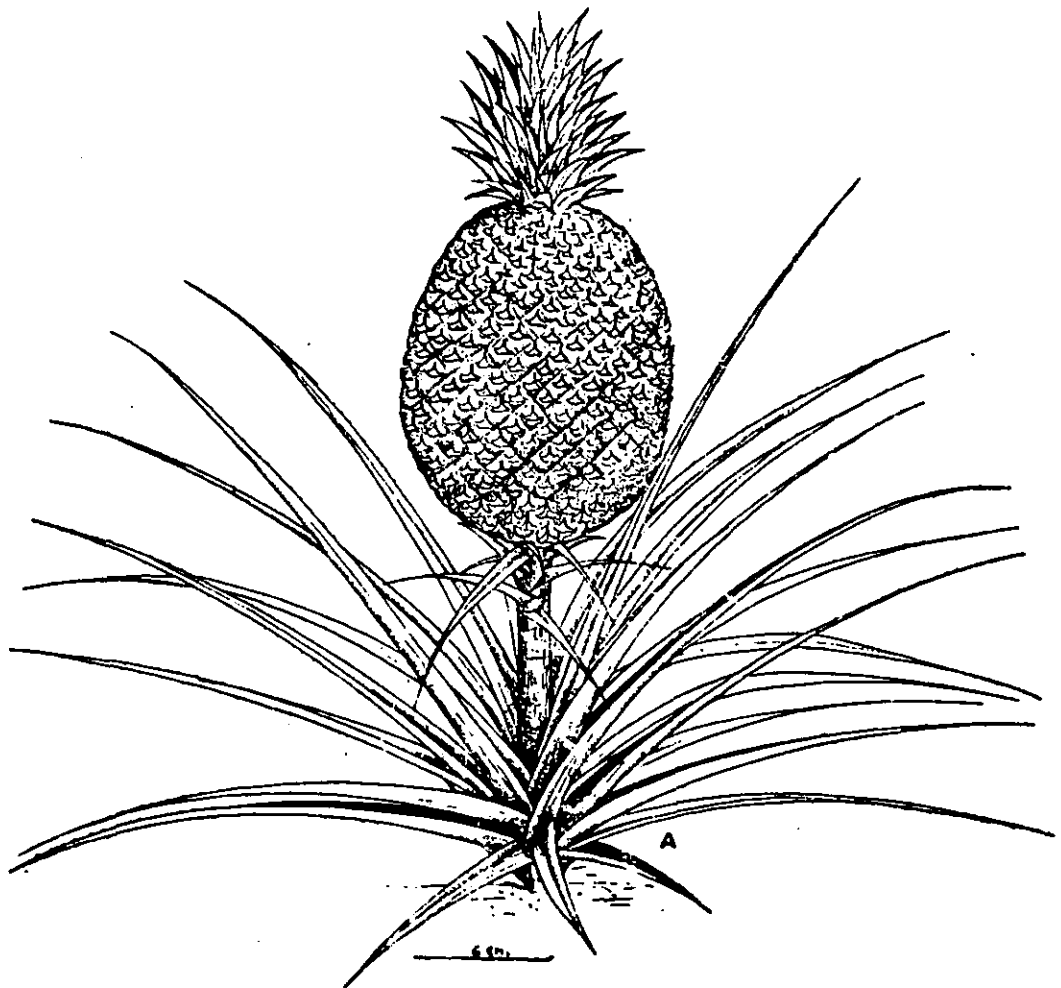


FIG. 97. *Ananas comosus*. Plant with a fruit.

21. BROMELIACEAE

1. *Ananas comosus* Merrill, Interpr. Rumph. Herb. Amboin. 133: 1917. (Fig. 97).

Bromelia comosa Linn. — *Bromelia ananas* Linn. — *Bromelia pigna* Perr. — *Ananas sativus* Schultes f. — *Ananassa ananas* Karst.

Engl. Pine-apple ; *Sinh.* Annasi ; *Tam.* Anassappalam ; *Hindi* Ananas, Anannas ; *Sans.* Ama, Anannasa, Kautukasanjaka, Paravati.

A terrestrial herb with rosettes of long and strong, spiny-serrate, linear-lanceolate leaves 1—1.5 m long, 5—7 cm broad, acuminate, green and shining on the upper surface, paler beneath; stem erect, central, bearing at its apex a simple, dense, cone-like spike; flowers sessile, bisexual, (sterile in cultivated forms); bracteoles numerous, triangular-ovate to oblong-ovate, acute, imbricated; sepals 3, ovate, thick, fleshy, about 1 cm long and imbricate; petals 3, free, oblanceolate, about 2 cm long, white below and violet above, provided with 2 small ligules at the base; stamens 6, attached to base of the perianth; ovary inferior, style filiform, 3-branched; fruit a syncarpium formed by the coalescence of thickened rachis, spiny-toothed bracts, abortive ovaries and adhering parts into one large globose or elongated fleshy fruit called the "pine-apple"; an eye is the sharp end of a berry composed of 6 segments, one series of 3 inside the other, the cavity underneath the segments containing the dried remains of the functionless stamens and style.

Flowers and fruits throughout the year.

DISTRIBUTION. A native of tropical America and now cultivated for its fruits in all tropical countries including India and Ceylon.

COMPOSITION. The flesh of the pine-apple contains the sugars saccharose, glucose, fructose and mannite, citric acid, traces of vanillin and the enzyme, bromelin, which has the same properties as trypsin. The fruit is also a good source of vitamins A, B, C and calcium and iron. The fresh young leaf yields ascorbic acid.

USES. The fruit as well as the juice of the leaves are a powerful anthelmintic and vermicide. The immature pine-apple contains a poisonous substance which brings about violent purging and hence the juice is given as a vermifuge for children and abortifacient for women. In Ceylon, the expressed juice of the leaves is given with sugar as a purgative and a cure for hiccough. The unripe fruit given with vinegar relieves flatulence and distension of the abdomen. Its juice in large doses causes uterine contractions. The juice of the ripe fruit is given for jaundice and diarrhoea. It is an antiscorbutic, diuretic, diaphoretic, aperient, refrigerant and digestive.

In China and in the Philippine Islands, an excellent fabric is turned out from the fibre of the leaves. Vinegar and an excellent wine are made from the ripe fruits. The essence of pine-apple is used in confectionery.



FIG. 98. *Boswellia serrata*. A. branch with leaves and flowers. B. front view of flower. C. fruit.

22. BURSERACEAE

1. *Boswellia serrata* Roxb. ex Colebr., As. Res. 9: 379, 1807. (Fig. 98).

Boswellia thurifera Roxb. ex Fleming — *Libanus thurifera* Colebr. — *Libanotus asiaticus* Stackhouse.

Sinh. Kundrikan; *Tam.* Attam, Kunduru, Kundurukkan, Kungiliyam, Kungulu, Muraiyidam, Parangichambrani, Sambrani, Valugam, Vellaikkungiliyam; *Hindi* Kunder, Luban, Salai, Salga, Salhe, Sali, Salpe, Selgond; *Sans.* Ashvnutri, Asraphala, Bahusrava, Gajabhaksha, Gajapriya, Gajashana, Gajavallabha, Gandhamula, Gandhavira, Hladini, Hraswada, Jalatiktika, Karaka, Konkanadhupa, Kumbhi, Kundu, Kunduru, Kunduruki, Lhadini, Maherana, Maheruna, Mocha, Nagavadhu, Rasala, Salasi, Sallaki, Shallaki, Silhabhumika, Silhaki, Sugandha, Sukhamoda, Surabhi, Surabhisillaki, Surabhisrava, Sushrika, Susrava Suvaha, Vanakarnika, Vasamaharuba, Viseshadupa, Yakshadhupa.

A deciduous, medium-sized tree with an ash-coloured, papery bark which peels off in thin flakes; young shoots and leaves pubescent; leaves alternate, crowded at the ends of branches, imparipinnate compound, 20—37.5 cm long, deciduous; leaflets opposite, 2.5—6.2 cm long, 1.2—3 cm broad, sessile, 8—15 pairs and an odd one (the pair at the base much smaller than the others), variable in shape, ovate or ovate-lanceolate, usually unequilateral and often obtuse, crenate-serrate, more or less pubescent, base acute, rounded or somewhat truncate; flowers small, white, bisexual in axillary racemes shorter than leaves; calyx small, 5-toothed pubescent outside, persistent, lobes broadly triangular-ovate; petals 5, imbricate, 5 mm long, ovate, narrowed at base, pubescent outside, tips inflexed; disc annular, fleshy, crenate; stamens 10, alternately long and short inserted at the base of the disc, anthers slightly pubescent; ovary sessile, surrounded by a disc, 3-locular with 2 pendulous ovules in each loculus, style short, grooved, stigma 3-lobed; fruit a trigonous drupe containing 3 pyrenes, valves septical; pyrenes 1-seeded, bony, heart-shaped with a long apex surrounded by a membranous wing; seeds compressed and pendulous.

ILLUSTRATIONS. Kirtikar and Basu, Indian Med. Pl. *pl.* 209. 1933; Colebr., Trans. Linn. Soc. 15: *pl.* 5. 1827.

DISTRIBUTION. A common tree on the dry hills of India but is not found in Ceylon.

India. Siwalik & Jaunsar, *Gandhe* 28, May 1921. Chota Nagpore, *Clarke* 21467 *H. G.*, Jan. 1884. Annamallay: *Bedome* 254. Malabar, Concan, etc. *Stocks*, *Law*, etc. Behar, *J. D. Hooker*. Bengal, Calcutta, *Bot. Gard.*, cultivated.

COMPOSITION. The gum contains oxidising and diastatic enzymes.

USES. The gum is used as an internal and external stimulant, expectorant, diuretic and stomachic. It is also a hepatic stimulant. It is useful in chronic cases of diarrhoea, dysentery, pulmonary affections and haemorrhoids. Used as a hair oil as it promotes the growth of the hair.

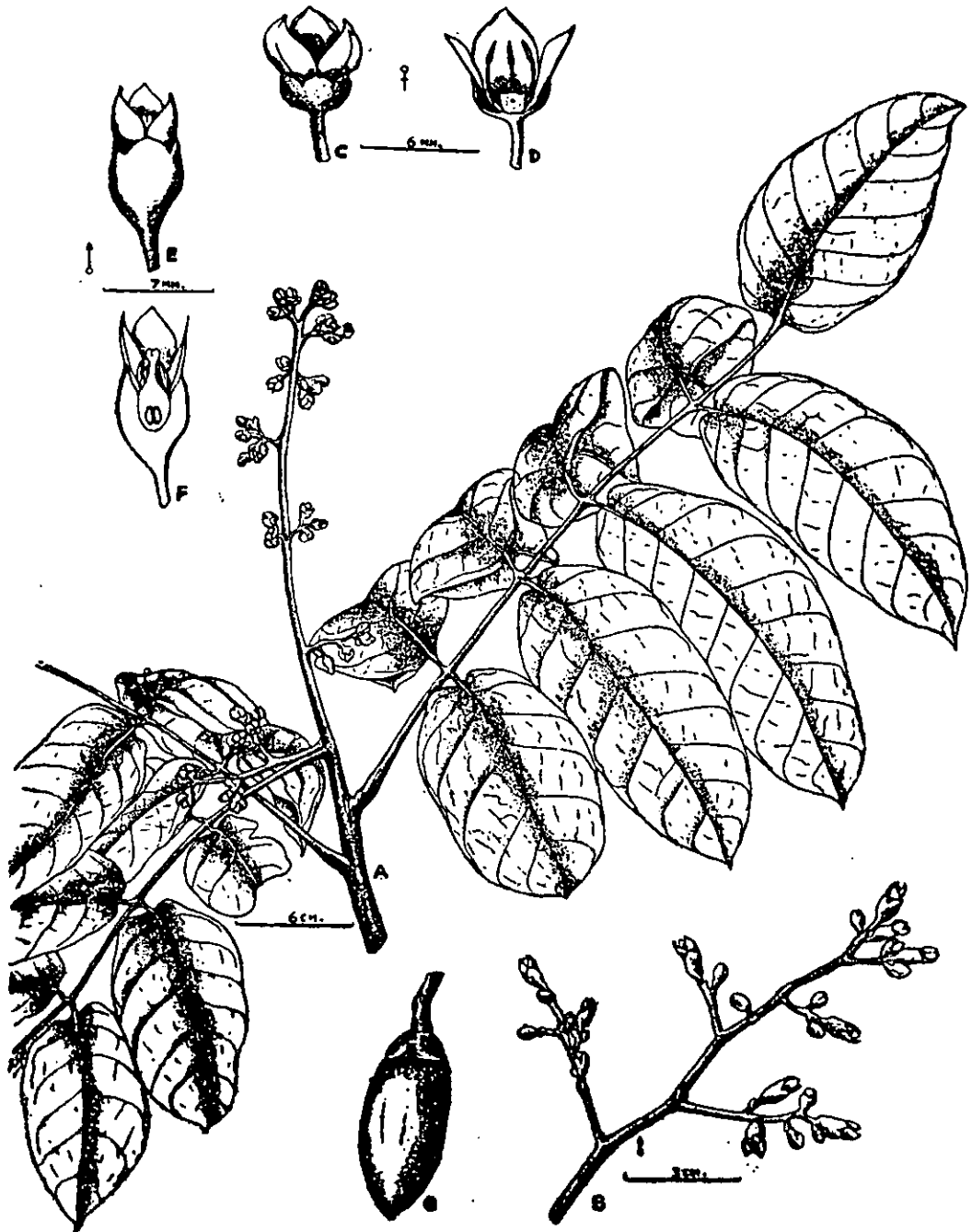


Fig. 99. *Canarium zeylanicum*. A, branch with leaves and flowers. B, panicle with flowers. C, male flower, side view. D, longitudinal section of male flower. E, female flower, side view. F, longitudinal section of female flower. G, fruit.

2. *Canarium zeylanicum* Blume, Mus. Bot. Lugd. Bat. 1: 218. 1849. (Fig. 99).
Amyris zeylanica Retz. —*Canarium balsamiferum* Moon

Sinh. Kekuna, Dik-kekuna; *Tam.* Pakkilipal.

A very large tree, with a pale, smooth, thin bark, buttressed roots and densely fulvous pubescent young shoots; leaves imparipinnate compound, alternate, rachis 15—20 cm long, cylindrical, thick, pilose, lenticellate; leaflets 3 pairs and a terminal one on short, stout, pilose, brown stalks, 5—7.5 cm long, broadly oblong-oval, subcordate at base, very shortly acuminate, entire, margin somewhat reflexed, glabrous, not shining, rigid, deep apple-green, veins yellow, broad and very conspicuous above, lateral ones prominent beneath; stipules on the petiole looking like a lower pair of small leaflets, rotundate-sagittate, shortly stalked, quickly falling and leaving prominent raised leaf scars; flowers small, regular, unisexual, pale greenish-yellow on short, stout pedicels, arranged in narrow rufous-tomentose, pedunculate, terminal panicles, the male flowers numerous, crowded, and female flowers few, bracts rotundate, tomentose, falling early; male flowers: sepals 3, fused into a 3-lobed calyx, cup-shaped, pilose; petals 3, about twice as long as the calyx, very thick, erect, pilose outside; stamens 6, erect, shorter than petals; ovary rudimentary; female flowers: calyx and corolla as in the male; stamens 6, rudimentary; ovary superior, 3-locular with 2 ovules in each loculus, style short, stigma capitate, 3-lobed; fruit, a drupe supported on the enlarged and persistent calyx, 3.7 cm long, oblong-ovoid, faintly trigonous, blunt, plum-coloured with a bluish-grey bloom, stone very thick, bony; seed large, oblong.

Flowers from May to September.

ILLUSTRATION. Herb. Peradeniya, drawing.

DISTRIBUTION. Endemic to Ceylon, commonly found growing in the moist low-country Ambagamuwa, Ratnapura and also in the Batticaloa region.

Ceylon. *Thwaites C. P.* 2649. Eastern Prov., Batticaloa, *Walker* 199, Sept. 1885.

USES. When the bark is injured, an abundance of a beautifully clear, fragrant, balsamic gum-resin exudes from it and this is used for fumigation and lighting in houses. Medicinally, the bark of the tree is astringent and antiseptic. A decoction of it is used as a gargle for bleeding and spongy gums. An ointment prepared by boiling it with coconut oil is used as a dressing for chronic ulcers and fistulae. Internally, it is used as an aromatic stomachic and astringent and is largely used against diabetes. As a febrifuge, it has antiperiodic properties and is useful for infective fevers and malaria. The gum-resin is used as a gargle for pyorrhoea and halitosis with beneficial results.

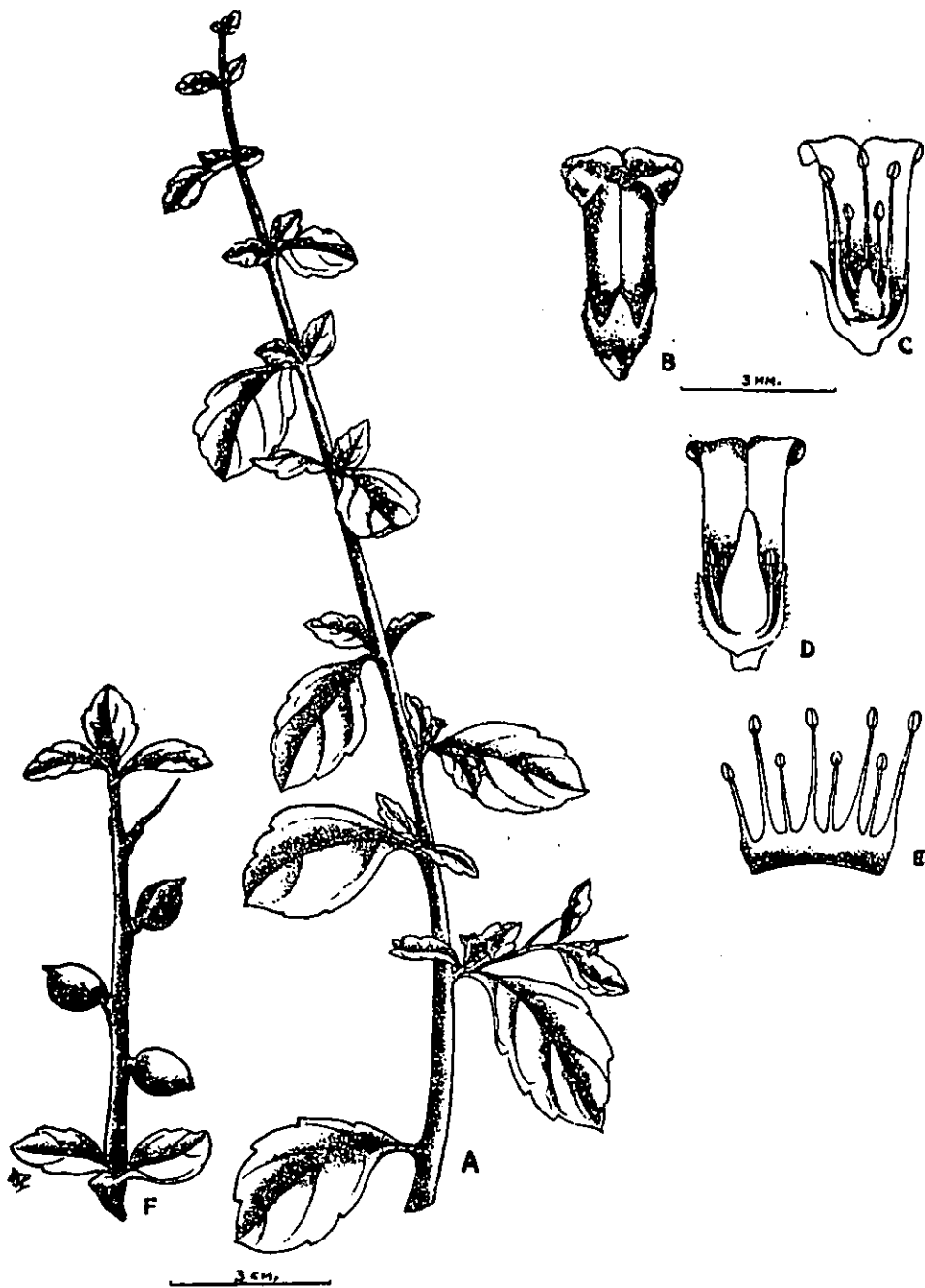


Fig. 100. *Commiphora mukul* A, branch with leaves. B, flower from side. C, longitudinal section of bisexual flower. D, longitudinal section of female flower. E, stamens with a portion of the disc. F, fruits.

3. *Commiphora mukul* Engl. in DC. Monogr. 4 : 12. 1883. (Fig. 100).

Balsamodendron mukul - Hook. ex Stocks — *Balsamodendron roxburghii* Stocks — *Balsamodendron wightii* Arn.

Sinh. Gugul, Jatayu, Javayu, Ratadummala ; *Tam.* Gukkal, Gukkulu, Muishakshi, Vellaippolam ; *Hindi* Gogil, Gugal, Guggul, Mukul, Ranghanturb ; *Sans.* Bhavabhishta, Bhutahara, Devadhupa, Deveshta, Dhurta, Divya, Durga, Guggulu, Jatala, Jatayu, Kalaniriyasa, Kaushika, Kumbha, Kumbhi, Kumbholu, Kumbholukhalaka, Kunti, Mahishaksha, Mahishakshaka, Marudishta, Nishadhaka, Palankasha, Pavandvishta, Pura, Puta, Rakshoha, Sarvasaha, Shambhava, Shiva, Uddipta, Ulukhalaka, Usha, Vayughna.

A balsamiferous shrub, 1.2—2 m high, with glandular pubescent young parts and knotty, crooked, divaricate branches often ending in sharp spines ; leaves alternate, membranous, 1—3 foliate ; leaflets sessile (the terminal up to 2 cm by 0.8 cm) rhomboid-ovate, serrate-toothed in the upper part with an entire, tapering base, smooth and shining, the lateral leaflets when present less than half the size of the terminal ones ; flowers polygamous, small, in fascicles of 2 or 3 with short pedicels ; calyx campanulate, glandular-hairy, lobes 4 or 5, triangular, as long as the calyx-tube ; petals, 4, brownish-red, broadly linear, about 3 times the length of the calyx, reflexed at apex, inserted on the margin of the disc ; stamens 8—10, alternately long and short, half the length of the petals ; disc cupular, 8—10 lobed, the alternate sinuses deeper and in these are inserted the shorter stamens ; ovary superior, oblong-ovoid, 2—4 locular with 2 ovules in each loculus, style short, stigma 3 or 4-lobed ; fruit an ovoid, red drupe, 6—8 mm diameter, acute, 4-valved.

Flowers during March and April in their natural habitat.

ILLUSTRATIONS. Hooker, Kew Journ. Bot. 1 : pl. 8. 1849 ; Kirtikar and Basu, Indian Med. Pl., pl. 211. 1933.

DISTRIBUTION. A common shrub growing in the arid and rocky tracts of Sind, Baluchistan, Rajasthan, Mysore and Madhya Pradesh but not in Ceylon.

COMPOSITION. The exudation from this shrub which is used medicinally, contains a gum, resin, a volatile oil and a bitter principle.

USES. The drug referred to as Gugul has a wide range of usefulness. It is used as a gargle for caries of the teeth, weak and spongy gums, pyorrhoea, chronic tonsillitis and pharyngitis and ulcerated throat. As an intestinal disinfectant, it is useful for chronic catarrh of the bowels with diarrhoea, in chronic colitis, tubercular ulceration of the bowels and tubercular diarrhoea. *Gugul* is also useful for typhoid fever, prevention and cure of malarial fever, filariasis and chronic rheumatism. In leprosy and tuberculosis, the effects of Gugul are remarkable. As a tonic it is given for anaemia, debility after acute illness, senile debility, neurasthenia, neuritis and paralytic conditions. It is used as an aphrodisiac in sexual debility and impotence. It is an antiseptic and used for boils, abscesses and as a paste for haemorrhoids and for ulcers.

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