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An issue to mark the
occasion of the
150th Anniversary
of the founding of
Singapore

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Notes on the Systematy of Malayan Phanerogams

I — V

from

FOREST RESEARCH INSTITUTE, KEPONG, MALAYA

Abstract

Canarium reniforme is described as new, from the Dindings.

Dillenia grandifolia is resurrected for a common Malayan simphoh.

Alloburkillia replaces *Burkillia* as the name for a very rare leguminous shrub. *Crudia sparei*, the second climber in the genus, is described as new. *Dialium angustisepalum* is reduced into *D. patens*. *Fordia johorensis* and *F. ngii* are new species. *Ormosia grandistipulata* is a new rare endemic species. *Abarema kiahii*, optimistically proposed, is sunk into *Pithecellobium globosum*.

Ctenolophon grandifolius is reduced to *C. parvifolius*.

A new variety, *Isonandra perakensis* var. *kelantanensis* is described. *Palaquium impressinervium* and *P. regina-montium* are new endemic species.

At Kepong there has commenced a grand stock-taking of the Malayan forests. This is taking the form of enumeration surveys to prepare an inventory of the amount of timber and its nature throughout the country, and a new Tree Flora of Malaya to give an up to date definitive account of the species prior to their full exploitation. The inventory data is being published as a series of cyclostyled reports, one administrative district at a time. The Tree Flora will appear as a Malayan Forest Record; in it we aim to cover all families of trees with species which grow larger than the timber-size of 3 ft (90 cm) girth, and to replace the now old account by Ridley (*The Flora of the Malaya Peninsula*, 1922-5) with a new treatise firmly biased towards the forest and the living tree. It is a big project, and like all floristic accounts, is bound to be imperfect. Firstly in a few cases there is doubt whether a tree reaches timber-size, e.g. Illiciaceae; so the total of 91 families to be encompassed is very slightly arbitrary. Secondly we have not, as our boundaries

are Malaya and off shore islands, had opportunity to plumb all nomenclatural deeps lying in Malasia at large. We have, however, taken care that the taxa we deal with are in our judgement homogeneous, so that even if a few change rank or name at least our concept should stand. In many cases our precursory studies are inappropriate in the Flora itself, and so we promulgate this series of taxonomic notes, echoing in the title a former series leading to a former and now famous book on Malayan trees. In that book Corner (*Wayside Trees of Malaya*, 1940, vol. 2) adjured:

Malayan trees who cares to know,

Upon his shoulder sits a berok.

We at Kepong, however, work on the basis that:

Malayan trees who cares to study,

Travels with him, an orang asli.

This first instalment of notes covers the families to be dealt with in the first volume of the Tree Flora, which it is hoped to publish in 1970. We thank Drs. A. J. H. G. Kostermans and B. C. Stone for assistance with the latin descriptions. English translations are not given of the latin, as they will be found in the Flora.

Our observations are based on material at Kepong and Singapore herbaria.

I. *Canarium*, Burseraceae

K. M. Kochummen and T. C. Whitmore

Canarium reniforme Kochummen et Whitmore sp. nov.

Arbor inter *C. caudatum* et *C. patentinervium* quasi intermedia. Arbor usque ad 18 m alta, circiter 90 cm. Stipulae grandes reniformes persistens, 15 × 10 mm, e ramulo productae. Foliola 5–9. Petioluli laterali 13–20 mm, petioluli terminali usque ad 35 mm. Lamina ovata ad elliptica, (3.5 × 1.5)–9.5 × 3.5–(13 × 9.5) cm, rufeo-brunneo, rigide-coriacea, apice late acuminato, base leviter asymmetrico; nervis utrinque 7–10 marginem versus arcuatis; reticulum vix prominens. Inflorescentia (fem. ignot.) terminalia c. 25 cm longa. Flores masculi parvissimi, 4 mm longi, calyx extus puberulenti intus glabri 5 mm longo apice trifido; petalis 3 oblongis 3 × 1.5 mm carnosus extus in parte mediani aureo-pubescentis, staminis 3 filamentis 3 mm longis antheris 1.3 mm longis, margine disci insertis, discus globosus in pseudostylo attenuato. Fructus ellipsoideus 5 × 3.8 cm, calyce cupuliformis planis 1 cm diam. Pyrena rugosa, obtuse triangulata. operculi c. 3 mm crassi. Semen unicum, loculis fertilibus seminibus unicum, loculis 2 reductus.

MALAYA, PERAK: coastal hill forest in the Dindings. Lumut F.R. FRI 978, 979; Pangkor Island KEP 99923 (holotype KEP), 99926, FRI 3060, 3094, 3096; Telok Kopia F.R. FRI 3104.

C. reniforme is a sparsely branched undergrowth tree, intermediate between *C. caudatum* and *C. patentinervium* and significantly different from both. The epithet refers to the big persistent reniform stipules.

In its leaves and large fruits *C. reniforme* has a strong resemblance to *C. patentinervium* which however has 6 stamens in the male flowers, small caducous stipules and a smooth fruit kernel.

The presence of 3 stamens and persistent stipules gives a resemblance to *C. caudatum* f. *caudatum* but that differs in size and shape of stipules, shape of the leaflets, smooth fruit kernel and glabrous flowers.

Leenhouts in his monograph (Blumea 9, 1959, 346) notes that *C. caudatum* f. *caudatum* and *C. patentinervium* closely resemble each other especially in Malaya. The latter is a very common species.

We have seen most of the material cited by him and a lot of more recent collections he did not see, and find the two species are quite distinct (see the forthcoming Tree Flora). There are no intermediate collections except one (KEP 97757) which differs from *C. caudatum* in having 4 not 3 stamens in the male flowers.

Because, even here in Malaya where the two species are closest, they yet remain distinct without intermediates we feel confident that in describing *C. reniforme* we are presenting a new species, not a member of a hybrid swarm, or of a population of intermediates; we do not think that ultimately this group will be reducible to one broad, polymorphic species.

II. Dillenia

K. M. Kochummen and T. C. Whitmore

Dillenia grandifolia Wall. ex Hk. f. et Thoms. Wall. Cat. 1828. 946, nomen nudum. Fl. Ind. 1 (1855) 71.

D. eximia Miq. Fl. Ind. Bat. Suppl. (1860) 620 **syn. nov.**

D. grandifolia is based on Wallich 946, leaves only, from Convalescent Hill, Penang. Hoogland in his recent monograph (Blumea 7, 1952, 134) points out that the collection comes from a sapling or young tree and considers it may be juvenile *D. ovata* or *D. reticulata*. He leaves *D. grandifolia* as a doubtful species.

We now reduce *D. eximia* to *D. grandifolia*, *pace* Hoogland, because both species are identical in the long decurrent leaf base, the minor venation, and the rather sparse harsh tomentum of the leaf below. No other Malayan species has these features together. Both *D. ovata* and *D. reticulata* by contrast have rounded leaf bases and are softly velvety below. The shape of the leaf base does not alter with age.

We base this decision on a study of collections from juvenile and mature trees and of photographs at Kepong of Wallich 946.

We also thank Mr. Forman at Kew for kindly comparing leaf fragments of KEP 98573 (*D. eximia*), KEP 94685 (*D. ovata*) and KEP 100022 (*D. reticulata*) with the Wallichian type and reporting on the tomentum.

III. Leguminosae

T. C. Whitmore

Alloburkillia Whitmore **nom. nov.**

Type Species — *Alloburkillia alba* (Ridley) Whitmore **comb. nov.**

Basionym — *Burkillia* Ridley Fl. Mal. Pen. 5 (1925) 304.

Type Species — *Burkillia alba* Ridley *loc. cit.*

Unfortunately the rare leguminous shrub *Burkillia alba* Ridley, known only from the type collection Burkill 12493 (sphalm. Burkill 12498 in Ridley *loc. cit.*), has to change its name as the green algal genus *Burkillia* West & West was published earlier in Ann. R. Bot. Gard. Calcutta 6 (1907) 228.

Crudia sparei Whitmore **sp. nov.**

Scandens. Rachis 2.5 cm, glabra. Foliola 2, ovata-elliptica 9 × 3–14 × 6 cm, subcoriaceae, infra leviter grisea vestita pilis sparsis minutis adpressis, apice late acuminato, base cuneato; nervis utrinque c. 8, reticulatio aequaliter manifesto. Racemi 25 cm porcati glabri. Flores aggregati, subsessili; calyx vix pubescens, apicis loborum acuminatis rotundantis. Legumen ignotum.

MALAYA, PERAK: S. Krian, SFN 34494 (holotype SING), collected by G. H. Spare, a rubber planter.

This is the second climbing *Crudia* known. The distinctive characters are all present in other Malayan species but differently combined.

Dialium patens Baker Fl. Brit. Ind. 2 (1879) 270.

D. angustisepalum Ridley Kew Bull. (1929) 255 **syn. nov.**

Ridley based his species on Yusop 4123, he also cited Yeop KEP 0846. He notes '(species) affine *D. patenti* Bak. sed sepalis anguste lanceolatis acuminatis differt.' I have examined the Kepong sheet of KEP 0846. Nearly all the flowers are old, with the sepals wide spreading or reflexed; they are indeed narrowly lanceolate but this is due to the fact that the margins are curled inwards a little at the base, progressively more towards the apex. The normal ovoid-oblong sepals of *D. patens* are present on a few young flowers on the sheet which have the sepals still covering the ovary. Two sheets of *D. patens* at Singapore (Denny s.n. 2/X/53, KEP 15772) also have a few overmature flowers with spreading incurled lanceolate sepals; the other flowers on these specimens and all the many other flowering collections at Kepong and Singapore have the normal sepals of *D. patens*. Clearly *D. angustifolium* cannot be maintained as a separate species.

Fordia johorensis Whitmore **sp. nov.**

Arbor parva usque ad 6 m alta. Rachis 12–20 cm. Foliola 11–17, ovata ad anguste-elliptica, parva c. 6.3 × 2.5 cm, griseo-
viridia, glabra, apice longo acuminato, base rotundo ad cuneato;

nervis utrinque 4–5; reticulum tenue densum a nervis subaequaliter manifestum. Paniculi fasciculati in tuberculis lignosis in trunco situato, 10–20 cm longi. Flores 7.5 mm longi, aggregati in pedunculis 3 mm sparsis, pedicellis 3 mm gracillis; sepala et petala alba fragrantissima. Legumen 7.5 × 2.5 cm.

A very common undergrowth treelet in parts of south Johore, hence the name. Its occurrence also in northern Borneo is typical of many Johore plants.

MALAYA, JOHORE: Bt. Tinjau Laut, SFN 37065 (holotype SING); Ulu Sedili F.R. KEP 93144, KEP 94813; Kluang F.R. KEP 98016.

BORNEO, SARAWAK: Marudi SAR 23291.

SABAH: Ranau SAN 33726.

Most closely similar to *F. ophirensis* Ridley against whose type (and only collection) at Kew Mr. Forman has kindly compared my description; he finds that the two taxa are clearly distinct.

Fordia lanceolata Ridley Flora 5 (Supplement) (1925) 304.

I unexpectedly had to take a party of student foresters into the S. Lallang Virgin Jungle Reserve, Selangor on 19th January, 1968 after this paper had gone to press. It was even more unexpected to find *F. lanceolata* gregarious on the hillside, and in full flower. The species was previously only known from a single fruiting collection (Holtum 9775) from Senaling Inas F.R. about 30 miles further south on the Main Range than S. Lallang F.R. Here follows a full description of the inflorescence and flower from fresh material of my collection FRI 4065.

Racemes solitary in leaf axils, to 9 cm long, stout, finely distantly hairy. Peduncles in a close spiral; subtended by a tiny (0.8 mm) brown bract; whitish-green, swollen, like a tiny *Morinda* fruit, 2 × 1 mm; closely covered with flower buds; only 1–2 flowers opening, others aborting to leave prominent scars. Open flowers 9 mm long, slightly fragrant. Pedicel 0.5 mm. Calyx whitish green, tubular, truncate, sometimes margin undulate, with sparse, short, white hairs outside, 3 mm long. Petals all clawed, white; standard 7 mm long with 1 mm claw; wings 6 mm long, linear, with 1 mm claw, spreading in open flower; keel 3 mm deep, base hastate, claws free, 2 mm, joining blade at centre line; stamens and carpel 9 mm long.

Fordia ngii Whitmore sp. nov.

Arbor parva 4 m alta. Rachis 10–14 cm longa. Foliola 3. Petiolulus crassus ater 8 mm. Lamina oblonga — elliptica ad elliptica usque ad 17 × 6 cm subcoriacea glabra griseo-viridia, acumine 3 cm, base cuneato ad late rotundato; nervis utrinque 5–6 valde arcuatis, infra valde prominentis. Racemi ex axillis et ramunculis producti usque ad 4 cm longis subtiliter aureo-velutini. Flores aggregata in pedunculis crassis 10 mm longis. Pedicelli 4 mm gracilli. Flores 15 mm longi, tubus calycis 3–4 mm longis oblongus leviter gibbosus parte basalis contractus 1 mm longus, lobi 4, 2 × 1 mm, extus aureo-sericeus; petala alba aequales, unguiculati, carina interdum abest. Legumen ignotum.

MALAYA, JOHORE: S. Kayu SFN 32042 (holotype SING); Lenggong F.R. KEP 99069.

Distinctive in its trifoliate leaves and stout, distinctly lobed calyx from all other *Fordia* species. The type collection has open flowers all without a keel, the other collection has flowers in bud, some keeled some not.

Named for F. S. P. Ng, Forest Botanist, Kepong.

***Ormosia grandistipulata* Whitmore sp. nov.**

Arbor parva 4 m alta. Stipulae oblongae late acutae, 2.5 × 1.3 cm persistens. Rachis 25 cm. Foliola 11, ovata, c. 11 × 8 cm subcoriacea glabra breviter acuminata base rotundato. Flores ignotis. Legumines (immaturi) aurantiaca nitida glabra c. 5 × 3 cm rigida coriacea. Semen unicum rubrum 14 × 9 mm.

MALAYA, TRENGGANU: Mile 10½ K. Trengganu-Besut Rd. SFN 40851 (holotype at SING !; K, L).

Although the flowers remain unknown this is a distinctive species in its small stature, big persistent stipules and leathery oblong pods. The leaflets resemble *O. polita* Prain.

Exploration of Trengganu, above all other Malayan States, continues to reveal novelties, this is one amongst many, and the interior still remains *terra botanica incognita*.

Pithecellobium sensu lato

***Pithecellobium globosum* (Bl.) Kosterm. Reinw. 3 (1954) 11.**

Pithecellobium affine Baker ex Benth. auctt. *Abarema globosa* (Bl.) Kosterm. Bull. Sci. Res. Indonesia 20 (1954) 37. *Abarema kiahii* Kosterm. **syn. nov.** Djawatan Kehutanan Indonesia. Bagian Planologi Kehutanan, Additional Notes on Mimosaceae etc. (1956) 5.

The Singapore isotype of *Abarema kiahii*, known from only one collection, *Sinclair & Kiah SFN 40940*, is in fruit. All the Singapore and Kepong sheets of *P. globosum* are in flower. The two species are identical in vegetative morphology on these sheets and moreover the descriptions by Kostermans (*ll. cc.*) of the missing fertile parts are the same, almost word for word. It appears that *A. kiahii* was 'optimistically proposed' and I therefore make this reduction.

IV. Ctenolophon, Linaceae

P. F. Cockburn

***Ctenolophon parvifolius* Oliver Trans. Linn. Soc. Bot. (Lond.) 28 (1873) 516, t. 43.**

Ctenolophon grandifolius Oliver loc. cit. **syn. nov.**

Oliver distinguishes these two species based respectively on Kew distrib. 382 Maingay (*C. parvifolius*) and Kew distrib. 383 Maingay (*C. grandifolius*) on the length of the ovarian cavity, the cavity in the former being longer than that in the latter,

where it only occupies base of the ovary. Beccari, Malesia 1 (1877) 119, distinguishes the species on the colour of the branches, which are much darker and with a fine scurf on the young twigs in *C. parvifolius*. Kings Materials (J. As. Soc. Beng. 64 1895, 106, adds size difference and the colour of the tomentum on the inflorescence. Ridley in Flora 1 (1922) 423 uses size of leaf and flower, colour of tomentum, and the more stout spreading branches of the panicle in *C. grandifolius*, but suggests that it may only be a variety of *C. parvifolius*.

From numerous collections at Kepong, six of which have mature flowers, I can find no important difference in the length of the ovarian cavity. Of Beccari's characters I find that young twigs of all specimens have a fine scurf. In KEP 9765 there is variation in the colour of the tomentum within the inflorescence from 'rusty', to 'pale'. In FRI 0177 the flowers are small, but the leaves rather long (11.5 cm). In KEP 9765 there is variation in flower size within a single inflorescence. Leaf size variation is great, 3.5–23 cm, and gradual.

I find no reason why these two should hold specific status, nor from the gradual variation can a variety be established. I have therefore reduced *C. grandifolius* to a synonym *C. parvifolius* bearing in mind that Bullock (Kew Bull. 14, 1960, 41) has selected the latter as basionym for the genus *Ctenolophon*.

I would like to thank Mr. Forman at Kew for observations on the type specimens.

V. Sapotaceae

F. S. P. Ng

Isonandra perakensis King et Gamble, var. *kelantanensis* Ng
var. nov.

A varietas typica differt foliis glabris obtusis. Fructus ignotus.

MALAYA, KELANTAN: Gua Jaya at Kuala Jenera, Sg. Nenggeri, FRI 4248 (holotype KEP). On summit of limestone hill.

Possibly a new species but as only one collection is known, I hesitate to describe it as such. It is known only from Kelantan whereas the var. *perakensis* is restricted to Perak.

Palaquium impressionervium Ng sp. nov.

Arbor magna usque ad 45 m alta, circiter 3.6 m. Stipulae binatae mox caducae. Petiolus 7–20 mm, gracilis, supra plerumque aplanatus canaliculatusque. Lamina chartacea, glabra, elliptica ad obovata, 5 × 2–15 × 5.3 cm, apice plerumque acuminato, base cuneato, costis supra anguste canaliculatis, nerviis secundariis supra saepe impressis utrinque 11–16 in nervium intramarginalem obscuram arcuatim conjunctis, tertiariis reticulatis ad parallelo-reticulatis supra saepe impressis. Inflorescentiae fasciculatae

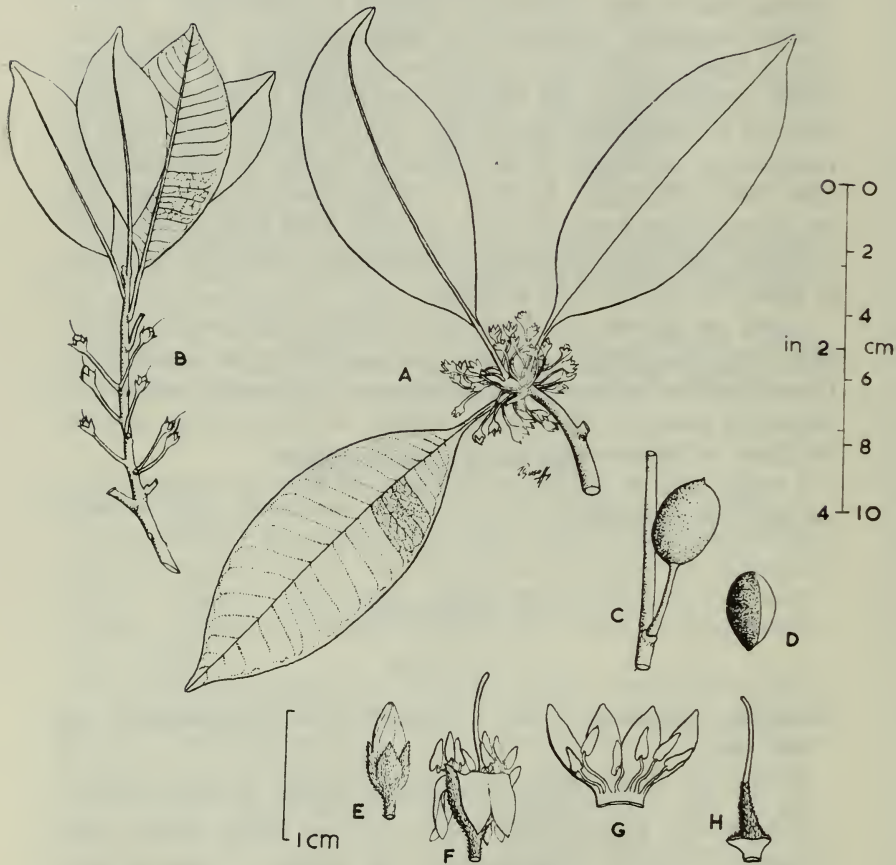


Fig. 1 *Palaquium impressinervium* Ng

A: Flowering twig, after Haniff & Nur 2726 (Type).

B: Twig with young fruits, after FRI 6189.

C & D: Mature fruit and seed, after KEP 10449.

E — H: Bud, open flower, part of corolla with stamens, pistil, after Haniff & Nur 2726.

axillaris c. 6-floriferae. Flores c. 7 mm diam.; pedicellis 12–20 mm longis sepalis 6 biseriatim triangularibus c. 3×2 mm, corolla 6-lobato c. 7 mm longo, staminibus 12, ovario ovoideo, stylo c. 8 mm longo. Fructus oblongus c. 30×17 mm. Semen unicum oblongum c. 25×12 mm, hilo subaequilongis, semen tertia parte obtectus. Albumen nullum. Cotyledones carnosae.

MALAYA, KEDAH, KELANTAN, PERAK, PAHANG, NEGRI SEMBILAN, JOHORE. The following fertile specimens are all from Perak: KEP 10449, 10828, 39067, 39069, 45182, 45191, 76729, 110752, 110754; numerous sterile specimens have been collected from the states listed above.

SIAM, Kopah Ban Kiap (B. Tinggi): SFN 2726 (holotype KEP).

Common big trees in Upper Perak and Kedah, known to the aborigines as 'surin', represented by a large number of collections, mostly sterile, in the Kepong herbarium. KEP 10449 was misidentified by Lam (Bull. Jard. Bot. Buitenz. sér 3, 7, 1927, 479) as *Mimusops elengi* L. Two other specimens (sterile), KEP 10414, KEP 10415, were also misidentified by him (*loc. cit.* 425), as *Ganua motleyana* Pierre var. *glabrescens* Lam. Probably influenced by the latter, Wyatt-Smith (Research Pamphlet 4, 1954, 12) considered this an undescribed species of *Ganua* though he annotated on one specimen (KEP 45182) that with 6 instead of 4 sepals, this could not possibly be a *Ganua*. Neither can it be *Payena* nor *Madhuca*, which also have 4 sepals. It was van Royen who first came to the conclusion (annotated on KEP 10828) that this was probably a new species of *Palaquium*. The difficulty in identifying these specimens was due to the fact that the Malayan collections have either very young flower-buds, or old fruits, or are sterile. To date, the only collection with mature flowers is the holotype cited above, which unfortunately was not seen by Lam or van Royen.

The species is distinct by its small to medium sized papery more or less elliptic leaves with midrib always, and secondary/tertiary nerves usually, sunken on the uppersurface.

***Palaquium regina-montium* Ng sp. nov.**

Arbor usque ad 30 m alta, circiter 2.4 m. Stipulae binatae minutae mox caducae. Petiolus 15–40 mm, supra leviter aplanatus. Lamina coriacea, bullata, supra glabra, subtus cupreo-velutina, obovata interdum elliptica, 5.3×2.5 – 13×7.3 cm, apice rotundato acuto vel leviter acuminato, base cuneato, nerviis secundariis utrinque 4–8, tertiariis transversis obscuris. Inflorescentiae fasciculatae, 1–6-floriferae, axillaris (sed folius interdum delapsis). Flores c. 5 mm diam. pedicellis usque ad 13 mm longis, sepalis 6 biseriatim ovatis c. 4×3 mm, corolla 6-lobato, ad 5 mm longo, staminibus 11–12, ovario conico apice in stylo breve attenuato. Fructus obovoideus c. 25×13 mm glabrescens. Semen unicum obovoideum $20 \times 8 \times 6$ mm, hilum anguste lineare semine aequilongis. Albumen crassum. Cotyledones tenues.

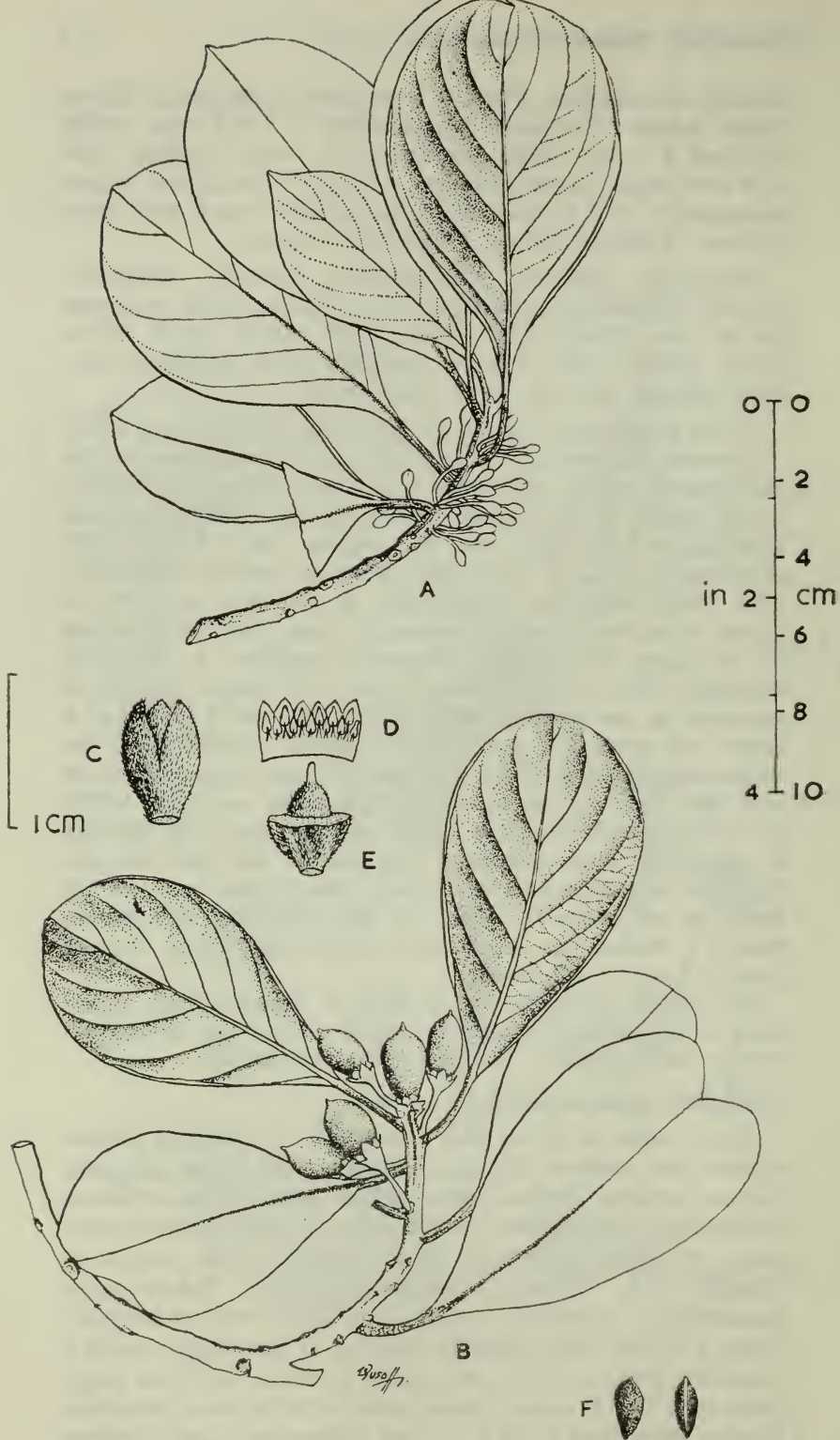


Fig. 2. *Palaquium regina—montium* Ng

A: Flowering twig, after KEP 78841 (Type).

B: Fruiting twig, after FRI 5818.

C — E: Bud, corolla with stamens, pistil, after FRI 3894.

F: Seeds, after FRI 5818.

MALAYA, PERAK, SELANGOR, PAHANG: on G. Tahan, G. Benom, and along the main range at Slim Hills, Fraser's Hill, B. Tunggul, G. Ulu Kali, G. Bunga Buah, and G. Mengkuang. Representative fertile collections are KEP 78841 (holotype KEP, from G. Mengkuang), FRI 1990, 2310, 3185, 5585, 5710, 5818.

This beautiful large tree, previously misidentified as the Sarawak *P. cryptocariifolium* van Royen, is found on the mountains at 1000–1830 m, where it often occurs gregariously and is easily recognised by its coppery crown and bullate leaves with few nerves and velvety undersurface.

Flora Malesianae Precursores XLVIII

A revision of Malesian Labiatae

by

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I. INTRODUCTION

Taxonomic accounts on the Labiatae from various parts of Malesia had been prepared by several authors such as Blume (Java), Miquel (Malay Islands), Prain (Malay Peninsula), Merrill (the Philippines), Backer and Bakhuizen van den Brink, Jr. (Java) and others. The present revision is an attempt to cover the whole Malesian region. It is mainly based on the materials accumulated in several leading herbaria. In some cases, as expected, a number of binomials proposed by different authors from separate geographical regions proved to be conspecific. Besides, some authors had a narrow concept of species; a number of species described by them, naturally has to be reduced either into the status of variety or form, or merely as synonyms. There are, however, some disturbing and puzzling problems that still remain to be solved.

The main part of this work was completed while I was on my study leave between November 1962 and May 1963. I am grateful to the authorities of the University of Singapore for granting the leave; to Prof. C.G.G.J. van Steenis, Director, Rijksherbarium, Leiden, and Sir George Taylor, Director, Royal Botanic Gardens, Kew, for the facilities generously afforded me while working in their respective institutions; and to the authorities of several other institutions to which I only paid very brief visit during the leave. My special thanks are due to Mr. H.M. Burkill, Director, Singapore Botanic Gardens, for the library and herbarium facilities kindly provided; to Dr. Bakhuizen van den Brink, Jr. and Prof. C.G.G.J. van Steenis of the Rijksherbarium, Leiden for going through the manuscript and for their numerous suggestions; and to many individuals who have kindly helped me in different ways: W.L. Chew (Singapore), L.L. Forman (Kew), R.E. Holttum (Kew), Ding Hou (Leiden), C.E. Hubbard (Kew), M. Jacobs (Leiden), J.H. Kern (Leiden), P. Leenhouts (Leiden), G. Lim (Singapore), W.T. Stearn (London), E.H. Walker (Washington, D.C.), R. Weibel (Geneva) and others. I also like to thank Mr. H.P. Chay, who typed the entire manuscript. Lastly, I would like to pay deserved tribute to my wife, Ro-siu Ling Keng for arranging the data of specimens which I have examined and copied and for her constant encouragement.

II. LABIATAE

Bl. Bijdr. (1826) 822; Benth. Lab. Gen. et Sp. (1832–36)* 1, in DC. Prodr. 12 (1848) 27, in Benth. & Hook. f. Gen. Pl. 2 (1876) 1161; Miq. Fl. Ind. Bat. 2 (1858–59)† 881; Hook. f. Fl. Brit. Ind. 4 (1885) 604; Briq. in Engl. & Prantl. Nat. Pflanzenfam. 4, 3a (1897) 183; Prain in J. As. Soc. Bengal 74, 2 (1907) ext. no. 699 (in King & Gambl. Mat. Fl. Mal. Pen.); Koord. Exk. Fl. Jav. 3 (1912) 139; Merr., Enum. Born. Pl. (1921) 519, Enum. Philip. Fl. Pl. 3 (1923) 408; Ridl., Fl. Mal. Pen. 2 (1923) 642, 5 (1925) 326; Kudo in Mem. Fac. Sc. & Agr. Taihoku Un. 2, 2 (1929) 37 (Lab. Sino-Jap. Prod.); Mansf. in Bot. Jahrb. 62 (1929) 376; Mukerj. in Rec. Bot. Surv. Ind. 14 (1940) 1 (Rev. Lab. Ind. Emp.); Back. & Bakh. f. Fl. Java, 2 (1965) 617.

Herbs, sometimes subshrubs or shrubs, glabrous, glabrescent or pubescent, usually aromatic; stem and branches usually 4-angled. Leaves mostly simple, opposite or sometimes whorled; exstipulate. Flowers mostly zygomorphic, axillary, in pairs, or in fascicled cymes which by union of two units form false whorls (or verticillasters) and, in many cases, agglomerate into spurious spicate, racemose, capitate or paniculate inflorescences. Calyx persistent, usually accrescent in fruit, nearly regular or unequally 4–5-toothed, tubular or 2-lipped. Corolla tube long or short, sometimes annulate within, the limb 5-, rarely 4-lobed, mostly 2-lipped and personate, the lobes always imbricate in bud. Stamens usually epicorolline, 4 and didynamous, sometimes the upper (or posterior) pair imperfect, rarely, the lower (or anterior) pair degenerated instead (as in *Mosla*); anthers linear, ovoid or rounded, the locules parallel or divaricate, sometimes confluent or rarely dimidiate (as in *Anisomeles*) or disjoined by a slender connective (as in *Salvia*). Ovary superior, composed of 2 carpels each is 2-loculed by intrusion of ovary wall; style simple, sub-terminal, or mostly gynobasic; stigma usually 2-fid, the arms often unequal; ovules in each ovary-locule solitary, anatropous. Fruit of 4 dry or rarely fleshy (as in *Gomphostemma*), 1-seeded nutlets, sometimes one or more of these abortive, enclosed within persistent calyx; scar of attachment usually basal, small, sometimes lateral or sublateral and large. Seed small, erect or more or less transverse (as in *Scutellaria*), with very scanty or more commonly without endosperm.

* pp. 1–60, 1832; 61–322, 1833; 323–644, 1834; 645–783, 1835; i–lixviii, 1836 (cf. F. A. Stafleu, Literature (1967) p. 27).

† pp. 881–960, 1858; 961–1112, 1859 (cf. Van Steenis-Kruseman & Stearn, in Fl. Mal. 1, 4 (1954) p. ccii).

The family is predominantly a temperate one, composed of about 200 genera and 3200 species (*vide* Lawrence, Tax. Vas. Pl. 1951), of cosmopolitan distribution. About 32 genera and 85 species are native to or are more or less naturalized in Malesian region (including Sumatra, Malay Peninsula, Java, Lesser Sunda Islands, Borneo, the Philippines, Celebes, Moluccas and New Guinea). Species of several other genera, such as *Cedronella*, *Leonotis*, *Lavandula*, *Majorana*, *Marsypianthes*, *Nepeta*, *Pycnostachys*, *Rosmarinus*, *Thymus*, etc. (cf. Back. & Bakh. f. Fl. Jav. 2, 1965) are occasionally cultivated.

III. CLASSIFICATION

Two major schemes of classification on the Labiatae have been proposed. One is Bentham's (in DC, Prodr. vol. 12, 1848, and in Benth. & Hook. f. Gen. Pl. vol. 2, pt. 2, 1876) in which 6 tribes were established. Another one is Briquet's (in Engler & Prantl, Pflanzenfam. IV, 3a, 1897) in which 8 sub-families were recognized. Since the latter is an improved version of the former, therefore it is adopted in this treatment.

The 32 Malesian genera are classified under 5 subfamilies as follows. (Based on Briquet, 1897)

A. Style not gynobasic; nutlets with lateral-ventral attachment, the usually large surface of contact often more than half the height of the ovary (seed without endosperm).

Subfamily 1. *Ajugoideae*

A. Style gynobasic; nutlets with basal attachment and small surface of contact.

B. Nutlets drupaceous with fleshy or strongly thickened exocarp and hard crustaceous endocarp.

Subfamily 2. *Prasioideae*

B. Nutlets with dry and often thin pericarp.

C. Seeds more or less transverse; embryo with a bent radicle lying on one cotyledon.

Subfamily 3. *Scutellarioideae*

C. Seeds erect; embryo with short straight superior radicle; (disc-lobes when distinct alternate with ovary-lobes).

D. Stamens ascending or spreading and projecting straight forwards.

Subfamily 4. *Stachyoideae*

D. Stamens descending, lying upon or enclosed in the lower lip.

Subfamily 5. *Ocimoideae*

There are five Malesian genera which were mostly proposed after the publication of Briquet's monograph, and were not included in it. Three of them can be easily assigned to the following subfamilies.

Acrymia Prain (near *Cymaria* and *Ajuga*).....*Ajugoideae*

Nosema Prain (near *Mesona*).....*Ocimoideae*

Ceratanthus F. Muell. (near *Plectranthus*).....*Ocimoideae*

The taxonomic positions of the remaining two genera, *Eurysolen* Prain and *Paraphlomis* Prain, are rather debatable. Prain (1906) tentatively classified *Eurysolen* under Prasioideae (as Prasieae). Briquet (cited in Prain 1906) suggested it should belong to the Ajugoideae. The latter view was accepted by Mukerjee (1940) and Wu (1959). I find, however, its general habit, inflorescence and flowers structures are almost indistinguishable from those of the genus *Achyrospermum*, save some minute detailed flower characters and the more prominent surface of contact on the nutlets. In the following key I assign *Eurysolen* under the *Stachyoideae*, to which the genus *Achyrospermum* belongs.

Paraphlomis, on the other hand, is somewhat intermediate between Prasioideae and Stachyoideae. The leathery pericarp (although lacking a hard crustaceous endocarp) and the general habit of this genus bear strong resemblance to *Gomphostemma* of the Prasioideae. Yet the flower structures reveal its close affinities with such genera as *Phlomis*, *Pogostemon*, etc. of the *Stachyoideae*. In accordance with the previous authors, I assign it to the latter group.

Keys to the 32 Malesian genera under 5 subfamilies are presented below:

Subfamily 1. Ajugoideae

- A. Corolla seemingly 1-lipped, i.e., the 2 lobes of upper lip deeply divided, in association with 3 lobes of the lower lip bent downward and forming a single piece; flowers in pairs (in Malesian species) on spicate inflorescence.

32. *Teucrium*

- A. Corolla 2-lipped, the upper lip entire or 2-fid, the lower 3-lobed.

- B. Upper lip of corolla 2-fid, only half as long as the lower lip or much shorter.

- C. Herbs or undershrubs; stem woody; flowers in terminal and axillary compound cymes, generally congested into a large flat-topped panicoid clusters.

3. *Acrymia*

- C. Herbs; flowers in false whorls, axillary or in terminal spicate inflorescence.

4. *Ajuga*

- B. Upper lip of corolla entire or shallowly notched, arched, slightly shorter than the lower lip; shrubs; flowers in dichotomously branched cymes, the upper cymes often congested into conical, panicoid clusters.

10. *Cymaria*

Subfamily 2. Prasioideae

- 1 genus: 14. *Gomphostemma* (large herbs or subshrubs; nutlet drupaceous, usually fleshy and creamy white).

Subfamily 3. Scutellarioideae

1 genus: 30. *Scutellaria* (calyx-tube with a large shield or pouch-like appendage above the upper lip; two calyx-lips closed after flowering, later the upper lip falling off together with the appendage).

Subfamily 4. Stachyoideae

A. Stamens erect, divergent or spreading, but not ascending under upper lip of corolla; corolla almost actinomorphic; generally not or less clearly 2-lipped.

B. Anthers rounded, the locules confluent into 1 locule and becoming flat after dispersing pollen grains.

C. Corolla 4-lobed; stamens long exerted, the filaments bearded.

D. False whorls glomerate in stout, lax, usually interrupted simple or branched, spike-like inflorescence; 4 corolla-lobes subequal, the anterior one most prominent. 28. *Pogostemon*

D. False whorls aggregated in slender, dense continuous spike-like inflorescence; 4 corolla-lobes subequal. 11. *Dysophylla*

C. Corolla 4- or 5-lobed; stamens barely exerted, the filaments glabrous; false whorls aggregated in slender or stout, terete or secund spike-like inflorescence.

12. *Elsholtzia*

B. Anthers 2-loculate, the locules parallel or divergicate, never turn flat after dispersing pollen grains.

C. Calyx tubular, almost actinomorphic; stamens 4, the anther-locules parallel; false whorls axillary (in Malesian species) 19. *Mentha*

C. Calyx 2-lipped; functional stamens 2, the anther-locules divergicate; false whorls 2-flowered, secund, in raceme-like inflorescence. 22. *Mosla*

A. Stamens ascending under the upper lip of corolla; corolla always 2-lipped.

B. Anther-locules linear, solitary or separated by a filiform connective; stamens 2; upper lip of corolla often concave. 29. *Salvia*

B. Anther-locules rounded or ovoid; stamens 4.

C. Upper lip of corolla generally shorter, nearly flat, glabrous or pubescent.

- D. Anthers reniform, with 2 more or less divaricate anther locules.
- E. Calyx-tube more or less gibbous at the base, the nerves prominent, the upper lip sharply 3-toothed; corolla-tube nearly straight.
7. *Calamintha*
- E. Calyx-tube straight, the nerves less prominent, the upper lip shallowly 3-toothed; corolla-tube long and recurved.
18. *Melissa*
- D. Anthers ovoid, with 2 parallel anther locules.
- E. Anthers uniform; anther-locules confluent; nutlets papillate, hispid or scaly.
- F. Calyx tubular, nearly actinomorphic; corolla gibbous in front above the annulus; nutlets papillose-glandulate.
13. *Eurysolen*
- F. Calyx campanulate, more or less 2-lipped; corolla neither gibbous nor annulate; nutlets hispid and scaly.
1. *Achyrospermum*
- E. Anthers dimorphic, locules of the anterior longer pair dimidiate, 1-loculate, of the posterior shorter pair 2-loculate; nutlets smooth.
5. *Anisomeles*
- C. Upper lip of corolla generally hooded, villous.
- D. Calyx 8-10-toothed; upper lip of corolla short, hairy; lower lip very large.
17. *Leucas*
- D. Calyx 5-spinous or 5-toothed.
- E. Calyx 5-spinous; anther-locules parallel; leaves deeply incised.
16. *Leonurus*
- E. Calyx 5-toothed; leaves entire or serrate, not incised.
- F. Anther-locules divaricate when young, at length confluent; filaments hirsute; lower lip of corolla 3-lobed, the mid-lobe the narrowest.
21. *Microtoena*
- F. Anther-locules divaricate, not confluent; filaments glabrous.
- G. Herbs; calyx teeth unequal; lower lip of corolla 3-lobed, the mid-lobe the broadest.
31. *Stachys*
- G. Subshrubs; calyx teeth nearly equal; lower lip of corolla 3-lobed, nearly equal.
26. *Paraphlomis*

Subfamily 5. *Ocimoideae*

A. Lower lip of corolla comparatively short (usually not much longer than the upper), the mid-lobe thick-edged, recurved, sometimes saccate at the base; calyx subequally 5-toothed.

15. *Hyptis*

A. Lower lip of corolla usually longer; calyx-teeth often very unequal, the limb mostly 2-lipped.

B. Lower lip of corolla concave or boat-shaped, constricted at the base.

C. Filaments free beyond the points of insertion on corolla-tube.

D. Corolla-tube with a prominent posterior spur at the base; lower calyx-lip subtruncate.

8. *Ceratanthus*

D. Corolla-tube straight or only gibbous at the base, not spurred; low calyx-lip 2-toothed.

27. *Plectranthus*

C. Filaments connate at the base in a sheath around the

9. *Coleus*

B. Lower lip of corolla patent, flat or slightly concave, broad-based.

C. Lower lip of fruiting calyx seemingly 4-toothed (i.e. 2 lateral calyx teeth associated with the 2 lower ones and forming a 4-toothed piece); filaments included in corolla.

D. False whorls in terminal or axillary globose or ovoid heads or cylindrical dense spikes; corolla subequally 5-lobed.

2. *Acrocephalus*

D. False whorls in axillary and terminal spurious racemes; corolla-limb 2-lipped.

6. *Basilicum*

C. Lower lip of the fruiting calyx nearly entire or 2-toothed; filaments exerted.

D. Lower lip of the fruiting calyx nearly entire.

E. Two lips of fruiting calyx subequal in length, the tube deeply pitted by the presence of elevated cross veins between the main veins.

20. *Mesona*

E. Upper lip of the fruiting calyx subentire; lower lip very short, the tube not pitted between the

23. *Nosema*

D. Lower lip of the fruiting calyx sharply 2-toothed.

E. Corolla-tube very short, not or slightly exerted; stigma 2-fid.

24. *Ocimum*

E. Corolla-tube long, usually far exerted; stigma capitate or clavate, entire or subentire.

25. *Orthosiphon*

IV. LIST OF GENERA AND SPECIES FOUND IN MALESIA

1. *Achyrospermum* Blume (Stachyoideae)
 - a. *Achyrospermum densiflorum* Bl.
2. *Acrocephalus* Benth. (Ocimoideae)
 - a. *Acrocephalus indicus* O. Kuntz. (with 1 form)
3. *Acrymia* Prain (Ajugoideae)
 - a. *Acrymia ajugiflora* Prain
4. *Ajuga* Linn. (Ajugoideae)
 - a. *Ajuga bracteosa* Wall. ex Benth.
5. *Anisomeles* R. Br. (Stachyoideae)
 - a. *Anisomeles indica* O. Kuntz.
 - b. *A. salviaefolia* R. Br.
 - c. *A. malabarica* R. Br. ex Sims
6. *Basilicum* Moench (Ocimoideae)
 - a. *Basilicum polystachyon* Moench
7. *Calamintha* Mill. (Stachyoideae)
 - a. *Calamintha gracilis* Benth.
 - b. *C. umbrosa* Benth. (with 1 variety)
8. *Ceratanthus* F. Muell. ex G. Taylor (Ocimoideae)
 - a. *Ceratanthus longicornis* G. Taylor
9. *Coleus* Lour. (Ocimoideae)
 - a. *Coleus amboinicus* Lour.
 - b. *C. scutellarioides* Benth. (with 4 varieties)
 - c. *C. macranthus* Merr.
 - d. *C. spariflorus* Elmer
 - e. *C. galeatus* Benth. (with 1 variety)
10. *Cymaria* Benth. (Ajugoideae)
 - a. *Cymaria acuminata* Decne.
 - b. *C. dichotoma* Benth.
11. *Dysophylla* Blume (Stachyoideae)
 - a. *Dysophylla auriculata* Blume
 - b. *D. stellata* Benth. (with 1 variety)
12. *Elsholtzia* Willd. (Stachyoideae)
 - a. *Elsholtzia blanda* Benth.
 - b. *E. elata* Zoll. & Mor.
 - c. *E. pubescens* Benth.
13. *Eurysolen* Prain (Stachyoideae)
 - a. *Eurysolen gracilis* Prain (New distribution)

14. *Gomphostemma* Wall. ex Benth. (Prasioideae)
 - a. *Gomphostemma racemosum* Van Steenis ex H. Keng (New species)
 - b. *G. microcalyx* Prain
 - c. *G. parviflorum* Wall. ex Benth.
 - d. *G. crinitum* Wall. ex Benth.
 - e. *G. hemsleyanum* Prain ex Coll. & Hemsl.
 - f. *G. curtisii* Prain
 - g. *G. javanicum* Benth.
 - h. *G. scortechinii* Prain
15. *Hyptis* Jacq. (Ocimoideae)
 - a. *Hyptis brevipes* Poit.
 - b. *H. rhomboidea* Mart. & Gal.
 - c. *H. spicigera* Lamk.
 - d. *H. pectinata* Poit.
 - e. *H. suaveolens* Poit.
16. *Leonurus* Linn. (Stachyoideae)
 - a. *Leonurus sibiricus* Linn.
17. *Leucas* R. Br. (Stachyoideae)
 - a. *Leucas aspera* Link.
 - b. *L. zeylanica* R. Br.
 - c. *L. lavandulifolia* Sm.
 - d. *L. javanica* Benth.
 - e. *L. mollissima* Wall. ex Benth.
 - f. *L. flaccida* R. Br.
18. *Melissa* Linn. (Stachyoideae)
 - a. *Melissa axillaris* Bakh. f.
19. *Mentha* Linn. (Stachyoideae)
 - a. *Mentha arvensis* Linn. var. *javanica* Hook. f.
20. *Mesona* Blume (Ocimoideae)
 - a. *Mesona palustris* Bl.
 - b. *M. philippinensis* Merr.
21. *Microtoena* Prain (Stachyoideae)
 - a. *Microtoena insuavis* Prain ex Briq.
22. *Mosla* Buch.-Ham. ex Maxim. (Stachyoideae)
 - a. *Mosla dianthera* Maxim.
 - b. *M. formosana* Maxim.
23. *Nosema* Prain (Ocimoideae)
 - a. *Nosema clausa* (Merr.) H. Keng (New combination)
 - b. *N. cochinchinense* Merr. (New distribution)

24. *Ocimum* Linn. (Ocimoideae)
 - a. *Ocimum americanum* Linn.
 - b. *O. basilicum* Linn.
 - c. *O. gratissimum* Linn.
 - d. *O. sanctum* Linn.
25. *Orthosiphon* Benth. (Ocimoideae)
 - a. *Orthosiphon aristatus* Miq.
 - b. *O. thymiflorus* v.d. Slesesen
26. *Paraphlomis* Prain (Stachyoideae)
 - a. *Paraphlomis javanica* Prain
 - b. *P. oblongifolia* Prain
27. *Plectranthus* L'Hérit. (Ocimoideae)
 - a. *Plectranthus javanicus* Benth.
 - b. *P. teysmanni* Miq.
 - c. *P. petraeus* Backer ex Adelb.
 - d. *P. steenisii* H. Keng (New species)
 - e. *P. apoensis* (Elmer) H. Keng (New combination)
 - f. *P. congestus* R. Br.
 - g. *P. parviflorus* Willd.
 - h. *P. klossii* S.M. Moore
28. *Pogostemon* Desf. (Stachyoideae)
 - a. *Pogostemon heyeanus* Benth.
 - b. *P. tomentosus* Hassk.
 - c. *P. cablin* Benth.
 - d. *P. reticulatus* Merr.
 - e. *P. philippinensis* S.M. Moore
 - f. *P. menthoides* Bl.
 - g. *P. velatus* Benth.
29. *Salvia* Linn. (Stachyoideae)
 - a. *Salvia scapiformis* Hance
 - b. *S. plebeia* R. Br.
 - c. *S. coccinea* Juss. ex Murr. var. *Pseudo-coccinea* Back.
30. *Scutellaria* Linn. (Scutellarioideae)
 - a. *Scutellaria discolor* Wall. ex Benth. (with 1 variety)
 - b. *S. indica* Linn.
 - c. *S. javanica* Jungh. (with 3 varieties)
31. *Stachys* Linn. (Stachyoideae)
 - a. *Stachys melissaefolia* Benth.
32. *Teucrium* Linn. (Ajugoideae)
 - a. *Teucrium quadrifarium* Buch.-Ham.
 - b. *T. viscidum* Bl.

V. TAXONOMIC TREATMENT

1. ACHYROSPERMUM BL.

Achyropermum Blume, Bijdr. (1826) 840; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1208; Briq. in E. & P. Pf. Fam. 4, 3a (1897) 268.

Undershrubs or herbs. Stems and branches terete, obscurely 4-angled, pubescent. False-whorls few-flowered, usually forming terminal, spike-like inflorescence. Calyx 10-nerved, tubular-campanulate, 5-toothed, \pm 2-lipped, the upper lip slightly longer. Corolla slender, 2-lipped, the upper (or posterior) lip short, erect, notched; the lower (or anterior) 3-lobed, the mid-lobe often concave. Stamens 4, ascending, in 2 pairs, the lower (or anterior) pair longer; anthers 2-loculate, the locules parallel. Styles briefly 2-fid. Nutlets scaly and chaffy on the ventral surface and on the top, rough and pubescent on the dorsal surfaces.

Over 10 species, from tropical E. Africa, Madagascar and Seychelles through Indo-Himalaya to Malesia; 1 in Malesia.

1. **Achyropermum densiflorum** Bl. Bijdr. (1826) 840; Benth. in DC. Prodr. 12 (1848) 458; Miq. Fl. Ind. Bat. 2 (1859) 989; Hook. f. Fl. Brit. Ind. 4 (1885) 673, in nota; Merr. Enum. Philip. Fl. Pl. 3 (1923) 412; Back. & Bakh. f. Fl. Java 2 (1965) 624.

Achyropermum phlomoides Bl. l.c. 841; Miq. l.c. 990. *syn. nov.*

Achyropermum philippinense Benth. in DC. Prodr. 12 (1848) 458; Miq. Fl. Ind. Bat. 2 (1858) 990; Vidal, Rev. Pl. Vasc. Filip. (1886) 214.

A herb, suberect, 30–60 cm high. Stems and branches pubescent. Leaves thin membranaceous, narrowly elliptic or ovate, 6–8 cm long, 2.5–4 cm wide, acute, or broadly acute, the base cuneate or attenuate, hirsute or pilose on both surfaces, the margins serrate or crenate-dentate. False-whorls always forming terminal, spike-like inflorescence, 4–6 (or more) cm long; bracts broadly ovate or spatulate, 6–8 mm long, pilose and ciliate. Calyx campanulate, 6–8 (in fruit 8–10) mm long, more or less 2-lipped, the upper lip 2-toothed, slightly longer than the lower lip, the teeth straight (in fruit often slightly recurved), obtuse or rounded at the apex. Corolla 3–4 mm exceeding the calyx, the upper lip erect, the lower lip much longer than the upper one, straight or decurved. Stamens in 2 pairs, the lower pair longer, exserted. Nutlets obtusely trigonous, 1.2 mm long 0.5 mm wide, scaly and chaffy on the ventral surfaces and the top, rough and pubescent on the dorsal surface.

Type: “Circa Linga Jattie Prov. Cheribon” (Blume) (not seen).

Distribution: Malesia (Sumatra, Java, Lesser Sunda Isls. and the Philippines).

Ecology: In forests often along streams and in damp places at low and medium altitudes from 500 to 1600 m.

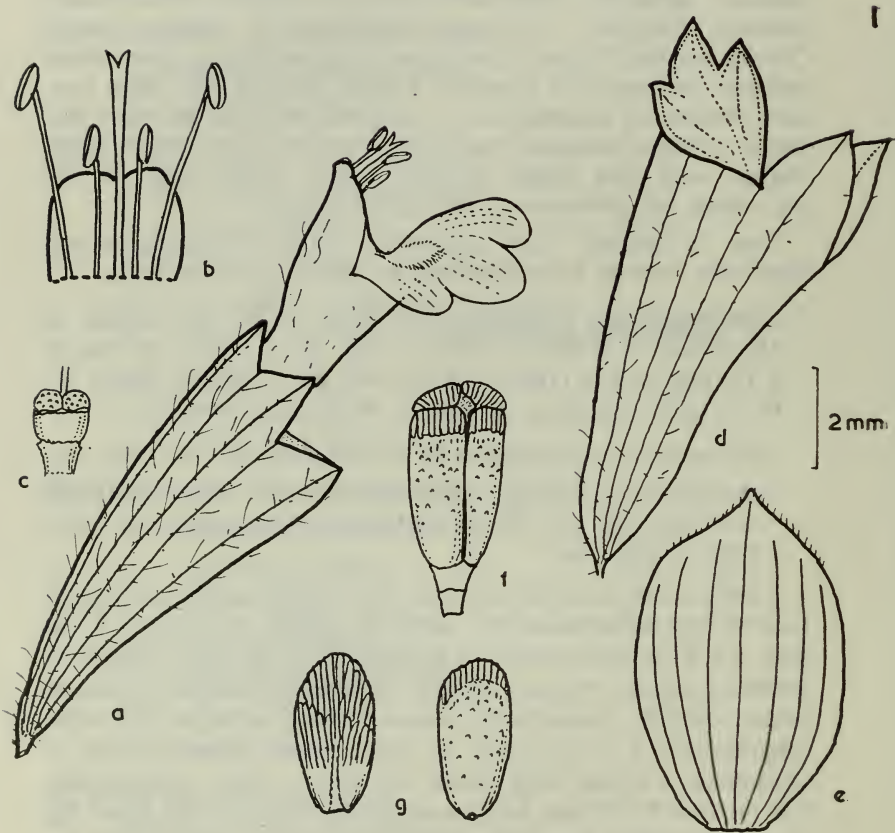


Fig. 1. *Achyrospermum densiflorum* Bl.

a. flower; b. portion of upper corolla-lip with stamens and style;
 c. ovary and nectary disc; d. fruiting calyx; e. bract; f. 4 nutlets;
 g. nutlet in 2 views. (flower, *Smith 880*; fruit, *Elmer 8709*)

Specimens examined:

Sumatra: Sungai Kumbang, alt. 1,500 m., *Robinson & Kloss 106* (BM); Benkoelen, Kaba, *Voogd 1367* (L).

Java: G. Kendeng, alt. 800 m., *Bakhuizen v/d Brink Jr. 2847* (L); Java, *Junghuhn 5 & 29* (K); Garoet, Danau Tjiharoes, Kamodjan, alt. 1,500 m., *Docters Van Leeuwen 13288* (L); G. Toegoe near Tjampaka, alt. 1,000 m., *Smith s.n. June, 1923* (L); Batavia, Pondok Walanda, G. Kendeng, alt. 1,000–1,520 m., *Steenis 12213* (L, Sing.); Tjadas Malang near Tjidadap, alt. 1,000 m., *Winckel 1181* (K,L); Tjadas Malang near Tjibeber, alt. 1,000 m., *Winckel 1457* (L); Java, *Zollinger 3476* (BM) (plant 10 cm. high).

Lesser Sunda Islands: Lombok, alt. 750–900 m., *Elbert 863* (L); Lombok, alt. 1,250–1,600 m., *Elbert 1779* (K,L); Lombok, alt. 200–400 m., *Elbert 2448* (L); Lombok, G. Poenikan, *Ernst s.n. March 1906* (L); Lombok, Poesoeh Pass, Sembalong, alt. 1,300 m., *Voogd 2083* (L, Sing.); West Soembawa, alt. 500 m., *Voogd 2564* (L).

Philippines: Leyte, Ormoc, Lake Danao, *Edano 11988* (L); Leyte, Ormoc, Mt. Janagdan, *Edano 12075* (Sing.); Luzon, Benguet, Baguio, *Elmer 8709* (K,L) (fls. pink); Mindanao, Davao, Todaya, Mt. Apo, *Elmer 11699* (K,L); Luzon, Benguet, Sablang, *Fenix 12760* (L); Banquet, *Loher 4212 & 6574* (K) (bract rosea, corolla roseo-lilac); Luzon, Laguna, *Mabesa 25389* (L); Luzon, Laguna, *Merrill 5101* (K); Luzon, Rizal, *Ramos 2035* (L, Sing.); Luzon, Benguet, Rio Trinidad, *Ramos 5567* (L); Luzon, Cagayan, Penabalanca, *Ramos 76766* (Sing.); Mt. Maquiling, *Vidal s.n. March, 1886* (K) (Type of *Achyropermum philippinense* Benth.).

Type specimen of *A. phlomoides* Bl. ("Sylvia altioribus humidis montis Burangrang") could not be traced. The only specimen in the Leiden herbarium, collector unknown, with collection number as 1437 (*Herb. Lugd. Bat. No. 909–105, 231*) bearing Blume's handwriting as *Achyropermum phlomoides* is clearly a specimen of *A. densiflorum* with underdeveloped terminal spicate inflorescences.

2. ACROCEPHALUS BENTH.

Acrocephalus Benth. in Bot. Reg. sub. *tt. 1282, 1300* (1829), in Benth. & Hook. f. Gen. Pl. 2 (1876) 1173; Briq. in E. & P. Pfl. Fam. 4, 3a (1997) 365.

Annual herbs. Stems and branches quadrangular. Leaves opposite or falsely whorled by the presence of the leaves of underdeveloped lateral branchlets. False whorls agglomerated into terminal or axillary globose or ovoid spurious heads or cylindrical spurious spikes; bracts imbricate. Flowers very small, sessile, Calyx ovoid (in fruit tubular), 7-nerved, the base slightly gibbous; upper lip flat, entire; lower lip generally 4-toothed (in Malesian species); throat naked. Corolla tube very short, subequally 5-lobed. Stamens 4, declinate; filaments free, toothless, included; anthers reniform, the locules confluent. Disk small, gibbous. Style 2-fid. Nutlets minute, smooth or glandulate.

Species about 30, subtropical and tropical Asia (Malesia, E. India to S. W. China) and Africa (and Madagascar). However, in a recent monographic work, all the African species are segregated

into several independent genera (cf. Morton in Hutchinson & Dalziel, Fl. W. Trop. Afr. 2 (1963), p. 445). As a result, only 5–6 Asiatic species remain in the genus; 1 species with 1 form occurs in Malesia.

1. **Acrocephalus indicus** (Burm. f.) O. Kuntz. Rev. Gen. Pl. (1891) 511; Merr. in Philip. J. Sc. 7 (1912) Bot. 101, Enum. Philip. Fl. Pl. 3 (1923) 421; Kudo in Mem. Fac. Sc. Agr. Taihoku Imp. Univ. 2 (1929) 109; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 29; Back. & Bakh. f. Fl. Java 2 (1965) 638.
Prunella indica Burm. f. Fl. Ind. (1768) 130.
Ocimum capitellatum Linn. f. Suppl. (1781) 276.
Ocimum capitatum Roth, Nov. Pl. Sp. (1821) 276.
Ocimum acrocephalum Bl. Bijdr. (1826) 834.
Lumnitzera capitata Spreng. Syst. 2 (1825) 687.
Lumnitzera acrocephala Zipp. in Herb. Lugd. Bat. (Leiden).
Orignum benghalense (non Burm.) Bl. Bijdr. (1826) 831.

Acrocephalus capitatus (Roth) Benth. Bot. Reg. sub. tt. 1282, 1300 (1829), in Wall. Pl. As. Rar. 2 (1831) 18, Lab. Gen. & Sp. (1832) 23, in DC. Prodr. 12 (1848) 47; Miq. Fl. Ind. Bat. (1856) 941; Hook. f. Fl. Brit. Ind. 4 (1885) 611; Ridl. Fl. Mal. Pen. 2 (1923) 644.

Acrocephalus blumei Benth. Lab. Gen. & Sp. (1832) 23.

A slender annual herb, 15–50 cm high. Stems quadrangular, glabrous, often branched from the base; branches often ascending. Leaves elliptic to narrowly lanceolate, 2–5.5 cm long, 0.5–1 cm wide, acute, the base attenuate, the margins remotely serrate, glabrous or glabrescent on both surfaces. Flowers in terminal and upper axillary spurious heads, 5–15 mm across, subtended at the base with 2 or several leafy bracts; flowering bracts suborbicular. 2–3 mm in diameter, shortly acuminate, each bract subtending 3–6 flowers. Calyx tubular, 2–2.5 mm (in fruit 4.5–5 mm) long, pubescent externally, 2-lipped; upper lip entire, rounded; lower lip with 4 lanceolate teeth, shorter than the upper lip. Corolla tubular, 3 mm long, suberect, inconspicuously 2-lipped; upper lip shortly 4-lobed, the lower lip entire, longer than the upper lip. Stamens 4, in 2 pairs, epipetalous. Nutlets minute, oblong-ellipsoid, 0.7 mm long, 0.4 mm broad, compressed, smooth.

Distribution: India, Thailand, Indo-China to S. China and Malesia.

Ecology: In open sandy places or in grassland, sometimes ascending to 1,200 m. altitude.

Vern. name: Sangketan rambat (Java; fide Koorders).

Specimens examined:

Sumatra: Sumatra, *Jacob* 6 (L); Sumatra *Korthals s.n.* (L) (several collections); Karo, Kabandjahe, alt. 1,225 m., *Lörzing* 6197 (L); Habinsaran, alt. 1,200–1,250 m., *Lörzing* 6549 (L); Karo, Kabandjahe, alt. 1,100 m., *Lörzing* 13555 (L); Gajo, Loeäs, *Pringgo Atmodjo* 102 (L) (“Beberteh”).

Malay Peninsula: Pahang, *Ridley s.n.* 1891 (Sing.).

Java: Bantam, alt. 5 m., *Backer* 1493 (L); Bantam, alt. 200 m., *Backer* 9259 (L); Java, *Blume* 974 (L) (Lectotype of *Ocimum acrocephalum* B1.) (*Herb. Ludg. Bat.* 904, 350–17) (several collections); Besoeki, *Buwalda* 7398 (L); Bawean, *Dorgelo* 82 (L); Java, *Horsfield lab.* 18 (K); Java, *Junghuhn* 48 & 52 (L) (several collections); Ngarengan, *Koorders* 33556 B (L); Java, *Kuhl & Hasselt s.n.* (L); Java, *Reinwardt s.n.* (L); Indramajoe, Plosokerep, alt. 25 m., *Steenis* 8202 (L); Java, *Zollinger* 106 (K); Madoera, *Zollinger s.n.* (L).

Lesser Sunda Islands: W. Sumbawa, Mt. Batulante, alt. 500–700 m., *Kostermans* 18854 (L); N. Bali, *Steenis* 7740 (K); Bali, alt. 400–500 m., *Voogd* 2446 (L).

Borneo: Bandjermassing, *Motley* 354 (K); Borneo, *Nieuwenhuis & Jaheri* 36 (L).

Philippines: Mindanao, Zamboanga, alt. 400 m., *Frake* 36182 (L); Luzon, Tarlac, *Merrill* 3622 (K); Luzon Benguet, *Merrill* 4384 (K); Luzon, Bulacan, *Ramos* 1986 (Sing.) & 1996 (L); Luzon, Rizal, Mt. Irig, *Ramos* 41970 (K, L, Sing.); Luzon Bontoc, *Vanoverbergh* 923 (Sing.);

Celebes: P. Muna, alt. 125 m., *Elbert* 2908 (L); P. Muna, alt. 75 m., *Elbert* 2926 (L).

New Guinea: Papua, near Guruguru village, alt. 25 m., *Hoogland* 4227 (L).

1a. ***Acrocephalus indicus*** (Burm. f) O. Kuntz. f. ***spicatus*** (C. B. Robinson) *stat. nov.*

Acrocephalus spicatus C. B. Rob. in Philip. J. Sc. 6 (1911) Bot. 356; Merr. Enum. Philip. 3 (1923) 421.

Acrocephalus dentatus C. B. Rob. in Herb. Kew.

This form is different from the species in the aggregation of 6–8 or more false whorls into a spurious spike which sometimes reach a length of 3–4 cm long.

Type specimen: Santa Cruz, Davao, S. E. Mindanao, *Williams* 2954 (co-type, K).

Distribution: Malesia (Mindanao, the Philippines).

Ecology: In open, rather wet places at low and medium altitudes (fide Merrill).

Specimens examined:

Philippines: Mindanao, Bukidnan, Tanculan, *Fenix* 26115 (BM,K); Mindanao, Bukidnan, Maluko, *Ramos & Edano* 38460 (K) (Type of *Acrocephalus dentatus* Rob.); Mindanao, Davao, Santa Cruz, *Williams* 2954 (K) (Type of *Acrocephalus spicatus* Rob.).

As the flower and fruit structures of this plant are indistinguishable from those of the species, and in rare cases, as in *Ramos* 41970 (K), a specimen collected from Mt. Irig, Rizal, Luzon in Feb. 1923, both “capitate” and “spicate” inflorescences occur in a same plant, therefore I reduce Robinson’s species as representing a form of *Acrocephalus indicus* O. Kuntze.

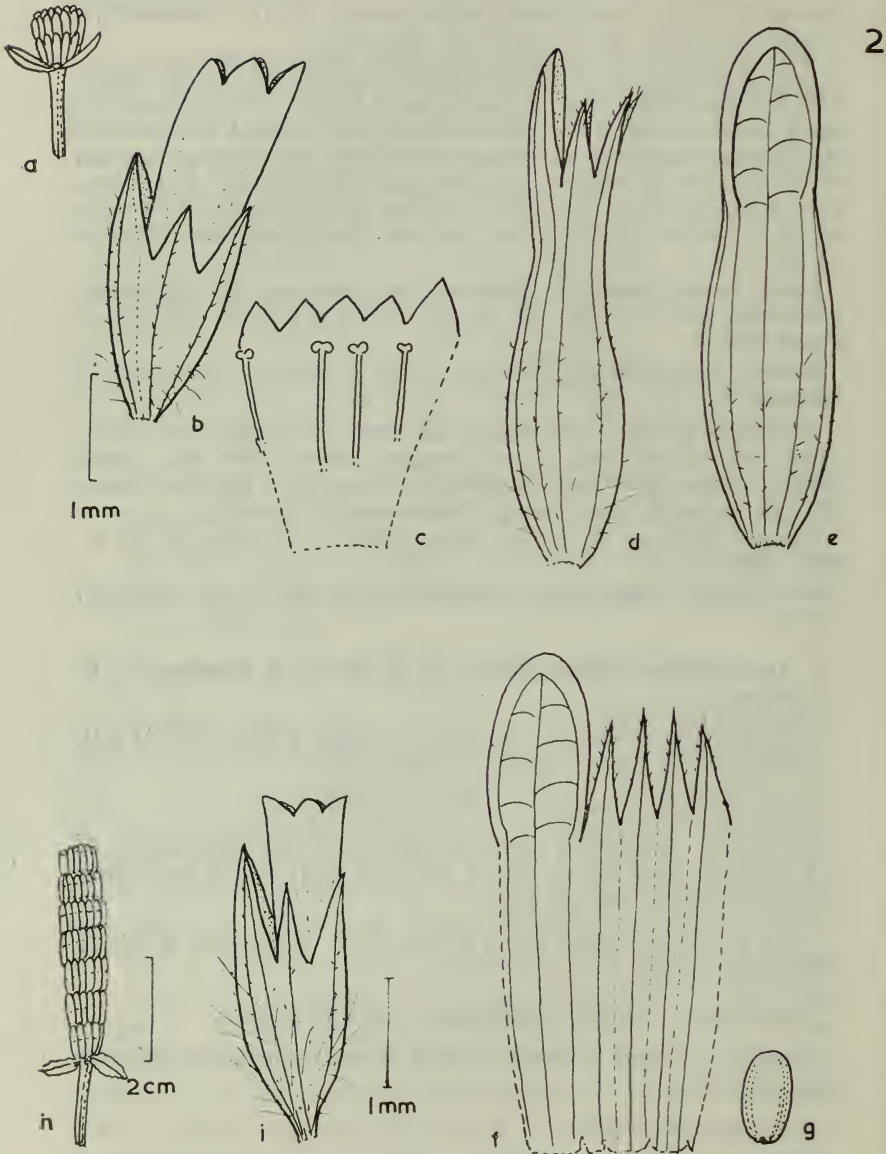


Fig. 2. *Acrocephalus indicus* O. Kuntz. (a-g) and *f. spicatus* (h & i).

a diagram of the spurious head; b. flower; c. corolla expanded; d. & e. fruiting calyx in 2 views; f. fruiting calyx, expanded; g. nutlet; h. diagram of the cylindric inflorescence; i. flower. (a-g, Motley 354, h & i, Ramos and Edano 38460)



Plate 1. *Acrymia ajugiflora* Prain, in Kanching Forest Reserve, Selangor, Malay Peninsula.

"The flowers are white with a dark red throat, and they open about one at a time on a cyme. The leaves are dark green with a velvety pile and pale view which makes them rather handsome . . . It is growing in company with *Phyllagathis hirta* and other forest floor melastomataceous herbs, and with *Didymocarpus*, and at one spot right at the foot of the quartz cliff with *Argostenma pictum* . . . It is restricted to quite a narrow zone on the slope below the cliff, in an area a few hundred yards square . . ."

Photographed by J. A. Reid, June, 1953.

3. **ACRYMIA** PRAIN

Acrymia Prain in Kew Bull, 1908 (1908) 114.

A herb or undershrubs. Leaves opposite, petiolate. Flowers small, in terminal and axillary, many-flowered, pedunculate, compound cymes. Calyx subcampanulate, 8-nerved, 5-toothed, the teeth subequal; throat naked within. Corolla shortly exerted; tube slightly enlarged upwards; limb 2-lipped, the upper lip suberect, or recurved, 2-fid, the lower lip 3-lobed, spreading, the midlobe larger than the lateral ones. Stamens 4, exerted, in 2 pairs, the upper pair slightly shorter; anthers reniform, 2-loculate, at length confluent. Disk small, equal, entire. Style briefly 2-fid, the upper branches very short. Nutlets obovoid, rugose and hirsute; scar very large, lateral.

Monotypic, endemic to Malesia (Malay Peninsula: Perak, Selangor).

1. **Acrymia ajugiflora** Prain in Kew Bull. 1908 (1908) 114, in Hook. f. Icon. Pl. 30 (1911) *t.* 2946, in J. As. Soc. Beng. 74 (1908) 878; Ridl. Fl. Mal. Pen. 2 (1923) 654.

A herb or undershrub. Stem woody, prostrate and rooting below, densely leafy above. Leaves thin chartaceous, elliptic to broadly elliptic, 15–20 cm long, 10–12 cm wide, obtuse, the base broadly acute or subtruncate, the margins irregularly serrate or doubly serrate, hirsute and strigose on both sides, especially along the main nerves; petioles 3–4 cm long, hirsute and strigose. Compound cymes dichotomously branched, with terminal flowers; flowers on the branches secundly arranged; peduncles slender, 6–8 cm long; bracteoles subulate, shorter than the pedicels. Calyx campanulate, 2.5–3 mm long (in fruit 3–4 mm long), the teeth triangular, subequal in length, ciliate; pedicels slender, strigose, 2–3 mm long. Corolla 6–7 mm long, glabrous; the upper lip suberect or recurved, 2-lobed, the lobes oblong; lower lip spreading, 3-lobed, the midlobe very large, obovate to orbicular. Anthers 2-loculate, at length confluent; filaments exerted, hirsute only at the base, glabrous elsewhere. Nutlets obovoid sub-triquetrous, 1.2–1.5 mm long, 1 mm broad, rugose, sparsely hirsute.

Type: Perak, Malaya, *Kunstler* (Dr. King's collector) 10709 (K).

Distribution: Endemic to Malesia (Malay Peninsula: Perak, Selangor).

Ecology: On forest floor at the foot of cliff, or on limestone rocks.

Specimens examined:

Malay Peninsula: Perak: *Kunstler* (Dr. King's collector) 10709 (K, Type); Selangor, Rawang *Melville* 4747 (K); Kanching Forest Reserve, *Nur* 34334 (K, L, Sing.), *Reid s.n.* June, 1953 (Sing.), *Ridley s.n.*, Dec. 1920 (K), *Steenis* 18509 (L) (corolla pale sulphur, endlobe white, tube dark red).

An unique herb, as Prain pointed out, resembles *Cymaria* (inflorescence, fruit), *Ajuga* (corolla) and *Gomphostemma* (habit) with regard to certain characters as indicated within the brackets. The calyx is clearly 8-nerved, instead of 10-nerved as stated in the original description.

3

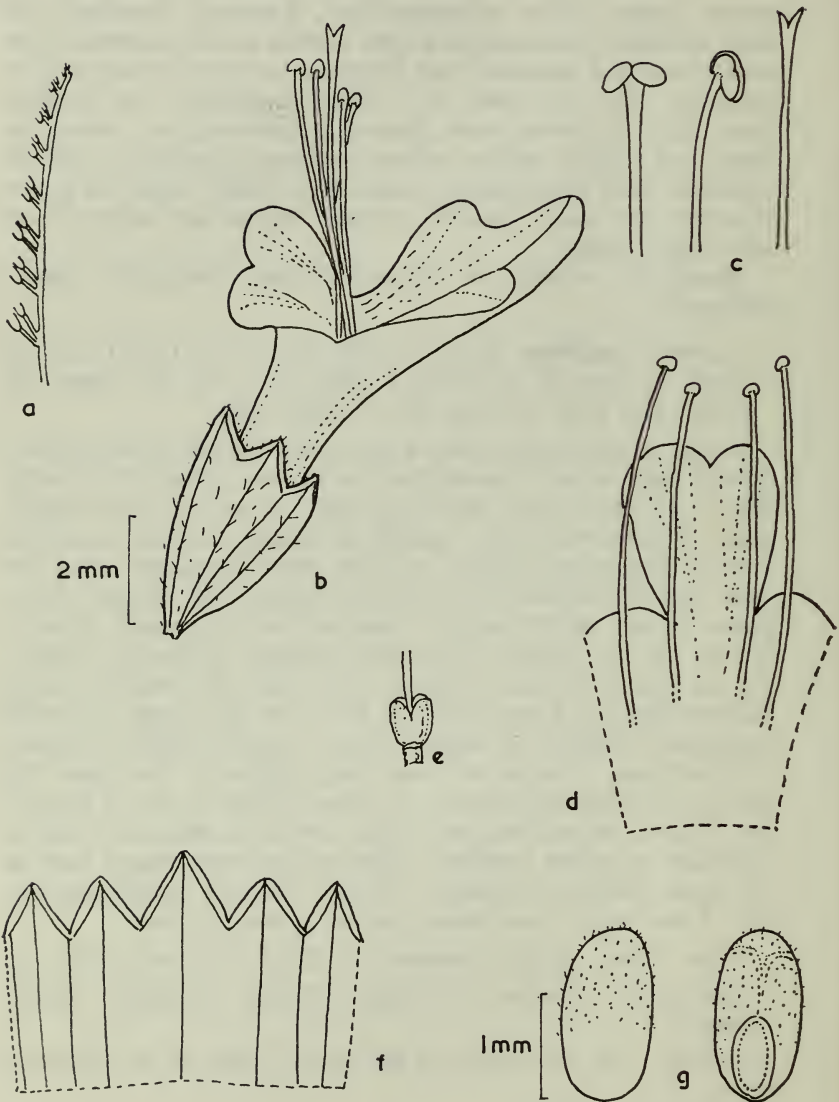


Fig. 3. *Acrymia ajugiflora* Prain.

a. diagram of a branch of cymose inflorescence; b. flower; c. Young stamen (in 2 views) and style; d. upper lip of corolla expanded; e. ovary; f. calyx expanded; g. nutlet, in 2 views. (Steenis 18509)

4. **AJUGA** LINN.

Ajuga Linn. Gen. Pl. ed. 5 (1754) 246; Sp. Pl. (1753) 561; Benth. & Hook. f. Gen. Pl. 2 (1876) 1222; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 209.

Annual or perennial herbs. Leaves opposite, petiolate or sessile. False whorls many-flowered (in Malesian species), axillary or in terminal leafy spike-like inflorescence. Calyx usually 10-nerved; teeth 5, subequal. Corolla exserted; tube often annulate within; limb 2-lipped, the upper lip usually very short, 2-fid, the lower lip long and spreading or slightly concave, 3-lobed, the midlobe the largest, often notched at the apex. Stamens 4, in two pairs, ascending, exserted; anthers 2-loculate, divaricate, often confluent at length. Disk symmetric or produced behind. Ovary shortly 4-lobed; style 2-fid at the end, the branches subequal. Nutlets elliptic or obovoid, reticulate-rugose; scar very large, lateral.

About 50 species, throughout the Old World. Only one species extends to Malesia.

1. **Ajuga bracteosa** Wall. Cat. (1830) no. 2032, *nom. nud.*; Benth. in Wall. Pl. As. Rar. 1 (1830) 59, Lab. Gen. & Sp. (1835) 696 in DC. Prodr. 12 (1848) 597; Hook. f. Fl. Brit. Ind. 4 (1885) 702; Merr. Enum. Philip. 3 (1923) 408; Kudo in Mem. Fac. Sc. & Ag. Taihok Un. II, 2 (1929) 287; Mukerj in Rec. Bot. Surv. India 14, 1 (1940) 224.

Ajuga remota Benth. in Wall. Pl. As. Rar. 1 (1830) 59.

Ajuga macrosperma (non Wall.) Miq. Fl. Ind. Bat. 2 (1859) 991.

Ajuga ternatensis Miq. in Herb. Utrecht.

Ajuga loheri Rolfe in Herb. Kew.

Ajuga macrosperma Wall. var. *cuneata* Back. in Herb. Leiden.

A low, diffuse, much branched herb, usually less than 20 cm high. Stems and branches from the rootstock, erect or ascending, generally hispid. Leaves oblanceolate, narrowly obovate or subspathulate, 4–8 cm long, 2–3 cm wide, obtuse or rounded, the base cuneate or gradually attenuate; the margins undulate, hirsute on both surfaces; upper leaves sessile, lower ones shortly petiolate. Flowers many in axillary false-whorls, sometimes crowded in terminal, spike-like inflorescence, with ovate or cuneate-obovate, entire or toothed prominent bracts. Calyx campanulate, often slightly oblique, 3–3.5 mm long, the teeth triangular. Corolla-tube straight, exserted, not inflated at the base; lower lip 2 mm long, 3-lobed, hirsute without. Stamens exserted, the locules confluent, often hairy. Nutlets obovoid, 1.5–2 mm long, 1 mm wide, shallowly rugose-reticulate, yellowish.

Type specimen: Napalia, 1821, *Wallich 2032* (K).

Distribution: Afghanistan, Himalayas, Malesia (Philippines, Celebes, Moluccas, and New Guinea) to China.

Ecology: Chiefly on banks and shaded ravines, low to medium altitudes. Wet places at low elevations, up to 1,500 m.

Vernacular name: *Tilad* (Celebes).

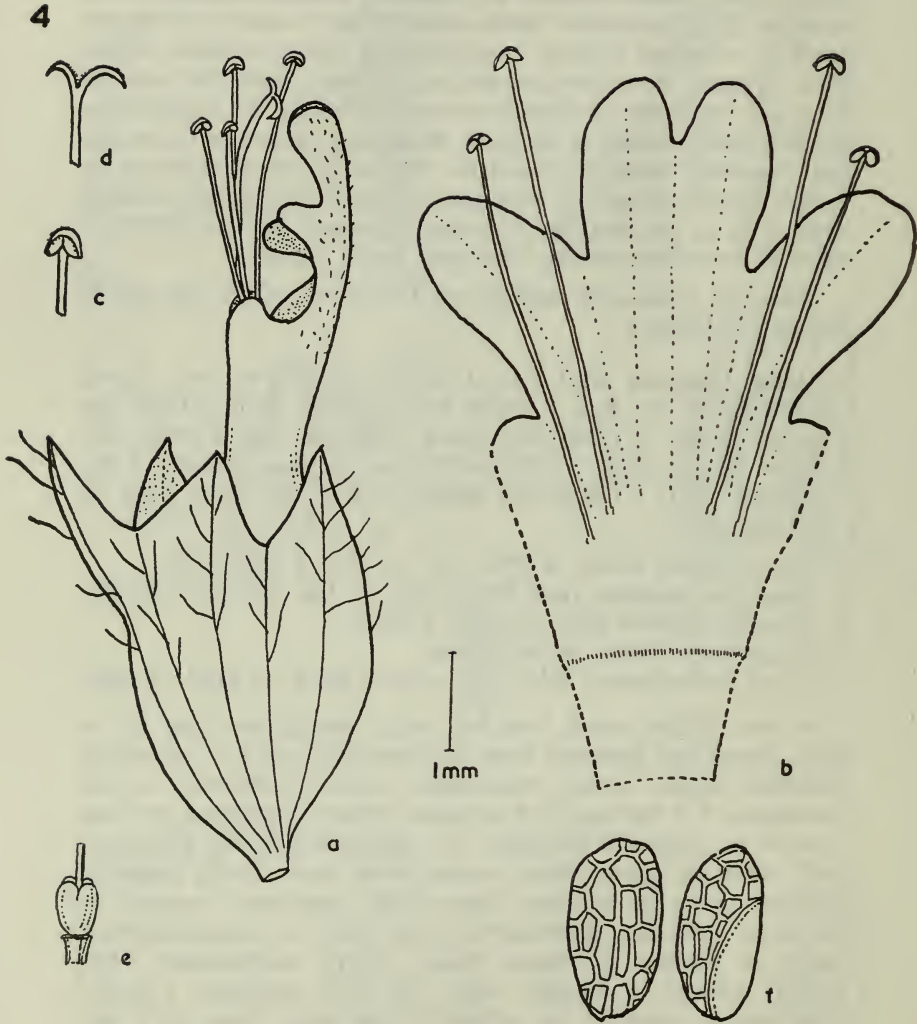


Fig. 4. *Ajuga bracteosa* Wall. ex Benth.

a. flower; b. corolla expanded, showing the stamens and annulus; c. anther; d. tip of style; e. ovary, f. nutlet, in 2 views. (Ramos & Edano 45071)

Specimens examined:

Philippines: Luzon, *Clemens* 570 (K), *Elmer* 8626 (K), *Loher* 4205, 4206 (K), *Merrill* 4422 (K), 7773 (BM), 10626 (BM, Sing, L), *Ramos & Edano* 37874, 45071 (L).

Celebes: *Forsten s.n.* (L), *Kaudern* 380 (L).

Moluccas: Talaud Isle. alt. 200 m. *Lam* 3160 (corolla white, young fruit green-yellow) (L), Halmaheira, *Pleyte* 171 (L), *Teysmann* 7845 (L); P. Ternate, *Teysmann* 5194 (U 76816A), *DeVriese & Teysmann s.n.* (L).
New Guinea: Seroei, *Aet & Idjan* 997 (L).

Specimens from Malesian region, in comparison with the type specimen, *Wallich* 2032, possess more elongate and less hairy leaves and much shorter corolla. In these respects, they match the type specimen of *Ajuga remota* Benth. (*Wallich* 2033, from Kamaon) quite well. The latter, however, was reduced as synonymous with *A. bracteosa* by Hooker f., Kudo, Mukerjee and others. Their basic floral structures are much the same.

5. ANISOMELES R. BR.

Anisomeles R. Br. Prodr. (1810) 503; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1207; Briq. in E. & P. Pfl. Fam. 4, 3a (1897), 268.

Herbs, or sometimes shrubby. Stems and branches softly pubescent or woolly. Flowers in axillary whorls or loosely forming terminal spicate or paniculate inflorescence. Calyx ovoid or tubular, straight, 10-nerved, almost equally 5-toothed. Corolla-tube short, annulate within; upper lip short, entire and erect; lower lip 3-lobed, broad and patent, the mid-lobe retuse or notched. Stamens exerted, in 2 pairs; anthers connivent, those of the lower pair often longer, smaller and dimidiate, and of the upper pair shorter, larger and 2-loculate, the locules parallel. Disk equal. Style subequally 2-fid. Nutlets smooth, flattened, bluntly angular, and with rather prominent scar on the ventral surface.

Species 5 to 6, in tropical and subtropical Asia and N. E. Australia; 3 in Malesia.

Key to the species

- A. Stems and branches acutely 4-angled, softly pubescent or glabrescent, brownish; fruiting calyx teeth nearly as long as the tube.
 - B. Leaves hirsute or glabrescent, ovate, flowers usually numerous, in dense axillary false whorls, often forming approximately dense spicate inflorescence; seeds ovoid.
 - 1. *A. indica*
 - B. Leaves densely villose, oblong-elliptic or lanceolate; flowers fewer, in axillary false whorls, often distantly disposed; seeds ellipsoid.
 - 2. *A. salviaefolia*
- A. Stems and branches obtusely 4-angled, densely woolly, grayish; fruiting calyx teeth much shorter than the tube.
 - 3. *A. malabarica*

W. Rothmaler (in Redde, Report. 53 (1944) 12) claimed that he had discovered Adanson's type specimen of *Epimeredi* (Fam. Pl. 2 (1763) 192) in the Paris Herbarium, and which he identified as *Anisomeles*. Therefore he reduced *Anisomeles* R. Br. as synonymous with *Epimeredi* Adans. and made a number of combined names. Yet from Adanson's original description, it is very difficult to conceive whether he referred to *Anisomeles* or other plants. Without further evidence, Robert Brown's generic name should be considered as valid.

1. ***Anisomeles indica*** (Linn.) O. Kuntze. Rev. Gen. Pl. (1891) 512; Merr. Enum. Philip. 3 (1925) 412; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 152; Back. & Bakh. f. Fl. Java 2 (1965) 624 (incl. 3 varieties).

Nepeta indica Linn. Sp. Pl. (1753) 571.

Anisomeles ovata R. Br. in Ait. Hort. Kew ed. 2, 2 (1811) 364; Benth Lab. Gen. & Sp. (1835) 702 (incl. b. *mollissima*), in DC. Prodr. 12 (1848) 455; Miq. Fl. Ind. Bat. 2 (1858) 975 (incl. r. *serratifolia* Miq.); Hook. f. Fl. Brit. Ind. 4 (1885) 672; Prain in J. As. Soc. Beng. 74 (1907) 715; Ridl. Fl. Mal. Pen. 2 (1923) 649.

Nepeta malabarica (non Linn.) Blume, Bijdr. (1826) 823.

Phlomis indica (non Forsk) Blanco, Fl. Filip. (1837) 474.

Anisomeles malabarica (non R. Br.) Miq. Fl. Ind. Bat. 2 (1859) 976.

Anisomeles albiflora (Hassk.) Miq. Fl. Ind. Bat. 2 (1859) 976.

A herbaceous or shrubby plant, 0.5–1.5 m high. Stems and branches acutely 4-angled, sparingly hairy to densely pubescent. Leaves thin- to thick-membranaceous, ovate to broadly ovate, 4.5–6 cm long, 3–3.5 cm wide, acute, the base rounded or truncate, subcordate, less often shortly cuneate, entire; margins elsewhere crenate-serrate, often irregular, sometimes almost pinnatifid, hirsute or woolly on both surfaces; petiole 1.5–4 cm long, tomentose. Flowers in dense false whorls, distant below, approximate above in a dense spicate inflorescence; bracts linear, 3–4 mm long, pilose. Calyx campanulate, 5–7 mm (in fruit 9–10 mm) long, shortly pedicellate, hirsute and pilose; teeth lanceolate, acute, almost as long as the tube, ciliate. Corolla tubular, 7–8 mm long. Filaments hirsute. Nutlets broadly ovoid, 1.8–2 mm long, 1.4–1.5 mm broad, subcompressed.

Distribution: India to S. China, Japan and to Malesia.

Vern. names: Batoe-Babra, Sib0 (Sumatra); Tahate dawang, Lalah (Lesser Sunda Islands); Kabling-lalake, Kadling-parang, Lilitan, Litalit, Sauang-sauang, Subusuba, Talingharap (Philippines).

Ecology: In open and waste places near settled areas, mostly at low altitudes.

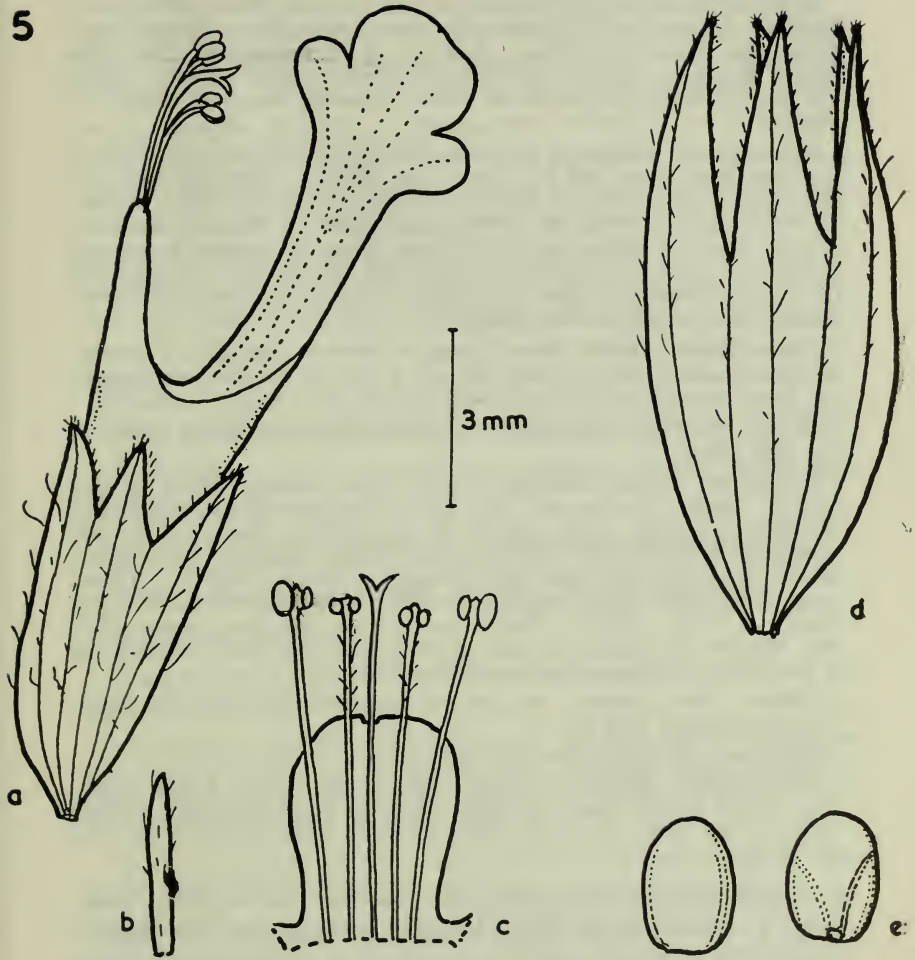


Fig. 5. *Anisomeles indica* O. Kuntze.

a. flower; b. bract; c. portion of upper corolla-lip with stamens and style; d. fruiting calyx; e. nutlet in 2 views (flower, *Sijde* 27, fruit, *Lörzing* 6307)

Specimens examined:

Sumatra: Telug Kabung, *Borssum Waalkes 1658* (L); West Coast, alt. 950 m., *Bünnemeyer 8191* (K); Sumatra, *Cuming 2438* (K); Cajolanden, *Jochems 115* (L); Medan, *Lörzing 13009* (L) (shrubby 1–1.5 m., fls. white); Karohoeheben, alt. 1,250 m., *Lörzing 13571* (L); Lake Toba, alt. 1,000 m., *Lörzing 14859* (L) (fls. purplish); Lake Toba, *Ridley s.n.* (K); Korinchi, Sandagang Agong, *Robinson & Kloss s.n.* 1914 (K); Kebanagoeng, *Voogd 1214* (L); Batoe Bara, *Yates 2237* (Sing.).

Malay Peninsula: Selangor, Kuala Lumpur, *Burkill & Haniff 16386* (Sing.); Malacca, *Cuming 2438* (K); Penang, *Curtis 1411* (Sing.); Perak, Ipoh, *Molesworth-Allen 4117* (Sing.); Selangor, Port Swettenham, *Nur 3006* (Sing.); Singapore, *Ridley 2692* (Sing.); Selangor, Kuala Lumpur, *Ridley s.n.* Dec. 1920 (K) (fls. white, lip mauve); Penang, *Ward s.n.* June 1941 (Sing.).

Java: Batavia, *Bakhuizen v/d Brink 1939* (K); Buitenzorg, *Danser 6295* (L); Soerabaya, *Hoed 509* (L); Java, *Hoed 3067* (L); Java, *Horsfield s.n.* (K); Java, *Kooper 7284* (L); Madioen, *Koorders 29137* (K); West Bantam, alt. 0 m., *Kregten 88* (L) (fls. purple); Java, *Lobb. s.n.* (K); Mt. Batu, alt. 260 m., *Nedi & Idjan 366* (L) (40 cm. high, fls. white); Buitenzorg, *Ooststroom 12649* (L); Buitenzorg, *Raap 422* (L); Bogor, *Teysmann 456* (L); Java, *Zollinger 183* (BM, K) (type of *Anisomeles ovata* β . *mollissima* Benth.); Java, *Zollinger 3039* (BM).

Lesser Sunda Islands: Babar, *Borssum Waalkes 3010* (L); Tanimber, *Borssum Waalkes 3163* (L); Alor, *Jaag 412 & 627* (L); Soemba, Matahapore, alt. 50 m., *Monod de Freideville 1943* (L) (fls. pink, strongly aromatic).

Borneo: Sarawak, Baram, *Hose 283* (BM); Sarawak, Native Collector, *s.n.* 1888 (Sing.).

Philippines: Luzon, Batangas, *Aranez 2* (L); Luzon, *Button 51* (L); Luzon, Lagona, *Cuming 643* (K, L); Philippines, *Cuming 1878* (K); Mindanao, Agusan, *Elmer 13443* (K, L); Luzon, *Elmer 16482* (K); Mindanao, Pasanan, *Frake 36263* (L) (fls. violet); Mindanao, Zamboanga, *Hallier 4619* (L); Sulu Isls., Siasi, *Kondo & Edano 38960* (L); Luzon, *Loher 4227 & 4228* (K); Luzon, *Mundo 34* (L); Luzon, Isabela, San Mariano, *Ramos & Edano 16710* (L, Sing.); Luzon, Rizal, Mt. Iriq, *Ramos 41935* (K); Mindoro, Pinagbayanan, *Sulit 22477* (L) (fls. pale blue); Luzon, *Vidal y Soler 506* (K); Luzon, Bataan, *Williams 100* (K).

Celebes: Soela Sanana, alt. 200 m., *Bloembergen 4429* (L); Malili, Tawibaroo, *Eyma 4201* (L).

Moluccas: Moluccas, *Buwalda 4043* (L).

New Guinea: Hollandia, *McKee 1790* (L) (fls. pink); Kebar Valley, *Royen 5023* (K, L, Sing.) (fls. blue, white at base); Merauke, *Versteeg 1858* (L) (fls. upper lip green, lower lip lilac); Merauke, *Zijde 4031* (L) (fls. lilac).

A widely distributed species, the tomentum varying from pubescent to woolly. Prain (1907) intended to recognize two varieties ('glabrata' and 'mollissima'). A large number of intermediate forms renders the infraspecific delimitation rather impractical.

The colour of flowers of this species, according to the field notes made by various collectors, vary from white to violet, recorded possibly in different stages at anthesis.

Anisomeles malabarica R. Br., a species of S. India and Ceylon, was collected twice from Penang, Malaya. A specimen deposited in the Leiden herbarium named as "*Nepeta malabarica*" (collected and identified probably by Blume, from Batavia, Java, bearing the number of *Herb. Lugd. Bat. no. 952, 55–502*), should however, be correctly referred to *Anisomeles indica* O. Kuntz.

2. ***Anisomeles salviaefolia*** R. Br. Prodr. (1810) 503; Benth. Lab. Gen. & Sp. (1835) 702, in DC. Prodr. 12 (1848) 455; Miq. Fl. Ind. Bat. 2 (1859) 976; Mansf. in Bot. Jahrb. 62 (1929) 376.

Anisomeles candicans (non Benth.) Miq. Fl. Ind. Bat. 2 (1859) 976.

A bushy plant, 0.5–1 m. or more high. Stems and branches acutely 4-angled, densely villose. Leaves membranaceous, sparingly hairy above, densely tomentose beneath, elliptic to narrowly ovate, 3–5 cm long, 1.5–2.5 cm wide, acute, the base broadly acute, entire; margins elsewhere crenate-serrate, petioles 0.5–1.5 cm long, tomentose. Flowers many (usually less than 15), in axillary false whorls, often distantly disposed; bracts linear lanceolate, 2–3 mm long. Calyx nearly cylindrical, narrowed on both ends, 5–8 mm (in fruit 8–9 mm) long, hirsute and pilose externally, the teeth broadly lanceolate, acuminate, 2–3 mm long, hairy and ciliate. Corolla 6–7 mm long, puberulent. Filaments puberulent or pubescent. Nutlets ellipsoid, 2 mm long, 1.2 mm broad, reddish brown, smooth.

Type specimen: In Nova Hollandia tropica, *R. Brown s.n.* (BM).

Distribution: N. E. Australia and Malesia (Lesser Sunda Isls. and New Guinea).

Ecology: Commonly found in open places at low altitudes.

Vern. names: Kaleb-Kaleb, Keranke (New Guinea).

Specimens examined:

Lesser Sunda Islands: Timor, *R. Brown s.n.* (in 1803) (BM), *Meyer s.n.* (in 1884) (K), *Smith & Wiles 1792* (BM).

New Guinea: Waraka, Papua, alt. 200 m. *Arttwell 154* (K); N. Coast, *Atasrip s.n.* (in 1903) (L); Baroka, Nakeo, C. Division, Papua, *Brass 3715* (BM); New Guinea, *Koch s.n.* (in 1904–5) (L); Hollandia, *McKee 1790*; Tamurik, S. N. Guinea, *Wentholt 228* (L).

In the Leiden herbarium, there are two old collections of this plant from Timor, without collector's name or other data, and numbered as Lugd. Bat. Herb. 904, 350–355, and 904, 350–356. Both are named as *Anisomeles candicans* Benth., a species confined to upper Burma.

The description given above is based on the New Guinea and Timor specimens which are somewhat intermediate between Australian *Anisomeles salviaefolia* and Malesian *Anisomeles indica*.

3. ***Anisomeles malabarica*** (L) R. Br. ex Sims in Bot. Mag. 46 (1819) *t.* 2071; Benth. in Wall. Pl. As. Rar. 1 (1830) 59, in DC. Prodr. 12 (1848) 456; Hook. f. Fl. Brit. Ind. 4 (1885) 673; Prain in J. As. Soc. Beng. 74 (1907) 716; Ridl. Fl. Mal. Pen. 2 (1923) 649; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 153.

Nepeta malabarica Linn. Mant. Pl. 2 (1771) 566.

Anisomeles intermedia Wight in Benth. Lab. Gen. & Sp. (1835) 703; Benth. in DC. Prodr. 12 (1848) 456.

Erect, shrubby, 0.5–1.5 m high; stems and branches obtusely 4-angled, densely tomentose or thickly woolly, silvery white. Leaves thick-chartaceous, narrowly oblong or oblong-lanceolate, 5–8 cm long, 2–3 cm wide, acute, the base rounded or shortly cuneate, entire; margin elsewhere crenate-serrate, silvery woolly-tomentose beneath; petiole 0.5–2.5 cm long, stout, softly woolly. Flowers in dense false whorls, distant below, approximate above, forming an interrupted spicate inflorescence, 8–10 cm long; bracts lanceolate, 1–1.5 cm long, acute, woolly. Calyx campanulate, 6 mm (in fruit 1 cm) long, densely villose, the margins ciliate. Corolla 13–14 mm long, puberulent. Filaments pubescent. Nutlets ellipsoid, 2 mm long, 1 mm broad, compressed, inner surface faintly angled, outer rounded, shining, brown.

Distribution: S. India to Ceylon, Mauritius and Malesia (Penang).

Ecology: a weed, on waste ground.

Specimens examined:

Malay Peninsula: Penang, *Wallich 2037* (K); Ayer Itam, Penang, *Curtis 3741* (K, Sing.) (Herb, 2–3 ft., fls. pink).

Prain (1907) and Ridley (1923) both pointed out that this plant in Malesia being confined to Penang, is probably an introduced species.

6. **BASILICUM** MOENCH

Basilicum Moench, Suppl. Meth. Pl. (1802) 143; O. Ktze. Rev. Gen. Pl. 2 (1891) 512; Morton in Hutch. & Dalz. Fl. W. Trop. Afr. 2 (1963) 454.

Moschosma Reichb. Consp. (1828) 171, *in adnot.*; Benth. Lab. Gen. & Sp. (1832) 24, in DC Prodr. 12 (1848) 48; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1173; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 368.

Annual or perennial herbs, erect, branched. Leaves opposite, petiolate. False whorls 6–10-flowered, secund, in axillary and terminal raceme-like inflorescences. Flowers very small; bract minute. Calyx ovoid or campanulate, 5-toothed, the uppermost tooth often very broad and forming the upper lip, the 2 lateral teeth often associated with the 2 lower teeth and forming the lower lip; throat of calyx naked. Corolla tubular-campanulate, the tube short, the limb 2-lipped; upper lip clearly 3-lobed (in Malesian species), the mid-lobe entire or shallowly notched; lower lip entire, auriculate at the base. Stamens 4, declinate; filaments not appendiculate; anthers 2-loculate. Style clavate, shortly 2-fid at the tip. Nutlets ovoid, compressed, smooth.

Species 6–7, widely distributed in tropical Asia and Africa; 1 extended to Malesia.

Basilicum Moench (1802), as O. Kuntze pointed out, is homonymous with *Basilicum* Rumphius. However, the former was based on an entirely different plant, and accompanied by an accurate description. Furthermore, it did not refer to Rumphius' name.

1. ***Basilicum polystachyon*** (L.) Moench. Suppl. Meth. Pl. (1802) 143; Morton in Hutch. & Dalz. Fl. W. Trop. Afr. 2 (1963) 454. *Ocimum polystachyum* Linn. Mant. 2 (1771) 567.

Ocimum tenuiflorum (*non* Linn.) Burm. f. Fl. Ind. (1768) 129.

Moschosma polystachyum (Linn.) Benth. in Wall. Pl. As. Rar. 2 (1831) 13, in DC. Prodr. 12 (1848) 48; Miq. Fl. Ind. Bat. 2 (1858) 942; Hook. f. Fl. Brit. Ind. 4 (1885) 612; Merr. Enum. Philip. 3 (1923) 421; Ridl. Fl. Mal. Pen. 2 (1923) 644; Mansf. in Bot. Jahrb. 62 (1929) 380; Back. & Bakh. f. Fl. Java 2 (1965) 638, (as *polystachyon*).

Moschosma tenuiflora (Burm. f.) Heynh. Nomen. 1 (1840) 532; Merr. Fl. Man. (1912) 408.

An erect herb, 40–100 cm high. Stems much branched, nearly glabrous, prominently 4-angled. Leaves thin membranaceous, ovate to oblong-ovate, 2–5 cm long, 1–3.5 cm broad, acuminate or caudate, the base acute or attenuate, the margins irregularly serrate, glabrous on both surfaces; petioles slender, 1–4 cm long. Raceme-like inflorescence 3–6 cm (in fruit over 10 cm) long; false-whorls 6–10-flowered; bracts minute, lanceolate, aristate, 1–2 mm long; pedicels 1–2 mm long, persistent. Calyx ovoid or campanulate, pubescent, 1.5–2 mm (in fruit 3–3.5 mm, slightly inflated near the base) long; upper lip broad, entire, reflexed; lower lip 4-toothed, the 2 lateral teeth ovate, and the 2 lower teeth cuspidate. Corolla 2–2.5 mm long. Stamens 4, in 2 pairs, included. Nutlets minute, broadly ellipsoid, compressed, smooth.

Distribution: Tropical Africa, Tropical Asia to Australia.

Ecology: A weed, in open waste land, often scattered in the settled areas, or in rice-fields.

Vern. names: Soelaseh doelang, Main-main, Tapoea djatten (Sumatra), Bauin, Lodokon, Pansi-pansi (Philippines, fide Merrill), Ariordan (New Guinea).

Specimens examined:

Sumatra: Asahan, *Bartlett & Rue 501* (L); Karo Highlands, Berastagi, *Hamel 413* (L); Karo Highlands, N. Berastagi, *Hamel & Rahmat Si Boeea 463* (L); Tapianoeli, Maranti, *Rahmat Si Boeea 6114* (L); Tapianoeli, Loemban Lobo, Toba, *Rahmat Si Boeea 9809* (L); Loemban, Toba, *Rahmat Si Boeea 10539* (L); Tapianoeli, Porsea, Toba, *Rahmat Si Boeea 10831* (L); Loemban, Toba, *Rahmat Si Boeea 10918* (L); Tapianoeli, Dolok Si Manoek-manoek, *Rahmat Si Boeea 11224* (L); Tapanoeli, *Surbeck 222* (L); Sumatra, *Teruya 2955* (Sing.).

Malay Peninsula: Penang, *Curtis 1430* (Sing.); Perlis, *Ridley 14928* (K, Sing.); Kedah, *Ridley 14930* (K, Sing.); Penang, *Sinclair 39372* (K, L, Sing.).

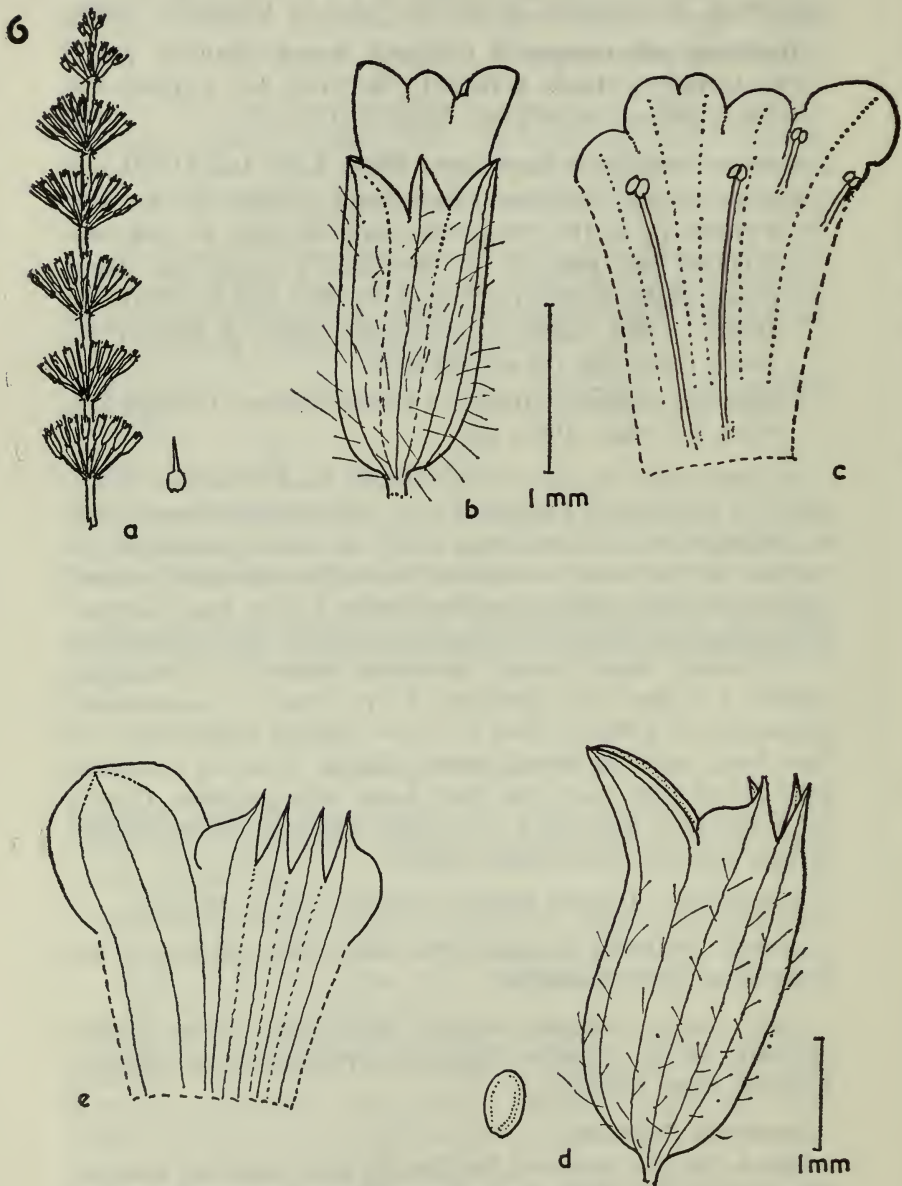


Fig. 6. *Basicicum polystachyon* Moench.

a. diagram of the spurious spicate inflorescence and a bract (enlarged); b. flower; c. corolla expanded, showing the stamens; d. fruiting calyx and nutlet; e. fruiting calyx expanded. (Sinclair 39372)

Java: Bantam, *Amdjah* 5 (L); Weltevreden, *Backer s.n.* 1902 (L); Randoeblatoeng, Rembang, alt. 150 m., *Backer* 6632 (L); T. Lorok, *Backer* 7644 (L); Pasoeroean, alt. 3 m., *Backer* 7644 (L); Poeger, alt. 15 m., *Backer* 18087 (L); Madjenang, alt. 30 m., *Backer* 18597 (L); Pasoeroean, alt. 4 m., *Backer* 36307 & 36568 (L); Buitenzorg, alt. 250 m., *Bakhuizen v/d Brink Jr.* 1940 (K, L); Java, *Blume s.n.* (L) (several collections); Java, *Blume* 1195 (L); Soerabaja, alt. 15 m., *Dorgelo* 515 (L); Bogor, cult. in Hort., *Hallier* 295 (L); Java, *Horsfield s.n.* (K); Semarang, alt. 15–20 m., *Houwing s.n.* 1924 (L); Semarang, alt. 15–20 m., *Houwing* 394 & 531 (L); Semarang, alt. 10–15 m., *Houwing* 845 (L); Semarang, alt. 15–20 m., *Houwing* 906 (L); Java, *Junghuhn* 22 (L) (several collections); Pangalengan, alt. 1,400 m., *Karsten* 36 (L); Banjoemas, *Kievits & Kooper* 7 (L); Banjoemas, alt. 20 m., *Kievits* 282 (L); Banjoemas, *Kievits* 2591 (L); Besoeki, Poeger Watangan, alt. 10 m. *Koorders s.n.* Oct, 1895 (L); Besoeki, *Koorders* 21550 (K); Bagelen, Karanganjer, *Koorders* 26233 β (L); Batavia, *Reinwardt* 1195 (L); Sourabaya, *Teruya* 1656 (Sing.); Java, *Wade s.n.* (L); Semarang, *Waitz s.n.* (L).

Lesser Sunda Islands: Lombok, alt. 50 m., *Elbert* 2387 (L); Timor, near Lore, alt. 1–5 m., *Steenis* 18194 (L) (fls. pale lilac); Timor, *Teysmann* 732 (K); Timor, *Teysmann* 10732 & 19742 (L); Bali, Tjoelik, alt. 0 m., *Voogd* 2052 (L); Lombok, *Wallace s.n.* 1856 (K); Timor, *Zippelius* 46 (L); Timor, *Zippelius s.n.* (L) (several collections).

Borneo: Poeloe Lampei, *Korthals* 23 (L).

Philippines: Luzon, *Cuming* 478 (K); Luzon, *Loher* 4214 (K); Luzon, Manila, *Merrill sp. Blanco* 423 (K, L); Luzon, Apalit, *Ramos* 41645 (K, Sing.); Catanduanes, *Ramos & Edano* 75303 (Sing.).

Celebes: Celebes, Belang, *Forsten* 325 & 328 (L); Celebes, *Teysmann* 12163 (L); Tempe, *Weber s.n.* (L).

Moluccas: Halmaheira, *Anang* 484 (L); Moluccas, *Forsten s.n.* (L) (several collections).

New Guinea: New Britain, M \ddot{o} wehafen, *Blackwood* 329 (K) (fls. purplish) ("Asiordan"); Papua, Gaima, lower Fly River, *Brass* 8321 (L) (fls. pink); Kaiserin Augusta River, near Papua, *Gjellerup* 356 (L); Hollandia, alt. 5 m., *Gjellerup* 998 (L); Merauke, *Koch s.n.* 1904–05 (L); E. Merauke, *Versteeg* 1938 (L).

7. CALAMINTHA MILL.

Calamintha [Tourn.] Mill. Gard. Dict. ed. 4, 1 (1754); Lamk. Fl. Fr. 2 (1778) 393; Moench. Meth. Pl. (1794) 408; Benth. in DC. Prodr. 12 (1848) 226, p.p., in Benth. & Hook. f. Gen. Pl. 2 (1876) 1190.

Melissa Linn. *sensu* Benth. sect. *Calamintha* (Moench.) Benth. Lab. Gen. & Sp. (1834) 384.

Satureia Linn. *sensu* Briq. sect. *Calamintha* (Moench.) Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 301.

Herbs often slender and prostrate (in Malesian species). Flowers small or medium-sized, in dense axillary false whorls and often forming loose spicate or racemose inflorescence. Calyx campanulate, always 13-nerved, 2-lipped; upper lip 3-toothed, the teeth broad and highly connate; lower lip 2-toothed, the teeth subulate;

throat naked or villous. Corolla-tube straight, the limb 2-lipped; upper lip erect, flat; lower lip spreading, 3-lobed. Stamens 4, in 2 pairs, ascending under the upper lip; upper pair always small and imperfect (in Malesian species); anthers 2-loculate, the locules parallel or divaricate. Disk uniform, entire. Style lobes equal or the upper lobe smaller. Nutlets minute, subglobose, smooth.

Species about 40 in North temperate regions, few extended to the tropical mountains; 2 species and 1 variety in Malesia.

Controversial opinions have been expressed as to whether *Calamintha* should be reduced to a section of *Satureia* as suggested by Briquet. For two opposing views, see Brenan (in Mem. N. Y. Bot. Gard. 9 (1954) 47) and De Wolf (in *Baileya* 2 (1954) 149). A full discussion on the nomenclature problems of the generic name *Calamintha* can also be found in another paper by De Wolf (in *Rhodora* 57 (1955) 74). In this treatment, *Calamintha* is considered as a separate genus.

Key to the species

- A. Calyx sparsely hirsute; upper calyx-teeth as long as or shorter than the lower ones; fruiting calyx 3.5–4 mm long; corolla-tube barely exserted. 1. *C. gracilis*
- A. Calyx densely pilose; upper calyx-teeth slightly longer than the lower ones.
 - B. Fruiting calyx 4.5–5 (–8) mm long; corolla-tube shortly exserted. 2. *C. umbrosa* var. *umbrosa*
 - B. Fruiting calyx 10–12 mm long; corolla-tube long-exserted.
 - 2a. *C. umbrosa* var. *javanica*.
- 1. ***Calamintha gracilis*** Benth. in DC. Prodr. 12 (1848) 232; Miq. Fl. Ind. Bot. 2 (1859) 968; Prain in J. As. Soc. Bengal 74, 2 (1907) 711; Ridl. Fl. Mal. Pen. 2 (1923) 648.

Cunila moluccana Zipp. in Herb. Lugd. Bat.

Calamintha molucana Miq. Fl. Ind. Bat. 2 (1859) 968. *syn. nov.*

Satureia gracilis (Benth.) Nakai in J. Coll. Sc. Un. Tokyo 31 (1911) 149; Back. & Bakh. f. Fl. Java 2 (1965) 630.

A slender, prostrate herb. Stems puberulous, rooting on the lower nodes. Leaves membranaceous, broadly ovate or subrounded, 1–2 cm long, 0.8–1.5 cm wide, acute, the base rounded or broadly cuneate, entire, margins elsewhere crenate-serrate, glabrous on both sides except on the nerves; petioles 0.5–1 cm long, puberulous. Flowers in lax many-flowered false whorls in axils of upper leaves, sometimes aggregated in racemose or subcapitate terminal inflorescence; bracts subulate, puberulous; pedicels slender, 1–3 mm long. Calyx tubular-campanulate, 2–3 mm (in fruit 4–4.5 mm) long, sparsely hirsute; tube slightly inflated below; upper teeth recurved, highly connate, slightly shorter than the lower ones; lower teeth subulate, ciliate, slightly incurved. Corolla straight, 3–4 mm long, barely exserted. Anther-locules parallel, connivent. Nutlets rounded, compressed, 0.5–0.6 mm across, pale brown, finely reticulate.

Distribution: India, Burma, Thailand to S. China, Formosa, S. Japan and Malesia.

Ecology: In wet, open places or in grassland, at low and medium altitudes (600–2,400 m).

Specimens examined:

Malaya: Perak, Taiping, *Burkill & Haniff 12812* (Sing.); Pahang, Fraser's Hill, alt. 1,300 m., *Purseglove 4118* (L, Sing.); Perak, Taiping, *Ridley 11912* (K, Sing.); Perak, Maxwell's Hill, *Spare 1486* (Sing.); Maxwell's Hill, alt. 1,200–1,300 m., *Sinclair & Kiah SF 38620* (K, L, Sing.) (creeping; fls. pink).

Java: Wanajasa, alt. 700 m., *Backer 13995* (L); Poerwakarta, alt. 630 m., *Bakhuizen v/d Brink 4618* (L) & *4839* (K, L); Tjilame, alt. 700 m., *Doctors V. Leeuwen 2760* (L).

Lesser Sunda Islands: Timor, *Zippelius s.n.* (L).

Celebes: Masamba, alt. 2,000–2,400 m., *Eyma 1510* (L) (fls. lilac).

Moluccas: Timor, *Zippelius s.n.* (*Herb. Lugd. Bat. 904, 351–38*) (type of *Calamintha molucana* Miq. L.) Molucca, *Zippelius s.n.* (L) (several collections).

Type specimen of Miquel's *Calamintha molucana*, (which apparently is based on Zippelius' unpublished binomial "*Cunila molucana*") has been studied. It proved to be identical with *Calamintha gracilis*.

2. ***Calamintha umbrosa*** (Bieb.) Benth. in DC. Prodr. 12 (1848) 233; Miq. Fl. Ind. Bat. 2 (1859) 968; Hook. f. Fl. Brit. Ind. 4 (1885) 450; Merr. & Rolfe in Philip. J. Sc. 3 (1908) Bot. 123; Merr. Enum. Philip. 3 (1923) 410. var. ***umbrosa***.

Melissa umbrosa Bieb. Fl. Taur.-Cauc. 2 (1808) 63.

Ziziphora javanica Bl. Bijdr. (1826) 822, *syn. nov.*

Satureia umbrosa (Beib.) Scheele in Flora, 26 (1843) 577; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 302.

Stachys rubispala Elm. Leaf. Philip. Bot. 1 (1908) 338.

A slender herb, profused branched, often prostrate. Stems 30–60 cm high, pubescent, often rooting on the lower nodes. Leaves membranaceous, puberulous, ovate to broadly ovate, 1–1.5 (–2) cm long, 0.8–1.2 cm wide, acute, the base rounded or cuneate, entire; margins elsewhere serrate; petioles 0.3–1 cm long, pubescent. Flowers usually in dense whorls, subcapitate, terminal and in axils of upper leaves; bracts subulate, hirsute, 3–4 mm long, often 2–4 in groups. Calyx 4–4.5 mm (in fruit 4.5–6 mm) long, pubescent with spreading long hairs; tube slightly inflated below; upper teeth spreading, only slightly recurved; lower teeth subulate, pilose on the margins; pedicels 2–3 mm long, pubescent. Corolla 5–6 mm long, 2-lipped, straight. Stamens 4, only 2 larger ones functional. Nutlets subrounded, 0.7–0.8 mm across, compressed, smooth.

7

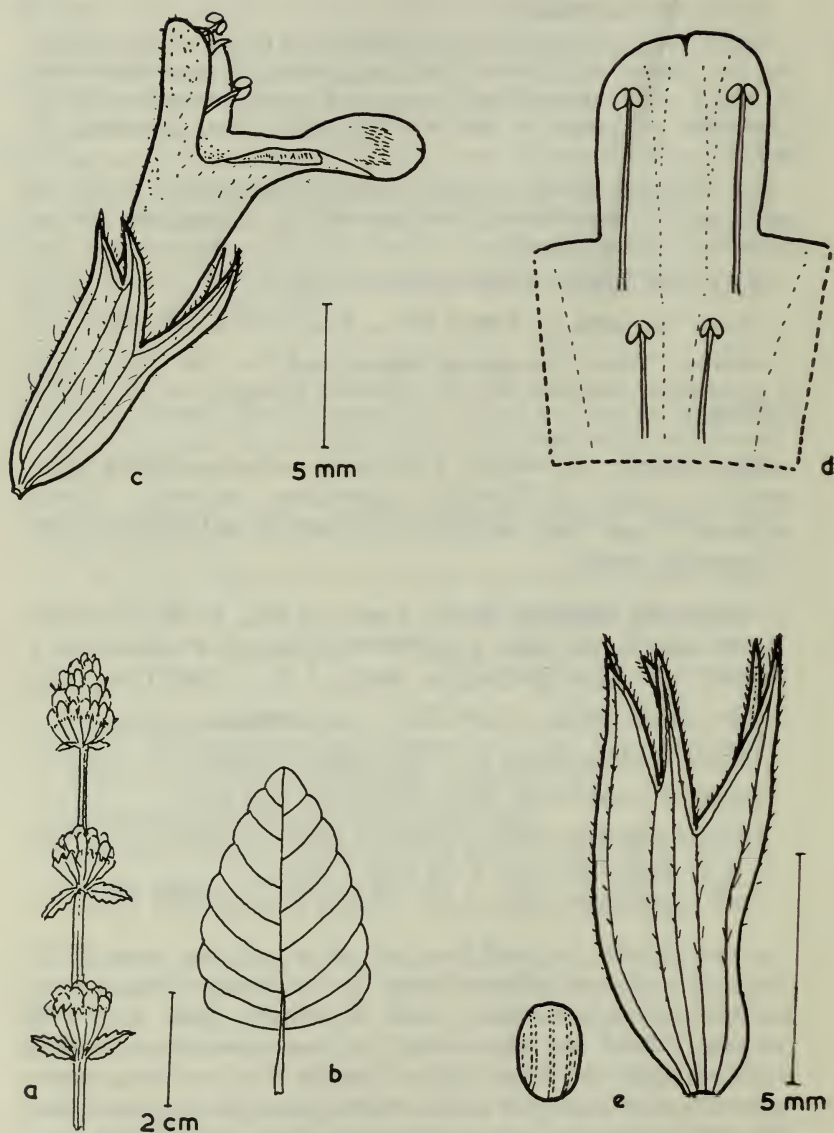


Fig. 7. *Calamintha umbrosa* Benth. var. *Javanica*.

a. diagram of portion of the inflorescence; b. leaf; c. flower; d. upper corolla-lip expanded, showing the stamens; e. fruiting calyx and nutlet (flower, Coert 1511, fruit Backer 37146).

Distribution: From Caucasus, Afghanistan, India to S. China and Japan and Malesia.

Ecology: Often in shaded ravines and on open slopes, altitudes 1,200–3,200 m.

Specimens examined:

Sumatra: G. Koerintji, alt. 1,700 m., *Bünnemeijer 9111* (K, L, Sing.).

Java: Tjeremai, *Blume s.n.* (L) (Type of *Ziziphora javanica* Bl.); Lawoe, alt. 3,100 m., *Brinkman 755* (L, Sing.); Besoeki, alt. 1,500 m., *Buwalda 7360* (L); E. Java, *Coert 1193* (L); Lawoe, alt. 2,900–3,200 m., *Elbert 147* (L); Preanger, *Forbes 678* (K) & *749* (BM, Sing.); Preanger, alt. 1,400 m., *Hochreutiner 1368* (L); Java, *Horsfield s.n.* (K); Java, *Junghuhn 36* (L), *47* (K, L) & *57* (K); Dieng, alt. 2,000 m., *Karsten 100* (L); Ngadisari, alt. 2,300 m., *Koorders 39702* (L); Besoeki, alt. 2,000 m., *Koorders 43200* & *43202* (L); Pasoeroean, alt. 2,500 m., *Koorders 43825* (L); Tosari, *Ridley s.n.* Jan. 1915 (K); Priangan, alt. 2,041 m., *Steenis 4268* (L, Sing.); Besoeki, alt. 1,900–3,000 m., *Steenis 10914* (L).

Lesser Sunda Islands: Lombok, *Elbert 1225* (L).

Philippines: Luzon, Benguet, Baguio, *Elmer 8408* (L) (Co-type of *Stachys rubisepala* Elm.); Benguet, *Loher 4184* & *4185* (K); Luzon, Benguet, alt. 2,600 m., *Mearns 4358* (L); Luzon, Benguet, alt. 1,500 m., *Mendoza 40933* (L); Luzon, Benguet, Mt. Santo Tomas, *Merrill 11709* (K, L, Sing.); Luzon, Bontoc, Mt. Pukis, *Ramos & Edano 37712* (L) & *37798* (Sing.); Luzon, Lepanto, Mt. Data, *Ramos & Edano 40248* (K, Sing.); Luzon, Benguet, Mt. Pulog, *Ramos & Edano 44892* (L); Luzon, Bontoc, alt. 1,100 m., *Santos 5475* & *5760* (L) (fls. purple); Luzon, Benguet, Pauai, *Santos 31682* (K, L, Sing.); Benguet, *Sinclair & Edano 9696* (Sing.); Luzon, Baguio-Bontoc, alt. 1,800 m., *Steenis 17938* (L); Mt. Pauai, *Sulit 7449* (L).

Lectotype of *Ziziphora javanica* Bl. in the Leiden herbarium (from Tjeremai, Java, collected by Blume) has been examined. It is indistinguishable from *Calamintha umbrosa* Benth. var. *umbrosa*.

2a. *Calamintha umbrosa* (Bieb.) Benth. var. *javanica* (Benth.) *stat. nov.*

Calamintha repens Benth. var. *javanica* Benth. in DC. Prodr. (1848) 233.

Satureia umbrosa (Bieb.) Scheele var. *javanica* (Benth.) Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 302.

Satureia umbrosa (Bieb.) Scheele var. *repens* (D. Don) Briq. l.c. 302; Back. & Bakh. f. Fl. Java 2 (1965) 630.

Scutellaria repens D. Don, Prod. Fl. Nepal. (1825) 110.

This variety differs from the species chiefly in the larger flowers with much longer calyx (in flower 8–9 mm long, in fruit 9–10 mm long) and long-exserted corolla (9–12 mm long), and in the larger nutlets (1–1.2 mm across).

Distribution: Malesia (Java).

Ecology: On open slopes at higher altitudes (2,000m–3,000m).

Specimens examined:

Java: G. Tjeremai, alt. 2,700–3,000 m., *Backer 5083* (K); G. Tengger, alt. 2,000 m., *Backer 37146* (L); G. Djembangan, alt. 2,000–3,000 m., *Coert 1511* (L); Java, *Junghuhn 133* (K, L); G. Ardjoeno, *Voogd 779* (L); G. Tengger, alt. 2,500–2,600 m., *Zollinger 1794* (L).

8. **CERANTHUS** F. MUELL. ex G. TAYLOR

Ceranthus F. Muell. *Fragm. Phytogr. Austral.* 5 (1865) 52 in obs. *nom. prov.*; G. Taylor in *J. Bot.* 74 (1936) 35.

Plectranthus sect. *Cornigera* F. Muell. *l.c.* 5 (1865) 51.

Hemsleia (non *Hemsleya* Cogn.) Kudo in *Mem. Fac. Sc. & Agr. Taihoku Un.* 2, 2 (1929) 142.

Herbs. Leaves opposite (or subverticillate at the base), petiolate. Flowers usually small, in few-flowered false whorls, forming a terminal raceme-like inflorescence. Calyx turbinate (more or less saccate in fruit), 5-toothed, 2-lipped; upper lip 3-lobed; lower lip obtuse, strongly incurved and gibbous in fruit. Corolla-tube exerted, spurred at the base; limb 2-lipped; upper lip 3–4-lobed, recurved; lower lip entire, concave. Stamens 4, in 2 pairs; filaments free, inserted at two different levels. Style briefly 2-fid. Nutlets orbicular, often finely pitted.

Species about 10, mostly in Thailand, Indo-China and S. W. China; only 1 species occurs in New Guinea and Australia (N. E. Queensland). The peculiar disjunctive distribution pattern of this genus has been cited by Prof. Lam (in *Proc. 7th Pac. Sc. Congr.* 5 (1953) 9) as an example of “bi-topical” genus — independently but convergently evolved from the *Plectranthus*-stock in two widely separated regions.

1. ***Ceranthus longicornis*** (F. Muell.) G. Taylor in *J. Bot.* 74 (1936) 39, f. 2.

Plectranthus longicornis F. Muell. *Fragm. Phytogr. Austral.* 5 (1865) 51; *Benth. Fl. Austral.* 5 (1870) 76.

Perennial herb. Stems solitary or rarely branched from the base, tomentose or pubescent, thickened (sometimes nodiferous) and scaly in underground portion; 25–30 cm long including the inflorescence. Leave usually 2–3 pairs, obovate or oblong, 2.5–3.5 (–5) cm long, 1–1.5 cm wide, obtuse or rounded, the base attenuate; margins sinuate or coarsely toothed or subentire, hirsute on both surfaces; petioles 0.2–0.5 cm long. False whorls 6–8-, rarely 4–5-flowered, forming a terminal, slender raceme 10–15 cm long; bracts cordate, acuminate; pedicels 2–3 mm long. Calyx turbinate, widely opened, 1.5–2.5 mm long; upper lip formed of a broad, truncate and emarginate upper tooth with 2 smaller lateral teeth at its base; the lower lip obtuse and emarginate. Corolla obliquely campanulate, produced at the base a narrow conical, recurved spur; upper lip erect, broad, shortly 3-lobed; lower lip oblong, concave. Stamens included, the 2 upper ones inserted near the mouth, and the 2 lower, near the base of corolla-tube. Fruiting calyx accrescent, inflated, 2.5–3 mm long and broad; upper tooth recurved at the top and decurrent at the base; lower lip strongly concave and saccate. Nutlets globular, flattened, 1 mm across, glandulate.

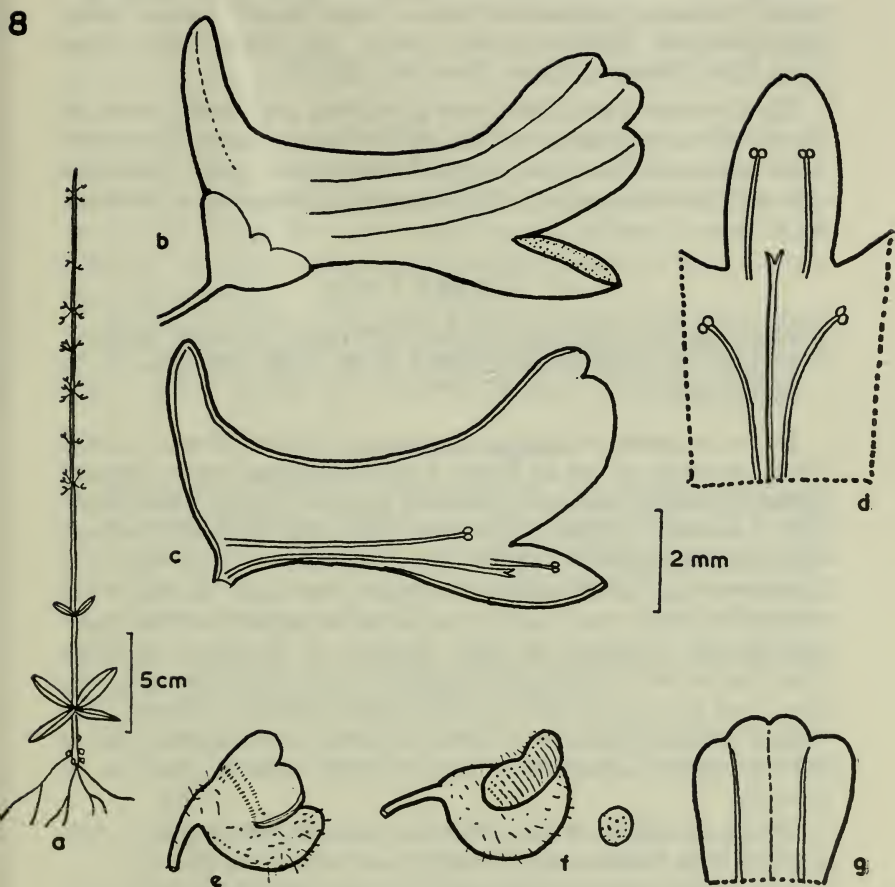


Fig. 8. *Ceratanthus longicornis* G. Taylor.

a. habit; b. flower; c. half of corolla; d. lower lip of corolla, expanded; e. & f. 2 views of fruiting calyx; g. upper lip of corolla. (Brass 8403)

Distribution: Australia (N. E. Queensland) and New Guinea (S. Papua).

Ecology: Common amongst grasses all over savannahs or on savannah ridges.

Specimens examined:

New Guinea: Wuroi, Oriomo River, W. Division, *Brass* 5692 (BM, K) (Stems, peduncles, petioles leaf-midribs purple tinged; flowers violet); Lake Daviumbu, Middle Fly River, *Brass* 7890 (BM), Tarara, Wassi Kussa River, Western Division, *Brass* 8403 (BM, K).

The description and illustration given here is primarily based on *Brass* 8403, a specimen identified by Sir George Taylor. It is somewhat different from the original description and illustration especially with reference to the shape and dimensions of the fruiting calyx.

9. COLEUS LOUR.

Coleus Lour. Fl. Cochinch. 2 (1790) 372; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1176; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 359.

Herbs or subshrubs. Leaves opposite, petiolate. Flowers usually small, generally in lax or dense, 6-many flowered cymes, forming axillary spurious raceme or terminal panicles. Calyx subcampanulate, 5-toothed, 2-lipped, accrescent and often declinate in fruit. Corolla-tube exserted, long or short, straight or decurved; limb gibbous or less often straight, 2-lipped; the upper lip (3-) 4-fid, strongly recurved; the lower lip entire, much longer than the upper, boat-shaped, narrowed at base. Stamens 4, declinate; filaments fused below into a short tube around the base of style but generally free from the corolla-tube; anther-locules usually confluent. Disc usually produced anteriorly. Ovary 4-partite; style shortly 2-fid at the tip. Nutlets orbicular, oblong or ovoid, smooth, granulate or punctate.

Species about 90, in the tropics of the Old World and in Australia. About 5 species with 5 varieties are found in Malasia.

It is rather controversial whether *Coleus* should be retained as an independent genus or should be incorporated into the genus *Plectranthus*. In Linnaeus's *Species Plantarum* (1753), the earliest known species of *Coleus* and *Plectranthus* were both included in the genus *Ocimum* (as *Ocymum*). As a consequence of emphasis on the presence of a tooth on the filaments of the upper stamens in some *Ocimum* species, a feature originally pointed out by Linnaeus, L'Heritier (1788) established the genus *Plectranthus* to accommodate the species without a tooth on the filaments and having a spur or an angle on the upper side of the corolla-tube. Loureiro (1790) further created the genus *Coleus* to contain the species with monadelphous androecium. Brown (1810), and Blume (1826) did not accept the genus *Coleus*, and placed the species in *Plectranthus*. However, Bentham and Briquet, two authors who wrote the monographs of the family Labiatae on a world-wide basis, and those

who compiled the regional flora of Malesia and neighbouring countries (notably Bentham, Hooker, Miquel, Prain, Merrill, Ridley, Backer & Bakhuiten van den Brink, Jr. and others), have generally accepted the genus *Coleus*.

Very recently, Morton [in J. Linn. Soc. Bot. 58 (1962) 242–249] after examining the West African material, strongly advocate a transference of all the *Coleus* species to *Plectranthus*. I fully agree with Morton that the separation of these two genera is “entirely arbitrary”. Nevertheless, I cannot help but think that the practice of the classification of such a natural family as Labiatae is basically an arbitrary one. Besides, should Morton’s generic concept of *Plectranthus* be accepted *in toto*, following his discussion and the key on P. 243, the most widely cultivated labiateous species in Malesian region, *Coleus scutellarioides* Benth., probably has to be reclassified under the genus *Solenostemon* Schum. *emend.* J. K. Morton, rather than under the genus *Plectranthus*. This appears to be unacceptable.

For these reasons, tentatively I regard *Coleus* and *Plectranthus* as two separate genera until a better delimitation of *Plectranthus* and its allied genera, on a world-wide basis, becomes available.

Key to the species

- A. False whorls densely many-flowered, subglobose; calyx-teeth at anthesis though different in shape, are subequal in length; in fruit, the uppermost calyx-tooth slightly accrescent and deflexed, the lower and lateral teeth all linear lanceolate or subulate, sharply pointed.
 - 1. *C. amboinicus*
- A. False whorls laxly few to many-flowered; calyx-teeth at anthesis or in fruit always very unequal in length.
 - B. Two lateral calyx-teeth usually short, with rounded or truncate (rarely mucronate in 2 varieties of *C. scutellarioides*) apices.
 - C. Corolla generally below 12 mm in length (except in *C. scutellarioides* var. *gibbseae* which can reach a length of 18 mm); lower calyx-teeth shorter, sometimes as long as, rarely slightly longer than the uppermost calyx-tooth.
 - 2. *C. scutellarioides*
 - C. Corolla above 15 mm in length; lower calyx-teeth manifestly longer than the uppermost tooth.
 - 3. *C. macranthus*
 - B. Two lateral teeth elongate, with acute or acuminate apices.
 - C. Spurious spikes 2–4 cm long; flowers 1–3 in a cyme; fruiting calyx 5–6 cm long, the uppermost tooth straight, 3–5-nerved.
 - 4. *C. spariflorus*
 - C. Spurious spikes 5–25 (–30) cm long; flowers 5–8 (–15) in a cyme; fruiting calyx 6–12 (–15) cm long, the uppermost tooth strongly reflexed, many-nerved.
 - 5. *C. galeatus*

1. **Coleus amboinicus** Lour. Fl. Cochinch. (1790) 372; Merr. in Philip. J. Sci. 7 (1912) Bot. 344, Enum. Philip. 3 (1923) 418; Back. & Bakh. f. Fl. Java 2 (1965) 637.
Plectranthus aromaticus Roxb. Fl. Ind. ed. 2, 3 (1832) 22, non Hort. Beng. (1814) 45.
Coleus aromaticus Benth. in Wall. Pl. As. Rar. 2 (1830) 16, in Bot. Reg. 18 (1832) t. 1520, Lab. Gen. & Sp. (1832) 51, in DC. Prodr. 12 (1848) 72.
Plectranthus amboinensis (Lour.) Spreng. Syst. 2 (1825) 690.
Majorana amboinica (Lour.) O. Kuntze, Rev. Gen. Pl. 1 (1891) 524.
Coleus suganda Blanco Fl. Filip. (1837) 438, ed. 2 (1845) 337, ed. 3, 2 (1878) 259; Benth. in DC. Prodr. 12 (1848) 71; Miq. Fl. Ind. Bat. 2 (1858) 948.
? *Coleus carnosus* Hassk. in Fl. Bot. Zeit. 5 (1842) 2; Benth. in DC. Prodr. 12 (1848) 79 (as *sp. dubiae*); Miq. Fl. Ind. Bat. 2 (1858) 953.
? *Coleus suborbicularis* Zoll. et Mor. in Moritzi, Verz. Jav. (1845-46) 54.

A herb, more or less succulent, 0.3-1 m high. Stems and branches subterete, densely pubescent when young, glabrescent when old. Leaves thick, fleshy, broadly ovate, suborbicular or deltoid, 5-7 cm long, 4-6 cm wide, obtuse or rounded, the base rounded or truncate, often long-attenuate, sparsely pubescent on the upper surface, and hirsute on the nerves in the lower surface; petioles 2-4.5 cm long, pubescent. Flowers in dense, many (12-20 or more)-flowered cymes forming subglobose verticillasters disposed in terminal spike-like inflorescences, the rachis 10-20 cm long, fleshy and pubescent; bracts broadly ovate, 3-4 cm long, acute, subsessile. Calyx campanulate, 2-4 mm long, hirsute and glandulate, subequally 5-toothed, the upper tooth broadly ovate, acute, the lateral teeth narrowly lanceolate, the lower teeth slightly longer than the rest, highly connate. Corolla boat-shaped, 8-12 mm long, the tube 3-4 mm long, 2-lipped, the upper lip short, erect, puberulent, the lower lip long, concave.

Distribution: Possibly a native of India. Introduced and cultivated in Malesia for its aromatic leaves.

Ecology: Cultivated from lowland to about 1,000 m high.

Vern. names: Terbangun, Daun-djinten (Karo, Sumatra), Duganda (Tagalo, Philippines).

Specimens examined:

Sumatra: S. Ramboetan, alt. 900 m., *Bünnemeijer* 3389 (L); Karo Highlands, near Kabandjahe, alt. 1,200 m., *Lörzing* 14366 (L).

Java: Java, *Horsfield Lab.* 30 (K); Pasoeroean, Tengger, *Koorders* 37615 b (L); Bandung, alt. 700 m., *Popta* 351 (L).

Lesser Sunda Islands: Flores, *Voogd 1812* (L); Flores, Mt. Keli Moetoe, *Voogd 2005* (L); Timor, Beboki, *Voogd 2313* (L); Flores, Keo, alt. 1,500 m., *Voogd 2828* (L).

Borneo: Sarawak, alt. 1,000 m., *Brooke 10512* (BM).

Philippines: Luzon, Gavite, Maragondon, *Merrill sp. Blanco 129* (BM, K, L); Mindanao, Zamboanga, Malangas, *Ramos & Edano 36950* (K).

Merrill (1912), following the view held by F.-Villar, reduced *Coleus suganda* Blanco to a synonym of *Coleus amboinicus* Lour. I am included to think that *C. carnosus* Hassk. and *C. suborbicularis* Zoll. & Mor. (both from Java), are probably synonymous with *C. amboinicus* Lour. too. Although their lectotypes are not available, several specimens in various herbaria identified as these two species are indistinguishable from the latter species.

No fruiting specimen from this region has been found. Backer (1965, p. 637) recorded that "(calyx) after anthesis upto 6 mm long with a slightly oblique mouth".

2. *Coleus scutellarioides* (Linn.) Benth. in Wall. Pl. As. Rar. 2 (1830) 16, Lab. Gen. et Sp. (1832) 53, in DC. Prodr. 12 (1848) 73; Miq. Fl. Ind. Bat. 2 (1858) 949 (incl. varieties); Steenis in Bull. Jard. Bot. Buitenz. III, 13 (1934) 288; Back. & Bakh. f. Fl. Java 2 (1965) 637.

Ocymum scutellarioides Linn. Sp. Pl. ed. 2 (1762) 834; Burm. f. Fl. Ind. (1768) 130.

Polypodium ovatum Burm. f. Fl. Ind. (1768) 223.

Plectranthus scutellarioides (Linn.) R. Br. Prodr. (1810) 506; Bl. Bijdr. (1826) 837.

Plectranthus ingratus Bl. Bijdr. (1826) 836.

Plectranthus laciniatus Bl. Bijdr. (1826) 838.

Coleus atropurpureus Benth. in Wall. Pl. As. Rar. 2 (1830) 16, Lab. Gen. et Sp. (1832) 54, in DC. Prodr. 12 (1848) 74; Miq. Fl. Ind. Bat. 2 (1858) 951; Prain in J. As. Soc. Bengal 74 (2) (1907) 706; Ridley, Fl. Mal. Pen. 2 (1923) 646; Merr. Enum. Philip. 3 (1923) 418.

Coleus blumei Benth. Lab. Gen. et Sp. (1832) 56, in DC. Prodr. 12 (1848) 75; Merr. Enum. Philip. 3 (1923) 419.

Coleus acuminatus Benth. in Linnaea 6 (1831), DC. Prodr. 12 (1848) 73; Miq. Fl. Ind. Bat. 2 (1858) 950; Merr. Enum. Philip. 3 (1923) 418. *syn. nov.*

An observation on the living plants and a study of a large number of herbarium materials bear out that there are many variations of this most extensively cultivated species with reference to the colour, shape and size of the leaves. Take *Coleus laciniatus* (Bl.) Benth. (or *Plectranthus laciniatus* Bl.) as an example, this species is essentially characterized by its "*foliis ovatis acuminatis laciniatis aut inciso-serratis*". It has been demonstrated (Kuswata 1964, unpublished) that the type with lacinate leaf-margins and irregular venation can be raised from seeds of the form possessing shallowly dentate leaf-margins and regular venation. Rife [in Proc. Summer

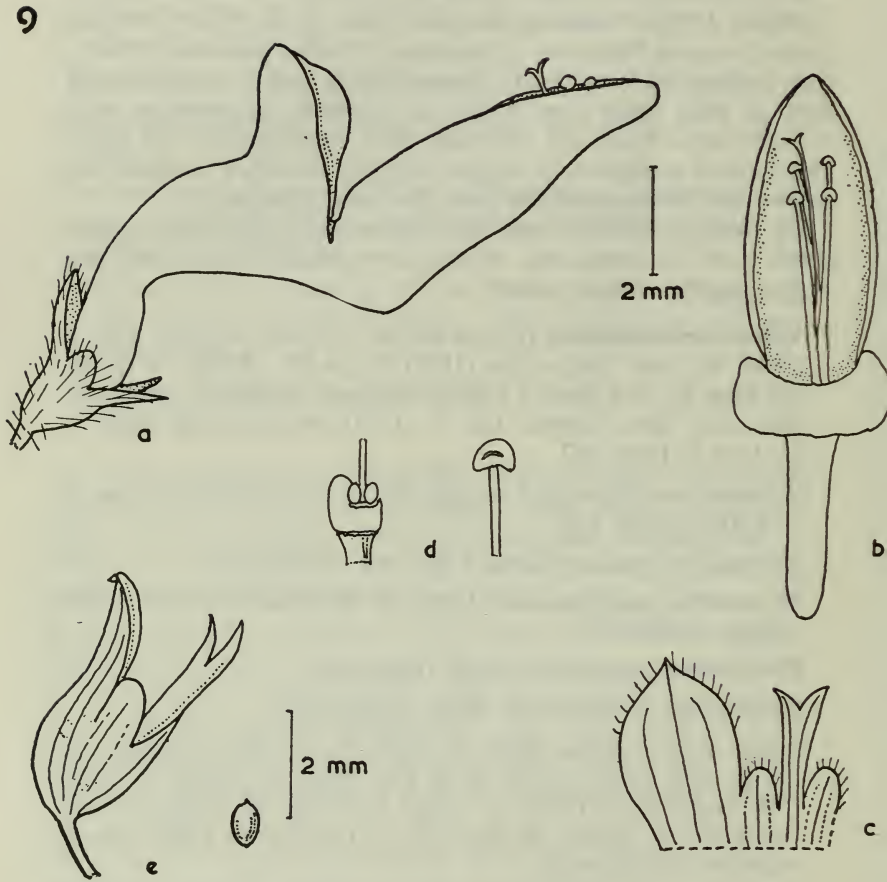


Fig. 9. *Coleus scutellarioides* Benth.

a. flower; b. corolla, seen from above; c. calyx expanded; d. stamen, ovary and nectary disc; e. fruiting calyx and nutlet (fresh material).

Sch. Bot. 1960, pp. 334–340] has shown conclusively that the difference merely resulted from a single gene. Therefore, Dr. Backer's (1965) broad concept of the species *Coleus scutellarioides* Benth. is accepted, with several varieties from definite geographic regions recognized and enumerated below:

Key to the varieties of *Coleus scutellarioides*

- A. Corolla usually below 12 mm long.
 - B. Upper calyx-lobe longer than or as long as the lower pair of calyx-teeth; lateral teeth with rounded or truncate apices.
 - a. var. *scutellarioides*
 - B. Upper calyx-lobe shorter than the lower pair of calyx-teeth.
 - C. Lateral calyx-teeth with rounded or truncate apices (Luzon, Philippines).
 - b. var. *crispipilus*
 - C. Lateral calyx teeth with mucronate or apiculate apices.
 - D. Upper calyx-lobe straight; peduncles of cymes and branches of thyse not elongated, thus flowers closely arranged in verticillasters. (Timor)
 - c. var. *grandifolius*
 - D. Upper calyx-lobe reflexed; peduncles of cymes and branches of thyse elongated, thus flowers laxly arranged in verticillasters. (Mindanao, Philippines).
 - d. var. *integrifolius*
 - A. Corolla 14–18 mm long; upper calyx-lobe longer than the lower pair of calyx-teeth; lateral teeth with rounded apices. (New Guinea)
 - e. var. *gibbseae*

2a. var. *scutellarioides*

A branched herb, 0.5–1 m high, erect or ascending. Stems and branches finely pubescent or glabrous. Leaves membranaceous, very variable in size, shaped and colour, generally ovate in outline, the blade 1–15 cm (generally 4–7 cm) long, 1–10 cm (generally 3–5 cm) wide, acute or acuminate, the base rounded or cuneate, entire, margins elsewhere crenate, serrate, remotely crenate or sometimes lacinate, pubescent on the main and secondary veins; petioles 1–5 (–8) cm long. Flowers in irregularly branched cymes disposed in simple or branched thyrses 5–10 (–25) cm long, 3–5 (–8) cm across; peduncles of the lateral cymes short or elongated; bracts ovate-acute, pubescent, 2–3 mm long; deciduous. Calyx obliquely campanulate, 10-nerved, 2–2.5 mm (in fruit 4–6 mm) long, hirsute and sparingly gland-dotted, unequally 5-toothed; the upper tooth broadly ovate, subacute; the two lateral teeth oblong-obtuse, truncate or rounded, vary short; the two lower teeth subulate, connate; pedicels 3–4 mm long, pubescent. Corolla boat-shaped, 8–13 mm long, puberulent, the tube abruptly decurved, the upper lip short, erect, the lower lip long, concave, enclosing the stamens and most part of the style. Stamens in 2 pairs; filaments connate beyond the point of attachment to the corolla-tube. Nutlets broadly ovate or orbicular, brown, shining, 1–1.2 mm long.



Fig. 9a. Diagrams of the inflorescences and sketches of the fruiting calyces of *Coleus*.

a. *Coleus amboinicus* Lour. (Lörzing 14366); b. *C. scutellarioides* Benth. (fresh material); c. *C. spariflorus* Elmer (Elmer 11646); d. *C. galeatus* Benth. (Backer 23267); e. *C. macranthus* Merr. (Merrill 4502).

Distribution: From India, Malesia to Polynesia.

Ecology: From lowland to high altitudes; generally cultivated for ornamentation, often escaped from cultivation.

Vernacular names: Djawer kotok (Java); Saribotang oeding; Piladang; Boengo piladang (Sumatra); Ati-ati; Dune Ati-ati; Hatisolo; Aroem gara (Malaya Peninsula); Ati-ati kedoyak, Myana (Borneo); Ton kau (Moluccas); Lampungaga; Sahemaya; Mayana (Philippines); Boedimoe pap (New Guinea).

Specimens examined:

Sumatra: Simaloer, *Achmad* 351 (L); Sumatra, *Batten Pool* s.n. 1939 (Sing.); Banka, P. Lepar, alt. 75 m., *Bunnemeijer* 2369 (L); Bt. Tinggi, alt. 1,000 m., *Bunnemeijer* 3038 (L); G. Malintang, alt. 1,100 m., *Bunnemeijer* 3510 (L); G. Sago, alt. 1,050 m., *Bunnemeijer* 3647 (L); G. Merapi, alt. 1,200 m., *Bunnemeijer* 5075 (L); G. Talang, alt. 1,400 m., *Bunnemeijer* 5159 (L); P. Singkep, alt. 30 m., *Bunnemeijer* 7228 (L); Telok, Bt. Ranggal, alt. 100–349 m., *Elbert* s.n. 1903 (L); Archipelago, Ind. Blalauw, alt. 3,000 m., *Forbes* 1881 (L); Palembang, Moeara, alt. 150 m., *Grashoff* 483 (L); Lampung, G. Rate Berenong, alt. 400 m., *Iboet* 256 (L); Sibolangit, alt. 500 m., *Lorzing* 5344 (L); Asahan, *Merrill* 79 (L); Gajo Loeas, *Pringo Atmodja* 220 (L); Palembang, *Praetorius* s.n. (L); Batoe, *Raap* 387 (L); Palembang, 600 m., *Voogd* 1522 (L); East Coast, *Yates* 1165 (L).

Malay Peninsula: Malacca, *Burkill* 3515 (Sing.); Perak Tanjong Malim, *Burkill & Haniff* 13500 (Sing.); Perak, Tapah, *Burkill & Haniff* 13527 (Sing.); Perak, Grik, *Burkill & Haniff* 13647 (Sing.); Pahang, Burtong, *Burkill & Haniff* 16536 (Sing.); Pahang, Pekan, *Burkill & Haniff* 17228 (Sing.); Penang, *Curtis* 466 (Sing.); Johore, Pulau Aor, *Feilding* s.n. Oct. 1892 (Sing.); Perak, Telok Anson, *Haniff* 10315 (Sing.); Perak, Batu Kurau, *Haniff Sa'ah* 13272 (Sing.); Perak, Tapah, *Haniff* 13971 (Sing.); Perak, Kota Lawa, Kuala Kangsar, *Haniff* 15562 (Sing.); Perak, Hutan Melintang, *Haniff* 15912 (Sing.); Perak, Kota Stia-Telok Anson, *Haniff* 15924 (Sing.); Perak, Telok Anson *Haniff* 15945 (Sing.); Perak, Lubok Merbok, Kuala Kangsar, *Haniff* 15985 & 16004 (Sing.); Lower Perak, Telok Anson, Bagan Datoh, *Haniff* 16273 (Sing.); Perak, Telok Anson, K. Gajah, *Haniff* 16299 (Sing.); Perak, Taiping, *Henderson* 10107 (Sing.); Singapore, Ang Mo Kio, *Ridley* 112 (Sing.); Singapore, Choa Chu Kang, *Ridley* s.n. Oct., 1889 (Sing.); Singapore, Kuala Lumpur, *Ridley* s.n. 1890 (Sing.); Singapore, Sungei Jurong, *Ridley* s.n. 1890 (Sing.); Singapore, Bukit Timah, *Ridley* s.n. 1894 (Sing.); Singapore, Pulau Damar, *Ridley* s.n. 1897 (Sing.); Singapore, Galang, *Ridley* s.n. Feb. 1898 (Sing.); Trengganu, Bundi, *Rostados* s.n. Feb. 1890 (L); Penang, Pulau Betong, *Sinclair* 39316 (L, Sing.); Perak, Jenah, alt. 70–100 m., *Wray Jr.* 1759 (L).

Java: Batavia, *Backer* s.n. 1905 (L); Soekaboemi, alt. 800 m, *Backer* 15205 (L); Madoera, P. Puteran, alt. 50 m, *Backer* 20832 (L); Batavia, Wanajasa, alt. 750 m, *Bakhuizen v/d Brink* 4730 (L); Batavia, G. Parang, alt. 700 m, *Bakhuizen v/d Brink* 4979 (L); Java, *Blume* s.n. (L) (several collections); G. Parang, *Blume* 992 (L); Tjibeureum Tjiomas, *Boerlage* 219 (L); Pelaboean Ratoe, *Boerlage* s.n. 1888 (L); Bogor Hortus, *Hallier* D. 268, 269, 270, 271 & 275 (L); Patoea, *Holstvoogd* 425 a (L); Tegal, *Holstvoogd* 578 b (L); Bawean, *Karta* 163 (L); Tjibodas, alt. 1,400 m, *Raap* 759 (L); Batavia, Tjibogea, alt. 250 m, *Schiffner* 2478 (L); Bogor, *Soegandiredja* 140 (L); Java, *Waitz* s.n. (L) (several collections); Java, *Zollinger* s.n. (L).

Lesser Sunda Islands: Timor, Coepang, *Brown* s.n. April 1803 (BM); Timor, Moetis, alt. 1,800 m, *Voogd* 2308 (L).

Borneo: Sandakan, Bambang, *Dagong bin Bakir* A 2745 (Sing.); Borneo, *Delmaar* 1969 (L); Sandakan, *Kadir* A 1658 (L, Sing.); Sandakan, *Kadir* A 2789 (Sing.); Sarawak, Sungei Tau, alt. 100 m, *Purseglove* P. 5166 (L, Sing.).

Philippines: Mindoro, Mt. Yagaw, alt. 460 m, *Conklin 761* (L); Samar, *Cuming 1683* (BM, K) (type of *C. acuminatus* Benth.); Mindanao, Lanao, Cristina Falls, *Ebalo 1200* (Sing.); Luzon, Illocos Norte, Mt. Quebrada, alt. 110 m, *Edano 3752* (L); Mindanao, Zamboanga del Norte, Jipay, *Frake 146* (L); Luzon, Rizal, Pasig, Barrio of Pineda, *Merrill sp. Blanco. 190* (L); Luzon, Manila, *Merrill 786* (L); Luzon, Rizal, Antipolo, *Ramos 22284* (L); Luzon, Laguna, *Ramos 24104* (L, Sing.); Luzon, Rizal, Mt. Irig, *Ramos s.n.* Feb. 1923 (L).

Celebes: Lombasang, alt. 950 m, *Bunnemeijer 11126* (L); G. Bonthain, *Bunnemeijer 12288* (L); Sidenren-rapang, alt. 20 m, *Eyma 318* (L); Masimboelong Enrekang, alt. 2,500 m, *Eyma 995* (L); Enrekang, alt. 1,200 m, *Eyma 1082* (L); Loewoek, Menado, *Eyma 3799* (L); Celebes, *Forsten s.n.* (L); Minahassa, Menado, alt. 200 m, *Koorders 17364* (L); Pakoe-oere, alt. 400 m, *Koorders 17365* (L); Minahassa, Menado, alt. 10 m, *Koorders 17371* (L); Minahassa, alt. 5 m, *Lam 2444* (L); Kg. Patimping, *Noerkas 260* (L); Pasang Kajoe, *Rachmat 195* (L); Celebes, *Teysmann s.n.* 1869 (L).

Moluccas: Tanimbar, Jamdena, *Borssum Waalkes 3270* (L); Aroe, Kep. Ngaibor, alt. few m, *Buwalda 5353* (L); Ceram, Kep. Kiandarar, alt. few m, *Buwalda 5789* (L); Ceram, Roho, alt. 100–200 m, *Kornassi 517* (L); Ceram, alt. nil, *Kornassi 760* (L); Ceram, Tusschen Seti Konoesi, alt. 200–500 m, *Rutten 404* (L); P. Bisa, *Saanan 51* (L); Bara, G. Fogha, *Stresemann 375 a* (L); Ceram, Ambon, *Wiljes-Hissink 122* (L).

New Guinea: New Guinea, *Atasrip 43* (L); Okaba, *Branderhorst 65* (L); Northern New Guinea, alt. 5 m, *Gjellerup 110* (L); Merauke, *Koch s.n.* Aug. 1904 (L); Doorman River, alt. 240 m, *Lam 1387* (L); Bismarck Archipelago, *Lauterbach 135* (L); New Guinea, *Leeuwen 9236, 9523, 10507 & 10733* (L); Southern New Guinea, alt. 40 m, *Pulle 1243* (L); Amboina, *Robinson 473* (BM, L); Southern New Guinea, *Versteeg 1710* (L).

2b. *Coleus scutellarioides* Benth. var. *crispipilus* (Merr.)

comb. nov. et stat. nov.

Coleus pumilus Blanco Fl. Filip. (1837) 482, ed. 2 (1845) 336, ed. 3, (1878) 257; Benth. in DC. Prodr. 12 (1848) 78; Miq. Fl. Ind. Bat. 2 (1858) 956; Merr. Enum. Philip. 3 (1923) 420.

Coleus gaudichaudii Briq. in Ann. Conserv. Jard. Bot. Geneve 2 (1898) 237.

Plectranthus monadelphus Llanos ex F.-Vill. & Naves in Blanco Fl. Filip. ed. 3, 4 (1880) 105, non Roxb.

Coleus macranthus Merr. var. *crispipilus* Merr. in Philip. J. Sc. 1 (1906) suppl. 234.

Coleus crispipilus Merr. in Philip. J. Sc. 5 (1910) Bot. 382, Enum. Philip. 3 (1923) 419.

Coleus pubescens Merr. in Philip. J. Sc. 3 (1908) Bot. 432, Enum. Philip. 3 (1923) 420. *syn. nov.*

Coleus zschokkei Merr. in Philip. J. Sc. 5 (1910) Bot. 382, Enum. Philip. 3 (1923) 420. *syn. nov.*

Coleus formosanus Hayata in Matsum. & Hayata, Enum. Pl. Formos. (1906) 320; Kudo in Mem. Fac. Sc. & Ag. Taihoku Un. II, 2 (1929) 145.

The shape and size of the leaves of this variety are varying from ovate or reniform and small (3–4 by 2.5–3 cm) to broadly ovate and large (10–13 by 8–9.5 cm). It can be easily recognized by the fused lower calyx-teeth which are invariably much longer than the strongly reflexed uppermost calyx-lobe.

Type: Suyoc to Panai, Benguet, Luzon, *Merrill 4780* (isotype, K).

Distribution: Malesia (Luzon, the Philippines) and Formosa (Botel Tobago Island only).

Ecology: In thickets or on open dry slopes at low altitudes, and also in mossy forest at higher altitudes (2,000–2,500 m).

Specimens examined:

Philippines: Luzon, Rizal *Ahern 3420* (K); Luzon, Benguet, Pulog, *Curran, Merrill & Zschokke 16146* (BM) & *16325* (K); Luzon, Zambales, Mt. Aglao, *Edano 26775* (K); Luzon, Bataan, Mt. Mariveles, *Elmer 6720* (K, L); Luzon, Benguet, Baguio, *Elmer 8342* (K, L); Luzon, Tayabas, Lucban, *Elmer 9170* (K, L); Luzon, Sorsogon, Irosin, Mt. Bulusan, *Elmer 15513* (K, L); Luzon, Laguna, Los Bano, Mt. Maquiling, *Elmer 17693* (L); Babuyan Isls. *Fenix 3892* (BM) (isotype of *Coleus pubescens* Merr.); C. Luzon, *Loher 4229, 4230 & 5038* (K); Luzon, Rizal, *Merrill sp. Blanco 190* (K); Culion Isl., *Merrill 455* (K); Luzon, Suyoc to Panai, Benguet, *Merrill 4780* (K) (isotype of *Coleus crispipilus* Merr.); Luzon, Pampanga, Mt. Arayat, *Merrill 3911* (K, L); Manila, *Merrill 3940* (K); Luzon, Benguet, Mt. Pulog, *Merrill 6529* (BM, K) (isotype of *Coleus zschokkei* Merr.); Manila, *Merrill 8017* (K, L); Luzon, Cavite, Talisay Ridge, *Merrill 10625* (K, L); Luzon, Abra, *Ramos 7069* (L); Camarine, Mt. Isarog, *Ramos 22108* (K, L); Luzon, Rizal, Antipolo, *Ramos 22284* (K); Luzon, Sorsogon, *Ramos 23482* (K, L); Luzon, Ilocos Norte, Bangui, *Ramos 27496 & 27660* (K, L); Luzon, Rizal, Mt. Lumutan, *Ramos & Edano 29667* (K, L); Luzon, Ilocos, Burgos, *Ramos 32747* (K); Luzon, Rizal, Mt. Irig, *Ramos 41976* (K); Luzon, Rizal, *Reillo 19228* (K); Luzon, Laguna, Mt. Maquiling, *Scrvina 16901* (L); Luzon, Manila, *Vidal 3486* (K); Luzon, Bataan, Lamao River, *Whitford 185* (K, L).

The interpretation of Blanco's *Coleus pumilus* is based on Merrill's *Sp. Blanco no. 190* (From Rizal, Luzon; Oct. 1914).

With the broad concept of *Coleus scutellarioides* Benth. in mind, I naturally thought of reducing *Coleus pumilus* Blanco to a variety status. I am very pleased to note that Mr. K. Kuswata, who conducted an experimental study on cultivated *Coleus* in the University of Singapore, came to the same conclusion in his unpublished dissertation for the B.Sc. degree with Honours, University of Singapore.

Merrill has earlier (1923) pointed out that *Coleus gaudichaudii* Briq. is synonymous with *C. pumilus* Blanco. In addition, after examining the isotypes of the following species: *Coleus zschokkei* Merr. (Mt. Pulo, Benguet, Luzon, *Merrill 6529*, (K), May, 1909), *C. pubescens* Merr. (Babuyan, *Fenix Bur. Sc. 3892* (BM), June 12, 1908), and *Coleus crispipilus* Merr. (Suyoc to Panai, *Merrill 4780* (K), Nov. 1905), I failed to find any substantial differences between these and *Coleus pumilus* Blanco [except in *C. pubescens* Merr., the leaves are sometimes much larger (up to 13 by 9.5 cm), more pubescent, and the thyrses vary from 10 to 20 cm long, densely flowered]. Therefore, I add them to the synonymy list.

Type specimens of *Coleus multiflorus* Benth. (Lab. Gen. & Sp.; "in Ins. Manilla, Perrottet", in Herb. Mus. Par.) have not been studied. Specimens identified and distributed by Merrill are merely a narrow-leaved and less pubescent form of *Coleus pubescens* Merr. which I consider a synonym of *C. scutellarioides* var. *crispipilus*.

2c. *Coleus scutellarioides* Benth. var. **grandifolius** (Benth.) *stat. nov.*

Coleus grandifolius Benth. Lab. Gen. et Sp. (1832) 54.

Leaves thin membranaceous, 10–12 cm long, 6–8 cm wide, acute, abruptly narrowed into an acumen nearly 2 cm long, the base rounded, entire, margins elsewhere coarsely dentate. Inflorescences 9–10 cm long; flowers 12–16 closely arranged in each verticillaster. Corolla 10–12 mm long.

A variety characterized by the ovate lateral calyx-teeth with a shortly apiculate or mucronate apex.

Type: Timor, *Guichenot s.n.* (type duplicates, K, L.)

Distribution: Endemic to Malesia (Timor).

Specimens examined: The type duplicates only.

2d. *Coleus scutellarioides* Benth. var. **integrifolius** (Elm.) *stat. nov.*

Coleus integrifolius Elm. Leaf. Philip. Bot. 7 (1915) 2696; Merr.

Enum. Philip. 3 (1923) 419.

Leaves ovate, 7–13 cm by 3–6 cm, the apex acute, the base rounded-acute, entire, margins elsewhere finely crenate; petioles 4–6 mm long. Calyx 2–3 mm (in fruit 4–5 mm) long, the two lower teeth (nearly completely fused except the tips) longer than the other three. Corolla 8–9 mm long, strongly curved near the base. Inflorescence in fruiting 20–25 cm long, 3–5 cm across.

This variety is characterized by the lateral calyx-teeth with mucronate apices, and by elongated peduncles and side branches of the thyse.

Type: Cabadbaran (Mt. Urdaneta), alt. 660 m, Agusan, Mindanao, *Elmer 13627*, (BM, K, L) Aug. 1912.

Distribution: Endemic to Malesia (Mindanao, Philippines).

Ecology: on slopes and steep shaded banks of streams, altitude 400–600 m.

Vern. name: Harinayam (Mindanao).

Specimens examined:

Philippines: Luzon, Sorsogon, Irosin (Mt. Bulusan), *Elmer 15358* (BM, K, L); Mindanao, Agusa, Cabadbaran (Mt. Urdaneta), *Elmer 13627* (BM, K, L) (isotype of *Coleus integrifolius* Elm.).

2e. *Coleus scutellarioides* Benth. var. **gibbseae** (S. Moore) *stat. nov.*

Coleus gibbseae S. Moore in L. S. Gibbs, Phytogeogr. & Fl. Arfak Mts. (1917) 178.

Leaves narrowly ovate or ovate-lanceolate, 1.5–2.5 cm by 0.5–0.8 cm, acute or acuminate, the base cuneate, entire, the margins elsewhere serrate; petioles sessile to 0.6 cm long. Inflorescence 15–25 cm long; flowers compactly arranged in verticillasters. Corolla 1.5–1.8 cm long, if fully expanded.

This variety differs from the typical form of the species in the smaller and narrower leaves and the much longer corolla.

Types: N. W. New Guinea, Arfak Mts. alt. 2,300 m *L. S. Gibbs 5909* (BM, holotype of *Coleus gibbseae* S. Moore; isotypes in K, L).

Distribution: Endemic to Malesia (New Guinea).

Ecology: On forest floor, altitude 1,800–2,900 m.

Specimens examined:

New Guinea: Arfak Mts., Angi Lakes, alt. 2,300 m, *Gibbs 5909* (Types BM, K, L); Wissel Lake region, 1,800–2,900 m, *Eyma 5026* (L); Star Mts. Sibil Valley, alt. 1,200 N 1,300 m, *Kalkman 4167* (L); Arfak Mts. Angi Gita Lake, *Kostermans 2158* (L), Merauke, S. New Guinea, *Versteeg 1833* (L).

3. *Coleus macranthus* Merr. in Philip. J. Sci. 1 (1906) Suppl. 234, 5 (1910) Bot. 382, Enum. Philip. 3 (1923) 419.

Erect, branched herb, 1–2 m high. Stems and branches rusty pubescent when young. Leaves membranaceous, ovate, oblong-ovate or narrowly rhomboid, 4–12 (–15) cm long, 1.5–5 (–7) cm, acute or broadly acute, the base rounded, subtruncate or acute, always entire and decurrent; margins elsewhere serrate or remotely dentate; puberulent on both surfaces but with more punctate glands beneath; petioles 2–6 (–7) cm long, slender. Flowers 5–9 (rarely more) in short cymes arranged in terminal or subterminal thyrses; thyrses 15–25 cm (in fruit to 30 cm) long, 4–5 cm across; rachis glandular puberulent; bracts lanceolate, 2–3 mm long, deciduous. Calyx campanulate, glandulate puberulent without, 4–7 mm (in fruit, 8–12 mm) long, the upper tooth broadly ovate, acute, the lateral teeth short and rounded, the lower teeth linear lanceolate, connate, longer than the rest. Corolla 1.5–2 cm long, slightly puberulent, the upper lip short and 3-lobed, the lower lip concave. Nutlets ovoid, 1.2–1.6 mm long, glabrous.

Types: The Philippines, Luzon: Mt. Data, Lapanto, *E. D. Merrill 4502, 4505* (isotypes, BM, K, L, Sing.).

Distribution: Endemic to Malesia (Luzon, the Philippines).

Habitat: In mossy forests at about 2,200 m.

Specimens examined:

Philippines: Luzon, Benguet, Bagulo, *Elmer 8529* (K, L); Luzon, Pampanga, Mt. Pinatubo, Camp Stotsenburg, *Elmer 22172* (L); Luzon, Arayat, *Loher 4193* (K); Benguet, *Loher 4194* (K); Luzon, Data, *Loher 4195* (K); Mt. Data, *Merrill 4502 & 4505* (BM, K) (Isotype); Luzon, Lepanto, Mt. Data, *Ramos & Edano 40283 & 40298* (K, L); Luzon, Lepanto, Mt. Sinapsapan, *Ramos & Edano 40452* (L); Luzon, Benguet, Pauai, *Santos 32034* (BM, K).

Among the specimens cited above, two of them, *Ramos & Edano 40283* (K, L) and *Ramos & Edano 40298* (K, L) bear Merrill's handwritings as "*Coleus macranthus* var. *stenophyllus* Merr." and "*Coleus longipes* Merr." respectively. I failed to find any difference from the typical form of the species, except that in the former, the leaves are remarkably narrower. Both names are not published.

4. *Coleus sparsiflorus* Elm. Leaflet. Philip. Bot. 7 (1915) 2699; Merr. Enum. Philip. 3 (1923) 420.

Coleus scutellarioides Elm. l.c. (1915) 2697, *non* Benth. 1830.

A suberect herb, 30–40 cm high, often branched below. Stems and branches glabrous, rooted on the lower parts. Leaves membranaceous, oblong-lanceolate or elliptic, 3–10 cm long, 1.5–4 cm wide, acute or caudate, the base cuneate, entire, elsewhere crenate-serrate or subentire; glabrous on both surfaces, the nerves hirsute or puberulent; petioles 1–2.5 cm long, slender. Flowers 1–3 in cymules disposed in short thyrses; thyrses terminal or on the upper leaf axils, 2–4 cm long and across, the rachis puberulent, 3–5 branched; bracts ovate, 8–10 mm long, acute. Calyx turbinate, 3.5–4 mm (in fruit 5–6 mm) long, glandulate and hirsute; the upper tooth rounded, 5-nerved (3 main nerves with 2 additional lateral ones); the lateral teeth deltoid, pointed; the lower teeth lanceolate, pointed, connate below, longer than the rest. Corolla boat-shaped, 10–18 mm long, the tube decurved, the limb 2-lipped. Stamens in 2 pairs. Nutlets (?immature, *Elmer 13614*) oblong-cylindric, 1.4 mm long.

Type specimens: Todaya (Mt. Apo) Davao District, Mindanao, *Elmer 11646* (isotypes, BM, K, L). Sept. 1909.

Distribution: Endemic to Malesia (Mindanao, the Philippines).

Ecology: In damp forest, alt. about 1,200 m.

Specimens examined:

Philippines: Mindanao, Mt. Apo (Todaya), Davao, *Elmer 11646* (isotypes, BM, K, L), Mt. Urdaneta, Agusan, *Elmer 13614* (isotypes of *Coleus scutellarioides* Elmer, BM, K, L), Mt. Malindang, Misamis, *Mearns & Hutchinson 4662* (K), Mt. Mayo, Davao, *Ramos & Edano 19424* (Sing.), Mahilucota River, Bukidnon, *Ramos & Edano 38672* (K, L).

Isotypes of *Coleus scutellarioides* Elmer (a later homonym of *Coleus scutellarioides* Benth.), *Elmer 13614*, have been examined, they proved to be identical to *Coleus sparsiflorus* Elmer. Thus confirmed the reduction made by Merrill in 1923.

5. *Coleus galeatus* (Poir.) Benth. Lab. Gen. & Sp. (1832) 56, in DC. Prodr. 12 (1848) 76; Miq. Fl. Ind. Bat. 2 (1858) 955; Back. & Bakh. f. Fl. Java 2 (1965) 637.

var. *galeatus*

Germanea galeatus Poir. Encyc. 2 (1788) 763.

Plectranthus galeatus Vahl, Symb. Bot. 1 (1790) 43.

Plectranthus bicolor Bl. Bijdr. (1826) 837.

Coleus bicolor (Bl.) Benth. Lab. Gen. & Sp. (1832) 55, in DC. Prodr. 12 (1848) 75. *syn. nov.*

Plectranthus macrophyllus Bl. Bijdr. (1826) 835.

Coleus macrophyllus (Bl.) Benth. Lab. Gen. & Sp. (1832) 55, in DC. Prodr. 12 (1848) 75. *syn. nov.*

Coleus remotiflorus Miq. Fl. Ind. Bat. 2 (1858) 954. *syn. nov.*

Coleus spectabilis Miq. l.c. 2 (1858) 955. *syn. nov.*

Coleus macropus Miq. l.c. 2 (1858) 956.

A slender herb, up to 1 m high, erect or ascending, sparsely branched. Stems and branches rusty pubescent when young. Leaves varying from oblong to broadly ovate, mostly ovate, 6–12 (–18) cm long, 3–8 (–13) cm wide, acute or acuminate, the base rounded or shortly cuneate, subentire, margins elsewhere irregularly crenate, glabrous above, pubescent on the nerves below; petioles 3–10 cm long, very slender, puberulent. Flowers 5–8 (rarely up to 15) in very short cymes disposed in terminal and axillary thyrses; thyrses 5–15 cm long, 4–5.5 cm across, often branched at the base; rachis rusty-sericeous; bracts subulate, 2–3 mm long, deciduous. Calyx subcampanulate, sericeous and gland-dotted, 3–5 mm (in fruit 7–8 mm) long, unequally 5-toothed; the upper tooth ovate, subacute, often strongly reflexed, the lateral teeth deltoid, acute at the apex, the lower teeth lanceolate-subulate, connate, longer than the rest, accrescent in fruit. Corolla 1.5–2 cm long, puberulent, the tube very slender below, slightly gibbous at the base, abruptly decurved above; limb 2-lipped; the upper lip short and erect, the lower lip concave; filaments partly exerted. Nutlets broadly ovoid, 1 mm long.

Distribution: Endemic to Malesia.

Ecology: In riverside or mountain forests, altitude from 350–1,900 m.

Vern. names: Djawer kotok (Java), Boekoeham (Java), Selasioetan (Sumatra).

Specimens examined:

Sumatra: W. G. Talamau, *Bunnemeijer* 559 (L); N. W. G. Talamau, *Bunnemeijer* 643 (L); S. Koeriman, alt. 850 m, *Bunnemeijer* 3300 (L); G. Malintang, alt. 1,200 m, *Bunnemeijer* 3741 (K, L); G. Kerintji, alt. 1,500 m, *Bunnemeijer* 9047 (L); Sumatra, *Forbes* 2164 (BM); Sibolangit, alt. 1,200 m, *Lorzing* 5744 (L); Bandarbaroe, alt. 1,250 m, *Lorzing* 6677 (L); Mt. Sago, alt. 900–1,200 m, *Meijer* 3346 (BM, L); Asahan, Loemban, *Rahmat Si Boeca* 7988 (L); Korinchi, *Robinson & Kloss s.n.* 1914 (BM); Palembang, G. Pakiwang, alt. 1,500 m, *Steenis* 3901 (L); Mt. Tanggamoos, alt. 800 m, *Voogd* 155 (L).

Java: G. Boender, *Backer s.n.* Aug. 1909 (L); G. Slamet, alt. 1,200 m, *Backer* 282 (L); Goea Gadjah, alt. 400 m, *Backer* 5959 (L); Denoe, alt. 400 m, *Backer* 8968 (L); G. Salak, Pasir Pogor, alt. 1,200 m, *Backer* 9146 (L); Nirmala, alt. 1,500 m, *Backer* 10715 (L); G. Argopoero, alt. 1,200 m, *Backer* 13224 (L); G. Gedeh, alt. 1,500–1,600 m, *Backer* 22269 (L); Pekalongan, Lebak barang, alt. 350 m, *Backer* 23267 (K, L); Preanger, Gandasoli, Halimoen, alt. 600 m, *Bakhuizen v/d Brink* 3145 (K, L); Batavia, Pasir Limoes, Boerangrang, alt. 1,100 m, *Bakhuizen v/d Brink* 4350 (K, L); Batavia, Pasir Dalem, *Bakhuizen v/d Brink* 5520 (K, L); Java, *Blume* 2037 (lectotype of *Plectranthus bicolor* Bl.) & 2038 (L); Tjibodas, *Boerlage s.n.* (L) (several collections); G. Papandajan, alt. 1,900 m, *Coert* 589 & 590 (L); G. Patoeha, alt. 2,000 m, *Coert* 617 (L); Preanger Malabar, alt. 1,200–1,400 m, *Denker* 99 (L); Java, *Forbes* 712 (BM, L); Java, *Forbes* 739 (K, L); Tjibodas, *Hallier* 109 & 479 (L); Tjibodas, Sindanlaja, G. Gede, *Harreveld s.n.* Aug. 1907 (L); G. Salak, *Hasselt* 640 (L); Taloen, *Ind.* 160 (L); Java, *Junghuhn* 57 (K, L); Bandoeng,

Pengalengan, *Kartamah* 409 (L); G. Gedeh, alt. 1,400 m, *Kern* 8297 (L); Preanger, Tjibodas, alt. 1,450 m, *Koorders* 31904 B (L); G. Karang, *Koorders* 40711 B (L); Java, alt. 1,500 m, *Koorders* 42585 (K); Besoeki, Kalibendo, alt. 200 m, *Koorders* 43194 & 43196 B (L); Java, *Korthals s.n.* (BM); G. Patocha, *Korthals s.n.* (L); G. Talagabodas, *Korthals s.n.* (L); Lembang, *Korthals s.n.* (L); Preanger, Kamodjan, alt. 1,600 m, *Leeuwen-Reymaan* 2441 (L); Preanger, G. Mandalagiri, alt. 1,650 m, *Lam* 23 (L); Buitenzorg, alt. 650 m, *Lieftinck s.n.* Dec. 1940 (L); G. Tlerep, alt. 1,750 m, *Lorzing* 597 (L); Tjipetir, *Monchy s.n.* May 1890 (L); Tjibodas, *Monchy s.n.* May 1890 (L); Tjibodas, alt. 1,600 m, *Pleyte* 90 (L); G. Salak, alt. 1,200 m, *Raap* 159 (L); Tjibodas, alt. 1,400 m, *Raap* 664 (L); Tjibodas, Tjisaroea, *Raap* 849 (L); G. Oeroeg, alt. 2,000 m, *Rant* 343 (L); Mt. Salak, *Ridley s.n.* Feb. 1915 (K); Batavia, G. Pasir-Angin, alt. 500 m, *Schiffner* 2474 (L); Preanger, G. Kantjana, *Soegandiredja* 27 (L); G. Papandajan, alt. 2,200 m, *Steenis* 4026 (L); Mt. Patocha, alt. 1,800 m, *Steenis* 6873 (L); Tjisoroea, alt. 1,020 m, *Steenis* 12747 (L); G. Melatti, *Went s.n.* (L); Boerangrang, alt. 1,100 m, *Wisse* 1236 (L); Java, *Zippelius s.n.* (L); Java, *Zollinger* 1709 (BM, L).

Lesser Sunda Islands: Bali, G. Pala, alt. 475 m, *Sarip s.n.* Sept. 1918 (L).

Moluccas: Moluccas, *Zippelius s.n.* (L).

The lectotypes, type duplicates or their fragments of the following Javanese species have been studied: (1) *Plectranthus bicolor* Bl. "Java, ad pedem montis Salack", *Blume s.n.* (L); (2) *Plectranthus macrophyllus* Bl. "Java, sylvaticis montosis" *Blume s.n.* (L); (3) *Coleus remotiflorus* "Java, in Soerakerta" *Horsfield Lab. 112*, (Bm, K, U 76818A); (4) *Coleus spectabilis* Miq. "Java, in Blambangan" *Horsfield s.n.* (Bm, K, U 69541). They proved to be identical with *Coleus galeatus* Benth.

5a. *Coleus galeatus* Benth. var. *borneensis* var. *nov.*

A typo differt racemis et pedunculo elongatis, calycis fructiferi magis.

Type: Penataran Basin, alt. 1,000 m, *Clemens* 34199 (L).

Distribution: Endemic to Malesia (Borneo).

Ecology: In dipterocarps and oak forests, altitude 1,000–1,800 m.

Specimens examined:

Borneo: Ranau, alt. 1,300 m, *Badak san.* 32378 (K); Mt. Kinabalu, E. Shoulder, alt. 1,000 m, *Chew, Corner & Stainton* 1027 (K); Mt. Kinabalu, Ulu Liwagu & Ulu Mesilan, alt. 1,800 & 1,300 m, *Chew, Corner & Stainton* 1417 & 1947 (K); Mt. Kinabalu, Minitindox Gorge, *Clemens* 10476 (K); Dallas, alt. 1,000 m, *Clemens* 26084 (K); Tenompok, alt. 1,700 m, *Clemens* 30028 (K); Penataran Basin, alt. 1,000 m, *Clemens* 34199 (type L); Tenompok, Kota Belud, alt. 1,600 m, *Meijer* 20325 (K); Kinabalu, Ranau, alt. 1,500–1,800 m, *Meijer & Corner* 22439 (K); Kundasan, alt. 1,500 m, *Sinclair* 8990 (K, L).

The Borneo material differs from the typical form of the species from Java in the much larger thyrses (20–25 cm long, 5–6 cm across) due to the more elongated main axis and extended peduncles of lateral cymes and cymules, and in the much larger fruiting calyx (1.2–1.5 cm long).

10. CYMARIA BENTH.

Cymaria Benth. in Bot. Reg. sub. *t.* 1292 (1829); in Benth. & Hook. f. Gen. Pl. 2 (1876) 1222; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 209.

Anthocoma Zoll. & Mor. in Nat. en Geneesk. Arch. Neerl. Ind. 2 (1845) 569.

Shrubs. Stems and branches 4-angled. Leaves opposite, petiolate. Flowers small, in lax, many-flowered, peduncled, dichotomously branched cymes; cymes usually axillary, sometimes the upper ones forming a terminal thyrsoid inflorescence. Calyx campanulate (in fruit urceolate or subglobose), 10-nerved, the intermediate nerves weaker than the other 5, equally 5-toothed. Corolla-tube straight, exerted; limb 2-lipped; upper lip arched, erect; lower lip 3-lobed, spreading, the mid-lobe larger than the lateral. Stamens 4, ascending under the upper lip, in two pairs, the upper pair shorter; anthers 2-loculate, divaricate, the locules connivent, at length confluent. Disk equal, entire. Style 2-fid at the end, the upper branch very short. Nutlets subglobose or obovoid, subtriquetrous, rugose, the apex beset with white hairs; scar of contact surface very large, lateral.

Species about 3, from Burma, Thailand, Indo-China, S. China (Hainan) to Malesia. The following two species are found in Malesia.

Key to the species

A. Leaves usually thin membranaceous, narrowly elliptic or narrowly ovate, peduncles subsessile or sometimes 0.5–1 cm long; flower-bearing branches extremely fine and slender, few (4–6) flowered; bracts often prominent; fruiting calyx subglobose.

1. *C. acuminata*

A. Leaves usually membranaceous, ovate or rhomboid; peduncles 1–3 cm long, flower-bearing branches slender, usually 6–12 flowered; bracts minute, inconspicuous; fruiting calyx urn-shaped, normally crowned with erect teeth.

2. *C. dichotoma*

1. *Cymaria acuminata* Decne. in Nouv. Ann. Mus. Paris (Herb. Timor. Decne.) 3 (1834) 71; Deles. Ic. Pl. 3 (1837) *t.* 86; Benth. in DC. Prodr. 12 (1848) 602; Miq. Fl. Ind. Bat. 2 (1859) 992; Prain in Ann. Bot. 6 (1892) 215; Merr. Enum. Philip. Fl. Pl. 3 (1923) 408; Back. & Bakh. f. Fl. Java 2 (1965) 617.

Anthocoma flavescens Zoll. in Nat. en Geneesk. Arch. 2 (1846) 569; Hassk. Fl. 30 (1847) 596.

Gomphostemma dichotoma Zoll. et Mor. in Hassk. Flora 30 (1847) 596.

Cymaria mollis Miq. Fl. Ind. Bat. 2 (1859) 992.

Gomphostemma flavescens (Zoll.) Miq. Fl. Ind. Bat. 2 (1859) 987.

? *Cymaria timoriensis* Backer in Herb. Leiden.

A small shrub, 1 m high. Stems and branches 4-angled, finely pubescent when young, glabrescent at length. Leaves thin membranaceous, narrowly elliptic or narrowly ovate, 5–8 cm long, 3–4 cm wide, acuminate or sometimes acute, the base cuneate or attenuate, the margins serrate, finely hirsute on both surfaces; petioles 1–2 cm long, hirsute. Flowers 4–6 or more secundly arranged on the slender branches of axillary dichotomous cyme; main peduncles either subsessile, or sometimes 0.5–1 cm long, puberulent; flower-bearing branches 0.5–1.5 cm long, bracts prominent, bracteoles inconspicuous. Calyx campanulate, 1.5 (in fruit globose, 2.2) mm long, sparingly hirsute. Corolla 2 mm long. Nutlets ovoid, flattened, 1.5 mm long, 1 mm wide, the apex beset with short white hairs.

Type specimen: Timor, *Decne s.n.* (not seen).

Distribution: Endemic to Malesia (Java, Lesser Sunda Isls., Celebes, and the Philippines).

Ecology: In open thickets and secondary forests, usually at low altitudes.

Specimens examined:

Java: Madoera, 50 m, *Backer 20914* (L); Soerabaja, *Backer 36290* (L); Negoro Goenoeng, *Beunee 1087* (L); Besoeki, alt. 100 m, *Buwalda 7277* (L); (fls. yellowish white); Mt. Semarang, *Horsfield s.n.* (K) (type specimen of *Cymaria mollis* Miq); Kediri, *Koorders 22758 & 22968* (L); Java, *Teysmann 1869* (L); Java, *Zollinger 3318* (L).

Lesser Sunda Islands: Babar Is. *Borssum 3020* (L) (stout herb, 0.5 m; fls, yellow); Tanimbar Is., *Borssum 3194* (L) (fls. whitish); Timor *Teysmann 11672* (L); Timor (?), *Zippelius s.n.* (L); Hort. Bogor (Cult.), Collector unknown (L).

Philippines: Luzon, *Cuming 446* (K, L); Mindanao, *Fenix 24966* (K); Mindanao, Zamboanga, *Hallier 636* (L); Luzon, Batangas, *Ramos 1833* (L, Sing.) & *22324* (K); Rizal, *Ramos 13587* (K, L); Sulu, Tawitawi, *Ramos & Edano 44048* (L, Sing.).

Celebes: S. E. Coast *Elbert 2958* (L); Salabosi, *Noerkas 385* (L); Laboanpero, *Kjellberg 1279* (L).

This is probably an extremely variable species. The following specimens are notably deviated from the typical form of the species: *Zollinger 3318* and *Horsfield s.n.* (all from Java; the latter is the co-type of *Cymaria mollis* Miq.) possess very large leaves, up to 13 x 7.5 cm, and subsessile peduncles; *Teysmann 11672* (from Timor, which was identified as *Cymaria timoriensis* Backer, although this binomial has never been published) has extremely thick and densely tomentose leaves and multi-flowered verticillasters, more or less comparable to the type specimens of *Cymaria elongata* Benth. (*Wallich 2079*, from Taong Dong, Burma)

except the flowers are much smaller; *Hallier 636, Ramos & Edano 44048* (all from the Philippines) possess much thinner and narrower leaves and denser inflorescence. Their basic flower structures are similar.

2. *Cymaria dichotoma* Benth. in Wall. Cat. 2080 (1828), in Bot. Reg. sub. *t.* 1292 (1829), in Wall. Pl. As. Rar. 1 (1831) 64, Lab. Gen. & Sp. (1836) 705, in DC. Prodr. 12 (1848) 603; Miq. Fl. Ind. Bat. 2 (1859) 992; Hook. f. Fl. Brit. Ind. 4 (1885) 705; Prain in J. As. Soc. Beng. 66 (1899) 522, 74 (1907) 936; Ridl. Fl. Mal. Pen. 2 (1923) 654; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 227.

A shrub, 1 m high or slightly over. Stem and branches faintly 4-angled, finely pubescent. Leaves membranaceous, ovate or rhomboid, 5–11 cm long, 3.5–6 cm wide, acute or subacute, rarely acuminate, the base cuneate or attenuate, entire; margins elsewhere crenate or remotely dentate; glabrous above, appressed pubescent beneath; petioles 0.5–2 cm long, finely pubescent. Flowers small, 6–15 secundly arranged on the branches of cyme; main peduncles 1–3 cm long, finely pubescent; bracts under branches varying from ovate, spatulate to lanceolate, 3–5 mm long. Calyx campanulate, 1.5 mm (in fruit urceolate, 2.5 mm long, often crowned with the erect, lanceolate teeth) long, glandulate and pubescent; teeth 5, equal, triangular; pedicels short and slender, finely pubescent. Corolla 2.5 mm long, finely pubescent externally. Filaments ascending under the upper lip, included. Nutlets obovoid, 1.2 mm long, 0.6 mm wide, reticulate, the apex glandulate and beset with short hairs.

Type specimen: Burma, Taong Dong et Segain, *Wallich 2080* (K).

Distribution: Burma, Thailand to S. China (Hainan) and Malesia (Malay Peninsula, Philippines, Celebes and New Guinea).

Ecology: Often found on limestone hills, at low altitudes.

Specimens examined:

Malay Peninsula: Perak, Padang Rengas, *Burkill 13573* (Sing); Perak, Ipoh, *Curtis 3189 & 3320* (Sing); Perak, Kuala Kangsar, *Haniff 15996* (Sing); Perlis, Tebing Tinggi, *Henderson 23030* (Sing); Perak, Ipoh, *Fox 10686* (K, Sing); Perak, Ipoh, *Ridley 9734* (K, Sing); *Ridley 14297* (K, Sing); Kedah *Ridley 14927* (K, Sing); Perlis, Bt. Lagi, *Ridley 14929* (K, Sing); Perak, Ipoh, *Ridley s.n.* Jan. 1921 (K); Perak, *Scortechini s.n.* March 1894 (K, Sing).

Philippines: Philippines, *Micholitz s.n.* in 1884–84 (K).

Celebes: Moena Isls., alt. 0–125 m, *Elbert 2872 a & b* (L); Lozwoek, *Kaudern 498* (L).

New Guinea: Papua, Kanosia, alt. sea level, *Carr 11216* (K, L) (1.3 m, tall; fls. white, dorsal petal yellowish green).

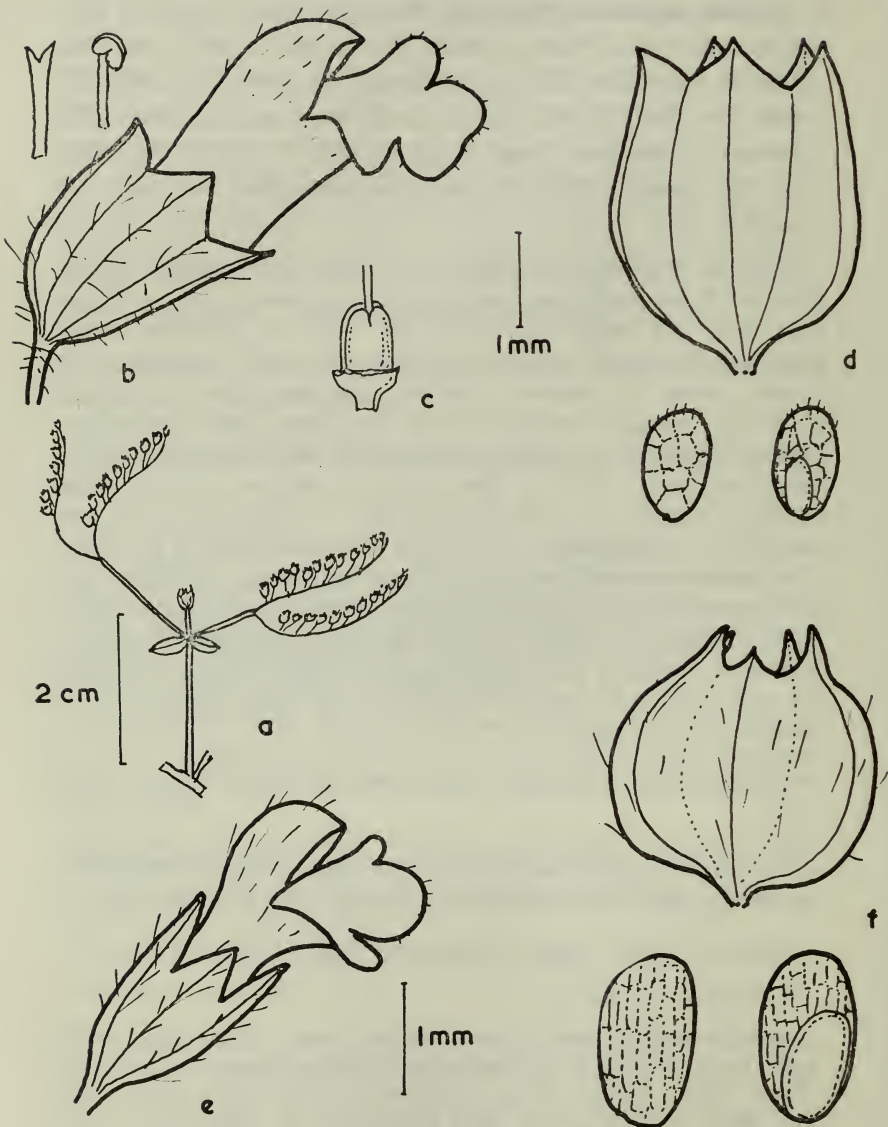


Fig. 10. *Cymaria dichotoma* Benth. (a-d) and *C. acuminata* Decne. (e. & f.).

a. diagram of cymose inflorescence; b. flower; c. ovary; d. fruiting calyx and nutlet (in 2 views); e. flower; f. fruiting calyx and nutlet (in 2 views) (a-d, Elbert 2872; e. & f. Backer 20914).

11. **DYSOPHYLLA** BL.

Dysophylla* Blume, Bijdr. (1826) 826; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1180; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 330.

Erect herbs, usually pubescent. Leaves opposite, whorled, petio- late or sessile. False-whorls many-flowered, in densely spike-like inflorescence, terete; bracts minute, densely hairy. Calyx ovoid, 5-toothed, the teeth subequal, ciliate; throat naked within. Corolla minute, tubular, straight; tube exserted (in Malesian spp.); limb subequally 4-fid, 2-lobed, the upper lobe entire or notched, the lower spreading. Stamens 4, exserted, nearly straight; filaments beared; anthers 2-loculate, confluent. Disk equal, subentire. Style slender, 2-fid at the top. Nutlets ovoid or oblong, smooth or granulate.

Species about 15, all in S.E. Asiatic, mostly in India; only one species, *D. stellata* Benth., extended to Australia. 2 species and 1 variety are found in Malesia.

Key to the species and varieties

A. Leaves opposite; stems and branches very densely pilose.
1. *D. auriculata*

A. Leaves whorled (or spuriously so).

B. Leaves 4–10 in a whorl; stem and branches glabrescent or very sparingly hairy. 2. *D. stellata* var. *stellata*

B. Leaves 4 in a whorl; stem and branches tomentose or pubescent. 2a. *D. Stellata* var. *roxburgiana*

1. **Dysophylla auricularia** (Linn.) Bl. Bijdr. (1826) 826; Benth. Lab. Gen. & Sp. (1833) 158, in DC. Prodr. 12 (1848) 156; Hook. f. Fl. Brit. Ind. 4 (1885) 638; Prain, in J. As. Soc. Beng. 74, 2 (1907) 710; Merr. Enum. Philip. 3 (1923) 415; Ridl. Fl. Mal. Pen. 2 (1923) 648; Mansf. in Bot. Jahrb. 62 (1929) 378; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 79; Back. & Bakh. f. Fl. Java 2 (1965) 633.

Mentha auricularia Linn. Mant. 1 (1767) 81.

Mentha foetida Burm. f. Fl. Ind. (1768) 126.

Pogostemon auricularius (Linn.) Hassk. in Tijdsch Nat. Geschied 10 (1843) 127, Cat. Bog. (1858) 131; Miq. Fl. Ind. Bat. 2 (1859) 964.

*According to Dr. Bakhuizen van den Brink, Jr. (In Back. & Bakh. f. Fl. Java 2 (1965) 633), *Alopecuro-Veronica* Linn. Amoen. Acad. 4 (1759) 143, is the prior and legitimate name of the genus. Therefore, *Dysophylla* Bl. has either to be conserved or to be discarded. Although it is a rather small genus, I am in favour of conserving Blume's name, which is shorter and more meaningful. (See addendum on page 179).

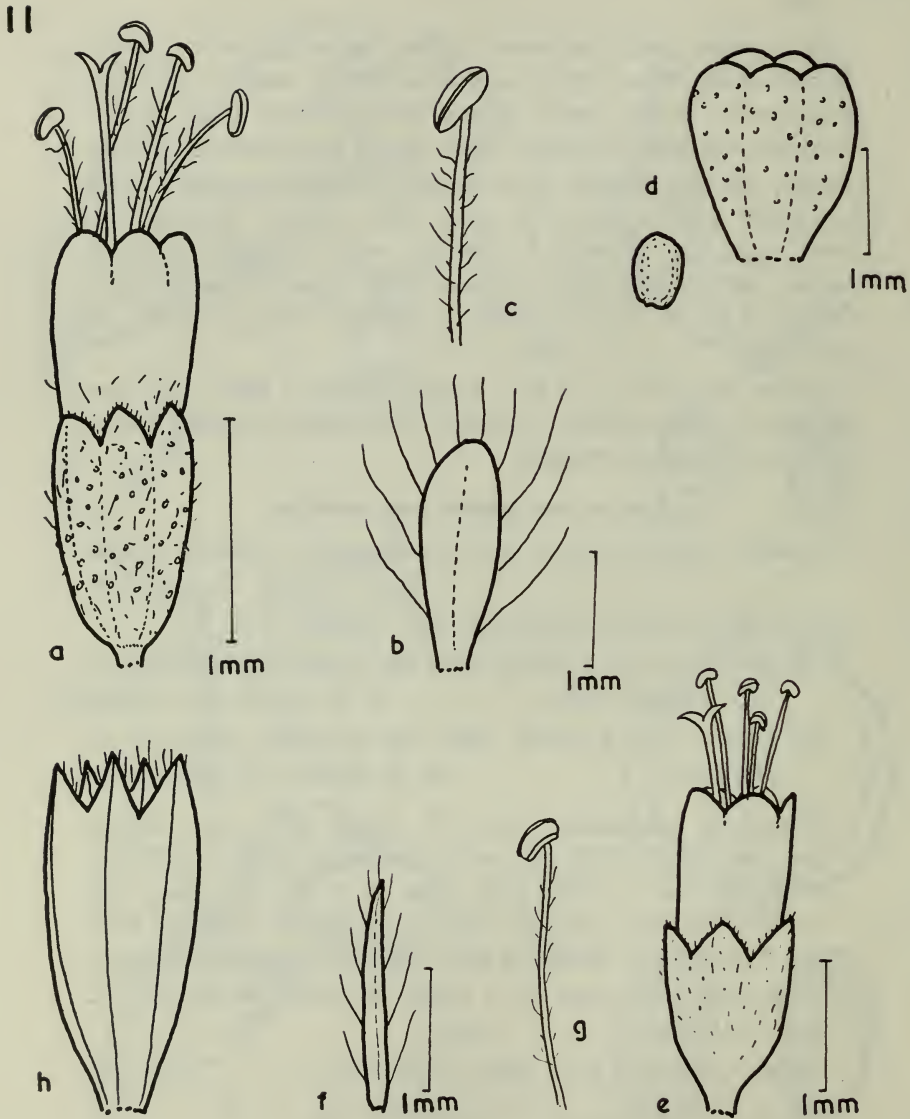


Fig. 11. *Dysophylla auriculata* Bl. (a-d) and *D. stellata* Benth. var. *roxburgiana* H. Keng (e-h).

a. flower; b. bract; c. stamen; d. fruiting calyx and nutlet; e. flower; f. bract; g. stamen; h. fruiting calyx. (a-d, *Horing 7338*; e-h, *Meijer 6053*).

An erect annual herb. Stems simple or laxly branched, 30–70 cm high, pubescent with spreading hairs. Leaves opposite, membranaceous, narrowly ovate to ovate, 4–6 cm long, 2–3 cm wide, acute or rarely obtuse, the base cuneate or rounded, entire; margins elsewhere irregularly serrate; pubescent on both surfaces; petioles 2–8 mm long, hairy. Flowers in dense, villous, terminal, cylindrical spicate inflorescence, 4–7 cm long; false whorls of cymes close-set throughout; bracts narrowly elliptic, long ciliate. Calyx subcampanulate, gland-dotted, 1.2–1.5 mm long, 5-toothed, the teeth subequal, triangular; calyx in fruit urn-shaped, the teeth often incurved over the nutlets. Corolla 2–2.5 mm long; tube slender, exserted; lobes obtuse, pubescent. Filaments 3.5–4 mm long, slender, villous. Nutlets ellipsoid, 0.6 mm long and 0.4 mm wide, finely reticulate.

Distribution: Throughout Southeast Asia.

Ecology: A common weed, in open wet places at low and medium altitudes (often below 1,200 m).

Vernacular names: Koetjing-Koetjing (Sumatra); Ekor Kuching (Malaya); Kambing Kambing (Borneo).

Specimens examined:

Sumatra: Padang, *Beccari* 878 (K); Sumatra, *Bünnemeijer* 3277 (K); Sumatra, alt. 1,350 m, *Bünnemeijer* 5160 (K) ("Koetjing"); Lingga Arch., *Bünnemeijer* 6024 & 7148 (L); Lampong, *Iboet* 458 (K, L); Medan, *Lörzing* 12944 (L); Karo Highlands, *Lörzing* 14394 (L); Enggano, *Lütjeharms* 3830 (K, L, Sing.) & 5385 (L); Djambi, *Posthumus* 753 & 864 (L); Gajo, *Loeäs*, *Pringgo Atmodjo* 253 & 272 (L); Alas. Landen, *Pringgo Atmodjo* 406 (L); Poelo Liman, *Rahmat Si Boeea* 5334 (L); Asahan, Hoeta Tomoean Dolok *Rahmat Si Boeea* 8469 (L); Asahan, Tomoean Dolok, Alt. 1,000 m, *Rahmat Si Boeea* 9050 & 9929 (L); Asahan, Tor Matoetoeng, alt. 1,792 m, *Rahmat Si Boeea* 9442 (L); Berastagi, *Ridley* s.n. Feb. 1920 (K) (Type of *Dysophylla auricularia* var. *montana* Ridley); Korinchi, alt. 820 m, *Robinson & Kloss* s.n. May 1914 (K); Korinchi, alt. sea-level, *Robinson & Kloss* s.n. June 1914 (K); Palembang, *Steenis* 3348 (L).

Malaya Peninsula: Pahang, Bentong, *Best* 13871 (Sing.); Singapore, Queenstown, *Burkill* 1864 (Sing.) (fls. violet); Pahang, Gali Raub, *Burkill & Haniff* 16840 (Sing.) ("Ekor Kuching"); Pahang, *Evans* s.n. June 1917 (K); Singapore, *Furtado* s.n. April 1924 (Sing.) ("Tingo Toh Chau"); Negri Sembilan, Batang Malaka, *Fuyimoto* 3033 (Sing.); Malacca, Panchor, *Goodenough* 1265 (Sing.); Malacca, *Griffith* s.n. 1845 (K); Pahang, Chegar Perah, *Henderson* 19356 (Sing.); Johore, Bukit Puumong, Cha'ah, *Henderson* 38274 (Sing.); Singapore, *Hullett* 375 (Sing.); Johore, Kota Tinggi, *Kadim & Noor* 265 (Sing.); Johore, Kuala Kahang, *Lake & Kelsall* 4028 (Sing.); Kelantan, Kuala Limau Nipis, *Nur* 12163 (Sing.); Pahang, Katapang, *Ridley* 1286 (Sing.); Singapore, Jurong, *Ridley* s.n. 1890 (Sing.); Singapore, Ang Mo Kei, *Ridley* s.n. 1890 (Sing.); Singapore, Chua Chu Kang, *Ridley* s.n. 1894 (Sing.); Johore, Pulau Kukul, *Ridley* s.n. 1905 (Sing.); Selangor, *Ridley* s.n. July 1914 (K); Pahang, Kuala Tahan, *Seimund* 822 (Sing.); Johore, Kota Tinggi, *Teruya* 182 (Sing.); Singapore, Geylang, *Teruya* 2216 (Sing.); Malaya, *Walker* 64 (K); Penang, *Wallich* s.n. 1822 (K); Perak, Taiping, *Wray* 763 (K); Kelantan, *Yapp* 243 (K).

Java: Batavia, alt. 300 m, *Bakhuizen v/d Brink* 6559 (L); Bantam, *Buwalda* 2838 (L); Tjibodas, *Enoh* 100 (L); Ketenger, alt. 500 m, *Gaag* 116 (L); Buitenzorg, *Hallier* 285 b, c & e (L); Java, *Horsfield* s.n. (K); Batavia, *Kooders* 31409 (L); Djogdja, *Meijer* 2744 (L); Tjibodas, *Ooststroom* 13988 (L); G. Salak, alt. 1,200 m, *Raap* 168 (L); Batavia, *Schiffner* 2470 (K, L), 2475, 2490, 2499 & 2500 (L); Java, *Zollinger* 726 & 336 (K).

Borneo: N. Borneo, Pembaliangam, *Amdjah 810* (K, L); Sarawak, Bau, *Anderson 47* (K, Sing.); N. Borneo, Jesselton, *Clemens 9711* (K); Sarawak, Kapit, Upper Rejang, *J. & M.S. Clemens 21060* K, L); Sarawak, Baraang, *Haviland s.n.* Nov. 1888 (Sing.); Sarawak, Niah, *Haviland & Hose 3598* (K); Borneo *Korthals s.n.* (L); N. Borneo, Sandakan, *Leano 5422* (K, Sing.) ("Kambing Kambing"); N. Borneo, Kinabatangan, *Maidin 1748* (K); Borneo, Pontianak, *Mondih 264* (K, L); Borneo, *Banjermasing, Motley 423* (K); Sarawak, Sematan, *Purseglove & Shah 1824* (K, L) (Herb 2 ft.; fls. lilac); Sarawak, Sungei Tau, *Purseglove 5165* (L, Sing.); Anambas & Nautoena Isls., *Steenis 786* (L); Borneo, Samarinda, *Winkler 3128* (L); N. Borneo, Sandakan, *Wood 786* (Sing.).

Philippines: Philippines, *Cuming 1835* (K); Luzon, Sorsogon, *Elmer 15671* (K); Culion Isl. *Merrill 683* (K, Sing.); Palawan, Taytay, *Merrill 1228* (Sing.); Luzon, Laguna, *Ramos 12034* (K); Siargao Isl., *Ramos & Pascasio 34971* (Sing.); Luzon, Camarines, Paracale, *Ramos & Edano 33603* (Sing.); Bukidnon, Barrio Sumpung, alt. 650 m, *Santos 6025* (L).

Celebes: Lombasang, alt. 950 m, *Bünnemeijer 11112* (L); Malili, *Eyma 3366* (L); Menado, Poso, *Eyma 4050* (L); Kendari, *Kjellberg 606* (L).

Moluccas: Ambon, *Kornassi 1127* (K, L); Ceram, *Rutten 1609* (L).

New Guinea: S.W. New Guinea, *Aët 715* (L) (fls. blue); Japen, *Aët & Idjan 752* (L); Kaiserin Augusta River, *Gjellerup 352* (L); Koeria, *Janowski 607* (L); Nr. Doorman River, *Lam 1255* (L); Vogelkop Pen. *Schram 6129* (L); Mamberamo, *Versteegh 37* (L).

2. *Dysophylla stellata* (Lour.) Benth. in Wall. Pl. As. Rar. 1 (1830) 30, *descrip. excl.*, Lab. Gen. & Sp. (1833) 159, *descrip. excl.* in DC Prodr. 12 (1848) 158, *descript. excl.*

var. *stellata*.

Mentha stellata Lour. Fl. Cochinch. 2 (1790) 361.

Mentha verticillata (non L.) Roxb. Hort. Beng. (1814) 44, *nom. nud.* Fl. Ind. ed. 2, 3 (1832) 5.

Dysophylla verticillata (Roxb.) Benth. in Wall. Fl. As. Rar. 1 (1830) 30, in DC. Prodr. 12 (1848) 157; Hook. f. Fl. Brit. Ind. 4 (1885) 639; Prain in J. As. Soc. Beng. 74, 2 (1907) 876; Ridl. Fl. Mal. Pen. 2 (1923) 648; Merr. Enum. Philip. 3 (1923) 416; Mukerj. in Rec. Bot. Surv. Ind. 14 (1940) 81.

Pogostamon verticillatus (Roxb.) Miq. Fl. Ind. Bat. 2 (1859) 965.

Dysophylla benthamiana Hance in Ann. Sc. Nat. 5, Bot. 5 (1866) 234; Merr. in Trans. Amer. Phil. Soc. 24, 2 (1935) 342.

Annual (or sometimes perennial) herb, erect or climbing. Stems laxly or profusely branched, 10–100 cm high, glabrous or very sparsely hirsute. Leaves in whorls of 4–10, glabrous, linear, 3–7 (or more) cm long, 0.2–0.5 cm wide, acuminate, the base attenuate; margins entire or obscurely serrate; petioles very short or sessile. Flowers in villous, cylindric, terminal spicate inflorescence, 3–6 cm long; false whorls of cymes close-set throughout. Calyx campanulate, with soft, white hairs, 1–1.2 mm long; teeth subequal, triangular, spreading. Corolla tubular, about 2 mm long, the lobes pubescent. Filaments exerted, hairy. Nutlets ellipsoid, pale brown, minute.

Distribution: India to S. China and Japan, through Malesia to Australia.

Ecology: In open wet places, normally at low altitudes; in Celebes and New Guinea, however, it occurs from low to medium altitudes and reaches 1,500 m or even 2,000 m.

Specimens examined:

Sumatra: Kota Pulai, *Meijer 6053* (L) (fls. pink).

Malay Peninsula: Kedah, Lankawi, *Cutis 2098* (Sing.); Perak, *Deikum 32* (Sing.) (fls. pink); Perlis, *Ridley s.n.* 1910 (Sing.).

Java: Bogor, *Teysmann s.n.* 1869 (L).

Philippines: Luzon, *Cuming 1471* (K); Philippines, *Cuming 1653* (K).

Celebes: Manado, alt. 700–1,300 m, *Bloebergen 4173* (L); Tanette, alt. 450 m, *Bünnemeijer 12545* (L); G. Bonthain, alt. 1,400 m, *Bünnemeijer 12624* (K, L); Masamba, alt. 1,100 m, *Eyma 1260* (L) (fls. lilac).

Moluccas: Halmahera, *Haan 1791* (L) (fls. pale purple-blue); Morotai, *Main & Aden 782* (L).

New Guinea: Papua, Vanapa Valley, alt. 1,900 m, *Brass 4809* (K, L); Papua, Dagwa, Oriomo River, *Brass 5917* (K); Papua, Lake Daviumbu, *Brass 7820* (K, L) (fls. purple-pink); Papua, Koitaki, alt. 500 m, *Carr 12670* (K); Papua, Milne Bay, alt. 1,000 m, *Cruttwell 1220* (K); Morobe, Bulolo, alt. 1,000 m, *Havel 7552* (L); Papua, North Dist., *Hoogland 4219* (L); West Highland Dist., alt. 1,700 m, *Hoogland 6230* (K, L); Hebar Valley, alt. 540 m, *Koster 8022* (L) (fls. purple) & *8025* (L) (fls. lilac); Aiyura alt. 2,000 m, *McKee 1258* (K, L); Morobe, *N.G.F. 3265* (L); Aiyura, alt. 1,490 m, *Royen 4455* (L).

Dysophylla verticillata (Roxb.) Benth. as Merrill (in Trans. Amer. Phil. Soc. 24, 2 (1935), p. 342) correctly pointed out, was based on an invalid basionym, *Menth verticillata* Roxb., and therefore should be abandoned. Although the descriptions and the citation of specimens of *Dysophylla stellata* (Lour.) Benth. as published in Wallich's *Plantae Asiaticae Rariores*, and in Benth. later works, clearly refer to an entirely different Indian plant (of which the type specimens were collected by Heyne from Malabar and by Hamilton from Mysore), the binomial alone, should still be considered as a legitimate one.

To clear up this nomenclatural confusion*, the Southern Indian plant in question (types from Malabar and from Mysore) is here referred to Dalzell's valid binomial, *Dysophylla tomentosa*, with a citation of the important synonyms and literatures as follows:

Dysophylla tomentosa Dalz. in Hook. Kew J. 2 (1850) 337; Hook. f. Fl. Brit. Ind. 4 (1885) 641.

var. ***tomentosa***

Dysophylla stellata (Lour.) Benth. in Wall. Pl. As. Rar. 1 (1830) 30, *excl. type, pro descriptione*; Lab. Gen. et Sp. (1833) 159, *excl. type, pro descriptione*, in DC. Prodr. 12 (1848), 158, *excl. type, pro descriptione*;

For the clarification of nomenclature of these two species (*Dysophylla stellata* Benth. and *D. tomentosa* Dalz.), I am very grateful to Dr. Wm. T. Stearn, Mr. L. L. Forman, Dr. Bakhuizen van den Brink Jr. and Miss Jirayupin Chermisrivatna, for their helpful suggestions and discussions.

Dysophylla stellata Benth. var. *tomentosa* (Dalz.) Cooke, Fl. Bomb. 2 (1908) 458; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 80.

Dysophylla tomentosa Dalz. var. **gracilis** (Dalz.) *comb. nov.*

Dysophylla gracilis Dalz. in Hook. Kew J. 2 (1850) 337; Hook. f. Fl. Brit. Ind. 4 (1885) 641.

Dysophylla erecta Dalz. in l.c. 337; Hook. f. l.c. 641.

Dysophylla stellata Benth. var. *gracilis* (Dalz.) Cooke, Fl. Bomb. 2 (1908) 458; Gamble, Fl. Madras (1924) 1137; Mukerj. l.c. 81.

These two varieties are confined to the Deccan Peninsula, S. India.

2a. *Dysophylla stellata* (Roxb.) Benth. var. *roxburgiana* var. *nov.*

Dysophylla quadrifolia (Roxb.) Benth. in Wall. Pl. As. Rar. 1 (1830) 30, in DC. Prodr. 12 (1848) 157; Hook. f. Fl. Brit. Ind. 4 (1885) 639; Merr. Enum. Philip. 3 (1923) 415; Fl. Mal. Pen.; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 79.

Mentha quadrifolia Roxb. Hort. Beng. (1814) 44, *nom. nud.*, Fl. Ind. ed. 2, 3 (1832) 4 (*non* D. Don 1825).

Erect herb, perennial; stems simple or laxly branched, 30–50 or more cm high, tomentose throughout. Leaves always 4 in a node, membranaceous, linear or linear-lanceolate, 3–6 cm long, 0.3–0.7 cm wide, acute or acuminate, the base cuneate or decurrent; scattered pubescent on both surfaces; margins remotely serrate, or subtire; petioles 0.2–0.4 cm long, more commonly sessile. Flowers in dense cylindric terminal (sometimes also axillary) spicate inflorescence, 3–6 or more cm long; whorls of cymes very closely approximate; bracts linear lanceolate, long haired and ciliate; calyx obconical, 1.5–2 mm long, sparsely hirsute, the teeth equal, more or less erect, ciliate on the margins; corolla 2–2.5 mm long, shortly lobed; stamens barely exerted, villose. Nutlets broadly ellipsoid.

Distribution: S. & E. India, Burma to Malesia (Philippines, Celebes, and New Guinea).

Ecology: On or near wet places, altitudes 40–950 m.

Specimens examined:

Philippines: Davao, Mindanao, *Copland 483* (L); N. Vizcaya Prov. Luzon, *Ramos 8277* (L).

Celebes: Lomasang, W. Celebes, alt. 950 m, *Bünnemeyer 10961* (L); Beao, alt. 300 m, *Kjellberg 2230* (L).

New Guinea: Dagwa, W. Division, Papua, *Brass 5917* (L); Kebar Valley, E. of Audjai, alt. 550 m, *Kalkman 6403* (L); Kebar Valley, W. of Manokwari, *V. Royan 3967* (K, L); S. New Guinea, *Wentholt 255* (L) (lalang growth, flowers red-blue).

For the same reason as mentioned above, Bentham's *Dysophylla quadrifolia* is also based on an illegitimate name *Mentha quadrifolia* Roxb., and therefore should be abandoned. Besides, I do not think it is specifically different from *Dysophylla stellata* (Lour.) Benth.

12. **ELSHOLTZIA** WILLD.

Elsholtzia Willd. in Roem & Usteri, Mag. 6, 11 (1790) 3; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1181; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 327.

Aphanochilus Benth. in Bot. Reg. sub. t. 1282 (1829).

Herbs or undershrubs. Leaves opposite, usually petiolate. False-whorls in spike-like or paniculate inflorescence, slender or stout, terete or secund; bracts linear to lanceolate, usually small (in Malesian species). Calyx ovoid or campanulate, 5-toothed, the teeth unequal. Corolla tubular, shortly exserted, straight or incurved; limb 4- or 5-lobed, obliquely 2-lipped, the upper lip erect, notched, the lower lip spreading, 3-lobed. Stamens 4, divergent or distant, often slightly unequal; anthers 2-loculate, the locules divaricate or at length confluent; filaments naked. Disk produced behind the ovary, oblique. Style subequally 2-fid with subulate lobes. Nutlets minute, ovoid, glandulate and pubescent (in Malesian species).

Species about 60, northern temperate and warm parts of the Old World; 3 species in Malesia.

Key to the species

- A. False-whorls consisting of fewer (2–12) flowers, apart, secund, in spike-like inflorescence; calyx 2 mm (in fruit 2.5–3 mm) long, the calyx tube gibbose, sparsely short-haired. 1. *E. blanda*
- A. False-whorls consisting of many (usually over 15) flowers, closely approximate, terete, in dense spike-like or paniculate inflorescence; calyx tubular, not gibbous.
 - B. Leaves elliptic or elliptic ovate, often covered with brownish yellow hairs beneath; inflorescence stout; calyx 4–4.5 (in fruit 6–6.5) mm. long, sparsely covered with curled yellowish hairs; bracts lanceolate. 2. *E. elata*
 - B. Leaves narrowly lanceolate, velutinous or sometimes glabrous beneath; inflorescence slender; calyx about 2 (in fruit 3–4) mm long; densely covered with long white hairs; bracts linear. 3. *E. pubescens*

1. **Elsholtzia blanda** (Benth.) Benth. Lab. Gen. & Sp. (1833) 162, in DC. Prodr. 12 (1848) 160; Hook. f. Fl. Brit. Ind. 4 (1885) 643.

Aphanochilus blanda Benth. in Wall. Pl. As. Rar. 1 (1830) 29, Bot. Mag. 58 (1831) t. 3091.

Herb, woody below, about 1 m tall. Stems often branched, puberulous or hoary. Leaves elliptic lanceolate, 3–5 cm long; 0.5–1 cm wide, acuminate, the base attenuate, narrowed into the petiole, the margins coarsely serrate, glabrous above, puberulous and dark glandulate on the lower surface; petioles 0.5 cm long. False whorls few-(2–12) flowered, closely apart, secund, in spike- or panicle-like inflorescence, 5–12 cm long; bracts lanceolate, 1–2.5 mm long.

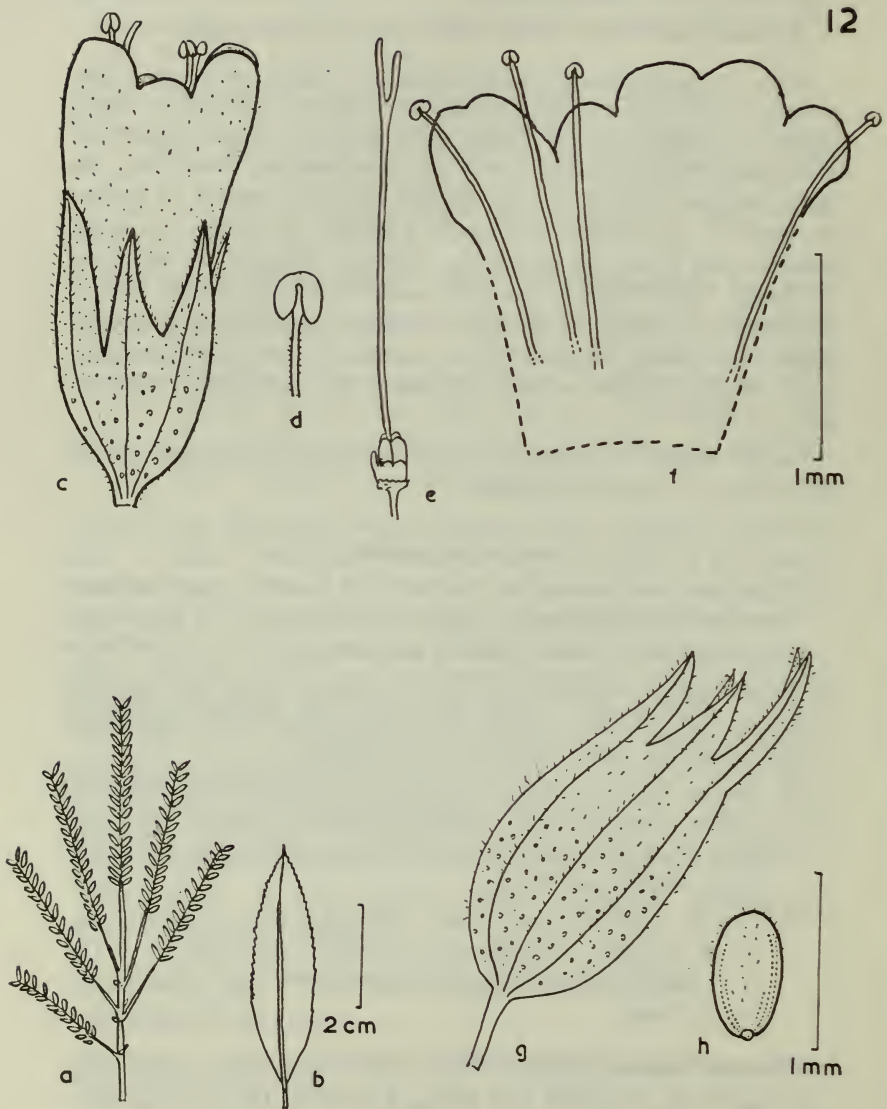


Fig. 12. *Elsholtzia blanda* Benth.

a. diagram of the inflorescence; b. leaf; c. flower; d. stamen; e. gynoecium and nectary disc; f. corolla expanded; g. fruiting calyx; h. nutlet (flower, Bünnenmeijer 5678; fruit, Läringer 6175).

Calyx urceolate, 1.5–2 mm (in fruit 2–3 mm) long, glandulate pubescent without, 5-toothed; mouth of fruiting calyx slightly contracted; teeth erect, lanceolate. Corolla campanulate, 2.5–3 mm long, 2-lipped, sparingly pubescent. Stamens in 2 pairs, subequal; filaments pubescent. Nutlets broadly ellipsoid, flattened, about 0.7 mm long.

Distribution: Himalayas to Burma and Malesia (Sumatra).

Ecology: In open places and forest edges at low to medium altitudes from 900 to 1,500 m.

Specimens examined:

Sumatra: Kabandjahe, alt. 1,225 m, *Bakhuizen v/d Brink 6179* (L); Sumatra, *Beccari 250* (K); Mt. Marapi, alt. 1,500 m, *Borssum Waalkes 2114* (L) (undershrub, fls. green yellow); G. Singgalang, alt. 1,300 m, *Bünnemeijer 2796* (L); G. Talang, alt. 1,350 m, *Bünnemeijer 5101* (K, L); Bt. Gombak, alt. 1,350 m, *Bünnemeijer 5678* (L); Dairi Lands, alt. 1,400 m, *Dames 61* (L); Toba Lake, alt. 900 m, *Huitema 42* (L); Karo Lands, alt. 1,350 m, *Lörzing 5922* (L); Karo Lands, alt. 1,350–1,500 m, *Lörzing 13804* (L); Piso-piso, alt. 1,400 m, *Lörzing 15563* (L); Berastagi, *Nur 7288* (K) (fls. white); Berastagi, *Ridley s.n.* Feb. 1921 (K) (fls. white); E. Sumatra, alt. 1,300 m, *Schiffner 2469* (K, L).

2. *Elsholtzia elata* Zoll. & Mor. in Nat. Geneesk. Arch. N. I. (*Obs. Phyt.*) 2 (1845) 5; Benth. in DC. Prodr. 12 (1848) 161; Miq. Fl. Ind. Bat. (1859) 966.

Elsholtzia eriantha Benth. in Herb. Mus. Berol. mss., in DC. Prodr. 12 (1848) 161; Miq. Fl. Ind. Bat. 2 (1859) 966. *syn. nov.*

Shrubby, 2 m or more high, sparsely branched. Stems and branches slender, tomentose. Leaves thin membranaceous, elliptic to elliptic-ovate, scabrous or sparingly hirsute above, tomentose and glandulate beneath, 5–7 cm long, 3–3.5 cm wide, acute, the base attenuate, entire, the margins elsewhere serrate; petioles 0.5–0.8 cm long. Spurious spikes 7–10 cm long, solitary or forming paniculate inflorescence; false-whorls closely approximate, many (usually over 20-) flowered; bracts narrowly lanceolate or ovate, 3.5–4 mm long, pubescent and ciliate. Calyx tubular, 4–4.5 cm (in fruit 6–7.5 mm) long, appressed with soft curled hairs, the teeth subequal. Corolla 6–7 mm long, puberulent. Stamens puberulent, exserted. Style briefly 2-fid. Nutlets narrowly ellipsoid, about 12 mm long, 5 mm broad, yellowish brown, glandulate and pubescent.

Type: E. Java, *Zollinger 2188* (K, L).

Distribution: Malesia (Java).

Specimens examined:

Java: E. Java, alt. 2,000 m, *Backer 37644* (L); Ngadisari, alt. 2,000 m, *Koorders 37620 & 37621* (L); Java, *Junghuhn 55* (K); Tasari, *Ridley s.n.* Jan. 1915 (K); E. Java, *Zollinger 2188* (K, L) (type).

The type locality of *Zollinger & Moritzi's Elsholtzia elata* is stated as "E. Java, in de bergstreken 3–9,000' germeen, in W. Java bij Tjipanas zeldzaam (Zoll.)". The only specimen available in the Leiden Herbarium is *Zollinger no. 2188* (also from E. Java) which bears *Zollinger's* handwriting identified as *Elsholtzia elata*. It

happened to be the same collection number cited by Bentham (in DC. Prodr. v. 12, p. 151) as the type specimen of *Elsholtzia eriantha*. Therefore, I reduce the latter as synonymous with *Elsholtzia elata* Zoll. & Mor.

3. *Elsholtzia pubescens* Benth. Gen. Lab. & Sp. (1833) 162, in DC. Prodr. 12 (1848) 161; Miq. Fl. Ind. Bat. 2 (1859) 965; Back. & Bakh. f. Fl. Java 2 (1965) 632.

Elsholtzia mollissima Benth. Lab. Gen. & Sp. (1832–36) 163, in DC. Prodr. 12 (1848) 161.

Anisochilus euneurus Miq. Fl. Ind. Bat. 2 (1859) 957. *syn. nov.*

An erect herb, 1–2 m high. Stems and branches slender, densely tomentose. Leaves membranaceous, very narrowly elliptic to narrowly lanceolate, 6–8 cm long, 2.5–3 cm wide, acute or acuminate, the base acute or cuneate, the margins serrulate; pubescent above, velutinous or tomentose beneath; petioles 0.5–1.5 cm long. False whorls many- (20–30-) flowered, closely apart or widely apart or widely apart below, forming terminal spike-like or paniculate inflorescence; bracts linear to linear-lanceolate, 1.5–2 mm long, densely pubescent. Calyx tubular, narrowed on both ends, densely covered with long, white hairs, 2–2.5 mm (in fruit 4–4.5 mm) long, 5-toothed, the teeth unequal, sharply pointed. Corolla about 4 mm long; stamens 4, in 2 pairs, exserted; style briefly 2-fid. Nutlets narrowly ellipsoid, 1 mm long, 0.5 mm wide, puberulent and gland-dotted.

Type: Java, *Commerson s.n.* (P) (not seen).

Distribution: Malesia (Java, Lesser Sunda Isls., Celebes).

Specimens examined:

Java: G. Prabata, alt. 1,350 m, *Backer 15978* (L); Pekalongan, alt. 1,450–1,550 m, *Backer 16062* (L, Sing.); E. Java, *Coert 1173* (L); Java, alt. 1,300–1,400 m, *Elbert 142* (L); Java, *Horsfield 337* (BM, K, U) (Type of *Anisochilus euneurus* Miq.); Dieng, alt. 2,000 m, *Karsten 32* (L); G. Lawoe, alt. 1,300 m, *Karsten 43* (L); Besoeki, *Koorders 14822* (L); Semarang, *Koorders 27787* (K, L); Semarang, alt. 1,600 m, *Koorders 36055* (L); Besoeki, alt. 1,450 m, *Koorders 43191* (L) & *43193* (K, L); Pranten, *Docters Van Leeuwen 167* (L); Besoeki, alt. 1,700–3,000 m, *Neth. For. Ser. 5* (L); G. Lawoe, alt. 1,433 m, *Rant s.n. 1922* (L); G. Welirang, alt. 2,000–2,800 m, *Steenis 7045* (L); Besoeki, alt. 1,600 & 1,800–2,400 m, *Steenis 10682* & *10908* (L, Sing.); G. Andjasmoro, alt. 1,900 m, *Winckel 34* (L).

Lesser Sunda Islands: Lombok, alt. 2,200–2,500 m, *Elbert 1024, 1057, 2327, 2337, 2374* & *2764* (L); E. Timor, alt. 2,400–2,950 m, *Steenis 18433* (L) (1–1.5 m, high; fls. white tinged pink, anther black); Lombok, G. Rindjani, alt. 2,000–3,000 m, *Tengwall 47* (L); Lombok, *Voogd 2079* (BM, K, L).

Celebes: Lombasang, alt. 950 & 1,100 m, *Bünnemeijer 11682* (Sing.) & *11817* (K, L); Mt. Bonthain, alt. 1,000 m, *Steenis 10393* (L).

Anisochilus euneurus Miq. is based on Horsfield's collection from G. Praoe, Java. The type specimen kept in the Utrecht Herbarium is identical with two other specimens kept in the Kew Herbarium and British Museum; the latter two specimens bear the collection number 337. They are indistinguishable from *Elsholtzia pubescens*.

13. EURYSOLEN PRAIN

Eurysolen Prain in Sc. Mem. Med. Offic. Ind. 11 (1898) 43; Kudc in Mem. Fac. Sc. & Agr. Taihoku Un. 2, 2 (1929) 275; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 226.

A herb or undershrub. Leaves opposite, petiolate. Flowers small, in many flowered false whorls condensed in terminal and axillary spicate inflorescences. Calyx tubular-campanulate, 10-nerved, 5-toothed, the teeth nearly equal, throat naked within. Corolla shortly exserted; tube annulate within, gibbous in front above the annulus; limb 2-lipped, the upper lip erect, slightly concave, retuse at the tip, the lower 3-lobed, spreading, the mid-lobe broader than the lateral ones. Stamens 4, in 2 pairs, the lower pair slightly longer; anthers ellipsoid, 2-loculate in bud, later confluent into 1-loculate; filaments puberulous with short hairs. Disk uniform. Style briefly 2-fid, the upper branch very short. Nutlets ovoid, subtriquetrous, papillose glandulate; scar of contact surface very large, lateral.

Monotypic, Burma, Thailand, Malesia (Sumatra, Java) to S. W. China (Yunnan).

1. **Eurysolen gracilis** Prain in Sc. Mem. Med. Offic. Ind. 11 (1898) 43, Ann. Roy. Bot. Gard. Calc. 9 (1906) 61, *pl.* 75; Kudo in Mem. Fac. Sc. & Agr. Taihoku Un. 2, 2 (1929) 276; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 227; Wu in Act. Phytotax. 8 (1959) 2.

Herb or undershrub, 30 cm to 1 m high. Stems and branches puberulous. Leaves membranaceous, ovate to rhomboid, 6–8 cm long, 2.5–4 cm wide, acute or acuminate, the base acute or alternate, entire; margins elsewhere serrate, glabrescent on both surfaces; petioles slender, 1.5–3 cm long. Flowers 6–10 in a false whorl, in terminal or upper-axillary spicate inflorescences, 8–15 cm long. Calyx tubular, 3–3.5 mm (in fruit 4–4.5 mm) long, sparsely puberulous and papillose-glandulate externally, 10-nerved, subequally 5-toothed, but hardly 2-lipped. Corolla tubular, 5–6.5 mm long; tube exserted, annulate within, slender and straight below the annulus, gibbous in front above the annulus; limb 2-lipped; upper lip short and erect, slightly concave and retuse at the tip; lower spreading, 3-lobed, the midlobe the largest. Stamens 4, in 2 pairs, the lower pair longer, all exserted; anthers ovate-reinform, 1-loculate; filaments puberulous. Ovary very briefly stalked; style 2-fid. Nutlets ovoid (about 1 mm in immature specimens), papillose-glandulate, with a large scar on ventral surface.

Type specimen: Burma, Kachin Hills, *Prain's collector*, s.n. (K).

Distribution: Burma, Thailand to S. W. China (Yunnan) and Malesia (Sumatra, Java and The Lesser Sunda Islands).

Ecology: In ravines, mount trails or moist valleys at low to medium altitudes (700–1,800 m).

13

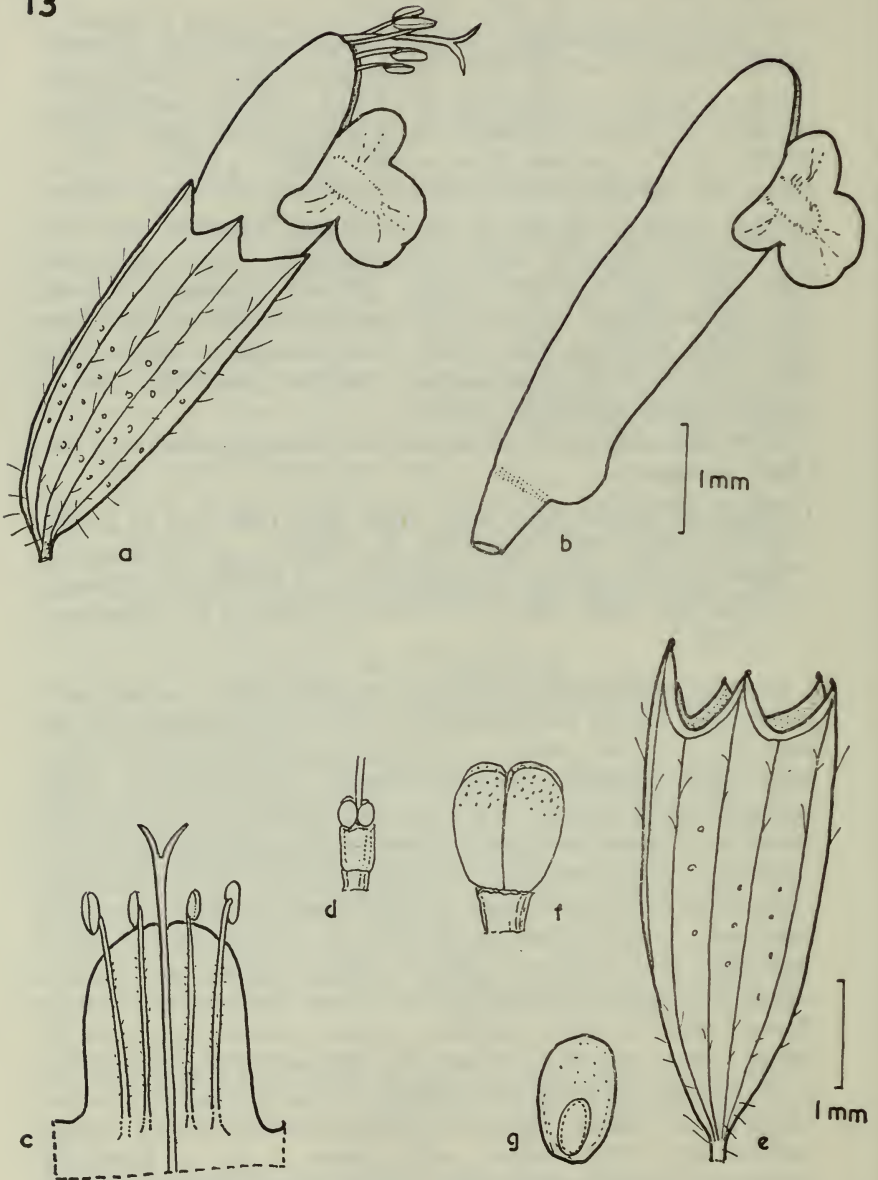


Fig. 13. *Eurysolen gracilis* Prain.

a. flower; b. corolla, showing the annulus and the gibbosity; c. portion of upper lip of corolla with stamens and style; d. ovary; e. fruiting calyx; f. 4 nutlets; g. nutlet, seen from ventral side, (flower, *Kostermans 18343*; fruit *Steenis 11118*).

Specimens examined:

Sumatra: Scolak Dras, Korinchi, alt. 1,000 m, *Robinson & Kloss s.n.* March 19, 1914, (BM, Sing); Sungei Kumbang, Korinchi, alt. 1,500 m, *Robinson & Kloss 130* (flowers white) (BM, K, Sing.).

Java: Besoeki, Jang Plateau East, Ravine of Djeloewang, alt. 1,800 m, *van Steenis 11118* (K, Sing.).

Lesser Sunda Islands: W. Soembawa, Balu lanteh, Mt. trail, from Baludulang to Pusu, alt. 700-800 m, *Kostermans 18343* (K) (herb, up to 1 m, fls. white, common from 900-1,100 m, in moist valleys on open places).

I am indebted to Miss Chirayupin Chermisrivathana who correctly identified *Robinson & Kloss 130* from Sumatra as belonging to this species. This led to the further discoveries of three more collections from the Malesian regions by myself. This monotypic genus was previously known only from Burma and S. W. China (Yunnan). Miss Chermisrivathana was also able to identify several collections from Thailand as referring to this species.

14. **GOMPHOSTEMMA WALL. ex BENTH.**

Gomphostemma Wall. ex Benth. in Wall. Pl. As. Rar. 2 (1831) 12; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1216; Prain in Ann. Roy. Bot. Gard. Calc. 3 (1891) 242; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 223.

Perennial herbs or subshrubs, sometimes tuberous. Stems coarse, tomentose or stellately pubescent. Leaves opposite, large, mostly long-petiolate. Flowers medium or large, in few- to many-flowered false whorls, often forming densely sessile or laxly branched cymose inflorescence, rarely seemingly racemose; bracts ovate, lanceolate or linear. Calyx campanulate, 10-nerved, subequally 5-toothed. Corolla-tube slender, erect or incurved; throat narrow or inflated; limb 2-lipped, the upper lip galeate, entire or emarginate, the lower lip spreading, broadly, 3-lobed. Stamens 4, pubescent, all ascending, the lower pair longer; anthers connivent in pairs, each anther 4-loculate in bud, later 2-loculate, the locules transverse, parallel. Disk subequal or gibbous behind. Style very briefly 2-branched, the lobes subulate, the anterior one slightly longer. Nutlets drupaceous, glabrous or pubescent, the pericarp usually fleshy and white, with a broad hilum; only 1 or 2, rarely all 4 developed.

Species about 30, confined to South-eastern Asia, from E. India, Burma to S. W. China and Malesia.

Prain's scheme of classification of the genus into 3 sections, namely, *Stenostoma*, *Podosiphon*, and *Eugomphostemma*, is essentially based on the corolla characters. This has been employed as the basis for constructing the following key. Admittedly without flowering specimens, it is almost inapplicable. After examining a large number of herbarium specimens, two other features, namely the nature of the inflorescence and the shape and size of the calyx teeth, are considered useful in differentiating the Malesian species. 8 species are recognized and enumerated below.

Key to the species

- A. Corolla with almost straight tube and narrow throat, glabrous internally; nutlets usually 1 or 2 (§ *Stenostoma*).
- B. Calyx teeth triangular or lanceolate, much shorter than the tube.
 - C. Flowers few in a verticil and forming axillary spurious racemes; calyx (in flower) 7–8 mm long, the teeth lanceolate. 1. *G. racemosum*
 - C. Flowers many in densely congested axillary verticils; calyx (in flower) 6–7 mm long, the teeth triangular. 2. *G. microcalyx*
- B. Calyx teeth linear-subulate or narrow lanceolate, as long as or longer than the tube; flowers in lax, axillary, pedunculate often branched cymes.
 - C. Calyx teeth narrow lanceolate, nearly as long as the tube; plants generally covered with dark brownish tomentum. 3. *G. parviflorum*
 - C. Calyx teeth linear-subulate, considerably longer than the tube; plants generally covered with ash-grey tomentum. 4. *G. crinitum*
- A. Corolla with broad, distinctly incurved tube and inflated throat; nutlets usually 1–4.
- B. Corolla-tube hirsute internally, and included in the calyx; lips small; nutlets usually 1–3 (§ *Podosiphon*). 5. *G. hemsleyanum*
- B. Corolla-tube glabrous internally, and exceeding the calyx; lips large and prominent; nutlets usually 4 (§ *Eugomphostemma*)
 - C. Calyx-tube not ribbed; ovary glabrous or punctate; flowers in lax, pedunculate, branched cymes; stems ascending. 6. *G. curtisii*
 - C. Calyx-tube often conspicuously ribbed; ovary villous or hispid; flowers more or less congested in axillary verticils; stems erect.
 - D. Flowers about 10–15 in a verticil; bracts linear-lanceolate; calyx (in flower) 10–15 (–20) mm long; calyx-teeth generally shorter than the tube; corolla 40–45 (–50) mm long. 7. *G. javanicum*
 - D. Flowers about 20 in a verticil; bracts subulate; calyx (in flower) 18–25 mm long; calyx-teeth often considerably longer than the tube; corolla 45–60 mm long. 8. *G. scortechinii*

1. *Gomphostemma racemosum* van Steenis ex H. Keng.

Planta erecta, circiter 2 m alta; caulibus sulcatis; ramulis et foliis et inflorescentiis desissimo ferrugineo- vel aureo-hirsuto-velutinis; foliis chartaceis, ellipticis vel rotundato-ellipticis, 10–20 cm longis, 6–13 cm latis, apice acutis, basi lato-acutis, margine denticulato, supra velutino-pilosis ad costam, subtus dense ciliatis; petiolo 1–5 cm longo, dense velutini; verticillastris racemosis dispositis, axillaribus, pedunculis dense cinereo pubescentibus, 4–7

14

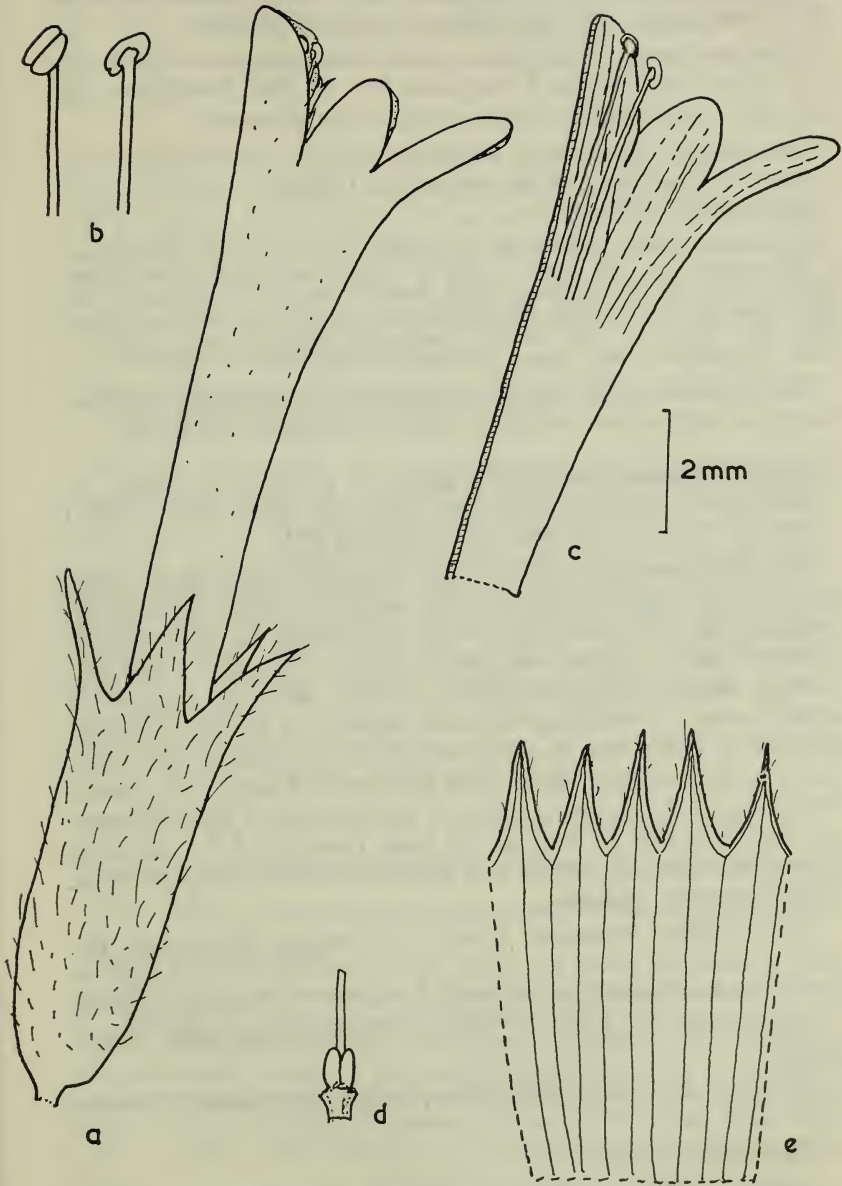


Fig. 14. *Gomphostemma racemosa* Steenis ex H. Keng.

a. flower; b. stamen (in 2 views); c. half corolla (upper portion) with stamens; d. ovary; e. calyx expanded, seen from inside. (Steenis 8684)

cm longis, rachibus usque 6 ad 7 cm longis; pedicellis subsessilis, bracteis parvissimis, linearis; calycibus 7–8 mm longis, costatis, extus dense pubescentibus, tubo cylindrico intus glabro, lobis lanceolatis, graciliter acuminatis, circiter 3 mm longis; corolla 18–20 mm longa, tubo plus minusve adpresso hirsuto.

Type specimen: N. Sumatra, Atjeh, Gajolanden, alt. 1,000 m. *Van Steenis 8684* (Type, L. duplicate Bo, K), Feb. 7 1937 (1–2 m tall, calyx hairy inside, corolla white, ovary glabrous).

Distribution: Endemic to Malesia.

Ecology: In forest, along stream, alt. 1,000 m.

Specimens examined:

N. Sumatra, Atjeh, Gajolanden, alt. 1,000 m, *Van Steenis 8684* (Type, L. duplicates, Bo, K), Feb. 7, 1937 (1–2 m. tall, calyx hairy inside, corolla white, ovary glabrous); Atjeh, bores Takengon, *Van Steenis 5815* (BO) Aug. 28, 1934; Atjeh, Gajolanden, alt. 1,050–1,150 m, *Van Steenis 9845* (BO) Mar. 19, 1937 (humid forest, fruit globular, with 1 kernel); Atjeh Gajolanden, Laut Tawar, *Jocheme 237* (BO) Jan. 18, 1924.

This species can be readily recognized by the axillary spurious racemose inflorescence which is unique throughout the genus.

2. *Gomphostemma microcalyx* Prain in J. As. Soc. Beng. 59 (1890) 316, 74 (1907) 723, in Ann. Roy. Bot. Gard. Calc. 3 (1891) 251, pl. 84; Ridl. Fl. Mal. Pen. 2 (1923) 652.

A coarse perennial herb, 60–150 cm high, woody below. Stem stout, erect, hoary pubescent and scabrid. Leaves herbaceous, oblong-ovate, 12–15 cm long, 7–9 cm wide, acute, the base abruptly cuneate, entire; margins elsewhere entire or crenate or remotely toothed, finely stellate-pubescent on both surfaces; petioles of upper leaves 1–2 cm long, of lower leaves 4–5 cm long, scabrid. Flowers in dense, few-flowered whorls in the axils of the lower leaves and on the bare stem below the leaves; bracts ovate-lanceolate, entire, 6–7 mm long. Calyx 6–7 mm long; teeth short, triangular, less than half as long as the tube. Corolla 2.5–3.5 cm long, puberulent externally; throat very narrow. Style and ovary glabrous. Nutlets smooth, glabrous.

Type: Malay Peninsula; Perak, Ulu Bubong, *Kustler* (or *Dr. King's collector*) 10445 (K. type) 1886 (shrub, about 1 m high, in dense bamboo forest, alt. 150–200 m, flowers rich orange yellow).

Distribution: Endemic to Malesia (Sumatra and Malay Peninsula).

Ecology: In dense forests from lowland to medium altitudes (150–1,400 m).

Specimens examined:

Sumatra: Soengai Koeriman, alt. 1,000 m, *Bünnemeijer 3479* (L); Kerintji, alt. 1,100, 1,500 & 1,700 m, *Bünnemeijer 8228, 8414 & 8866* (BO); Kerintji alt. 1,400 m, *Jacobs 4546* (L); Sibolangit, alt. 400 m, *Lorzing 5769* (L); Bangunpurba, Serdang, alt. 300 m, *Lorzing 14646* (L); Djambi, alt. 200 m, *Posthumus 943 a* (BO, L); Asahan, Pargambiran, *Rahmat si Boeca 5738 & 5815* (L); Palembang, Ranaumeer, alt. 1,600, 550 & 500 m, *Steenis 3385, 3488 & 3776* (L); Asahan, *Yates 1738* (K).

Malay Peninsula: Perak, Larut, alt. 600–700 m, *Kustler 2155* (K); Perak, Ulu Bubong, alt. 150–200 m, *Kustler 10445* (K) (Type of *Gomphostemma microcalyx* Prain); Perak, Tapah, *Ridley 14061* (Sing.); Perak, Larut Hills, *Ridley s.n.* 1891 (Sing.); Malacca, *Ridley s.n.* (Sing.); Perak, Tapah, *Wray 835* (Sing.).

The collection number of the type specimen was erroneously given by Prain as *Kunstler 10455*. It should be *Kunstler 10445*.

This species, as pointed out by Prain, is nearest to *G. parviflorum* Wall. but with a much smaller calyx with diminutive teeth and a much narrower corolla. Their basic structures of inflorescences are also very different: verticils sessile, densely congested in *G. microcalyx*; verticils pedunculate, lax and often branched in *G. parviflorum*.

3. *Gomphostemma parviflorum* Wall. Cat. n. 2158/1 (*in parte*) Herb. Heyne (1828) et n. 2158/E (1859) *nom. nud.*; Benth. in Wall. Pl. As. Rar. 2 (1831) 12, (*in parte*); Hook. f. Fl. Brit. Ind. 4 (1885) 697 (*in parte*); Prain in Ann. Roy. Bot. Gard. Calc. 3 (1891) 252, pl. 86. Barker & Bakh. f. Fl. Java 2 (1965) 619.

Gomphostemma dichotomum Zoll. & Mor. Syst. Verz. (1846) 54; Miq. Fl. Ind. Bat. 2 (1856) 986.

Gomphostemma bartlettii Merr. in Pap. Mich. Acad. Sci. Art Let. 1933, 19 (1934) 191. *Syn. nov.*

A coarse, erect shrub, 2.5–3 m high. Stems stout, sulcate, densely covered with brownish stellate-tomentose. Leaves chartaceous, elliptic-ovate, 15–20 cm long, 6–10 cm wide, acute, the base attenuate, entire; margins elsewhere finely serrate, hirsute above, densely tomentose beneath; petioles 2–4 cm long, tomentose. Flowers in lax or condensed, many-flowered, axillary, pedunculate often branched cymes; bracts lanceolate to ovate, 1–1.5 cm long. Calyx 1–1.4 cm long, densely tomentose externally; teeth narrow lanceolate, nearly as long as the tube. Corolla 2–2.5 cm long, puberulent externally, the throat narrow. Style and ovary glabrous. Nutlets smooth, glabrous, 8 mm long, 3 mm broad.

Distribution: India, Burma to Malesia (Sumatra, Java).

Ecology: In moist and shaded rain forest, alt. 300–1,500 m.

Vern. names: Sarang banoea, Soeri-soeri, Kotok ring2 (Sumatra).

Specimens examined:

Sumatra: Between Panapparan & Pagar Batoe Habinsaran, *Bartlett 7935* (L) (Isotype of *Gomphostemma bartlettii* Merr.); Koerintji Peak, alt. 1,500 m, *Bunnemeijer 8414* (K, L); Asahan, Lower slope of Dolok si Manoek-manoek, *Rahmat si Boeea 9772* (L); Asahan, Aek si Tamberak, *Rahmat si Boeea 10644* (L); Toba, Loemban Loboe, *Rahmat si Boeea 10874* (L); Toba, Aek Rimán, *Rahmat si Boeea 11405* (L).

Java: *Zollinger 2028* (BM) (Type of *Gomphostemma dichotomum* Z. & M.)

Prain (l.c.) reduced *G. dichotomum* Z. & M. to a synonym of *G. parviflorum* Wall. An examination of the type specimen of the former justifies the reduction. I also consider the above-listed specimens from Sumatra, including the isotype of *G. bartlettii* Merr. as belonging to *G. parviflorum* Wall., a species formerly found in the Indo-Burma region.

4. **Gomphostemma crinitum** Wall. Cat. 2159/1 (1828) *nom. nud.*; Benth. in Wall. Pl. As. Rar. 2 (1831) 12, Lab. Gen. & Sp. (1835) 648, in DC. Prodr. 12 (1848) 552; Miq. Fl. Ind. Bat. 2 (1859) 987; Hook. f. Fl. Brit. Ind. 4 (1885) 695; Prain in Ann. Roy. Bot. Gard. Calc. 3 (1891) 254, *pl.* 88, in J. As. Soc. Bengal 74 (1907) 724 (incl. var. *griffithii*); Ridl. Fl. Mal. Pen. 2 (1923) 652.

Gomphostemma parviflorum (non Wall. ex Benth. 1831) Benth. Lab. Gen. & Sp. (1835) 648, in DC. Prodr. 12 (1848) 551; Miq. Fl. Ind. Bat. 2 (1859) 987.

A coarse perennial herb, 50–150 cm high. Stems stout, erect, sulcate, hoary-pubescent or scabrid. Leaves herbaceous, elliptic-ovate or oblanceolate, 25–30 cm long, 8–15 cm wide, acute, base cuneate, entire; margins elsewhere entire or remotely serrate, pubescent above, softly pubescent or tomentose beneath; petioles 2–5 cm long, scabrid. Flowers in lax or condensed, many-flowered axillary, often branched cymes; bracts linear, lanceolate or ovate-lanceolate, 1–2 cm long. Calyx 1.5–2 cm long, hispid-tomentose; teeth linear subulate, 0.9–1.3 cm long. Corolla 2.5–3.5 cm long, puberulent externally; the throat narrow. Style and ovary glabrous. Nutlets smooth, glabrous, 6 mm long, 3 mm broad.

Distribution: Burma (Tenasserim) Indo-China and Malesia (Malay Peninsula).

Ecology: Usually on limestone cliffs or at the base of limestone hills, altitudes 1,300–1,750 m.

Vern. name: Mungulon Bukit (Malay Peninsula).

Specimens examined:

Malay Peninsula: Perak, Tambun, *Burkill* 6298 (K, Sing.) (fls. dull yellow, on limestone cliff); Upper Perak, N. of Lawin, *Burkill* 12484 (Sing.); Perak, Grik, *Burkill & Haniff* 13783 (Sing.); Kedah, Kroh, alt. 130 m, *Corner* 38046 (K, Sing.); Perak, Ipoh, *Curtis* 3191 (Sing.); Pahang, Sungai Yu, *Foxworthy & Nur* 11922 (Sing.); Selangor, Ulu Selangor, Ulu Selangor, *Goodenough* s.n. Oct. 1899 (Sing.); Malacca, *Griffith* 4042 (K); Perak, Taiping, Batu Tegoh, *Henderson* 10058 (Sing.); Pahang, Tembeling, *Henderson* 21770 (BM, Sing.); Perak, Tanjong Rambutan, *Henderson* 23773 (Sing.); Pahang, Raub, Bukit Serdam, *Henderson* 25061 (Sing.); Negri Sembilan, Ulu Bendol, Bukit Lingsung, *Holtum* 9836 (Sing.); Pahang, Kuala Tembeling, *Holtum* 20531 (Sing.); Selangor, Ginting Simpak, *Hume* 9263 (Sing.); Selangor, Ginting Bidai, *Kloss* s.n. (BM, K); Malacca, *Malvius* 2130 (Sing.); Trengganu, Ulu Brang, *Morsey & Kiah* SFM 33705 (Sing.); Pahang, Cameron Highlands, *Nur* 32572 (BM); Pahang, *Ridley* 2149 (BM, Sing.); Pahang, Kuala Tahan, *Ridley* 2185 (K, Sing.); Malacca, *Ridley* s.n. June 1892 (Sing.); Selangor, Ginting Neras, *Ridley* 7600 (Sing.); Selangor, *Ridley* 8564 (BM); Perak, Ipoh, *Ridley* s.n. Feb. 1904 (Sing.); Perak, *Ridley* 14298 (BM, K, Sing.); Perak, G. Kerbau, alt. 1,300–1,500 m, *Robinson* s.n. June 1913 (BM, K); Perak, Hulu Kavanse, *Scortechini* 928 (Sing.); Perak, Ipoh, *Sinclair* 9849 (K, Sing.) (on limestone rocks); Penang, *Wallich* 2159/1 (K); Penang, *Wallich* s.n. (K); Perak, Kota Kambong, *Wray* 3340 (Sing.); Upper Perak, alt. 100 m, *Wray* 3775 (Sing.).

5. *Gomphostemma hemsleyanum* Prain ex Collett & Hemsley in J. Linn. Soc. 28 (1890) 116; Prain in Ann. Roy. Bot. Gard. Calc. 3 (1891) 250, *pl.* 82, Backer & Bakh. f. Fl. Java 2 (1965) 619.

A perennial herb, about 60 cm high. Stems erect, woody, 4-angled, succate, densely tomentose. Leaves oblong to elliptic ovate, 6–12 (–18) cm long, 3.5–4.5 (–7) cm wide, acute, the base attenuate; margins crenate-serrulate, hispid above, densely greyish tomentose beneath; petioles 1–1.5 (–3) cm. long. Flowers numerous in axillary subglobular false whorls, the upper ones almost forming an interrupted spurious spike; bracts linear lanceolate, 6–12 mm long, 2–3 mm wide; calyx tubular-campanulate, 12–14 (in fruit 16–22) mm long; teeth broadly lanceolate, 7–9 mm long; corolla 8–10 mm long, incurved, hirsute internally below the throat. Nutlets 1–3, smooth, glabrous, ellipsoid, 4.5 (–6) mm long, 2.5 (–5) mm broad.

Distribution: upper Burma and Malesia (Java).

Ecology: in arid, sunny place, at low altitude.

Specimen examined:

Java: Near Asem Bagus, E. Java, alt. 150 m Backer 8241 (BO), May 1913.

This interesting Burmese plant was collected only once by the late Dr. Backer. The specimen available is essentially a fruiting branch, with a few detached flowers contained in a folder. The general habit, and the inflorescences agree very well with the type of the species which is illustrated in Prain's monograph. The dimensions of the leaves and the flower parts, however, are much smaller in our plant than those in the typical form. The leaf-margin of our specimen is crenate-serrulate, instead of *argute* serrate, as described by Prain.

6. *Gomphostemma curtisii* Prain in J. As. Soc. Beng. 59 (1890) 315, 74 (1907) 75, in Ann. Roy. Bot. Gard. Calc. 3 (1891) 266, *pl.* 92; Ridl. Fl. Mal. Pen. 2 (1923) 654.

Cyrtandromoea repens Ridl. in J. Roy. As. Soc. Str. Br. no. 57 (1910) 74, Fl. Mal. Pen. 2 (1923) 543. *Syn. nov.*

A coarse perennial herb, 60–150 cm high. Stems flexuose, ascending, scabrid. Leaves herbaceous, ovate to oblong-ovate, or cordate, 8–12 cm long, 3–7 cm wide, acute, base very shortly cuneate; margins serrate or denticulate, sparsely hirsute above, adpressed tomentose beneath; petioles 3–12 cm long, tomentose. Flowers many in lax, axillary, branched cymes at the lower part of the stem; bracts oblong, 10–15 mm long, long-acuminate, entire or crisped. Calyx 12–14 mm long, smooth, glabrous within; teeth subulate-lanceolate, slightly larger than the tube. Corolla 25–35 mm long, distinctly recurved, puberulous externally. Style and ovary glabrous. Nutlets glabrous or punctate, oblong-ovoid, 6 mm long, 3 mm wide, apex rounded.

Type specimen: Malay Peninsula: Waterloo, Perak, alt. 650 m, *Curtis 1310* (K, Type; Sing. isotype), Dec. 1880.

Distribution: Endemic to Malesia (Sumatra, Malay Peninsula, Borneo).

Ecology: In dense mountain forest, from low to medium altitudes (250–1,300 m).

Specimens examined:

Sumatra: Berkoelen, Soeban Ajam, alt. 1,200 m, *Ajoeb 337* (B); Talamau, alt. 66 m, *Bunnemeijer 505* (B, L); Sibolangit, alt. 1,000 m, *Lorzing 4670* (L); Sibolangit, alt. 525 m, *Lorzing 5408* (L); Mt. Sibajak, alt. 1,000 m, *Lorzing 14079* (L); Pajakumbuh, Mt. Sago, alt. 800 m, *Meijer 4504* (L); East Coast, *Yates 895* (BM, K).

Malay Peninsula: Pahang, Cameron Highlands, *Batten Pool s.n.* Nov. 1939–Jan. 1940 (Sing.); Pahang, Pulau Tioman, *Burkill s.n.* June 1915 (Sing.); Pahang, Fraser Hill, alt. 1,300 m, *Corner 33178* (K, Sing.); Perak, Waterloo, *Curtis 1310* (K, Sing.) (Types); Waterloo, alt. 500 m, *Curtis 2166* (K, Sing.); Perak, G. Perak, *Haniff 10337* (Sing.); Pahang, Sungei Yel. Bukit Frasu, alt. 900 m, *Nur 11100* (Sing.); Pahang, Pulau Tioman, Bukit Bayoh, *Nur 18567* (K, Sing.); Pahang, Cameron Highlands, alt. 1,300 m, *Nur 32572 & 32839* (K, Sing.); Pahang, Telom, *Ridley 13593* (BM, Sing.); Perak, Temengoh, *Ridley 14446* (K, Sing.) (corolla white) (Type of *Cyrtandromoea repens* Ridley); Perak, Taiping, *Ridley s.n.* Feb.–Mar. 1892 (Sing.); Locality unknown, *Scortechini 924* (Sing.); Perak, G. Batu Puteh, *Wray 1233* (K, Sing.).

Borneo: Sarawak, Mt. Poi, *Clemens 20175* (K); Borneo, Bukit Mehipit, alt. 500 m, *Winkler 1113* (L).

The reduction of *Cyrtandromoea repens* Ridley (Gesneriaceae) as a synonym of this species was made by Mr. B. L. Burtt in an annotated sheet in the Kew Herbarium. A study of the type specimens, *Ridley 14446* (represented both at Kew and Singapore) confirms this reduction.

7. *Gomphostemma javanicum* (Bl.) Benth. Lab. Gen. & Sp. (1835) 650, in DC. Prodr. 12 (1848) 553; Miq. Fl. Ind. Bat. 2 (1859) 986; Prain in Ann. Roy. Bot. Gard. Calc. 3 (1891) 261; Backer & Bakh. f. Fl. Java 2 (1965) 618.

Prasium javanicum Bl. Bijdr. (1826) 840.

Prasium phlomoides Reinw. ex Bl. Bijdr. (1826) 840.

Gomphostemma oblongum Wall. ex Benth. in Wall. Pl. As. Rar. 2 (1830) 12, in DC. Prodr. 12 (1848) 551; Miq. Fl. Ind. Bat. 2 (1859) 986; Prain in Ann. Roy. Bot. Gard. Calc. 3 (1891) 261, pl. 95, in J. As. Soc. Beng. 74 (1907) 725; Ridl. Fl. Mal. Pen. 2 (1923) 653, f. 131. (incl. var. *setosa* Ridl.).

Gomphostemma phlomoides (Reinw. ex Bl.) Benth. Lab. Gen. & Sp. (1835) 649, in DC. Prodr. 12 (1848) 551; Miq. Fl. Ind. Bat. 2 (1859) 985.

Gomphostemma philippinarum Benth. in DC. Prodr. 12 (1848) 551; Prain in Ann. Roy. Bot. Gard. Calc. 3 (1891) 259, pl. 101; Merr. Enum. Philip. 3 (1923) 409.

Gomphostemma cinereum Elm. Leaf. Philip. Bot. 8 (1919) 3086.

Gomphostemma lacteum Ridl. in J. Bot. 62 (1924) 300. *syn. nov.*

A coarse perennial herb, 60–150 cm high. Stems erect, woody, 4-angled, densely tomentose. Leaves herbaceous, elliptic oblong, ovate or obovate, 15–30 cm long, 5–10 cm wide, acute, the base abruptly cuneate or subtruncate; margins crenate or crenate-serrate, hispid above, densely pubescent beneath; petioles 1–3 cm long, densely tomentose. Flowers 10–15 in dense, axillary false whorls; bracts ovate-lanceolate, 6–10 mm long, pedicels 4–7 mm long. Calyx 10–15 (–20) mm long, often very prominently ribbed, hirsute within; teeth lanceolate, acute or acuminate, generally shorter than the tube. Corolla 40–45 (–50) mm long, distinctly incurved, tomentose externally. Style sparingly hirsute when young, later glabrous; ovary villous. Nutlets 1–4, smooth, hispid at the apex, 6 mm long, 4 mm broad.

Type specimens: Java: Gunong Gede, *Blume s.n. (Herb. Lugd. Bat. 904, 354–154 & duplicates, nos. 97, 98, 101, 150 & 154)* (L, leptotype of *Prasium javanicum* Bl.).

Distribution: Endemic to Malesia.

Ecology: In forests from lowland to medium and higher altitudes (100–2,400 m).

Vern. names: Ata-Ata, Kagong, Kasunisuni, Magtingon (Philippines, fide Merrill).

Specimens examined:

Sumatra: Asahan, *Bartlett & La Rue 224* (L); Karo, Berastagi, *Bartlett 6527* (L); Singalang, alt. 1,500 & 2,300 m, *Bunnemeijer 2631 & 2747* (L); Malintang, alt. 1,100 m, *Bunnemeijer 3599* (L); G. Merapi, alt. 1,300, 1,500, 1,700, 1,150, 1,600, 1,600 & 1,140 m, *Bunnemeijer 4507* (BO); G. Koerintji, alt. 4744 (L), 4886 (BO), 4961 (BO), 4994 (BO) & 5032 (BO); G. Koerintji, alt. 1,300, 1,100, 1,500, 1,600, 1,700, 2,200, 1,800, 2,200 & 2,200 m, *Bunnemeijer 8230, 8518, 8557, 8688, 8868, 9205, 9299, 9889 & 10141* (BO); Sumatra, *Forbes 1579* (L); Hoedjoeng, *Forbes 1910* (BM, L); Sumatra, *Junghuhn s.n. (L)*; Sumatra, *Koers 76* (BO); Sipora, *Kloss 14803* (K); *Bandarbaroe*, alt. 950 & 1,100 m, *Lorzing 4616* (L); & 4780 (BO, L), Karo, alt. 1,400 m, *Lorzing 5949* (BO, L); Sibolangit, Karo, alt. 1,350 m, *Lorzing 6178* (BO, L); Berastagi, alt. 1,350 m, *Lorzing 6765* (BO); Toba Highlands alt. 1,300 m, *Ouwehand 373* (BO); Korinchi, *Robinson & Kloss 4, 187 & 193* (BM); Atjeh, alt. 1,275 m, *Steenis 5908* (BO); Atjeh, alt. 1,000 m, *Steenis 8685* (BO, L); Palembang, G. Dempo, alt. 2,000 m, *Voogd 1551* (L).

Malay Peninsula: Selangor, Fraser's Hill, alt. 1,300–1,400 m, *Burkill & Holttum 8650* (K, Sing.); Pahang, Fraser's Hill, alt. 1,300 m, *Corner 33212* (K); Langkawi, G. Raya, *Haniff & Nur 7138* (K); Pahang, G. Senyum, *Henderson 22234* (Sing.); Kelantan, Bt. Batu Papan, *Henderson 29618* (K, Sing.); Kelantan, Gua Masang, *Henderson 29658* (K, Sing.); Pahang, Pine Tree Hill, alt. 1,600 m, *Nur 11075* (K, Sing.) (Types of *G. lacteum* Ridley); Pahang, Pulau Sawarwood, *Ridley 2148* (BM, K); Kota Glangii, *Ridley s.n. Aug. 1891* (Sing.); Pahang, Tahan Valley, *Ridley s.n. 1891* (Sing.); Selangor, 5th mile Pahang Track, *Ridley 8564* (K); Johore, Bt. Saya, *Ridley 11130* (K, Sing.); Pahang, Telom, *Ridley 13690* (Sing.); Pahang, *Ridley 13698* (BM); Perak, *Ridley 1406* (BM); Selangor, Semang Kok Pass, *Ridley s.n. Jan. 1922* (K) (Type of *G. oblongum* var. *setosum* Ridley); Penang, Koh, *Robinson s.n. May 1913* (K); Kedah Perak, alt. 500 m, *Robinson & Kloss 6144* (K); Pahang, Kuala Tahan, *Seimund 921* (Sing.).

Java: Pulasari, W. Bantam, alt. 750 m, *Adelbert* 460 (L); G. Malang, *Backer s.n.* Mar. 1909 (L); Preanger, alt. 1600 m, *Backer* 2430 (L); G. Gedeh, *Backer* 3304 (L); Wonosari, alt. 150–200 m, *Backer s.n.* 1912 (L); Soendih, alt. 150 m, *Backer* 6531 (L); G. Lawoe alt. 700 m, *Backer* 6731 (L); G. Salak, alt. 1200 m, *Backer* 9375 (L); G. Kendeng, alt. 1250 m, *Backer* 10976 (L); Moentilan, alt. 350 m, *Backer* 12052 (L); G. Lembang, alt. 1300 m, *Backer* 12217 (L); Java alt. 1900 m, *Backer* 21878 (L); Pematang, alt. 50 m, *Backer* 23351 (L); Tjidadap, alt. 1000 m, *Bakhuizen v/d Brink* 2189 & 2469 (L); Tjadas-Malang, alt. 1000 m, *Bakhuizen v/d Brink* 2968 (L); Tjidadap, alt. 900 m, *Bakhuizen v/d Brink s.n.* May 1917 (L); Tjidadap, *Bakhuizen v/d Brink* 3317 (L); G. Parang, alt. 650 m, *Bakhuizen v/d Brink* 4936 (L); G. Gede, *Blume s.n.* (L) (lectotype and type duplicates of *Prasium javanicum* Bl., Herb. Lugd. Bat. No. 904, 354–97, 98, 101, 150, 154); Besoeki, *Buwalda* 7538 (L); Lembang, alt. 1850 m, *Coert* 1547 (L); S.E. Java, *Forbes* 623, 843, & 997 (BM, L); G. Gedeh, *Hallier* 392 (L); G. Gedeh, *Hallier* 478 (L); Buitenzorg, *Hallier s.n.* May 1895 (L); G. Tjibodas, *Hallier s.n.* June 1896 (L); Poeloesari, *Holstvoogd* 522 (L); Java, *Horsfield s.n.* (BM, L); Besoeki, alt. 1700 m, *Koorders* 14853 (L); Tahoka, *Koorders* 15012 (L); Besoeki, *Koorders* 20938 (L); Kediri, alt. 350–500 m, *Koorders* 22937 (L); Madioen, Ngebel, alt. 850 m, *Koorders* 23258 (L); Madioen, G. Wilis, alt. 1300 m, *Koorders* 23274 (L); Semarang, Kedoeng-Djati, *Koorders* 27205 (L); Ngebel, *Koorders* 29370 & 29833 (L); Ngebel, alt. 800 m, *Koorders* 29856 (L); Besoeki, *Koorders* 30015 (L); Tjibodas, *Koorders* 31959 (L); Tjibodas, alt. 2400 m, *Koorders* 32022 (L); Pringombo, alt. 800 m, *Koorders* 33930 (L); Semarang, *Koorders* 36049 (L); G. Telemojo, alt. 1600 m, *Koorders* 36057 (L); Pasoeroean, *Koorders* 38195 (L); G. Papanadajan, *Koorders* 40500 (L); G. Mandalagiri, alt. 1700 m, *Lam* 83 (L); Sendoro, *Lorzing* 741 (L); G. Wilis, alt. 1200 m, *Lorzing* 832 (L); G. Gedeh, *Lorzing* 2239 (L); Keruwang, *Monchy* 19 (L); Lembang, alt. 1500 m, *Pijl* 673 (L); Java, *Popta* 1301 (L); Kediri, *Rant s.n.* May 1924 (L); Magelang, *Rant s.n.* June 1928 (L); Java, *Reinwardt s.n.* (L) (lectotypes of *Prasium phlomioides* Bl.; Herb. Lugd. Bat. no. 909, 71–693; 909, 354–120); G. Gedeh, *Sapiin* 49 (L); G. Gedeh, *Sapiin* 285 (L); Tjidadap, alt. 1000 m, *Winkel s.n.* Dec. 1917 (L); Poeloesari, *Wisse* 1011 (L).

Borneo: Tenompok, alt. 1,700 m, *Clemens* 26116 (L); Mt. Kinabalu, Penibukan, alt. 1300 m, *Clemens* 30655 (BM, L); Penataran Basin, alt. 1300 m, *Clemens* 34145 (BM, L); Mt. Kinabalu, *Clemens* 35013 (BM, L); W. Koetei, alt. 200 m, *Endert* 2891 (L); E. Borneo, Samarinda, *Kostermans* 6824 (L); Matang, *Ridley s.n.* July 1905 (K); Anambas & Natoena Isl. alt. 200 m, *Steenis* 950 (L).

Philippines: Luzon, Rizal, Bosboso, *Ahern's Collector* 1866 (K); Mt. Falinas, alt. 1500 m, *Butt* 328 (L); Bohol Isl., *Cuming* 1840 (BM, K) (type of *G. philippinense* Bth.); Negros, *Edano* 7145 (L); Leyte, Ormoc, Lake Danao, *Edano* 11894 (BM, L); Palawan, Malasgao, *Edano* 14077 (BM, L); Luzon, Mt. Pico de Loro, *Edano* 18024 (L); Luzon, Sorsogon, Mt. Bulusan, alt. 730 m, *Edano & Gutinez s.n.* May 1957 (L); Luzon, Benguet, Mt. St. Tomas, alt. 2000 m, *Elmer* 6534 (K); Luzon, Tayabas, *Elmer* 7435 (K); Mindanao, Davao, Todaya, *Elmer* 11146 (BM, K, L); Mindanao, Agusan, Mt. Urdaneta, *Elmer* 13469 (BM, L); Luzon, Irosin, *Elmer* 15290 (BM, K, L); Luzon, Los Banos, *Elmer* 17836 (BM, K, L) (type duplicate of *G. cinerea* Elm.); Luzon, Pampanga, Mt. Pinatubo, *Elmer* 22371 (BM, K, L); Luzon, Pangasinan, Mt. San Isidro, *Fenix* 29945 (BM, L); Basilan, *Hallier* 18 (L); G. Luzon, *Loher* 42 (K); Luzon, Benguet, *Loher* 4215 (K); C. Luzon, *Loher* 4232 (K); Luzon, Rizal, *Loher* 6594 (K); Luzon, Laguna, *Mabesa* 25009 (K); Luzon, Albay, Mayon Volcano, *Mendoza* 18370 (L); Luzon, Cavite, *Mendoza & Steiner* 41555 (L); Luzon, Lepanto, Mt. Data, *Merrill* 4563 (K); Mindanao, Camaguin, *Ramos* 14673 (BM, L); Luzon, Sorsogon, *Ramos* 23481 (L); Samar, Catubig River, *Ramos* 24403 (K); Luzon, Rizal, *Ramos & Edano* 29402 (K); Catanduanes, *Ramos* 30280 (K); Luzon, Kalinga, Mt. Masingit, *Ramos & Edano* 37494 (K); Luzon, Bontoc, Mt. Polis, *Ramos & Edano* 37617 (K); Mindanao, Bukidnon, Mt. Candoon, *Ramos & Edano* 38749 (K); Leyte, Cabalian, *Ramos* 41489 (L); Isl. Bohol, *Ramos* 43199 (BM, K); Basilan, *Reillo* 15411 (K); Luzon, Camarines, Maagnas, *Robinson* 6364 (L); Panay, Illoilo, *Robinson* 18189 (K); Luzon, Bontoc, *Vanoverbergh* 101 (L).

Celebes. Bonthain, *Teysmann* 13722 (L).

This is the commonest species found in the Malesian regions. Owing to the considerable variation in its tomentum, its leaf and floral characters, it has been described under several species names.

Based on the Javanese material alone, Backer and Bakhuizen van den Brink Jr. (1965) recognized two main forms: a. *javanicum* — corolla 3–5.25 cm long; narrow part of corolla-tube exceeding the calyx, 1.5–2 cm; calyx strongly ribbed; segments often abruptly acuminate; style glabrous or almost so; b. *phlomooides* (*G. phlomooides* Benth.) — corolla 2.5–3 cm long, narrow part of corolla-tube whether or not longer than the calyx, 0.75–1.25 cm; calyx not very strongly ribbed; segments acute or subacuminate; style at the top with many long hairs.

As the same authors correctly pointed out, these two forms are connected by a long series of intermediate forms. It is especially true when a large collection of materials from various geographical regions are examined. Therefore, I conclude that *G. javanicum* Benth. is a polymorphic species.

3. *Gomphostemma scortechinii* Prain in J. As. Soc. Beng. 59 (1890) 315, 74 (1907) 724, in Ann. Roy. Bot. Gard. Calc. 3 (1891) 260, *pl.* 93; Ridl. Fl. Mal. Pen. 2 (1923) 653.

A coarse perennial herb, 60–150 cm high, erect, woody below. Stems sulcate, scabrid. Leaves herbaceous, elliptic-oblong or obovate, 20–30 cm long, 10–15 cm wide, acute, the base long-cuneate; margins entire or remotely serrate, sparingly hirsute above, densely tomentose on the nerves beneath; petioles usually short, 0.5–1 cm long, sometimes obsolete. Flowers about 20 in dense axillary false whorls; bracts subulate, 6–8 mm long; pedicels 8–10 mm long. Calyx 18–25 mm long, prominently ribbed, hirsute within; teeth lanceolate, longer than the tube. Corolla 30–60 mm long, distinctly incurved, tomentose externally. Style hirsute towards the apex, with spreading hairs; ovary densely villous. Nutlets smooth, hispid towards the apex, 8 mm long, 5.5 mm broad.

Types: Malay Peninsula: Kedah, G. Tuyok, *Scortechini 1225* (K, Type; Sing. isotype) Sept. 1884.

Distribution: Burma (Tenasserim) and Malesia (Sumatra and Malay Peninsula).

Ecology: In forest, at low to medium altitudes (300–1,500 m).

Specimens examined:

Sumatra: West Coast, alt. 1500 m. *Bunnemeijer 8414* (L); Indragiri, Pangian, *Buwalda 6258* (BO, L); Atjeh, G. Goh Lemboeh, alt. 1000 m, *Steenis 8927* (L) (Fl. leather yellow-orange).

Malaya: Pahang Bentong, Raub, *Best 14117* (Sing.); Kedah, Langkawi, G. Raya, *Cornier s.n.* Nov. 1941 (Sing.); Kedah, Langkawi, *Haniff & Nur 7138* (Sing.); Selangor, Semenyih, *Hume 7965* (Sing.); Kedah, *Kerr 21706* (BM); Kedah, G. Tuyok, *Scortechini 1225* (K, Type; iso-type, Sing.); Pahang, Bentong, Sabai Estate, *Shah 166* (K, L, Sing.); Selangor, Gua Batu Woods, *Ridley 8221* (Sing.); Selangor, Batu Cave Woods, *Ridley s.n.* Dec. 1896 (Sing.); Kelantan, Channing Woods, *Ridley s.n.* Feb. 1917 (K).

The type locality of this species was cited by Prain as Gunong Tuyok, Kedah. Ridley (l.c., p. 653), suggested it is probably meant for *G. Hijau*, on the top of the Taiping hills in Perak.

15. **HYPTIS** JACQ.

Hyptis Jacq. Collect. 1 (1787) 101, 103, *nom. cons.*; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1178; Briq. in E. & P. Pl. Fam. 4, 3a (1897) 333.

Mesosphaerum R. Br. Hist. Jamaica (1756) 257.

Herbaceous or shrubby, often aromatic. Leaves opposite, serrate. Flowers small or medium, variously arranged in densely spicate or densely capitate inflorescences or in few-flowered clusters, often secund; bracts subulate or setaceous. Calyx tubular, straight or oblique, 10-nerved; teeth 5, subequal, acute or awned, erect. Corolla 5-lobed, 2-lipped; upper lip 2-lobed, the lobes erect or spreading or reflexed; lower lip 3-lobed, the mid-lobe abruptly deflexed, with thickened margins, sometimes saccate at the base. Stamens 4, declinate; filaments free, without basal appendages; anther-locules confluent. Disk entire. Style subentire or shortly 2-fid. Nutlets oblong or ovoid, smooth or rugose sometimes only one or two developed.

Species over 350, all American; the following 5 species are more or less established in the Old tropical regions as weeds.

Key to the species

- A. Flowers in numerous flowered verticillasters, congested into globose or ellipsoid spurious heads (or dense-spikes).
 - B. Spurious heads axillary, globose or subglobose.
 - C. Spurious heads 0.8–1.2 cm (in fruit) across; peduncles usually not longer than the heads. 1. *H. brevipes*
 - C. Spurious heads 1.5–2 cm (in fruit) across; peduncles several times as long as the heads. 2. *H. rhomboidea*
 - B. Spurious heads (or dense spikes) terminal; oblong or ellipsoid, 3–5 cm (in fruit) long. 3. *H. spicigera*
- A. Flowers in few-flowered cymose clusters, axillary or in terminal spurious racemes or panicles.
 - B. Cymes 6–15-flowered, comb-shaped in terminal spurious racemes or panicles; calyx tubular, 3–4 mm long in fruit. 4. *H. pectinata*
 - B. Cymes 2–5-flowered, clustered in leaf-axils or racemosely disposed; calyx obliquely campanulate, 8–10 mm long in fruit. 5. *H. suaveolens*

1. **Hyptis brevipes** Poit. in Ann. Mus. Paris 7 (1806) 465; Benth. Lab. Gen. Sp. (1833) 105, in DC. Prodr. 12 (1848) 107; Miq. Fl. Ind. Bat. 2 (1858) 959; Hook. f. Fl. Brit. Ind. 4 (1885) 630; Prain in J. As. Soc. Beng. 74, 2 (1907) 704; Merr. Enum. Philip. 3 (1923) 416; Ridl. Fl. Mal. Pen. 2 (1923) 645; Kudo in Mem. Fac. Sc. Ag. Taihoku Un. 2, 2 (1929) 147; Mukerj. Rec. Surv. Ind. 14, 1 (1940) 62; Back. & Bakh. f. Fl. Java 2 (1965) 634. *Thymus biserratus* Blanco Fl. Filip. (1837) 478.

Pycnanthemum subulatum Blanco l.c. ed. 2 (1845) 333, ed. 3, 2 (1878) 251, t. 204.

Leucas globuligera Hassk. Cat. Bog. (1844) 133; Miq. Fl. Ind. Bat. (1859) 984. *syn. nov.*

Hyptis brevipes Poit. var. *serrata* Briq. in Ann. Cons. Jard. Bot. Geneve 2 (1898) 227.

An erect herb, 0.5–1 m high. Stems shortly branched, glabrous or pilose. Leaves membranaceous, narrowly lanceolate or ovate-oblong, 4–8 cm long, 1–2.5 cm wide, acute or acuminate, the base long cuneate, entire; margins elsewhere serrate, sparsely hispid on nerves on both surfaces; petioles 0.5–1 cm long, hispid. Flowers in dense spurious heads, 0.6–0.8 cm (0.8–1.2 cm in fruit) in diameter, on axillary, hispid slender peduncles, 1–1.2 cm long; subtending bracts lanceolate or subulate, 4–6 mm long, setaceous. Calyx subtubular, 2.5–3 mm (in fruit 3–4 mm) long; teeth erect, subulate, 1–1.4 mm long, sparsely ciliate. Nutlets ovoid, 0.7 mm long, dark brown, minutely rugose.

Distribution: A native of tropical America, now naturalized in tropical Asia and tropical Africa.

Distribution: A pantropic weed, native of Mexico.

Ecology: In open waste places of the lowland.

Vern. names: Ane-Ane (Sumatra), Koempai-hoeloeman (C. E. Borneo), Djoekoel pendoel (Java).

Specimens examined:

Sumatra: Loeboeksikaping, alt. 450 m, *Bunnemeijer 1225* (L); Bangka, alt. 60 m, *Bunnemeijer 1645* (L); Coast Koerintji, Koemantan, alt. 850 m, *Bunnemeijer 8124* (L); P. Siberoet, *Iboet 191* (L); Lampong, alt. 200 m, *Iboet 320* (L); Medan, alt. 15–20 m, *Lorzing 12888* (L); Bangko, Djambi, alt. 60 m, *Posthumus 511* (L); Karbouwengat, *Stomps s.n.* Sept. 1923 (L); Palembang, Sekajoe, alt. 15 m, *Thorenaar 150* (L); Laboehan, Kota Pinang, *Toroes 3651* (L); Tapianoeli, Padang Si Dempoean, Pandang Lawas, *Toroes 5069* (L); Soengie Pantjoer, *Wyssling s.n.* 1932 (L).

Malay Peninsula: Singapore, *Anderson 144* (K); Johore, Kg. Slantai, alt. 1.4 m, *Burkill & Shah 2495* (K, L); Malacca, *Griffith 3961* (K); Malacca, alt. 7 m, *Shah 16* (K, L); Singapore, Lim Chu Kang, *Sinclair s.n.* Jan. 1951 (L); Johore, *Spare 783* (K); Kedak, *Spare 3739* (K).

Java: Batavia, *Backer s.n.* 1902 (L); Poerwakarta, alt. 75 m, *Backer 89* (L); Tanah Biureum, *Backer 6023* (L); Pasoeroean, Djatirotto, alt. 15 m, *Backer 7829* (L); Djasinga, alt. 250 m, *Backer 10046* (L); Nirmala-tji Langgar, alt. 900 m, *Backer 11114* (L); Tjitjoeroeg Djampang, alt. 200–250 m, *Backer 17222* (L); Djember alt. 80–125 m, *Backer 17709* (L); Poeger, alt. 25 m, *Backer 18267* (L); Preanger, Tjikidang, alt. 600 m, *Bakhuizen v/d Brink 113* (L); Tjidadap, alt. 1000 m, *Bakhuizen v/d Brink 2557* (L); Batavia, Wanajasa, alt. 600 m, *Bakhuizen v/d Brink 4837* (L); Buitenzorg, Soekasari, *Burck s.n.* (L); Bantam, alt. 125 m, *Buwalda 2831* (L); Buitenzorg, *Hallier 281b, d & 282a* (L); (several collections); Semarang, Koedoes, *Houwing 14* (L); Semarang, alt. 15–20 m, *Houwing s.n.* 1925 (L); Banjosmas, Serajoe, *Kievits Banj. 39* (L); Banjoemas, *Kievits 2312 & 2481* (L); Banjoemas, alt. 15–20 m, *Kievits s.n.* 1924 (L); Java, *Kobus 7342* (L); Banjoemas, Pringombo, *Koorders 27119β* (L); Pekalongan, *Koorders 27451β* (L); Buitenzorg, Depok, *Koorders 31303β* (L); Batavia, Tjiampea, alt. 150 m, *Koorders 31475β* (L); Bogor, *Korthals s.n.* (L); Java, *Korthals s.n.* (L); Pakisan, *Kulescha 32* (L); Bogor, Djabaruu, alt. 260 m, *Nedi & Idjan 137* (L); Java, alt. 700 m, *Popta 225/66* (L); Buitenzorg, alt. 250 m, *Reap 15* (L); Batavia, Tjiliwong, alt. 250 m, *Schiffner 2471* (L); Batavia, Tjiliwong, alt. 240 m, *Schiffner 2494* (L); Buitenzorg, Horto Botanico, alt. 260 m, *Schiffner 2502* (L); Bogor, *Teysmann 107* (L); Tjidadap, alt. 3000 m, *Winckel 789* (L); Preanger, Tjadas Malang, alt. 1,000 m, *Winkel s.n. & 1355* (L).

Lesser Sunda Islands: Lombok, alt. null to 50 m, *Elbert* 2379 (L); Flores, alt. 1000–1200 m, *Elbert* 4314 (L).

Borneo: British North Borneo, *Agama* 466 (L); Mt. Kinabalu, Tenompok, alt. 1333 m, *Clemens* 30069 (L); Sandakan, *Elmer* 20158 (L); W. Koetai, *Ender* 2179 (L); Borneo, *Korthals s.n.* (L); Sarawak, Kampong Push, Sematan, alt. 17 m, *Purseglove & Shah* 4641 (L); Samarinda, *Roos s.n.* 1941 (L).

Philippines: Batangas, Mataasnakahoy, *Araney* 21 (L); Luzon, Sorsogon, Irosin, Mt. Bulusan, *Elmer* 1787 (L); Mindanao, Bukidnon, Tanulan, *Fenix* 26118 (L); Quezon, Bagong-bantay, *Manayon* 43 (L); Batangas, *Merrill* 478 (L); Luzon, Bataan, Lamao River, Mt. Mariveles, *Merrill* 3270 (L); Sto. Domingo, *Mundo* 17 (L); Mindanao, Cotabato, *Robinson* 11583 (L); Cotabato, Ala Valley, *Santos* 4813 (L); Bukidnon, Maramag, alt. 700 m, *Santos* 4995 (L); Iba Zambales, Barrio Amungan, Sitio Apulul, *Santos* 6107 (L); Iloilo, Sara, Mason son, *Soriano* 1252 (L).

Celebes: Malino, alt. 280 m, *Bunnemeijer* 10716 (L); Manado, Poso, *Eyma* 4051 (L); Manado, *Forsten* 84 (L); Manado, *Forsten* 69 (L); Tondano, *Forsten s.n.* May 1840 (L); Kendari, *Kjillberg* 373a (L); Minahassa, Menado, alt. *Koorders* 17381 β (L); Macassar, *Robinson* 2457 (L).

Moluccas: Ternate, alt. 2 m, *Beguín* 1052 (L); Ambon, alt. null m, *Kornasei* 1093 (L); Amboina, *Zippelius s.n.* (L).

New Guinea: Sepik, Wewak-Angoram Area, alt. 27 m, *Pullen* 1793 (L); Mamberamo, Pioneerbivouack, *Versteegh* 41 (L).

Leucas globuligera Hassk. is represented by the following specimen at Leiden Herbarium: *Herb. Lugd.*—*Bat.* 904, 356–446, which has been correctly identified by H. Hallier as *Hyptis brevipes* Poit. 2. ***Hyptis rhomboidea*** Mart. & Gal. in Bull. Acad. Bru. 11, 2 (1844) 188; Epling in Kew Bull 1936 (1936) 278.

Hyptis capitata (non Jacq.) Miq. Fl. Ind. Bat. 2 (1858) 958; F.-Vill. Novis App. (1880) 164; Merr. Enum. Philip. Fl. Pl. 3 (1923) 416; Kudo in Mem. Fac. Sc. & Ag. Taihoku Un. 2, 2 (1929) 147; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 63; Back. & Bakh. f. Fl. Java 2 (1965) 634.

Hyptis decurrens (Blanco) Epling in Fedde, Peper. 34 (1933) 120.

Pycnanthemum decurrens Blanco, Fl. Filip. ed. 2 (1845) 333, ed. 3, 2 (1878) 251, t. 294.

Hyptis celebica Zipp. ex. Koord. in Meded.'s Lands Plantent. 19 (1898) 561. *syn. nov.*

Hyptis lanceolata (non Poit.) Briq. in Ann. Cons. Jard. Bot. Geneve 2 (1898) 225 (quoad *Cuming* 591).

A stout, erect annual herb, 0.5–1.5 m high; non aromatic. Stems and branches (often very short) densely or sparsely pubescent on the angles. Leaves lanceolate or rhomboid-elliptic, 6–10 (–14) cm long, 1.5–4 (–6) cm wide, acute or acuminate, the base cuneate and decurrent; margins crenate-serrate or serrate, sparsely pubescent on the nerves of lower surfaces; petioles 2–3 cm long. Flowers numerous in verticils crowded forming axillary, solitary globulate heads, 0.8–1 cm (1.5–2 cm in fruit) in diameter; peduncles 3–5 (–8) cm long; basal involucre bracts linear-lanceolate, hairy, 3–6 mm long. Calyx 3–4 mm (6–8 mm in fruit) long; teeth subulate, erect, as long as or shorter than the tube. Corolla 5–6 mm long. Nutlets ovoid, compressed 1.2–2 mm long, round-truncate above, subtriquetrous below, sparingly puberulent.

15

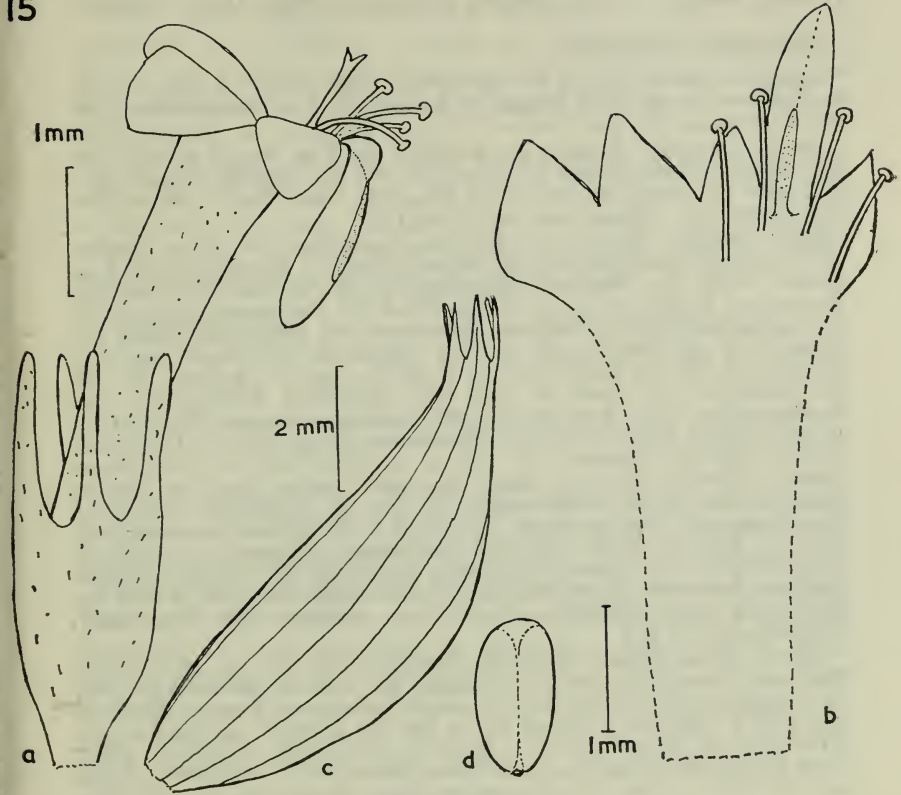


Fig. 15. *Hyptis rhomboidea* Mart. & Gal.

a. flower; b. corolla expanded; c. fruiting calyx; d. nutlet (fresh material).

Distribution: A native of tropical America, naturalized in many parts of the tropics.

Ecology: In open waste places, a common weed.

Vern. names: Sawa hdijkje (Java); Oaga bini (Brunei) Tembuku-tembuku, Dan buku napsu (N. Borneo); Timan-Timan (Borneo); Abgoanam, Tatabak, Ilite bubung, Merara welana (Lesser Sunda); Aring Kaming (Celebes); Pupu (New Guinea).

Specimens examined:

Sumatra: Riau, alt. 20 m, *Bünnemeijer* 5970 (L); P. Lingga, alt. 30 m, *Bünnemeijer* 6672 (L); Lingga, P. Sinkep, alt. 5 m, *Bünnemeijer* 7234 (L); Palembang, alt. 3 m, *Raadt* 13 (L).

Malay Peninsula: Pangkor Is., Pangkor, alt. 7 m, *Burkill & Shah* 284 (L); Kuala Lumpur, *Monod de Froideville* 646 (L); Pahang, Fraser's Hill, alt. 1400 m, *Purseglove* 4253 (L); Singapore, Ama Keng Village, Lim Chu Kang Road, *Sinclair s.n.* Jan. 1951 (L).

Java: Batavia, *Backer s.n.* 1902 (L); Pasoeroean, alt. 20 m, *Backer* 7973 (L); Soekaboemi, alt. 600 m, *Backer* 14528 (L); Pekalongan, alt. 5 m, *Backer* 15468 (L); Madoera, Soemenap, alt. 25 m, *Backer* 21249 (L); Pasoeroean, Bangil, alt. 20 m, *Backer* 37465 (L); Pasoeroean, Kepoch, alt. 75 m, *Backer* 37691 (L); Batavia Tjikeumeuh, alt. 250 m, *Bakhuizen v/d Brink* 3659 (L); Batavia, alt. 250 m, *Bakhuizen v/d Brink* 9518 (L); Batavia, alt. 325 m, *Bakhuizen v/d Brink Jr.* 1040 (L); Batavia, alt. 250 m, *Bakhuizen v/d Brink Jr.* 1976 (L); Buitenzorg, *Boerlage s.n.* (L); Bawean Is. alt. 2 m, *Buwalda* 3353 (L); Soerabaja *Dorgelo* 142 (L); Cult. in Hort. Bogor, *Hallier D* 284 (L); Soekaboemi, *Hoed* 3010 (L); Banjoemas, *Kievits* 1769 (L); Batavia, alt. 150 m, *Koorders s.n.* (L); Pekalongan, Soebah, *Koorder* 36904 (L); Bogor, Batutapak, Sedane River, alt. 260 m, *Nedi & Idjan* 15 (L); Buitenzorg, alt. 240 m, *Ooststroom* 13898 (L); Boeabatoe, alt. 700 m, *Popta* 174/45 (L); Soekalilah, Soerabaja, alt. 1-5 m, *Rant & Coert* 221 (L); Buitenzorg, Tjibogen, alt. 250 m, *Schiffner* 2477 (L); Batavia, Kampong Nangrang, alt. 250 m, *Schiffner* 2407 (L); Buitenzorg, horto botanico, alt. 250 m, *Schiffner* 2484 & 2868 (L); Buitenzorg, horto botanico, alt. 260 m, *Schiffner* 2498 (L); Bogor, *Soegandredja* 71 (L).

Lesser Sunda Islands: Lombok, Mataram, alt. 500 m, *Bloembergen* 3024 (L); Timor, Kp. Bioba, G. Timaoe, alt. 1300 m, *Bloembergen* 3380 (L); Sumbawa, Bima, *Colfs* 208 (L) (several collections); Lombok, Rindjani, alt. 0-20 & 500-700 m, *Elbert* 560 & 764 (L); Lombok, G. Rindjani, alt. 1185-1265 m, *Elbert* 1567 (L); Sumbawa, Bima, alt. 75-250 m, *Elbert* 3540 (L); Sumbawa, Bima, alt. 75-250 m, *Elbert* 3540 (L); Sumbawa, Bima, alt. 100-300 m, *Elbert* 3587 (L); Soemba, Mao Marroe, *Iboet* 461 (L); Alor, alt. 300 & 500 m, *Jaag* 147 & 1339 (L).

Borneo: North Borneo, Pemblingan, *Amadjah* 838 (L); North Borneo, Pemblingan, *Amadjah s.n.* (L); Sarawak, *Brooke* 9844 (L); Sarawak, *Brooke* 10649 (L); North Borneo, Kinabalu, alt. 1700 m, *Clemens* 28884 (L); North Borneo, Sandakan, *Cuadra A* 2384 (L); Pontianak, alt. 6 m, *Ench* 353 (L); North Borneo, Sandakan, *Kadir A* 1660 (L); North Borneo, Sandakan, *Kadir A* 2687 (L); Borneo, *Korthals s.n.* (L) (several collections).

Philippines: Batangas, Mataasnakahay, *Aranez* 19 (L); Luzon, Camarines Sur, Pili, Carambola, *Convocar* 2963 (L); Luzon, Lagona, *Cuning* 591 (L); Luzon, Sorsogon, Irosin, Mt. Bulsan, *Elmer* 14380 (L); Rizal, Montalban, *Gongales* 60 (L); Rizal, Antipolo, *Guia* 62 (L); Luzon, Albay, Mayon Volcano, alt. 600 m, *Memdoza* 1383 (L); Luzon, Rizal Antipolo, *Merrill* 472 (L); Luzon, Rizal Ramos 1944 (L); Sulu, Turtle Island, *Santos* 4760 (L); Bukidnon, Maramag, alt. 270 m, *Santos* 4996 (L); Malaybalay Bupiduon, Barrio Sumpung, alt. 650 m, *Santos* 6029 (L); Luzon, Laguna, Mt. Maquiling, *Servinas* 16294 (L).

Celebes: Menado, G. Ngilalaki, alt. 1,000 m, *Bloembergen* 4109 (L); Bonto Parang, alt. 50 m, *Bünnemeijer* 10560 (L); Kabajana, alt. null to 200 m, *Elbert* 3410 (L); Masamba, alt. 400 m, *Eyma* 1128 (L); Menado, Poso, alt. 1,250 m, *Eyma* 1690 (L); Goeroepahi, alt. 600 m, *Kaudern* 60 (L); Minahassa, Menado, S. H. *Koorders* 17373, 17374, 17378 17380 (L); Talaud, P. Karakelong, alt. 5 m, *Lam* 2496 (L); Minahassa, alt. 300 m, *Lam* 2419 (L); Menado, alt. 1,200 m, *Posthumus* 2303 (L); Celebes, *Rant* 906 (L).

Moluccas: Morotai, alt. 10 m, *Anang 194* (L); Ternate, *Atasrip 17* (L); Aroe, Dobo, alt. *Buwalda 4842* (L), Ceram, Kp. Kiandarar, alt. for m., *Buwalda 5829* (L); Ceram, Wahai, alt. 100 m, *Kaornassi 19* (L); Ambon, alt. 0 m, *Kornassi 1093 a* (L); Ternate, alt. 1,400 m, *Pleyte 58* (L); Saparoea, *Reinwardt, s.n.* (L); Ceram, alt. 50 m, *Rutten 1612* (L); Ambon, *Saanan 39* (L); Ternate, *Teymann 7456* (L).

New Guinea: Morobe, *Brass 32512* (K); Madang, alt. 125 m, *Hoogland 4856* (L); Fakfak, *Kalkman 6350* (K, L); Amboina, *Robinson 2002* (L); New Britain, Gazelle Peninsula, alt. 70 m, *Womersley & Jones 8789* (L).

This weed generally recorded as *Hyptis capitata* Jacq. in literature, is extensively distributed in the Malesian region. Epling first referred it to *Hyptis decurrens* (Blanco) Epling, but later identified it as *Hyptis rhomboidea* Mart. & Gal. His later identification is accepted here.

The following specimens have been referred to *Hyptis lanceolata* Poit. by Briquet and to *H. celebica* Zoll. by Koorders respectively: *Cuming 591* from the Philippines, and *Koorders 17373, 19374, 17378 & 17380* all from Celebes. They are indistinguishable from *H. rhomboidea* Mart. & Gal.

3. *Hyptis spicigera* Lam. Encycl. 3 (1789) 185; Benth. in DC. Prodr. 12 (1848) 87; Miq. Fl. Ind. Bat. 2 (1858) 958; Merr. Enum. Philip. 3 (1923) 417.

Pycnanthemum elongatum Banco. Fl. Filip. ed. 2 (1845) 333, ed. 3, 2 (1878) 252.

An erect annual herb, 1–1.5 m high. Stems scabrous: branches glabrous or only slightly pubescent. Leaves herbaceous, lanceolate to elliptic-lanceolate, 2.5–6 cm long, 1.2–3 cm wide, acute or acuminate, the base acuminate, decurrent; margins serrulate, glabrous or glabrescent on both surfaces; petioles 0.5–2.5 cm long. False whorls many-flowered, forming dense spike-like or head-like inflorescence, 1–1.5 cm (in fruit 3–4.5 cm) long, terminal and in upper leaf-axils; bracts subulate, 3–4 mm long, setaceous. Calyx tubulate, 4–5 mm (in fruit 6–7 mm) long, ribbed, reticulate; teeth subulate, 2 mm long, setaceous. Nutlets ellipsoid, compressed, 1.2 mm long, finely granulate.

Distribution: A native of tropical America, now widely spread in several parts of Malesia (Lesser Sunda Islands, Borneo, the Philippines, Celebes, Moluccas) and in Marianne Islands.

Ecology: In open dry grasslands.

Specimens examined:

Lesser Sunda Islands: Timor, *Riedel s.n.* June 1883 (K); Soemba, *Teysmann s.n.* (L).

Borneo: Borneo, *Korthals* (several collections) (L); Bandjermasin, *Motley 417* (K).

Philippines: Palawan, *Bermejor 188* (K); Mindanao, Davao, *Copeland 540* (K); Quezon City, *Guia 28* (L); Luzon, *Loher s.n.* (K); Sto. Domingo, *Mendo 2*, (L); Luzon, Bataan, Mt. Marivales, Lamao River, *Merrill 3293* (K, L); Luzon, Rizal, Antiopolo, *Merrill sp. Blanco 108* (K, L); Luzon, Zambales, Anuling, *Ramos & Edano 44701* (L); Philippines. *Vidal 3469 & 3496* (K); Luzon, Bataan, Whitford s.n. 1904 (K).

Celebes: Baeolo, alt. 900 m, *Bünnemeijer 12571* (L); Muna, alt. 0–125 m, *Elbert 2897* (K, L) & *7065* (L); Buton, alt. 0–75 m, *Elbert 2595* (L); Lasao, alt. 100 m, *Kjellberg 1175* (L); Kp. Mara, *Noerkas 216* (L) (two collections).

Moluccas, Boeroe, *Teymann s.n.* 1859–1860 (L).

4. **Hyptis pectinata** (Linn.) Poit. in Ann. Mus. Paris 7 (1806) 474, t. 30; Benth. Lab. Gen. & Sp. (1833) 127; Miq. Fl. Ind. Bat. 2 (1858) 960; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 46; Back. & Bakh. f. Fl. Java 2 (1965) 634.

Nepeta pectinata Linn. Syst. Nat. ed. 10 (1759) 1097.

Erect perennial herb, often shrubby, 0.5–1 m or more high. Stems and branches glabrous or pubescent. Leaves herbaceous, ovate or elliptic, 2–3 cm long, 1–1.5 cm wide, acute or acuminate, the base rounded or truncate, entire; margins elsewhere serrate or more often crenate, glabrous or glabrescent above, sparsely or densely tomentose and glaucous beneath. Spurious racemes 4–8 (–15) cm long, consisting of 10 to many secund cymes, densely congested toward apex, generally forming large, terminal panicles; cymes 6–15-flowered, subcapitate, secund, pectinate, incurved; bracts crinite and setaceous. Calyx tubular, 2–2.5 mm (in fruit 3–4 mm) long, tomentose; teeth subulate, setaceous, slightly longer than the calyx-tube. Corolla 3–3.5 mm long. Nutlets small, oblong, 1.5–2 mm long, smooth, black.

Distribution: A native of American tropics, now occurs in many parts of the world.

Ecology: In open waste places.

Specimens examined:

Java: Java, *Backer s.n.* 1902 (L); Batavia, *Backer s.n.* 1903 (L); Soekaboemi, alt. 400 m, *Backer 14854* (L); Soekaboemi, alt. 500 m, *Backer 21439* (L); Batoetoelis, alt. 350 m, *Backer 22061* (K, L); Buitenzorg, Tegal Sapi, alt. 240 m, *Bakhuizen v/d Brink Jun. 1014* (K, L); Buitenzorg, *Boerlage s.n.* (L); Depok, *Burck & Monchy s.n.* (L); Buitenzorg, *Hallier 283 a & b s.n.* (L) Bogor, *Hallier 285* (L); Buitenzorg, Tjikopoh, alt. 1,600 m, *Hoed 3182* (L); Depok, *Koorders 31131* (L); Bandoeng, alt. 800 m, *Popta 249/76* (L); Bandoeng, alt. 700 m, *Popta 757/216* (L); Bantardjati, *Raap 536* (L); Batavia, Tjiliwung, alt. 250 m, *Schiffner 2483* (L); Buitenzorg, Tjiliwung, alt. 240 m, *Schiffner 2492* (K, L).

5. **Hyptis suaveolens** (Linn.) Poit. in Ann. Mus. Paris 7 (1806) 472, t. 29, f. 2; Benth. Lab. Gen. & Sp. (1833) 124, in DC. Prodr. 12 (1848) 126; Miq. Fl. Ind. Bat. 2 (1858) 959; Hook. f. Brit. In. 4 (1885) 630; Prain, in J. As. Soc. Bengal 74, 2 ext. no. (1907) 705; Ridl. Fl. Mal. Pen. 2 (1923) 645; Merr. Enum. Philip. Fl. Pl. 3 (1923) 417; Kudo in Mem. Fac. Sc. & Ag. Taihoku Un. 2, 2 (1929) 147; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 63; Back. & Bakh. f. Fl. Java 2 (1965) 634.

Ballota suaveolens Linn. Syst. Nat. ed. 10 (1759) 1100.

Bysteropogon graveolens Bl. Bijdr. (1826) 824.

Marrubium indicum (non Burm. f.) Blanco Fl. Filip. (1837) 477, ed. 2 (1845) 352.

A strongly aromatic, much-branched herb, 0.5–1.5 m high. Stems hirsute, 4-angled. Leaves firmly herbaceous, ovate to broadly obovate, 3–5 cm long, 2–4 cm wide, subacute; base rounded, truncate, often slightly oblique; margins irregularly serrulate; sparsely pilose above, densely pubescent beneath; petioles slender, 0.5–3 cm long, sparsely pubescent. Flowers in

lax, 2-5-flowered, secund cymes, arranged racemously towards ends of branches in the axils of smaller leaves; peduncles pubescent, 0.5-1 cm long; bracts minute, setaceous. Calyx campanulate, 5-5.5 mm (in fruit 8-10 mm) long, strongly ribbed; mouth villous; teeth erect, setaceous. Corolla blue; tube slender. Nutlets narrowly oblong, 1.2-1.5 mm long, often emarginate at the top, faintly rugose.

Distribution: Tropical America; introduced and widely spread in tropical Asia and Africa.

Ecology: A weed in open and dry waste places at low and medium altitudes.

Vern. names: Selasie (Sumatra).

Specimens examined:

Sumatra: Serdang, alt. 2 m, *Lorzing 13406* (L); Pajakumbuh, Indarug, *Meijer 6002* (L); Palembang, alt. 20 m, *Verboom 5* (L); Painan, alt. few m, *Waalkes 1701* (L).

Malay Peninsula: Port Dickson, *Monod de Froideville 717* (L); Selangor, Kanching, alt. low, *Nur 34414* (L); Singapore, Potong Pasir, *Sinclair s.n.* Dec. 1948 (L).

Java: Pasoeroean, alt. 10-15 m, *Backer 7544* (L); Besoeki, alt. 1 m, *Backer 37066* (L); Soerabaja, alt. 1 m, *Backer 37300* (L); Besoeki, alt. 5 m, *Backer 37690* (L); Djombang, *Bovien no. Djomb 14* (L); Besoeki, Poeger, alt. 1 m, *Buwalda 7167* (L); Besoeki, Sitoebondo, *Buwalda 7414* (L); Kediri, *Coert 1701* (L); Besoeki, alt. 10 m, *Dillewijn s.n.* 1928 (L); Soerabaja, *Dorgelo 134* (L); Soerabaja, alt. 15 m, *Dorgelo 392* (L); Soerabaja, alt. 15 m, *Dorgelo 535* (L); Semarang, alt. 15-20 m, *Houwing s.n.* 1924 (L); Bandoeng, *Karsten 14* (L); Garoet, G. Goentoer, alt. 1,000 m, *Karsten 51* (L); Bogor, alt. 250 m, *Kern 7278* (L); Banjoemas, *Kievits no. Banj. 29* (L); Bangjoemas, *Kievits 1501* (L); Banjoemas, *Kievits 2541* (L); Sumbing, alt. 1,300 m, *Lorzing 177* (L); Bogor, Tjiomas, *Nedi & Idjan 206* (L); Buitenzorg, alt. 240 m, *Ooststroom 12552* (L); Buitenzorg, Kuripan, *Ooststroom 13761* (L); Bandoeng alt. 700 m, *Popta 833/240* (L); Batavia, alt. 230 m, *Schiffner 2467* (L); Batavia, alt. 250 m, *Schiffner 2482* (L); Anjer, *Visser CI 3401* (L).

Philippines: Malaybalay, Bukidnon, *Santos 6048* (L); Luzon, Quezon, lowland, *Villaflor 37540* (L).

New Guinea: Papua, *Brass 1172* (K); Papua, *Carr 12384* (K); Morobe, *Heutz 11698* (K).

16. LEONURUS LINN.

Leonurus Linn. Gen. Pl. ed. 5 (1754) 254, Sp. Pl. (1753) 584; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1210; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 256.

Erect herbs. Leaves opposite, often lobed or dissected. Bracts subulate. Calyx turbinate, 5-nerved and 5-toothed, the teeth more or less equal, spinescent, spreading. Corolla naked or annulate within, 2-lipped; upper lip entire, erect; lower lip 3-lobed, the mid-lobe very large, deeply notched. Stamens 4, in 2 pairs, ascending under the upper lip; lower pair slightly

longer; anthers 2-loculate, the locules parallel, transverse, connivent. Disk uniform. Style equally 2-fid, the branched obtuse or subulate. Nutlets dry, smooth, triquetrous, truncate at the apex.

Species about 8, mainly in temperate regions of Asia and Europe; 1 extended into tropics as a weed, sometimes cultivated as a garden plant.

1. **Leonurus sibiricus** Linn. Sp. Pl. (1753) 584; Bl., Bijdr. (1826) 823; Benth. in DC. Prodr. 12 (1848) 501; Miq. Fl. Ind. Bat. 2 (1859) 978; Prain in J. As. Soc. Bengal 74, 2 (1907) 720; Ridley, Fl. Mal. Pen. 2 (1923) 651; Merr. Enum. Philip. 3 (1923) 412; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 193; Back. & Bakh. f. Fl. Java 2 (1965) 623.

Stachys artemisiae Lour. Fl. Cochinch. (1790) 365; Blanco, Fl. Filip. (1837) 476.

Annual or perennial herb. Stems 4-angled, furrowed, softly pubescent or glabrescent, 1–1.5 m high. Leaves chartaceous, the upper ones linear, 4–5 cm long, the lower and basal ones ovate or deltoid in outline, 5–7 cm long, 3–4.5 cm wide, palmately partite or dissected, with linear incised segments, glabrous or glabrescent above, often glaucous and pubescent on the nerved beneath; petiole 2–4 cm long. Flowers in axillary false-whorls; bracts subulate or spinescent, 0.4–1.0 cm long. Calyx turbinate, 4–5 mm (in fruit 6–7 mm) long, glabrous or sparingly pubescent; teeth 5, subulate. Corolla 10–11 mm long; tube often obliquely annulate within; limb 2-lipped; upper lip erect, obovate, entire, pubescent externally; lower lip 3-lobed, the mid-lobe obcordate, pubescent. Filaments included, epicorolline. Nutlets ellipsoid, 2 mm long, truncate above.

Distribution: A native of temperate Asia, now distributed in many warm and tropical countries.

Ecology: Sometimes cultivated as a garden plant occasionally escaped.

Vern. names: Si Saratting (Sumatra); Tebung Aga, Seranting (Malay Peninsula); Kamariang-songsong (Philippines).

Specimens examined:

Sumatra: E. Coast, Asahan, *Rahmat Si Boeea* 8386 (K).

Malay Peninsula: Malacca, Chenana Puteh, *Alvins* 966 (Sing.); Selangor, Klang, *Burkill* 1288 (Sing.); Perak, Ampang, *Burkill* 13949 (Sing.); Pahang, Pekan, *Burkill & Haniff* 17135 (Sing.); Malacca, *Griffith* 1845 (K); Kelantan, Kota Bharu, *Jupp* 257 (K); Pahan, Pekan, *Ridley* 1164 (Sing.); Selangor, Pudok, *Ridley* 10462 (Sing.); Singapore, Foot of Bukit Piatu, *Sinclair* 38857 (Sing.).

Java: Batavia, *Backer s.n.* July 1904 (K. Sing.); Java, *Horsfield s.n.* (K); Ngadisari, alt. 2,000 m, *Koorders* 37613 (K).

Borneo Sarawak, *Hullett* 376 (Sing.).

Philippines: Luzon, *Cuming* 706 (K); Luzon, *Loher* 4213 (K); Laguna, *Loher* 6686 (K); Luzon, Rizal, San Mateo, *Merrill Sp. Blanco* 947 (K).

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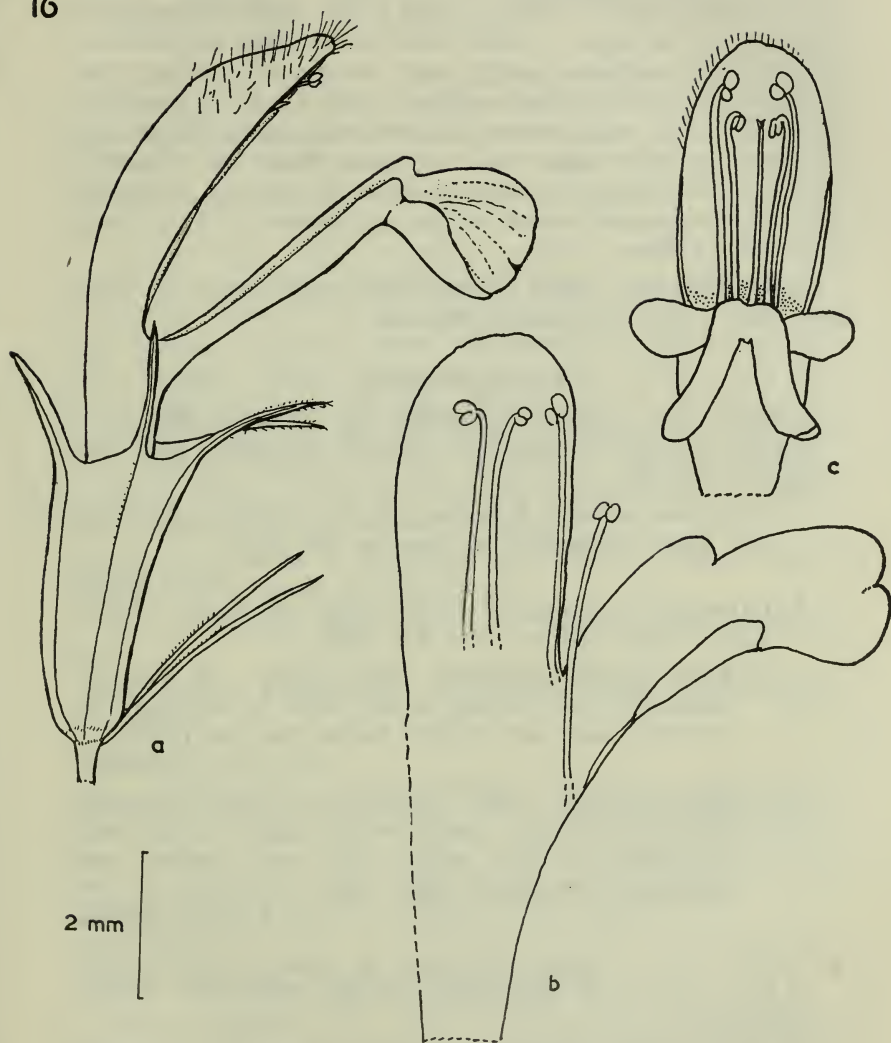


Fig. 16. *Leonurus sibiricus* Linn.

a. flower; b. corolla expanded; c. corolla, seen from above, showing the style and stamens (fresh material).

17. LEUCAS R. BR.

Leucas R. Br. Prodr. (1810) 504; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1213; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 250.

Herbs or undershrubs. Stems and leaves often villous. Flowers medium or small, in dense axillary, distant false whorls; sometimes forming terminal, capitulate clusters. Calyx 8–10 nerved, often striate; mouth equal or oblique; teeth 8–10, usually unequal, the posterior one the largest. Corolla-tube slender, often not exerted, annulate or not within; upper lip erect, concave, the margins often fringed with dense velutinous hairs; lower lip 3-fid, spreading, the mid-lobe very large. Stamens 4, didynamous; upper pair shorter; all ascending under upper lip, the locules divaricate, ultimately confluent. Disk entire or lobed, uniform or enlarged anteriorly. Style subulate; upper branch minute or obsolete. Nutlets ovoid, triquetrous, obtuse.

Species about 60, chiefly in warm and tropical parts of Africa and Asia; about 6 species in Malesia.

Key to the species

- A. Verticils few, usually congested into terminal cluster or clusters; mouth of calyx-tube oblique, the upper part projected forwards.
 - B. Calyx-tube tubular, 8–9 mm long (in flower); calyx-teeth 10; bracts lanceolate, as long as the calyx.
 - 1. *L. aspera*
 - B. Calyx-tube turbinate, 5–7 mm long (in flower); bracts linear, much shorter than the calyx.
 - C. Plant usually hispidous; leaves elliptic or narrowly lanceolate; calyx-mouth open; teeth 8, subequal, the posterior one only slightly larger than the others.
 - 2. *L. zeylanica*
 - C. Plant usually finely puberulous; leaves generally linear lanceolate; calyx-mouth often constricted, especially in fruit; teeth 5–9, very unequal, the posterior one much longer than the others.
 - 3. *L. lavandulifolia*
- A. Verticils few to many, distributed in distant nodes; mouth of calyx-tube not or only slightly oblique; plants often densely tomentose.
 - B. Calyx usually hispidous or hoary on the ribs; corolla-tube barely exerted.
 - C. Calyx-teeth lanceolate; corolla-tube obliquely annulate within; two lips almost equal in length.
 - 4. *L. javanica*
 - C. Calyx-teeth subulate; corolla-tube not annulate within; lower lip much longer than the upper one.
 - 5. *L. mollissima*
 - B. Calyx tomentose or sparingly puberulent; corolla-tube long-exserted, annulate within.
 - 6. *L. flaccida*

1. *Leucas aspera* (Willd.) Link. Enum. Hort. Berol. 2 (1822) 113; Spreng. Syst. 2 (1825) 743; Benth. Lab. Gen. & Sp. (1834) 615, in DC. Prodr. 12 (1848) 532; Miq. Fl. Ind. Bat. 2 (1859) 982; Hook. f. Fl. Brit. Ind. 4 (1885) 690; Merr. Enum. Philip. Fl. Pl. 3 (1923) 410; Back. & Bakh. f. Fl. Java 2 (1965) 623.

Phlomis aspera Willd. Enum. Hort. Berol. 2 (1809) 621.

Leucas minahassae Koorders in Kord.-Schum. Syst. Verz. 3 (1914) 112 *nom. nud.* (*syn. nov.*)

Annual herb, 30–60 cm high, often branched. Stems and branches hispidous, with spreading hairs. Leaves membranaceous, linear-lanceolate, or narrowly lanceolate, 4–6 cm long, 0.8–1 cm wide, acuminate, the base attenuate, the margins remotely crenate, tomentose on both surfaces, pilose on nerves; petioles 0.5–1 cm long, densely hispidous. Flowers sessile, in terminal false whorls, forming globular head, 1.5–2.5 cm across; bracts narrowly lanceolate, 8–10 mm long, ciliate along the margins. Calyx 8–10 mm (only slightly accrescent in fruit) long, cylindric, the tube pilose, 10-nerved and 10-toothed, the mouth strongly oblique, the teeth erect, the posterior one the longest. Corolla 15–16 mm long, strongly curved, annulate near the middle; upper lip 2 mm long, densely velutinous, the lower lip 6 mm sparsely pubescent. Nutlets narrowly ovoid, 2.5 mm long, 0.8 mm broad, the ventral surface triquetrous, the dorsal rounded, finely granulate or nearly smooth, black.

Distribution: India to Mauritius and Malesia (Malay Peninsula, Java, Celebes and the Philippines).

Ecology: A weed often in open dry sandy soil and in waste places.

Vern. names: Karukansoli, Pansi-pansi, Sipsipa, Sulasulasipan (Philippines).

Specimens examined:

Java: Batavia, *Backer s.n.* Jan. 1903 (L); Ngawi, alt. 50 m, *Backer 6670* (L); Madioen, alt. 60 m, *Backer 6897* (L, Sing.); Pasoeroean, *Backer 7733 & 8023* (L); Besoeki, alt. 5 m, *Backer 8148* (L); Kediri, alt. 100 m, *Backer 11626* (L); Madoera, alt. 200 m, *Backer 19514 & 20395* (L); Pasoeroean, alt. 25 m, *Backer 37499* (L); Pasoeroean, *Dorgelo 31* (L); Semarang, *Houwing 446* (L); Semarang, *Koorders 25363* (L).

Philippines: Luzon, Manila, *Merrill 1350* (L, Sing.); Luzon, Manila, *Merrill 5626* (L).

Celebes: Minahassa, Manado, *Koorders 17382* (L).

2. *Leucas zeylanica* R. Br. in W. T. Aiton, Hort. Kew. ed. 2, 3 (1811) 409; Spreng. Syst. 2 (1825) 742 (*ceylonica*); Benth. Lab. Gen. & Sp. (1834) 614, in DC. Prodr. 12 (1848) 531; Miq. Fl. Ind. Bat. 2 (1859) 982; Hook. f. Fl. Brit. Ind. 4 (1885) 689; Hallier f. in Bull. Cerb. Boiss. 6 (1898) 617; Prain in J. As. Soc. Beng. 74, 2 (1907) 718; Merr. Enum. Philip. 3 (1923) 411; Ridl. Fl. Mal. Pen. 2 (1923) 650; Back. & Bakh. f. Fl. Java 2 (1965) 623.

Phlomis zeylanica Linn. Sp. Pl. (1753) 586.

Leucas bancana Miq. Fl. Ind. Bat. suppl. (1861–62) 572.

Leucas malayana Hance in Walp. Ann. Bot. Syst. 3 (1852–53) 269.

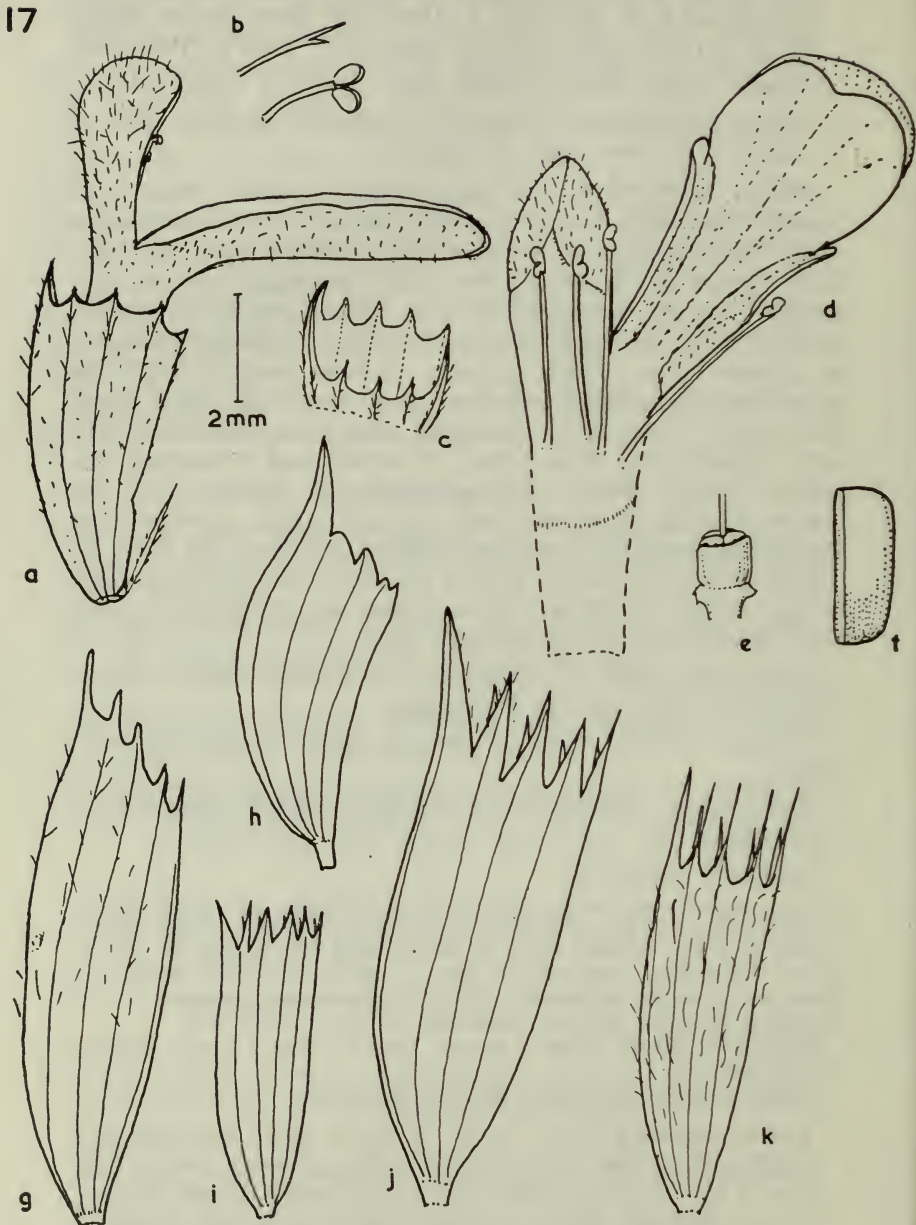


Fig. 17. *Leucas zeylanica* R. Br. (a-f) and the calyx of other species.

a. flower; b. style and stamen (upper portions); c. calyx (upper portion); d. corolla expanded; e. ovary and cup-shaped nectary disc; f. nutlet; g. *L. aspera*; h. *L. lavandulifolia*; i. *L. flaccida*; j. *L. javanica*; k. *L. mollissima*. (a-f, fresh material; g. Backer 11626; h. de Wit 3951; i. Eyma 306; j. Backer 3003; k. Merrill 11539).

Annual herb, 20–60 cm high, often branched. Stems and branches hispid. Leaves membranaceous, lanceolate, 4–5.5 cm long, 1–1.3 cm wide, acuminate, the base attenuate, entire; margins elsewhere remotely serrate, hirsute on both surfaces; petioles 0.2–0.8 cm long, hispid. Flowers subsessile, in terminal false-whorls, usually 6–8 forming a globular head, 1.5–2 cm across, occasionally also axillary false-whorls occur below; bracts linear, 4–5 mm long, spinescent. Calyx turbinate 5–6 mm (in fruit 7–8 mm) long, slightly curved, hispid, 10-nerved and 8-toothed; the mouth slightly oblique, pubescent within; the uppermost tooth slightly longer than the rest. Corolla 8 mm long, the tube annulate near the middle; upper lip obovate, white-woolly; lower lip patent, 3–4 mm long, 3-lobed. Nutlets obovoid, 3 mm long, 1 mm broad, apex truncate; ventral surface angular, dorsal rounded; smooth.

Distribution: Throughout southern and south-eastern Asia.

Ecology: In open grasslands at low altitudes, sometimes as a weed.

Vern. names: Ketumbit (Malay Peninsula); Guma-guma, masibulan (Philippines).

Specimens examined:

Sumatra: Simaloer, *Achmad* 683 (L); Atjeh, *Asdat* 162 (L); Asahan, *Bartlett & Rue* 51 (L); W. Coast, *Borssum Waalkes* 1647 (L); Banka, *Muntok, Bünnemeijer* 1477 (L); G. Malintang, alt. 800 m, *Bünnenmeijer* 3807 & 4445 (L); Riouw Arch., *Bünnemeijer* 5990 (L); P. Bintan, *Bünnemeijer* 6112 (L); Lingga Arch., *Bünnemeijer* 6869 (L); Palembang, *Monod de Froideville* 534 (L); E. Coast, *Surbeck* 347 (L).

Malay Peninsula: Pangkor Isl., *Dindings, Burkill & Shah* 277 (K, L, Sing.); Johore, P. Pisang, *Burkill & Kiah* 647 (L, Sing.), *Penang Curtis* 409 (Sing.); Johore, Jason Bay, *Corner* 28531 (K, Sing.); Pahang, Pekan, *Evans s.n.* July 1917 (K); Perak, Taiping, *Henderson* 10292 (Sing.); Perak, Lima Blus Estate, *Reed* 5 (Sing.); Singapore, *Robinson* 5708 (K); Selangor, *Seimund s.n.* June 1921 (K); Malacca, *Shah* 31 (K, L, Sing.); Singapore, *Sinclair* 39143 (L); S. Johore, *Spare F* 749 (K); Lumut, *Dindings, Strugnell* 27082 (L); Kelantan, G. Kedah, *Symington* 37955 (Sing.).

Java: Banten, *Adelbert s.n.* 1954 (L); Karangampel, *Backer* 16793 (L); Madoera, *Backer* 18997 & 19854 (L); Besoeki, *Backer* 37069 & 37196 (L); Buitenzorg, alt. 250 m, *Bakhuizen v/d Bring* 1941 (L); Butenzorg, *Hallier* 171 a (L); Semarang, *Karta* 220 & 418 (L); Java, *Kievits s.n.* Sept. 1923 (L); Banjoemas, *Kievits* 2523 (L); Bagelen, *Koorders* 26225 (L); Tegal, *Winckel s.n.* Oct. 1917 (L).

Lesser Sunda Islands: Kisar, *Bloembergen* 3857 (L); Lombok, *Elbert* 601 (L).

Borneo: Sandakan, *Emler* 20235 (L); Soeka Lanting, *Hallier* 57 (L); Sandakan, *Kadir* 2887 (L); Sarawak, Sematan, *Purseglove* 4614 (L).

Philippines: Leyte, Tacloban, *Frohne* 35091 (L); Sulu Arch. *Kondo & Edano* 38765 (L); Davao, *Loher* 4203 (K); Luzon, Bataan, *Merrill* 3095 (K, L); Luzon Bataan, *Whitford* 514 (K).

3. *Leucas lavandulifolia* Sm. in Rees. Cycl. 20 (1812) n. 2; Prain in J. As. Soc. Beng. 74 (1907) 719; Merr. Enum. Philip. 3 (1923) 411; Ridl. Fl. Mal. Pen. 2 (1923) 650; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 167; Back. & Bakh. f. Fl. Java 2 (1965) 623.

Phlomis linifolia Roth, Nov. Sp. (1821) 260.

Leucas linifolia (Roth) Spreng. Syst. 2 (1825) 743; Benth. Lab. Gen. & Sp. 617 (1834) 744 (1836), in DC. Prodr. 12 (1848) 533; Miq. Fl. Ind. Bat. 2 (1859) 983; Hook. f. Fl. Brit. Ind. 4 (1885) 690.

Phlomis zeylanica (non Lin.) Blanco Fl. Filip. (1837) 475 (*ceilanica*).

Erect annual herb, 30–80 cm high, often much-branched. Stems and branches pubescent, subglauous. Leaves herbaceous, linear lanceolate, rarely lanceolate, 4–6 cm long, 0.4–0.6 cm wide, acuminate, the base attenuate, entire, margins elsewhere subentire or remotely and sparingly serrate; petiole subsessile. Flowers shortly pedicelled, in terminal and axillary, always leafy false-whorls, often congested towards apex and forming cluster or clusters, 1.5–2 cm across; bracts linear, 3–4 mm long, puberulous. Calyx obliquely turbinate, 6–7 mm (in fruit 8–9 mm) long, glabrescent or puberulent; mouth oblique, pubescent within with white hairs, slightly constricted; teeth varying from 8–10, the uppermost one large and broad, others minute and spinescent. Corolla 10 mm long; tube annulate within near the middle; upper lip oblong, woolly; lower lip patent, the mid-lobe large, obovate. Nutlets oblong, 2.5 mm long, 1 mm broad, rounded at apex, inner surface angular, outer rounded.

Distribution: India to S. China and Malesia.

Ecology: in open waste places at low and medium altitudes.

Vern. names: Patji-patji (Java) Pansi-pansit (Philippines).

Specimens examined:

Sumatra: Tapanoeli, Habinsaran, *Bartlett* 7780 (L); Kabandjahe, alt. 1,225 m, *Lörzing* 6180 (L); Lake Toba, alt. 1,200 m, *Lörzing* 6538 (L); Tapanoeli, Maranti, *Rahmat Si Boeca* 6152 (L); Padang Boelan, *Stomps s.n.* Oct. 1923 (L).

Malay Peninsula: Penang, Bukit Penang, *Curtis* 1115 (Sing.); Penang, Tanjong Tokong, *Curtis* 2491 (Sing.) (Corolla white); Malacca, *Griffith s.n.* (K); Singapore, *Hullett* 377 (Sing.); Malacca, *Ridley s.n.* 1890 (Sing.); Singapore, Mt. Faber, *Ridley* 3888 (Sing.); Singapore, *Sinclair* 39142 (L, Sing.).

Java: W. Banten, *Adelbert* 338 (L); G. Tjeremai, alt. 700 m, *Backer* 4991 (L); G. Lawoe, alt. 700 m, *Backer* 6732 (L); Kediri, alt. 100 m, *Backer* 11627 (L); Welari, alt. 200 m, *Backer* 16603 (L); Pasoeroean, *Backer* 36200 (L); Batavia, *Bakhuizen v/d Brink* 1021 & 2125 (L); Kediri, *Coert* 1690, 1737, 1781 & 1813 (L) Madioen, *Dorgelo* 1535 (L); Buitenzorg, *Hallier* 288 (L); P. Purmerend, *Hoed* 3082 (L); Semarang, *Houwing* 918 (L); Java, *Junghuhn* 31 (L); Bawean, *Karta* 11 (L); Madioen, alt. 700 m, *Koorders* 23143 & 23278 (L); Semarang, *Koorders* 25096 & 27629 (L); Banjoemas, *Koorders* 27177 (L); Madioen, *Koorders* 29141 (L); Buitenzorg, *Koorders* 31306 & 32577 (L); Batavia, *Koorders* 44153 (L); Buitenzorg, *Oostroom* 12874 (L); Buitenzorg, *Raap* 64 (L); Batavia, *Schiffner* 2473 (L); Bogor, *Soegandiredjo* 96 (L); Buitenzorg, *Wit* 3951 (L).

Philippines: Luzon, *Cuming* 709 (K, L); Luzon, Sorsogon, Irosin, *Edano & Gutierrez* 37764 (L); Luzon, Sorsogon, *Elmer* 16481 (K, L); Luzon, Laguna, Los Banos, *Hallier* 4075 (L); Luzon, *Loher* 4204 (K); Luzon, Manila, *McGregor* 45 (K); Luzon, Rizal, Antipolo, *Merr. Sp. Blanco* 324 (K, L); Manila, *Merrill* 347 (K); Mindoro, Baco, *Merrill* 1266 (K); Manila, *Merrill* 1351 (L); Luzon, Tayabas, *Merrill* 1956 (K); Luzon, Rizal, *Merrill* 2728 (K); Luzon, Laguna, San Antonio, *Ramos* 12046 (L); Luzon, *Vidal* 3467 (K).

Celebes: Manado, *Forsten* 48 (L).

Moluccas: Soela Isl., Sanana, alt. 200 m, *Bloembergen* 4462 (L); Soela Isl., Mangoli, *Bloembergen* 4633 (L); Ceram, *Kornassi* 831 (L); Ceram. *Kornassi* 1298 (L); Halmahera, *Pleyte* 76 (L); Ceram, *Rutten* 169 (L).

New Guinea: Misoöl group, *Eykman* 52 (L); Misoöl group, *Pleyte* 835 (L).

4. *Leucas javanica* Benth. Lab. Gen. & Sp. (1834) 611, in DC. Prodr. 12 (1848) 528; Miq. Fl. Ind. Bat. (1859) 980; Vidal Rev. Pl. Vas. Filip. (1886) 214; Merr. Enum. Philip. Fl. Pl. 3 (1923) 410; Back. & Bakh. f. Fl. Java 2 (1965) 622.

Phlomis chinensis (non Retz.) Bl. in Bijdr. (1826) 829.

Leucas biflora (non R. Br.) Miq. Fl. Ind. Bat. 1859) 980.

Leucas procumbens (non Desf.) Miq. Fl. Ind. Bat. (1859) 979.

Leucas leucocephala Miq. Fl. Ind. Bat. (1859) 981.

Leucas oxyodon Miq. Fl. Ind. Bat. (1859) 981.

Perennial herb, to 1.5 m high, branched. Stems and branches tomentose, sometimes densely long-villose, subglaucous. Leaves thin membranaceous, ovate to broadly ovate, 3–4 cm long, 2.5–3 cm wide, (sometimes very small, 1.5 x 1.2 cm) acute, the base rounded or truncate, the margins elsewhere coarsely serrate or crenate; pubescent or hirsute on both surfaces; petiole 0.2–0.5 cm long. Flowers 2–6 (sometimes more) in axillary whorls, remotely distant; bracts linear, 2–3 mm long, setose. Calyx subcampanulate, usually 8–9 mm (in fruit 10–11 mm) long, sparsely hirsute or densely long-villose externally, 10-toothed, the teeth lanceolate, subequal or alternately larger and smaller ones, the posterior one the largest, 2–2.5 mm long. Corolla 15–16 mm long, obliquely annulate; two lips almost equal in length. Nutlets ellipsoid, 2 mm long, 1 mm broad, scabrous.

Type specimen: Java: Intra montem Burangrang et Tankawam Paku, Blume. *Herb. Lugd. Bat.* 904, 356–479 (L.)

Distribution: Malesia.

Ecology: In open waste places, thickets and grassland, at low and high altitudes.

Vern. names: Patji-patji (Java), Banbansit, Paling-harap (Philippines).

Specimens examined:

Java: Preanger, *Backer* 966 (L); Preanger, alt. 550 m, *Backer* 3003 (L); Tueschen Bantoe, alt. 300 m, *Backer* 4001 (L); Djationoro, alt. 20 m, *Backer* 8089 (L); Tjidjoeroeg, *Backer* 17284 (L); Madoera, alt. 50 m, *Backer* 19397 (L); Batavia, alt. 934 m, *Bakhuizen v/d Brink* 4975 (L); Pasanggrahan, *Boerlage* 3819 (L); Buitenzorg, *Binnemeijer* 94 (L); Parangtritis, *Coert* 446 (L); Madura, *Coert* 1674 (L) (Fls. white); Tjemaralela, *Coert* 3453 (L); Moeriah, *Docters van Leeuwen* 944 (L); Soerabaja, *Dorgelo* 207 (L); Bogor, *Hallier* 290 (L); Buitenzorg, *Hallier s.n.* Oct. 1894 (L); Dieng, alt. 2,000 m, *Hochreutiner* 2396 (L); Tengger, Mt. Ajak-ajak, alt. 2,800 m, *Hochreutiner* 2662 (L); Sindiglaja, *Holstvoogd* 119 (L); Java, *Horsfield s.n.* (K. type of *Leucas leucocephala* Miq.), *Horsfield s.n.* (K. type of *Leucas oxyodon* Miq.) Tjikampek, *Karsten* 30 (L); Tjibodas, G. Gedeh, alt. 1,500 m, *Kern* 7411 (L); Pasoeroean, *Kobus* 72600 (L); Besoeki, alt. 1,150 m, *Koorders* 14829 (L); Madioen, alt. 1,300 m, *Koorders* 23286 (L); Pasoeroean, *Koorders* 23377 (L); Semarang, *Koorders*

24999 (L); Madioen, alt. 800 m, *Koorders* 29777 (L); Djapara, *Koorders* 33549 (L); Pasoeroean, alt. 2,100 m, *Koorders* 37625 (L); Besoeki, *Koorders* 38525 (L); Gempolkrep, *Kreulen* 119 (L); Beneden, *Lörzing* 2238 (L); Panaragan, *Nedi & Idjan* 11 (L); Tjibodas, G. Gede, *Ooststroom s.n.* May 1950 (L); Bandoeng, *Popta* 470 (L); Lembang, *Popta* 763 (L); Bantardjati, *Raap* 528 (L); Tjisaroea, *Raap* 893 (L); Buitenzorg, alt. 260 m, *Schiffner* 2468, 2476 & 2480 (L); Soerabaja, *Slooten* 2031 (L); Priangan, G. Papandajan, alt. 2,401 m, *Steenis* 4275 (L); Pasoeroean, alt. 2,400 m, *Steenis* 7249 (L); Besoeki, alt. 2,300 m, *Steenis* 10926 (L).

Lesser Sunda Islands: Babar, *Borssum Waalkes* 3006 (L); Soemba, *Iboet* 188 (L); Tanimbar, *Pleyte* 125 (L); Lombok, *Zollinger s.n.* July 1846 (L).

Philippines: Luzon, *Ahern's Collector* 3401 (K); Philippines, *Cuming* 495 (K, L); Mindanao, Pujada Isl., *Edano* 11665 (L); Luzon, Laguna, *Elmer* 8104 (K); Luzon, Laguna, Mt. Maquiling, *Elmer* 18079 (K, L); Luzon, *Loher* 4224 (K); Coron Isl., *Ramos* 41158 (K); Luzon, Laguna, Mt. Makiling, *Sulit* 34065 (L); (Fls. white).

New Guinea: Papua, Sudest Isl., Rambuso, *Brass* 28094 (K, L) (Lvs. not aromatic; fls. white).

This is an extremely variable species, with regard to the density of verticillasters (from 2–3, 5–6 or more flowers), the pubescence of the calyx tube, the length of the calyx-teeth, and the dimension (1.5–4 x 1.2–3 cm) and texture (fleshy or herbaceous) of the leaves. Based on the various combination of these characters, Miquel (1859) recognized 3 varieties (var. *horsfieldiana*, Miq., var. *montana*, Zoll. and var. *littoralia* Zoll.) and also described 2 new species, *Leucas leucocephala*, and *Leucas oxyodon*. Backer (1965) observed 3 intergrading forms (f. *javanica*, f. *littoralis* and f. *montana*) from Java.

As a result of observations on a fairly large number of herbarium specimens, all these are seemingly connected by a series of intermediate forms. Variations often occur in the same specimen. Therefore I consider them as belonging to a single but variable species.

5. *Leucas mollissima* Wall. ex Benth. in Wall. Pl. As. Rar. 1 (1830) 62; Benth. Lab. Gen. & Sp. (1834) 607, in DC Prodr. 12 (1848) 525; Hook. f. Fl. Brit. Ind. 4 (1885) 682; Merr. & Rolfe in Philip. J. Sc. (1910) Bot. 381; Merr. Enum. Philip. 3 (1923) 411.

Leucas marrubioides (non Wall.) Ceron Cat. Pl. Herb. Manila (1892) 135.

Leucas sericea Elm. Leaflet. Philip. Bot. 1 (1908) 340.

Annual or perennial herb, 40–60 cm high, much-branched. Stems and branches hoary-tomentose. Leaves thin to thick membranaceous, narrowly ovate to elliptic, 1.5–3 cm long, 1–1.5 cm wide, obtuse or acute, the base rounded, entire, the margins elsewhere crenate or serrate, densely appressed tomentose on both surfaces, the lower often silvery glaucous; petioles 0.2–0.5 cm long. Flowers 6–10 in axillary false whorls, distant; bracts linear, minute. Calyx cylindrical, 7–8 mm long, densely sericeous, striate; teeth subulate, subequal. Corolla 14–15 mm long, curved, not annulate; upper lip 3–4 mm long, densely sericeous; lower lip 7–8 mm long, nearly flat. Nutlets broadly ellipsoid, fattened, 1.5 mm long, 1 mm broad, nearly smooth.

Distribution: India to S. China and Malesia.

Ecology: In open places or in thickets, from low to medium altitudes.

Vern. names: Saja-hetela (Sunda), Abra (Philippines).

Specimens examined:

Malay Peninsula: Kedah, G. Baling, summit, *Corner & Nauen 35381* (Sing.); G. Baling, *Kiah s.n.* May 1938 (Sing.) (Fls. white).

Lesser Sunda Islands: Lombok, alt. 500–1,200 m, *Elbert 1420 & 1462* (L); Wetar Isl., *Elbert 4369* (L).

Philippines: Luzon, Baguio, *Elmer 8409* (K) (Type of *Leucas sericea* Elm.); Benguet, *Loher 4183* (K); Luzon, *Loher 4226* (K); Golo, *Merrill 11539* (K, L); Luzon, Benguet, Mt. Santo Tomas, *Merrill 11699* (L); Philippines, *Micholtz s.n.* (K); Mindoro, Mt. Calavite, *Ramos 39388* (L); Luzon, Baguio, *Trono 35164* (L); Panay, Iloilo, Miagas, *Vidal 3468* (K).

Moluccas: Goal, *Idjan 188* (L) (Herb 1 m, high; fls. white).

New Guinea: Papua, Isuarava, *Carr 15343* (K, L).

Ceron (1892) recorded the occurrence of *Leucas marrubioides* in the Philippines which was based on *Vidal 3468* from Panay, Miagas. Here I confirm Merrill's suggestion that the specimen cited is merely a form of *Leucas mollissima* Wall. ex Benth.

One noticeable fact is that according to Bentham's description, the typical form of the species usually has 10–30 flowers in a verticillaster. The Malesian plant, however, usually possesses only 6–10 flowers in a verticillaster.

6. ***Leucas flaccida*** R. Br. Prodr. (1810) 505; Benth. Lab. Gen. & Sp. (1834) 609, in DC. Prodr. 12 (1848) 526; Miq. Fl. Ind. Bat. (1859) 979; Hook f. Fl. Brit. Ind. 4 (1885) 684; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 179.

Leucas parviflora Benth. in Wall. Pl. As. Rar. 1 (1830) 62.

Leucas decemdentata (non Sm.) Benth. Lab. Gen. & Sp. (1834) 609, in DC. Prodr. 12 (1848) 526 (cit. spec. from Timor).

Annual herb, 20–30 cm up to 1 m high, usually flabby and withered. Stems and branches slender, tomentose. Leaves membranaceous, lanceolate to narrowly ovate, 2–3.5 cm long, 1–1.5 cm wide, acute, the base cuneate, entire, the margins elsewhere crenate-serrate, pubescent above, tomentose and subglaucous beneath; petioles 0.5–1 cm long. Flowers 3–8 in axillary whorls, well-apart; bracts linear, 2–3 mm long, setose. Calyx tubular, 5–6 mm long, tomentose, 10-toothed, the teeth subequal, triangular at base, abruptly narrowed above. Corolla 13–14 mm long, the tube long-exserted, annulate within; the lower lip slightly longer than the upper one. Nutlets obovoid, 1.5 mm long, 0.6 mm broad, subtruncate above, smooth.

Distribution: Burma, Malesia (Malay Peninsula, Lesser Sunda Islands, Philippines, Celebes and New Guinea) to N. E. Australia.

Ecology: In dry, open places or on limestone hills at low altitudes.

Vern. names: Bimig-Arial, Daarutuk, Kafi (Sunda Islands).

Specimens examined:

Malay Peninsula: Kedah, G. Baling, alt. 400 m, *Henderson 35381* (K) (Fls. white).

Lesser Sunda Islands: Timor, near Kapan, alt. 900 m, *Bloembergen 3533* (L) (Herb 30 cm. high; fls. white); Wetar, alt. 250 m, *Bloembergen 3641* (L) (Herb 1 m, high; fls. white); Timor Coefang, *Brown s.n.* April 1803 (L); Alor, alt. 400 m, *Jaag 202* (L); Timor, *Meyer s.n.* June 1883 (K); Timor *Teysmann 10930* (L); W. of Timor, Sejra, *Treub s.n.* 1893 (L).

Philippines: Palawan, *Merrill 1269* (L); Sulu, Tawitawi, *Ramos & Edano 44040* (L); Luzon, Laguna, Mt. Maquilung, *Servinas 16898* (L).

Celebes: Pangkadjene, *Eyma 306* (L); Sangi & Talaud Isls., alt. 300 m, *Lam 2402* (L) (Calyx green; fls. white); Pangkadjene, *Teysmann 12268* (L).

New Guinea: N. New Guinea, Humboldt Bay, *Gjellerup 988* (L) (Fls. white scentless).

18. MELISSA LINN.

Melissa [Tourn] Linn. Gen. Pl. ed. 5 (1754) 257; Sp. Pl. (1753) 592; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1191; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 295.

Perennial herbs, branched. Leaves opposite, crenate. Flowers medium-sized, usually in few-flowered, axillary false whorls. Calyx always 13-nerved, sometimes not very clear due to the reticulation of transverse veins; 2-lipped; upper lip 3-dentate, the teeth broad and highly connate, often slightly recurved; lower lip 2-toothed, the teeth long and subulate. Corolla rather straight, long and slender; upper lip emarginate or notched, erect; lower lip 3-lobed, flat and spreading. Stamens 4, didynous, ascending, epicorolline, the posterior pair smaller and shorter than the anterior pair; anthers 2-loculate, the locules divaricate. Style lobes subequal. Nutlets obovoid, smooth and dark, often with a very prominent scar.

Species 3, S. Europe and S. & S. E. Asia; 1 species extended to Malesia.

1. *Melissa axillaris* Bakh. f. in Back. & Bakh. f. Fl. Java 2 (1965) 629.

Melissa hirsuta (non Hornem.) Bl. Bijdr. (1826) 830; Benth. Lab. Gen. & Sp. (1834) 394, in DC. Prodr. 12 (1848) 241.

Melissa parviflora (non Salisb. 1796) Benth. in Wall. Pl. As. Rar. 1 (1830) 65, Lab. Gen. & Sp. (1834) 394, in DC. Prodr. 12 (1848) 241; Hook. f. Fl. Brit. Ind. 4 (1885) 651; Miq. Fl. Ind. Bat. 2 (1859) 960; Kudo in Mem. Fac. Sc. Agr. Taihoku Un. 2, 2 (1929) 96; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 100.

Geniosporum axillare Benth. in Wall. Pl. As. Rar. 2 (1830) 18.

Erect herb, upto 1 m high, more or less woody at the base. Branches pubescent when young. Leaves thin or thick membranaceous, very variable in size and shape; the small ones ovate or elliptic, 1.2–3 cm long, 0.8–1.5 cm wide, acute, the base rounded or cuneate, the margins crenate; the larger ones lanceolate-ovate, often unequalateral, 5–7 cm long, 2–3 cm wide, acuminate, the

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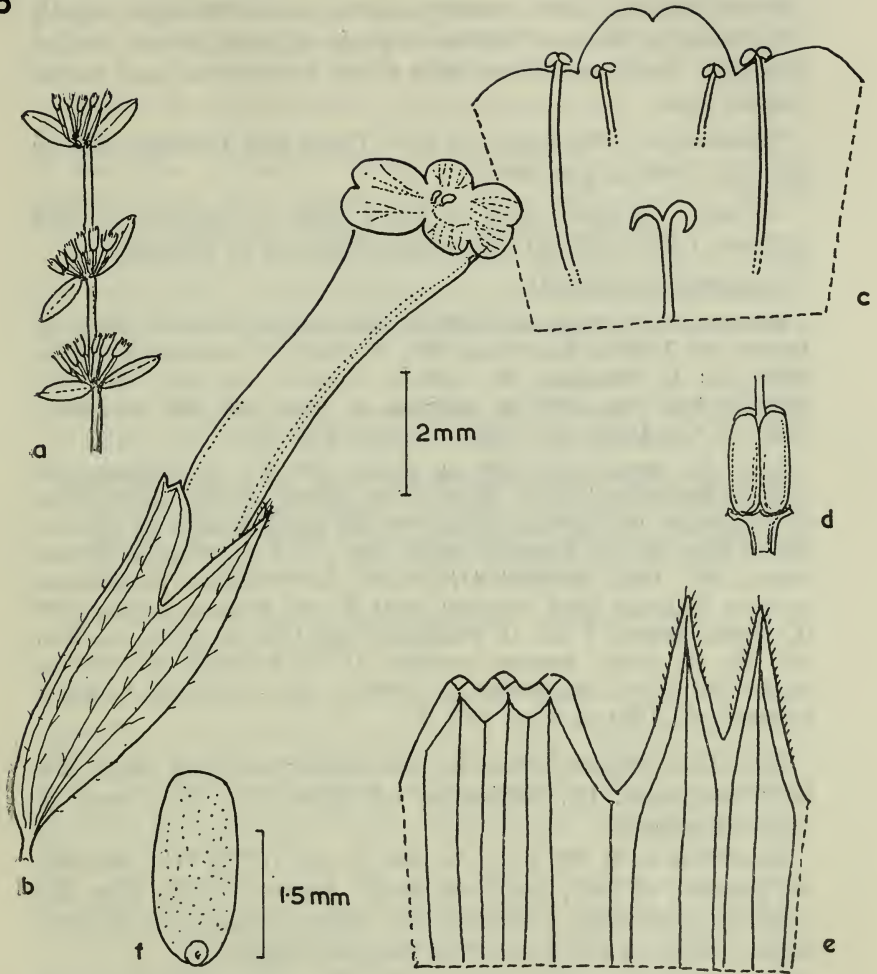


Fig. 18. *Melissa axillaris* Bakh. f.

a. diagram of portion of the inflorescence; b. flower, c. portion of corolla expanded, showing the stamens and tip of style; d. ovary; e. upper portion of fruiting calyx expanded; f. nutlet. (flower, *Backer 21603*; fruit, *Backer 489*).

base acute, the margins remotely toothed except the base; petioles 0.5–3 cm long. Flowers few (usually 4–8) in axillary false whorls; pedicels 1–2 mm long, sericeous. Calyx 5–6 mm (in fruit 6–8 mm) long, pilose on the ribs outside; tube not inflated below; upper lip shortly 3-toothed, often recurved; lower teeth 2, subulate, ciliate. Corolla 9–10 mm long; tube slender; upper lip notched; lower lip 3-lobed. Stamens 4, the anterior pair barely exerted. Style equally 2-branched at the top. Nutlets narrowly ellipsoid, 8 mm long, 2 mm wide, finely puberulent, with a very conspicuous scar on the ventral base.

Distribution: Himalayas, to S.W. China and Formosa, and to Malesia (Sumatra and Java).

Ecology: In open trials or forest edges at medium to high altitudes 1,500–2,600 m), sometimes at the top of volcanoes.

Specimens examined:

Sumatra: G. Kerintji, alt. 2,200 m, *Bünnemeijer 9196* (L, Sing); G. Kerintji, alt. 2,600 m, *Bünnemeijer 9805* (L, Sing.); G. Kerintji, *Bünnemeijer 10266* (L); G. Singalang, alt. 1,200 m, *Matthew s.n.* Dec. 1913 (K); Korinchi Peak, alt. 2,400 m, *Robinson & Kloss 144* (BM, K, Sing.); Gajoe & Alas Lands, alt. 1,500 m, *Steenis 8744* (L).

Java: G. Slamet, alt. 2,500 m, *Backer 489* (L); G. Tjeremai, alt. 1,500 m, *Backer 4914* (L); G. Tjeremai, alt. 2,000 m, *Backer s.n.* 1912 (L); G. Papandajan, alt. 1,800 m, *Backer 5543* (L); Dieng Plateau, alt. 2,000 m, *Backer 21603* (K, L); Tjeremai, *Blume 1589 a & b* (L) (Type of *Melissa hirsuta* Bl.); Java, *Horsfield 111 & 114* (K); Preanger, Pengalangen, *Leeuwen 2351* (L); Tegal, *Leeuwen 13342* (L); W. Patoeha, *Lörzing 1299* (L); Tegal, *Monchy 8* (L); G. Papandajan, alt. 1,700 m, *Ridley s.n.* Feb. 1915 (K) (fls. white); Preanger, *Schiffner 11* (L); Preanger, alt. 2,000 m, *Slooten 764* (K); G. Papandajan, alt. 2,041 m, *Steenis 4273* (K, L, Sing.); Preanger, alt. 2,000 m, *Wisse 1057* (L).

Since both *Melissa hirsuta* Bl. and *Melissa parviflora* Benth. are later homonyms, Dr. Bakhuizen v.d. Brink, Jr.'s new name is therefore accepted.

Merrill (in J. St. Br. Roy. As. Soc. sp. no. (1921) 519) recorded the presence of this plant from Brunei, Borneo. So far, from the available specimens* examined, this species appears to be confined to Sumatra and Java in the Malaysian regions.

Excluded species

Melissa indora Hassk. in Hoen. & De Vriese, Tijdschr. Nat. Gesch. & Phys. 10 (1843) 127, Cat. Bogor. (1844) 132; Miq. Fl. Ind. Bat. 2 (1859) 969. — *Teucrium viscidum* Bl.

The reduction was made by Koorders (Exkur. Fl. Java 3 (1912) 142).

* I am indebted to Dr. J. A. R. Anderson and Dr. P. Ashton for sending all the Labiatae specimens in the Herbarium of the Forest Department, Kuching, Sarawak to Singapore. I failed to find any specimen that can be referred to this species.

19. MENTHA LINN.

Mentha (Tourn.) Linn. Gen. Pl. ed. 5 (1754) 257, Sp. Pl. (1753) 592; Benth, in Benth. & Hook. f. Gen. Pl. 2 (1876) 1182; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 317.

Perennial herbs with creeping rootstocks, often strongly scented. Leaves opposite, often dotted. Flowers small, in axillary false whorls (in Malesian species) or forming terminal spicate inflorescence; bracts often small. Calyx tubular or campanulate, 10-nerved, 5-toothed, the teeth subequal. Corolla funnel-shaped, short, 4-lobed, the uppermost lobe broader than the other 3, emarginate. Stamens 4, dimorphic, subequal; anthers 2-loculate, the locules parallel; filaments free, erect, distant. Disk entire, uniform. Style shortly 2-branched, subequal. Nutlets ovoid, smooth or reticulate.

Species about 25–30*, mainly in North temperate regions of the Old World; with 1 species (*Mentha arvensis* Linn.) introduced and cultivated and 1 variety (or considered as a species) probably native to Malesia.

1. **Mentha arvensis** Linn. var. **javanica** (Bl.) Hook. f. Fl. Brit. Ind. 4 (1885) 648; Back. & Bakh. f. Fl. Java 2 (1965) 631.

Mentha javanica Bl. Bijdr. (1826) 826; Benth. Lab. Gen. & Sp. (1833) 183, in DC. Prodr. 12 (1848) 173; Prain in J. As. Soc. Bengal 74, 2 (1907) 710; Merr. Enum. Philip. 3 (1923) 415; Ridl. Fl. Mal. Pen. 2 (1923) 655 (as *Excl. sp.*)

Mentha arvensis Benth. (*non* Linn.) var. *zollingeri* Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 319.

Herb, prostrate, often rooting below. Stems 30–60 cm high, pubescent with adpressed hairs. Leaves thin membranaceous, lanceolate to broadly lanceolate, 2.5–4.5 cm long, 1–2.5 cm wide, acute, the base long-cuneate, entire; margins elsewhere serrate; sparingly hairy above, glabrous beneath; petioles 0.5–1 cm long. Flowers in axillary false whorls; bracts linear or subulate, 2–4 mm long; pedicels 2–2.5 mm long. Calyx tubular-campanulate, 2.5 mm (in fruit 3 mm) long, adpressed with short and long hairs, 5-toothed; teeth subequal, lanceolate or subulate, ciliate, often shorter than the tube. Corolla 4.5–5 mm long, puberulent externally. Nutlets ellipsoid, 1 mm long, finely granulate, often pointed above, and with a large lateral scar below.

Type specimen: Java, Buitenzorg, et in uliginosis prope Tugu, *Blume s.n.* (L).

*The number of species has been variously estimated. To quote de Wolf (in Bailey, vol. 2, p. 3, 1954), "The genus *Mentha* is taxonomically a most perplexing group of cultivated plants. This situation arises principally from its long history in cultivation and its propensity for hybridization. In the past there has been a tendency by students, as in many similar genera, to recognize every individual variation as a distinct species. This has resulted in an almost hopeless multiplication of names, so that now, in a genus with about 25 species there are more than 600 specific names."

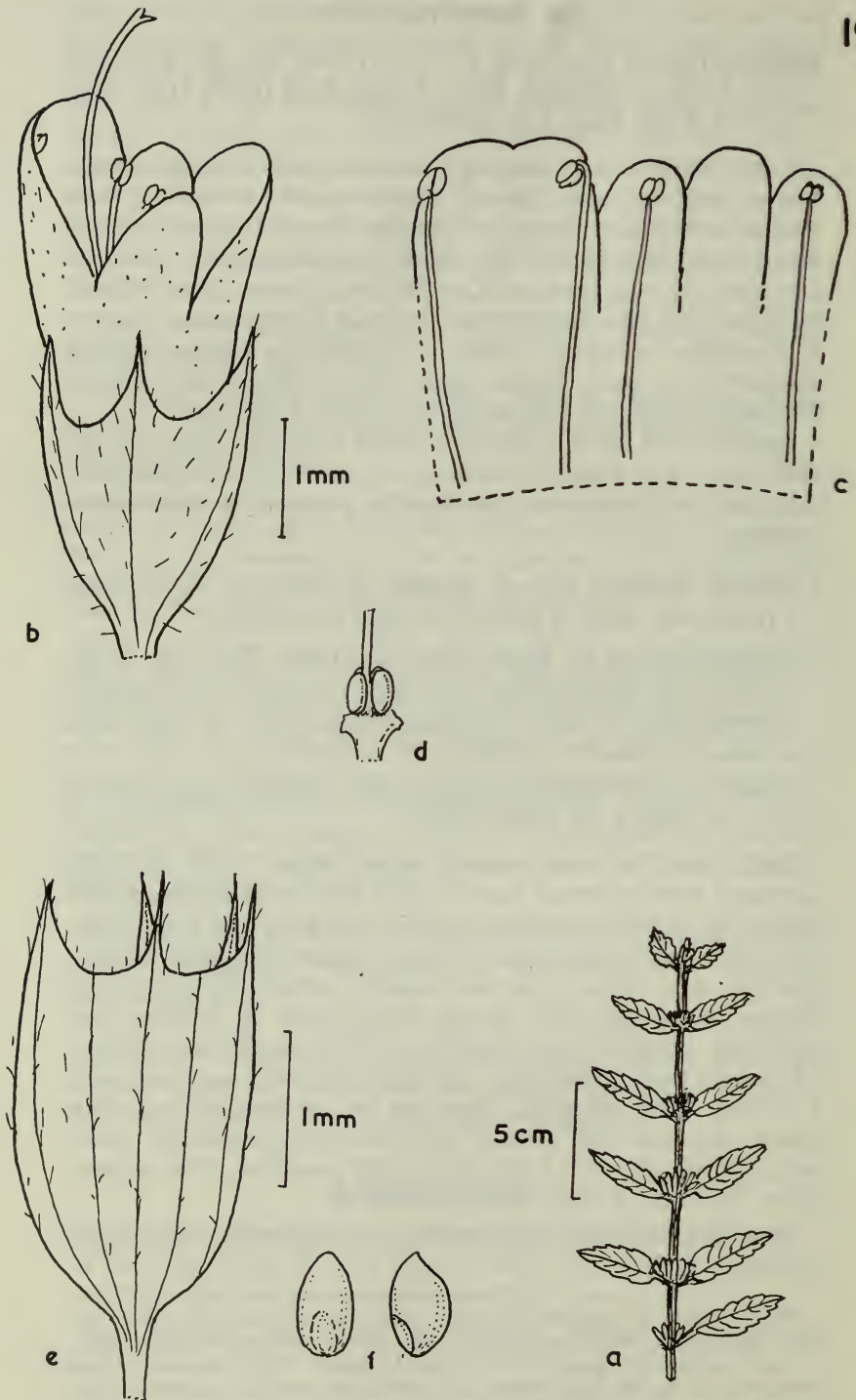


Fig. 19. *Mentha arvensis* Linn. var. *javanica* Hook. f.

a. portion of a branch with axillary verticillasters; b. flower; c. corolla expanded (upper portion only); d. ovary; e. fruiting calyx; f. nutlet in 2 views. (Blume, s.n.)

Distribution: Ceylon and Malesia (Malay Peninsula, Java, & the Philippines).

Ecology: Often cultivated only.

Vern. names: Bidjanggung, Daun poko (Java); Polihos, polio (Philippines).

Specimens examined:

Malay Peninsula: Singapore, Galang, *Bakar s.n.* 1892 (Sing.); Singapore, *Burkill 276* (Sing.); Singapore, *Furtado s.n.* March 1924 (Sing.); Malacca, *Griffith 3977* (K).

Java: Buitenzorg, *Bakhuizen v/d Brink 7901* (K); Java, *Zollinger 1843* (BM).

Philippines: Philippines, *Cuming 1718* (K).

This Malesian plant perhaps is not specifically different from the southern European species, *Mentha arvensis* Linn., although it can be easily distinguished from the latter by its lanceolate leaves and by its longer calyx-teeth which often exceed the length of the calyx-tube; while in the typical form of *Mentha arvensis*, the leaves are generally oblong-ovate, and the length of the calyx-teeth never exceeds that of the calyx-tube. Their basic structures of the flower and inflorescence, nevertheless, are very much the same. Kooders (in Exkurs. Fl. Jav. 3 (1912) 150) was of the opinion that they are conspecific.

A large number of specimens of this species from the Malaysian regions are deposited in the Leiden herbarium. I regret that I did not have time to study them during my short stay there.

Cultivated species

Mentha arvensis Linn. Sp. Pl. (1753) 577; Merr. Enum. Philip. 3 (1923) 415.

Mentha crispa (non Linn.) Blanco, Fl. Filip. (1837) 474, ed. 2 (1845) 330, ed. 3, 2 (1878) 246.

A native of Europe, cultivated in the Malesia as a pot plant. Propagated vegetatively.

20. MESONA BL.

Meson Blume Bijdr. (1826) 838; Benth. in Benth. & Hook. f. 2 (1876) 1172; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 365.

Annual herbs. Stems erect or procumbent, pubescent. Leaves opposite, petiolate. False whorls many flowered, forming axillary and terminal racemose inflorescences; flowers small, bracts often caducous. Calyx campanulate (in fruit tubular, declinate), 8-nerved, 2-lipped, the upper lip 3-fid, the lower entire. Corolla short; throat inflated, abruptly constricted towards the base; limb 2-lipped, the upper lip truncate or 3-lobed, the median lobe very broad, the lower oblong, concave. Stamens 4, in 2 pairs; anther locules confluent into 1-loculate; filaments exserted, those of the posterior pair appendaged at the base. Style briefly 2-fid. Disk inflated, gibbous.

Nutlets ellipsoid or ovoid, minute, smooth; lower part of the fruiting calyx-tube deeply pitted between the nerves and the connecting transverse bars.

Species about 8–10, from the Himalayas, Thailand, Indo-China to S. China, Formosa and Malesia. 2 species are distributed in Malesia.

Key to the species

- A. Flowers usually 12–20 in a false whorl; flowering calyx 2–2.5 mm long, lower part of fruiting calyx conspicuously inflated and cross-barred and pitted; leaves and stems often pubescent or densely villous. 1. *M. palustris*
- A. Flowers usually over 20 in a false whorl; flowering calyx 2.5–3 mm long; lower part of fruiting calyx not or only slightly inflated, the cross bars and pits less conspicuous; leaves and stems often glabrescent or pubescent. 2. *M. philippinensis*

1. *Mesona palustris* Bl. Bijdr. (1826) 839; Benth. in DC. Prodr. 12 (1848) 46; Miq. Fl. Ind. Bat. 2 (1858) 940, (incl. var. *petiolata*); Back. & Bakh. f. Fl. Java 2 (1965) 638.

An erect, aromatic herb, 30–50 cm high. Stems slender, unbranched or only sparsely branched at the top, glabrescent, pubescent or densely villous. Leaves membranaceous or chartaceous, oblong-elliptic or narrowly obovate-elliptic, 3–8 cm long, 1.2–3.5 cm wide, acute or obtuse, the base narrowly acute or rounded, the margins crenate or serrulate; petioles 0.5–2 cm long, hispid or villose. False whorls close or distant, many- (usually 12–20) flowered, forming terminal, rarely also axillary, raceme-like inflorescence, 5–12 cm long; rachis villose or hirsute; bracts subtending the whorls lanceolate to ovate, 7–10 mm long, acuminate, deciduous; pedicels 5–6 mm long. Calyx campanulate, 2–2.5 mm long, covered with white hairs; limb 2-lipped, the upper lip 3-lobed, ciliate, the lower lip oblong, rounded, often thin and transparent. Corolla 4–5 mm long, the tube inflated above, and abruptly narrowed below. Fruiting calyx tubular-urceolate, 4–5 mm long, the lower part of the tube inflated, deeply reticulate and pitted between the nerves, hirsute. Nutlets ellipsoid, flattened, about 1 mm long, 0.6–0.7 mm wide, finely granulate.

Type specimens: Buitenzorg, Java, *Blume s.n.* (*Herb. Lugd. Bat.* 905, 103–495, & 497).

Distribution: Malesia.

Ecology: In lowland rice fields or on open grassy slopes or in forest margins from low to medium altitudes (75–2,300 m).

Specimens examined:

Java: G. Boender, *Backer s.n.* 1910 (L); Madioen, Patjitan, alt. 420 m, *Backer* 2974 (L); G. Lawoe, alt. 75 m, *Backer* 6727 (L); Java, *Blume s.n.* (L) (Lectotypes of *Mesona palustris* Bl.) (*Herb. Lugd. Bot.* No. 905, 103–495 & 497) Bogor, Tjampea, *Bonsma s.n.* (L); Lawoe, alt. 150 m, *Coert* 1027 (L); Lawoe, *Coert* 1049 (L); Madioen, G. Lawoe, Sarangan, alt. 1,000 & 1,500 m, *Dorgelo s.n.* 1923 (L); Madioen, G. Lawoe, alt. 2,300–2,600 m, *Elbert* 146 (L); Madioen, Ramping, 1,300–1,400 m, *Elbert* 147 (L); Madioen, G. Lawoe, alt. 2,000–2,300 & 2,300–2,600 m,

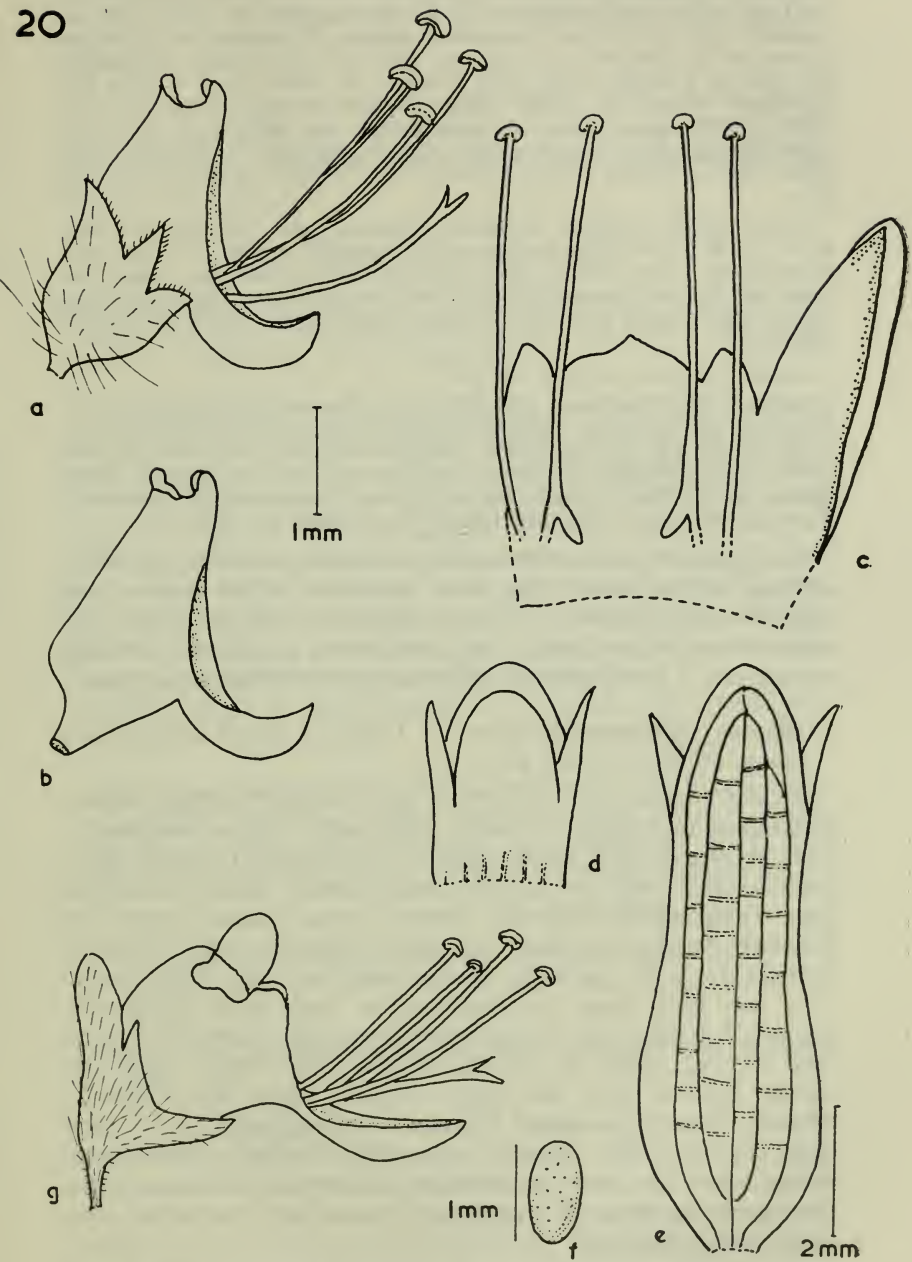


Fig. 20. *Mesona palustris* Bl. (a-f) and *M. philippinensis* Merr. (g).

a. flower; b. corolla; c. corolla expanded, showing the stamens (the upper pair appendaged at the base); d. upper portion of fruiting calyx, seen from below; e. fruiting calyx, seen from above; f. nutlet; g. flower (a-f, Horsfield s.n.; g. Ramos & Edaño 40206).

Elbert 745 & 746 (L); Idjen Plateau, *Geert-Ronner s.n.* 1923 (L); Bogor, cult., *Hallier 294* (L); Java, *Hoffmannsegg 117* (K); Java, *Horsfield lab. 22* (K) (Type of *Mesona palustris* Bl. var. *petiolare* Miq.); Java, *Junghuhn 13* (K, L) & *14* (L); Java, *Junghuhn 573* (L); G. Ungarang, alt. 3,000–4,000 m, *Junghuhn 574 & 576* (L); Madioen, Sarangan, G. Lawoe, alt. 1,300 m, *Karsten 47* (L); Kertosono, *Kooper s.n.* June 1925 (L); Besoeki, Ridjengan, alt. 1,450 m, *Koorders 43204* (K, L); Bogor, alt. 260 m, *Nedi & Idjan 203* (L) (height 40 cm; fls. violet); Pasoeroean, G. Boetak, *Oosten s.n.* Nov. 1930 (L); Priangan, Bandoeng, Batoedjadar, alt. 600 m, *Piji 908* (L); Idjen Plateau, *Rant s.n.* June 1927 (L); Pasoeroean, G. Ardjoeno, alt. 1,600–2,000 m, *Steenis 7008* (L); Java, *Waitz s.n.* (L); Java, *Zippelius s.n.* (L).

Lesser Sunda Islands: Lombok, Rindjani, alt. 500–700, 750–900, 900–1,350 & 2,200–2,300 m, *Elbert 747, 884, 973 & 1047* (L); Lombok, Rindjani, alt. 1,175–1,250 m, *Elbert 1459* (K, L); W. Sumbawa, Semongkat Atas, alt. 700 m, *Kuswata 183* (L); Bali, alt. 1,250 m, *Steenis 8157* (L. Sing.); Bali, *Voogd 1926* (L); Lombok, Poesoek, alt. 1,500 m, *Voogd 2099* (L).

Borneo: Borneo, *Korthals s.n.* (L).

Celebes: G. Bonthain, alt. 2,000 m, *Bünnmeijer 72909* (K); G. Bonthain, alt. 1,800 m, *Bünnmeijer 12274* (L); Sidenreng-Rapang, alt. 75 m, *Eyma 338* (L) (fls. pink); Pasoei-Rante Lemo, alt. 600–1,300 m, *Eyma 405* (L); Kanandede-Komba, alt. 900 m, *Eyma 1157* (L) (fls. lilac); Teleboi, alt. 1,050 m, *Eyma 1520* (L); Celebes, *Foresten 38* (L); Enrekang, *Noerkas 340* (L); G. Sikoekoe, *Vuuren & Rachmat s.n.* 1913 (L).

The species is extremely variable in shape, dentation and indumentum of the leaves. The basic structures of the flowers and fruit are very constant. *Mesona parviflora* (Wall.) Briq., (or *Mesona wallichiana* Benth.) of Indo-Burma, as Miquel correctly pointed out, is not specifically different from this Malesian species.

2. ***Mesona philippinensis*** Merr. in Philip. J. Sc. 7 (1912) 101. Enum. Philip. 3 (1923) 420.

An erect annual herb, 30–50 cm high, aromatic. Stems slender, glabrescent or sparingly covered with hairs. Leaves membranaceous or chartaceous, oblong-elliptic, 3–5 cm long, 1.5–2 cm wide, acute on both ends, the margins finely serrate; petioles 2–2.5 cm long. False whorls close or distinct, many- (usually over 20) flowered, forming terminal raceme-like inflorescence, 8–12 cm (in fruit up to 20 cm) long; bracts subtending each whorl ovate, 7–10 mm long, acute to acuminate on both ends, deciduous; pedicels 5–6 mm long. Calyx tubular, sparingly hairy, 2.5–3 mm long, 2-lipped; upper lip 3-lobed, the central lobe larger; lower lip oblong. Corolla 4.5–5 mm long, 2-lipped; upper lip rhomboid, inflated; lower lip oblong. Fruiting calyx cylindrical, 5–5.5 mm long, the lower part curved, only slightly inflated, hirsute and warted; cross-bars and pits between the nerves less conspicuous. Nutlets oblong ellipsoid, compressed, 1 mm long, 0.4 to 0.5 mm wide, finely granulate.

Type specimens: Mt. Data, Lepanto, Luzon, *Merrill 4500* (isotype, BM, K), Nov. 1905; Bontoc subprov., Luzon, *Father M. Vanoverborgh 601* (paratype, L), Oct. 1914.

Distribution: Endemic to Malesia (Luzon, Philippines).

Ecology: On grassy slopes in thin pine forests, alt. 1,300–2,000 m.

Specimens examined:

Philippines: Benguet, Data, *Loher 4200 & 4201* (K); Luzon, Lepanto, Mt. Data, *Merrill 4500* (BM, K) (Type of *Mesona philippinensis* Merr.); Luzon, Lepanto, Mt. Data, *Ramos & Edano 40206* (L); Luzon, Cagayan, Penablanca, *Ramos 76847* (Sing.); Luzon, Bontoc, *Vanoverbergh 601* (L) (Paratype).

This species with a pair of small lateral teeth in the upper calyx-lip, and with less conspicuously cross-barred and pitted fruiting calyx is somewhat intermediate between *Masona* Blume and *Nosema* Prain.

21. MICROTOENA PRAIN.

Microtoena Prain in Hook. Ic. Pl. 19 (1889) *t. 1872*; in J. As. Soc. Beng. 59 (1890) 310, in Bull. Soc. Bot. Fr. 42 (1895) 417; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 269.

Perennial herbs, erect and branching. Leaves opposite, long-petiolate. Flowers in large terminal panicles and smaller axillary cymes. Calyx campanulate, accrescent in fruit, unequally 5-toothed, obscurely 10-nerved; throat glabrous within. Corolla-tube long exerted, 2-lipped; upper lip galeate, concave, entire; lower lip spreading, 3-fid, the mid-lobe much narrower than the lateral ones. Stamens 4, in 2 pairs, ascending under the upper lip; anther-locules divaricate when young, at length confluent; filaments often hirsute. Style bifid, the upper branch very short. Nutlets minute, ovate, the ventral surface subtriquetrous, smooth or granulate.

Species about 6, Indo-Himalaya, S. China and Indo-China; 1 extended to Malesia (Java).

1. *Microtoena insuavis* (Hance) Prain ex Briq. in E. P., Pfl. Fam. 4, 3a (1897) 269; Dunn in Not. Roy. Bot. Gard. Edinb. 6 (1915) 188; Kudo in Mem. Fac. Sc. & Agr. II, 2 (1929) 183; Wu in Act. Phytotax. 8 (1959) 44; Back. & Bakh. f. Fl. Java 2 (1965) 625.

Gomphostemma insuave Hance in J. Bot. 22 (1884) 231.

Microtoena cymosa Prain in Hook. Ic. Pl. 19 (1889) *t. 1872*, in J. As. Soc. Beng. 59 (1890) 310, in Kew Bull. Misc. Inf. (1902) 11.

Plectranthus patchouli Clarke in Hook. f. Fl. Brit. Ind. 4 (1885) 624.

Erect branching herb, 0.5–1 m high. Stems and branches densely villose. Leaves chartaceous, ovate to broadly ovate, 7–10 cm long, 4.5–7.5 cm wide (sometimes much smaller), acute, the base rounded or subcordate, often abruptly cuneate, the margins serrate or crenate-serrate; adpressedly pubescent on both surfaces; petioles slender, 1–7 cm long. Flowers in lax, terminal and axillary cymes, usually forming large paniculate thyrses, up to 15 cm high. Calyx turbinate, 3–4 mm (in fruit 6–7 mm) long hirsute and glandulate; teeth triangular, subequal, the uppermost one the largest. Corolla 15–16 mm long, pubescent; upper lip hooded; lower lip shallowly 3-fid, the central lobe narrowly elliptic, laterally spreading. Nutlets ovoid, flattened, 1.5 mm long, 1 mm wide, finely granulate.

21

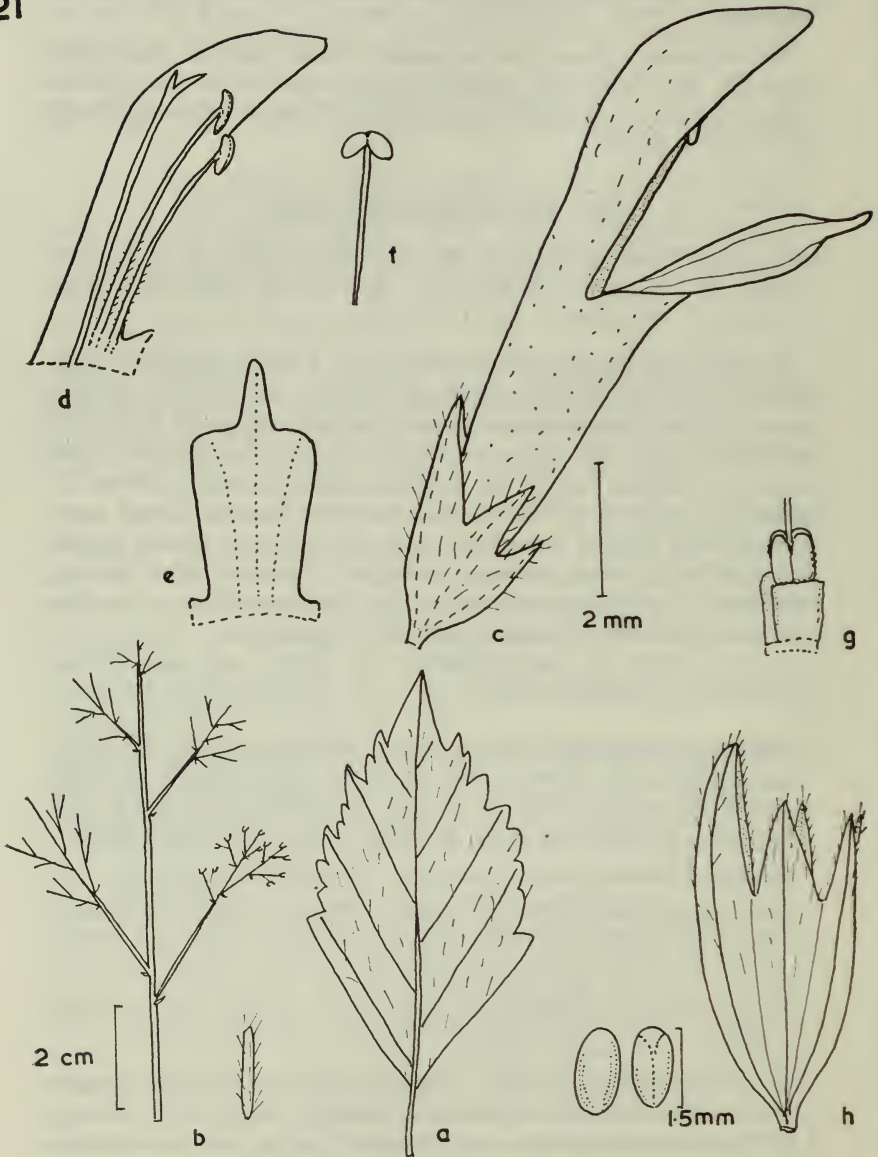


Fig. 21. *Microtoena insuavis* Prain ex Briq.

a. leaf; b. diagram of the paniculate inflorescence and a bract (enlarged); c. flower; d. half upper lip of corolla (upper portion only); e. lower lip of corolla; f. stamen; g. ovary and nectary disc; h. fruiting calyx and nutlet (a & b. *Rant s.n.*; c-h. *Koorders 23161*).

Type specimen: N. River, Kwangtung, S. China, *Henry 22237*. (type of *Gomphostemma insuave* Hance, not seen).

Distribution: E. India, Burma, Indo-China to S. China and Malesia (Sumatra, Java, the Lesser Sunda Islands & New Guinea).

Specimens examined:

Sumatra: Keban Djahe, East Coast, *Hamel & Si Toroes 689* (L); Berastagi, *Ridley s.n.* (Feb. 1921) (K).

Java: E. Java *Coert 1071* (L); G. Oenganan, C. Java, *D.v. Leeuwen 2187* (L); G. Tjaksa, Preanger, *D. v. Leeuwen 2327* (L); Ngebel, E. Java, *Koorders 23161* (K, L); Res. Madioen, E. Java, *Koorders 29140* (L); Ngebel, alt. 883 m, *Rant s.n.* (1922) (L); Idjen, E. Java, alt. 1,300 m, *Rant s.n.* (1927) (L); Preanger, *Winckel s.n.* (Aug. 1917) (L).

Lesser Sunda Islands: Bali, alt. 1,250–1,300 m, *v. Steenis 8132* (K); Batoe Kaoe, Bali, *De Voogd 1853* (L).

New Guinea: North vicinity of Rigo, C. Dist. Papua, in eucalyptus Savannah, alt. 330 m, *Schodde 2700* (L) (erect perennial, c. 1.5 m, high, leaves mid dull green above, paler below; corolla mid lavender with dark reddish lines inside).

The Malesian plant agrees fairly well with the type specimens of *Microtoena cymosa* Prain which was described from a cultivated plant (in Mr. Mann's garden, in 1887 and 1888) that originated from Khasia Hills, E. India. These specimens are preserved in the Kew Herbarium.

This binomial was reduced by Dunn as synonymous with *Microtoena insuavis* (Hance) Prain ex Briq. (Basionym: *Gomphostemma insuave* Hance). The latter was based on *Henry 22237*, from North River, Kwangtung, S. China, which I have not seen. Several specimens deposited in the Kew Herbarium, collected by Ford and others from or near the type locality identified as *Microtoena insuavis* (Hance) Prain ex Briq. by Dunn, however, possess somewhat larger flowers and leaves, and much lax inflorescences.

Only a single specimen from New Guinea (Papua) has been seen. It differs from the typical form of the species in the narrowly ovate (rather than ovate to broadly ovate) leaves, and in the subequal (rather than the posterior one being the largest) calyx-lobes. This probably represents a new variety.

22. MOSLA BUCH.-HAM. ex MAXIM.

Mosla Buch.-Ham. ex Benth. in Wall. Pl. As. Rar. 1 (1830) 66, in *Syn.*; Maxim. in Bull. Acad. St. Petersb. 20 (1875) 457; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1182; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 326.

Orithodon Benth. ex Oliv. in J. Linn. Soc. 9 (1865) 167. (*Norr Schwaeg.*)

Hedeoma Pers. sect. *Mosla* Benth. Lab. Gen. & Sp. (1832-36) 366.

Annual herbs, aromatic. Leaves opposite, petiolate. False whorls 2-flowered, secund, in terminal or axillary raceme-like inflorescence; bracts minute or the lower ones large and leafy. Calyx campanulate, 10-nerved, often gibbous at the base, subequally 5-toothed and 2-lipped; upper lip 3-toothed (in Malesian species),

shorter; lower lip 2-toothed, generally slightly longer; throat of calyx pubescent. Corolla exserted; lips short, the upper lip notched, the lower 3-fid. Stamens 4, only the upper pair perfect; anthers 2-loculated, the locules divaricate; the lower pair abortive, present or absent. Disk glandular, produced in the front. Style deeply bifid. Nutlets globose, reticulate (in Malesian species).

Species about 10, throughout S. E. Asia; 2 species in Malesia.

Key to the species

A. Leaves rhomboid to ovate, 1–2 by 0.5–1 cm; upper lip of calyx shallowly 3-toothed, the teeth deltoid. 1. *M. dianthera*

A. Leaves ovate to oblong-ovate, 2–2.5 by 0.8–1 cm; upper lip of calyx deeply 3-toothed, the teeth lanceolate. 2. *M. formosana*

Orthodon Benth. ex Oliver (1865) is a later homonym of *Orthodon* Schwaeg. (1823), a moss genus. Therefore, *Mosla* Buch.-Hamilton, though only validly published by Maximowicz in 1875, is still the legitimate name of the genus.

1. *Mosla dianthera* (Buch.-Ham.) Maxim. in Bull. Acad. Petersb. 20 (1875) 457; Hook. f. Fl. Brit. Ind. 4 (1885) 647; Briq. in E. & P. Ffl. Fam. 4, 3a (1897) 326, f. 98 E.

Lycopus dianthera Buch.-Ham. in Roxb. Fl. Ind. ed. 1, 1 (1820) 145.

Mosla ocimoides Buch.-Ham. ex Benth. in Wall. Pl. As. Rar. 1 (1830) 66; Mukerj. in Rec. Bot. Surv. Ind. 14, (1940) 101.

Cunila nepalensis Don, Prodr. Fl. Nep. (1825) 107.

Hedeoma nepalensis (Don) Benth. Lab. Gen. & Sp. (1834) 366, in DC. Prodr. 12 (1848) 244.

Erect aromatic herb, 30–100 cm high. Stems branched, sparsely pubescent, often woody at the base. Leaves membranaceous, rhomboid or ovate, 1–2 cm long, 0.5–1 cm wide, acute, the base acute or cuneate; margins few-toothed; glabrous above, often glandulate beneath; petioles 0.2–0.5 cm long, pubescent. Paniculate inflorescence terminal, often profusely branched, 10–30 cm long, the branches 4–15 cm long, lax-flowered; bracts lanceolate, often minute, 1–2 mm long, subtending the flowers. Calyx campanulate, 2–2.5 mm (in fruiting 4–5 mm) long; throat pubescent with a ring of hairs; teeth deltoid, the lower two teeth longer than the upper ones. Corolla 3–3.5 mm long, 2 fertile stamens slightly shorter than the upper corolla-lobe; 2 staminodes generally absent. Nutlets ellipsoid, 1 mm long, 0.7 mm broad, brown, reticulate.

Distribution: E. India, Burma, Indo-china to S. W. China, S. Japan, Formosa and Malesia (Sumatra).

Ecology: In valleys or open places along trails; altitudes 1,000–1,250 m.

Specimens examined:

Sumatra: Habinsaran, *Bartlett 7761* (L); Habinsaran, alt. 1,200–1,250 m, *Lörzing 6522* (K, L); Asahan Valley, alt. 1,000 m, *Lörzing 9979* (L); Tapianoeli, Toba, *Rahmat Si Boeca 9815* (L).

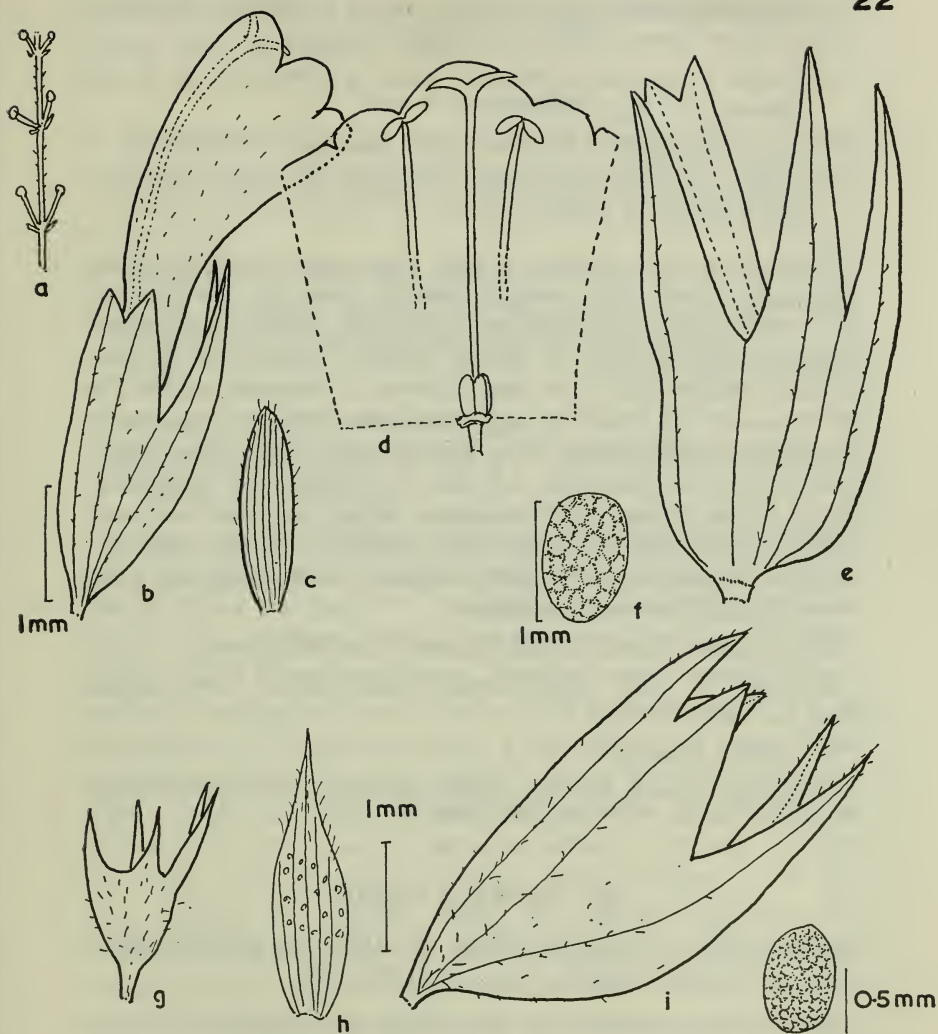


Fig. 22. *Mosla dianthera* Maxim. (a-f) and *M. formosana* Maxim. (g-i).

a. diagram of portion of inflorescence; b. flower; c. bract; d. corolla expanded, showing 2 fertile stamens; e. fruiting calyx; f. nutlet; g. calyx; h. bract; i. fruiting calyx and nutlet. (a-f, Lörzing w9979); g-i. Ramos and Edano 37803).

The Malesian plant differs from the typical form of the species from India in the much smaller leaves (1–2 by 0.5–1 cm) and in the completely disappearance of the anterior staminodes. In Indian plant, the leaves are usually 1.5–3.5 cm long and 1–2 cm wide, and the two anterior staminodes normally are present.

2. *Mosla formosana* Maxim. in Bull. Acad. St. Petersb. 20 (1875) 459; Merr. Enum. Philip. Fl. Pl. 3 (1925) 414.

Orthodon formosanum (Maxim.) Kudo in Mem. Fac. Sc. & Ag. Taihoku Un. 2, 2 (1929) 79.

Mosla lysimachiiflora Hayata, Ic. Pl. Formos. 8 (1919) 104.

Orthodon lysimachiiflorus (Hay.) Masam. in Trans. Nat. Hist. Soc. Formos. 22 (1932) 232.

Small erect herb, 20–100 cm high. Stems and branches grayish, pubescent. Leaves thin membranaceous, ovate to oblong-ovate, 2–2.5 cm long, 0.8–1 cm wide, acute, the base cuneate or attenuate; margins crenate-serrate or sharply serrate, glabrescent on both surfaces; petioles 0.5–1 cm long. Flowers in terminal raceme-like inflorescences on branches and branchlets, 3–4 cm long; bracts lanceolate, slightly longer than the flowering buds, often gland-dotted. Calyx campanulate, 1.5 mm (in fruiting, 4–5 mm) long, hirsute on the nerves; teeth lanceolate, ciliate, the lower two teeth slightly longer than the upper ones. Corolla 3–4 mm. long, not annulate. Nutlets ovoid to nearly rounded, 0.8 mm long and wide, brown, slightly flattened, reticulate.

Distribution: Formosa and Malesia (The Philippines).

Ecology: In open places along trails, and on forest edges, altitudes 1,000–1,600 m.

Specimens examined:

Philippines: Bontoc, Mt. Polis, *Ramos & Edano 37726* (BM); Bontoc, Mt. Pukis, *Ramos & Edano 37803* (BM, K, L).

23. NOSEMA PRAIN

Nosema Prain in J. As. Soc. Beng. 73 (1904) 20; Kudo in Mem. Fac. Sc. & Agr. Taihoku Un. 2, 2 (1929) 108.

Erect herbs, branched or not. Stems and branches slender, pubescent. Leaves opposite, petiolate. False whorls many flowered, forming terminal cylindrical racemose inflorescence, continuous or interrupted below; flowers small; bracts leafy below, gradually diminishing in size upwards. Calyx obliquely ovoid (in fruit tubular), 10-nerved, 2-lipped, the upper lip oblong, entire or very inconspicuous, 3-lobed, the lower round, entire, much shorter than the upper lip. Corolla short; throat inflated, abruptly constricted towards the base; limb 2-lipped, the upper lip slightly shorter, unequally 3-lobed, the median lobe often very broad; lower lip oblong, entire, concave. Stamens 4, in two pairs, declinate; anther-loculate confluent into 1-loculate; filaments pubescent, those of

the upper pair appendaged at the base. Nutlets ovoid, minute, smooth; fruiting calyx-tube flattened cylindrical, transverse veins connecting the longitudinal nerves though present, but inconspicuous, not deeply pitted.

Over 6 species have been described from India to Thailand, Indo-China, S. China (Kwangtung and Hainan). The following 2 species occur in Malesia.

Key to the species

- A. Inflorescence 12–15 cm long; false whorls generally 0.5–1.5 cm apart; upper corolla-lip very unequally 3-lobed; fruiting calyx thick coriaceous, pitcher-shaped, inflated in the middle, 6.5–7 mm long. 1. *N. clausa*
- A. Inflorescence 6–8 cm long; false whorls more or less continuous; upper corolla-lip equally 3-lobed; fruiting calyx herbaceous, tubular, not or only slightly inflated in the middle, 8–8.5 mm long. 2. *N. cochinchinense*

1. *Nosema clausa* (Merr.) *comb. nov.*

Masona clausa Merr. in Philip. J. Sc. 7 (1912) 345, Enum. Philip. 3 (1923) 420.

An erect unbranched herb, 20–30 cm high. Stems densely covered with villose hairs. Leaves chartaceous, oblong or narrowly oblong, 4.5–6 cm long, 1–2 cm wide, acute or obtuse, the base acute, velvet on both surfaces, lateral nerves 7–8 on each side; petioles 0.5–1.5 cm long, velvet. Spurious spike terminal, 12–15 cm long, interrupted; false whorls 12–20 flowered, about 1.5 cm in diameter, 2–2.5 cm apart; bracts 2 subtending each whorl, ovate, acuminate, 0.5–1.5 cm long, densely villous, the lowermost ones almost foliaceous. Calyx obliquely campanulate, 2.5–3 mm long, densely hairy, the upper lip lanceolate-oblong, obscurely 3-lobed; the lower truncate-rounded. Corolla trumpet-shaped, 3.5–4 mm long, inflated from middle above, and abruptly narrowed into a small tube below; upper lip shortly 3-lobed, the mid-lobe much larger than the 2 lateral ones; lower lip entire, concave. Stamens in 2 pairs, the upper pair pubescent and appendaged at the base. Fruiting calyx thick coriaceous, pitcher-shaped, 7–8 mm long, slightly inflated in the middle, the mouth nearly closed by the lid-like lower lip. Nutlets ellipsoid, 1 mm long, smooth.

Type: Culion Island, the Philippines, *Merrill 460* (K, Sing. iso-type) Dec. 13, 1903.

Distribution: Malesia (The Philippines).

Habitats: In open, damp places at low altitudes.

Specimens examined:

Philippines: Culion Island, *Merrill 460* (K, Sing. type), *Ramos 41313* (L).

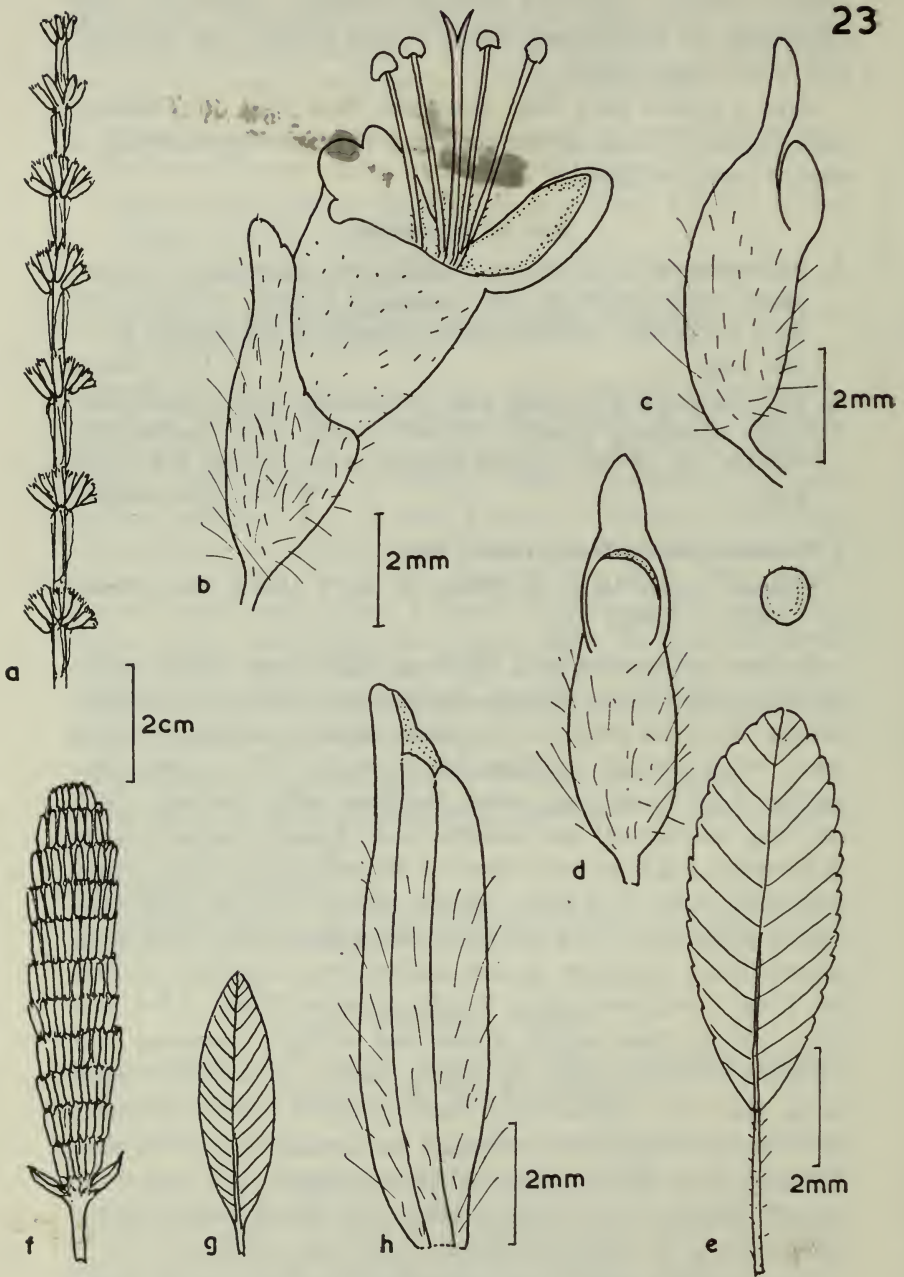


Fig. 23. *Nosema clausa* (Merr.) H. Keng (a-e) and *N. cochinchinense* Merr. (f-h).

a. diagram of the spicate inflorescence; b. flower; c. & d. fruiting calyx in lateral and ventral views, and a nutlet; e. leaf; f. diagram of inflorescence; g. leaf; h. fruiting calyx, in lateral view. (a-c. Merrill 460; f-h. Junghuhn 51).

2. *Nosema cochinchinense* (Lour.) Merr. in Trans. Amer. Philos. Soc. n.s. 24 (1935) 343; Wu in Act. Phytotax. 8 (1959) 62.

Dracocephalum cochinchinense Lour. Fl. Coch. (1790) 371; ed. Willd. (1793) 450.

Mesona prunelloides Hemsl. in J. Linn. Soc. Bot. 26 (1890) 267.

Nosema prunelloides (Hemsl.) C. B. Clarke ex Prain in J. As. Soc. Beng. 73 (1904) 21.

Nosema capitatum (Hemsl.) C. B. Clarke ex Prain var. *javanica* C. B. Clarke ex Prain in op. cit. 73 (1904) 21, *in adnot.*

An erect herb, about 30–50 cm high, sparingly branched. Stems obscurely angled, densely covered with villous hairs. Leaves chartaceous, oblong or narrowly oblong, 4–6 cm long, 1–1.5 cm wide, both ends acute or obtuse, the margins crenulate, sparsely villous on both surfaces; petioles 0.5–1(–2) cm long. Inflorescence terminal, 6–8 cm long; false whorls almost continuous; bracts subtending the lowermost whorls similar to the foliage leaves but smaller, densely villous. Calyx obliquely campanulate, 2.5–3 mm long, densely hairy; upper lip shallowly 3-lobed; lower lip much shorter than the upper, emarginate or notched in the middle, densely covered with long hairs externally. Corolla campanulate, 3–4 mm long; upper lip shortly 3-lobed, the lobes more or less equal in size; lower lip oblong, entire, concave. Stamens in 2 pairs, the upper pair puberulent and appendaged at the base. Fruiting calyx herbaceous, tubular, 8–8.5 mm long. Nutlets minute, about 1 mm long, smooth.

Distribution: Siam, Indo-China to S. China (Kwantung, Hainan) and Malesia (Sumatra, Java).

Specimens examined:

Sumatra: Toba, C. D. Duwachond 83 (L, type of *Achocephalus sumatranus* Backer in sched, unpublished).

Java: Junghuhn no. 13, no 14 (L), no. 8, no 51 (K, types of *Nosema capitatum* var. *javanicum* Clarke ex Prain).

24. OCIMUM LINN.

Ocimum Linn. Sp. Pl. (1753) 833; Benth. Lab. Gen. & Sp. (1832) 1 (as *Ocymum*), in Benth. & Hook. f. Gen. Pl. 2 (1876) 1171; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 369; Furtado in Gard. Bull. Str. Settl. 4 (1929) 416.

Becium Lindl. in Bot. Reg. (1842) misc. 43.

Herbs or undershrubs, strongly scented. Stems often much-branched. Leaves opposite, petiolate. Flowers small; false whorls 6–10-flowered, forming racemose inflorescence, simple or branched; pedicels recurved under the calyx; bracts minute, caducous. Calyx ovoid or campanulate (in fruit deflexed), 2-lipped; upper lip large, broad, flat (in fruit strongly reflexed), often decurrent on the tube; lower lip usually with 4 narrow, pointed teeth. Corolla campanulate, not annulate within, 2-lipped; upper lip truncate, subequally 4-fid; lower lip declinate, flat, entire. Stamens 4, declinate, in 2 pairs, exserted; filaments free (in Malesian species) or the lower

pair connate below, naked or the upper pair toothed or hairy below; anther-locules confluent. Disk entire or 2-4-lobed. Style 2-fid; branches subulate or flattened. Nutlets smooth or subrugose, in some species mucilaginous when moistened.

Species over 100, throughout the tropics. 4 species in Malasia.

Key to the species

- A. Pedicels much shorter than calyx, the latter glabrous or hairy within.
 - B. Calyx hairy within; 2 lower calyx teeth slightly longer than the upper tooth; fruiting pedicels strongly recurved; herbs or undershrubs.
 - C. Corolla 4-6 mm long; fruiting calyx 2.5-3 mm long, hairy and setaceous. 1. *O. americanum*
 - C. Corolla 7.5-12 mm long; fruiting calyx 5-6 mm long, often glabrous. 2. *O. basilicum*
 - B. Calyx glabrous within; lower calyx-teeth shorter than the upper one; fruiting pedicels straight; shrubby. 3. *O. gratissimum*
- A. Pedicels nearly as long as calyx, the latter glabrous within; 2 lower calyx-teeth longer than the upper tooth, soft hairy. 4. *O. sanctum*

1. ***Ocimum americanum*** Linn. Cent. Pl. 1 (1755) 15, Amoen. Acad. 4 (1759) 276; Back. & Bakh. f. Fl. Java 2 (1965) 640. (*non*. Jacq. 1798).

Ocimum canum Sims, in Bot. Mag. 51 (1823) pl. 2452; Benth. Lab. Gen. & Sp. (1832) 3, 707, in DC. Prodr. 12 (1848) 32; Miq. Fl. Ind. Bat. 2 (1859) 936; Hook. f. Fl. Brit. Ind. 4 (1885) 607; Kudo in Mem. Fac. Sc. & Ag. 2, 2 (1929) 113; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 17.

Ocimum africanum Lour. Fl. Cochinch. (1790) 370 (as *Ocymum*); Merr. in Trans. Amer. Phil. Soc. 24, 2 (1935) 343.

Ocimum brachiatum Bl. Bijdr. (1826) 833. (as *Ocymum*).

Erect herb, 30-50 cm high, branched. Stems and branches striate, pubescent or glabrescent. Leaves lanceolate to elliptic, 2.5-5 cm long, 0.9-2.5 cm wide, acute, the base cuneate, the margins entire or remotely crenulate, glabrous and glandular-dotted on both surfaces; petiole 1-2.5 cm long. False whorls in raceme-like inflorescence, terminal, simple or branched, 7-15 cm long; bracts elliptic-lanceolate, 2-3(-5) mm long, acuminate, hairy; pedicels subsessile. Calyx 2-2.5 mm (in fruit 4-4.5 mm) long, villous within, pubescent with long, white hairs externally; uppermost tooth broad and rounded, ciliate; lower teeth lanceolate-subulate. Corolla 5-6 mm long, glabrescent or puberulous. Filaments exerted, slender, the upper ones toothed above the base. Nutlets narrowly ellipsoid, 1.2 mm long, punctate, black.

Distribution: Tropical Africa, India, Ceylon to S. China, and Malesia.

Ecology: In settled areas or in open waste places at low altitudes.

Vern. names: Kamangi, Theru Neetu Patchai (Malay Peninsula).

Specimens examined:

Sumatra: Sumatra, *Korthals s.n.* (L); Batoe Isls., *Raap 575* (L); Sumatra, *Collector Unknown s.n.* (L).

Malay Peninsula: Perak Temoh, *Burkill & Haniff 13510* (Sing.); Kedah, Langkawi, *Curtis 2492* (Sing.); Singapore, *Hamilton s.n.* 1926 (Sing.); Kuala Kangsar, Istana Garden, *Haniff 14930* (Sing.); Perak, Sungkai, Lima Blas Estate, *Reed s.n.* 1941 (Sing.).

Java: Java, *Backer s.n.* 1902 (L); Bantam, alt. 300 m, *Backer 7406* (L); Batavia, *Blume s.n.* (L) (Type of *Ocimum brachiatum* Bl.) (several collections); Tanjong Priok, *Kuhl & Hasselt s.n.* (L); Anjer, *Collector Unknown s.n.* Aug. 1930 (L).

Lesser Sunda Islands: Lombok, Rindjani, alt. 0–20 m, *Elbert s.n.* April 1909 (L).

New Guinea: Papua, Veiya alt. sea level, *Carr 11606* (L); Kaiser Wilhelmsland, *Weinlan 207* (L).

Type specimen of Blume's *Ocimum brachiatum* has been studied, it is identical with *Ocimum americanum* (= *O. canum* Sim.) thus confirming Miquel's (1859, p. 936) earlier suggestion that the former is synonymous with the latter.

2. ***Ocimum basilicum*** Linn. Sp. Pl. (1753) 833; Benth. Lab. Gen. & Sp. (1832) 4, in DC. Prodr. 12 (1848) 32 (incl. var. *glabratum*) Miq. Fl. Ind. Bat. 2 (1858) 937; Hook. f. Fl. Brit. Ind. 4 (1885) 608; Prain in J. As. Soc. Beng. 74, 2 (1907) 702; Merr. Enum. Philip. 3 (1923) 421; Ridl. Fl. Mal. Pen. 2 (1923) 643; Kudo, Mem. Fac. Sc. Agr. Taihoku Un. 2, 2 (1929) 113; Back. & Bakh. f. Fl. Java 2 (1965) 639.

Ocimum americanum (non Linn.) Blanco, Fl. Filip. (1837) 480, ed. 2 (1845) 335.

Ocimum citriodorum Blanco, Fl. Filip. ed. 2 (1845) 591.

An erect branching herb, 0.5–1 m high. Stem and branches glabrous or hispidly hairy when young. Leaves membranaceous, ovate or elliptic-ovate, 3–5 cm long, 1.2–2 cm wide, acute, the base cuneate, entire, the margins elsewhere entire or few-toothed, glabrescent or hairy; petioles 1–2 cm long. False whorls many-flowered, in simple or branched racemes, 10–15 (or more) cm long; bracts lanceolate-ovate, 2–3 mm long; pedicels very short. Calyx 2–3 mm (in fruit 5–6 mm) long; upper lip suborbicular; lower lip with central pair of teeth longer than the upper lip, sharply pointed. Corolla 7–12 mm long, glabrous or hispidous. Filaments exserted; the upper ones with a tooth above the base. Nutlets ellipsoid, 1.5 mm long, pitted.

Distribution: Throughout the Old Tropics.

Ecology: In settled areas or in open waste places at low and medium altitudes, also commonly cultivated.

Vern. names: Kemangi, Selasih (Java); Roedang, Koelasa Koling, Roedangna lopak, Selang-bano, Roedangna birong (Sumatra); Selasih (Malay Peninsula); Bawingsulug, Glontud, Sag bu, solasi (Philippines).

Specimens examined:

Sumatra: Simaloer, *Achmad* 309 (L); Gajo & Alas Lands, *Daalen* 217 (L); Sumatra, *Korthals s.n.* (L); Palembang, *Practorius* 28 (L); Kota Pinang, Laboeban Batoe, *Rahmat Si Toroes* 3654 (L); Asahan, *Rahmat alias Bidin* 6 & 74 (L).

Malay Peninsula: Perak, Ipoh, *Allen* 4792 (Sing.); Penang, Lanyong Tokong, *Curtis* 2492 (Sing.); Pahang, P. Tiomon, Telok Paya, *Henderson* 18428 (Sing.); Perak, Irik Estate, *Milsum s.n.* 1929 (Sing.); Tampin, alt. 1 m, *Monod de Froideville* 664 (L); Perak, Sungkai, *Reed s.n.* 1914 (Sing.); Pahang, Kuala Taulelin, *Ridley s.n.* 1891 (Sing.); Singapore, P. Ayer Merbau, Kampong Ayer Merbau, *Sinclair s.n.* Aug. 1949 (L); Johore, Kota Tinggi, *Teruya* 334 (Sing.); Penang, *Wallich s.n.* 1829 (K) (Type of *Ocimum basilicum* var. *glabratum* Benth.).

Java: Java, *Backer s.n.* 1902 (L); Kendal, alt. 5 m, *Backer* 16468 (L); Madoera, Sampang, alt. 50 m, *Backer* 19610 (L); Madoera, Rapa, alt. 125 m, *Backer* 20091 (L); Madoera, Tamberoe, alt. 10 m, *Backer* 20547 (L); Besoeki, *Backer* 36567 (L); Baweang, G. Malang, *Buwalda* 2983 (L); Soerabaja, alt. 10 m, *Dorgelo* 1648 (L); Bogor, *Hallier d* 297 (L); G. Ungarang, alt. 1,000-1,600 m, *Junghuhn* 7 (L); Besoeki, Poeger Watangan, alt. 5 m, *Koorders* 21539B (L); Ngarengan, *Koorders* 27454B (L); Tanjung Priok, *Kuhl & Hasselt s.n.* (L); Batavia, Kampong Nangrang, *Schiffner* 2488 (L); Java, *Waltz s.n.* (L).

Lesser Sunda Islands: Timor, *Zippelius s.n.* (L).

Borneo: N. Borneo, Pembliangan, *Amdjah s.n.* (L).

Philippines: Mindoro, Yagaw, *Conklin* 973 (L); Luzon, Laguna, *Elmer* 8067 (K); Zamboanga, alt. 300 & 500 m, *Frake* 530 & 562 (L); Luzon, Rizal Antipolo, *Merrill Sp. Blanco* 437 (K, L); Luzon, Camarines, *Ramos* 1541 (L); Mindanao, Santa Maria, *Reillo* 16459 (K); Mindanao, Davao, Santa Cruz, *Williams* 2709 (K).

Celebes: Menado, Paloe, alt. 5 m, *Eyma* 1747 (L); Menado, *Koorders* 19760B (L).

Moluccas: Ceram, Kp. Kiandarar, alt. few m, *Buwalda* 5971 (L); Ceram, *Forsten s.n.* (L) (several collections); Halmahera, *Idjan & Mochtar* 280 (L); Halmahera, *Pleyte* 73 (1178) (L).

New Guinea: Papua, Maclatchie Point, *Brass* 1187 (K); Papua between S. Coast & Owen Stanley Range, *Burke* 358 (K); Waga Waga, *Daniels Ethnographical Exp.* 6926 (K); NE. New Guinea, *Lewandowsky* 50 (L).

Recently Morton [in *J. Linn. Soc. (Bot.)* 58 (1962) 232] pointed out that *Ocimum americanum* (= *O. canum* Sims) and *O. basilicum* Linn. differ but little from one another except in size though the former is more hairy. These differences in size are associated, as revealed, with chromosome number: West African material of *O. americanum* having $2n=24$ and of *O. basilicum*, $2n=48$.

3. *Ocimum gratissimum* Linn. Sp. Pl. (1753) 832 (as *Ocimum*); Benth. in DC. Prodr. 12 (1848) 34; Miq. Fl. Ind. Bat. (1858) 938; Hook. f. Fl. Brit. Ind. 4 (1885) 608; Prain in J. As. Soc. Beng. 75, 2 (1907) 702; Ridl. Fl. Mal. Pen. 2 (1923) 644; Back. & Bakh. f. Fl. Java 2 (1965) 639.

A perennial herb or shrubby, 1-2 m high, woody at the base. Stems and branches glabrous, pubescent when young. Leaves membranaceous, elliptic-lanceolate, 5-10 cm long, 2.5-4.5 cm wide, acute, the base cuneate, entire; margins elsewhere coarsely crenate-serrate, puberulent or pubescent; petioles 2-4.5 cm long,

slender, pubescent. False whorls in simple or branched racemes, 10–15 cm long, the rachis softly pubescent; bracts sessile, ovate, acuminate; pedicels very short. Calyx 1.5–2 mm (in fruit 3–4 mm) long; upper lip rounded and recurved; lower lip with central pair of teeth minute and much shorter than the upper lip. Corolla 3.5–4 mm long, pubescent externally. Filaments distinctly exerted; upper pair with a bearded tooth at the base. Nutlets subglobose, 1.5 mm long, rugose.

Distribution: Pantropical.

Ecology: In open waste places or in the settled area at low altitudes.

Vern. names: Selasi, Boekoe-roekoe, rimbo, Selasih (Java); Nai Thoolasi (Malay Peninsula).

Specimens examined:

Sumatra: Pajakumbuh, alt. 550 m, *Meijer 7143* (L).

Malay Peninsula: Perak, Sungei Siput, *Haniff 6923* (K, Sing.); Perak, Bidor Estate, *Reed 8* (Sing.).

Java: Batavia, *Backer s.n.* Sept. 1903 (L); Pekalonggan, Pernalang, alt. 2 m, *Backer 15632* (L); Bangka, *Berkhout s.n.* Aug. 1886 (L); Batavia, Depok, Alt. 90 m, *Bakhuizen v/d Brink Jr. 1375* (L); Tandjong Priok, *Buitendijk s.n.* 1914 (L); Banka, Poeloe Nangka, alt. 3 m, *Bünnemeijer 2073* (L); Bogor, *Hallier D 298* (L); Batavia, alt. 150 m, *Koorders 31408B* (L) ("Selasih"); Bandoeng, alt. 750 m, *Popta 743/212* (L); Bogor, Seogandiredjo 236 (L); Batavia, *Vorderman s.n.* Aug. 1893 (L).

New Guinea: New Britain, alt. 1–3 m, *Peekel 12* (L).

4. *Ocimum sanctum* Linn, Mant. 1 (1767) 85; Benth. Lab. Gen. & Sp. (1832) 11, in DC. Prodr. 12 (1848) 38; Miq. Fl. Ind. Bat. 2 (1858) 939; Hook. f. Fl. Brit. Ind. 4 (1885) 609; Prain in J. As. Soc. Beng. 74, 2 (1907) 699; Merr. Enum. Philip. 3 (1923) 422; Ridl. Fl. Mal. Pen. 2 (1923) 643; Kudo in Mem. Fac. Sc. Ag. Taihoku Un. 2, 2 (1929) 114; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 19; Back. & Bakh. f. Fl. Java 2 (1965) 639.

An erect, much branched herb, 30–60 cm high, often woody at the base. Stems and branches soft hairy. Leaves membranaceous, elliptic-oblong or elliptic, 3–6 cm long, 1–2.5 cm wide, obtuse or acute, the base cuneate or attenuate, entire; margins elsewhere entire or remotely serrate; pubescent on both surfaces, especially on the nerves underneath. False whorls in slender raceme or panicles, 8–10 cm long; bracts ovate, acuminate, 2–3 mm long, ciliate; pedicels 3–4.5 mm long, pubescent. Calyx 2.5 mm (in fruit 3–3.5 mm) long; upper lip suborbicular, reflexed, shortly apiculate; lower lip longer than the upper, the teeth 4, lanceolate. Corolla 3.5–4 mm long. Filaments exerted, slender, the upper ones with a small bearded basal appendage. Nutlets minute, broadly ellipsoid, 1.2 mm long, smooth.

Distribution: Pantropic.

Ecology: A weed, commonly found in waste places or in settled areas.

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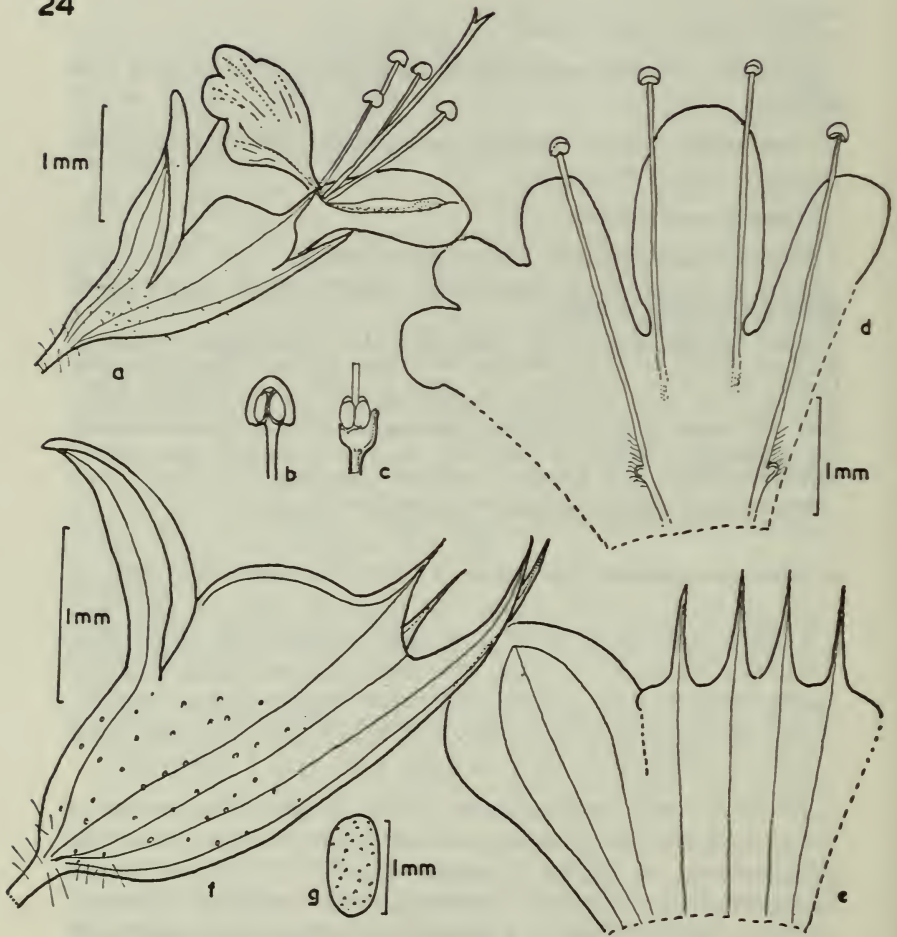


Fig. 24. *Ocimum sanctum* Linn.

a. flower; b. stamen (from bud); c. ovary and nectary disc; d. corolla expanded; e. calyx expanded; f. fruiting calyx; g. nutlet (fresh material).

Vern. names: Roedang tampoea, Kemangi, Selasih poetih (Sumatra); Lampes, Soerawoeng (Java); Oku, Ruku-ruku, Thulasi, Salassay (Malay Peninsula); Kemangen (Celebes); Sagbu, Hanumo, Colo-cogo, Samirig hau (Philippines); Bengh, Sulasi (Borneo).

Specimens examined:

Sumatra: Simaloer, *Achmad* 305 (L); Asahan, *Bartlett & Rue* 403 & 404 (L); Banka, *Bontja*, alt. 100 m, *Bünnemeijer* 2251 (L); G. Merapi, alt. 900 m, *Bünnemeijer* 4815 (L); Alaslanden, *Daalen* 472 (L); Enggano, Malakoni, *Lütjeharms* 4922 (L); Alaslanden, *Pringo Atmodjo* 472 (L); Kota Puiang, *Rahmat Si Toroes* 3653 (L), Asahan, *Tates* 2559 (L).

Malay Peninsula: Malacca, *Alvins s.n.* (Sing.); Johore, Pulau Tinggi, *Burkill s.n.* 1915 (Sing.); Port Swettenham, *Burkill* 2700 (Sing.); Kedah, Langkawi, *Curtis* 2126 (Sing.) Singapore, Pulau Ubin, *Furtado* 18622 (Sing.); Singapore, *Hullett* 374 (Sing.); Penang, *Lobb* 298 (K.); Prov. Wellesley, Prai, *Nur* 6226 (Sing.); Selangor, Tanjong Karang, *Nur* 34186 (Sing.); Pahang, Pekan, *Ridley* 167 (Sing.); Prov. Wellesley, Pagas Tras, *Ridley* 7168 (Sing.); Selangor, Kuala Lumpur, *Ridley* 10214 (Sing.); Pahang, Kuala Tahan, *Seimund* 831 (Sing.); Singapore, Tandjong Teritip, *Sinclair s.n.* Aug. 1950 (L); Kedah, Ichong Estate, *Spare* 3846 (Sing.); Perak, Matang, *Wray* 5588 (Sing.).

Java: Soerakarta, alt. 150 m, *Backer* 6421 (L); Kediri, alt. 75 m, *Backer* 11280 (L); Tegal alt. 50–100 m, *Backer* 15367 (L); Pekalongan, alt. 5 m, *Backer* 15656 (L); Kendal alt. 1–2 m, *Backer* 16372 (L); Tjitioreog, alt. 200 m, *Backer* 17321 (L); Madoera, Bakgalan, alt. 5 m, *Backer* 19111 (L); Madoera, Ketapang, alt. 100 m, *Backer* 19943 (L); Batavia, Bantamtijn, alt. 80 m, *Backer* 24013 (L); Depok, alt. 90 m, *Bakhuizen v/d Brink Jr.* 1753 (L); Poerwakarta, alt. 85 m, *Bakhuizen v/d Brink Sr.* 4883 (L); Bantam, *Blume s.n.* (L); Java, *Blume s.n.* (L) (several collections); Soerabaja, alt. 15 m, *Dorgelo* 362 (L); Buitenzorg, *Hallier* 278 a & b (L); Bogor, *Hallier D* 299 b (L); Batavia, *Hallier s.n.* Aug. 1896 (L); Batavia, *Hasselt s.n.* (L); Semarang, Koedoes, alt. 15–20 m, *Houwing* 791 (L); Tjilatjap, *Junghuhn* 587 (L); Banjoemas, Noesamangir, *Kievits & Kooper Banj.* 15 (L); Banjoemas, Serajoe, *Kievits & Kooper Banj.* 23 (L); Banjoemas alt. 20 m, *Kievits Banj.* 129 (L); Banjoemas, *Kievits Banj.* 2553 (L); Wonoredjo, *Kooper* 542 (L); Besoeki, Poeger-Watangan, *Koorders* 21538B (L); Madioen, alt. 70 m, *Koorders* 23367B (L); Semarang, *Koorders* 24509B (L); Karanganjur, *Koorders* 26206B (L); Pekalongan, *Koorders* 27453B (L); Bogor, *Korthals s.n.* (L); Batavia, Proik, *Raap* 387 (L); Batavia, alt. 100 m, *Steenis* 5303 (L); Batavia, *Vorderman s.n.* (L); Java, *Waitz s.n.* (L).

Lesser Sunda Islands: Tenimber Isl., alt. few m, *Buwalda* 4051 (L); Lombok, Rindjani, alt. 125–225 m, *Elbert* 729 (L); Sumbawa, Bima, 0–200 m, *Elbert* 3973 (L); Soemba, Kindara, *Iboet* 159 (L); Flores, Reo, alt. 20 m, *Posthumus* 3420 (L); Timor *Zippelius s.n.* (L) (several collections).

Borneo: North Borneo, Keningan, alt. 410 m, *Keith* 1611 (L); North Borneo, Pababag Isl., alt. 7 m, *Keith* 7394 (L); Borneo, Bandjarmasin, *Collector Unknown s.n.* (L).

Philippines: Mindoro, Boliran, *Celestino & Castro* 1965 (L); Mindoro, Mt. Yagaw, alt. 400 m, *Conklin* 35952 (L); Mindoro, Mt. Yagaw, alt. 300 & 700 m, *Conklin* 37608 & 37857 (L); Palawan, Baraki, *Fox* 13442 (L); Cagayan Sulu, *Kondo & Edano* 39023 (L); Luzon, Pangasinan, Umingan, *Merrill sp. Blanco* 400 (L); Luzon, *Ramos* 7598 (L); Basilan, *Reillo* 15443 (L); Iloilo, *Soriano* 16465 (L).

Celebes: Muna, Raha, alt. 0–125 m, *Elbert* 2863 (L); Manado, alt. 5 m, *Eyma* 1748 (L); Minahassa, alt. 0 & 10 m, *Koorders* 17384B & 17388B (L); Lake Tempe, *Weber s.n.* (L).

Moluccas: Ceram, *Vriese s.n.* 1859–60 (L); Banda, *Collector Unknown s.n.* (L).

New Guinea: Oeta, Aendoea River, alt. 3 m, *Aet* 525 (L); S. New Guinea, Goboki forest, Oleabi, *Branderhorst* 50 (L); Aroe Isls., P. Kobroör, alt. few m, *Buwalda* 4976 (L); Papua, Veiya, alt. sea level, *Carr* 11605 (L); Merauke, *Koch s.n.* 1904–05 (L); New Guinea, *Zippelius s.n.* (L).

25. ORTHOSIPHON BENTH.

Orthosiphon Benth. in Bot. Reg. 13 (1829) t. 1300, in Benth. & Hook. f. Gen. Pl. 2 (1876) 1174; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 372; v.d. Slessen in Reinwardtia 5 (1959) 37.

Clerodendranthus Kudo in Mem. Fac. Sc. & Agr. Taihoku Un. 2, 2 (1929) 117.

Herbs or subshrubs. Leaves opposite, serrate or crenulate. False whorls 4–6-flowers, arranged in terminal, racemose inflorescence. Calyx tubular campanulate (in fruit deflexed), 2-lipped; upper lip broad, membranaceous, often recurved; lower lip 4-toothed, the lateral teeth oblong, aristate, the central teeth subulate. Corolla-tube slender, the limb 2-lipped; upper lip 3–4-lobed; lower lip entire, concave. Stamens 4, declinate, included or long-exserted; filaments free, not appendaged at base; anther-locules confluent. Disk 4-lobed, produced anteriorly. Style filiform, entire; stigma capitate or clavate. Nutlets ovoid or globose, smooth.

Species about 40, in tropics of the Old World; 2 species in Malesia.

Key to the species

- A. Leaves often decurrent; stamens and style over 3 cm long, exserted from corolla-tube. 1. *O. aristatus*
 A. Leaves mostly not decurrent; stamens and style less than 1 cm long, included in corolla tube. 2. *O. thymiflorus*

1. **Orthosiphon aristatus** (Bl.) Miq. Fl. Ind. Bat. 2 (1858) 943; Merr. Enum. Philip. 3 (1923) 422; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 26; v.d. Slessen in Reinwardtia 5 (1959) 38; Back. & Bakh. f. Fl. Java 2 (1965) 640.

Ocimum aristatum Bl. Bijdr. (1825) 833.

Ocimum grandiflorum (non L'Heirt.) Bl. Bijdr. (1825) 835.

Orthosiphon stamineus Benth. in Wall. Pl. As. Rar. 2 (1831) 15, Lab. Gen. & Sp. (1832) 29, in DC. Prodr. 12 (1848) 52 (incl. var. *angustifolia* Benth.); Miq. Fl. Ind. Bat. 2 (1858) 944; Hook. f. Fl. Brit. Ind. 4 (1835) 615; Prain in J. As. Soc. Bengal 72 (1907) 703; Ridl. Fl. Mal. Pen. 2 (1923) 645.

Clerodendranthus stamineus (Benth.) Kudo in Mem. Fac. Sc. & Agr. 2, 2 (1929) 117.

Orthosiphon spiralis (Lour.) Merr. in Trans. Amer. Phil. Soc. 24, 2 (1935) 344.

A slender, ascending herb, 30–60 cm high; stems 4-angled, sparingly pubescent in young shoots. Leaves chartaceous or membranaceous, ovate or rhombic, 3–9 cm long, 2–4.5 cm broad, acuminate, the base cuneate, entire; margins elsewhere coarsely serrate, puberulous or pubescent on the nerves on both surfaces; petioles 1–2(–4.5) cm long, puberulent. False whorls distantly apart below, arranged in lax terminal racemes 10–15(–20) cm long; bracts sessile, ovate, 1–2 mm long. Calyx curved campanulate,

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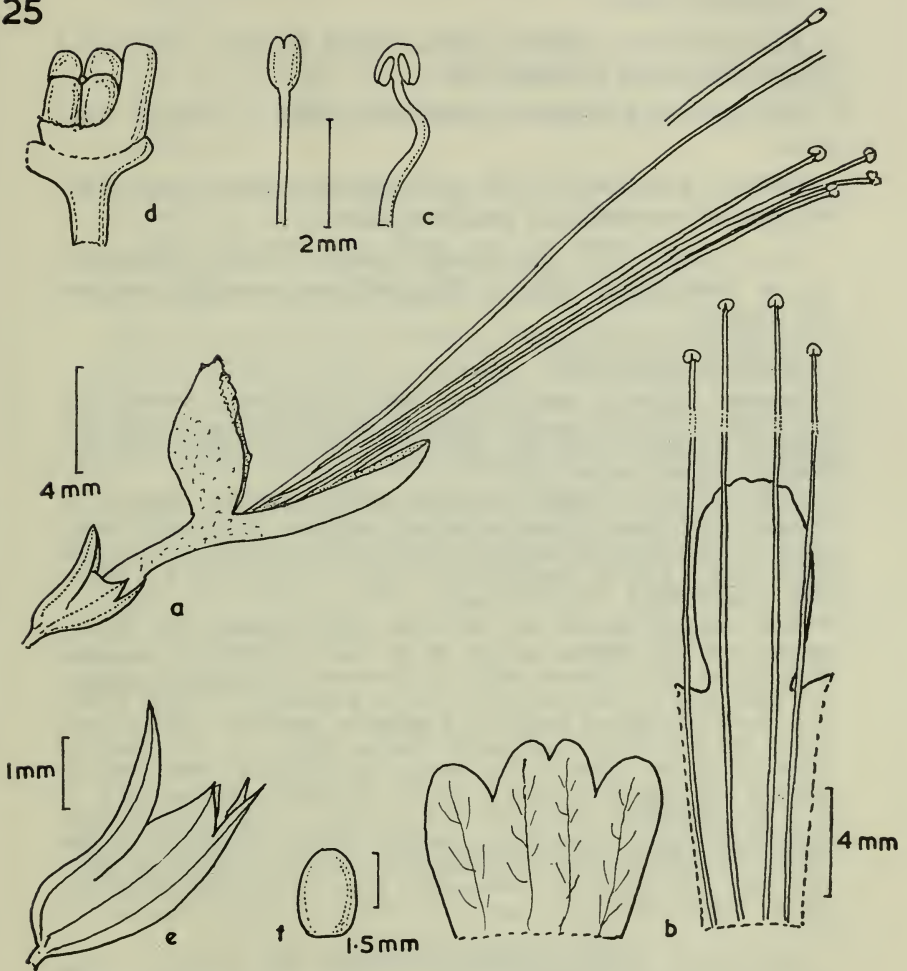


Fig. 25. *Orthosiphon aristatus* Miq.

a. flower; b. upper and lower lips of corolla; c. style-tip and stamen (from bud); d. ovary and nectary disc; e. fruiting calyx; f. nutlet (fresh material).

2.5–4.5 mm (in fruit 6.5–10 mm) long, puberulous on the nerves, gland-dotted or warted externally. Corolla 10–16(–20) mm long; tube slender 10–12 mm long, straight; upper lip shallowly 4-lobed, recurved; lower lip straight, concave. Filaments glabrous, filiform, coiled in bud, projecting about 20 mm beyond corolla-throat. Style 50–60 mm long, the tip enlarged, club-shaped, very briefly 2-fid; the branches clasped. Nutlets broadly oblong, compressed, 1.5 mm long, rugose.

Type specimens: Batavia, Java, *Blume s.n. (no. 1091?)*, (L) (Type of *Ocimum aristatum* Bl.).

Distribution: Throughout southeastern Asia to tropical Australia.

Habitat: In thickets at low and medium altitudes, often cultivated as an ornamental or medicinal plant.

Vern. names: Giri giri mareh, Koemis Koetjing (Sumatra); Dacén remoerjoeng (Java); Tjikupi-tjikupi, mangkat kwabon (N. Guinea).

Specimens examined:

Sumatra: Simaleor Island, *Achmad* 818 (L); Moeara, *Boerlage* 223 (L); Sumatra, *Korthals s.n.* (L); Sibolangit, alt. 500 m, *Lorzing* 7255 (L); Sumatra, *Lütjeharms* 5032 (L); Djambi, alt. 30 m, *Posthumus* 1026 (L); Djambi, *Rutten-Kooistra* 72 (L).

Malay Peninsula: Kedah, Langkawi, Dayang Bunting, *Alphonso & Samsuri A 91* (Sing.) (limestone rocks); Langkawi, *Curtis* 2577 (Sing.) Kelantan, Kuala Pertang, *Haniff & Nur* 10375 (Sing.); Langkawi, *Henderson* 29092 (Sing.); Pahang, *Holtium* 24683 (Sing.); Perak, *King's Collector* 8813 (Sing.); Perak, *Reed* 3 (Sing.).

Java: Bandung, *Backer s.n.* Dec. 1910 (L); Rembang, alt. 150 m, *Backer* 6596 (L); Madjenang, alt. 40 m, *Backer* 18463 (L); Madoera, Djelgong, alt. 100 m, *Backer* 20050 (L); Buitenzorg, alt. 200 m, *Bakhuizen v/d Brink* 6343 (L); Buitenzorg, alt. 250 m, *Bakhuizen v/d Brink Jr.* 926 (L); Rembang, *Beumee* 803 (L); Bultenzorg, *Boerlage s.n.* (L); Java, *Blume* 933 (L) (several collections); Batavia, *Blume s.n. No. 1091* (L) (Type of *Ocimum aristatum* Bl.); Bantam, alt. 125 m, *Buwalda* 2843 (L); Madioen, alt. 400–900 m, *Elbert* 483 (L); Buitenzorg, *Hallier* 279 a, b, & c (L); Buitenzorg, *Harrevelde* 5732 & 7367 (L); Djapara, *Koorders* 35054 (L); Bantam, G. Kantjana, *Koorders* 41718 (L); Tjikampek, *Karsten* 39 (L); Java, *Korthals s.n.* (L); Buitenzorg, alt. 240 m, *Ooststroom* 13896 (L); Java, *Perrottet* 29 (L); Buitenzorg, *Raap* 351 (L); Buitenzorg, alt. 200 m, *Schiffner* 2496 (L); Bogor, *Teysmann s.n.* (L); Java, *Zippelius s.n.* (L).

Lesser Sunda Islands: Sumbawa, *Colfs* 236 (L); Sumbawa, Bima, alt. 200–375 m, *Elbert* 3692 (L); Sumbawa, Bima, alt. 300–450 m, *Elbert* 3700 (L); Sumbawa, Dompou, alt. 40–100 m, *Elbert* 3963 (L); Sumbawa, alt. 500 m, *Kostermans* 18683 (L); Flores, alt. 20 m, *Posthumus* 2377 (L); Timor, *Spanoghe* 50 (L); Sumbawa, Dompou, *Voogd* 1909 (L).

Borneo: Bandjermasing, *Korthals* 20 (L) (several collections); Poeloe Lampe, *Korthals s.n.* Nov. 1836 (L); Doesoen, *Korthals s.n.* (L).

Philippines: Luzon, *Cuming* 734 (K) (Type of *Orthosiphon stamineus* var. *angustifolius* Benth.).

New Guinea: N. Guinea, *Atasrip* 143 (L); Papau, Misima Isl., alt. 20 m, *Brass* 27621 (L); Papau, Woodlark Isl., alt. 100 m, *Brass* 28829 (L); Papua, *Cheesman* 96 (K, L); Papau, Morobe, *Fryar* 3983 (L); Papua, Milne Bay, alt. 10 m, *Hoogland* 4745 (L); Kaisah, alt. 10 m, *Wentholt* 43 (L); Kaliki, alt. 5 m, *Wentholt* 239 (L).

2. *Orthosiphon thymiflorus* (Roth) v.d. Slesesen in Reinwardtia 5 (1959) 42; Back. & Bakh. f. Fl. Java 2 (1965) 640.

Ocimum thymiflorum Roth, Nov. Pl. Sp. (1821) 269.

Ocimum viscosum Roth, l.c. 274.

Ocimum tomentosus (non De Wildem) Benth. in Wall. Pl. As. Rar. 2 (1831) 14, Lab. Gen. & Sp. (1832) 27, in DC. Prodr. 12 (1848) 51.

Ocimum glabratus Benth. in Wall. Pl. As. Rar. 2 (1831) 14, Lab. Gen. & Sp. (1832) 28, in DC. Prodr. 12 (1848) 50; Miq. Fl. Ind. Bat. 2 (1858) 942; Mukerj. in Rec. Bot. Surv. Ind. 14 (1940) 23.

Orthosiphon viscosus Benth. in Wall. Pl. As. Rar. 2 (1831) 14, Lab. Gen. & Sp. (1832) 27, in DC. Prodr. 12 (1848) 50; Mukerj. in Rec. Bot. Surv. Ind. 14 (1940) 23.

Orthosiphon petiolaris Miq. Fl. Ind. Bat. 2 (1858) 943.

Erect or ascending herb, 30–50 cm high. Stems often glandulate-pubescent. Leaves ovate or broadly ovate, 3–4.5(–7) cm long, 2.5–3(–4.5) cm wide, obtuse or subacute, the base rounded or truncate, entire; margins elsewhere crenate or wavy, glabrescent above, viscous and glandulate-punctate below; petioles 1–2.5(–5) cm long, pubescent. False whorls 5–6-flowered; racemose inflorescence terminal, 5–8(–12) cm long; bracts ovate, acuminate, 2–5 mm long; pedicels 2–3 mm long, shortly pubescent. Calyx tubular, 4–5 mm (in fruit 7–8 mm) long, puberulous externally. Corolla 11–14 mm long, the tube slightly incurved, puberulous. Stamens included. Style 9–10 mm long. Nutlets subglobose, compressed, minutely glandulate.

Distribution: India, Ceylon, Indo-China to Malesia.

Specimens examined:

Java: *Horsfield Lab. 23* (U 69547 A, type of *Orthosiphon petiolaris* Miq., duplicate, K).

Malay Peninsula: Kuala Tekam, Pahang *Evans s.n.* (K); Kota Bahru, Kelantan, *Ridley s.n.* (K).

26. PARAPHLOMIS PRAIN.

Paraphlomis Prain in Ann. Bot. Gard. Calc. 9 (1901) 60, *in obs.*, in J. As. Soc. Beng. 74, 2 (1907) 791; Ridl. Fl. Mal. Pen. 2 (1923) 651; Kudo, in Mem. Fac. Sc. & Ag. Taihoku Un. 2, 2 (1929) 209.

Herbs or shrubs. Leaves opposite, membranaceous, long-petioled. Flowers medium-sized, in dense axillary, many-flowered false-whorls, often forming globose clusters; bracteoles numerous, filiform. Calyx 10-nerved, more or less equally 5-toothed, the teeth deciduous or persistent; tube slightly incurved. Corolla-tube pubescent externally, glabrous and annulate within; upper lip erect; lower lip spreading, 3-lobed. Stamens 4, ascending under

upper lip, the lower pair longer; all filaments without basal appendages; anthers connivent, the 2 locules divaricate; filaments glabrous. Disk uniform, entire. Style 2-fid, the lobes subequal or the upper one shorter. Nutlets obovoid, triquetrous below, rounded above and on the dorsal surface, glabrous; pericarp thick, more or less coriaceous.

Species 6 or more, Eastern Himalayas to S. China, Formosa; 2 in Malesia.

Key to the species

A. False whorls only sparingly hirsute; corolla 2–2.5 cm long; fruiting calyx glabrous, the teeth often broken off.

1. *P. javanica*

A. False whorls densely covered with long woolly hairs, golden yellow in colour; corolla 1.5–2 cm long; fruiting calyx hirsute or woolly pubescent, the teeth persistent. 2. *P. oblongifolia*

1. **Paraphlomis javanica** (Bl.) Prain in Ann. Bot. Gard. Calc. 9 (1901) 59, *in obs*; Back. & Bakh. f. Fl. Java 2 (1965) 619.

Leonurus javanicus Bl. Bijdr. (1826) 828; Benth. Lab. Gen. & Sp. (1834) 522.

Phlomis javanica (Bl.) Prain in Ann. Bot. Gard. Calc. 3 (1891) 231, 9 (1901) 59.

Phlomis rugosa Benth. in Wall. Pl. As. Rar. 1 (1830) 63, Lab. Gen. & Sp. (1834) 634, in DC. Prodr. 12 (1848) 545; Hook. f. Fl. Brit. Ind. 4 (1885) 693; Prain in Ann. Bot. Gard. Calc. 3 (1891) 231, *in Nota*; Stapf. in Trans. Linn. Soc. London 4 (2) (1894) 216.

Paraphlomis rugosa (Benth.) Prain in Ann. Bot. Gard. Calc. 9 (1901) 60, *pl. 74, in nota*. in J. As. Soc. Beng. 74 (1907) 721; Merr. Enum. Philip. 3 (1923) 412; Ridl. Fl. Mal. Pen. 2 (1923) 651; Kudo in Mem. Fac. Sci. & Ag. Taihoku Un. 2, 2 (1929) 209.

Gomphostemma petiolare Miq. Fl. Ind. Bat. (1859) 987. *syn. nov.*

Gomphostemma membranifolium Miq. Fl. Ind. Bat. (1859) 988.

Gomphostemma luzonense Elm. Leaf. Philip. Bot. 1 (1908) 339.

Lamium gesnerioides Hayata, Icon. Pl. Formos. 8 (1918) 92.

Lamium longepetiolata Hayata, Icon. Pl. Formos. 8 (1918) 92.

Gomphostemma sumatrense Ridl. in J. Mal. Br. R. As. Soc. 1 (1923) 85. *Syn. nov.*

Paraphlomis brevidens Merr. in Pap. Mich. Acad. Sc. 1933. (1934) 193. *Syn. nov.*

A subshrub, 1–1.5 m high. Stems stout or slender, minutely hirsute. Leaves thin membranaceous, elliptic, oblong-ovate or oblong-lanceolate, 15–30 cm long, 6–10 cm wide, acuminate or caudate, the base cuneate or truncate or rounded, entire; margins

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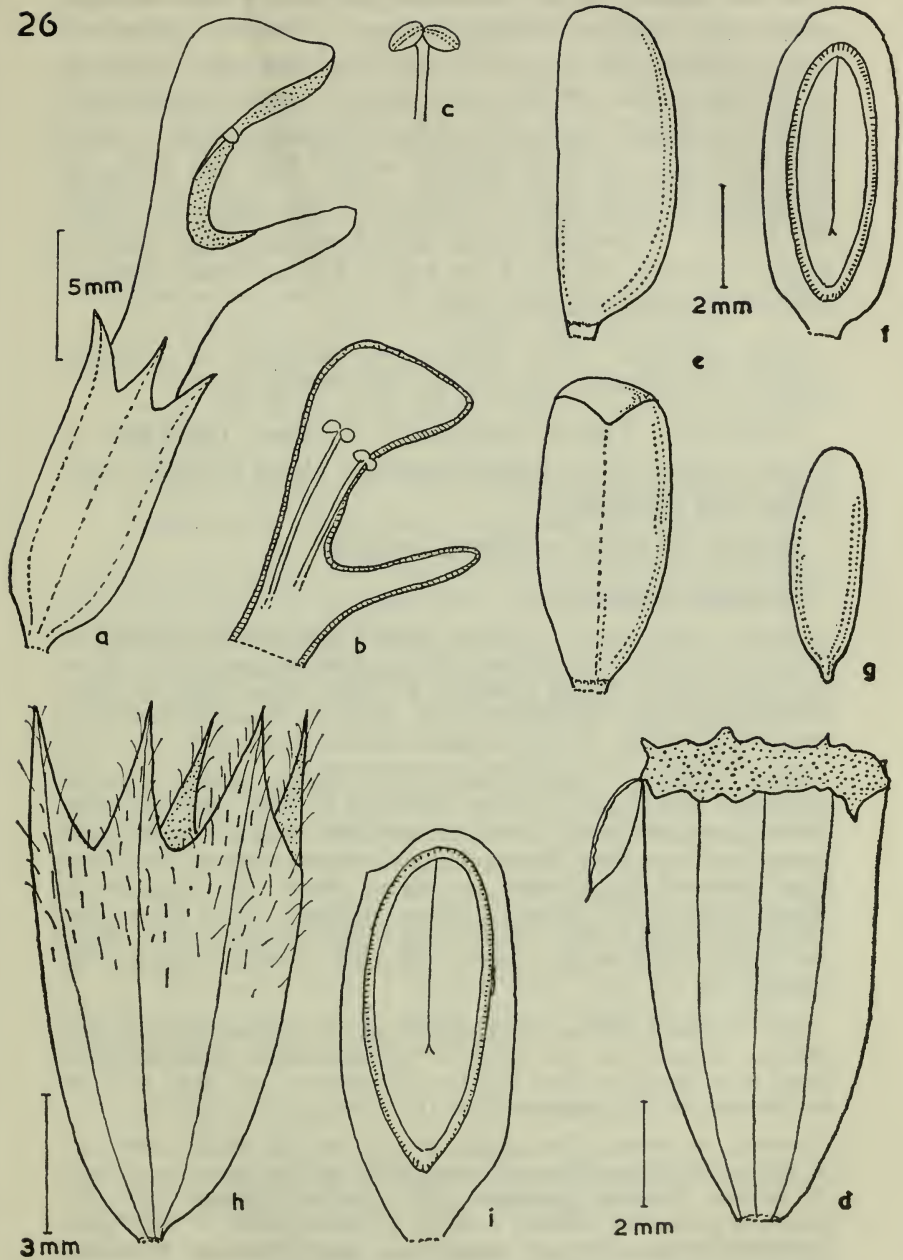


Fig. 26. *Paraphlomis javanica* Prain (a-g) and *P. oblongifolia* Prain (h & i).

a. flower; b. half corolla (upper portion); c. stamen; d. fruiting calyx; e. nutlet (in lateral and ventral views) f. section of nutlet; g. embryo; h. fruiting calyx; i. section of nutlet. (a-c. Horsfield s.n.; d-g. Clements 31629; h & i. Popta 1517).

elsewhere irregularly crenate-serrate, glabrous or with minute scattered hairs on the nerves on both surfaces. Flowers in small distant false whorls, axillary; bracteoles filiform, glabrescent. Calyx turbinate, 0.8–1.2 cm (in fruit about the same length, the teeth often broken off) long; tube slightly curved, hispid below; teeth 5, lanceolate, the base triangular, membranaceous. Corolla 2–2.5 cm long, the tube annulate within; both lips pubescent externally, upper lip narrow, rounded at apex; lower lip 3-lobed, the mid-lobe oblong, the lateral lobes lanceolate. Style branches subequal. Nutlets obovoid, 6 mm long, 3–3.5 mm broad, acute and triquetrous below, rounded above.

Type specimen: Java, *Blume s.n.* (lectotype of *Leonurus javanicus* BL.) (*Herb. Lugd. Bat. no. 904, 356–66*) (L).

Distribution: Eastern Himalayas to Thailand, Indo-China, S. China, Formosa and to Malesia (Sumatra, Malay Peninsula, Java, Borneo and Philippines).

Ecology: In forests at medium altitudes.

Specimens examined:

Sumatra: Karo Plateau, Berastagi, Deleng Singkoet, *Bartlett 8568* (L) (Type of *Paraphlomis brevifidens* Merr.); Karo Plateau, Dolok Boros, alt. 1,450–1,500 m, *Lörzing 16169* (L); E. Coast, Asahan, slope of Dolok Se Manoeck-manoeck, *Rahmat Si Boeca 9772* (L); Berastagi, *Ridley s.n.* Feb. 1912 (K) (Type of *Gomphostemma sumatrense* Ridl.).

Malay Peninsula: Perak, *Anderson 112* (Sing.); Pahang, Cameron Highlands, *Batten-Pooll s.n.* Nov. 1940 (Sing.); Perak, Natuloo, *Curtis 2726* (K, Sing.) (fls. yellow); Perak, *Haniff 14259* (Sing.); Cameron Highlands, *Henderson 23614* (Sing.); Selangor, Ginling Simpak, *Hume 9057* (Sing.) Selangor, Ulu Gombak, alt. 600 m, *Hume 9513* (Sing.); Perak, *King's Collector 2372* (Sing.); Cameron Highlands, alt. 1,300 m, *Nur 32876* (K, L, Sing.); Perak, *Ridley 2892* (Sing.); Pahang; Telom, *Ridley 13715* (BM, Sing.); Perak, Maxwell's Hill, alt. 1,000 m, *Scortechini 339* (Sing.).

Java: G. Salak, *Blume s.n.* (L) (lectotype, of *Leonurus javanicus* Bl.); Patjitan, *Horsfield s.n.* (K) (Type of *Gomphostemma membranifolium* Miq.); Java, *Koorders 39041* (L); Java, *Korthals s.n.* (L); Java, alt. 1,150 m, *Mousset 620* (L); *Reinwardt s.n.* (L).

Borneo: N. Borneo, Ulu Liqagu, *Chew Corner & Stainton 2894* (K); N. Borneo, Minitindok Gorge, *Clemens 10465* (K) (fls. white; seed black); N. Borneo, Kinabalu, Tenompok, alt. 1,800 m, *Clemens 27897* (K); Kinabalu, Dallas, alt. 1,000 m, *J. & M. S. Clemens 29657 = 26317* (BM, K, L) (fls. cream with dark purple inner parts); Kinabalu, Penibukan, alt. 1,400 m, *Clemens 30683, 31629* (BM, L) & *40300* (K, L) (fls. cream with pink center).

Philippines: Philippines, *Cuming 1876* (BM, K); Leyte, Ormoc, Lake Danao, *Edano 11920* (L, Sing.); Luzon, Tayabas, *Elmer 7433* (K) (Type of *Gomphostemma luzonense* Elm.); Philippines, *Elmer 9176* (K), Rizal, *Loher 6583* (K); Luzon, Laguna, *Mabesa 25379* (L, Sing.); Luzon, Rizal, *Ramos 992* (K); Rizal, Mt. Irig, *Ramos 41962* (L); Morong, *Vidal 3488* (K).

In examining the several type specimens of Blume's *Leonurus javanicus*, *Leonurus oblongifolius* and *Prasium javanicum*, some obvious technical errors — the displacement of labels and specimens — were noticed. This fact has been pointed out in the annotated sheets made by Dr. A. G. L. Adelbert, (the author of the family Labiatae, in Backer's Bekn. Fl. Java (em. ed.) 14, 1954, fam. 201). With the willing assistance of Prof. C. G. G. J. van Steenis, and Mr. J. H. Kern, we have carefully checked Blume's original description with the specimens he studied, and selected the following specimens as lectotypes, respectively.

- (1) *Leonurus javanicus* Bl. [or *Paraphlomis javanica* (Bl.) Prain] E. Java, Blume. (*Herb. Lugd. Bat. No. 904, 356-66*).
- (2) *Leonurus oblongifolius* Bl. [or *Paraphlomis oblongifolia* (Bl.) Prain] Mt. Salak, Java, Blume (*Herb. Lugd. Bat. No. 904, 356-65*).
- (3) *Prasium javanicum* Bl. [or *Gomphostemma javanicum* (Bl.) Benth.] Java, Blume (*Herb. Lugd. Bat. No. 904, 354-154*).

I fully agree with Dr. Adelbert (in Annotate sheet, Herb. Leiden) in reducing *Paraphlomis rugosa* (Benth.) Prain as synonymous with *Paraphlomis javanica* (Bl.) Prain.

I also consider *Paraphlomis javanica* (Bl.) Prain as a rather variable species. In addition to the synonyms given by Prain, Kudo (under *P. rugosa* Prain), I add here the following 3 binomials to the list. (1) *Gomphostemma petiolare* Miq. which is a new name intended to replace *Leonurus javanicus* Bl. to avoid confusion with *Gomphostemma javanicum* Benth. (2) *Gomphostemma sumatrense* Ridl. of which the types specimen was collected from Berastagi, Sumatra, by Ridley, which is indistinguishable from the typical form of this species. (3) *Paraphlomis brevidens* Merr. which differs from *P. javanica* (Bl.) Prain (as *P. rugosa* Prain) mainly in its very short calyx teeth. I do not think they are specifically different. Incidentally, nearly all the Borneo materials studied are characterized by their shorter calyx-teeth.

2. ***Paraphlomis oblongifolia*** (Bl.) Prain in Ann. Bot. Gard. Calc. 9 (1901) 59, *in nota*.

Leonurus oblongifolius Bl. Bijdr. (1826) 828; Benth. Lab. Gen. & Sp. (1834) 522, in DC. Prodr. 12 (1848) 502.

Phlomis oblongifolia (Bl.) O. Kuntze, Rev. Gen. 2 (1891) 529; Prain in Ann. R. Bot. Gard. Calc. 3 (1891) 231, *in nota*, 9 (1901) 59, *pl. 73*.

Gomphostemma macrophyllum Miq. Fl. Ind. Bat. 2 (1859) 988.

Shrubby, 1-2 m high. Stems and branches soft-woolly. Leaves thin membranaceous, oblong ovate, 15-20 cm long, 6-8 cm wide, acuminate or cordate, the base cuneate, entire; margins elsewhere

remotely toothed, springly hispid on the nerves on both surfaces; petioles very slender, 5–8 cm long. Flowers in distant axillary false-whorls, densely covered with long golden hairs; bracts filiform. Calyx obconic-campanulate, 1.2–1.3 cm (in fruit 1.2–1.4 cm) long; tube slightly curved, hirsute; teeth subulate. Corolla 1.5–2 cm long, densely pubescent externally; upper lip narrow, the apex truncate; lower lip with 3 subequal rounded lobes. Posterior style branches much shorter than the anterior. Nutlets oblong, 7–8 mm long, 3.5 mm broad, subtriquetrous, glabrous.

Distribution: Endemic to Malesia (Sumatra, Java, and Celebes).

Type: Mt. Salak, Java, *Blume s.n.* (L), (lectotype of *Leonurus oblongifolius* Bl. *Herb. Lugd. Bat. No. 904, 356–65*).

Ecology: In primary forest at medium altitudes.

Vern. names: Bubukuan bulu (Java).

Specimens examined:

Sumatra: G. Malintang, alt. 1,200 m, *Bünnemeyer 3742* (L); G. Marapi, *Bünnemeyer 4565* (L); Kota Agoeng, *Cramer s.n.* 1915 (L); Karo, Biang, *Lörzing 14420* (L) (fls. light yellow, corolla 14 mm long, side-lobe ovate-lanceolate; nutlets dark blue-green nearly back); Berastagi, *Ridley s.n.* Feb. 1921 (K); Kabandjahe, *Surbeck 30* (L); E. coast, *Surbeck 358* (L).

Java: G. Gedeh, alt. 1,350 m, *Backer 14975* (L); G. Gedeh, alt. 1,400 m, *Backer 22162* (L, Sing.); G. Salak, *Blume s.n.* (lectotype of *Paraphlomis oblongifolia* (Bl.) Prain.); Tjibodas, *Boerlage s.n.* 1917 (K); G. Gede, *Burkill 8226* (fls. pale yellow; fr. bluish green); Tjibodas, alt. 1,500 m, *Djamhari 107* (L); S. E. Java, *Forbes 997 c* (K); Tjibodas, *Hallier 253* (K, L); G. Salak, 900–1,000 m, *Hoochreutiner 179* (L); Java, *Junghuhn 50* (K); Tjibodas, *Koorders 31686* (L); Tjibodas, *Lam 309* (L); Tjisaroea, alt. 1,200 m, *Ooststroom 12834* (L); Tjibodas, *Ooststroom 13409* (L); Tjibodas, alt. 1,500 m, *Popta 1517* (L); Tjilatjap, *Riviers s.n.* 1920 (L); G. Gedeh, *Sapiin 465* (L).

Celebes: Celebes, *Forsten s.n.* (L).

As a result of the displacement of labels with the specimens, Merrill (in *Pap. Mich. Acad. Sc.* 1933, 19 (1934) 194) was perplexed and erroneously reduced this species as synonymous with *Paraphlomis javanica* Prain (as *P. rugosa*).

Miquel thought the plant formerly described by Blume as *Leonurus oblongifolius* should be referred to the genus *Gomphostemma*. As he was aware that there was another plant, an entirely different one from India, already described under the name *Gomphostemma oblongum* Benth., he therefore proposed a new binomial *Gomphostemma macrophyllum* Miq. to replace *Leonurus oblongifolius* Bl.

The report of occurrence of this species in Celebes by Miquel was based on a sterile specimen collected by Forsten around 1840.

27. **PLECTRANTHUS** L'HERIT. *NOM. CONS.*

Plectranthus L'Hérit., *Stirp. Nov.* (1788) 84, t. 41, 42, *nom. cons.*;
Benth. in Benth. & Hook. f. *Gen. Pl.* 2 (1876) 1175; Briq. in E.
& P. Pfl. *Fam.* 4, 3a (1897) 352.

Germanea Lamk. *Encyc.* 2 (1788) 690.

Isodon Schrad. ex Benth. *Lab. Gen. & Sp.* (1832) 40; Kudo in
Mem. Fac. Sci. & Agr. Taihoku Un. 2, 2 (1929) 118.

Rabdosia Hassk. in *Flora*, 25 (1842) 2, Beibl.

Herbs or undershrubs. Leaves opposite petiolate. Flowers usually small, generally in 6–8-flowered cymes, forming axillary spurious racemes or terminal panicles. Calyx 5-toothed, subequal or 2-lipped, often accrescent in fruit. Corolla-tube exerted, long or short, decurved or straight, sometimes having a spur or angle on the upper side; limb, 2-lipped, the upper lip short, 3–4-fid, recurved, the lower lip entire or notched, long boat-shaped. Stamens 4, declinate; filaments free or adnate to the corolla-tube but free from each other; anther-locules usually confluent. Disk usually produced anteriorly, there nearly to fully as long as the ovary. Style briefly 2-fid. Nutlets orbicular or occasionally oblong or ovoid, smooth, granulate or punctate.

Species about 100, mainly in the tropical and subtropical regions of Africa, Asia, Australia and the Pacific Islands. About 8 species are found in Malesia.

Key to the species

- A. Calyx (in flowering) equally or subequally 5-toothed, not forming two lips; uppermost tooth as broad as or only slightly broader than the other teeth.
 - B. Calyx (in flowering) less than 2 mm long; calyx-teeth deltoid or nearly so.
 - C. Fruiting calyx 3.5–4.5 mm long; lower calyx-teeth (in fruiting) acute; leaves ovate or rhomboid, the apex acute, the base acute or rounded; upper leaves petiolate; stamens included. 1. *P. javanicus*
 - C. Fruiting calyx 2.5–3.5 mm long; lower calyx-teeth obtuse or rounded; leaves more or less deltoid, the apex acuminate, long-caudate, the base truncate; upper leaves sessile or amplexicaul; stamens long-exserted. 2. *P. teysmannii*
 - B. Calyx over 3–4 mm long; calyx teeth lanceolate or subulate.
 - C. Calyx obliquely gibbous at the base; corolla 6–8 mm long, the corolla tube very short (about 1 mm long), slender, not gibbous. 3. *P. petraeus*
 - C. Calyx straight, not gibbous at the base; corolla 10–12 mm long, the corolla tube 5–6 mm long, distinctly gibbous above. 4. *P. steenisii*

- A. Calyx unequally 5-toothed, 2-lipped; the uppermost tooth generally much broader than the others.
- B. Inflorescences paniculate, 20–30 cm long.
- C. Flowers 5–10 in a false whorl; stamens all attached near the throat of corolla, nearly equal. 5. *P. apoensis*
- C. Flowers 20 or more in a false whorl; stamens inserted at two different levels, 2 attached near the throat, 2 at the base of corolla. 6. *P. congestus*
- B. Inflorescences racemose, unbranched, or occasionally with 1 or 2 short branches at the base.
- C. Racemose inflorescence 25–35 cm long; false whorls 8–12 flowered, congested; calyx densely woolly; the uppermost calyx-lobe reflexed and decurrent in fruit. 7. *P. parviflorus*
- C. Racemose inflorescence 8–10 (–12) cm long; false whorls 5–6 flowered, laxly disposed; calyx sparingly hirsute; the uppermost calyx-lobe erect and not decurrent in fruit. 8. *P. klossii*

1. **Plectranthus javanicus** (Bl.) Benth. Lab. Gen. & Sp. (1832) 45, in DC. Prodr. 12 (1848) 69; Miq. Fl. Ind. Bat. (1858) 946; Koord. Exk. Fl. Jav. 3 (1912) 155; Back. & Bakh. f. Fl. Java 2 (1965) 636.

Elsholtzia javanica Bl. Bijdr. (1826) 825.

Rabdosia javanica (Bl.) Hassk. in Flora, 25 (1842) 2.

Plectranthus intermedius Zoll. & Mor. in Mor. Syst. Verz. (1854) 55; Koord. Exk. Fl. Jav. 3 (1912) 154. *syn. nov.*

Plectranthus benthamianus Miq. Fl. Ind. Bat. (1858) 946; Koord. Exk. Fl. Jav. (1912) 155. *syn. nov.*

Plectranthus diffusus Merr. Philip. J. Sc. 1 (1906) suppl. 235, 5 (1910) Bot. 382, Enum. Philip. 3 (1923) 418. *syn. nov.*

Moschosma philippinense Elmer, Leaflet. Phil. Bot. 10 (1939) 3809.

A herb or shrubby, 1.5–2.5 m high, much-branched. Stems and branches angled, slender, pubescent. Leaves membranaceous, ovate to oblong-ovate or rhomboid, 2–5 (–8) cm long, 1–2.5 (–4.5) cm wide, acuminate, the base acute or rounded, entire; margins elsewhere prominently serrate; crisped hairy on both surfaces; petioles 0.5–1 cm long. Flowers in lax, lateral thyrses and forming large compound terminal panicles, 20–30 (or more) cm long; the bracts foliaceous, gradually reduced upwards. Calyx 1.5–2 mm (in fruit 4.5–5 mm) long, sparingly hirsute, subequally 5-toothed, the teeth acute. Corolla 5–6 mm long, straight, the limb gibbous, 2-lipped. Stamens free, the filaments pubescent below. Nutlets ovoid or ellipsoid, about 1 mm long, glabrous, smooth.

Type specimen: Java, Buitenzorg, *Blume s.n.* (L, lectotype and duplicates of *Elscholtzia javanica* Bl. several collections).

Distribution: Endemic to Malesia.

Ecology: In damp forest floors or in shaded ravines along streams at medium low to altitudes (500–2,400 m).

Vern. names: Surawang langit (Java); Lateng ajam (Sumatra).

Specimens examined:

Sumatra: Karo Plateau, alt. 1,500 m, *Lörzing 13658* (L); Korinchi, alt. 1,500 m, *Robinson & Kloss 63* (BM) (fls. violet).

Java: G. Tangkoeban, *Backer s.n.* Oct. 1903 (L); Garoet, Pangentjongan, alt. 1,400 m, *Backer s.n.* 1909 (L); Pasoeroean, Tosari, alt. 1,700 m, *Backer 8352* (L); G. Boerangrang, alt. 900–1,000 m, *Backer 14122* (L); Diëng Plateau, alt. 2,000–2,100 m, *Backer 21624* (L); Java, *Backer & Coert 409* (L); Besoeki, alt. 1,500–1,600 m, *Backer 37437* (L); Java, *Blume s.n.* (L) (lectotype and duplicates of *Elscholtzia javanica* Bl.) (several collections); Java, *Boerlage s.n.* (L) (several collections); G. Papandajan, *Boerlage s.n.* (L); Garoet, *Burck s.n.* June 1891 (L); Preanger, *Denker 90* (L); Madioen, Lawoe, alt. 1,300–1,400 m, *Elbert s.n.* Oct.–Nov. 1907 (L); Tjibodas, G. Puteri, alt. 1,700 m, *Enoh 238* (L); Java, *Forbes 611* (BM, L); Pasoeroean, alt. 2,150 m, *Gisius 18* (L); Telaga, Warna, *Hallier s.n.* Feb. 1895 (L); G. Prahoe, *Horsfield s.n.* (K, U 69537 A) (Type of *Plectranthus benthamianus* Miq.); Java, *Horsfield 20* (BM, K); Java, *Junghuhn 6 & 134* (L); Madioen, alt. 850 m, *Koorders 23835* (K); Ngadisari, alt. 2,400 m, *Koorders 37617* (K); Semarang, *Koorders 27789* (K); Preanger, alt. 720 m, *Koorders 43222* (K); Besoeki, alt. 2,100 m, *Koorders 43517* (K); Java, *Korthals s.n.* (L); Tosari, G. Bromo, *Kreulen 145* (L); W. Java, *Kuhl & Hasselt s.n.* (L); Bandoeng, G. Windoe, *Native Collector 338* (L); Soerabaja, G. Andjasmoro, *Radermacher s.n.* Aug. 1930 (L); Idjen Plateau, *Rent s.n.* June 1927 (L); Java, *Reinwardt s.n.* (L); Tjibodas, G. Gedeh, *Sapiin 2069* (L); Pasir Kiamis, *Schiffner s.n.* 1893 (L); Tjibodas, G. Puteri, *Soewarta 163* (L); Pasoeroean, G. Tengger, alt. 2,000–2,300 m, *Steenis 7235* (L); Besoeki, Jang Plateau, alt. 2,000 m, *Steenis 11039* (L); Java, *Waitz s.n.* (L); Papandajan, *Went s.n.* (L); Tosari, *Went s.n.* (L); Tjibodas, *Went s.n.* (L); Java, *Zollinger 1761* (G) (Type of *Plectranthus intermedium* Zoll. & Mor.)

Lesser Sunda Islands: Timor *Forbes 3888* (L); Sumbawa, alt. 500–700 m, *Kostermans 18636* (K, L); Lombok, *Voogd 2098* (K).

Philippines: Luzon, Benguet, Baguio, *Elmer 8406* (K, L); Benguet, Mt. Libbung, *Mendoza 40947* (K); Luzon, Lepanto, Mt. Data, *Merrill 4554* (K) (Cotype of *Plectranthus diffusus* Merr.); Luzon, Benguet, Baguio, *Merrill 11654* (BM, K, L).

Type specimens of the following 3 species have been examined: *Plectranthus benthamianus* Miq., *Pl. intermedium* Zoll. & Mor., *Pl. diffusus* Merr. Except in the first one which is based on a Horsfield's collection, the dimension of foliate leaves are much larger (7–10 cm by 4.5–5 cm) than usual, no other conspicuous differences can be found.

2. *Plectranthus teysmanni* Miq. Fl. Ind. Bat. (1858) 954; Back. & Bakh. f. Fl. Java 2 (1965) 636.

? *Plectranthus zollingeri* Briq. in Ann. Conserv. & Jard. Bot. Geneve (1898) 234.

Erect herb or shrubby, 0.5–1.5 m high. Stems and branches tetragonous, slender, pubescent. Leaves chartaceous, ovate or elliptic-ovate, 2.5–5 cm long, 1.5–3.5 cm wide, acute or acuminate, the base truncate or rounded, rarely acute, entire; margins elsewhere serrate-dentate, puberulent above, densely glandulate-pubescent beneath; petioles 0.5–1 cm long. Flowers in lax cymes disposed in lateral thyrses, and forming a large terminal panicle 12–15 (–20) cm long, 4–5 cm across. Calyx subcampanulate, 1.5–2 mm (in fruit 3.5–4 mm) long, densely glandulate-villous, 5-toothed, the teeth blunt or rounded. Corolla 5–6 mm long, the tube straight. Filaments long-exserted. Nutlets ovoid, 0.8–1 mm long.

Type: Java, op den Wilis in Madioen, *Teymann s.n.* (U 37953, 37954).

Distribution: Endemic to Malesia.

Ecology: In shaded and damp places in or along the forest at altitudes 1,000–2,600 m.

Vern. name: Slanghet (Java).

Specimens examined:

Java: G. Slamet, alt. 2,620 m, *Backer 486* (L); G. Mahameroe, alt. 2,400 m, *Backer 3734* (L); Idjen Plateau, G. Merapi, alt. 1,900–2,150 m, *Backer 25295* (L); Garoet, *Burck s.n.* July 1891 (L); Java, *Coert 816* (L); Tengger, G. Djembangan, alt. 2,000–3,000 *Coert 1508* (L); Semarang, *Koorders 28049* (K, L); Besoeki, alt. 2,100 m, *Koorders 43426* (K); Java, *Mousset 476* (L); Preanger, *Soegandiredja s.n.* April 1909 (L); Madioen, Wilis, *Teymann s.n.* (Type, U 37953, 37954).

Lesser Sunda Islands: Lombok, Rindjani, alt. 1,500–1,570, 2,200–2,300 & 1,175–1,250 m, *Elbert 1042, 1048* (L) & *1476* (K, L); Flores, alt. 1,000 m, *Jaag 1564* (L); Sumbawa, *Kostermans 18257* (K).

Borneo: Mt. Kinabalu, alt. 1,600 m, *Chew, Corner & Stainton 1276* (K, Sing) (fls. white).

Celebes: Lomasang, alt. 950 m, *Bünnemeijer 10947* (L); Celebes, *Bünnemeijer 11034* (K); G. Bonthain, alt. 2,300 m, *Bünnemeijer 11887* (K, L); Masamba, Kamboeno, alt. 2,200–2,600 m, *Eyma 1329* (L); Lompo Batang, alt. 1,800 m, *Monod de Froideville 218* (L); Gowa, Lembaja, alt. 1,600 m, *Neth. Ind. For. Service s.n.* May 1936 (L); Malino, alt. 1,000 m, *Steenis 10389* (L).

A recent collection from Mt. Kinabalu, Sabah (*Chew, Corner & Stainton 1276*) agrees with the typical form of the species in general habit, in leaf and floral characters. However, it differs from the latter in the shorter and narrower terminal thyrse (about 8–9 cm long, 4–5 cm across), and in the calyx teeth being almost rounded at the tips. This may represent a variety or form of the species.

Backer and Bakhuizen van den Brink Jr. (l.c. 636) suggested that *Plectranthus zollingeri* Briq. (based on Zollinger no. 2215, from Java) might be a synonym of *Pl. tezsmanni* Miq.

3. ***Plectranthus petraeus*** Backer ex Adelb. in Reinwardtia 3 (1954) 152, f. 3.; Back. & Bakh. f. Fl. Java 2 (1965) 636.

Shrubby, 1–1.5 m high, very fragrant. Stems and branches slender, nearly terete. Leaves membranaceous, elliptic or ovate, 4–10 cm long, 3–6 cm wide, acute or obtuse, the base cuneate or shallowly cordate, entire; margins elsewhere crenate-serrate; petioles 1–3 cm long. Flowers in spurious spikes disposed in large terminal panicles, 15–20 cm long; bracts rhomboid, sessile, 2.5 mm long and broad; pedicels 2–3 mm long. Calyx campanulate, curved, 3–3.5 mm (in fruit 4–5 mm) long, 5-toothed, all subulate, densely tomentose externally. Corolla 7–8 mm long, the tube very short, the limb 2-lipped. Stamens included in the lower lip of corolla. Nutlets rounded, flattened, about 1 mm across.

Type specimen: Java, Besuki, Idjen plateau, *Backer 36387* (L), July, 1917.

Distribution: Endemic to Malesia (Java).

Ecology: Common on lava rocks, altitudes 1,100–1,450 m.

Specimens examined:

Java: Idjen Plateau, alt. 1,100 m, *Backer 36387* (L) (holotype); Idjen Plateau, alt. 1,450 m, *Koorders 43207B* (L) (Paratype); Idjen Plateau, alt. 1,100 m, *Steenis 12008* (L, K) (very common on lava rocks; 1–1.5 m, high; very fragrant).

4. ***Plectranthus steenisii*** *sp. nov.*

Caule herbaceo erecto. Ramis dense villosis. Folia membranacea, ovata vel spatulato-obovata, crenato-dentata; 5–9 cm longa, 4–6.5 cm lata, acuta vel rotundata, basi acuta vel acuminata, integerrima; supra et subtus hirsuta, valde nervosa. Panicula parce ramosa, 25–30 cm longa. Verticillastri laxi, 20–30 flori. Pedicelli 2–4 mm longi, divaricati. Calyx campanulatus, 4 mm longis. Corolla 10–12 mm longis; tubo recto, supra gibbo ad medium; labiis superiore lobis quatuor, inferiore concavo. Stamina libera ad basin labii inferioria inserta. Stylus breviter bifidus. Achenia plano subrotunda, 1.2 mm longa et lata.

Type Specimen — Java: Res. Pasoerean, G. Ardjoeno, road between Sawahan Bahal and Sawahan Ardjoeno, on stony slope, alt. 2,650 m; dominant; leaves fragrant, flowers nice blue; *van Steenis 7111* (L, duplicate K), June 1935.

This species is manifestly different from other Malesian species in the very long corolla which reaches a total length of 10–12 mm and in the corolla-tube which is conspicuously gibbous in the central portion above.

27

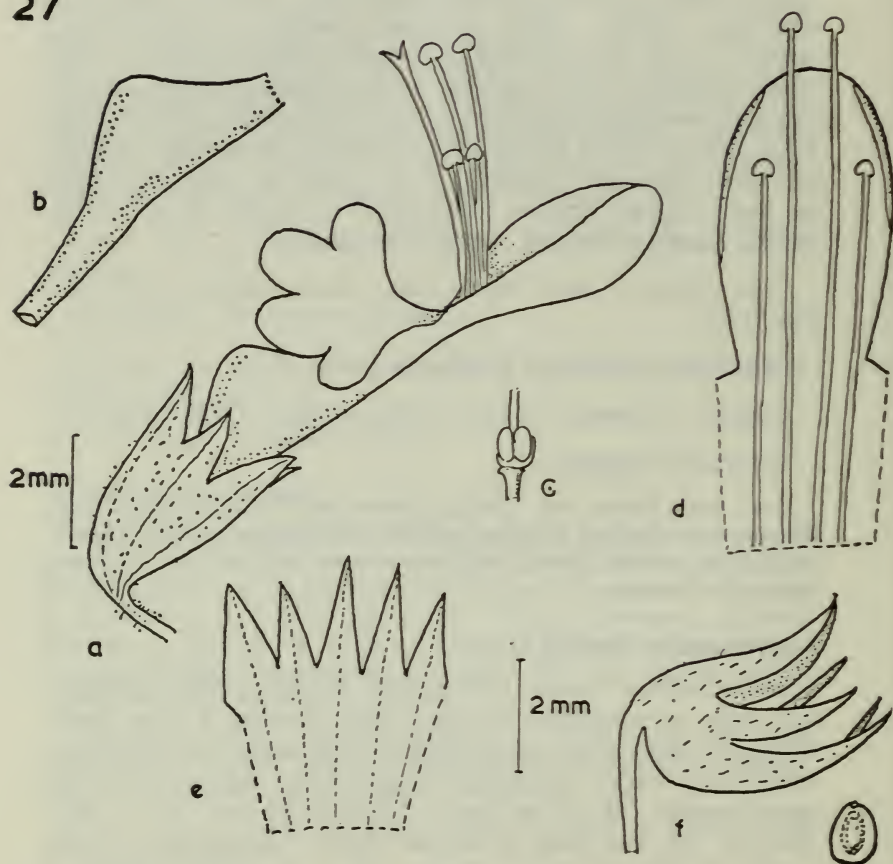


Fig. 27. *Plectranthus steenisii* H. Keng.

a. flower; b. portion of corolla showing the gibbosity; c. ovary and nectary disc; d. lower lip of corolla and stamens; f. fruiting calyx and nutlet. (*Steenis 7111*)

5. *Plectranthus apoensis* (Elmer) *comb. nov.*

Coleus apoensis Elm. Leaf. Philip. Bot. 7 (1915) 2694; Merr. Enum. Philip. (1923) 418.

Herb, 1–2 m high. Stems and branches erect and slender, obscurely angulate, puberulent. Leaves more or less succulent, deltoid ovate, 4–7.5 cm long, 5–6.5 cm broad, rounded, the base truncate, entire; margins elsewhere irregularly crenate or double-dentate; petioles 1.5–3 cm long, slender, hairy. Flowers 6–10 in a false whorl, forming lax spicate inflorescences disposed in a large terminal panicle, 20–25 cm long, 10–12 cm across; pedicels divaricate, 2 mm long. Calyx campanulate, 2.5 mm long, the upper tooth broad and 3 veined, the lower 4 teeth sharply pointed. Corolla 6–7 mm long; tube slender, crooked at about the middle, slightly gibbous near the base; limb 2-lipped, the upper lip recurved, the lower lip concave, notched. Stamens 4, attached on the throat of corolla, enclosed. Style shortly 2-fid.

Type: Philippines: Todaya (Mt. Apo), Davao, Minadanao, Elmer 11601, (isotypes, BM, K, L), Sept. 1909.

Distribution: Endemic to Malesia (The Philippines).

Ecology: Associated with grasses in thickets on fertile soil, along an open ridge at 1,000 m, altitude (Elmer).

Vernacular name: Calalapo-bulan (Philippines).

The four stamens of this plant are attached on the throat of the corolla nearly at the same level. They do not, however, form a filamental-tube as in *Coleus*, therefore I transfer it to the genus *Plectranthus*. Incidentally, Elmer described this plant under *Coleus* with uncertainty.

6. *Plectranthus congestus* R. Br. Prodr. (1810) 506; Benth. Lab. Gen. & Sp. (1832) 36, in DC. Prodr. 12 (1848) 66, Fl. Austral. 5 (1870) 79.

Tall herb, 1–1.5 m high. Stems and branches hoary-tomentose. Leaves membranaceous, ovate or elliptic, 2–6 cm long, 1.5–4 cm wide, obtuse, the base cuneate, entire; margins elsewhere undulate-crenate, tomentose on both surfaces; petioles 0.5–1 cm long. Flowers numerous (about 15–30) in dense clusters, forming false spikes and disposed in terminal panicles 15 cm or more long, and 5–8 cm across; pedicels subsessile, 1–2 mm long. Calyx villous and glandulate-dotted, 2 mm long (in fruit 2.5–3 mm long), declinate, 5-toothed; the upper tooth broadly ovate, obtuse, not decurrent, the lateral and the lower teeth subulate, acute, incurved. Corolla 6 mm long, declinate and slightly gibbous on the base of the upper side below the middle. Stamens inserted at different levels, 2 near the throat, 2 at the base of corolla. Nutlets rounded, flattened, subtriquetrous, 0.8 mm long and broad, glandulate-dotted.

Distribution: N. Australia and Malesia (New Guinea).

Ecology: in open places and thickets.

27a

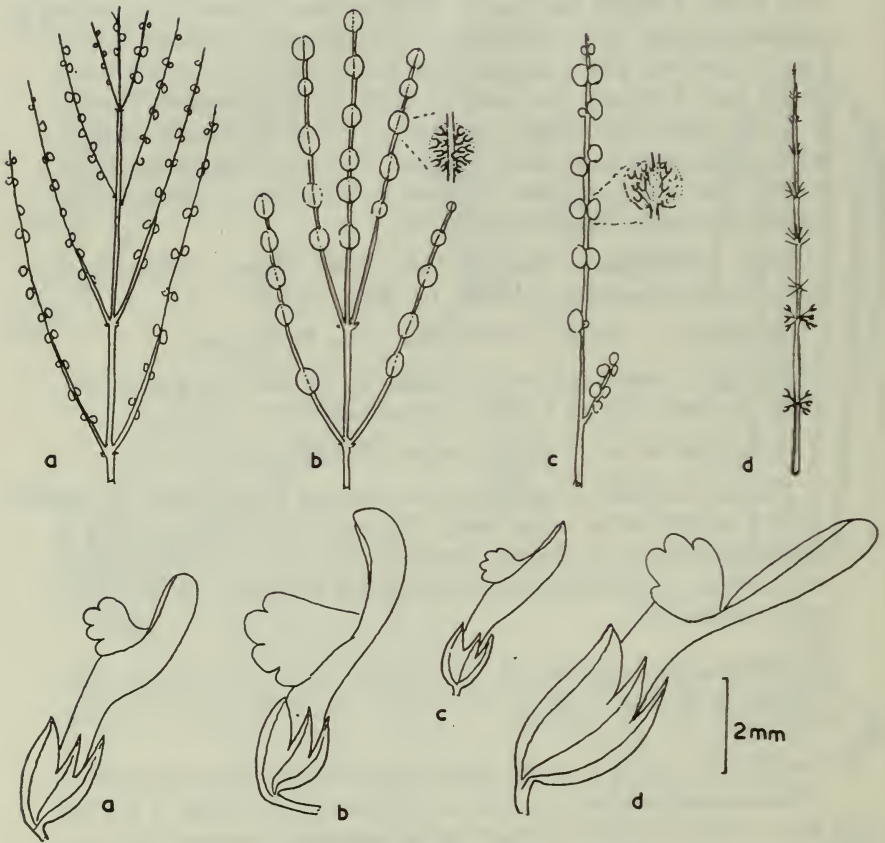


Fig. 27a. Diagrams of the inflorescences and sketches of the flowers of *Plectranthus* (1).

a. *P. opoensis*; b. *P. congestus*; c. *P. parviflorus*; d. *P. klossii*; (a. Elmer 11601; b. Brass 27602; c. Bünnenmeijer 8459; d. Brass 32392).



Fig. 27b. Diagrams of the inflorescences and sketches of the flowers of *Plectranthus* (2)

e. *P. javanicus*, f. *P. teysmannii*, g. *P. petraeus*, and h. *P. steenisii*.
 (e. Horsfield Lab. 20; f. Zolf 218, g. Backer 36387, h. Steenis 7111).

Specimens examined:

New Guinea: Papua, *Brass* 27602 (K, L); *Womersley NGF 11010* (L) (herb, stems rather woody, flowers pale blue, above Rouna Falls, 20 miles from Port Moresby, C. Dist.).

7. ***Plectranthus parviflorus*** (*non* R. Br.) Willd. Hort. Berol. 1 (1806) t. 65; Benth. Lab. Gen. & Sp. (1832) 37, in DC. Prodr. 12 (1848) 67; Mansf. in Bot. Jahrb. 62 (1929) 379.

Craniotome versicolor (*non* Reichb.) van Steenis in Bull. Jard. Bot. Butg. III, 13 (1934) 221.

Erect herb or shrubby, 0.3–1 m high. Stems and branches rather fleshy, glabrescent to densely villous. Leaves thick or thin chartaceous, ovate to sub-orbicular, 2–2.5 (–9) cm long, 0.5–1 (–5) cm wide, broadly acute or rounded, the base rounded or subcordate, often slightly oblique, entire; margins elsewhere crenate or remotely crenulate, soft rugose or villous on both surfaces; petioles 0.5–1 (–3.5) cm long, woolly. Flowers 8–12 in dense clustered false whorls, laxly disposed in terminal and upper axillary racemes 15–30 (–35) cm long, simple or branched at the base; bracts cordate, caducous. Calyx 1.2–1.5 mm (in fruit 2.5–3 mm) long, densely villous and woolly, the upper tooth very broad, decurrent in fruit. Nutlets very minute, ovoid, about 0.8 mm long.

Distribution: N. E. Australia and Malesia (Sumatra, Lesser Sunda Isls., and New Guinea).

Ecology: Common on rocky steep slopes and limestone walls and cliffs, very aromatic (v. Steenis). Altitudes 500–2,000 m.

Specimens examined:

Sumatra: G. Kerintji, C. Sumatra, alt. 1,200–2,100 m, *Binnenmeijer 8459, 8720* (Bo).

Lesser Sunda Islands: Timor, *Forbes 3888* (BM, L); Timor, Mt. Perdido, alt. 800–1,200 m, *Van Steenis 18243* (BM); Timor, alt. 500 m, *Walsh 378* (BM).

New Guinea: Papua, Laloki River Rona, *Brass 3578* (BM); Papua, Port Moresby, *Womersley 11010* (K).

Binnemeijer 8459 & 8720 from Sumatra were formerly identified as *Craniotome vericolor* Reichb. [or correctly *Craniotome furcata* (Link.) O. Kuntz.]. Although the foliage leaves are much larger than those from Timor and New Guinea, their inflorescence and detailed flower structures are indistinguishable.

8. ***Plectranthus klossii*** S. M. Moore (incl. var. *major*) in Trans. Linn. Soc. London Bot. III ser. 9 (1916) 137 (Ridl. Bot. Wollast. Exp.); Mansf. in Bot. Jahrb. 62 (1929) 379.

Herb, 8–30 cm high, rarely branched. Stem covered with soft hairs. Leaves membranaceous ovate to broadly ovate, varying from 1–1.2 by 0.6–0.8 cm to 4.5–5.5 by 3.5–5 cm obtuse, the base rounded or truncate, entire; margins elsewhere crenate; puberulent on both surfaces. False whorls about 5–6-flowers, laxly disposed in terminal raceme-like inflorescence, 5–10 (–12) cm long, rarely branched at the base, bracts subulate, very minute, less than 1 mm long; pedicels 4–5 mm long. Calyx 2.5 mm (in fruit 4–5

mm) long, slightly oblique at the base; upper tooth broad, the remaining teeth lanceolate-subulate. Corolla 5.5 mm long; lower lip boatshaped, longer than the upper lip. Stamens exerted.

Type: W. New Guinea: Otakwa River to Mt. Carstenz, alt. 2,000–2,100 m Camp. ix-x, *Kloss s.n.* (Wallatos Exped.), (type, BM, K), Jan. 1913.

Distribution: Endemic to Malesia (Lesser Sunda Isls., and New Guinea).

Specimens examined:

Lesser Sunda Islands: Timor, Koepang, *Brown s.n.* April 1803 (BM); Timor, Soë, alt. 800 m, *Walsh s.n.* Dec. 1928 (BM) (fls. light blue-mauve).

New Guinea: Papua, *Brass 32362* (K, L); Otakwa River, Carstenz Peaks, alt. 2,000–2,100 m, *Kloss s.n. Jan. 1913* (BM, K) (Type of *Plectranthus Klossi* S. Moore); Otakwa River, Carstenz Peaks, alt. 1,600–1,800 m, *Kloss s.n. Jan. 1913* (BM) (Type of *Plectranthus Klossi* var. *major* S. Moore).

Doubtful species

Plectranthus kunstleri Prain in J. As. Soc. Beng. 66 (1897) 521, 74 (1907) 916, in Ann. Roy. Bot. Gard. Calc. 9 (1906) 54, *pl. 90*; Ridl. Fl. Mal. Pen. 2 (1923) 646.

Shrubby, 1–1.5 m high. Stems and branches angled, stout, puberulous. Leaves membranaceous, ovate or elongately ovate, 9.5–12 cm long 4–6 cm wide, acute or acuminate, the base cuneate, entire; margins elsewhere regularly crenate, sparsely glandular-puberulous beneath; petioles 2.5–3 cm long. Flowers in spurious racemes disposed in large panicles 11–14 cm long and 5–6 cm across; pedicels 4–5 mm long, finely puberulous. Calyx 2.5 mm (in fruit 6–7 mm) long, 5-toothed, the upper tooth ovate, recurved and decurrent, the two lateral ovate-acute and the two lower subulate. Nutlets oblong, 1.2 mm long, brown, hardly shining.

Type: Malay Peninsula: Perak, top of limestone hills, 130–200 m King's collector 8240, (Shrubby, 2–3 ft. long, leaves light green, flowers pale green) Sept. 1885. (K, BM).

Distribution: Malesia (Malay Peninsula).

Ecology: Known only from the limestone hills, at low altitudes.

The materials available are the two iso-types deposited in the herbaria at Kew and in the British Museum. Both are fruiting ones. The holotype, on which Prain's description and illustration of the flower are based, has not been seen. The foliage leaves and the fruiting calyx of this species strongly resemble those of *Coleus micranthus* Merr. of the Philippines.

28. POGOSTEMON DESF.

Pogostemon Desf. in Mem. Mus. Par. 2 (1815) 154, *t. 6*; Benth. in Benth. & Hook. f. 2 (1876) 1179; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 328.

Wensea Wendl. Coll. Pl. 3 (1819) 24, *t. 84*.

Herbs or undershrubs, often strongly scented. Leaves usually opposite. Flowers small, in simple or branched, spicate-racemose, formed of many densely flowered subcapitate false whorls. Calyx tubular or campanulate, subequally or equally 5-toothed. Corolla tubular, exserted; limb 2-lipped; upper lip 3-lobed, the central lobe usually longer and narrower than the lateral ones; the lower lip patent, entire. Stamens 4, exserted, usually straight, the lower pair often slightly shorter than the upper; anther-locules confluent; filaments pubescent. Disk subentire, uniform. Style shortly 2-fid, the branches subulate, subequal. Nutlets smooth, ovoid or ellipsoid.

Species 35–40, Eastern India to S. China and Japan and to Malesia; about 7 species in Malesia.

Key to the species.

- A. Spicate-racemes usually branched and forming a paniculate inflorescence.
 - B. False whorls distinctly apart (or spicate-racemes with distinct internodes).
 - C. Calyx 3–3.5 mm (in fruit 3.5–4 mm) long.
 - 1. *P. heyneanus*
 - C. Calyx 4–5 mm (in fruit 5.5–6 mm) long.
 - 2. *P. tomentosus*
 - B. False whorls nearly continuous, occasionally interrupted only at the base; calyx 4–4.5 mm (in fruit about 5 mm) long.
 - 3. *P. cablin*
- A. Spicate-racemes usually simple, terminal, solitary, rarely accompanied by 1 or 2 short spicate-racemes at the base.
 - B. False whorls distinctly apart.
 - C. Calyx cylindric, 5–7 mm (in fruit 7–8 mm) long; teeth clasping.
 - D. Leaves oval-cordate, hirsute; flowers 3–6 (–8) in a false whorl.
 - 4. *P. reticulatus*
 - D. Leaves oblong-ovate to ovate, nearly glabrous; flowers 10 or more in a false whorl.
 - 5. *P. philippinense*
 - C. Calyx campanulate, 4–4.5 mm (in fruit 5–5.5 mm) long; teeth often spreading.
 - 6. *P. menthoides*
 - B. False whorls nearly continuous, occasionally interrupted only at the base; rachis densely tomentose or hairy.
 - 7. *P. velatus*

1. *Pogostemon heyneanus* Benth, in Wall. Pl. As. Rar. 2 (1831) 16, Lab. Gen. & Sp. (1833) 154 (as *heyneanum*), in DC. Prodr. 12 (1848) 153; Miq. Fl. Ind. Bat. (1859) 961; Prain in J. As. Soc. Beng. 74, 2 (1907) 707; Merr. Enum. Philip. 2 (1923) 414; Ridl. Fl. Mal. Pen. 2 (1923) 647; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 71; Back. & Bakh. f. Fl. Java 2 (1965) 633.

Pogostemon patchouli (non *P. patchouly* Pellet.) Hook. f. Fl. Brit. Ind. 4 (1885) 633. (excl. var. *suavis* Hook. f.).

Erect branching herb, 1–1.5 m high. Stems and branches slender, sparingly pubescent. Leaves thin membranaceous, ovate to broadly ovate, 5–8 cm long, 3.5–5.5 cm wide, acute, the base broadly cuneate, often slightly oblique, entire, margins elsewhere crenate or double-crenate; sparingly puberulous or sometimes almost glabrous on both surfaces; petioles 1–3 cm long, puberulous. Paniculate inflorescence 6–10 cm long, terminal; false whorls globular, 0.5–1.5 cm apart at the base, more approximate upwards; bracts narrowly lanceolate, 3–3.5 mm long, acute, puberulous. Calyx 3–3.5 mm (in fruit 3.5–4 mm) long, tomentose externally; teeth equal, triangular. Corolla 4.5–5 mm long, 2-lipped, glabrous. Filaments exerted, almost straight, all bearded. Style shortly 2-branched. Nutlets obliquely ovoid, 0.5–0.6 mm long, black, smooth.

Type: E. India, *Heyne s.n.* (K).

Distribution: India, Ceylon and Malesia.

Ecology: In thickets, old clearings, etc., at low to medium altitudes. Cultivated or as an escape from cultivation.

Vern. names: Patchouli (Sumatra); Ruku, Pakochilam, Poko Nyao, Rumput Kuku (Malay Peninsula), Kadlum, lagumtum (Philippines).

Specimens examined:

Sumatra: E. Sumatra, *Beccari 600 & 662* (K); W. Coast, alt. 900 & 1,500 m, *Bünnemeijer 8123* (K, L) & *9057* (L); Lampong, alt. 400 m, *Iboet 105* (K, L); Berastagi, alt. 1,350 m, & 1,500 m, *Lörzing 6792* (K, L) & *13844* (L); Deli, *Lörzing 15829* (L); E. Sumatra, *Ridley 11334* (K); Sandaran Agong, *Robinson & Kloss s.n.* May 1914 (K); Padang, *Toroes 5635* (L).

Malay Peninsula: Sembilan, *Alvins 880 & 1088* (Sing.); Sungei Ujong, *Alvins 1937 & 2240* (Sing.); Malaya Pen., *Griffith 3966 & 3970* (K, Sing.); Malacca, *Griffith s.n.* (K); Penang, *Haniff s.n. Feb. 1920* (Sing.); Teku, G. Tahan, *Haniff 8031* (Sing.); Pahang, near Kuala Toku, *Holtum 20816* (Sing.); Selangor, *Ridley 7603* (K, Sing.); Perak, *Ridley 14300 a* (Sing.); Pahang, Kuala Toku, *Seimund 485* (Sing.); Upper Perak, *Wray 4046* (Sing.).

Java: Buitenzorg, *Bakhuizen v/d Brink 1753 & 3654* (L); Java, *Horsfield lab. 17* (K); Kota Batoe, *Monchy s.n.* (L); Tjibodas, *Schaffer s.n.* (L).

Borneo: Sarawak, *Beccari 1747 & 2747* (K); Sarawak, Pen Kulu Ampat, *Haviland s.n.* (Sing.); Borneo, Bandjarmassing, *Mosley 392* (K); Sarawak, Lundu, *Ridley 12381* (K).

Philippines: Palawan, *Bermejos 287* (K); Mindanao, alt. 450 m, *Frcke 38323* (L); Mindanao, Zamboanga, *Merrill 5467* (K) & *8238* (K, L); Mindanao, *Ramos & Edano 36972* (L).

2. *Pogostemon tomentosus* Hassk. Hort. Bogor. (1858) 131; Benth. in DC. Prodr. 12 (1848) 153; Miq. Fl. Ind. Bat. (1859) 962.

Perennial, erect herb, branched. Stems and branches slender, tomentose. Leaves thin or thick membranaceous, puberulous above, densely tomentose beneath, oblong-ovate or ovate, 5–9 (–14) cm long, 3.5–6 (–10) cm wide, acute, the base obliquely rounded, entire; margins elsewhere incisely serrate or partly double-serrate. Spicate-racemes few or several, forming terminal panicles; false whorls 10-many-flowered, more or less apart at the base, closely approximate upwards; bracts linear lanceolate, 3–6 mm long.

Calyx tubular, 4–5 mm (in fruit 5.5–6 mm) long, pilose. Corolla 5.5–6 mm long, 2-lipped. Filaments shortly exerted, woolly below. Seeds subrounded, 0.6 mm long, 0.5 mm broad, obscurely 3-angled, black.

Type specimen: Java, Buitenzorg, *Hasskarl s.n.* (not seen)

Distribution: Malesia (Java ?, Lesser Sunda Isls., the Philippines, Celebes).

Specimens examined:

Lesser Sunda Islands: Soemba, *Teysmann 8814* (K, L); Bali, *Voogd 2187* (L).

Philippines: Luzon, Mt. Arayat, *Ramos 22432* (K, L).

Celebes: S. W. Celebes, *Eyma 3301* (L); Celebes, *Teysmann 12601* (L); Tjamba, *Teysmann 12620* (L); Baleh-Angien, *Teysmann 8814* (K, L).

Type specimen of this species was not available for examination. The identification of the Celebes and Lesser Sunda Islands specimens as belonging to this species was made by Boerlage (in Herb. Leiden), on which the above descriptions were drawn. One notable feature is that no available specimens from Java can be referred to this species. It is also not included in Backer and Bakhuizen's Flora of Java Vol. 2, (1965).

3. ***Pogostemon cablin*** (Blanco) Benth. in DC. Prodr. 12 (1848) 146; Miq. Fl. Ind. Bat. 2 (1859) 964; Prain in J. As. Soc. Beng. 74, 2 (1907) 708, in Kew Bull. (1908) 78; Merr. Enum. Philip. 3 (1923) 414; Back. & Bakh. f. Fl. Java 2 (1965) 633.

Mentha cablin Blanco, Fl. Filip. (1837) 473.

Meniha auricularia (non Linn.) Blanco, op. cit. ed. 2 (1845) 329, ed. 3, 2 (1878) 245.

Pogostemon patchouly Pellet. in Mem. Soc. Sc. Orleans 5 (1845) 277, t. 7;

Pogostemon patchouly Pellet. (as *patchouli*), var. *suavis* Hook. f. Fl. Brit. Ind. 4. (1885) 634.

Pogostemon patchouli Hook. in Kew J. Bot. 1 (1849) 328, t. 11.

Pogostemon comosus Miq. Fl. Ind. Bat. (1859) 963. *syn. nov.*

Pogostemon neptoides Stapf. in Kew Bull. (1908) 116; Merr. in Philip. J. Sc. 7 (1912) Bot. 347 (incl. var. *glandulosus*), Enum. Philip. 3 (1923) 414. *syn. nov.*

Pogostemon battakianum Ridl. in J. R. As. Soc. Mal. Br. 1 (1923) 85. *syn. nov.*

Pogostemon javanicus Backer ex Adelb. in Reinwardtia 3 (1954) 150, f. 1. Back. & Bakh. f. Fl. Java 2 (1965) 632, *syn. nov.*

Erect herb, branched, 50–100 cm high. Stem and branches densely tomentose. Leaves thin or thick membranaceous, narrowly ovate or ovate, 7–10 (–13) cm long, 5–6.5 (–7) cm wide, acute, the base cuneate-rounded to truncate, entire; the margins elsewhere incisely dentate or crenate; petioles 1–3.5 cm long, tomentose. Spicate-racemes 3 or many forming a terminal panicle, 15–30 (–40) cm long; false whorls slightly apart below, closely approximate

above; bracts elliptic or narrowly ovate, 2–7 mm long. Calyx tubular, 4–5 mm (in fruit 5–6 mm) long, narrowed at both ends, hirsute to strigose, equally 5-toothed. Corolla 6–7 mm long, 2-lipped. Filaments soft hairy. Style 2-branched at the apex. Nutlets ellipsoid, 1 mm long, 0.6 mm broad, subtriquetrous, smooth.

Distribution: India, Ceylon and Malesia.

Ecology: Occasionally cultivated or escaped from cultivation and occurring in areas remote from settlement.

Vern. names: Kabling, Kadlum, Karlin, Sarok (Philippines, fide Merrill).

Specimens examined:

Sumatra: W. Coast, alt. 1,550 m, *Bünnemeijer 8811* (L); G. Kerintji, alt. 1,900 m, *Bünnemeijer 9612* (K, L); Berastagi, *Ridley s.n.* Feb. 1921 (K) (Type of *Pogostemon battakianun* Ridl.).

Malay Peninsula: Selangor, *Collector unknown, s.n.* May 1932 (K).

Java: Bogor, *Hallier 303* (L); Buitenzorg, Garden, *Holmes s.n.* 1896 (K); Banjoemas, *Horsfield s.n.* (U 69535) (Type of *Pogostemon comosus* Miq.); Banjoewangi, *Zollinger 4651* (L) (Type of *Pogostemon javanicus* Backer).

Lesser Sunda Islands: Sumbawa, *Elbert 3677* (L).

Philippines: Luzon, Rizal, *Ahern's Collector 2443* (K, Sing.); Luzon, *Loher 4211* (K); Luzon, Rizal, *Merrill sp. Blanc. 112* (K, L); Luzon, *Merrill 5025* (K); Luzon, Ilocos, alt. 1,000 m, *Merritt & Darling 12479* (K); Philippines, *Micholitz s.n.* (K) (Type of *Pogostemon nepetoides*); Luzon, Rizal, *Ramos 1849, 2061, 2130 & 5199* (K); Luzon, Pampanga, *Ramos 22432* (K); Luzon, Rizal, *Reillo 19292* (K, L); Philippines, *Vidal 505* (K, L).

4. *Pogostemon reticulatus* Merr. in Philip. J. Sc. 8 (1912) Bot. 348, Enum. Philip. 3 (1923) 415.

Erect branched herb, 50–75 cm high. Stems and branches puberulent, scattered with long white hairs. Leaves thin membranaceous, 5–10 cm long, 3.5–7 cm wide, obtuse or shortly acuminate, the base rounded or cordate; margins coarsely and irregularly crenate, ciliate on both surfaces; petioles 3–6 cm long. False raceme terminal, solitary, 6–15 cm long including the peduncle; false whorls 3–8 flowered, internodes 1–2 cm long, more or less evenly apart; bracteoles filiform, 2 mm long, puberulent, ciliate. Calyx tubular, 4.5–6 mm long, puberulent and very sparingly pilose, narrowed at both ends; the teeth oblong-lanceolate, ciliate.

Type: Luzon, Rizal, Montablan, *For. Bur. 3395 Ahern's collector* (K, L).

Distribution: Malesia (the Philippines).

Ecology: In thickets or forests at low or medium altitudes.

Vern. names: Kadling (the Philippines).

Specimens examined:

Philippines: Luzon, Rizal, Montablan, *Ahern's Collector 3395* (K, L) (Type); Rizal, San Andales, *Edano 48842* (K, L); Luzon, Mariveles, *Loher 4207* (K) (Fls. lilac); Luzon, *Loher 6690* (K); Luzon, Laguna, San Antonio, *Ramos s.n.* Aug. 1910 (K); Philippines, *Vidal 3487* (K, L).

Loher 4207 deviates from the typical form of the species in the conspicuously pedunculate verticillasters. They are normally sessile.

5. ***Pogostemon philippinensis*** S. M. Moore in J. Bot. 43 (1905) 146; Merr. in Philip. J. Sc. 5 (1910) Bot. 381, Enum. Philip. (1923) 415.

Pogostemon membranaceus Merr. in Philip. J. Sc. 7 (1912) 347, Enum. Philip. 3 (1923) 414. *syn. nov.*

Erect herb, 50–75 cm high, branched. Stems and branches puberulent. Leaves thick or thin membranaceous, oblong-ovate to ovate, 3–9 cm long, 2.5–5 cm wide, acuminate, the base rounded, entire; margins elsewhere serrate or double-serrate; glabrescent above, glandulate-punctate beneath; petioles 1–3 cm long, puberulent. Spicate-raceme terminal, solitary, 4–12 cm long; false whorls 10-many-flowered, more or evenly apart; bracts linear lanceolate, pubescent, caducous. Calyx tubular, 5–6 mm (in fruit 6–7 mm) long, sparingly pubescent and glandular-punctate. Corolla slender, glabrous, 9–10 mm long. Filaments exerted, bearded below the middle. Nutlets ovoid, 0.6–0.7 mm long, obscurely triquetrous, smooth.

Type: Luzon, Prov. of Ilo-ilo, *Vidal 3421*, (K) March. 1886.

Distribution: Malesia (the Philippines).

Ecology: In thickets or forests along streams at low or medium altitudes.

Vern. names: Legleg, Ngingiyau, Panga-ti-Nuang (Philippines).

Specimens examined:

Philippines: Luzon, Lepanto, *Merrill 4501* (K); Luzon, Pampanga, *Merrill 11210* (K); Luzon, Abra, *Ramos 7267* (K); Luzon Laguna, *Ramos 16419* (L) (Co-type *Pogostemon membranaceus* Merr.); Luzon, Laguna, San Antonio, *Ramos 16596* (K); Luzon, Baguio, *Ramos 27404* (K, L. Sing.); Luzon, Ilocos, Mt. Palimlim, *Ramos 33320* (K); Luzon, Cagayan Penablanca, *Ramos & Edano 46599* (Sing.); Luzon, Rizal, Mt. Irig, *Ramos & Edano 48558* (K); Luzon, Benguet, Pauai, *Santos 31792* (K); Mindoro, Mt. Yagaw, alt. 500 m, *Sulit & Conklin 16927* (L); Luzon, Bontoc, *Vanoverbergh 208* (L); N. Luzon, *Vidal 1655 & 1659* (K); Panay, Iloilo, Miagao, *Vidal 3421* (K) (Type of *Pogostemon philippinensis* Moore).

A co-type of *Pogostemon membranaceus* Merr. has been examined. It differs from *P. philippinensis* Moore merely in the thinner and somewhat broader leaves.

6. ***Pogostemon menthoides*** Bl. Bijdr. (1826) 825; Benth. Lab. Gen. & Sp. (1833) 156, in DC. Prodr. 12 (1848) 155; Miq. Fl. Ind. Bat. 2 (1859) 963; Back. & Bakh. f. Fl. Java 2 (1965) 632.

Pogostemon fraternus Miq. Fl. Ind. Bat. 2 (1859) 963. *syn. nov.*

Erect branched herb, 50–100 cm high. Branches pubescent. Leaves thick membranaceous, lanceolate to ovate, 1–5 (–8) cm long, 0.7–3 (–5) cm wide, acute, the base acute or rounded, often slightly oblique; margins often doubly serrate or incised-serrate in larger ones; sericeous on both surfaces; petioles 0.5–1 cm long, pubescent. Spicate-raceme terminal, solitary, 3–15 cm long; false whorls 3–12 flowered, evenly apart; bracts linear, minute. Calyx campanulate, strigose, 4–4.5 mm (in fruit 5–5.5 mm) long, 5– (occasionally 7–) toothed; teeth lanceolate, sharply pointed, often spreading. Corolla 6–7 mm long, 2-lipped, sparingly puberulent.

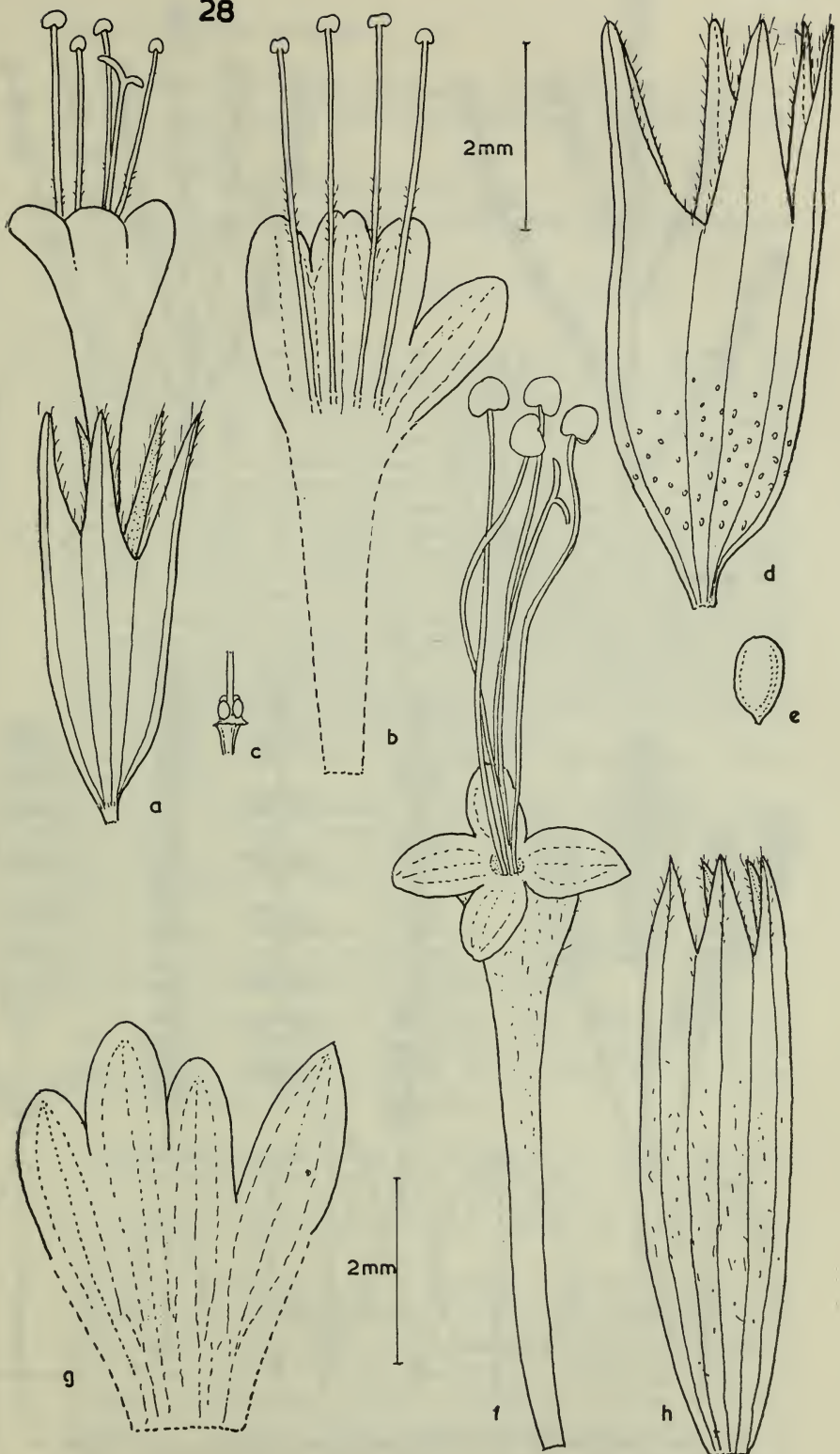


Fig. 28. *Pogostemon menthoides* Bl. (a-e) and *P. philippinense* S.M. Moore (f-h).

a. flower; b. corolla expanded showing the stamens; c. ovary; d. fruiting calyx; e. nutlet; f. corolla and stamens; g. upper portion of corolla expanded; h. calyx. (a-c, *Boelage s.n.*; d & e, *Blume s.n.*; f-h, *Ramos 16419*).

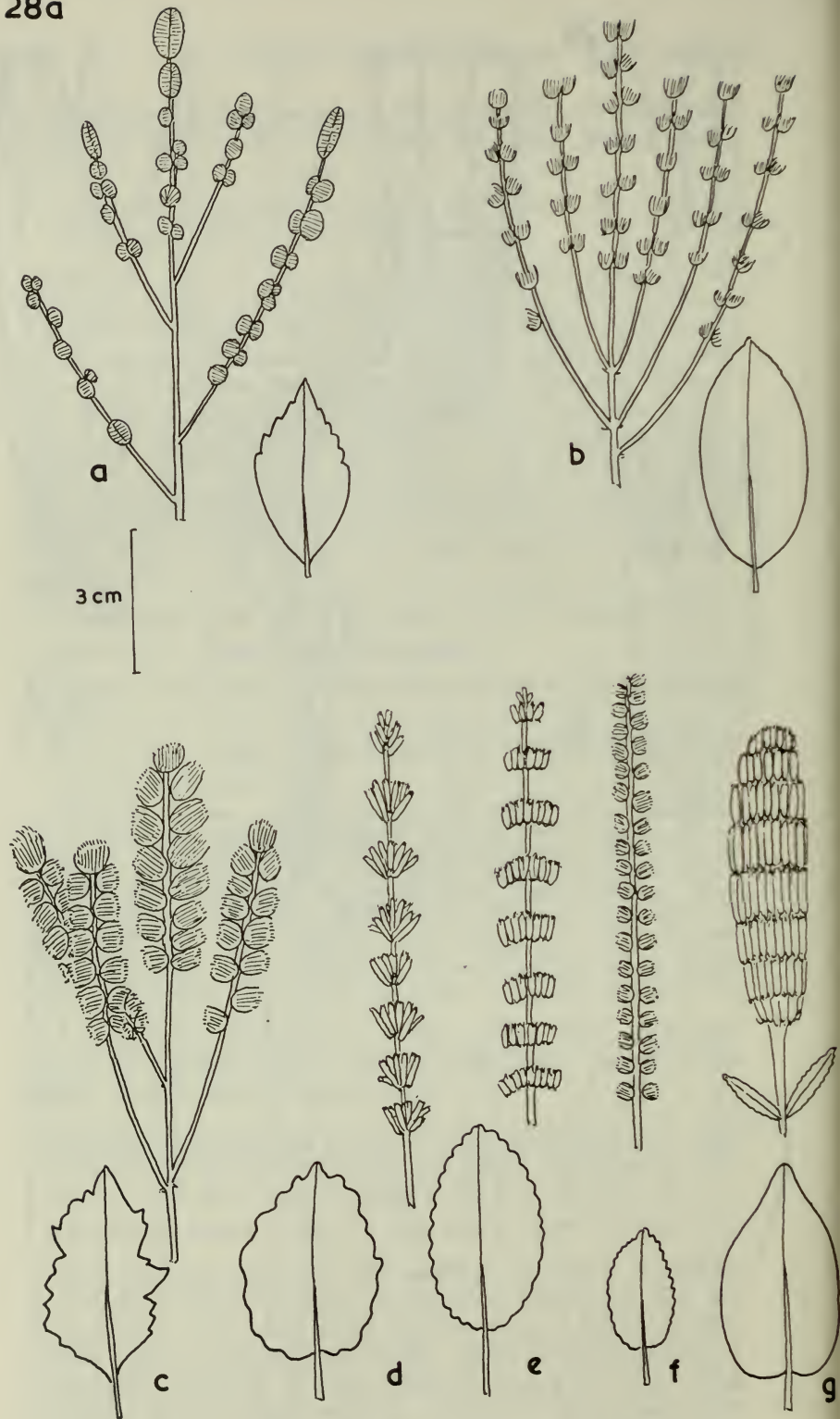


Fig. 28a. Diagrams of the inflorescences and sketches of the leaves of *Pogostemon*.

a. *P. heyneanus* Benth.; b. *P. tomentosus* Hassk.; c. *P. cablin* Benth.;
 d. *P. reticulatus* Merr.; e. *P. philippinense* S.M. Moore; f. *P. menthoides* Bl.; g. *P. velatus* Benth. (a. Bakhuizen v.d. Brink 3654; b. Teysmann 12601; c. Vidal 505; d. Ahem's collection; e. Ramos 16419; f. Koorders 44057; g. Cuming 1097).

Filaments exerted, bearded below the middle. Nutlets subglobose, 0.6 mm long and 0.5 mm across, obscurely 3-angulate, black, finely reticulate.

Type: Mt. Gede, *Blume s.n.* (L).

Distribution: Malesia (Java, Lesser Sunda Islands, Borneo and the Philippines).

Ecology: In damp forests, altitude 1,500–2,500 m.

Specimens examined:

Java: G. Widodaren alt. 1,750 m, *Backer 3715* (L); G. Tjeremai, alt. 1,500 m, *Backer 4898* (L); G. Gedeh, alt. 2,000 m, *Backer 13721* (L); G. Hayang, alt. 2,200 m, *Backer 9845* (L); Preanger, alt. 1,620 m, *Backhuizen v/d Brink 4559* (K, L); Tjibodas, *Boerlage s.n.* 1917 (L); G. Papandajan, *Burck s.n.* July 1891 (K, L); G. Gede, *Blume s.n.* (lectotype of *Pogostemon menthoides* Bl.); G. Gedeh, *Clemens 30434* (K); G. Gedeh, *Hallier 480* (L); G. Gede, *Hochreutiner 828* (L) (Herb 0.5 m; fls. violet); Java, *Horsfield 1141* (K) (Type of *Pogostemon fracterus* Miq.); G. Gedeh, alt. 1650 m, *Kern 8301* (L) (Corolla light purple; fil. dark purple; style less purplish); Tjibodas, alt. 2,000 m, *Koorders 25846 & 31075* (L); Besoeki, alt. 2,000 m, *Koorders 43203* (K, L); G. Delaman, alt. 1,600 m, *Koorders 43205* (L); G. Ardjoeno, alt. 2,000 m, *Koorders 44057* (L); G. Wilis, alt. 2,000 m, *Kuntze 5871* (K); G. Prahoe, alt. 2,100–2,500 m, *Loogen 11* (L); G. Kentjana, *Native Collector 345* (L); Tjibodas, *Pleyte 119* (L) (Herb 70 cm fls. lilac); Tjibodas, alt. 1,400 & 1,500 m, *Raap 646 & 718* (L); Wajang, *Rant 608* (L); Tjibodas, *Sapiin 2479* (L); G. Kentjana, *Soegandiredjo s.n.* April 1909 (L); G. Patoeha, alt. 1,600–2,000 m, *Steenis 4422* (L); Kandangbak to Tjibeureum, *Yates 2873* (Sing.)

Lesser Sunda Islands: Bali, *Steenis 7887* (K, Sing.); Bali, alt. 1,700 m, *Voogd 2766* (L).

Borneo: N. Borneo, Kinabalu, Silan Basin, alt. 1,700–2,700 m, *Clemens 29727* (K, L); Kinabalu, Penaturan River, alt. 1,200 m, *Clemens 32575* (L)

Philippines: Luzon, Ilocos, Mt. Quebrada, alt. 1,000 m, *Edano 3953* (L); Luzon, Mt. Darna, alt. 1,000 m, *Edano 6057* (L); Luzon, Mt. Tonglon, *Ramos 5415* (L).

Descriptions of *Pogostemon fraternus* Miq. was based on Horsfield's collection from G. Praoe, Java. A type specimen in the Kew Herbarium is identical with *P. menthoides* Bl.

Two specimens collected by Edano from Luzon (*Nos. 3953, 6057*) probably represent a new variety. It is characterized by the much longer inflorescence (up to 20 cm long) and the denser verticils consisting of over 20 flowers.

7. *Pogostemon velatus* Benth. in DC. Prodr. 12 (1848) 155; Miq. Fl. Ind. Bat. 2 (1859) 964; Merr. Enum. Philip. 3 (1923) 415.

Pogostemon williamsii Elmer, Leaf. Philip. Bot. 9 (1934) 3197, *syn. nov.*

Perennial branching herb or shrubby, 1 m high. Stems and branches stout, densely tomentose. Leaves thick membranaceous, lanceolate to broadly ovate, 3–8–11 cm long, 1.5–4 (–5) cm wide, acute or acuminate, the base rounded or cordate, the margins remotely double-serrate, densely velutinous on both surfaces; petioles 1–3 cm long. Spicate-raceme terminal and solitary, 5–12 (–15) cm long; false whorls 12-many flowered, closely approximate. Calyx tubular, 5 mm long (in fruit 6–6.5 mm long, the mouth enlarged), sparingly pilose; teeth 5, broadly lanceolate, ciliate.

Corolla slender, 7–8 mm long, pilose externally. Filaments exerted, hairy below. Nutlets subspherical, 0.6 mm long, and 0.5 mm across, black, smooth.

Type: Luzon, Insul. Philippines, *Cuming 1097* (K, L) 1841.

Distribution: Malesia (the Philippines).

Ecology: In ravines, thickets, etc. altitude 1,200–1,800 m.

Vern. names: Dila, Opop, Sipan-ti-bayungan (Philippines).

Specimens examined:

Philippines: Luzon, *Cuming 1097* (K, L) (Type of *Pogostemon velatus* Benth.); Luzon, Alba, *Darling 16566* (L); Luzon, Benguet, *Elmer 5912* (K); Luzon, Benguet, Baguio, *Elmer 8385* (K, L); Luzon, Pampanga, Mt. Pinatubo, *Elmer 22225* (K, L, Sing.) (Type of *Pogostemon williamsii* Elm); Luzon, *Loher 4208, 4209 & 4210* (K); Luzon, Nueva Vizcaya, *McGregor 11339* (K, L); Luzon, Benguet, *Mendoza 20362* (L); Luzon, Benguet, Mt. Abocot, *Mendoza 40923* (K, L); Luzon, Benguet, Baguio, *Merrill 4778* (K); Luzon, Baguio, *Merrill 11673* (K, Sing.); Luzon, Zambales, Anuling, *Ramos & Edano 44557* (Sing.); Luzon, Cagayan, Penablanca, *Ramos 76828* (Sing.); Luzon, Baguio-Bontoc, *Steenis 17914* (L); Luzon, Mt. Pauai, *Sulit 7535* (L); Luzon, Bontoc, *Vanoverbergh 157* (L); Luzon, Benguet, *Vidal 1660* (K); Luzon, Benguet, Baguio, *Williams 1353* (K).

The type specimen of *Pogostemon williamsii* Elmer has been studied, it differs from *P. velatus* Benth. mainly in the narrower inflorescence (1–1.5 cm across vs. 2–2.2 cm across) and the narrower leaves (lanceolate vs. cordate). Their basic flower structures, however, are very similar.

Species imperfectly known

Pogostemon cristatus Hassk. in Hoev. & De Vriese, Tijdschr. 10 (1843) 121; Back. & Bakh. f. Fl. Java 2 (1965) 633.

According to Backer and Bakhuizen van den Brink Jr., this species is closely allied to *Pogostemon heyneanus* Benth., "from which it may be distinguished by the larger dimensions of the flower." No materials are available for the present study.

29. SALVIA [TOURN.] LINN.

Salvia [Tourn.] Linn. Gen. Pl. ed. 5 (1754). Sp. Pl. (1753) 23; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1194; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 270.

Herbs, undershrubs, or shrubs. Leaves opposite, cauline or almost all radical, simple or pinnatifid. Flowers small to large and showy; false whorls in terminal and axillary racemes; bracts small or large, sometimes brilliantly coloured in cultivated forms. Calyx campanulate or tubular, 2-lipped; upper lip entire or 3-fid; lower lip notched or 2-toothed. Corolla 2-lipped; tube naked or annulate within; upper lip erect; lower lip 3-lobed, the central lobe usually wider than the lateral ones, entire or emarginate. Fertile stamens 2, representing the lower pair; filaments short, articulating with a slender connective, and sometimes produced beyond the joint; connective linear, transverse, with an upper ascending arm which bears a linear fertile anther-locule, and a lower straight or deflexed branch bearing a reduced anther-locule or empty. Disk usually

enlarged anteriorly. Style shortly 2-fid; the lobes usually subulate, equal or the lower larger, sometimes flattened. Nutlets ovoid, often triquetrous, smooth.

About 500 species, widely distributed in temperate and subtropical regions of the World, only 2 species are perhaps native to Malesia; several other species are often cultivated in the gardens*, one of them, *S. coccinea*, var. *pseudococcinea*, sometimes escapes from cultivation.

Key to the species

- A. Dwarf rhizomatous herb, usually below 20 cm high; leaves nearly all radical, always pinnatifid; style branches nearly equal. 1. *S. scapiformis*
- A. Erect herbs, often above 30 cm high; leaves cauline, simple and entire; style branches unequal, the upper ones very short.
- B. Inflorescence paniculate; flowers bluish violet, minute, inconspicuous; corolla-tube short, not exserted. 2. *S. plebeia*
- B. Inflorescence racemose; flowers red, rather large, showy; corolla-tube long, exserted. 3. *S. coccinea* var. *pseudococcinea*

1. *Salvia scapiformis* Hance in J. Bot. 23 (1885) 368 in Bot. Mag. t. 6980; Merr. in Philip. J. Sc. 5 (1910) Bot. 228, Enum. Philip. 3 (1923) 413 (as *S. scaphiformis*); Kudo in Mem. Fac. Sc. & Ag. Taihoku Un. 2, 2 (1929) 175.

Dwarf rhizomatous herb, usually 10–20 cm high. Leaves very variable, nearly all radical, odd-pinnatifid, ovate or broadly ovate in outline, 5–10 (–18) cm long; leaflets often 5, sometimes 3 or 7, rarely simple; terminal leaflets the largest, ovate, 1–4 cm long, 0.8–3 cm wide, acute, the base rounded or cordate, entire, the margins crenate-serrate, or few-toothed in the lateral ones, glabrescent on both surfaces; petioles very slender, 4–10 cm long. Flowers 4–7 in a false-whorl, the whorls 1–1.5 cm apart, in raceme-like inflorescence borne on a terminal scape. Calyx tubular-campanulate, 5–5.5 mm (in fruit 7–9 mm) long, sparsely pilose, 2-lipped; upper lip broad deltoid, entire; lower lip sharply 2-toothed. Corolla 8–9 mm long, exserted; tube annulate within; upper lip erect, emarginate; lower lip shorter, 3-lobed. Stamens exserted, lower connective-branches reduced. Style shortly 2-branched, the branches nearly equal. Nutlets ellipsoid, 2 mm long and 1 mm broad, subtriquetrous.

Type specimen: Tam Sui, Ins. Formosa, *C. Ford* (Herb. Propr. 22314), June, 1884 (K).

Distribution: Western China, Formosa, and Malesia (The Philippines).

* A key to 13 cultivated species and varieties in Java can be found in Backer & Bakhuizen, Fl. Java. 2 (1965), pp. 625–628.

Specimens examined:

Philippines: Mt. Picode-Loro, Ilocos, Luzon, alt. 500 m, *Edano 17973* (L); Banguio, Benquet, Luzon, *Elmer 5834* (K), 8637 (K, L); Burgos, Ilocos, Luzon, *Ramos 27184* (K); Mt. Nagapatan, Ilocos, Luzon, *Ramos 33145* (L, Sing); Umiray, Tayabas, Luzon, *Ramos & Edano 29046* (K); Mt. Suson-Dalaga, Rizal, Luzon, *Ramos & Edano 29415* (K); Mt. Data, Lepanto, Luzon, *Ramos & Edano 40256* (K, L) 40233 (K, isotype of *Salvia philippinensis* Merr. probably an unpublished binomial).

This is possibly a true native species of *Salvia* in the Malesian region.

2. *Salvia plebeia* R. Br. Prodr. (1810) 501; Benth. in DC. Prodr. 12 (1848) 355; Miq. Fl. Ind. Bat. 2 (1859) 970 (as *S. plebeja*); Prain in J. As. Soc. Beng. 74 (1907) 713; Merr. Enum. Philip. 3 (1923) 413.

Salvia violacea (non Ruiz & Pav.) Blanco Fl. Filip. (1845) 14, ed. 3, 1 (1877) 27.

Erect herb, 40–60 cm or more high. Stems 4-angled, grooved, tomentose or glabrescent. Leaves membranaceous, sparsely hirsute or nearly glabrous, very narrowly elliptic or narrowly ovate, 2–4 cm long, 0.8–1.5 cm wide, sub-acute or obtuse, the base usually cuneate, entire; margins elsewhere crenate; petioles 2–4 cm long, hirsute. False racemes terminal and in upper leaf-axils, often forming large panicles; flowers 4–10 in a false whorl; bracts small, linear-spathulate; pedicels 1–2 mm long, hairy. Calyx campanulate, 2 mm (in fruit 2.5 mm) long, densely tomentose and glandulate, 2-lipped; upper lip obtuse, often shortly 3-fid at the tip; lower 2-toothed, the teeth acute. Corolla small, 3–3.5 mm long, shortly exserted; upper lip oblong, obtuse; lower lip 3-lobed, the mid-lobe exceeding the lateral ones. Nutlets ovoid, 1 mm long, 0.7 mm broad, brown, rugose.

Type specimen: Nova Hollandia tropica, R. Brown, s.n. (BM).

Distribution: Southeastern Asia to Australia.

Ecology: A weed occurring at low altitudes, rather rare.

Vern. name: Ruku-ruku begal (Sumatra).

Specimens examined:

Sumatra: Karo Lands, alt. 1,350 m, *Lörzing 5921* (L); Karo Lands, Biang Valley, *Lörzing 14502* (L) (Herb, 40 cm, lvs. aromatic, fls. violet); Berastagi, *Ridley s.n.* Feb. 1926 (K) (Fls. purplish).

Philippines: Luzon, Cagayan, *Cuming 1347* (L); Luzon, Cagayan, Penablanca, *Ramos & Edano 46556* (Sing.).

New Guinea: Lae, Bot. Gard., *Heuz 9827 & 10503* (L).

3. *Salvia coccinea* Juss. ex Murr. var. *pseudococcinea* (Juss. ex Murr.) Back. in Onkrnidfl. Jav. Suikerr. (1934) 561; Back. & Bakh. f. Fl. Java 2 (1965) 628.

Salvia pseudococcinea Juss. ex Murr. in Comm. Gott. 1 (1778) 86; Mansf. in Bot. Jahrb. 62 (1929) 378.

Salvia coccinea (non Juss. ex Murr.) Prain in J. As. Soc. Beng. 74 (1907) 712; Ridl. Fl. Mal. Pen. 2 (1923) 655 (as *Sp. excl.*)

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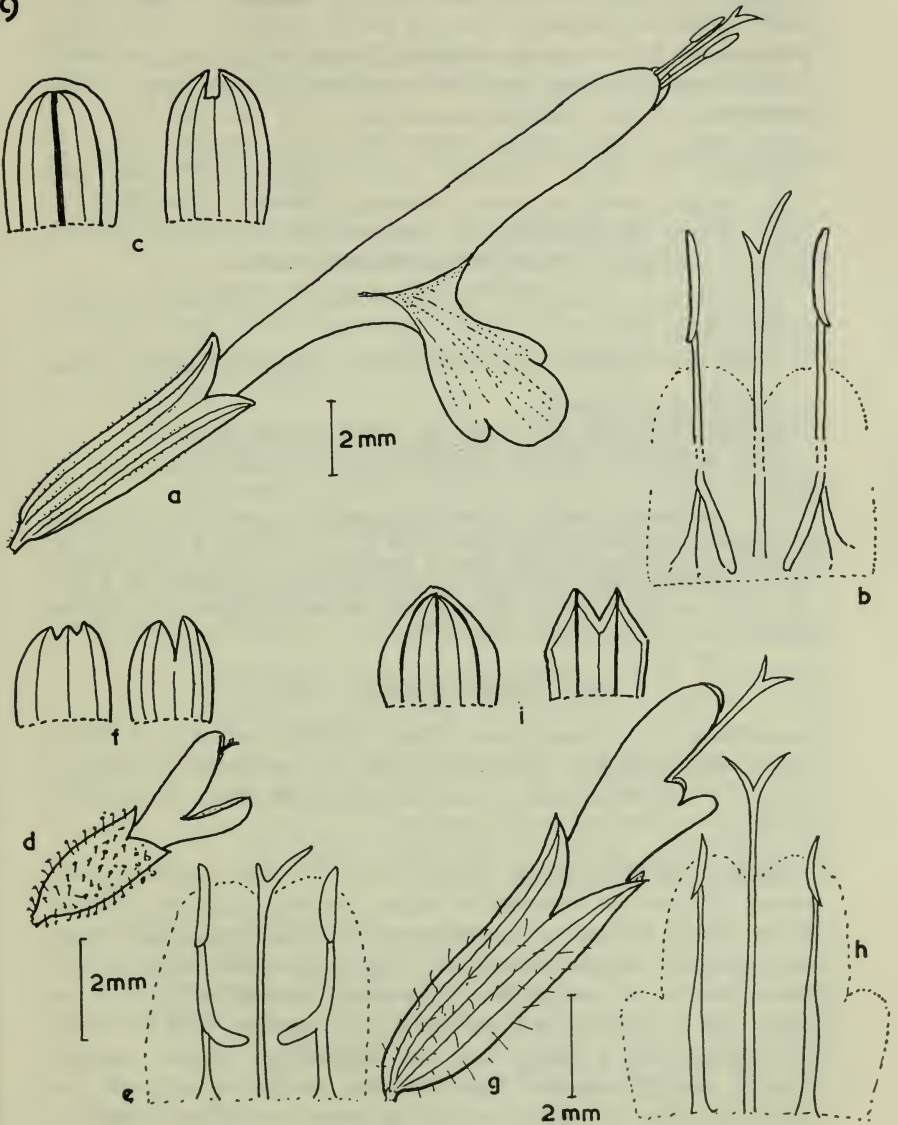


Fig. 29. *Salvia coccinea* Juss. ex Murr. (a-c), *S. plebeia* R. Br. (d-f, and *S. scapiformis* Hance (g-i).

a, d, g. flowers; b, e, h. stamens and portions of styles; c, f, i. upper (left) and lower (right) fruiting calyx-lips; (a-c, Lörzing 11849; d-f, Lörzing 14502, Cuming 1347; g-i, Edano 17973, Ramos 33145).

A slender herb, 60 cm to 1 m high. Stems several, ascending, often branched, finely pubescent (in some cultivated forms with extremely long silky hairs). Leaves membranaceous, ovate or deltoid-ovate, 2.5–3.5 cm long, 1.5–2.5 cm wide, acute, the base truncate or cordate, the margins crenate or serrate; glabrous above, finely pubescent beneath; petioles slender, 0.5–1 cm long, finely puberulous. False racemes terminal; flowers 6–10 in a false whorl; bracts ovate-acuminate, deciduous; pedicels 2–4 mm long, slender, puberulous. Calyx tubular-campanulate, 7–8 mm (in fruit 9–10 mm) long, hirsute, striate; upper lip entire, obtuse; lower lip 2-toothed, the teeth triangular, acute. Corolla 20–25 mm long; tube straight, much exerted, widened upwards; upper lip short, erect; lower lip spreading or recurved, 3-fid. Nutlets narrowly ovoid, 3 mm long, 1.2 mm broad, smooth, brown.

Distribution: A native of tropical America; cultivated in South-eastern Asia.

Ecology: A garden plant, occasionally escaped from cultivation.

Specimens examined:

Sumatra: Sibolangit, Bot. Gard., alt. 500 m, *Lörzing 11849* (L).

Malay Peninsula: Malaya, *Maingay 1167* (K); Malacca, *Maingay 1778* (K).

Java: Pasoeroean, *Backer 36769* (L); Sarangan, *Coert 179* (L); Madioen, G. Lawoe, alt. 1,300–1,400 m, *Elbert 749* (L); S. E. Java, *Forbes 756* (L); Pangalengan, *Forbes 758* (BM, Sing.); Preanger, alt. 1,400 m, *Hochreutiner 1280* (L); Pangalengan, alt. 1,400 m, *Karsten 19* (L); Sarangan, G. Lawoe, alt. 1,300 m, *Karsten 50* (L); Besoeki, *Koorders 28490* (K); Batavia, *Schiffner 2503* (L); Preanger, Tjijiroean, alt. 1,450 m, *Smith 793* (L).

30. SCUTELLARIA LINN.

Scutellaria [Riv.] Linn. Gen. Pl. ed. 5 (1754) 260, Sp. Pl. (1753) 598; Benth. in DC. Prodr. 12 (1848) 412, in Benth. & Hook. f. Gen. Pl. 2 (1876) 1201; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 225.

Herbs, sometimes woody below. Leaves opposite, petiolate, rarely sessile. Flowers in terminal or upper axillary racemose inflorescence; bracts minute or conspicuous and foliaceous. Calyx short, campanulate, 2-lipped, accrescent; calyx tube with a large deciduous shield- or pouch-like appendage ("scutellum") above the upper lip; in fruit, at first the lips closed together, then the upper lip falling away together with the appendage. Corolla trumpet, usually sharply recurved from the base and erect upwards, not annulate within, 2 lipped; upper lip often boat-shaped, entire or notched; lower lip broad, 3-lobed. Stamens 4; lower pair longer, the anthers often dimidiate or 1-loculate; upper pair shorter, the anthers 2-loculate. Disk tubular, elongate. Ovary oblique, on a short gynophore; style 2-fid. Nutlets very minute, smooth, granulate or hispid. Seeds more or less transverse, with curved embryo.

Species about 200, nearly throughout the World, (absent in S. Africa). Over 10 species have been described or reported from the Malesian region, only the following 3 species with 4 varieties are recognized in this treatment.

Key to the species and varieties

- A. Flowers mostly 3 and subverticillate (sometimes also 2 and opposite) in a false whorl, radially spreading.
- B. Leaves membranaceous, generally larger (4.5–6 by 3.5–5 cm); bracts usually linear, 1–2 mm long, inconspicuous.
1. *S. discolor* var. *discolor*
- B. Leaves chartaceous, generally smaller (3.5–5 by 2–4 cm); bracts usually lanceolate, 3–5 mm long, very prominent.
1a. *S. discolor* var. *cyrtopoda*
- A. Flowers 2 and opposite in a false whorl, the pedicels twisted, nearly in one plane.
- B. Raceme-like inflorescence terminal and also in the axils of upper leaves; dwarf herb; leaves mostly radical, reniform or rounded, the base often cordate. 2. *S. indica*
- B. Raceme-like inflorescence usually terminal only; erect or prostrate herb; leaves basically ovate, acute, the base truncate or rounded.
- C. Tall herbs, often erect; leaves thin membranaceous, usually over 3 cm long, the margins crenate or entire.
- D. Leaves smaller (3–4 by 1.5–2 cm); rachis of inflorescence often glandulately haired.
3. *S. javanica* var. *javanica*
- D. Leaves larger (7.5–10 by 3–3.5 cm); rachis of inflorescence often glandulately haired.
3a. *S. javanica* var. *sumatrana*
- C. Dwarf herb, often procumbent; leaves chartaceous, usually 1–2.5 cm long, the margins subentire or often with 2–3 coarse teeth on each side.
- D. Leaves 0.5–1.5 cm long, the margins often remotely crenate or subentire. 3b. *S. javanica* var. *luzonica*
- D. Leaves 2–2.5 cm long (sometimes up to 6.5 cm long), the margins often with 2–3 coarse teeth on each side.
3c. *S. javanica* var. *russeliaefolia*

1. ***Scutellaria discolor*** Wall. ex Benth. in Wall. Pl. As. Rar. (1830) 66; Benth Lab. Gen. & Sp. (1834) 428, in DC. Prodr. 12 (1848) 417; Miq. Fl. Ind. Bat. 2 (1859) 972; Prain in J. As. Soc. Beng. 74 (1907) 714; Ridl. Fl. Mal. Pen. 2 (1923) 649; Kudo in Mem. Fac. Sc. & Agr. Taihok Un. 2, 2 (1929) 253; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 146; Back. & Bakh. f. Fl. Java 2 (1965) 620.

var. **discolor**

Scutellaria heteropoda Miq. Fl. Ind. Bat. 2 (1859) 972 (incl. var. *grandis*) *syn. nov.*

Scutellaria indica (non Linn.) Bl. Bijdr. (1826) 839.

Small herbs, usually 20–50 cm high; stem hirsute, rarely branched. Leaves membranaceous, broadly elliptic to rotund, rarely ovate, 4.5–6 cm long, 3.5–5 cm wide, sometimes smaller, obtuse or

rounded, the base often rounded-cordate, the margins coarsely crenate, glabrescent or sparsely pubescent on both surfaces; petioles 1–2 (or more) cm long, hirsute. Flowers in simple terminal raceme-like inflorescence 10–15 cm long; 3 (or 4) flowers subverticillately arranged in false whorls not confined to one plane; bracts linear, 1–3 mm long; pedicels 2–4 mm long, pubescent. Calyx cup-shaped, 2–2.5 mm (in fruit 4–5 mm) long, hirsute. Corolla trumpet, 10–12 mm long. Nutlets ellipsoid, 1.2 mm long, 0.7 mm wide, black, echinate.

Distribution: E. India, Burma, Indo-China, Malesia (Sumatra, Malay Peninsula, Java, Lesser Sunda Islands, Moluccas), to S. W. China.

Ecology: In grassland along rivers or in shade and moist spots in forest, from low to medium altitudes (200–2,200 m).

Specimens examined:

Sumatra: Precise locality unknown, *Korthals s.n.* (L) (Type specimen of *Scutellaria heteropoda* var. *grandis* Miq.); Sungei Kumbang, alt. 1,500 m, *Robinson & Kloss* (K).

Malaya Peninsula: Gorge of S. Tras, alt. 200 m, *Burkill & Haniff 16942* (Sing.); Kedah, Kedah peak, alt. 1,200 m, *Haniff 606* (Sing.); Kedah. G. Jerai, alt. 1,000 m, *Evans & Gordon 1055* (Sing.); Kedah peak, alt. 1,200 m, *Haniff 606* (K, Sing.) (fls. blue); Perak, G. Kubau, *Haniff 3916* (Sing.); Perak, Jor, *Haniff 14234* (Sing.); Pahang, Lubok Tamang, alt. 1,200 m, *Henderson 11000* (Sing.); Pahang, Cameron's Highlands, *Henderson 11655, 11771 & 17819* (Sing.); Pahang, Sg. Ichat, *Jaamat 25186* (Sing.); Pahang, Sg. Terolak, *Jaamat 27591* (Sing.); Pahang, Cameron's Highlands. *Pool s.n.* 1939–40 (Sing.); Kedah, Kedah peak, alt. 1,300 m, *Ridley s.n.* June 1893 (Sing.); Pahang, Telau, *Ridley 13567* (Sing.); Perak, *Ridley 16314* (K); Kedah peak, alt. 900–1,300 m, *Robinson & Kloss 6036* (K); Pahang, Cameron's Highlands, alt. 1,600 m, *Robinson 11195* (Sing.); Kedah, *Vesterdal 211* (Sing.); Sira Rimau peak, alt. 300 m, *Yapp 549* (K).

Java: Java, alt. 1,500 m, *Backer 5482* (L); Geger Bintang, alt. 1,700 m, *Backer 13662* (L); G. Beser, alt. 1,050 m, *Backer 22974* (L); Kangean, alt. 150 m, *Backer 27500* (L); G. Tjibeber, alt. 1,200 m, *Bakhuizen v/d Brink 2424* (L); Tjidadap, alt. 1,100 m, *Bakhuizen v/d Brink s.n.* May 1917 (L); G. Menangis, alt. 200 m, *Buwaldá 3006* (L); Poentjak, *Hallier s.n.* Feb. 1895 (K, L, Sing.) Geger Bintang, *Hochreutiner 1140* (L); Poentjak, *Hoed 3191* (L); Java, G. Gede, *Horsfield s.n.* (K, U, type specimens of *Scutellaria heteropoda* Miq.) Java, *Junghuhn 2128* (K); Dieng, alt. 2,000 m, *Karsten 90* (L); Batavia, G. Salak, alt. 7,000 m, *Koorders 24130* (L); Preanger, alt. 2,215 m, *Koorders 36709* (L); Java, *Lobb 120* (K); G. Gede, alt. 1,400 m, *Ooststroom 13865* (L); Kapala Tjiburrung, *Reinwardt* (L); G. Gede, *Ridley s.n.* Feb. 1915 (K); Tjibodas, *Sapiin 2283* (L); Mt. Megamendoeng, alt. 1,400 m, *Schiffner 2493 & 2495* (L); Bogor, Pasir Tlaga, *Soeganda 30* (L) (fls. violet); Mt. Menapa, alt. 900 m, *Steenis 17381* (L); G. Lawoe, *Voogd s.n.* 1920 (L); G. Beser, alt. 1,000 m, *Winckel 137* (L).

Lesser Sunda Islands: Timor, alt. 1,300 m, *Bloembergen 3354* (L); Wetar, alt. 600 m, *Bloembergen 3620* (L); Timor, Koepang, alt. 1,800 m, collector unknown (L); Lombok, *Elbert 972, 1889 & 2775* (L); Wetar, alt. 150–550 m, *Elbert 4404* (L); Alor, alt. 200 m, *Jaag 695* (L); Timor, *Newton* (K); Timor, alt. 1,600–1,750 m, *Steenis 18316* (L); Lombok, alt. 1,200 m, *Voogd 2077* (L).

Moluccas: Ceram, *Kornassi 487* (K, L), *579, 588 & 1010* (L).

A very variable species of wide geographical distribution. Specimens from E. India (on which basis the species was originally described), in comparison with the Malaysian ones, are rather tiny herbs, usually less than 30 cm tall, with rounded-cordate or cordate reniform and small (1.5–2/1.5–1.8 cm) leaves and few-flowered terminal inflorescence.

Type specimens of *S. heteropoda* Miq. (collected by Horsfield from Java) and its variety (var. *grandis* collected by Korthals, from Sumatra) have been examined. They are indistinguishable from *S. discolor*.

1a. ***Scutellaria discolor*** Wall. ex Benth. var. ***cyrtopoda*** (Miq.) Back. & Bakh. f. Fl. Java 2 (1965) 620.

Scutellaria cyrtopoda Miq. F. Ind. Bat. (1859) 973.

? *Scutellaria zollingeriana* Briq. in Ann. Cons. & Jard. Bot. Genève (1898) 104.

Leaves chartaceous, ovate to broadly ovate, 3.5–5 cm long, 2–4 cm wide, acute or broadly acute; the base rounded, the margins crenate-serrate, appressed hirsute above, pilose on the nerved beneath; petioles 0.5–1.5 cm long, pilose; bracts very prominent, the lower ones lanceolate, 3–5 mm long, decreasing in size upwards.

Distribution: Java.

Specimens examined:

Java: G. Lawoe, alt. 1,800–2,000 m, *Backer 6794* (L), Dieng Plateau, *Backer 21592* (L); G. Hijang (Gilp Kriutjing), alt. 2,200–2,700 m, *Bremekamp & Backer 9819* (K, L); G. Lawoe, near the top, *Coert 252* (L); Madioen, 2,900–3,200 m, *Elbert 150* (L); Pasoeroean, 2,300 m, *Gisuis 23* (L); Malabar, *Hermans 581* (L); Java, *Horsfield s.n.* (K, lectotype) Pasleroean, *Jeswiet s.n.*, July, 1929; Dieng, alt. 2,000 m, *Karsten 62* (L); G. Muriah, alt. 600–700 m, *Kern 8610* (L); Jang Plateau, alt. 2,100 m, *Koorders 43406* (L); Priangan, G. Djaja, alt. 2,200 m, *Steenis 4354* (L).

Backer and Bakhuizen (l.c.) regard that the description of *Scutellaria zollingeriana* Briq. (based on *Zollinger no. 2695*, from Java) for the greater part agrees with that of var. *cyrtopoda*.

2. ***Scutellaria indica*** Linn. Sp. Pl. (1753) 600; Benth. in DC. Prodr. 12 (1848), Fl. Hongk. (1861) 278; Merr. Enum. Philip. 3 (1923) 409; Kudo in Mem. Fac. Sc. & Ag. Taihoku Un. 2, 2 (1929) 255; Mansf. in Bot. Jahrb. 62 (1929) 377, (*non* Blume, 1826).

Scutellaria copelandii Merr. in Philip. J. Sc. 7 (1912) Bot. 349.

Small herb, usually prostrate, 20–30 cm tall, often not branched. Stems and branches acutely 4-angular, glabrescent or strigose. Leaves chartaceous, mostly radical, broadly ovate to very broadly ovate, 1.5–2 (–3) cm long, 1.5–2 cm wide, rounded, the base usually cordate, appressed hirsute on both surfaces, the margins crenate; petioles 0.5–1.5 cm long, hirsute and scabrid. Flowers in a terminal, raceme-like inflorescence, solitary or occasionally several; flowers 2 in a whorl, opposite; bracts rounded to ovate, 2–3 mm long, villose. Calyx 1.5 mm (in fruit 3–4 mm) long, glandular-haired. Corolla 12–14 cm long, puberulent. Nutlets protuberant, 1 mm long, 0.6 mm broad.

Distribution: Japan, China, Formosa to Malesia (Sumatra, Java, Philippines, Celebes, and New Guinea).

Ecology: On cliffs and boulders along streams at low and medium altitudes, rather rare in Malesia.

Specimens examined:

Java: G. Ipis, alt. 2,300 m, *Doctors v. Leeuwen 13329* (L).

Sumatra: Aek Moente, E. Coast, *R. si Boeea 9124* (L), Aek Salabat, E. Coast, *R. si Bocca 9583* (L).

Philippines: Zamboanga, Mindanao, *Merrill 8210* (K, syntype of *S. copelandii* Merr.).

Celebes: Masamba, near Aea, alt. 1,000 m, *Eyma 1200* (Flowers lilac. along way edges).

New Guinea: Tufi, Papua, *Hoogland 4590* (L) (flowers pale to deep purple); Babrongko, alt. 95 m, *Iwangin 5241* (L); Cycloop geb, *Lam 7774* (L); Cycloop Mts. alt. 400 m, *Mijer Drees 83* (L) (leaves tinged purplish, corolla violet blue).

The specimen identified by Blume (ad sepes circa Tugu Provinciae, Buitenzorg, *Herb. Lugd. Bat. no. 905, 123–28*) as *Scutellaria indica* L. (as listed in his *Bijdr.* p. 839), should be correctly referred to *S. discolor*. However, in some other specimens cited above, their general habit, leaves, inflorescences, flowers and fruits are indistinguishable from those of the typical forms which was first described from the Orient (not from India) by Linnaeus.

The New Guinea plant tends to have larger and thinner leaves and often several branched stems each possessing a terminal racemose inflorescence. It perhaps represents a form or variety of the species.

3. ***Scutellaria javanica*** Jungh. Java 1 (1853) 661, in *Adnot.*; Miq. Fl. Ind. Bat. 2 (1859) 974; Back. & Bakh. f. Fl. Java 2 (1965) 620.

var. ***javanica***

Scutellaria horsfieldiana Miq. l.c. 2 (1859) 974 *syn. nov.*

Subshrub, slender, 60–100 cm high, often branched. Stems and branches acutely 4-angled, pubescent. Leaves thin membranaceous, narrowly ovate to ovate, 3–4 (–5) cm long, 1.5–2 (–3) cm wide, acute or caudate, the base rounded or subcordate, more or less entire, the margins elsewhere crenate or remotely serrate, often only few-toothed; puberulent on both surfaces; petioles 1–3 cm long, hirsute. Flowers in terminal, sometimes also in upper axillary, lax, false racemes, 8–10 cm long; rachis glandulate-hairy, often 2 flowers in a whorl, secund. Calyx campanulate, 3–4 mm (in fruit 5–6 mm) long, hirsute. Corolla trumpet, 14–16 mm long, puberulent, the upper lip notched. Nutlets broadly oblong, flattened, 1.5–1 mm long, black, finely tuberculate and puberulent.

Type specimen: Dieng, Java, alt. 2,100 m, *Junghuhn 34* (L).

Distribution: Malesia (Sumatra, Java, Philippines, Moluccas to New Guinea).

Ecology: in open primary forests, on slopes, low to medium altitudes.

Vernacular names: Aepar-aepar (Java) Riemos (New Guinea).

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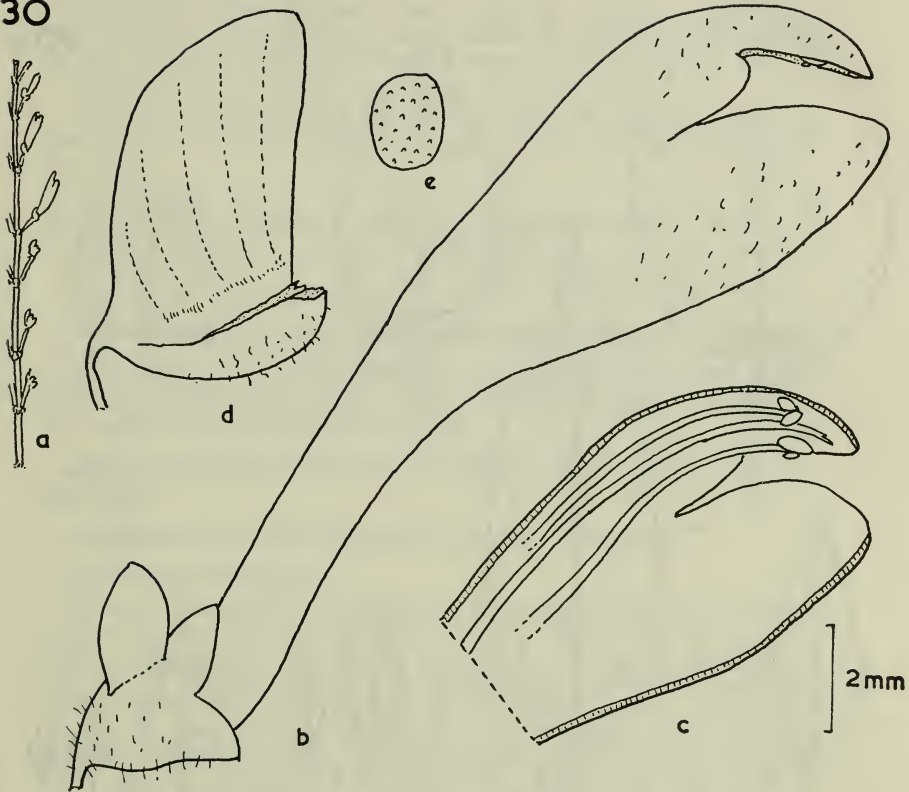


Fig. 30. *Scutellaria javanica* Jungh.

a. Diagram of portion of the inflorescence; b. flower; c. longisection of corolla-limb showing the stamens and style; d. fruiting calyx; e. nutlet. (flower, Junghuhn 34, fruit, Korthal s.n.)

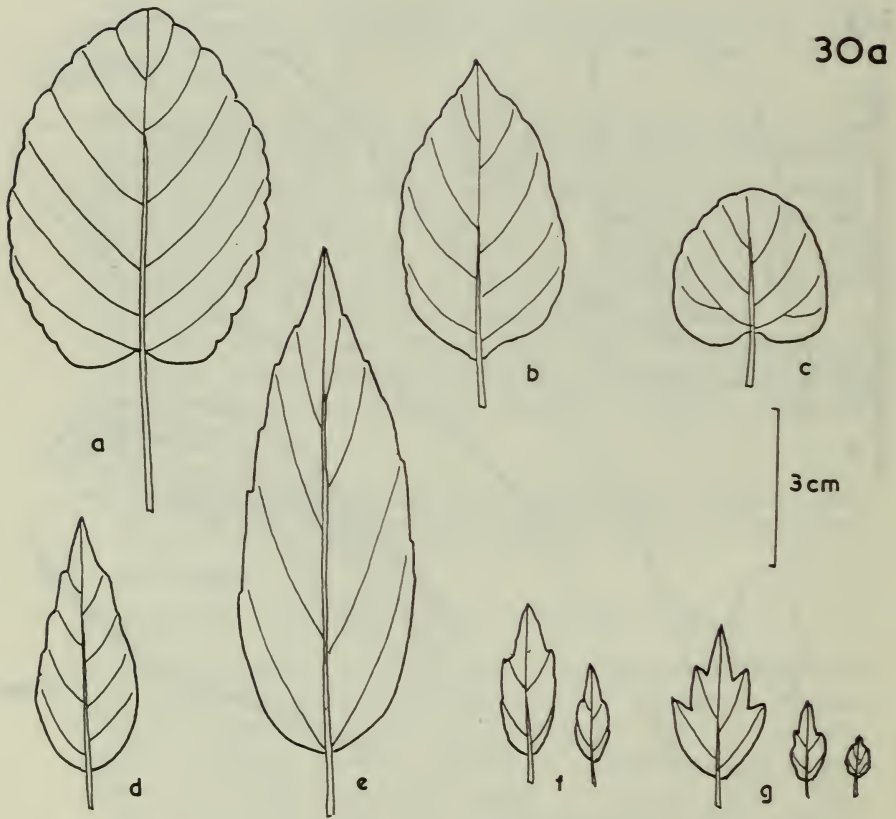


Fig. 30a. Sketches of the leaves of *Scutellaria*.

a. *S. discolor*; b. *S. discolor* var. *cyrtopoda*; c. *S. indica*; d. *S. javanica*; e. *S. javanica* var. *sumatrana*; f. *S. javanica* var. *luzonica*; g. *S. javanica* var. *russeliaefolia*.

Specimens examined:

Sumatra: Padang Highlands, alt. 1,200 m, *Batten Pool* s.n. Aug. 1936 (Sing.); G. Singalang, alt. 1,100 m, *Bünnemeyer* 2958 (L); Kerintji, alt. 1,200 m, *Bünnemeyer* 8187 (L); Kabandjahe, alt. 1,225 m, *Lörzing* 6225 (L); Lake Toba, alt. 700 m, *Lörzing* 16263 (L); Mt. Sago, 900 m, *Meijer* 3183 (L); Benkoelen, alt. 850 m, *Rappard* 143 (L); G. Singalang, alt. 900 m, *Schiffner* 2479 (K, L); Kabandjahe, *Surbeck* 95 (L).

Java: Java, *Horsfield* 330 (K) (Type of *Scutellaria horsfieldiana* Miq.); Dieng, alt. 2,100 m, *Junghuhn* 34 (L) (Type of *Scutellaria javanica* Jungh.); Dieng, *Karsten* 92 (L); Pasoeroean, *Rant* s.n. Oct. 1930 (L); Dieng, G. Prahoe, alt. 2,300 m, *Steenis* 4615 (L).

Philippines: Luzon, Benguet, *Briones* 29796 (K); Mindoro, Mt. Haloon, *Edano* 3503 (L); Luzon, Ilocos, *Ramos* 27180 (K); Mindoro, Mt. Haloon, *Ramos & Edano* 40606 (K); Luzon, Benguet, *Santos* 31835 (K).

Moluccas: Ceram, Koniki, alt. 600 m, *Kornassi* 552 (L).

New Guinea: Papua, Daru Isl., *Brass* 6324 (L); Papua, *Carr* 11253 (L); New Guinea, *Schlechter* 14007 (K); Vogelkop Penin., alt. 100 m, *Versteegh* 7468 (L).

3a. *Scutellaria javanica* Jungh. var. **sumatrana** (Miq.) Backer in Back. & Bakh. f. Fl. Java 2 (1965) 620.

Scutellaria sumatrana Miq. Fl. Ind. Bat. 2 (1859) 974.

Differs from the typical form of the species mainly in the thinner and larger (7.5–10 cm long, 3–3.5 cm wide) leaves and in the sparsely hirsute inflorescence rachis which may reach a length of 20 cm and is not glandularly haired.

Type specimen: Sumatra, bij de Batang Baroes, Teysmann s.n. (not seen).

Distribution: Malesia (Sumatra and the Philippines).

Specimens examined:

Sumatra: Tanang Taloe, alt. 1,100 m, *Bünnemeijer* 1041 (L); G. Singalang, alt. 1,200 & 2,600 m, *Bünnemeijer* 2513 & 2850 (K, L); G. Sago, alt. 1,100 m, *Bünnemeijer* 3689 (K, L); G. Merapi, alt. 1,300 m, *Bünnemeijer* 4589 (L); G. Talang, alt. 1,260 m, *Bünnemeijer* 5604 (L); G. Sago, alt. 1,000 m, *Ichlas* 11 (L); G. Merapi, alt. 2,000 m, *Matthew* s.n. Jan. 1914 (K, L); Mt. Kerintji, alt. 1,800–1,900 m, *Meijer* 6081 (L); Tapianoeli, Toetoeapan, *Rahmat si Boeea* 5929 (L); Tapianoeli, Toba, *Rahmat si Boeea* 10828, 10913 & 11225 (L); Siolak Daras, alt. 1,000 m, *Robinson & Kloss* s.n. March, 1914 (BM, K & Sing.); G. Pakiwang, alt. 700–1,600 m, *Steenis* 3822 (K, L); Gajoe & Alas Lands, alt. 500 m, *Steenis* 8855 (L) (fl. pale blue); Tapianoeli, *Surbeck* 94 & 236 (L).

Philippines: Mindoro, *Conklin* 18814 (K); Mindanao, Mt. Mansamuga, *Edano* 11108 (K).

3b. *Scutellaria javanica* Jungh. var. **luzonica** (Rolfe) *stat. nov.*

Scutellaria luzonica Rolfe in J. Linn. Soc. Bot. 21 (1884) 315; Merr. Enum. Philip. 3 (1923) 410; Mansf. in Bot. Jahrb. 62 (1927) 377.

Scutellaria marivelensis Elm. Leaf. Philip. Bot. 2 (1908) 516.

Ascending, procumbent herb. Leaves chartaceous, lanceolate to broadly ovate, 0.5–1.5 cm long, 0.3–1 cm wide, acute to acuminate, the base subrounded, the margins remotely crenate or subentire. Petioles 2–3 mm long or sessile Racemes 2–4 cm long.

Type specimen: Luzon, without precise locality, *Lobb s.n.* (K, type of *S. luzonica* Rolfe).

Distribution: Malesia (The Philippines and New Guinea).

Ecology: In ravines, on ridges in mossy forest etc. at medium altitudes above 1,000 m.

Vernacular names: Lupingan, sidit (Philip.).

Specimens examined:

Philippines: Luzon, Bataan, *Borden 2110* (K); Luzon, Benguet, *Elmer 5835* (K); Luzon, Bataan *Elmer 6984* (K); Luzon, Baguio, *Elmer 8650* (K, L); Luzon, *Lobb s.n.* (Type of *Scutellaria luzonica* Rolfe) (K); Philippines, *Loher 6689, 7285 & 7290* (K); Luzon, Bataan, *Merrill 3114* (K); Luzon, Pampanga, Mt. Arayat, *Merrill 3925* (K); Luzon, Benguet, *Merrill 4660 & 4692* (K); Luzon, Bataan, *Meyer 2217* (K); Luzon, Angat, Bulacan, *Ramos & Edano 34087* (Sing.); Luzon, *Vidal 3380 & 3382* (K); Luzon, Bataan, *Whitford 203* (K).

New Guinea: Papua, Kanosia, *Carr 11253* (K) (fls. bluish violet, 1 ft. tall); Lala Rivers, alt. 1,800 m, *Carr 14062* (L) (fls. lilac); Mt. Bainan, alt. 1,500 m, *Crutwell 888* (K) (fls. bright violet); Milne Bay, alt. 2,100 m, *Crutwell 1355* (K); Mt. Abree, alt. 2,000 m, *Cuthbertson & Sayer* (K) (Type of *Scutellaria papuana* F. v Mull unpublished?); Finisterre Mts., alt. 1,250 m, *Schlechter 1908i* (K, L).

3c. *Scutellaria javanica* Jungh. var. *russeliaefolia* (Vatke) *stat. nov.*

Scutellaria russeliaefolia Vatke in Bot. Zeit. 30 (1872) 716; Merr. Enum. Philip. 3 (1923) 410.

Small herb, suberect. Leaves chartaceous, ovate, 2–3.5 (–6.5) cm long, 1–2 (–3) cm wide, acute or acuminate, the base rounded or often subcordate, the margins with 2–3 coarse teeth on each side; lateral veins usually very prominent; petioles less than 5 mm long or subsessile, hirsute.

Distribution: Malesia (The Philippines and Celebes).

Ecology: Often in mossy forest above an altitude of 600 m.

Specimens examined:

Philippines: Basilan Isls. *Britton 477* (L) (flowers blue and white); Mt. Magnas, Luzon, *Edano 19769* (L); Mt. Malinao, Luzon, alt. 800 m, *Edano 34375, 34412* (L); C. Luzon, *Loher 4188* (K); Mayon Volcano, Luzon, alt. 860 m, *Mendoza 18289* (L) (flowers violet); Mt. Iriga, Camarines, *Ramos 22205* (K); Lake Polog, Luzon, *Ramos 23595* (L); Pauai, Luzon, *Santos 31734* (L).

Celebes: Minahassa alt. 600 m, *Koorders 17390* (L).

31. STACHYS LINN.

Stachys Linn. Gen. Pl. ed. 5 (1754) 243, Sp. Pl. (1753) 580; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1208; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 260.

Herbs or undershrubs. Leaves opposite, crenate or serrate. False whorls axillary and in terminal spike-like inflorescence. Calyx campanulate, 10-nerved; teeth 5, unequal. Corolla usually with a ring of hairs within; upper lip ascending, concave; lower lip spreading, 3-lobed, the mid-lobe the largest. Stamens 4, subequal

ascending; anthers 2-loculate, the locules divaricate (in Malesian species); filaments glabrous. Style 2-fid, the branches subequal. Nutlets ovoid, obtuse above, subtriquetrous below.

About 200 species, nearly World-wide, except Australia and New Zealand. Only one species extends to Malesia.

1. *Stachys melissaefolia* Benth. Lab. Gen. & Sp. (1834) 538, in DC. Prodr. 12 (1848) 466; Hook. f. Fl. Brit. Ind. 4 (1885) 675; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 188; Back. & Bakh. f. Fl. Java 2 (1965) 624.

Stachys oblongifolia (non Wall. ex Benth.) Back. Fl. Java (em. ed.) 14 (1944) fam. 201, 57.

Annual herb, erect. Stems 30–60 cm high, rarely branched, often villous. Leaves thick membranaceous, narrowly elliptic or lanceolate, 4–6 cm long, 1.5–2.5 cm wide, broadly acute, the base truncate or subauriculate, the margins crenate-serrate, densely villose on the surfaces; petioles about 0.5 cm long. False whorls 4–10-flowered, in distant upper axils, forming spike-like inflorescence, to 15 cm long or more; rachis tomentose; bracts narrowly elliptic, 6 mm long. Calyx campanulate, 6–5 mm (in fruit 6–7 mm) long, pilose; the 3 upper teeth slightly longer; the 2 lower teeth highly joined. Corolla 14–15 mm long, strigose without, the upper lip 5–6 mm long. Nutlets broadly obovoid, flattened, 1.8 mm long, 1.6 mm wide, subtriquetrous.

Type specimen: “in montibus Nepalensibus”, *Wallich 2075 B*, (K.).

Distribution: Kashmir to Tibet.

Specimens examined:

Java: G. Gedeh, alt. 1,600 m, *Backer 26072* (K, L); G. Gedeh, near Kertasari, alt. 1,700 m, *van Steenis 11657* (L).

This interesting Malesian plant was first identified by Dr. Backer as *Stachys oblongifolia* Wall. ex Benth., a species widely distributed from E. India, China, Korea, Japan to Formosa (type specimen: Sylhet, E. Pakistan, *Wallich 2076/2*, K). It differs from the latter in that the 2 lower calyx-teeth are rather highly connate, and the bracts subtending the flower are much larger (generally 6 x 2 mm).

The general appearance of this plant, on the other hand, is more resemblant to the type specimen of *Stachys sericea* Wall. ex Benth. (from Kamoan, Nepal, *Wallich 2077/2*, K) which is unfortunately a later homonym of *Stachys sericea* Cav. A species closely related to *S. sericea* Wall. ex Benth. is *S. melissaefolia* Benth. which, according to Hooker f. (l.c. 676), is “usually smaller, more slender and less hairy, silky and leafy than *S. sericea*”. Hooker f. also pointed out, “The specimens described by Bentham under the names of *sericea*,...*melissaefolia*, etc. are so mixed up that it is useless to individualize them”. Mukerjee (l.c. 188) thinks that *S. sericea* Wall. ex Benth. and *S. melissaefolia* Benth. are not specifically different.

For these reasons, the Malesian plant is tentatively referred to *Stachys melissaefolia* Benth.

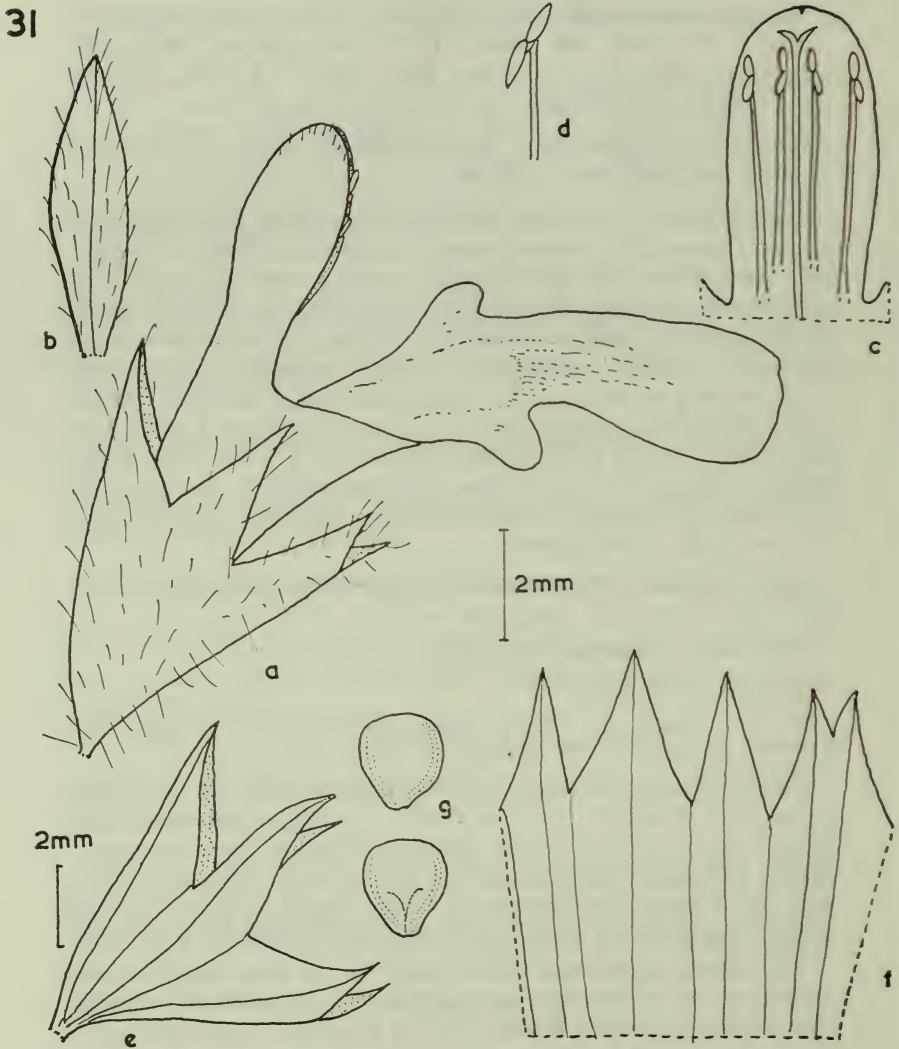


Fig. 31. *Stachys melissaefolia* Benth.

a. flower; b. bract, c. upper lip of corolla with stamens and portion of style; d. stamen; e. fruiting calyx; f. the same, expanded; g. nutlet. (Steenis 11657)

32. **TEUCRIUM** LINN.

Teucrium [Tourn.] Linn. Gen. Pl. ed. 5 (1754) 247; Sp. Pl. (1753) 562; Benth. in Benth. & Hook. f. Gen. Pl. 2 (1876) 1221; Briq. in E. & P. Pfl. Fam. 4, 3a (1897) 210.

Herbs (in Malesian species). Flowers 2 (in Malesian species) in a false whorl, forming terminal and axillary spike-like inflorescence. Calyx 10-nerved, 5-toothed, more or less 2-lipped. Corolla long-exserted; tube not annulate within; limb 2-lipped, the upper lip deeply 2-lobed, seemingly absent, the lower lip 3-lobed, in associate with the two upper lobes forming a 5-lobed piece, spreading and usually concave. Stamens 4, exserted; anthers reniform, 2-loculate, at length confluent. Disc symmetrical. Style 2-fid, the branches subequal. Nutlets flattened, sub-triquetrous, rugose or reticulate; surface of contact large, oblique or lateral.

Species about 100, world-wide in distribution, concentrated in the Mediterranean regions. 2 species extend to Malesia.

Key to the species

A. Leaves chartaceous, narrowly elliptic to very narrowly ovate, very unequal; two lateral calyx-teeth much shorter than the others; corolla 15–20 mm long.

1. *T. quadrifarium*

A. Leaves membranaceous, narrowly ovate to ovate; two lateral calyx-teeth nearly as long as the others; corolla 5–8 mm long.

2. *T. viscidum*

1. **Teucrium quadrifarium** Buch.-Ham. in D. Don, Prodr. Fl. Nep. (1825) 108; Benth. Lab. Gen. & Sp. (1835) 675, in DC. Prodr. 12 (1848) 583; Kudo in Mem. Fac. Sc. & Ag. Taihoku Un. II, 2 (1929) 292; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 218.

Erect annual herb, 60–100 cm high; stems and branches velvety tomentose or villous. Leaves chartaceous, narrowly elliptic to very narrowly ovate, 6–9 cm long, 2–4 cm wide, bluntly acute, the base truncate or cordate, often oblique; the margins serrulate, hirsute and slightly rugose above, densely tomentose beneath; petioles 1–1.5 cm long, the uppermost leaves sessile. Spurious racemes axillary and terminal, generally forming panicles 7–10 cm (to 15 cm or more in fruit) long; bracts ovate, acuminate, often smaller than the calyx. Calyx tubular-campanulate, 3–5 mm long, the upper tooth ovate, broad, the 2 lower teeth lanceolate, 1.5–2 mm long; pubescent outside and with a ring of hairs at the throat. Corolla expanded and recurved, 15–20 mm long. Nutlets ovoid, 1.5 mm long, 1 mm broad, rugose, dark-brown.

Distribution: Himalayas, Burma, Malesia (Sumatra) to S. China.

Ecology: Common in secondary forest, altitudes 1,300–1,400 m.

Specimen examined:

Sumatra: Boven Takengon, Atjeh, *van Steenis 5807* (L), Aug. 1934.

This interesting specimen from Sumatra, matches quite well with the descriptions of *T. annandalei* Mukerjee (in Rec. Bot. Surv. Ind. 14, (1940) 219 type: *Annandale 138*, from Burma), both perhaps representing a form of *T. quadrifarium* with a considerably longer corolla-tube.

2. ***Teucrium viscidum*** Bl. Bijdr. (1826) 827; Miq. Fl. Ind. Bat. (1859) 991 (incl. var. *densiflora* Miq.); Merr. Enum. Philip. 3 (1923) 409; Kudo in Mem. Fac. Sc. & Ag. Taihoku Un. 2, 2 (1929) 295; Mukerj. in Rec. Bot. Surv. Ind. 14, 1 (1940) 218; Back. & Bakh. f. Fl. Java 2 (1965) 618.

Teucrium stoloniferum Roxb. Hort. Beng. (1814) 44, *nom. nud.*, Fl. Ind. ed. 2, 3 (1832) 3.

Teucrium stoloniferum Hamilt. ex Benth. in Wall. Pl. As. Rar. 1 (1830) 58, Lab. Gen. & Sp. (1835) 674, in DC. Prodr. 12 (1848) 583; Miq. Fl. Ind. Bat. (1859) 990.

Teucrium philippinense Merr. in Philip. J. Sc. 7 (1912) Bot. 100.

Teucrium stoloniferum Roxb. var. *typicum* Maxim. in Bull. Acad. Petersb. 9 (1877) 825, *syn. nov.*

Melissa indora Hassk. in Hoev. & De Vriese, Tijdschr. Nat. Gesch. & Phys. 10 (1843) 127; Cat. Hort. Bog. (1844) 132; Miq. Fl. Ind. Bat. 2 (1859) 969.

Annual herb, erect, 30–60 cm high, often branched and stoloniferous; stems and branches hirsute. Leaves membranaceous, narrowly ovate to ovate, 4–7 cm long, 3–4 cm wide, acute or broadly acute, the base cuneate or round and entire, the margins elsewhere prominently crenate-serrate, both surfaces with scattered, weak, white hairs; petioles slender, 1.5–3 cm long. Flowers 2 in a false whorl, opposite; raceme-like inflorescences terminal and axillary, 2–3 cm (in fruit up to 10 cm) long, viscous; pedicels 2–3 mm long; bracteoles pilose, lanceolate, 2–3 mm long. Calyx campanulate, 2–3 mm long, glandular ciliate, the upper 3 teeth ovate to triangular, the lower 2 slightly narrower. Corolla exerted, slender, 5–6 mm long, slightly concave. Nutlets shallowly ridged, ovoid or globoid, 1.5 mm long.

Type specimen: Tugu, Java, *Blume 1809* (lecto-type, L).

Distribution: Himalayas, Malesia to China, Formosa and Japan.

Ecology: In forests and in thickets, alt. 800–1,700 m (in Papua, collected from 4,500 m by Carr).

Specimens examined:

Sumatra: G. Malintang, alt. 1,000 m, *Bünnemeyer 4193* (L); G. Talang, alt. 1,500 m, *Bünnemeyer 5340* (L); Koerintji, alt. 850 m, *Bünnemeyer 7986* (L); Scolak Dras alt. 1,000 m, *Robinson & Kloss s.n.* March 1914 (Sing.); Sandaran Agong, alt. 820 m, *Robinson & Kloss s.n.* May 1914 (K, Sing.); Baraong baru, Sapan, *Robinson & Kloss s.n.* June 1914 (K, Sing.); E. Sumatra, alt. 1,400 m, *Schniffner 2487* (L, K).

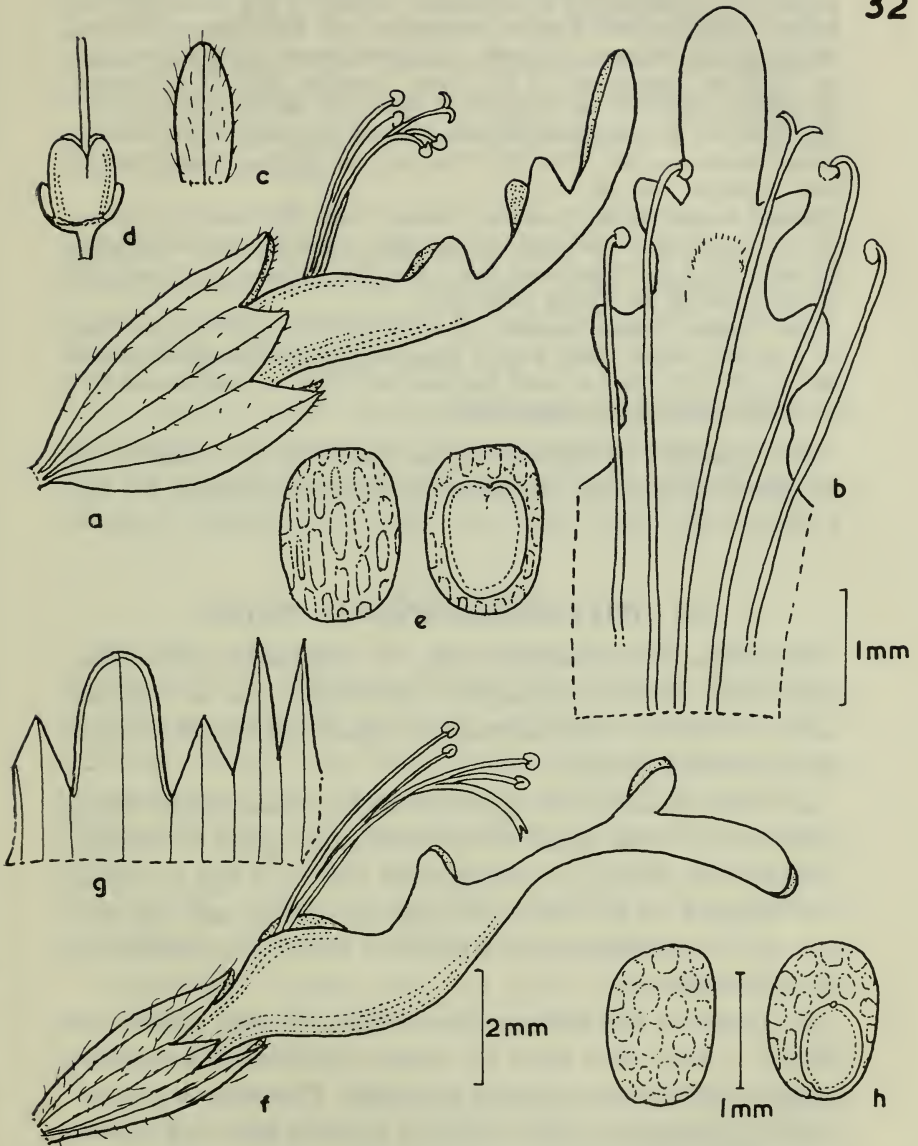


Fig. 32. *Teucrium viscidum* Bl. (a-e) and *T. quadrifarium* Buch.-Ham. (f-h).

a. flower, b. corolla expanded, showing the stamens and style; c. bract, d. ovary; e. nutlet (in 2 views); f. flower; g. upper portion of fruiting calyx expanded; h. nutlet (in 2 views). (a-e, *Blume s.n.*; f-h, *Steenis 5807*)

Java: G. Tjirmai, alt. 900 m, *Backer 4841* (L); G. Wilis, alt. 1,250 m, *Backer 11358* (L); Tjibodas, alt. 800 m, *Backer 13441* (L); G. Boerangrang, alt. 900 m, *Backer 14139* (L); Tjibodas, alt. 1,500 m, *Backer 21492* (L); Tjikidang, alt. 1,000 m, *Bakhuizen v/d Brink 59* (L); Batavia, Tjideroem, *Bakhuizen v/d Brink 2145* (L); Preanger, *Bakhuizen v/d Brink 2784* (L); Batavia, Wanajasa, alt. 1,000 m, *Bakhuizen v/d Brink 4666* (L); Tuku, *Blume 1809* (L, lectotype); Tjibodas, G. Gedeh, *Hallier 192* (L); Sindaglaja, alt. 1,100 m, *Holstvoogd 33* (L); Java, *Horsfield 1424* (K); Preanger, alt. 1,000 m, *Koorders 14953* (L, K); G. Wilis, alt. 800 m, *Koorders 23223* (L), *29767* (L, K); Semarang, *Koorders 27788* (L); Java, *Lobb 122* (K); Tosari, *Ridley s.n.* Jan. 1915 (K); Preanger, alt. 1,000 m, *Smith 840* (L); Java, *Zollinger 822* (K).

Lesser Sunda Islands: Lombok, *Elbert 1583* (L); Bali, G. Abang, alt. 1,500–1,600 m, *Steenis 8027* (L, K, Sing.); Timor, collector unknown (L, lectotype of var, *densiflorum* Miq.); Bali, Mt. Tabanan, *de Voogd 1853* (L); E. Lombok, *de Voogd 2076* (L).

New Guinea: Papua, Isuarava, alt. 4,500 m, *Carr 15338* (L) (fls. lilac, lvs. fragrant); Wissel Lakes Region, *Eyma 4615* (L); Kaiser Wilhelmeland, *Hellwig 626* (K); Trail to Angi gita lake, alt. 1,000 m, *Kostermans 2051* (L) (30–50 cm high, fl. purple-pink).

The reduction of *Melissa indora* Hassk. to the synonym of *Teucrium viscidum* Bl. was made by Koorders [Exkurs. Fl. Jav. 3 (1912) 142].

VI. PHYTOGEOGRAPHICAL NOTES

The species of Malesian Labiatae, 85 enumerated in this treatment, based on their geographical distribution, can be classified under 5 categories. After an analysis of each category, the following conclusions emerge:

(a) There are about 38 species (or 44.7 per cent) widely distributed from S. Asia (mainly Indo-Himalayan region) to Malesia. A number of them (e.g. *Acrocephalus indicus*, *Ajuga bracteosa*, etc.) extended to E. Asia (Sino-Japanese region), and very few (e.g. *Basilicum polystachyon*, *Dysophylla stellata*, etc.) reached as far as Australia.

(b) There are about 30 species (or 35.8 per cent) endemic to Malesia. Among them some are widely distributed (e.g. *Achryospermum densiflorum*, *Cymaria acuminata*, *Paraphlomis oblongifolia*, etc.), others are rather restricted to small areas (e.g. *Coleus macranthus*, *Elsholtzia elata*, *Gomphostemma racemosa*, etc.). Nearly all these endemic species, however, belong to the genera also found in neighbouring regions, especially S. Asia. Only *Acrymia* (monotypic) is an endemic genus.

(c) About 11 species (or 12.9 per cent) are either pantropic weeds (e.g. all the species of *Ocimum*, *Hyptis*) or cultivated plants becoming more or less naturalized in certain areas (e.g. *Coleus amboinicus*, *Pogostemon cablin*).

(d) Only 4 species (or 4.7 per cent) are circumscribed to Malesia (mostly restricted to New Guinea) and Australia. These include: *Anisomeles salviaefolia*, *Ceratanthus longicornis*, *Plectranthus congestus*, and *Plectranthus parviflorus*. They are either the Australian elements which have migrated into Malesia or the earlier Asiatic elements which entered Australia, and for unknown reasons, have disappeared from most parts of Malesia. At least the present distribution pattern of *Ceratanthus* appears to be in favour of the second postulation.

(e) Only 2 species (or 2.3 per cent) are common to Malesia (confined to Luzon, the Philippines) and E. Asia. They are: *Mosla formosana* and *Salvia scapiformis*. These possibly represent typical examples of migration of E. Asiatic elements into Malesia via the Formosa-Philippine track.

To summarize, with reference to Labiatae, the closest floristic relationships of Malesia are with the Indo-Himalayan region. This is in accordance with conclusions drawn by Hooker & Thompson, Miquel, and several others many years ago.

ADDENDUM

After the completion of the manuscript and before the appearance of the galley proof, three important papers concerning the genus *Dysophylla* Bl. have been published. It is decided to add a detailed footnote in the form of addendum rather than to alter the printed text. These three papers are by (1) A. El-Gazzar & L. Watson, (2) H. K. Airy Shaw and (3) R. C. Bakhuizen van den Brink Jr. and C.G.G.J. van Steenis, in *Taxon*, 16: 186–189, 189–190, 1967, and 17: 235–236, 1968, respectively. The sequential and relevant points can be summarized as follows:

a. Following a critical study, the generic differences between *Pogostemon* and *Dysophylla* are re-defined by El-Gazzar and Watson as:

Pogostemon Desf. — Leaves opposite, ovate or narrowly ovate, petiolate, usually more or less hairy or tomentose. Calyx tubular, 5 dentate, Corolla usually subbilabiate, upper lip trifid, lower entire; sometimes minute (3–6 mm). (Crystals present in calyx. Aerenchyma absent in stem.)

Dysophylla auctt.—Leaves verticillate, 3–10 in a whorl, linear, sessile and usually glabrous. Calyx tubular, 5-dentate. Corolla subequally quadrid. (Crystals usually absent in calyx. Aerenchyma present in stem.)

b. As a result, four species of *Dysophylla* Blume formerly classified under section *Oppositifoliae* Benth (including *Dysophylla auriculata* (L.) Blume and 3 other species not found in Malesia) which possess opposite leaves, should be transferred to *Pogostemon*. Thus:

Pogostemon auricularius (L) Hassk. in Tijdsch. Nat. Geschied. 10 (1843) 127.

Basyn. *Mentha auricularia* L. Mant. Pl. 1 (1767) 81.

Syn. *Dysophylla auricularia* (L) Bl. Bijdr. (1826) 825: H. Keng in Gard. Bull. Singapore 24 (1969) 00.

c. Since *Dysophylla auricularia* (L.) Bl. is the type species of *Dysophylla*, with the transference of it to *Pogostemon*, therefore leaving the bulk of the species currently included in *Dysophylla* (these include *Dysophylla stellata* Benth. and about ten other species formerly classified under section *Verticillatae* Benth.) without a generic name. To solve this complication, Airy-Shaw proposes to use *Dysophylla* El-Gazzar & Watson as a new generic name and to assign *Dysophylla quadrifolia* Benth. as the type species and followed by a formal proposal for the conservation of the name. Bakhuizen van den Brink and Steenis, on the other hand, point out that there is already a later synonym for *Dysophylla* sens. auct., namely *Eusteralis* Rafinesque (in Fl. Tellur. 2 (1836) 95), therefore suggest that the alternative is to adopt the latter as the generic name.

d. If Airy Shaw's proposal is accepted, namely to use *Dysophylla* El-Gazzar & Watson as a new generic name and then to conserve it, the type species, however, in my opinion, should be *Dysophylla stellata* (Lour.) Benth., rather than *D. quadrifolia* Benth. as proposed. The reasons have been discussed in the text.

New records of plant diseases in Sarawak for the years 1966 and 1967

by

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Plant diseases recorded for the first time in Sarawak and collected during 1966 and 1967, are given below. The records include a number of fungi associated with insects or pathogenic on other fungi. The causal organisms are listed alphabetically under their individual hosts and unless otherwise stated, have been recorded only once. In instances where identification has been performed at the Commonwealth Mycological Institute, the Institute Herbarium serial number is given. Three species were identified at the Royal Botanic Gardens, Kew.

Achras zapota L. (Sapodilla, Chiku)			
Thread blight	<i>Marasmiellus scandens</i> (Mass.) Denis & Reid		—
Sooty mould	<i>Microxyphium</i> species		129978b
Sooty mould	<i>Nactrocymbe depressa</i> Batista		129978a
Sooty mould	<i>Trichomerium</i> species		129978c
Agathis dammara Lamk.			
Rust	<i>Aecidium fragiforme</i> Ces.	Locally common	130723
Amaranthus gangeticus L. (Bayam)			
Wilt	<i>Sclerotium rolfsii</i> Sacc.		—
Annona squamosa L. (Custard apple)			
Leaf spot	<i>Corynespora cassicola</i> (Berk. & Curt.) Wei		129979
Arachis hypogaea L. (Groundnut)			
Leaf rot	<i>Choanephora cucurbitarum</i> (Berk. & Rav.) Thaxt.		—
On rotting pods	<i>Rhizopus stolonifer</i> (Ehrenb. ex Fr.) Lind.	Occasional	—
Artocarpus integra Merr. (Jack fruit)			
On branches	<i>Septobasidium</i> species		—
Bougainvillea species			
Pink disease	<i>Corticium salmonicolor</i> Berk. & Br.		—
Brassica alboglabra Bailey (Kai Lan, Chinese Kale)			
Wilt	<i>Sclerotium rolfsii</i> Sacc.		—
Cajanus cajan (L.) Millsp. (Pigeon Pea)			
Root rot	<i>Sphaerostilbe repens</i> Berk. & Br.		—

Camellia sinensis (L.) Kunth. (Tea)			
Grey blight	<i>Pestalotiopsis theae</i> (Saw.) Steyaert	Locally common	—
Canarium commune L.			
Sooty mould	<i>Microthyriella</i> species		123517
Carica papaya L. (Papaya)			
Fruit rot	<i>Choanephora cucurbitarum</i> (Berk. & Rav.) Thaxt.		—
Cassia alata L.			
On <i>Shiffnerula</i> species	<i>Eriomycopsis ugandae</i> Hansford		129981a
Sooty mould	<i>Shiffnerula</i> species	Common	129981b
Cassia grandis L.			
Seedling leaf blight	<i>Corticium solani</i> (Prill. & Delacr.) Bourd. & Galz.		—
Citrus grandis (L.) Osb. (Pomelo)			
Horse hair blight	<i>Marasmius equicrinus</i> Müll.		—
Citrus nobilis Lour. (Mandarin)			
Horse hair blight	<i>Marasmius equicrinus</i> Müll.		—
Citrus sinensis Osb. (Sweet orange)			
Pink disease	<i>Corticium salmonicolor</i> Berk. & Br.		—
Cocos nucifera L. (Coconut)			
Associated with die back	<i>Thielaviopsis paradoxa</i> (De Steynes) Höhn.		—
Coffea robusta Linden (Robusta coffee)			
Brown root disease	<i>Fomes noxius</i> Corner		—
Cyrtostachys lakka Becc. (Sealing-wax Palm)			
On blighted leaves	<i>Botryodiplodia theobromae</i> Pat.		—
Derris elliptica Bent. (Tuba root)			
Horse hair blight	<i>Marasmius equicrinus</i> Müll.		—
Elaeis guineensis Jacq. (Oil palm)			
On seedling leaves	<i>Choanephora cucurbitarum</i> (Berk. & Rav.) Thaxt.		—
Leaf spot	<i>Pestalotiopsis palmarum</i> (Cooke) Steyaert	Occasional	12352†
From blighted frond	<i>Rhizopus stolonifer</i> (Ehrenb. ex Fr.) Lind.		—
Euphorbia species			
Thread blight	<i>Marasmiellus scandens</i> (Mass.) Denis & Reid		—
Gliricidia sepium Steud.			
White root disease	<i>Fomes lignosus</i> (Klotzsh) Bres.	Occasional	—

Hevea brasiliensis	Muell. Arg. (Rubber)		
Leaf spot	<i>Choanephora cucurbitarum</i> (Berk. & Rav.) Thaxt.		—
Powdery mildew	<i>Oidium heveae</i> Steinm.	Common	—
On dead tree trunk	<i>Trametes corrugata</i> (Pers.) Bres.		Kew Herb.
Indigofera teysmannii	Miq.		
Leaf blight	<i>Corticium solani</i> (Prill. & Delacr.) Bourd. & Galz.	Occasional	—
Branch die-back	<i>Irpex flavus</i> Kl.		Kew Herb.
Root disease	<i>Poria</i> species		Kew Herb.
Languas galanga	Stuntze (Galangal, Lengkuas)		
Leaf blight	<i>Corticium solani</i> Prill. & Delacr. (Bourd. & Galz.)		—
Leucaena glauca	Benth.		
Leaf blight	<i>Corticium solani</i> (Prill. & Delacr.) Bourd. & Galz.	Occasional	—
Luffa cylindrica	Roem. (Loofah)		
Sooty mould	<i>Asteridiella confragosa</i> (Syd.) Hansf.		123516
Mangifera indica	L. (Mango)		
Horse hair blight	<i>Marasmius equicrinus</i> Müll.		—
Manihot utilissima	Pohl. (Cassava)		
Leaf spot	<i>Choanephora cucurbitarum</i> (Berk. & Rav.) Thaxt.		—
Metroxylon sagus	Rottb. (Smooth sago palm)		
Thread blight	<i>Marasmiellus scandens</i> (Mass.) Denis & Reid		—
Metroxylon rumphii	Mart. (Spiney sago palm)		
Associated with insect damage	<i>Septoria</i> species		129982
Murraya koenigii	Spreng (Indian curry leaf)		
Pink disease	<i>Corticium salmonicolor</i> Berk. & Br.		—
Oryza sativa	L. (Rice)		
Narrow leaf spot	<i>Cercospora oryzae</i> Miyake	Abundant	—
Smut	<i>Neovossia horrida</i> (Tak.) Padwick & A. Khan	Occasional	—
Passiflora edulis	Sims (Passion fruit)		
Wilt	<i>Phytophthora parasitica</i> Dast.	Locally common	—
Passiflora quadrangularis	L. (Grenadilla)		
On <i>Schiffnerula mirabilis</i>	<i>Eriomycopsis</i> species		123518b
Sooty mould	<i>Schiffnerula mirabilis</i> Höhn.		123518a

Peperomia sandersii C. DC.			
Damping-off	<i>Pythium splendens</i> Braun		—
Phaseolus aureus Roxb. (Green gram)			
Wilt	<i>Sclerotium rolfsii</i> Sacc.	Occasional	—
Phaseolus vulgaris L. (French bean)			
Powdery mildew	<i>Oidium</i> species		—
Piper betle L. (Betel)			
Leaf spot	<i>Botryosphaeria stevensonii</i> Shoemaker		129977
Mould on branches	<i>Meliola stenospora</i> Wint. var. <i>major</i> Hansford		129980
Piper nigrum L. (Pepper)			
On scale insects	<i>Aschersonia</i> species		—
Brown root disease	<i>Fomes noxius</i> Corner		—
Sooty mould	<i>Microxyphium</i> species		129983
Pogostemon cablin Benth. (Patchouli)			
Wilt	<i>Sclerotium rolfsii</i> Sacc.		—
Sesbania aculeata Poir.			
On stems	<i>Septobasidium</i> species		—
Sorghum vulgare Pers. (Sorghum)			
Grain mould	<i>Curvularia pallescens</i> Boedijn		123519
Wormia suffruticosa Griff. (Simpoh)			
Thread blight	<i>Marasmiellus scandens</i> (Mass.) Denis & Reid		--
Horse hair blight	<i>Marasmius equicrinus</i> Müll.		—
Zea mays L. (Maize)			
Leaf blight	<i>Choanephora cucurbitarum</i> (Berk. & Rav.) Thaxt.		—

Acknowledgements

The writer wishes to thank the Director of Agriculture, Sarawak, for permission to publish this list, and the Directors and staff of the Commonwealth Mycological Institute and the Royal Botanic Gardens, Kew, without whose help in identifying many of the species, the list could not have been published.

A revision of *Lagerstroemia* L. (Lythraceae)

by

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SUMMARY

Sections: As a result of these studies the Sections given by Koehne (1903) and generally followed by most botanists have been revised. For priority reasons Sect. *Sibia* DC. has been re-established with *Velaga* as a synonym, and because of the affinities Koehne's sect. *Pterocalymma* has been made into a subsection of *Sibia*.

Similarly *Adambea* DC. has been re-established with *Adambeola* Koehne and *Muenchhausenia* Koehne as synonyms. However, two new subsections have been added to it:

Subsect. *Microcarpidium* to include the small flowered and small fruited species which bear 12–14 superficial ridges to the flower buds and which were placed by Koehne together with unrelated species of *Sibia* Subsect. *Sibia*. A new subsection *Banglamea* has been created to include a group species confined to Indochina and South China, which differs from the species of *Adambea* proper in having tomentose sepals in the superior half within. The sect. *Trichocarpidium* Koehne has been subdivided into subsections to distinguish between the species which have glabrous calyces within (Subsect. *Trichocarpidium*) from those which are tomentose in the sepals in the superior half within, *Trichosepalum*. No species of this section is found wild in any parts, east of Burma, so that neither *L. rotterli* Clarke nor *L. hirsuta* (Lam) Willd. could actually be wild in India, especially since from the description they both should be *Trichosepalum* species which are limited to Lower Burma, Malaysia, Thailand, Indochina, and Indonesia. In fact *L. rotterli* is only a synonym of *L. loudonii*, a native of Thailand but widely spread in cultivation. *L. hirsuta* (Lam) Willd. has been shown to be a badly drawn figure of *L. reginae* with a description of the tomentum of another plant.

New Species:

L. alatulata, *L. aruensis*, *L. borneensis*, *L. crassifolia*, *L. cristata*, *L. costa-draconis*, *L. inopinata*, *L. langkawiensis*, *L. moluccana*, *L. pterosepala*, *L. pustulata*, *L. subangulata*.

New varieties or forms:

L. cochinchinensis var. *ovalifolia*. *L. macrocarpa* var. *reflexa*, *L. noi* var. *longifolia*, *L. ovalifolia* var. *apiculata*, *L. ovalifolia* var. *exapiculata*, *L. ovalifolia* var. *minor*, *L. ovalifolia* var. *novoguineensis*, *L. ovalifolia* var. *riedeliana* (Oliv.) comb. nov., *L. ovalifolia* var. *ruptilis*, *L. piriformis* f. *batitanan* (Vidal) comb. nov., *L. piriformis* var. *callosa*, *L. piriformis* var. *valleculata*, *L. speciosa* var. *intermedia* (Koehne) comb. nov.

Reduced species:

L. engleriana = *L. archeriana*, *L. hirsuta* = *L. reginea*, *L. punctulata* = *L. speciosa* prob., *L. rotterli* = *L. loudonii*, *L. thorellii* = *L. duperreana*, *L. thomsonii* = *L. microcarpa*, *L. lanceolata* Brandis & Clarke = *L. microcarpa*.

New Name:

L. gagnepainii nom. nov. (basynym *L. glabra* Gagn.)

DISTRIBUTION: The genus occurs in China, India, Burma, Indochina, Thailand, Malay Peninsula, Indonesia, Celebes, Borneo, New Guinea, North Australia and the Philippine Islands. (See map 1 Section *Sibia*. Map 2 Section *Adambea* and Map 3 Section *Trichocarpidium*.)

Map 4 shows the Forest Regions of Thailand.

*Colombo Plan Senior Fellow, 1965–67, Botanic Gardens, Singapore.

INTRODUCTION

The junior author, on obtaining a Fellowship from the government of the Republic of Singapore, was assigned to make himself familiar with the taxonomy of the species of *Lagerstroemia*, a genus of great economic importance in his native Thailand. As the literature available in English was rather outdated, he sought the assistance of the senior author who provided him with a translation of the "Key to the Species" first from Gagnepain's *Flore de L'Indochine* (II, 1923) and then from Koehne's revision in Engler's *Pflanzenreich* (17, 1903).

However he was soon faced with new difficulties due partly to the deficiencies in the keys and the specific descriptions, but mostly to inadequate definitions of some species that permitted equivocal interpretations. This meant an inquiry into the types and nomenclature of some important species in the genus, involving the need to borrow material from other herbaria—a task beyond the competence of the junior author. Hence the senior author decided to join him in this inquiry which has resulted in this revision. Though the specimens from the herbaria of Bogor and Leiden were not available for consultation, the task was prosecuted with care so as to make the solutions, where possible, quite definite.

In this paper the specific descriptions in English were drawn by the junior author who also arranged most of the citations of the specimens that were not types or their duplicates; the senior author has been responsible for dealing with the typification or nomenclatural problems and for the diagnoses in Latin.

LAGERSTROEMIA Linnaeus

Trees or shrubs. Leaves often opposite, distichous, entire. Panicles axillary and terminal. Flowers often showy; calyx tube funnel shaped or campanulate, smooth or hairy, grooved, angular or subulate; the lobes 6, sometimes 7–9, ovate, subacute, valvate; petals 6 or more, inserted at the summit of the calyx tube, clawed, wrinkled; stamens many, inserted near the bottom of the calyx tube, the filaments long, slender, exserted; ovary subglobose or ellipsoid, sessile, 3–6 celled, the style long, bent, the stigmas capitate, the ovule very many, ascending, the placenta axile. Capsule more or less adnate to the calyx, globose or ellipsoid, smooth or hairy, 3–6 celled, 3–6 valved. Seeds many, elongate and winged.

Sections and Subsections

Early authors were not very particular in distinguishing between sections and subgenera unless both these infrageneric subdivisions occurred under the same genus. Thus Blume (1852) and Miquel (1855) regarded De Candolle's (1826) sections as equivalent to their subgenera, while Koehne (1883 and 1903) treated all these taxa as sections when published. Nevertheless, the last mentioned author rejected all the earlier sectional names or reduced some of them to subsections, but only to adopt new sectional or subsectional names, on the plea that older generic names have priority

in considering names to sections or subsections. However, under the modern Code of Botanical Nomenclature, validly published names of supra specific rank are not priorable for the taxa of another rank. Thus names like *Munchoisia* L. (1770), *Pterocalymma* Turcz. (1846) and *Velaga* Gaertn. (1791), though valid and priorable as generic names, cannot be included in considering the priority of names for the sections and subsections of the genus *Lagerstroemia* L.

In some cases old generic names were adopted for sections interpreted in a different sense from that indicated by the protolog. Thus the monotypic generic name *Munchoisia* L. (1770) based on a plant producing a 12-furrowed calyx was later (1771) adopted by Linnaeus himself to a species having a smooth calyx, and De Candolle (1826) adopted *Munchoisia* as a sectional name to the latter taxon and defined it accordingly. Hence there is no justification in trying to typify Section *Munchoisia* DC. on the original type of the genus. In view of this no attempt has been made in tracing the history and the "prehistoric" types of the names redefined as sections like *Adambea*, *Pterocalymma*, *Sibia*, etc.

I. *Ovary glabrous:*

A1. Calyx ridges as many as the sepals or reduced to warts or auricles

Sect. SIBIA — a

a1. Calyx ridges slightly developed, often disappear later in the calyx tube without any warts or auricles

Subsect. *Sibia*

a2. Calyx ridges distinct, angular or reduced to auricles

Subsect. *Pterocalymma*

A.2 Calyx ridges twice the number of sepals (12 or more)

Sect. ADAMBEA — b

b1. Flower buds and fruits generally large, ridges distinct, sepals glabrous within

Subsect. *Adambea*

b2. Flower buds small, ridges clear but superficial, sepals glabrous within, fruit much smaller

Subsect. *Microcarpidium*

b3. Flower buds or fruits generally small; ridges as in b1 or reduced to warts, sepals tomentose or pubescent in the superior half within

Subsect. *Banglamea*

II. *Ovary tomentose:*

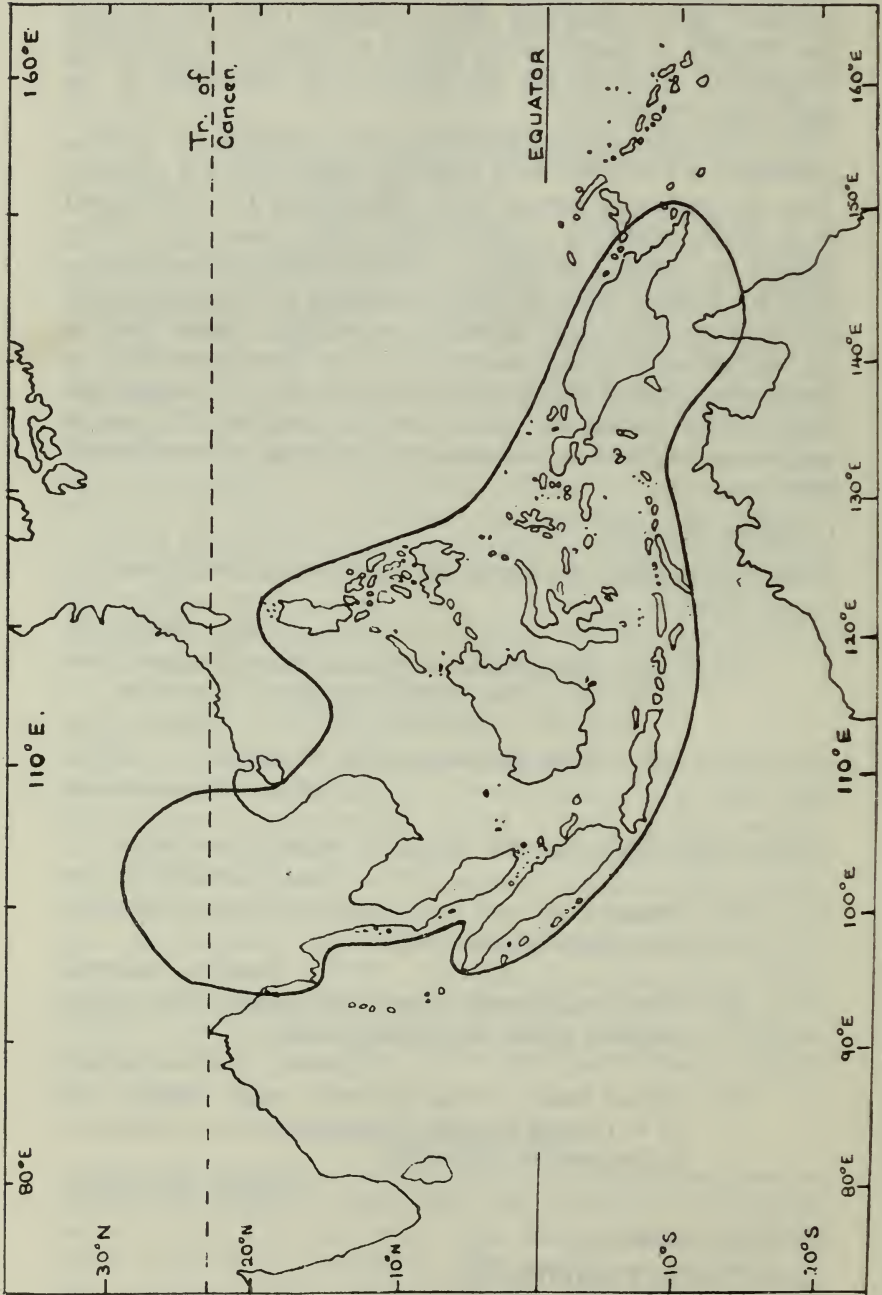
Sect. TRICHOCARPIDIUM

c1. Calyx lobes glabrous within

Subsect. *Trichocarpidium*

c2. Calyx lobes tomentose in the superior half within

Subsect. *Trichosepalum*



Map 1. Distribution of Section Sibia: Subsect. Pterocalymma (—)

Section **Sibia**

Section **Sibia** DC. in Mem. Sec. Helv. III, 2 (1826) 70 et. Prodr. III (1828) 93; Bl., Mus. Lugd. Bat. II (1856) 125 (subgen.) *Velaga* Miq., Fl. Ind. Bat. I (1856) 622 & 1090 (subgenus); Clarke in Hook. f. Fl. Brit. Ind. II (1879) 575 (sect.); Koehne in Engl. Jahrb. IV (1883) 15 & Engl. Pflanzenr. 17 = IV 216 (1903) 257.

Ovary glabrous, ridges as many as the sepals.

Both *Sibia* and *Velaga* were described for flowers having a smooth calyx, but actually the ridges are as many as the sepals even in both the syntypes, but generally they become obscure and do not produce either conspicuous ridges or auricles as in the subsection *Pterocalymma*.

Section *Munchhausia* DC. was based on a misidentification of *L. speciosa* (Pers.) L. with *L. indica* L. and *L. grandiflora* Roxb. (species of *Duabanga*). In 1856 Blume excluded *L. speciosa* from the section or subgenus reserving it to *L. grandiflora* Roxb. only, see synonymy under *Adambea*.

DISTRIBUTION: India, North Burma and Eastern Himalayan regions, China and Japan.

TYPE SPECIES: *Lagerstroemia indica* L.

Subsection **Sibia**

Calyx ridges superficial, sometimes evanescent in the tube.

- 1a. Leaves oblong or obovate, sessile or almost so, not glaucous beneath. Flower-buds globose, 5–6 mm long, superficially ridged. Capsule about 10 mm long, 8 mm in diam., 4–6 valved *L. indica*
- 1b. Leaves often glaucous beneath, sessile or not, ovate or elliptic. Flower-buds much smaller, 2–3 mm in diam. Capsule 10–12 mm long or longer 2
- 2a. Leaves variable, distinctly petiolate, glabrous or pubescent beneath, elliptic, narrowed on both sides, up to 6 cm broad, broadest portion just below the middle. Fruiting calyx tube small, about 2 mm deep. Capsules 10–12 mm long, 6–8 mm in diam., 3–4 valved *L. microcarpa*
- 2b. Leaves variable, glabrous or downy beneath, sessile or subsessile, ellipsoid, oblong or ovate oblong, usually about 3 cm broad, rarely broader. Fruiting calyx tube 6–9 mm deep or longer. Capsule 1.3 mm long or longer, 1–1.5 cm in diam *L. parviflora*

1. *Lagerstroemia indica* L. Arn. Acad. IV (1759) 137, Syst. Pl. ed 10 (1760) 1076 & sp. Pl. ed 2 (1762) 732; Thunb., Fl. Jap. (1784) 224; Lour., Fl. Cochin (1790) 340; Curtis Bot. Mag. XII (1798) t. 405; DC in Mem. Soc. Helv. III (1826) 70 et Prodr. III (1828) 93; Wight, Ill. I (1840) t. 88; Voigt. Hort. Sub. Calc (1845) 131; Blanco. Fl. Filip. ed. 3 II (1878) 219 t. 207; Clarke in Hk. f., Brit. Ind. II (1879) 575; Koehne in Engl. Jahrb. IV (1883) 19 in Engl. Prantl. Pflanzenf. III, 7 (1891) 13 f. 5A-0 & Pflanzenr. 17 = IV 216 (1903) 259 fig. 55A-0.; Merr., Int. Rumph. Herb. Amb. (1918) 381; Lourteig, Fl. Parag. (1963) 17 t. VI. — **Fig. 1.**

A shrub. *Leaves* obovate or ovate-oblong, 5–7 nerved, 3–10 cm long, 2–4 cm broad, chartaceous, minutely pubescent on both sides when young, later glabrous above or almost so, sometimes pubescent along the midrib and the side nerves below; petiole subsessile about 1 mm long. *Panicle* subpyramidal with many or few-flowered, not condensed, 5–20 cm long, 7–20 cm broad, deciduously puberulous all over with angled branchlets. *Flower-bud* sub-globose, with a short nipple at apex, 5–6 mm long, 5–6 mm broad, 5–6 superficially ridged, ridges often evanescent in the upper half, variable in length of pedicelliform base (2–10 mm long). *Calyx* campanulate, 3–4 mm deep, 5–6 mm broad; lobes 4–6 erect, triangular, 3–4 mm long, annulate inside. *Petal* sub-orbicular ± 11 mm long (excluding ± 7 mm long claw), ± 12 mm broad, undulate and crispate in the margin. *Stamens* many, 4–6 stouter and longer, others subequal. *Ovary* subglobose, glabrous with a long slender style. *Fruiting calyx* funnel-shaped or cup-shaped with about 7 mm long pedicelliform base, often having a cavity-like at the sinus. *Capsule* variable in size ± 10 mm long, ± 8 mm in diam., 4–6 valved.

DISTRIBUTION: Himalayan Regions, China, Indochina and Japan, widely cultivated all over the world.

This species is very variable regarding the shape and size of the flowers and leaves, the colour of the petals, the hairiness of the leaves, so that many authors have attempted to separate varieties or forms. Thus Koehne (1883) have described two forms, *latifolia* and *angustifolia* on the width of the leaves, while Voigt has three varieties, *rosea*, *lilacina* and *alba*, on the colour of the petals. Other forms described in horticultural books have often been ignored. Koehne has discarded var. *pallida* Benth. as not being distinct.

Actually several cultivars can be separated using different characters, but for this purpose the type form described by Linnaeus has to be identified; or if it is merely based on Rumphian Herb. Amb. VII (1755) 61 t. 28, the cultivar of the latter will have to be established.

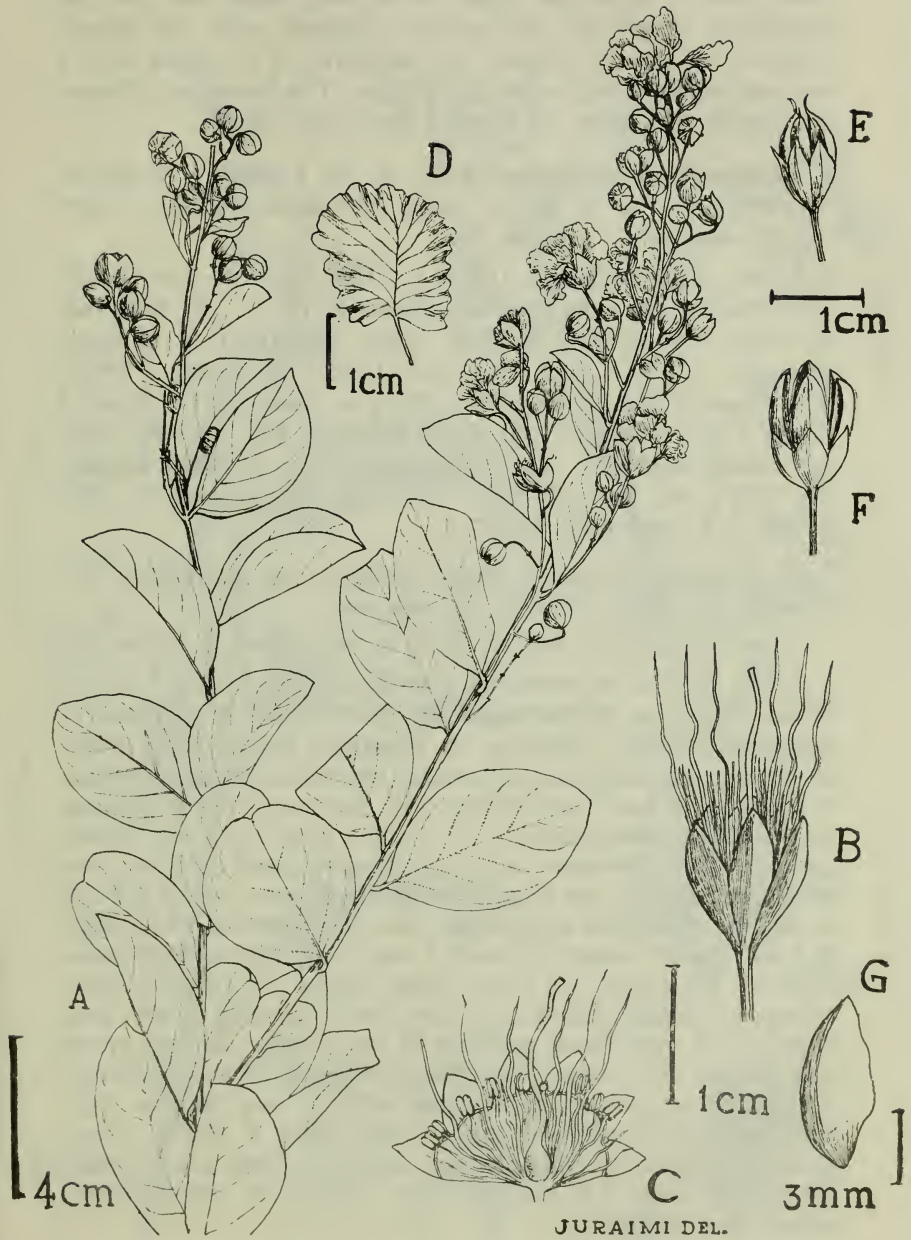


Fig. 1. *L. indica* Linn. (Forrest 6,580 in E).

A, Fertile twig. B, Flower to show stamens. C, Longitudinal section of flower. D, Petal. E-F, Capsule. G, Seed.

Tsang 27,831 from Kwangsi, China, might be mistaken for a small flowered variety of *L. indica*, but the facts that its flower-buds show 12 superficial ridges in the early stages and that the episepalous ridges do not entirely disappear with the growth indicate that we are dealing with a hybrid of *L. indica* with a microcarpidium species with 12–14 ridges. The leaves are *glabrous* and sessile, and often are broader above the middle.

2. **Lagerstroemia microcarpa** Wight, Ic. Pl. I (1838) t. 69 obs. & (1839) t. 109 & Ill. Bot. I (1840) 206; Bedd., Fl. Sylv. (1869) t. 30; **stat. nov.** — **Figs. 2a, 2b.**

L. lanceolata Wall. Cat. (1828) n. 2120; Wight & Arn., Prodr. I (1834) 309 pp. *nom nudum*; Clarke in Hf. f., Fl. Brit. Ind. II (1879) 576; Koehne in Engl. Jahrb. IV (1883) 16 & Engl., Pflanzenr. 17 =IV. 216 (1903) 257; Cooke, Fl. Bomb. I (1903) 513; Brandis, Ind. Trees (1911) 338 p.p.; Gamble, Fl. Madr. I (1919) 513; Troup, Silv. Ind. Trees II (1921) 602; Gamble, Man. Ind. Timb. (1922) 372 (non. *L. lanceolata* Dalz. et Gibs., Bombay Fl., 1861 p. 98; Bedd. Fl. Sylv. 1869 t. 32; Brandis, For. Fl., 1874 p. 240 = *L. parviflora* Roxb.)

L. thomsonii Koehne in Engl. Pflanzenr. op. cit. (1903) 257; Gamble, Fl. Madr. I (1919) 513; **syn. nov.**

L. parviflora Roxb. var. *B.* Wight & Arn. Prodr. I. (1834) 308

A tree 10–15 m or more tall. *Leaves* 5–11 cm long, 2.5–6.0 cm broad, elliptic or elliptic-lanceolate, glabrous above, glabrous or pubescent beneath, acuminate or sometimes acute, rarely obtuse at the apex, gradually cuneate towards the base, sometimes oblique, 6–8 nerved on each side; petiole 3–10 mm long. *Panicle* terminal and axillary, sub-pyramidal, 10–35 cm long, 5–25 cm broad, minutely grey pubescent all over; flowers sessile. *Flower bud* subglobose about 2 mm long, 2 mm in diam., more or less callused at each sinus, nipped at the apex. *Calyx* campanulate 2 mm deep, 2–3 mm broad, borne on about 1 mm long, pedicelliform base; lobes 6, triangular, 1–1.5 mm long, patent or reflexed. *Petal* oblong or elliptic oblong, 4–5 mm long (including 1 mm long claw), 1.5–3 mm broad, undulate in the margin. *Stamens* many, 4–6 thicker and longer, the others sub-equal. *Ovary* glabrous, oblong or subglobose surmounted with a long slender style. *Fruiting calyx* cup-shaped about 2 mm deep, 5 mm in diam., brownish pubescent, lobes reflexed and often break out. *Capsule* 10–12 mm long, 6–8 mm in diam., elliptic or oblong-elliptic, usually 3–4 valved.

INDIA: Konkan & North Kanara, Yellapur (Bor 9,681: SING); Lahaghat (Rolla 69,717: BIP); Karjat (Fernandes 101: A); Lahgarh Hill (Jain 903: BIP; Raghavan 79,550: BIP); loc. incert. (Talbot 60: CAL; Young s.n.: BM); Goa (Kanodia 88,166, 88,423 & 89,655; BIP; Raghavan 103,369: BIP; Fernandes 1,365 & 1,622: A); Kumpta (Fernandes 177: A); Belgaum (Ritchie s.n.: E 277: E; Econ. Prod. file 162: CAL). **Western Ghats**, Mysore

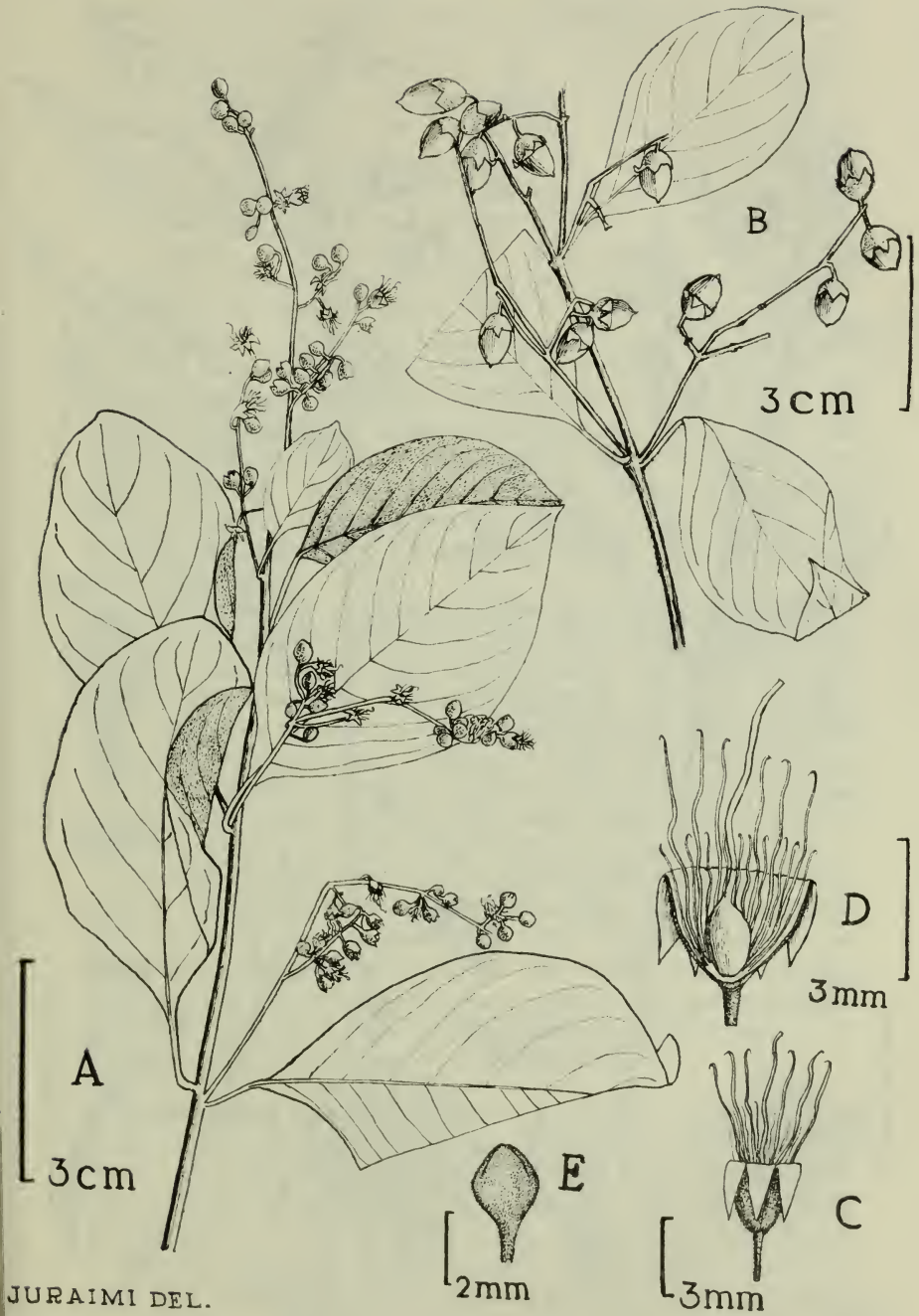
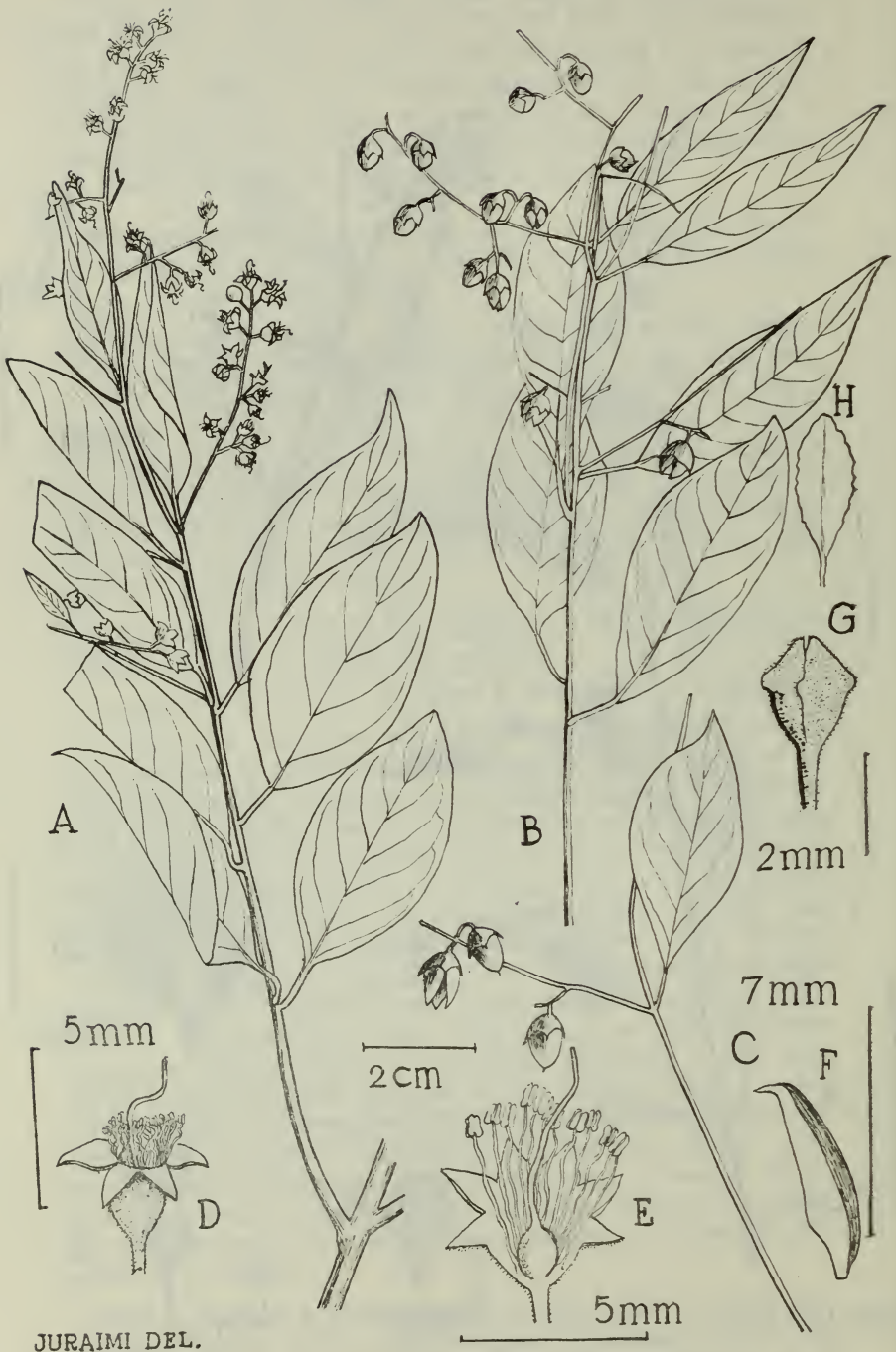


Fig. 2a. *L. microcarpa* Wight (Cleghorn 130: E).

A, Fertile twig. B, Twig with capsules. C, Flower after anthesis.
D, Longitudinal section of flower. E, Flower bud.



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Fig. 2b. *L. microcarpa* Wight (Wight 275 in E & 1,035 = Wall. Cat. 2119—g. in E—holotype).

A, Fertile twig. B, Twig with capsules. C, Twig with mature capsules. D, Flower after anthesis. E, Longitudinal section of flower. F, Seed. G, Flower bud. H, Petal.

(Barber 7,079: CAL; Meebold 10,276: E; Raghavan 97,363: BIP; Mahajan 34,522: BIP; Thomson s.n.: **K-holotype** of *L. thomsonii*); Coimbatore (Fischer 2,027: CAL); Attapadi Hills (Fischer 2,775: CAL); Nilghiri (Gamble 18,353: BM; 15,371: K; & Thomson s.n.: G.H.); Courtallum (Wight 1035 = Wall. Cat. no. 2119-g: **E-holotype**; & 275: E & 299: E); loc. incert. (probably Courtallum: Wight Kew distr. no. 971: A, GH & K). **Malabar** Travancore (Calder & Ramaswami 651: CAL); loc. incert. (Stocks & Law: s.n.: E); Tenmalai in Kerala (Subramaniam 77,075: BIP).

In naming *L. microcarpa* (1838) Wight noted that it is his *L. parviflora* var. B from Courtallum only. He mentioned that the fruit is shorter than the calyx, which is seen in immature fruits, but his plate t. 106 depicts larger fruits. *L. lanceolata* Wall. was a *nomen nudum* in Wallich's Catalogue (1828) n. 2120 and was not validated until 1861 when Dalzell & Gibson (Bombay Fl. p. 98) applied it to a broader leafed form of *L. parviflora* Roxb., an interpretation upheld also by Beddome (Fl. Sylv. 1869 p. t. 32) & Brandis (For. Fl. 1874 & 1,240). This being the case *L. lanceolata* Wall. ex Clarke (1879) cannot be made a priorable name by rejecting the priority of *L. microcarpa* Wight. and ignoring an earlier homonym.

In old collections preserved in Kew and elsewhere one often finds two collections mounted on the same sheet. Thus Wight's collection distributed by Kew under Kew d. no. 971 (which are probably duplicates of Wight's Courtallum specimens number 299, collected in February 1836) is sometimes found mounted with a broad leafed specimens collected in Coorg in March 1852 by a different collector. Similarly Wight n. 1035 (holotype or isoholotype of *L. microcarpa* in Herb. E. is found mounted with another specimen which is probably Wight 1034 = *L. parviflora* Roxb.

The species is deciduous and one finds leaves varying in size, texture, colour and even indumentum so that there is no doubt that these are merely ecological forms. Leaves glabrous or tomentose beneath are found on the same tree and forest botanists (e.g. Beddome) who have studied the species in the field also, have noted these varying characters. Hence there is no reason to keep *L. thomsonii* as a good species.

3. *Lagerstroemia parviflora* Roxb., Pl. Cor. I (1795) 47 t. 66; DC., Prodr. III (1828) 93; Roxb., Fl. Ind. II (1832) 505; Don. Gen., Syst. II (1832) 724; Wight & Arn., Prodr. I (1834) 308 p.p.; Wight, Ic. Pl. I (1840) t. 69; Miq., Fl. Ind. Bat. I (1855) 622; Bedd., Fl. Sylv. I (1869) t. 31; Brand., For. Flor. (1874) 239; Kurz, For. Fl. Burma I (1877) 521; Clarke in Hook. f., Fl. Brit. Ind. II (1879) 575; Koehne in Engl., Jahrb. IV (1883) 17 & Engl., Pflanzenz. 17 = IV. 216 (1903) 258; Cooke, Fl. Bomb. I (1903) 512; Brand., Ind. Trees (1911) 338 — **Figs. 3a, 3b.**

L. lanceolata Wall. ex Dalz. & Gibbs., Bomb. Fl. (1861) 98; Bedd., Fl. Sylv. I (1869) t. 32; Brand., For. Fl. (1874) 240 (non *L. lanceolata* sec. Clarke) **syn. nov.**

L. parviflora var. δ Wright & Arn., Prodr. I (1834) 308.

L. parviflora Roxb. var. β in Wight & Arn. loc. cit. (1834) 308 p.p.

L. parviflora var. *benghalensis* Clarke op. cit. II (1879) 576; **syn. nov.**

L. parviflora var. *majuscula* Clarke op. cit. p. 575.

L. parviflora Roxb. subsp. *nudinervis* Koehne op. cit. (1883) 18 & (1903) 259; **syn. nov.**

L. parviflora subsp. *pubinervis* Koehne op. cit. (1883) 18; **syn. nov.**

L. parviflora var. *napaulensis* (DC.) Koehne op. cit. (1903) 258; **syn. nov.**

L. fatioa Bl., Mus.-Lugd. Bat. II (1852) 125; **syn. nov.**

Fatioa napaulensis DC., Prodr. III (1828) 89 & in Mem. Soc.

Helv. I (1828) 97 t. 3; Don., Gen. Syst. II (1832) 717; **syn. nov.**

Type: INDIA: Coromandel: Circars (Roxburgh in E).

A tree. *Leaves* elliptic or ovoid or elliptic-oblong, 4–11 cm long, 3–5.2 cm broad, acute or obtuse at apex, rounded or obtuse or slightly decurrent when young at the base, often with undulate margin coriaceous, glabrous with minutely pubescent mid-rib above, whitish glaucous downy beneath, side nerves 6–8 on each side; petioles short or almost absent, often covered with whitish down, rounded, 0.1–0.4 cm long. *Inflorescence* panicate 5–20 cm long, with opposite cymes on branchlets; bracts leafy, elliptic-oblong; bracteoles 2; flowers pedicellate in two or three on each axillary peduncle on lateral branchlets; pedicels rather long, slender 0.5–1.5 cm long; buds globose without ribs, whitish puberulent, 2–3 cm in diam. *Calyx* cup-shaped glabrous inside, 4–7 mm long, without rib, minutely puberulent outside; lobes 6, triangular, shortly acuminate at apex, almost equal to the tube. *Petals* small, orbicular, deciduous 3.5 mm long with small slender claws 2 mm broad, undulate. *Stamens* many, inserted at the base of the calyx tube. *Ovary* globose, glabrous; style slender, 6–7 mm long, bent; stigma small. *Fruiting calyx* 6–9 mm long or larger, 1 cm in diam., minutely puberulent. *Capsule* oblong ellipsoid, coriaceous, glabrous, 1.5 cm long, 1 cm in diam.; sometimes larger exceeding 2.5 cm long and 1.5 cm in diam., stalks long 2.3–5 cm., rounded at apex.

INDIA: **Western India and Ghats:** loc. incert. (Watt's Coll: E); Kolaba (Vain 3,416: BSI); Senhagadh (Puri 9,258 BSI); Poona Hills (Coll. of Sc. Poona: E); Belgaum (Ritchie 949: E & GH & 949/6: E, & 276: E); Konkan and Malabar (Stocks et al. s.n.: GH; Nilgiri Hills (Wight 1,035 = Wall. Cat. 2119 h: E; Hooker

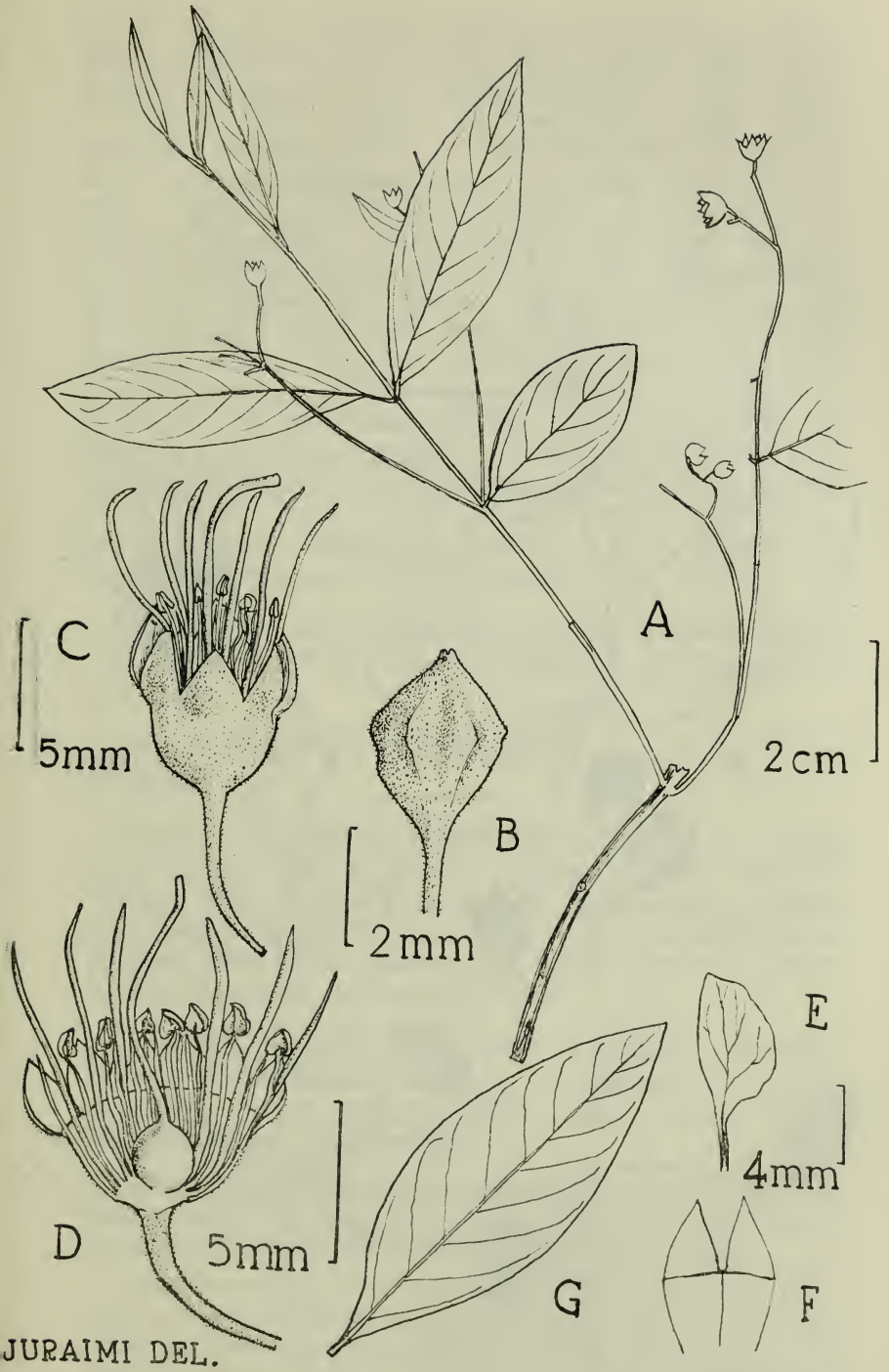
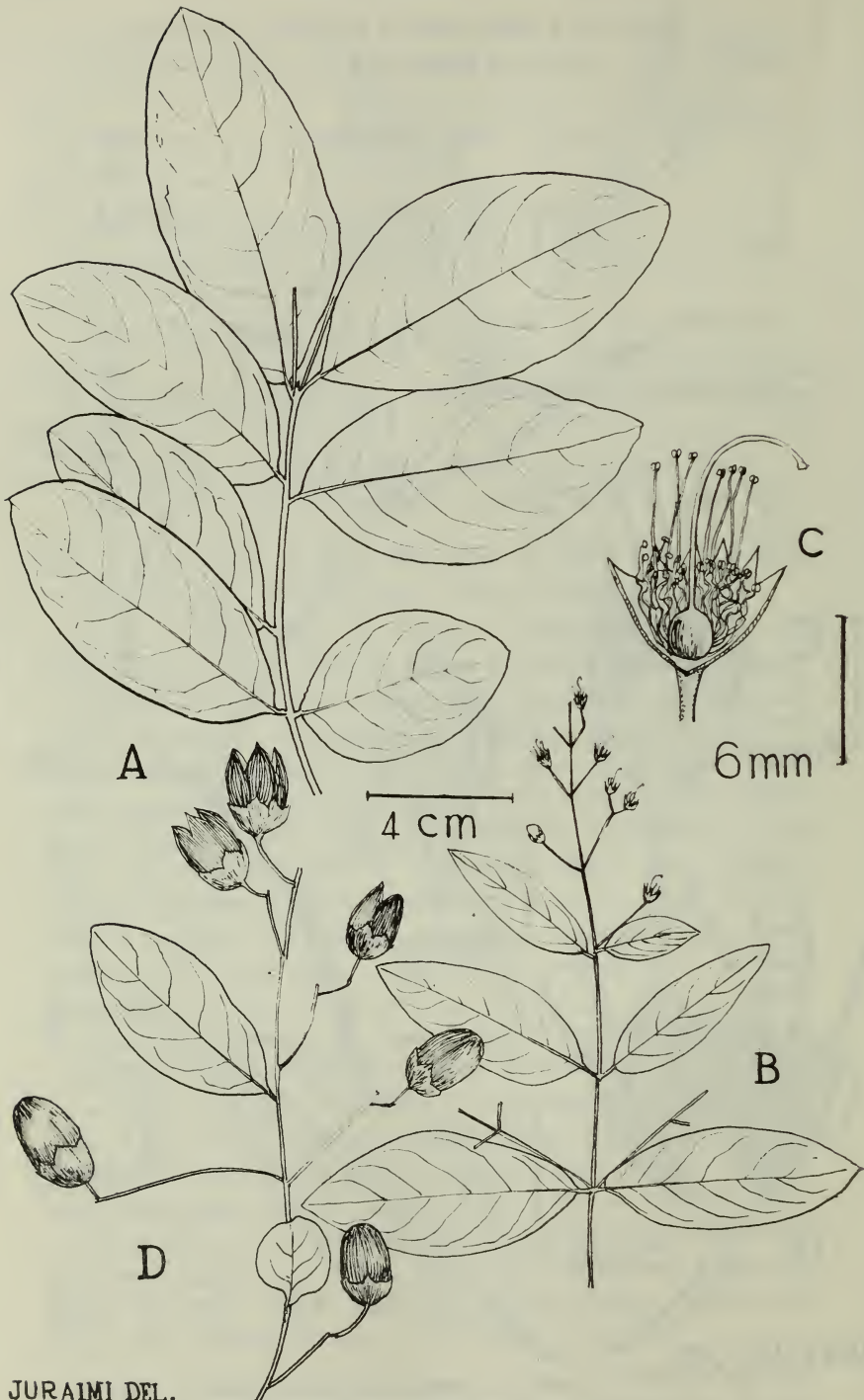


Fig. 3a. *L. parviflora* Roxb. (A: Roxburgh s.n in Circar: E; B — G; Roxburgh s.n.: E-holotype).

A, Fertile twig. B, Flower bud. C, Flower after anthesis. D, longitudinal section of flower. E, Petal. F, Part of calyx dissected. G, Leaf.



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Fig. 3b. *L. parviflora* Roxb. (Range Officer 3 in SING).

A, Twig. B, Fertile twig. C, Longitudinal section of flower. D, Twig with capsules.

s.n.: E, GH & A; Cleghorn in 1857: E; Thomson s.n.: CAL; Salem (Yeshoda 566: A & 154: B); Mysore (Rolla 73,457: BSI); Carnatic (Thomson s.n.: E); Droog (Cleghorn s.n.: E); Madras — Garden, Cult. Cleghorn: E). **North and Central India:** Sharanpur (McGollan 1,270: E); Berar (Wittenbaker et al. 11, & 13 & 23: E); Bampada (Hooper 38, 825: CAL); Oudh at Kheri (Inayal s.n.: E); Posserah (Campbell in May 1836: E); Pokhusia (Campbell = Watt's 8,406: E). **N.W. India:** (Stewart in 1871: E); Baulapilly (Campbell 402: E); Chota Nagpur (Clarke 25,072: E). **Andhra State North:** Godavari Distr. (Ramaswami 1,459: CAL); Kurnool Distr. (Gamble 17,697: CAL); Ganjam (Gamble 14,221: CAL); loc. incert. prob. Circar (Wight 968: GH; Roxburgh s.n.: E — **holotype** et Roxburgh per Wight s.n.: E; Wight 1,034: E). **Eastern Himalaya:** (India & Pakistan) loc. incert. (Lace 2,358: E; Hooker s.n.: GH); Nepal (Wallich s.n.: GH — **isoholotype** of *Fatiao nepalensis* apparently; Wallich 2,119. a: E; Wallich 2,119 b, from cultivated plants: GH); Sikkim, Khasya & Juntea (Prains Coll: E; Mann. s.n.: E; Gallatly s.n.: E); Kumaon (Strachey and Winterbottom 2,012: GH).

BURMA: loc. incert. (Dickason 6,152: A; Buchanan 107 & 77B: E; Lace 4,217: E; Forest: 9,178 & 9,648: E; Toppin 2,574: E & CAL).

SMALLEST FRUITS: Hort. Bot. Bogor cult. sub. No. VII D. 18 (SING).

LARGE FRUITS: **N. Bengal** (Biswas 1,628: A); **Nepal**, Talkot (Ram. 208: A & UC); Jajalkot (Polunin, Sykes & Williams 5,796: A). **West Coast of India**, Bombay State at Karjat (Fernandes 39 & 257: A); Goa (Raghavan 103,370: BSI). **Central & North India:** Behar (Watt 26: E); Indore (Rao 79,221: BSI); Andhra, Baulapilly (Wight 2,311: E).

LARGEST FRUITS & LEAVES LARGER, OBLONG, CORIACEOUS: **Bombay** at Kayat (Fernandes 39: A). **Goa:** (Raghavan 103,370: BSI); **Belgaum?** Dandelly (Ritchie 276/a: GH). **Aundrugah** (Prain: SING).

Leaves downy pubescent below especially on the midrib; at anthesis 13–65 mm long, later 35–118 mm long; calyx minutely puberulous; fruit smaller 15 mm long or less.

There are extremely few specimens that are entirely glabrous, and in some collections the different components of the same collection both pubescent and glabrous leafed specimens may be found in one and the same collection, a reason why Koehne cites the same numbers under both his subspecies. The holotype itself was described as being “covered with whitish down”, and the specimens marked above as an apparent holotype and Wight 968 are both pubescent beneath.

Kanjilal and his co-workers who studied Assamese plants including also from the mountainous regions stated that they could not recognise the varieties of Clarke since variations in the size of the fruits and in the pubescence or glabrescence of the leaves were noticed even in his area.

This species is widely distributed and it is known to accommodate itself to a variety of soils and even humidity, being intolerant of shade and waterlogging (cf. Troup, Sch. Ind. Trees II, 1921 p. 593); also it is a deciduous tree. Hence a great deal of variation it shows is probably a result of variations in the soil, climatic and growth conditions and probably also a response to some grades of shade. It is impossible to separate specimens on any one or more characters; though it is seen that the specimens from very high altitudes have leaves which are generally hairy underneath and a wavy or crispate margin. Also the fruits are generally smaller. The smallest fruit seen was in the specimen from a cultivated plant in the Gardens of Bogor, Indonesia.

Subsection **Pterocalymma**

Subsection **Pterocalymma** (Turcz.) Furtado & Montien **stat nov**
 Secion *Pterocalymma* (Turcz.) Koehne in Engl. Jahrb IV (1883)
 22 & Engl.

Pflanzenr. 17 = IV. 216 (1903) 266 **isonym.**

Genus *Pterocalymma* Turcz. in Bull. Soc. Nat. Moscou XIX (1846)
 50 **basinym.**

Trees, occasionally shrubs. *Leaves* opposite or almost opposite, entire, generally short petioled, occasionally petiole as long as 2 cm. *Inflorescence* lateral or terminal panicles, pyramidal or cylindrical (with short lateral branches), often on long, sometimes on very short axis. *Flowers* generally showy. *Flower bud* subglobose, piriform or turbinate, smooth, grooved, ridged or winged, or merely auriculate or warted through the suppression of the ridges; lobes 6-9, deltoid, valvate in the bud, sometimes also mammillate. *Petals* 6 or more, inserted at the base of the sinus within, clawed, wrinkled within the bud. *Stamens* many, exsert, those opposed to sepals, few, larger and long, those opposite to petals, numerous, inserted in the tube above the base. *Ovary* sessile, 3-6 celled, style piliform, curved in the bud, longer than stamens; stigma terminal, capitate or nearly so; ovules many, axile. *Capsule* more or less, adnate to the calyx, ellipsoid, ovoid or globoss, dehiscent 3-6 valved. *Seed* many, elongate and winged.

DISTRIBUTION: From India, China and Japan southward to Malaysia, the Indonesian Archipelagos and North Australia, but absent from Ceylon.

The leaves on the lower half of the twigs are often small and of different shapes, sometimes even obovate or almost orbicular.

TYPE SPECIES: *Lagerstroemia paniculata* (Turcz.) Vidal.

Key to the species

(Calyx with angular ridges or wings as many as sepals or sometimes provided with an auricle only at each sinus.)

- 1a. Ridges nearly absent or very slight in flower buds, but provided with a long auricle at each sinus *L. venusta*.
- 1b. Ridges or wings prominent, straight or undulate or crispate in flower buds, at times also shortly auriculate 2.
- 2a. Petals lanceolate, oblanceolate or elliptic, with the claw up to 6 mm long including cuneate claw 3.
- 2b. Petals rounded or nearly rounded, with the claw 6–18 mm long 4.
- 3a. Inflorescence 3–8 cm long, branchlets often in the axils of leaves; axis and calyx hirsutely grey pubescent. Petals lanceolate or elliptic 1.5–3 mm long, not with undulate margin. Leaves greenish grey, ovate 6–11 cm long, similarly hairy on both sides at first, later glabrescent with persistent pubescence on the midrib above and also on side nerves and reticulations below *L. villosa*.
- 3b. Inflorescence long, with long basal branches provided with bracts or reduced leaves; axis and calyx minutely pubescent, dark yellowish brown, eventually becoming dark brown. Petals oblanceolate with sinuate margins, 4–6 mm long. Leaves elliptic 3–4 cm long, at first minutely hairy on both sides, later glabrous or puberulous on midrib *L. subangulata*.
- 4a. Fruit over 19 mm long or more, 12 mm or more in diameter 5.
- 4b. Fruit smaller, 12–18 mm long, 9–14 mm in diameter 8.
- 5a. Leaves glabrous, epunctate or pustulate, greenish. Fruiting calyx ochraceous tomentose or puberulous green with 6 non-sinuate ridges 6.
- 5b. Leaves dark, punctate, pubescent especially on the lateral nerves and midrib beneath. Fruiting calyx dark, minutely white puberulous, 6–9 ridged in the same inflorescence (ridges sinuate especially at the base, sepals patent). Fruit elliptic or ovate-elliptic 23 mm long, 14 mm in diameter, rounded or slightly apiculate at apex or not *L. ovalifolia*.
 - (a) Capsule apiculate var. *ovalifolia*.
 - (b) Capsule blunt var. *exapiculata*.
- 6a. Fruit 19 mm long, 12–14 mm in diameter with its calyx lobes reflexed. Leaves concolorous, 7–10 cm long; petiole \pm 1.5 mm long *L. subsessilifolia*.
- 6b. Fruit larger with calyx lobes patent or erect over 19 mm long. Leaves paler beneath; petiole 4–10 mm long 7.
- 7a. Fruit 25 mm long, 20–22 mm in diameter. Leaves pustulate 12 cm–17 cm long, 7 cm broad; petiole 5–10 mm long. Calyx pustulate, minutely pubescent, grey, dirty brown in fruit *L. pustulata* (San. 2006).
- 7b. Fruit 19–23 mm long, 17–20 mm in diameter. Leaves not pustulate, 10–14 cm long, 3–5.4 cm broad; petiole 4 mm long. Fruiting calyx ochraceous tomentose, not pustulate *L. quinquevalvis*.
- 8a. Calyx ridges slightly sinuate crispate or not in tube, not auriculate at the sinus 12.
- 8b. Calyx ridges crispate or crispate undulate, even above the sinuses also, auriculate like at the sinus 9.
- 9a. Leaves glabrous above, glabrescent and dotted beneath when adult 11.
- 9b. Leaves hairy on both sides, not dotted beneath, hairs persistent on the nerves 10.

- 10b. Leaves 6–10 cm long, 2.5–4.5 cm broad, shining above. Calyx ridges almost orbicularly and undulately auriculate at the sinus, abruptly narrowed into thickened bands on both sides of the sutures of the sepals in the bud above *L. undulata*.
- 10b. Leaves 6–10 cm long, 2.5–4.5 cm broad, shining above. Calyx ridges in the bud broadly auriculate and crispate at the sinus, gradually narrowed along both sides of the suture above *L. crispa*.
- 11a. Calyx ridge in the bud enlarged at the sinus and then gradually narrowed along the suture toward the bud-apex. Leaves dull above, greenish brown beneath, 8–17 cm long, 3–7 cm broad, lanceolate or oblong-elliptic, 8–11 nerved. Petiole 5–10 mm long. Petal oblong, 6–7 mm long, 3–4 mm broad *L. paniculata*.
- 11b. Calyx ridges not auriculate at the sinus convexly dilated along the sutures of the flower bud. Leaves shining above, light or greyish green beneath, elliptic or obovate elliptic, 5–8 cm long, 2.5–5 cm broad, 5–7 nerved. Petiole 1–3 mm long. Petal rhomboid, 11 mm long, 9 mm broad *L. pterosepala*.
- 12a. Leaves reddish beneath, elliptic, acute or obtuse, rarely lanceolate and caudate 13.
- 12b. Leaves greenish on both sides, often lanceolate, long acuminate or caudate. Fruiting calyx abruptly narrowed into a long base 19.
- 13a. Fruiting calyx abruptly narrowed into a long base 18.
- 13b. Fruiting calyx gradually narrowed towards the base or abruptly into a very short base 14.
- 14a. Fruiting calyx lobes conspicuously winged along the margins, wings folded backwards. (Flower bud with raised sutures) 15.
- 14b. Fruiting calyx lobes slightly thickened along the margins, not conspicuously winged. (Flower bud ridges not conspicuously raised along sutures) 16.
- 15a. Fruiting calyx almost obconical. Capsule almost flat at top, rostrate with 1.5 mm long beak. Leaves ovate or oblong, obtuse or obtusely acute, 6–9 cm long, 3–7 cm broad *L. ovalifolia* var. *minor*.
- 15b. Fruiting calyx often elongated into a pedicelliform base. Capsule oblong or subglobose, 12–14 mm long, with a beak about 0.5 mm long. Leaves elliptic, oblong, 3–7 cm long, 2–4 cm broad, smaller ones obovate or almost orbicular *L. ovalifolia* var. *novoguineensis*.
- 16a. Calyx wings fall off very early in the development of the fruit so as to make the ridges straight in fruiting calyx. (Capsule apparently curvedly narrowed towards the apex, shortly nipped.) Calyx obconical *L. ovalifolia* var. *ruptilis*.
- 16b. Calyx ridges otherwise 17.
- 17a. Fruiting calyx obconical, slightly elongated at base. Ridges of flower buds slightly undulate. (Capsule with 1–2 mm long beak) *L. ovalifolia* var. *riedeliana*.
- 17b. Fruiting calyx almost cupular with short abruptly pedicelliform base. Ridges of the flower buds straight. (Capsule with 2 mm long beak) *L. ovalifolia* var. *apiculata*.
- 18a. Fruiting calyx lobes reflexed. Leaves coriaceous *L. crassifolia*.
- 18b. Fruiting calyx lobes erect. Leaves chartaceous *L. borneensis*.
- 19a. Calyx ridges raised along the sutures in the bud 20.
- 19b. Calyx ridges not raised or almost obscure along the sutures in the bud 21.
- 20a. Flower bud club shaped, excluding the pedicelliform base, the tubular portion almost equal to cupola. Ridges in the bud slightly desinent at the sinus, but raised and sulcate along the suture below the apex *L. cristata*.
- 20b. Flower bud turbinate, the tube almost twice as long as the cupola; ridges raised at the sinus along the suture *L. inopinata*.

- 21a. Ridges in calyx bud sinuate in the tube, gibbose at the sinus, desinent in the sutures above 22.
- 21b. Ridges in the calyx not sinuate in the tube and not gibbose at the sinus, almost absent in the sutures 23.
- 22a. Calyx bud, ridges abruptly gibbose at the sinus, desinent and sulcate along the sutures *L. aruensis*.
- 22b. Calyx bud ridges broadened at the sinus, desinent and sulcate towards the apex *L. alatulata*.
- 23a. Inflorescence cylindrical, with short, almost equal lateral branches. Ridge in the calyx bud elliptically areolate at the sinus above (obscurely mammillate bud) *L. moluccana*.
- 23b. Inflorescence pyramidal or almost so. Ridge in the calyx bud not areolate 24
- 24a. Flower buds including pedicelliform base about 15 mm long, 7 mm in diam., conspicuously apiculate, ridges winged; pedicels of lateral flowers \pm 5 mm long *L. Koehneana*.
- 24b. Flower buds 8–12 mm long, 5–6 mm in diam., shortly nipped or not; ridges slight or superficial (*L. piriformis*)—25.
- 25a. Ridges of the flower bud obscure or superficial in the calyx tube; bud slightly apiculate 26.
- 25b. Flower bud apiculate or not; ridges somewhat prominent in tube 27.
- 26a. Flower bud 9–12 mm long, 5 mm in diam. Ridges distinctly thickened and obscurely sulcate along the suture forma *piriformis*.
- 26b. Flower bud 10–11 mm long, 6 mm in diam., ridges broadly sulcate but not thickened along the suture var. *valleculata*.
- 27a. Flower buds 9 mm long, 6 mm in diam., ridges completely desinent below the sinus in mature buds, reappearing in the suture just below the apex, not thickened var. *callosa*.
- 27b. Flower buds 8–9 mm, 5 mm in diam., ridges prominent and slightly thickened along the suture forma *batitanan*.

4. *Lagerstroemia venusta* Wall. ex Clarke in Hook. f., Fl. Brit. Ind. II (1879) 576; Koehne in Engl. Jahrb. IV (1883) 26, in Engl. Prantl, Pflanzenf. III. 7 (1891) 14 f. 5 Y, & in Engl., Pflanzenr. 17 = IV. 216 (1903) 269 fig. 55 Y; Craib in Fl. Siam Enum. I, (1931) 720 sub observ. *L. collettii* — **Fig. 4.**

L. collettii Craib in Kew Bull. (1911) 53; Gagnep. in Fl. Indochine II (1921) 960; Craib in Fl. Siam Enum. I (1931) 720; **syn. nov.**

L. corniculata Gagnep. in H. Lec. Not. Syst. III (1918) 357 and in Fl. Indochine II (1921) 943 fig. 101. **syn. nov.**

Tree or shrub. *Leaves* oblong or elliptic-oblong, obtuse or sometimes nearly rounded at the apex, undulate in the margin, thin coriaceous, whitish puberulous on nerves beneath when young, later glabrescent, 4–15 cm long, 2.5–5.8 cm broad, often oblique at base, 5–9 nerved on each side; petiole 3–6 mm long, buds often light brown in colour when dry, short, triangular. *Panicle* large up to 45 cm long, diffuse, whitish puberulous, pedicel short \pm 4 mm long and unequal. *Flower bud* campanulate abruptly narrowed into the base, about 9 mm long, 6 mm in diam., whitish puberulous, raised and furrowed, provided with a liguliform auricle at each sinus, smooth in tubes sometimes more or less 6 ridged, ridges straight. *Calyx* campanulate, lobes 6, acute. *Petals* clawed, short oblong, 9 mm long (including 2–3 mm

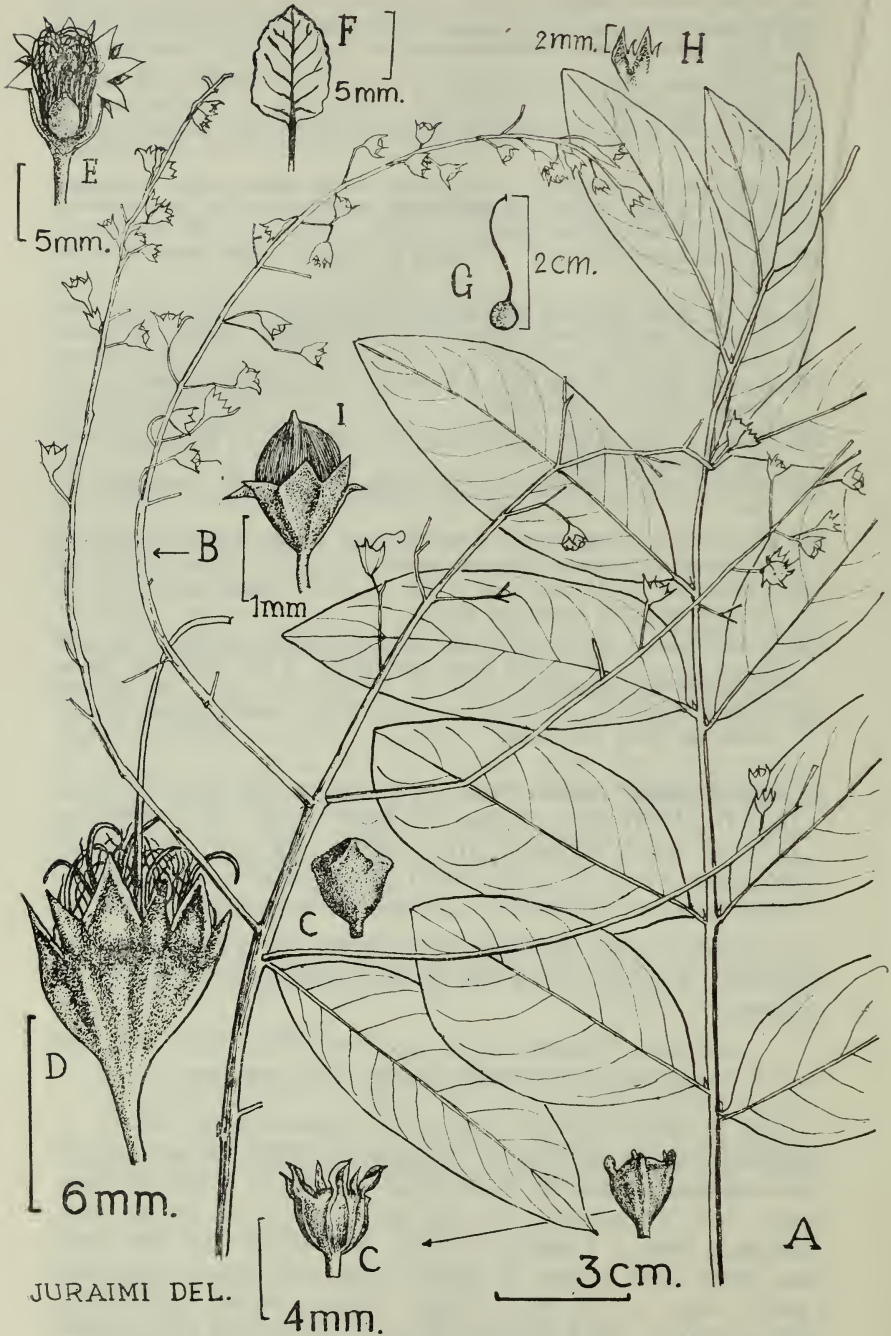


FIG. 4. *L. venusta* Wall. ex Clark (A-B Talbot de Malahide 45 in SING; C-H Royer 499 in E; I Lace 5,414 in E).

A, Twig. B, Inflorescence. C, Flower bud. D, Flower after anthesis. E, Longitudinal section of flower. F, Petal. G, Ovary with style. H, Part of calyx. I, Capsule.

long claw), obtuse at the apex, undulate in the margin. *Stamens* many, 6–8 thicker and longer, others subequal. *Ovary* glabrous, globose with a long slender style, capitate stigma. *Fruiting calyx* cuneate abruptly narrowed into a short pedicelliform base, ridgeless or sometimes distinctly ridged; lobes 6, alternating with liguliform auricles or their bases at the sinus, thickened in the margin, reflexed or porrect.

CHINA: **Yunnan** (Wang 80, 430: A).

BURMA: **Upper Burma**; Wetwun near Maymyo (Lace 6,249: CAL, E); **Upper Chindwin**; Kalewa (Lace 4,192: E — isoparatype of *L. colletii*); Yindaw (Collett 857: E — isoparatype of *L. collettii*); Myingyan near Popayura (Rogers 499: E). **Shan States**, Thondong (Lace 5,385 on 30. VII. 1911: CAL & E; 5,415: E & Batin 12,152: E; Forest Ranger or Lace 5,414 on 9. IX. 1911: CAL & E).

THAILAND: *Northern*: **Chiengmai** (Kerr 1,264: BM — holotype of *L. collettii*); **Lampang**, Che Hom (Kerr 4,796; UC); Prae, Hui Che (Vanpruk 320 = BKF 5,153: BKF). *South-Western*: **Kanburi** (Kostermans 1,115: A, 1,150A: A; Marcan 894: BM). *North-Eastern*: **Nakon Phanom**, Mukdahan (Lakshnakara 962: BM).

INDO-CHINA, LAOS & CAMBODIA: Mekong bank (Talbot de Malahide 45: BM, SING); Paksan Road (Talbot de Malahide 63: BM, SING); Stung-Streng (Thorel 2,162: BM — isosyntype of *L. corniculata*).

The holotype of the species was collected near Thayet Moo on the Irrawaddy river in Burma, from which region we have seen some collections, but they generally bear ridged calyces, but sometimes ridgeless or almost ridgeless calyces in flower buds and fruit (e.g. Rogers 499) are found even in the same specimens as described in the protolog of the species. A great deal of variation is also seen in the leaves depending upon the new or old shoots. Hence we have no hesitation in reducing *L. collettii* to this species.

5. ***Lagerstroemia villosa*** Wall. ex Kurz in Journ. As. Soc. Bengal XVII, 2 (1873) 234, Pegu For. Rept. Append. B (1875) 54 in Journ. cit. XLVI (1877) 88, For. Fl. Burm. I (1877) 524; Clarke in Hook. f., Fl. Brit. Ind. II (1879) 578; Koehne in Engl. Jahrb. IV (1883) 27 & in Engl. Pflanzenr. 17-IV. 216 (1903) 269 fig. 58; Craib in Kew Bull. (1911) 54; Gagn. in Fl. Indochine II (1921) 947; Craib, Fl. Siam. Enum. I (1931) 728. — **Fig. 5.**

L. villosa Kurz var. *sparsior* Craib in op. cit. (1931) 729 **syn. nov.**

L. tomentosa sec. Hoss. in Bot. Centralbl. Beih. XXVIII, 2 (1911) 416 pro parte.

A tree about 20 m high. *Leaves* lanceolate 6–11 cm long, 3–4 cm broad, ovate 2.5–6 cm long, 2–3 cm broad, acuminate or acute at the apex, slightly decurrent into the petiole, densely whitish puberulous on both surfaces when young, later hairy in the midrib and side nerves above, puberulous beneath and pilose along the nerves, usually bicolourous green but sometimes brownish, 5–8 nerved on each side; petiole 3–5 mm long. *Panicle* terminal, cylindrical or subpyramidal, 3–8 cm long, 3–4 cm broad, densely white puberulous. *Flower bud* white puberulous, turbinate suddenly narrowed toward the base, about 4 mm long (including 1–2 mm long pedicelliform base), 2 mm in diam., 4–6 ridged, undulately winged up to the sinus, very slightly ridged along the suture with an obscure apex. *Calyx* 5–6 mm long (including 2 mm long pedicelliform base), 4–5 mm in diam.; lobes 4–6, 2 mm long, triangular, not or slightly thickened along the margin, patent or slightly reflexed. *Petal* lanceolate or elliptic, 1.5–3 mm long, 0.5–1 mm broad. *Stamen* many, 3–6 thicker and longer filamented, others shorter, subequal. *Ovary* subglobose with about 10 mm long slender style. *Fruiting calyx* cup-shaped, 3 mm deep, 8–9 mm in diam., adpressed to the fruit with ridges straight, not decurrent into the base; lobes reflexed, brittle. *Fruit* elliptic 15–22 mm long, 11 mm in diam., 3–4 valved.

CHINA: **Yunnan** (Wang 74,687: A).

BURMA: *Upper Burma:* **Maymyo** Plateau, Thondaung (Lace 6,211: E); Sakangyi (Lace 5,954: E); Katha, Gahe to Indaw (Lace 4,442: E); loc. incert. (Prazer 21: A, E, SING); Shan States, Taungi (Abdul Khalil s.n.: CAL); Lashis (Lace 5,834: E); Bawgys (Lace 4,837: E); Keng Tung (MacGregor 698 bis: E). **Mandalay**, Sedaw (Lace 5,794: CAL, E). **Namkhok State**, Namkhok (Dickason 8,287: SING). **Pyinmana**, Kaing (Lace 4,544: E). **Thayetmyo**, Taungyan (Lace 2,680: E). **Pegu & Tharrawaddy:** Pegu (Kurz 1,973: BM & CAL. — **lectoparatypes**; Pegu Yama (Kurz 1,343: CAL — **lectoholotype**; Scott s.n.: GH, E); Meaday (Hamilton s.n.: BM); Kangyi (Lace 5,704: CAL, E).

THAILAND: *Northern:* **Mae Haung Sorn**, Kun-Yuam Noi (Kerr s.n.: BM & UC). **Chiengmai**, Maung Fang (Garrett 173: E; Hosseus 616: BM, E); Chiengmai to Chiengrai (Rock 1,626: A); Doi Sutep (Kerr 1,150: BM; Chermisrivathana 509: SING). **Kampang Pet** (Kerr 5,969: BM, E, UC): between Kampang Pet. & Raheng (Kerr 2,614: E). **Uthaithani**, Banrai (Kasem 361: SING). *South-Western:* **Kanburi**, Wangka (Kerr 10,461: E — **isoholotype** of var. **sparsior**); Kwai Noi river at Bangkasi (Hoed & Kostermans 689: A). *North-Eastern:* **Loie**, Sitan (Smitinand 4,867: A).

This species is easily distinguished from *L. tomentosa* by its indumentum which is of simple hairs, while the latter has stellate hairs. It is obvious that Clarke had not seen either Kurz's original description or his syntypes.

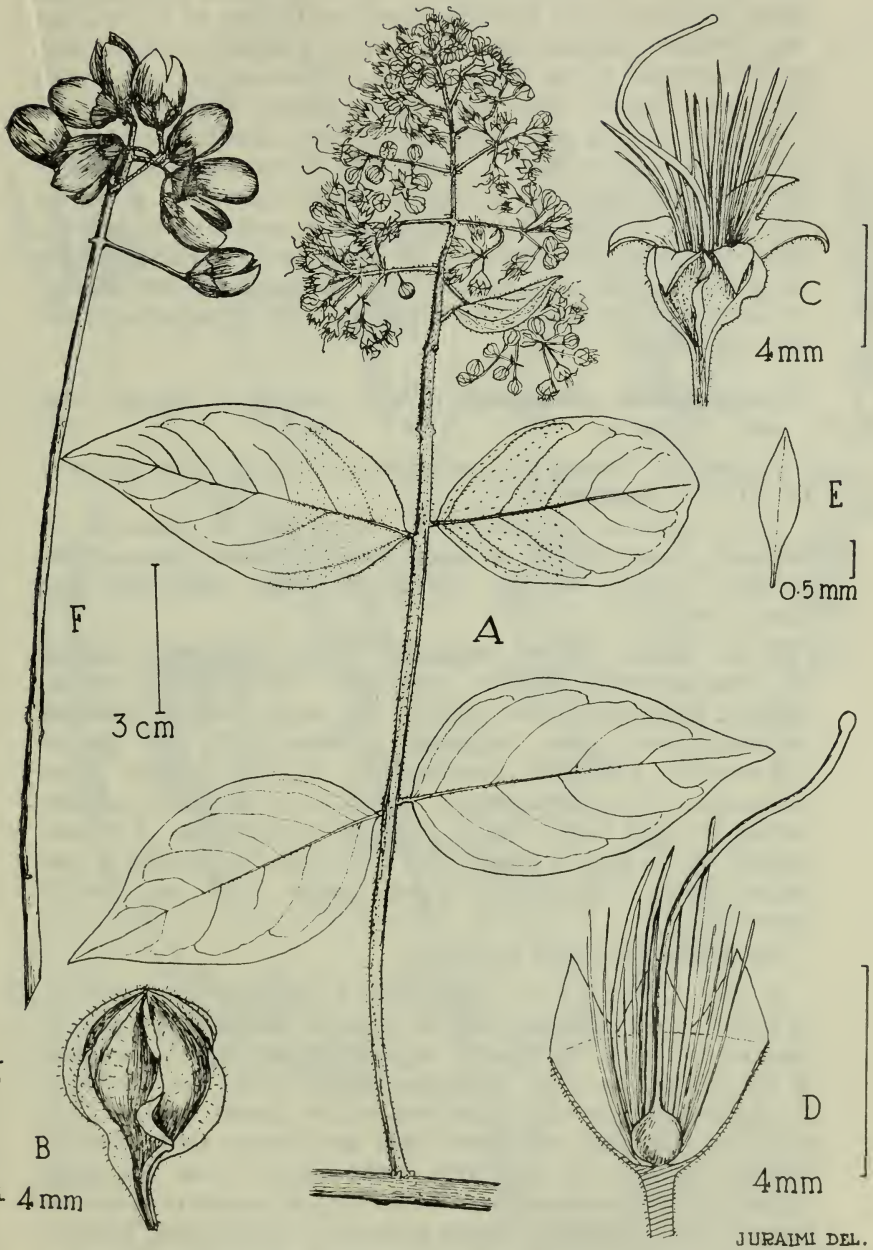


Fig. 5. *L. villosa* Wall. (A-E: Lace 6,211 in E; F: Lace 5,704 in E).

A. Fertile twig. B. Flower bud. C. Flower after anthesis. D. Longitudinal section of flower E, Petal. F, Twig with capsules.

We have reduced Craib's var. *sparsior* to the type variety because the specimens from the type region produce glabrescent leaves and the fruits are about the size described by Kurz and found in Kurz 1,343. Kurz described the capsule as 4-6 valvate, but 3-valvate capsules are also found, 4-valved capsules seem to be common in the Pegu and the Tharrawaddy regions. We have seen smaller fruits from North Burma and much larger fruits from Burma and Thailand, but they cannot be said to be typical. The leaves shed a good deal of indumentum as they become older and even acquire brownish colouration as in the type of var. *sparsior*. To us the problem seems to be more a result of ecology than heredity. If some varietal distinctions are to be made on the size capsules, then the specimens with smaller or larger capsules than in the lectotypes could be separated from the type form.

6. *Lagerstroemia subangulata* (Craib) Furtado et Montien stat. nov. — Fig. 6.

L. undulata Koehne var. *subangulata* Craib, Fl. Siam. Enum. I (1931) 727: **basinym**.

A *L. undulata* cui affinissima, calycis alis in alabastro vix undulatis, haud crispatis, ad sinum haud auriculatis, secus suturas sulcatas margine elevatas undulatulas, foliis minoribus haec species recedit.

Folia: lamina 5-8 cm longa, 2.5-3.5 cm lata, ovato elliptica vel elongato-ovato elliptica, utrinsecus 7-9 nervata, primum utrinque pubescens, dein glabra vel secus costam puberula reticulationibus supra depressis; petiolus 1-3 mm longus. *Inflorescentia* axe fusco brunnescentis, ut calyx minute griseo-pubescentis. *Petala* oblanceolata, basin versus attenuata, margine sinuata, 4-6 mm longa. *Fructus* ellipticus vel oblongus, 15-18 mm longus, 10-12 mm in diam.; calyx 6-alatus, in tubo 5-6 mm longus; lobis triangularibus apice acutis, 2-2.5 mm longis, patentibus.

Holotypus: Kerr 7,018 (non vidi).

A tree. *Leaves* 5-8 cm long, 2.5-3.5 cm broad, ovate-elliptic or elliptic, often acuminate with an acute or obtuse apex, curvedly narrowed towards the shortly angustate base, slightly undulate in the margin, hairy on both sides when young, later glabrous or glabrescent especially along the midrib, dotted beneath; 7-9 nerves on each side; reticulation sunk and obscure above, distinct beneath; petiole 1-3 mm long. *Inflorescence* 10-40 cm long, minutely greyish white pubescent all over, on a dark or brownish surface, lateral branches curved upwards, 5-25 cm long. *Flowers* congested at the top of short dichotomous peduncles borne on short, simple or subdivided branches on primary axis or lateral branches, often axillary to the bracts or reduced leaves. *Petals* oblanceolate or lanceolate 4-7 mm long (including \pm 2 mm long claw), 2-3 mm broad, undulate in margin; pedicel sessile or up to 2 mm long. *Calyx* 6-hardly undulate ridges, 5-6 mm long, 4 mm broad; lobes 6, acute at the apex, spreading or slightly

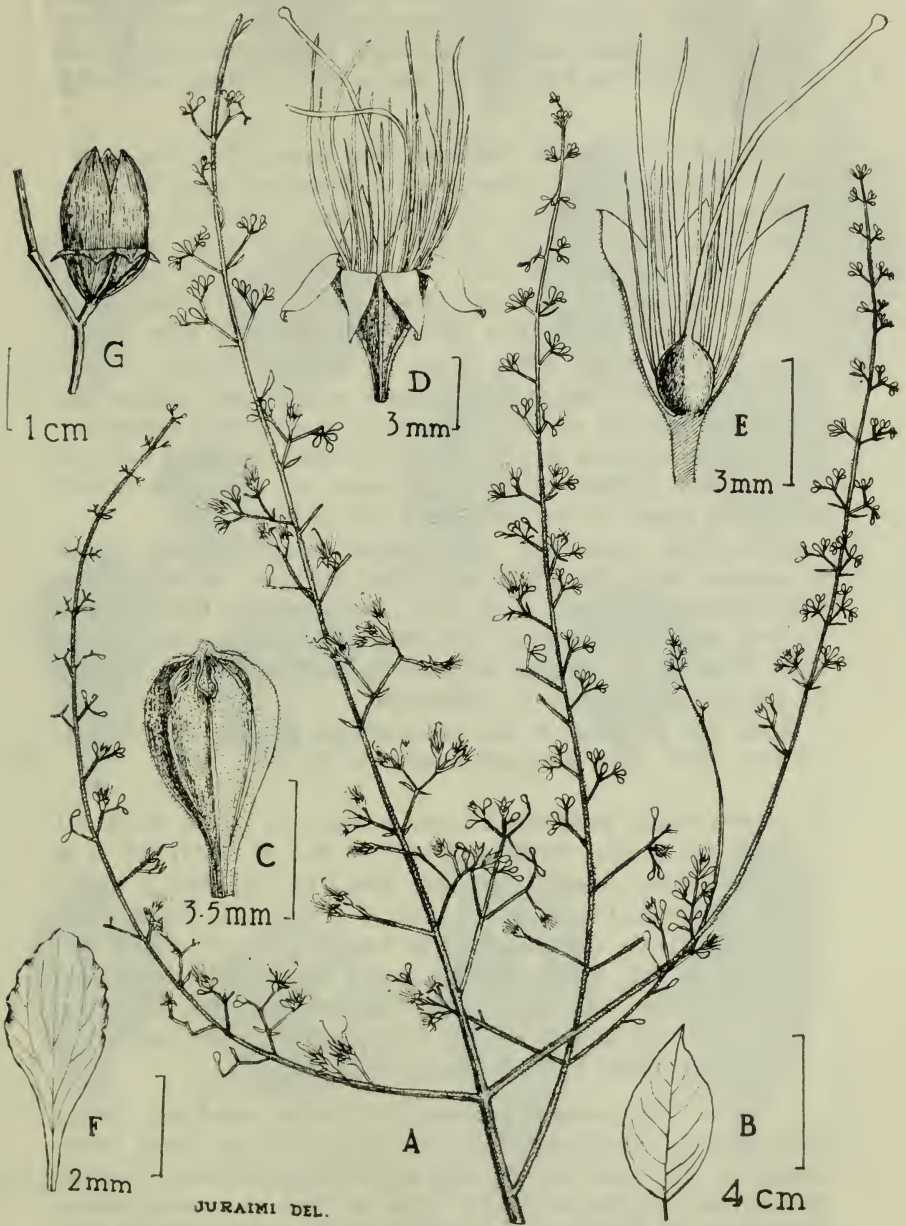


Fig. 6. *L. subangulata* (Craib). (A-F: King 5,497 in GH; G: Put 1,148 in BM).

A, Inflorescence. B, Leaf. C, Flower bud. D, Flower after anthesis. E, Longitudinal section of flower. F, Petal. G, Capsule.

reflexed, sparsely puberulous in the upper parts within. *Flower bud* turbinate or almost so, 5–7 mm long, 3 mm in diam., furrowed and raised along the suture, shortly nipped at the apex. *Stamen* many, unequal with 6 longer and thicker. *Ovary* oblong. *Fruiting calyx* slightly undulate in ridges; lobes spreading. *Capsule* glabrous, 15–18 mm long, 10–12 mm in diam., elliptic or oblong, 3–4 valved.

THAILAND: *Central*: Saraburi, Ban Nawng Bua (Put 1,148: BM — isoparatype, E. — paratype of the basynym). *South-Western*: Kanburi, Kanburi 7 kms northwest (King 5,497: GH & UC); Wang Kanai (Marcan 2,210; BM — isoparatype of the basynym); loc. incert. (Marcan 898: BM — isoparatype of the basynym); Ta-salao (Marcan 2,503: BM; Kerr 19,484 & 19,484a: BM). *Eastern*: Korat (= Nakhon Rachasima); Bua Yai (Put 4,288: BM, E); loc. incert. (Pong Sono 16 = BKF 23,586: SING).

In Kerr 19,484a the fruits are much smaller and dehisce into 2–4 valves, but this we think is a result of ecological conditions. The fruits in this also vary in size, the smallest one being 6–7 mm long, almost globose, while larger ones on the same branch are oblong about 12 mm long and 9 mm in diam.

In its leaf characters this species resembles very much *L. undulata* which has a bud with broad and much undulate wings which become auriculate at the sinus, and which has thick margins on both sides of the suture. The bud in *L. subangulata*, on the other hand, is less winged and scarcely undulate and so it might be placed very close to *L. paniculata*.

Since the protolog is not sufficient to identify this species, we have given here a longer description in Latin.

7. *Lagerstroemia ovalifolia* Teysm. et Binn. in Kruid, Arch. III (1840) 410. in Nat. Tydschr. Nederl. — Ind. II (1851) 306 & in Fl. Nov. Hort. Bogor (1866) 29; Miq., Fl. Ind. Bat. I (1855) 624; Bl., Mus. Bot. Lugd. — Bat. II (1856) 127; Walp., Ann. Bot. IV (1857) 690; Koehne in Engl. Jahrb. IV (1883) 24; Koord. et Val., Bijdr. Booms. Java I (1894) 193; King, Mat. Fl. Mal. Pen. III (1898) 352; Koehne in Engl. Pflanzenr. 17 = IV. 216. (1903) 268 fig. 58A; Gagnep. in Fl. Indoch. II (1921) 945; Ridl., Fl. Mal. Pen. I (1922) 662.

A big tree with spreading crown, 15–20 m or more tall. *Leaves* ovate, oblong or obovate, 6–11 cm long, 4–5.6 cm broad (often smaller in the lower part of twigs about 2.5–6 cm long, 1.7–4 cm broad), sub-rounded, acute or obtuse at both ends, chartaceous, glabrescent or minutely pubescent on nerves and midrib on both surfaces, greenish or grey above, brown and densely black dotted below, 5–9 nerved on each side; petiole up to 5 mm. *Panicle* terminal, pyramidal or subcylindrical, 6–36 cm long, 10–25 cm broad, few flowered, grey puberulous all over; pedicels unequal, 5–10 mm long. *Flower bud* turbinate or clavellate, 8–15 mm long, 9–10 mm in diam., ridges 6–9, broadly winged, undulate or not, raised and undulate or almost absent along the suture, with a

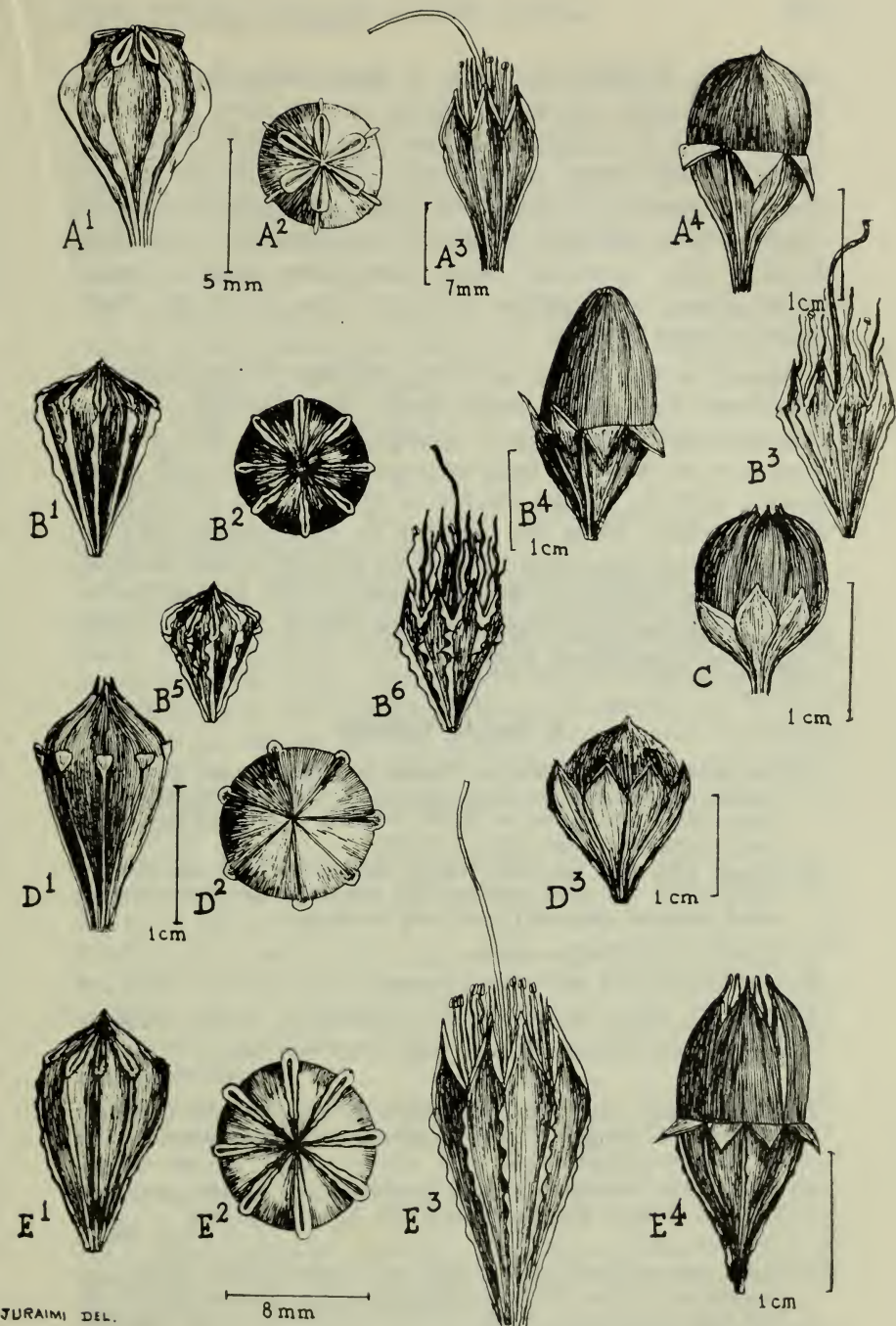


Fig. 7. *L. ovalifolia* varieties: var *novoguineensis* (A¹-A³: Schram 6,068: LAE—holotype, & A⁴: Iwangan 5,661: SING); var. *exapiculata* (B¹-B³: Mat Nong 4,025: SING & B⁴: Burkill & Haniff 17,179: SING—holotype, & B⁵-B⁶: Toroes 2,473: SING); var. *minor* (C: Iboet 64: SING); var. *ruptilis* (D¹-D³: Lakshnakara 836: BM—holotype); var. *ovalifolia* (E¹-E³: Kurz s.n. ex Hort. Bogor.: CAL & E⁴: Koorders 4,411B: CAL).

A¹-A², Flower bud. A³, Flower after anthesis. A⁴, Capsule. B¹-B², B⁵, Flower bud. B³, B⁶, Flower after anthesis. B⁴, Capsule. C, Capsule. D¹-D², Flower bud. D³, Capsule. E¹-E², Flower bud. E³, Flower after anthesis. E⁴, Capsule.

short up to 1 mm long nipple at apex. *Calyx* funnel-shaped; lobes 6–9, acutely triangular, winged or not along the margin outside. *Petal* 6–9, orbicular 15 mm long (including 5 mm long claw), 10 mm broad, membranous, undulate in the margin. *Stamens* numerous 6–9 longer and thicker, others many, subequal. *Ovary* globose, glabrous, adnate to the calyx-tube at the base. *Fruiting calyx* persistent, thick, hard; lobes patent. *Capsule* elliptic-oblong, or subglobose 14–25 mm long, 13–16 mm diam., shortly nipped or blunt.

Some of the varieties e.g. *apiculata*, *riedeliana* and *novoguineensis* have flower-buds which might justify the separation of these taxa as quite distinct from *L. ovalifolia*, but we have retained them here because they have to be studied further which is not possible with the limited number of specimens at our disposal. Generally these forms are referred to *L. ovalifolia* since no distinction had been found between the different forms. Koorders 26,924^B from Banjoemas in Java probably also belongs to this group which has to be separated from true *L. ovalifolia* forms; it has very small flower buds.

A Key to Varieties

- 1a. Flower buds 12 mm long or longer, 9–10 mm broad, with ridges sinuate or plicate in the tube, gibbose at the sinus. (Fruiting calyx obconical in tube, acute or slightly truncate at base, gibbose at the sinus). Capsule 15 mm long or longer 2.
- 1b. Flower buds 8–10 mm long, slightly alate in the tube and with the exception of var. *novoguineensis*, not gibbose at the sinus. (Fruiting calyx different). Capsule 15 mm long or shorter 5.
- 2a. Capsule 19 mm long or longer 3.
- 2b. Capsule about 15 mm long or shorter 4.
- 3a. Capsule apiculate. Flower buds 12–13 mm long var. *ovalifolia*.
- 3b. Capsule not apiculate. Flower buds 13–15 mm long var. *expiculata*.
- 4a. Fruiting calyx wings fall off and make its ridges straight; sepals not winged in the margins. Capsule apparently curvedly narrowed towards the apex, shortly nipped var. *ruptilis*.
- 4b. Calyx wings persistent, sinuate, sepals winged. Capsule somewhat flattened at apex, abruptly rostrate into 2 mm long beak..... var. *minor*.
- 5a. Calyx straight ridged, even in fruit, not winged, in fruit almost cup-shaped with a short abruptly pedicelliform base. Capsule with 2 mm long beak. (Sepals not winged) var. *apiculata*.
- 5b. Calyx sinuately ridged in the tube and evanescent above or broadly alate at the sinus and above. Fruiting calyx gradually narrowed at base. Capsule shortly beaked 6.
- 6a. Ridges in flower-buds sinuate, not broadly winged at the sinus or above. Fruiting calyx obconically elongate at base, sepals not winged var. *riedeliana*.
- 6b. Ridges in flower-buds broadly winged at the sinus, desinent above, but winged and raised near the apex. Fruiting calyx gradually elongate at base, sepals winged var. *novoguineensis*.

7a. *Lagerstroemia ovalifolia* T. & B. var. *ovalifolia* — Fig. 7E.

L. ovalifolia T. & B. in Kruid., Arch. III (1840) 410, in Nat. Tydschr. Ned. Ind. II (1851) 306 et in Pl. Nov. Bogor (1866) 29; Miq., Fl. Ind. Bat. I (1855) 624; Bl. Mus. Bat. Lugd. — Bat. II (1856) 127; Walp; Ann. Bot. IV (1857) 690; Koord. et Val., Bijdr. Booms. Java I (1894) 193 et vers. Flor. Cel. (1898) 469 pp. et autt. supra cit. pro parte.

L. hexaptera Miq. sec. Koorders, ex Kurz Fl. Java II (1912) 662 pp. et Atlas Baum. Java IV (1918) tab. 783 fig. I & K pp.

Flower buds 12–13 mm long, 9–10 mm broad, turbinate, 7–9 broadly ridged, ridges rugose and denticulate, raised and sulcate above the sinus along the sutures. *Fruiting calyx* with rugose or sinuate ridges. *Capsule* 20–24 mm long, beaked.

INDONESIA: **Java**, loc. incert. (Koorders 4,411^B: CAL); Bogor Gardens (Kurz sn.: CAL).

According to Miquel (1855) and Blume (1856) the type of the species was from Bantam in Java, but the actual description was based on a specimen collected from a plant grown in the Botanic Gardens, Bogor, whence Kurz later collected a specimen, now preserved in the Calcutta Herbarium. Koorders and Valetton (1894) stated that the species occurs in Java almost exclusively in the Preanger and the Bantam districts of West Java, while Koorders (1912) later noted that it does not occur in Central and East Java.

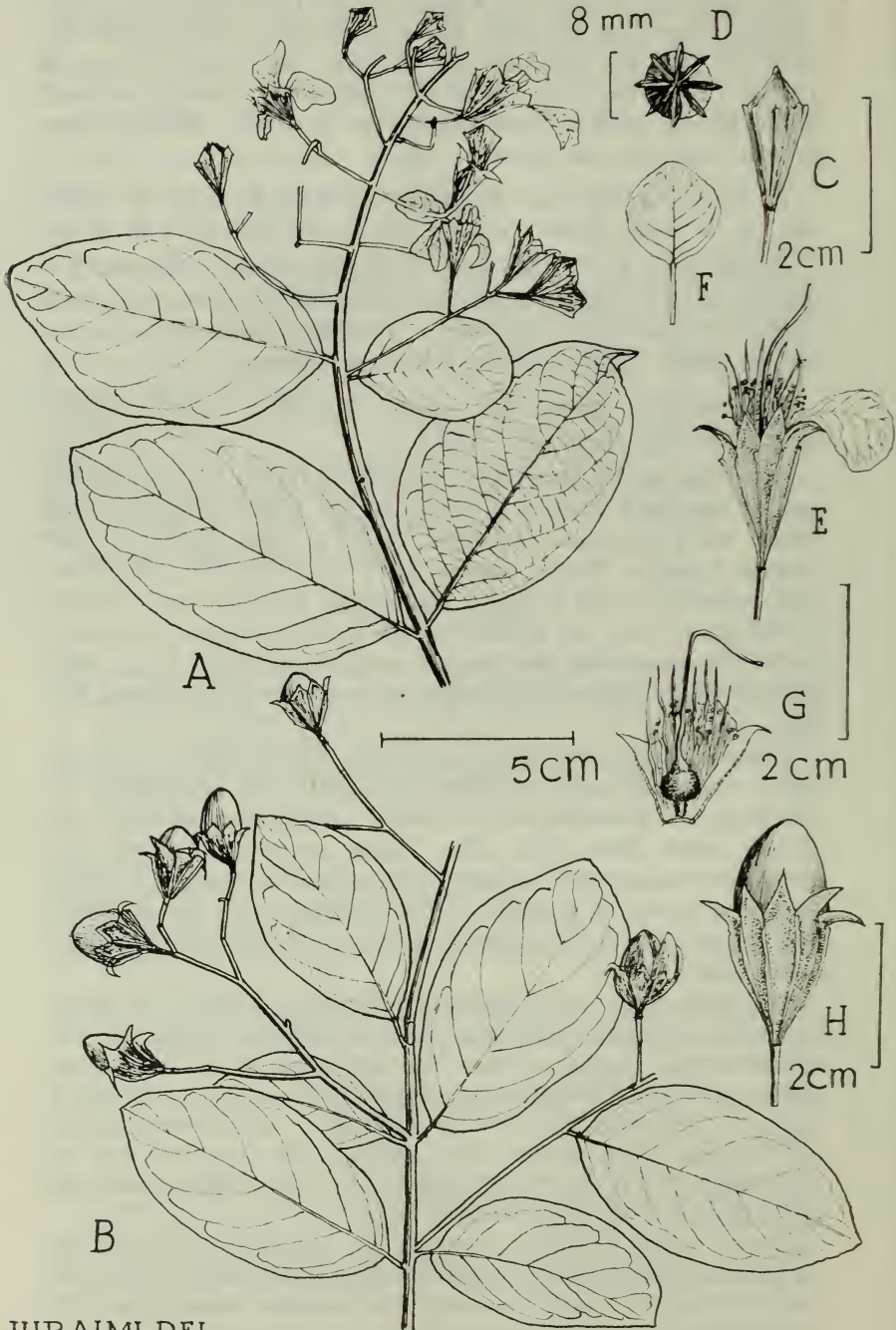
However, there are reasons to believe that at least two forms of *L. ovalifolia* occur in West Java. The one represented by the fruits on Koorders 4,411^B (CAL) and flowers in Kurz s.n. (CAL) which have their calyx ridges somewhat toothed and the sutures sulcate and rugosely raised along the margins in buds. In fact a stamp in Koorders 4,411^B indicates that the specimen was compared with the authentic specimens in Bogor by Koorders and Valetton.

The other form is represented by Koorders 29,924^B, the small flower buds which unlike the buds of the first form, do not reveal winged ridges in the tube and winged sulcate sutures above the sinus. The fruit in Koorders' Atlas (1918) t. 783 fig. I under *L. hexaptera* Miq. (= *L. ovalifolia* T. & B.) has straight, not toothed, ridges in the calyx, and has not elongated base as in Koorders 4,411^B and so it may be the fruit of the same form represented by the small flowers.

If so it would probably represent var. *apiculata*. Unfortunately we have not been able to consult the Bogor Herbarium specimens and to typify *L. ovalifolia* except on Koorders' description and specimens.

7b. *Lagerstroemia ovalifolia* T. & B. var. *exapiculata* Furtado et Montien — Fig. 7B and Fig. 8.

L. hexaptera Miq. *sensu* Clarke in Hk. f., Fl. Br. Ind. II (1879) 577 quoad specimina malayana.



JURAIMI DEL.

Fig. 8. *L. ovalifolia* var. *exapiculata* (A-H Bidin 6,541 in SING).

A, Fertile twig. B, twig with capsules. C-D, Flower bud. E, Flower. F, Petal. G, Longitudinal of flower. H, A capsule.

L. ovalifolia T. & B. *sensu* King Mal. Fl. Pen. III (1898) 352; Ridl., Fl. Mal. Pen. I (1922) 662; Craib, Fl. Siam Enum. I (1931) 725; quoad specimina malayana tantum.

Inter varietates *L. ovalifoliae* cum floribus capsulisque maximis ponenda sed capsulis elliptico-ovoideus, exapiculatis ad 24 mm longis, alabastris ad 15 mm longis haec varietas sat distincta.

Holotypus: MALAYA: **Pahang**, Kuala Lipis (Burkill & Haniff 17,179: SING).

This variety has the largest flower buds (13–15 mm long) and the largest capsules (22–24 mm long), but unlike the other varieties the capsules here are blunt.

THAILAND: **Pattani**, Betong (Kerr 7,487: BM, E, UC).

MALAYA: **Langkawi**, Gunong Raya (Chew 171: SING; Idris 33,173: SING). **Perak**, Ulu Bubong (King 10,025: CAL, KEP, SING, UC); Ulu Kerling (Kunstler 8,701: CAL). **Pahang**, Kuantan (Sohar 4,189: SING); Kuala Lipis (Burkill & Haniff 17,179: SING — **holotype:** Mat Nong 4,025: SING); Ulu Sikin (Bidin 6,541: SING); Kuala Tahan (Ridley 2,640: CAL, SING); Sungei Triang (Mohamed 29,980: SING); Bentong (Spewewinde s.n.: SING); Kuantan, Ulu Sikin (Bidin 6,535: SING). **Selangor**, Kepong (Osman 18,244: SING); Sungei Buloh (Sow & Tachun 16,901: KEP); Kanching (Strugnell 12,778: KEP, SING); Kepong cult. (Soo 73,538: SING). **Malacca** Brisu (Derry 1,050: SING). **Negri Sembilan**, Linggi. (Usope 0586: SING). **Johore**, Mawai (Ngadiman 34,738: A, SING, & Corner s.n.: SING).

INDONESIA: **Sumatra**, Sigamata (Toroes 2,985: A, SING & UC); Langga Pajoeng (Toroes 3,565: A & UC); Aer Kandis (Toroes 2,473: A, SING, UC & 2,508: A & UC); Asahan at Boenvet (Yates 748: A & UC; 2,101: BM & UC; 1,759: UC).

Most of the Sumatran specimens cited here are in flower and we have not had ample material to see if flower buds of this variety can be distinguished from those of the type form. However, we have cited all the specimens here because the specimens which had young fruits and no nipple at apex. Since all these specimens are from a small region on the east coast of Sumatra, we have ventured to refer all the specimens to this variety.

7c. *Lagerstroemia ovalifolia* T. & B. var. **ruptilis** Furtado et Montien — **Fig. 7D**.

L. ovalifolia T. & B. *sensu* Gagn. in Fl. Ind. II (1961) 945 p.p.; Craib. Fl. Siam Enum. I (1931) 725 p.p.; Pham et Nguyen, Flor. Vietn. (1960) 350 tab. 126 fig. F. quoad specimina indochinensia.

Inter varietates cum capsulis ad 15 mm longis ponenda, sed haec varietas alabastris 8-alatis, circa 15 mm longis, 9 mm in diam., alis rectis mox ruptis, ad sinum gibberosis, secus suturas paulo alatis vel non; capsulis immaturis, apicem versus curvato angustatis, summo breviter apiculatis; sepalis calycis fructiferi non vel breviter alatis, costis in tubo rectis sat distincta.

Holotypus: THAILAND: **Toh Moh**, Ban Kamung (Lakshnakara 836: BM).

This variety is distinguished by its flower buds being conical, 8 ridged, 15 mm long, 9 mm broad, with straight wings gradually broadened towards the sinus, where it is conspicuously humped, practically absent along the sutures; the wings fall off so as to make the fruiting calyx straight ridged; sepals not winged along the margin. (Capsule immature, beaked).

THAILAND: **Toh Moh**, Ban Kamung (Lakshnakara 836: BM — **holotype**).

INDOCHINA: **Cochinchina:** Dinh Mountains (Pierre 1,512: A); Thuya-Thyen (Pierre 174: GH).

In the Flora of Vietnam, Pham-Hoang Ho & Nguyen-van-Duong quotes *L. ovalifolia* with a query mark and depicts flower-bud or calyx with straight ridges.

7d. **Lagerstroemia ovalifolia** T. & B. var. **minor** Furtado et Montien — **Fig. 7C**.

L. ovalifolia T. & B. *sensu* Ridl. in Kew Bull. (1926) 66.

A var *ovalifolia*, cui alabastris similibus, subequilongis eodemmodo alatis ut videtur, haec varietas capsulis brevioribus (circa 15 mm longis), apice applanatis, summo longe (2 mm) rostratis, foliis latoribus differt.

(Calyx alis persistentibus, sinuatis, interdum basin versus denticulatis, ad sinum gibbosis praeditus, sepalis margine alatis).

Holotypus: Mentawi Archipelago: insula Siberut (Boden-Kloss 12,300: SING).

Fruiting calyx funnel-shaped, 10–11 mm long, 12–15 mm broad, 6–8 ridges undulate, broader and often denticulate in the lower half, gibbose at the sinus; lobes 6–8, patent, narrowly winged along the rim. *Fruit* light brown, short oblong, 13–15 mm long, 11–13 mm in diam., obscurely angular, somewhat flattened at apex, provided with about 2 mm long nipple, usually 5-valved.

INDONESIA: **Mentawi Archipelago** (West of Sumatra) Island of Siberut, Boden-Kloss 12,300: SING — **holotype**; BM & UC — **isoholotypes**; Iboet 64: SING).

This variety seems to have flower-buds that resemble those of the type form in length and in the wings of the ridges which are here 6–8, but the capsules are much shorter, somewhat flattened at apex with about 2 mm long beak. The leaves are also broader.

7e. **Lagerstroemia ovalifolia** T. & B. var. **apiculata** Furtado et Montien — **Fig. 9**.

Inter varietatis *L. ovalifoliae* cum alabastris capsulisque minoribus ponenda sed alabastris ad sinum haud gibbosis, costis 6 rectis vix alatis; calycibus fructiferis recte costatis fere cupularibus, basi breviter et abrupte pedicellatis, ejusdem sepalis margine haud alatis; capsulis apicem versus convexo angustatis summo rostratis, rostro 2 mm longo haec varietas facile distinguenda.

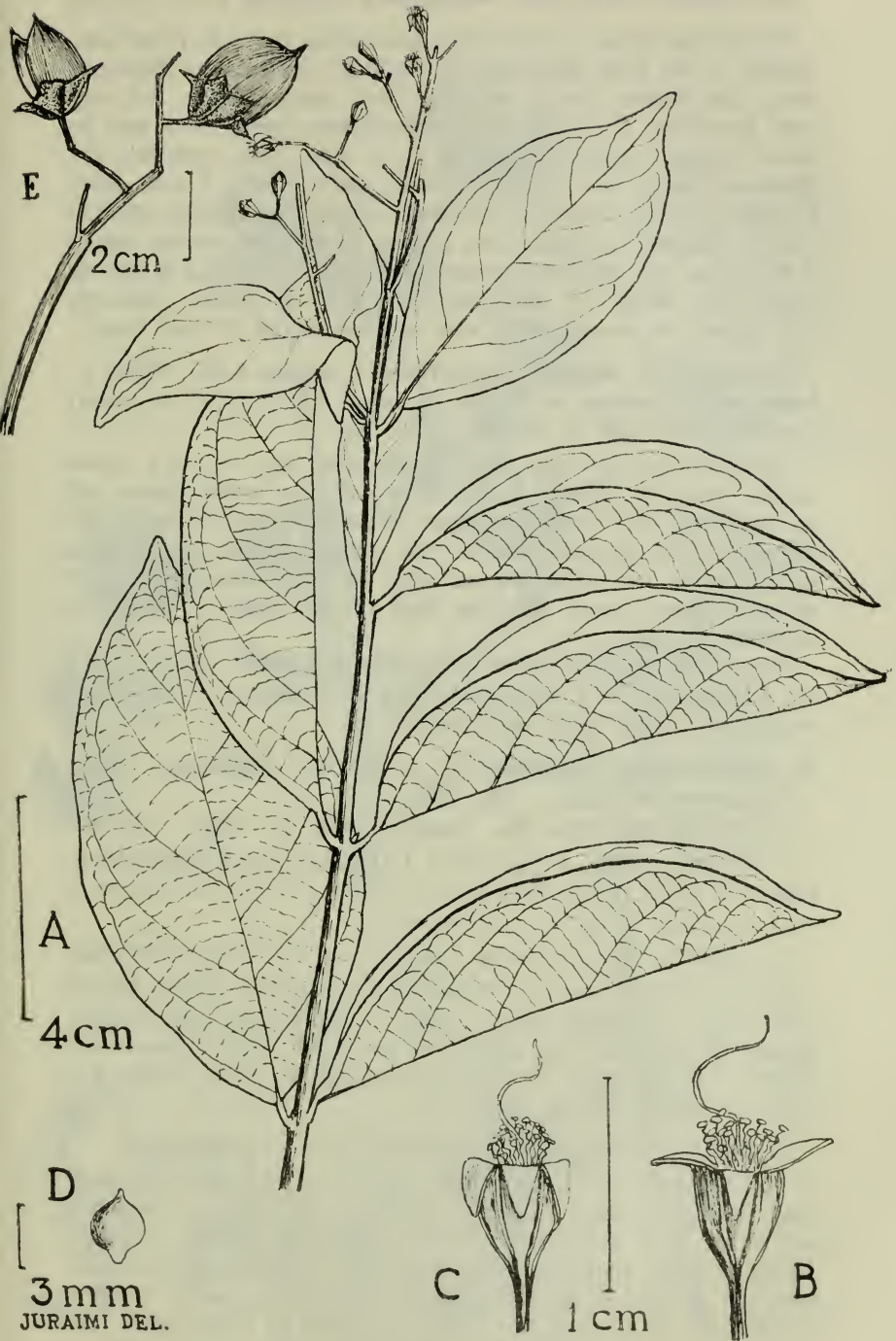


Fig. 9. *L. ovalifolia* T. & B. var. *apiculata* (A-D: Loerzing 6,407: SING — holotype; E: Forbes 2,705: SING).

A, Fertile twig. B-C, Flower after anthesis. D, ovary. E, Twig with capsules.

Holotypus: SUMATRA: **Bandarbaru** (Loerzing 6,407: SING).

Flower bud about 5 mm long, 3 mm broad; ridges 6, prominent, straight in the tube, obscurely furrowed at the top, not thickened along the suture, shortly nipped. *Calyx* campanulate, 7–8 mm long (including 2–3 mm long pedicelliform base), 4–5 mm in diam., straight ridged; lobes 6, 2–2.5 mm long, reflexed, not thickened along the margin. *Fruiting calyx* about 8 mm deep, 11 mm in diam., broadly obconical, almost cup-shaped, straight ridged, abruptly narrowed into a short base, lobes patent, about 5 mm long, not thickened along the margin. *Capsule* 5–6 valved, subglobose about 15 mm long, 13 mm in diam., obscurely 5–6 angled in cross-section with a beak about 2 mm long.

INDONESIA: **Sumatra**, Bandarbaru (Loerzing 6,407: SING — **holotype**), Palembang at Rawas (Grashoff 1,092: UC); loc. incert (Forbes 2,705; GH & SING).

The holotype specimen has flowers only, but its calyx shows readily how it differs from those of the other forms of *L. ovalifolia*. The fruit has been described from Forbes 2,705 (SING). With the exception of the straight ridges, the fruiting specimens of var. *apiculata* are easy to be confused with that of var. *minor*, except that the fruit of the latter is somewhat flattened at apex.

This form appears to be very like Koorders' Atlas t. 783 fig. I, described as *L. hexaptera* Miq. & Koorders 29,924^B with very small flower buds may also be it.

7f. *Lagerstroemia ovalifolia* T. & B. var. **riedeliana** (Oliv.) Furtado et Montien — **Fig. 10.**

L. celebica Bl., Mus. Bot. Lugd. — Bat. II (1856) 127?

L. hexaptera Miq., Fl. Ind. Bot. I (1855) 623 and (1856) 1090; Clarke in Hook. f. Fl. Brit. Ind. II (1879) 577 pro parte typica?

L. ovalifolia T. & B. sensu Auctt.

L. riedeliana Oliv. in Journ. Linn. Soc. XV (1876) 99 **basynym.**

This variety falls among the smaller flowered and smaller fruited forms of *L. ovalifolia* with 6 ridges to the flower-buds, slightly sinuate in the tube, not gibbose at the sinus, almost evanescent above. Fruiting calyx obconically elongate at base, sepals not winged; capsule shortly beaked.

CELEBES: **North:** Gorontalo (Riedel: K — **holotypus**).

The holotype of *L. hexaptera* Miq. (= *L. celebica* Bl.) was from Likupang also in North Celebes, collected by Forester, which we have not seen; but the description of the subgenus *hexaptera* Miq. based on it states that "the calyx is hexagonal in tube, not plicate but shortly winged in the ridges", which excludes *L. ovalifolia* var. *ovalifolia*. Further Koehne in Engl. Jahrb. IV (1883) 24 in a footnote to *L. hexaptera* Miq. states that a duplicate specimen labelled by Miquel in Herbarium of Goettingen was not *L. ovalifolia* but belonged to *L. calycina* which is a lapsus calami for *L. paniculata*; this statement also suggests the correctness of our identification.

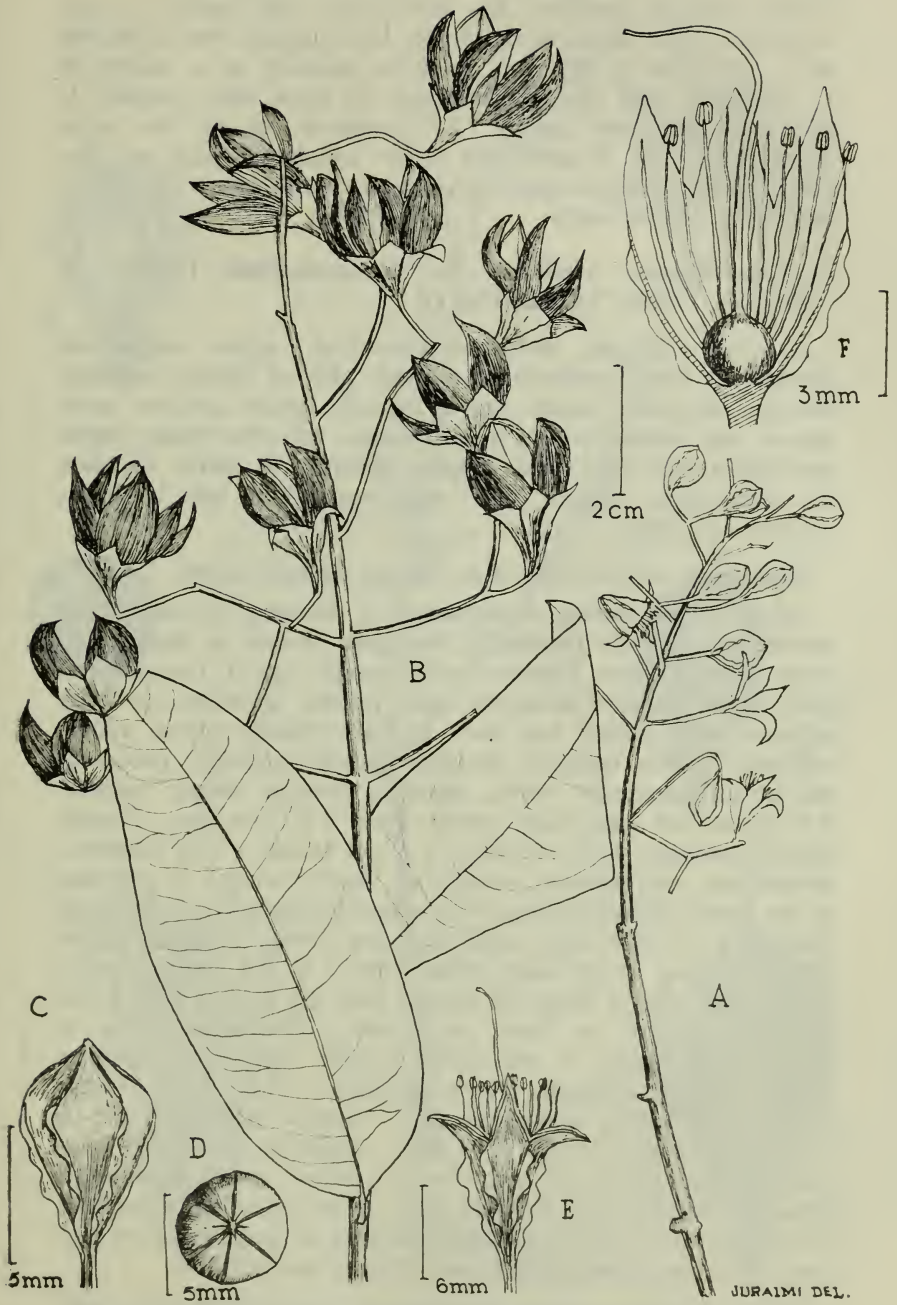


Fig. 10. *L. ovalifolia* T. & B. var. *riedeliana* (Riedel s.n.: K — holotype).
A, Inflorescence. B, Twig with mature capsules. C-D, Flower bud.
E, Flower after anthesis. F, Longitudinal section of flower.

Koorders 17,716^B from Minahassa in Celebes probably belongs here, but it is too young for an accurate determination.

The holotype specimen has both fruits and flowers, a rare occurrence. The ridges in the flower buds suggest that it belongs to *L. piriformis* group. But we have retained as a variety of *L. ovalifolia* until the species could be more fully studied. It may be placed very close to *L. borneensis* but for the larger flower buds, the broader and more undulate ridges and for fruiting calyx less abruptly narrowed into the base. The group requires a further study.

7g. *Lagerstroemia ovalifolia* var. *novoguineensis* Furtado et Montien — Fig. 7A and Fig. 11.

A var. *ovalifolia* *alabastris* minoribus, supra subglobosis abrupte in basin pedicellatis, 6-alatis, alis ad sinum interdum abrupte latioribus, supra sinum elevatis, prope apicem secus suturas late sulcatis magis alatis; fructus calycibus basin versus pedicelliformiter (4–5 mm longis) cuneatis, in parte cupulare 6–7 mm longis; capsulis 12–14 mm longis, 9–10 mm in diam., breviter apiculatis.

Holotypus: NOVA-GUINEA: Wirsar (Schram 6,068; LAE).

Leaves elliptic-oblong or obovate, 3–7 cm long, 2–4 cm broad, acuminate, acute or rounded at the apex, (leaves at the base of twigs often smallest, obovate with rounded apex), pustulate on both sides, shortly decurrent into petiole, greenish on both surfaces when young, but when in fruit greenish brown above, yellowish brown beneath, deciduously and minutely pubescent on nerves, glandular above, minutely densely dotted beneath, 5–8 nerved on each side; petiole short 1–2 mm long. *Panicle* short cylindrical, 5–10 cm long, 3–5 cm broad, a few flowered, deciduously and minutely velutinous, slightly winged in the axis of the young growth. *Flower bud* somewhat clavate 10 mm long (including 3–4 mm long base), 4–5 mm broad, 6-ridged, ridges slightly sinuate in the tube, often gibbose at the sinus, broadly sulcate and winged along the sutures near the apex. *Calyx* 10–12 mm long 6 mm in diam., deciduously puberulous; lobes 6, erect or spreading, 3 mm long; winged along the margins. *stamens* many, subequal. *Ovary* subglobose with about 17 mm long style. *Fruiting calyx* obconical strongly narrowed into a long base, about 10–11 mm long, (including 4–5 mm long pedicelliform base), 10 mm broad; ridges acute, prominent, straight, running up to the very base; lobes spreading, sometimes reflexed, about 3 mm long. *Capsule* oblong or globose, 12–14 mm long, 9–10 mm broad, light brown, shortly mammillate.

NOVA-GUINEA: **West New Guinea**, Wirsar (Schram 6,068; LAE — **holotype**, SING — **isoholotype**); Sorong by the Warsamson River (Iwangin 5,661; LAE, PNH & SING).

This falls into a group of varieties of *L. ovalifolia* which are characterised by having smaller flower buds and smaller capsules, but this variety is peculiar. The flower buds are 6-winged, the

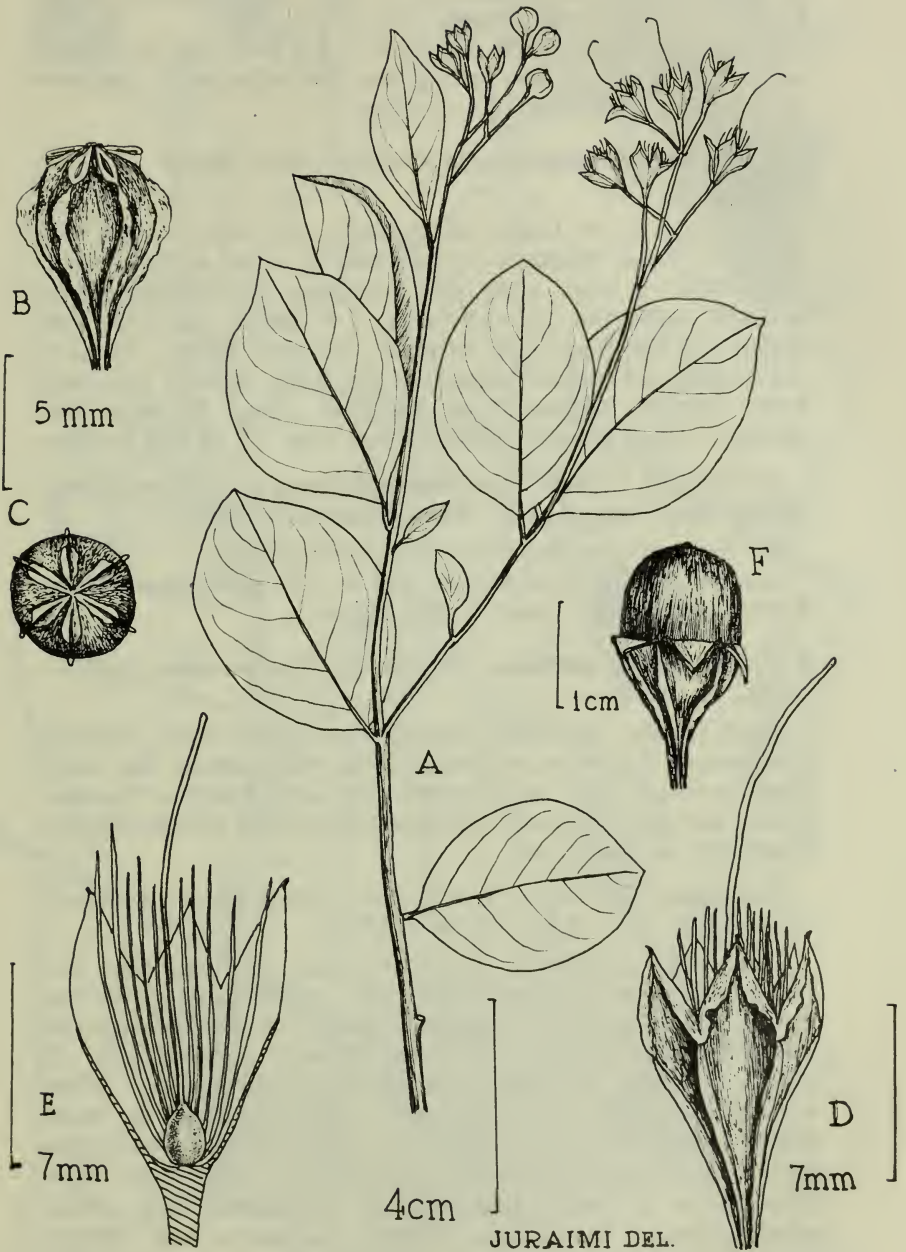


Fig. 11. *L. ovalifolia* var. *novoguineensis* (A-E: Schram 6,068: LAE — holotype; Iwangin 5,661: SING).

A. Fertile twig. B-C. Flower bud. D. Flower after anthesis. E. Longitudinal section of flower. F. Capsule.

wings sometimes much broader at the sinus, but smaller above it and raised and sulcate near the apex. The fruiting calyx too is narrowed into a pedicelliform base, and capsules shorter (12–14 mm long) very shortly apiculate.

Probably Schram 12,361 and Mall 11,664 from the Warsamson valley in New Guinea also belong here, but being sterile specimens we have left them from the citations.

8. *Lagerstroemia subsessilifolia* Koehne in Engl. Pflanzr. 17 = IV. 216 (1903) 267.

Tree about 16 m. *Leaves* not punctate, glabrous, 7–10 cm long, 3.3–5 cm broad, oblong or oblong-elliptic, acute at base, somewhat obtuse at apex, sometimes acuminate, chartaceous, greyish on both sides, not paler beneath, 5–9 nerved on each side; petiole 1.5 mm long, with narrowly decurrent lamina. *Peduncle* and pedicel ochraceous tomentose, the latter about 6 mm long; lobes reflexed, adpressed on the tube, about 3.5 mm long, glabrous within. *Capsule* about 19 mm long, 12–14 mm in diam.

AUSTRALIA: **Cape York Peninsula**, upper part of the Mitchell Seeding Bag, mountainous region. (Hann 47: BRI?).

We have not seen any specimens of this species.

Another species *L. archeriana* and its var. *glabrescens* (Section *Trichosepalum*) also occur in this region.

9. *Lagerstroemia pustulata* Furtado et Montien **spec. nov.** — **Fig. 12.**

Inter species Sectionis *Pterocalymma* cum foliis, calycibus fructibusque majoribus et costis calycis rectis acutis hoc taxon ponendum, sed foliis calycibusque pustulatis, fructibus maximis, sepalis margine incrassatis, basi propter margines retroflexiusculas constrictis sat distinctum.

Holotypus: BORNEO: Sabah, Prov. Lahad Datu ad Segama Sarai (Muin Chai: SAN. 26.006: SING).

Folia elliptica oblonga, 12–17 cm longa, 6–7 cm lata, basi interdum oblique acuta vel obtusiuscula, utrinsecus 10–12 nervata, viridia glabra, utrinque pustulata, pustulis in pagina superiore conspicuioribus; petiolus 5–10 mm longus. *Inflorescentia* axi cinereo-puberula, paniculata, remote breviterque ramosa, diffuse cymosa, pedunculis circa 2.5 cm longis, pedicellis ad 1.5 cm usque longis. *Alabastrum* non visum. *Calyx* post anthesin tantum visus, cinereo puberulus, pustulatus, campanulatus, in tubo 6 mm altus, infra subito obconico-pedicellatus, 6 costulatus, costis acutis; sepalis circa 5 mm longis, margine incrassatis, basi propter margines retroflexas constrictis. *Stamina* numerosa, versus basin calycis sita, exserta. *Ovarium* glabrum, ovatum, apice conoideum; stylus longus, exsertus. *Calyx* fructiferus lignosus, late cupularis, 5 mm altus, infra 8–12 mm longo pedicello abrupte praeditus; sepalis triangularibus, patulis vel porrectis. *Capsula* oblonga vel subglobosa, circa 25 mm longa, 20–22 mm in diam., apice subito mammillata.

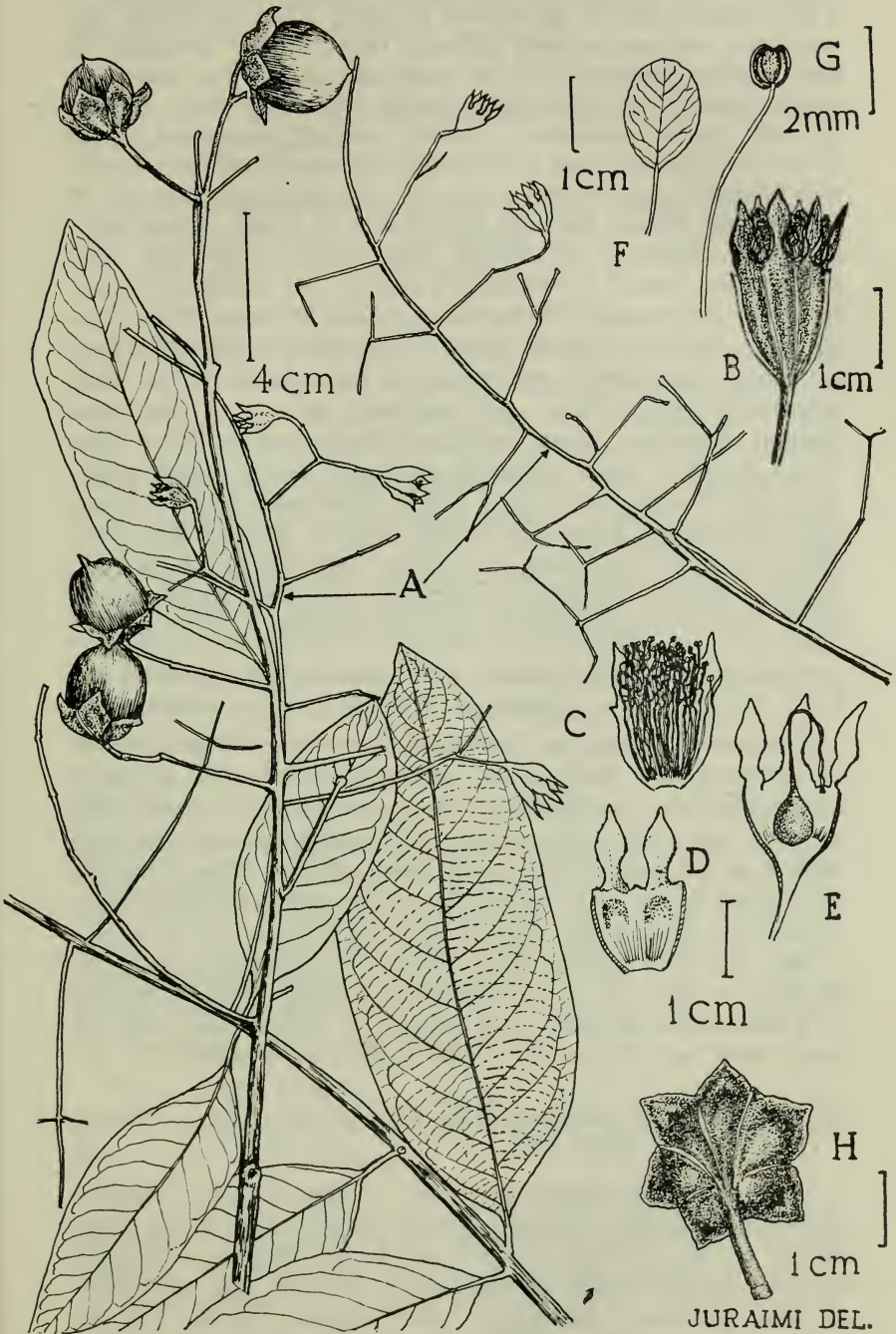


Fig. 12. *L. pustulata* (A-H: Muin Chai 26,006 in SING — isoholotype).

A, Twigs with flowers and capsules. B, Flower after anthesis. C, Part of calyx with stamens. D, Part of calyx. E, Longitudinal section of flower. F, Petal. G, Stamen. H, Fruiting calyx showing external structure.

Tree 10–18 m high. *Leaves* elliptic-oblong, 12–17 cm long, 7 cm broad, acute or acuminate at apex, acute or obtuse and sometimes oblique at base, glabrous but distinctly pustulate on both surfaces; nerves 10–12 on each side, rarely less, ascending slightly curved at about 60°; petiole 5–10 mm long. *Panicle* minutely greyish pubescent, terminal, narrowly pyramidal, up to 32 cm long, bearing once or twice dichotomously branched cymes, with distant long peduncles (± 2.5 cm long); pedicels up to 1.5 cm long. *Flower bud* (not seen). *Calyx* in flower campanulate, pustulate, cinereous, puberulous, tube about 6 mm long with an obconical base 7–8 mm long; 6 ribbed, ribs prominent, acute, decurrent into pedicelliform base; space between the ridges curvedly swollen; lobes 6, about 5 mm long, erect, thickened in margin and slightly retroflexed at base. *Petals* ± 6 ; limb suborbicular or obovate, ± 10 mm long; claw ± 5 mm long. Stamens numerous, exert, seated at the bottom of calyx-tube. *Ovary* glabrous, ovate, gradually narrowed into a conical apex; style long. *Fruiting calyx* hard, abruptly narrowed into 8–12 mm long pedicelliform base; tube broadly cupular, about 5 mm deep; lobes triangular, spreading or porrect, thickened in the margin. *Capsule* oblong or subglobose up to 25 mm long, 20–22 mm in diam., abruptly mammillate at apex; mammillus 1–2 mm long.

NORTH BORNEO: **Sabah**, Prov. Lahad Datu (Muin Chai SAN. 26,006: SING — **holotype**, SAN & SAR — **isoholotypes**.)

This species belongs to *Pterocalymma* section and falls among the species having large leaves, calyces and fruits, but is easily distinguished by its pustulate leaves and calyces, very large capsules, and calyx lobes which look constricted near the base because of the margins there being more reflexed. Were it not for the number of the calyx ridges, the species could be placed near *L. speciosa* since it has large leaves and fruit.

The only two species which from the description seem to be akin to this are *L. subsessilifolia* Koehne from Australia, *L. quinquevalvis* Koehne from Tonkin in Indo-China, both of which were not represented in the collections examined by us.

10. **Lagerstroemia quinquevalvis** Koehne in Engl., Pflanzr. 17 = IV. 216 (1903) 268.

Tree 4–5 m tall, with spiny trunk; fruiting branches darkish, pulverulent pruinose, glabrous. *Leaves*: petiole about 4 mm long; lamina 10–14 cm long, 3.5–5.4 cm broad, shortly acuminate at base, oblong-obovate to lanceolate, more or less acuminate at apex, glabrous, chartaceous, paler beneath; nerves 8–9 on each side apparently, slightly prominent beneath; reticulations not prominent. *Fruiting calyx*, like pedicels and axis of the panicles, ochraceous pulverulent tomentulose; tube saucer-shaped, 5–6 mm long, 15 mm in diam., strongly 6-costate; lobes 3–4 mm long, spreading, glabrous within. *Capsule* 19–23 mm long, 17–20 mm in diam., 5-valved, sometime 4, glabrous.

INDOCHINA: **Tonkin:** Muong de Rip village near Tu Phap (Balansa 3,866 — **holotype** in P, not seen).

We have not seen any specimens of this species. Gagnepain (Fl. Indochina II, 1923 p. 962) has included this among insufficiently known but good species.

11. ***Lagerstroemia undulata*** Koehne in Engl. Jahrb. XLII, Beibl. 97, (1908) 52; Gagn., Fl. Indochine II (1921) 946; Craib, Fl. Siam. Enum. I (1931) 727. — **Fig. 13.**

A tree 10 m tall. *Leaves* ovate-elliptic or ovate-oblong, 6–15 cm long, 4–7 cm broad (smaller in inflorescence axis), acute at the apex, shortly cuneate or sometimes roundedly narrowed to the base, hairy on both sides when young, later minutely puberulous along midrib above, and velutinous puberulous along the midrib and nerves beneath, paler beneath; 7–9 nerves on each side of midrib; petiole 2–4 mm long. *Panicle* terminal or axillary, 15–25 cm long, 9–15 cm broad; axis and branchlets minutely velutinous, angular and slightly winged, often bearing smaller leaves or leaf-like bracts, primary lateral branches 7–8 cm long, opposite or sub-opposite; bracteoles at the base of pedicels linear, 1–3 mm long with puberulus. *Flower bud* turbinate with undulate or crispate wings, orbicularly and undulately auriculate at the sinuses, abruptly narrowed into wings or bands on both sides of the sutures of the bud above, ending with a small nipple at apex; pedicel 2–3 mm long, the mid-flowers in the dichotomy sessile. *Calyx* 6–8 mm long, 5 mm broad, puberulous, 6-ridged, ridges orisplate or undulate, tube gradually cuneate to the base; lobes thickened or winged in the margin. *Petal* oblong 8 mm long (including 2–3 mm long claw), 4 mm broad, undulate in the margin. *Stamens* many, with 3–6 thicker and longer filaments, the rest subequal, filaments 2–2½ times longer than the calyx-tube. *Ovary* oblong with a long slender style, glabrous, capitate.

THAILAND: Northern: (Nakawn Sawan?), Me-ping River Rapids, on the border of the hilly jungle, at 200 m (Hosseus 530: BM and E — **isoholotypes**).

This is closely allied to *L. crispa* which has smaller leaves, the ridges on the flower-bud, calyces much more crispate passing crispately and undulately into the suture above without forming a hollow, cupuliform auricle at the sinus. In *L. paniculata* which belongs also to a group having undulate ridges to the calyx, has larger leaves than in *L. crispa* that are black dotted beneath; its calyx ridges being less crispate, slightly enlarged at the sinuses to merge into the suture with the least possible undulations.

We have made var. *subangulata* the basynym of a new species.

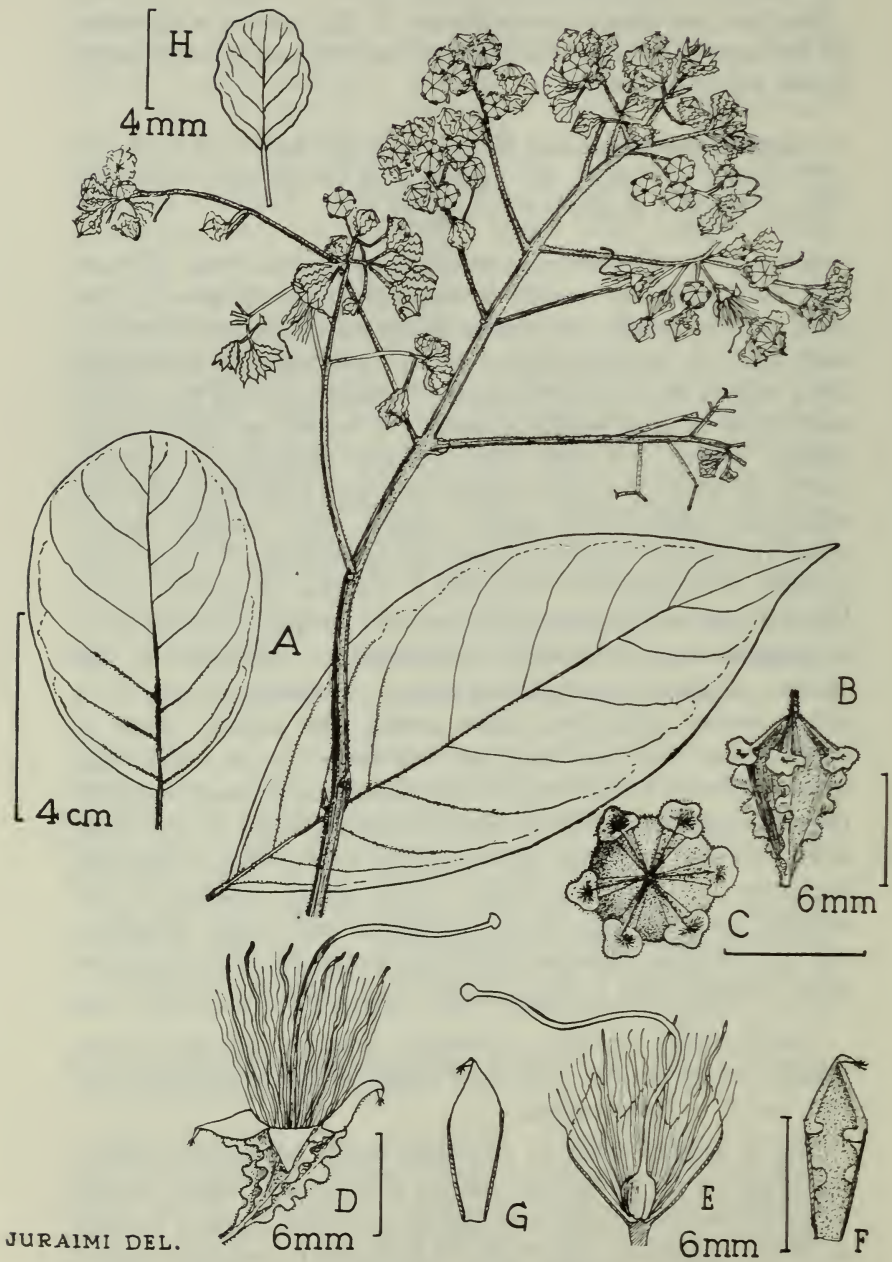
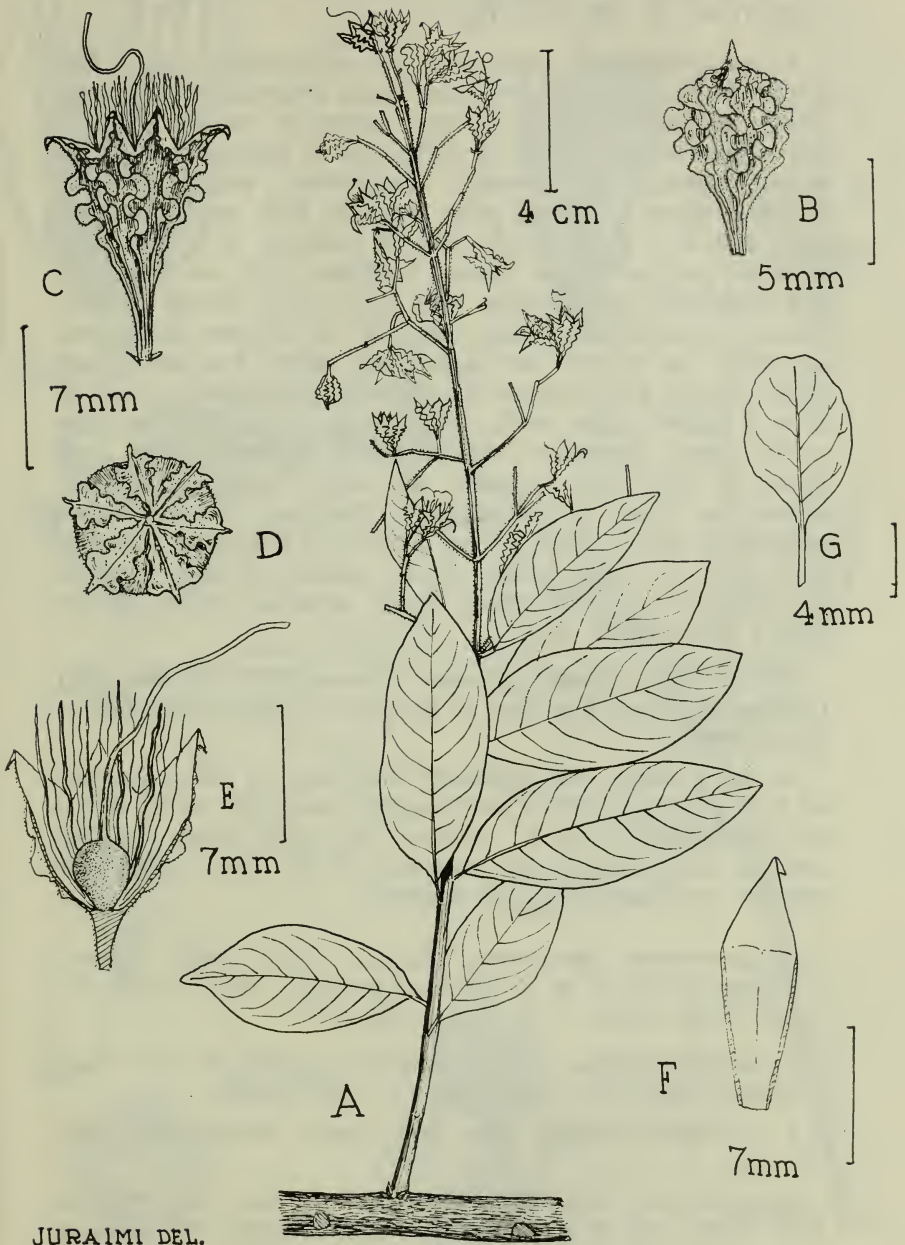


Fig. 13. *L. undulata* Koehne (A-H: Hosseus 530 in E — isoholotype).

A, Inflorescence and leaf B-C, Flower bud. D, Flower after anthesis.
 E, Longitudinal section of flower. F, Part of calyx showing exterior.
 G, Part of calyx showing interior. H, Petal.



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Fig. 14. *L. crista* Pierre (A-G: Clemens 3,477 in A).

A, Inflorescence. B & D, Flower bud. C, Flower after anthesis. E, Longitudinal section of flower. F, Part of calyx showing interior. G, Petal.

12. **Lagerstroemia crispa** Pierre ex Laness, Plant. Util. (1886) 321: & Koehne, in Engl. Jahrb. LXLI (1908) 102 (seminuda) ex Gagnep in Not. Syst. III (1914) 357 et in Fl. Indochine II (1921) 945 fig. 101-4. — **Fig. 14.**

A tree, branchlets puberulous. *Leaves* lanceolate or ovate-elliptic, 6-10 cm long, 2.5-4.5 cm broad, acuminate at the apex, shortly angustate at base, slightly undulate in margin, more or less puberulous on nerves on both surfaces especially along the midrib, shining and minutely gland-dotted above, dark or brownish green in colour, paler beneath; 8-11 nerves on each side; petiole 2-4 mm long. *Panicle* terminal, 8-25 cm long, minutely grey pubescent, lateral branches 4-12 cm long, axis and branchlets quadrangular with each angle shortly winged. *Flowers* bi-bracteolate, lateral ones in the ultimate trichotomy pedicelled, the middle one larger and sessile, bracteoles small linear. *Flower bud* turbinate or pyriform, prominently nipped at apex, 6 ridged; ridges much crispate in the calyx tube, auriculate at the sinus, undulately and crispately narrowed along both sides of the suture towards the apex. *Calyx* deciduously puberulous; lobes 6, triangular, 3 mm long, patent, slightly puberulous within. *Petals* oblong, 5 mm long (including 1-1.5 mm long claw), 3-4 mm broad, shortly cuneate at base. *Stamens* 3-6 thicker and longer, others many, subequal. *Ovary* obovate with a long slender style.

INDOCHINA: **Annam**, Tourane (Clemens 3,477: A, BM, UC). **Cochinchina** Prov. Bun Hao at Baochiang (Pierre 4,995: BM — isoholotype).

In the protolog the leaves are described as being glabrous on both surfaces but they are minutely puberulous on the nerves on both surfaces. In *L. undulata* the calyx ridges are less undulate and crispate, the auricles at the sinus hollow and abruptly narrowed along the sutures.

13. **Lagerstroemia paniculata** (Turcz.) Vidal, Phan. Cuming Philipp. (1885) 39 et 115; Koehne in Engl., Pflanzr. 17 = IV. 216 (1903) 268 fig. 55 W & X — **Fig. 15.**

L. calycina Koehne in Engl. Jahrb. IV (1883) 25 et in Engl. u. Prantl., Pflanzf. III, 7 (1891) fig. 5 C & X: **isonym.**

L. piriformis Koehne Merr., Sec Enum. Philipp. III (1923) 137 p.p.

Pterocalymma paniculata Turcz. in Bull. Soc. Nat. Moscow XIX (1846) 508; Walp., Ann. Bot. Syst. I (1848) 295. **basinym.**

A tree 15-18 m tall. *Leaves* oblong-elliptic or ovate-oblong, 6-17 cm long, 3-7 cm broad, obtusely acuminate at the apex, subrounded often oblique and shortly cuneate at the base, glabrous and dark green above, deciduously puberulous along the midrib and dotted and paler beneath, 8-11 nerved on each side; petiole 5-10 mm long. *Panicle* terminal 10-30 cm long, 5-20 cm broad; young growth minutely velutinous, quadrangular

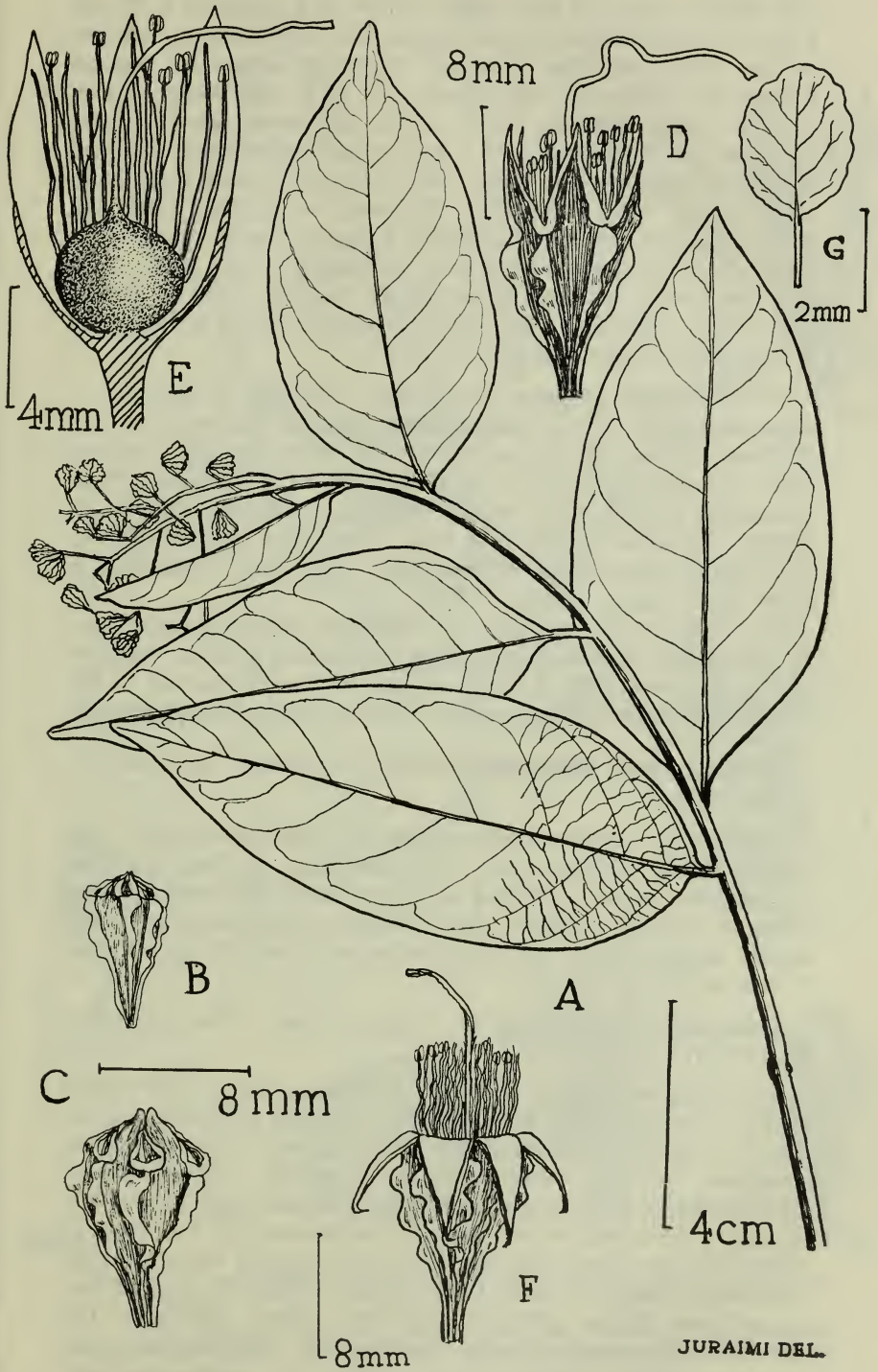


Fig. 15. *L. paniculata* (Turcz.) (A-C: Cuming 1,188 in E — isoholotype; D-E Azurin 29,375 in SING).

A, Twig with leaves and inflorescence. B-C, Flower bud. D & F, Flower after anthesis. E, Longitudinal section of flower.

and slightly winged at each angle. *Flower bud* turbinate 8–12 mm long with wings undulate and crispate, 4–6 mm in diam., enlarged at the sinus and then gradually narrowed along the sutures toward the bud-apex; but nipple up to 1 mm long; pedicel 4–5 mm long; the mid flower in the dichotomy sessile. *Calyx* in flower 10–30 mm long, 4–5 mm broad, puberulous, 6-ridged somewhat abruptly narrowed into a long 3–5 mm long base; lobes 3 mm long, triangular, thickened or slightly winged in the margins at the apex, gradually broader winged towards the base. *Petal* oblong about 5 mm, excluding 2 mm long claw, 3–4 mm broad, undulate in the margin. *Stamens* many, 6 thicker and longer filamented, the others subequal. *Ovary* oblong with a long slender style. *Capsule* not seen.

PHILIPPINES: Luzon, loc. incert. (Cuming 1,188: A — **clasto-holotype**; E — **isoholotype**); Isabela Province at San Mariano (Ramos & Edano 46,861: B, SING & UC); Isabela Prov. (Azurin 29,375: A, SING & UC); Laguna Prov. (Amarillas 25,122: GH); Mount Makiling (Abadilla 35,394: A, PNH); Casiguran in Tayabas Prov. (Ramos & Edano 45,371: UC); South Camarines (Ahern in 1902, s.n.: UC); Montalban in Rizal Prov. (Loher 13,251: UC).

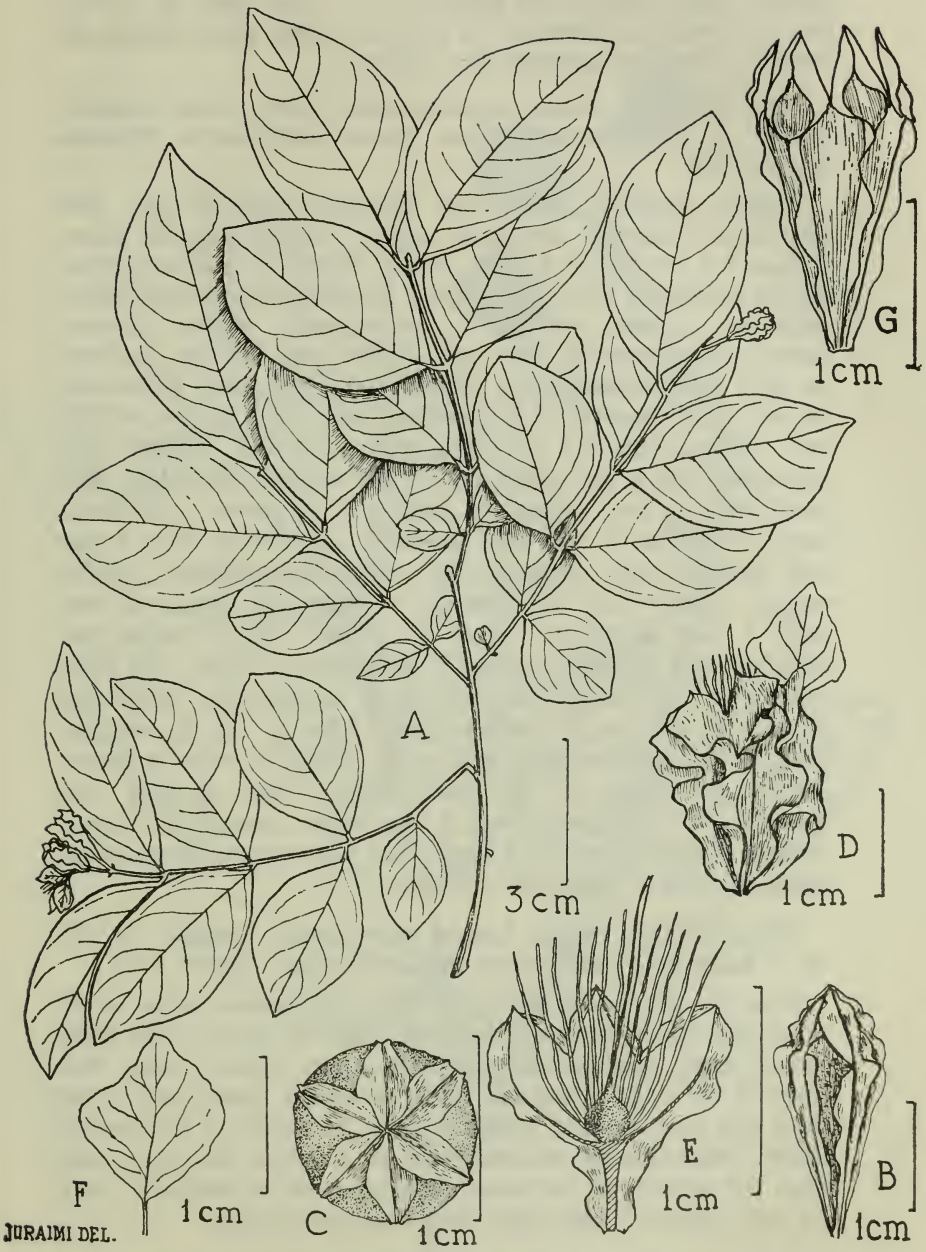
The holotype is apparently in Herbarium Petropolitanum (now of Leningrad), whence Koehne had received as a gift a fragment of the specimen. This fragment is now in the Herbarium of the Arnold Arboretum. Hence we have indicated this as clastoholotype.

14. *Lagerstroemia pterosepala* Furtado et Montien **spec. nov.** — **Fig. 16.**

A speciebus omnibus cum calyculis alis crispato-undulatis haec species facile distinguenda: alis chartaceis, e basi alabastris angustissimis superne dilatatis, ad sinum constrictis, secus suturam utrinque convexo ampliatis, post anthesin longitudinaliter plicatis sepala externe tectis; petalis rhomboideis, circa 10 mm longis, 9 mm latis.

Holotypus: PHILIPPINES: Luzon, Abra Prov. (Adduru 21,959: A).

Arbuscula ut videtur; ramulis primum alutaceis dein badiis, glabris, quadrangulatis, secus angulos alatulatis. *Folia* elliptica vel obovato-elliptica, utrinque glabra vel subtus secus costam obscure parceque pilosula, utrinsecus 5–7 nervata, supra lucida, fuscescentia, secus costam depressam glandulis paucis praedita, subtus viridescens, minute brunneo-glandulosissima, basi acuta in petiolo 1–3 mm longo breviter decurrentia, apicem versus breviter acuminata, summo obtusa. *Inflorescentia* apicalis, 3–6 cm longa, in ramulos paucos perbreves angulatos, alatos, puberulos 1–2 divisa. *Alabastra* claviformia, 6-alata, alis chartaceis alutaceis crispato-undulatis, superne valde ampliatis, ad sinum constrictis, secus suturam utrinsecus convexo dilatatis, post anthesin longitudinaliter retroflexis, sepala externe tectis. *Flores:* pedunculi, pedicelli calycesque canescente puberuli; tubus calycis circa



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Fig. 16. *L. pterosepala* Furtado et Montien (Adura 21,959 in A — holotype).

A, Fertile twig. B-C, Flower bud. D, Flower. E, Longitudinal section flower. F, Petal. G, Calyx in flower to show external structure.

10 mm longus, obconicus; sepala 4–5 mm longa; petala rhomboidea vel obovato-rhomboidea, basi breviter decurrentia, margine repanda apice obsusa, cum unguiculo 1–1.5 mm longo 10–11 mm longa, 9 mm lata. *Stamina* 3–6 longiora, altera plura subequalia, breviora. *Ovarium* subglobosum, glabrum.

PHILIPPINES: **Luzon** Septentrionalis, prov. Abra (Adduru 21959: A — **holotypus**); prov. Ilocos meridionalis (Clemens 15,815: UC).

Treelet apparently, branchlets yellowish grey at first, then dull brown, glabrous, tetragonal, slightly winged along the edges. *Leaves* 5–8 cm long, 2.5–5 cm broad, elliptic or obovate-elliptic, shortly acuminate with obtuse apex, convexly cuneate and shortly decurrent at base, opposite or sub-opposite, shining chestnut brown above, greenish with dark brown dots beneath, glabrous on both sides or sometimes slightly and deciduously puberulous on the midrib beneath, 5–7 nerved on each side; petiole 1–3 mm long. *Inflorescence* 3–6 cm long, terminal panicle, minutely grey pubescent with a few short angled and winged branchlets, each subdivided or not, ultimately bearing 1–3 flowers; mid-flower larger, sessile on 5 mm long peduncle; side flower on 2–5 mm long pedicel, both peduncle and pedicel quadrangular, shortly winged. *Flower bud* club shaped or nearly so, about 10 mm long, 6 mm in diam.; ridges 6, winged, wings chartaceous, undulate and crispate, enlarged both sides toward the sinus, convexly dilated along both sides of the suture; *calyx* tube funnel shaped, 10 mm long, 6–7 mm in diam.; lobes 6, with the marginal wings folded longitudinally backwards, patent or erect in flower, slightly puberulous at the apex within. *Petal* 10 mm long (including 1–2 mm long claw), 9 mm broad, rhomboidal, shortly cuneate at base. *Stamen* 3–6 longer and thicker ones, others many, subequal. *Ovary* subglobose, glabrous.

PHILIPPINES: **North Luzon**: prov. Abra (Adduru 21,959: A — **holotype**); prov. South Ilocos (Clemens 15,815: UC).

From all the species having crispate and sinuate wings to the calyx, this taxon is very remarkably distinct in its wings being conspicuously chartaceous and often much dilated along both sides of the ridge below the sinus, somewhat constricted at the sinus and then enlarged convexly along both sides of the sutures, folded longitudinally backwards so as to cover the calyx lobes after the anthesis of the flower; the petals are rhomboidal about 10 mm long and 9 mm wide, shortly cuneate at base.

15. *Lagerstroemia crassifolia* Furtado et Montien — Fig. 17.

A *L. borneense* cui valde affinis, haec species calycibus fructiferis costis minus prominentibus, sepalis reflexis, basi breviora pedicellatis, foliis coriaceis sat distincta.

Holotypus: BORNEO: Sabah, regio Sandakan ad Gumantong, prope flumen Lambah (Ahwing 47,262: SING).

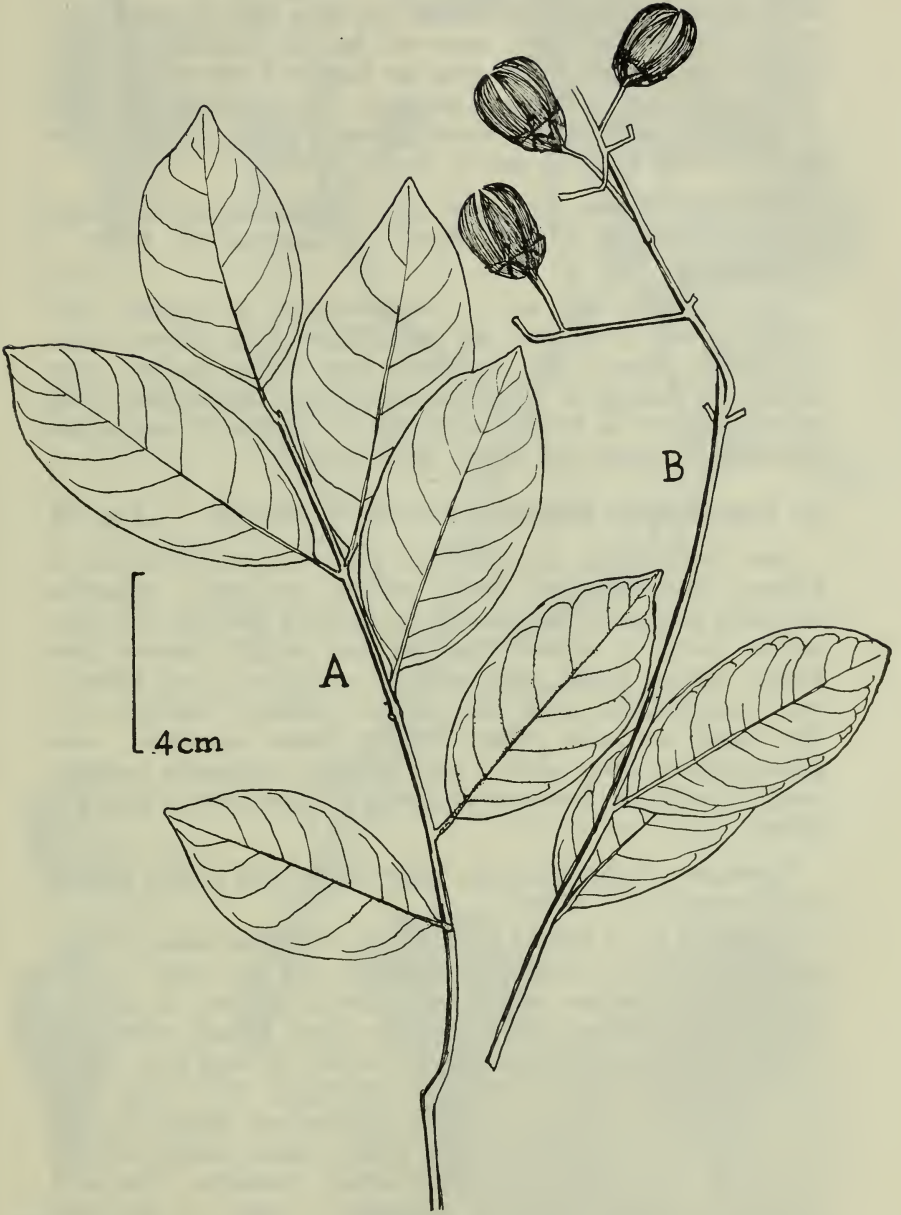


Fig. 17. *L. crassifolia* (Ahwing 47,262 in SING — holotype).

A, Twig. B, Twig with capsules.

A tree 50 ft. tall. *Leaves* oblong-elliptic, coriaceous, 5–8 cm long, 3–4 cm broad, shortly acuminate or acute or obtuse at the apex, often oblique at base, greenish grey and shining above, dark brown with minutely pubescent along the nerves beneath, 6–10 nerved on each side; petiole 4–6 mm long. *Fruiting calyx* shortly cupular, abruptly narrowed into a pedicelliform base, slightly and straight ridged upto the base, 4–5 mm deep in cup, 10 mm in diam. with stalk-like base 3–4 mm long; lobes six, 4 mm long, completely reflexed. *Capsule* oblong or subglobose about 15 mm long, 12 mm in diam.; 6-valved.

BORNEO: **Sabah**, Sandakan distr. at Gumantong, by Sungei Lambah (Ahwing 47,262: SING — **holotype** & SAN — **isoholotype**).

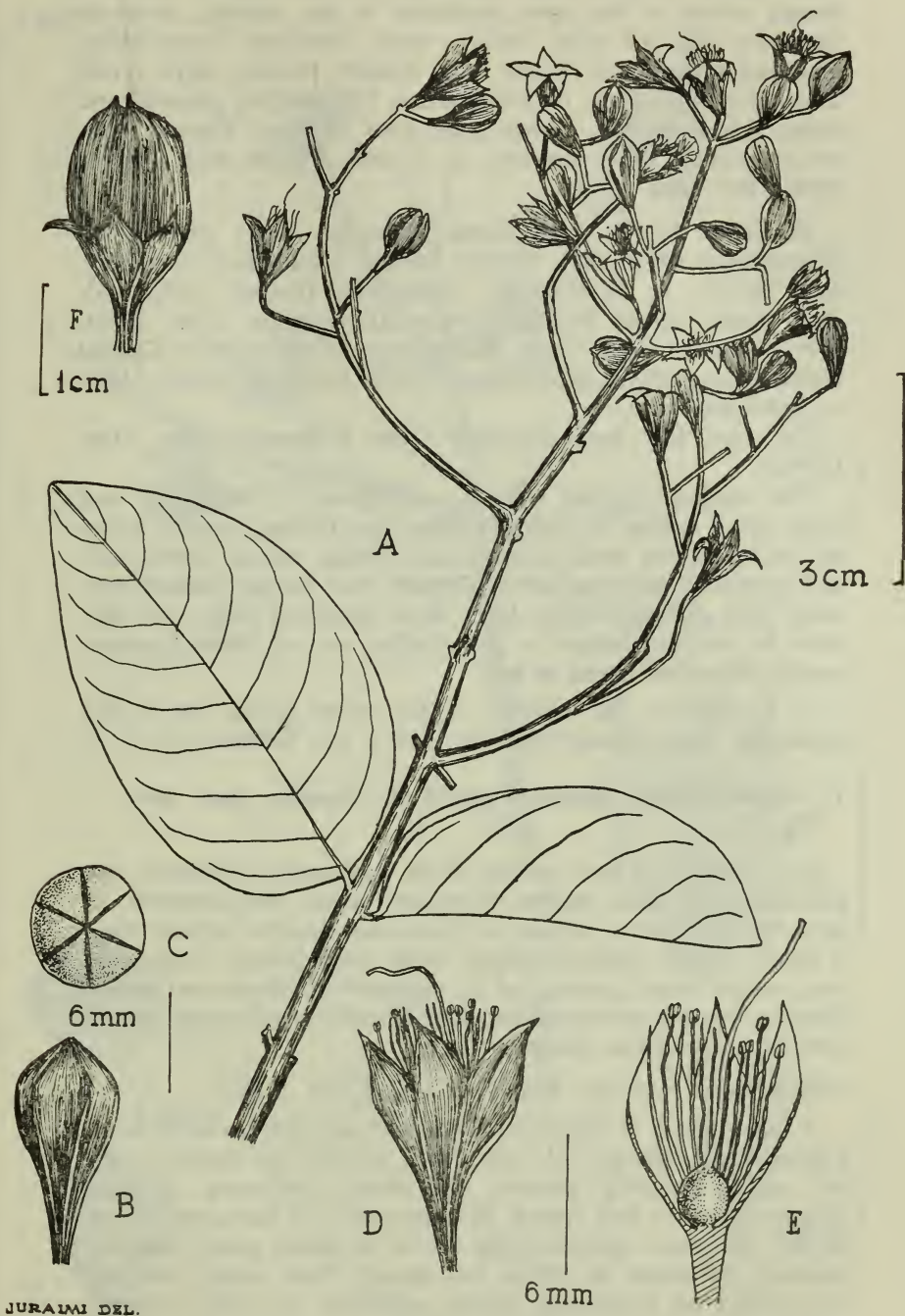
This species is very like *L. borneensis* but the fruiting calyx ridges are less prominent, the pedicelliform base shorter, sepals completely reflexed and the leaves very coriaceous and often oblique. It belongs to *L. borneensis-piriformis-koehneana* group which requires a further collecting to enable a comparison between the forms and clarify their status.

16. *Lagerstroemia borneensis* Furtado et Montien — **Fig. 18.**

Inter species (e.g. *L. piriformis*) cum calycibus fructiferis in longam pedicelliformen basin abrupte angustatis, alabastris 6-costatis piriformis basi breviter pedicellatis ponenda, sed haec species costis ad sinum usque deciduo recteque alulatis, post horum lapsum etiam prominentibus, ad sinum haud gibbosis, supra desinentibus, secus suturas mox sulcatis; fructus calyce fere medio in basin pedicelliformiter subito angustato, costis prominentibus rectis acutis e sino ad basin conspicuis praedito; sepalis haud alatis, fere arrectis; fructu oblongo breviter apiculato differt.

Holotypus: Borneo orientalis; regio Kutai, juxta flumen Belajan (Kostermans 10,249: SING).

A tree 15–32 m high. *Leaves* oblong or elliptic-oblong, (ovate and smaller in the lower part of twigs), 4–9 mm long, 3–4 cm broad, acute or obtuse at the apex, sometimes shortly acuminate, glabrous and shining above, minutely gland dotted, puberulous on nerves and brownish beneath, 6–9 nerved on each side; petiole 2–5 mm long. *Panicle* terminal, cylindrical, 10–30 cm long, 5–10 cm broad, dark grey or brown puberulous, slightly angular in the axis and branchlets when young; bracts small, leaf-like, deciduous. *Flower-bud* minutely brown pubescent, obscurely apiculate, turbinate gradually elongated at base, 11 mm long (including 3 mm long pedicelliform base), 6 ridged; ridges prominent, shortly and deciduously winged, straight, desinent above the sinus. *Calyx* in flower campanulate, 10–12 mm long (including 4–5 mm long pedicelliform base), 6 mm in diam., prominently straight-ridged; lobe 3 mm long, triangular, spreading or reflexed, slightly thickened along the margin; lateral flowers borne on a pedicel about 5 mm long; mid-flowers sessile. *Petal*



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Fig. 18. *L. borneensis* (A-E; Kostermans 10,249 in SING — holotype; F: Kostermans 5,046 in SING — holotype of fruit.)

A, Fertile twig. B-C, Flower bud. D, Flower after anthesis. E, Longitudinal section of flower. F, Capsule.

rhomboidal, 12 mm long (including 2–3 mm claw), 6–7 mm broad, acute at the apex, undulate in the margin, narrowly decurrent into the claw. *Stamen* many, subequal. *Ovary* ovate, glabrous; style about 15 mm long, slender. *Fruiting calyx* 7 mm deep, 12 mm in diam., narrowed into a 3.5 mm long pedicelliform base; ridges straight, conspicuous even at base. *Capsule* light brown, oblong, 15–17 mm long, 10–12 mm in diam., with a nipple upto 1 mm long.

BORNEO (East): **West Kutei**, Kelindjau River near Melan (Kostermans 9,627: BM, SING); Medom (Neth. Ind. For. Serv. b.b. 29,270: A, SING); M. Antjaloeng (Endert 2,073: A). **East Kutei**, Sungai Menubar region (Kostermans 5,046: PNH, SING); Berau, Kelei River (Kostermans 21,051: SING). **Central Kutei**, Belajan River (Kostermans 10,214: SING, & 10,249: SING — **holotype**).

The fruit has been described from Kostermans No. 5,046 (SING).

This species together with *L. crassifolia*, *L. piriformis* and other allied species or varieties from New Guinea, form a group of species having small slightly and straight ridged flower buds and a fruiting calyx narrowed abruptly into a long pedicelliform base. The different forms have been separated here, but they must be studied further to see whether any of these represent merely ecological forms or not.

L. koehneana also belongs to the same group but it has somewhat larger flower-buds; its fruit is not known.

17. Lagerstroemia cristata Furtado & Montien **spec. nov.** — **Fig. 19.**

A *L. piriforme* haec species facile distinguitur alabastro sine pedicelliforme base ambitu rhombeo, costis prominentibus in tubo, prope apicem elevatis et latiusculo sulcatis, sepalis apice it inter suturas calloso-cristatis, callis inter suturas orientibus, cum suturis haud junctis. Ad *L. callosam* proximior sed differt alabastro majore conspicue apiculato ejusdem costis prope apicem elevatis et conspicue sulcatis.

Holotypus: PAPUA: Koitaki (Carr 12,270: SING).

A tree about 6 m tall by a stream bank in open savannah land. Leaves ovate-oblong, 7–11 cm long, 4.5–5.7 cm broad, (apex not seen), gradually rounded and shortly decurrent at base, darkened due to bad drying, but apparently of the same colour as var. *piriformis*, (greyish-green above, brownish green beneath), minutely pubescent on nerves and densely black dotted beneath, 7–9 nerved on each side, nerves prominent on both surfaces; petiole 4–5 mm long. *Panicle* terminal, pyramidal, often the lateral branches in the axils of adult leaves, 10–25 cm long or longer, brownish, puberulous and angular in the axis and branchlets when young, lateral pedicels about 3 mm long, mid-flower in the cyme sessile. *Flower bud* rhombical, about 11 mm long (including 3 mm long pedicelliform base), 6–7 mm in diam.,

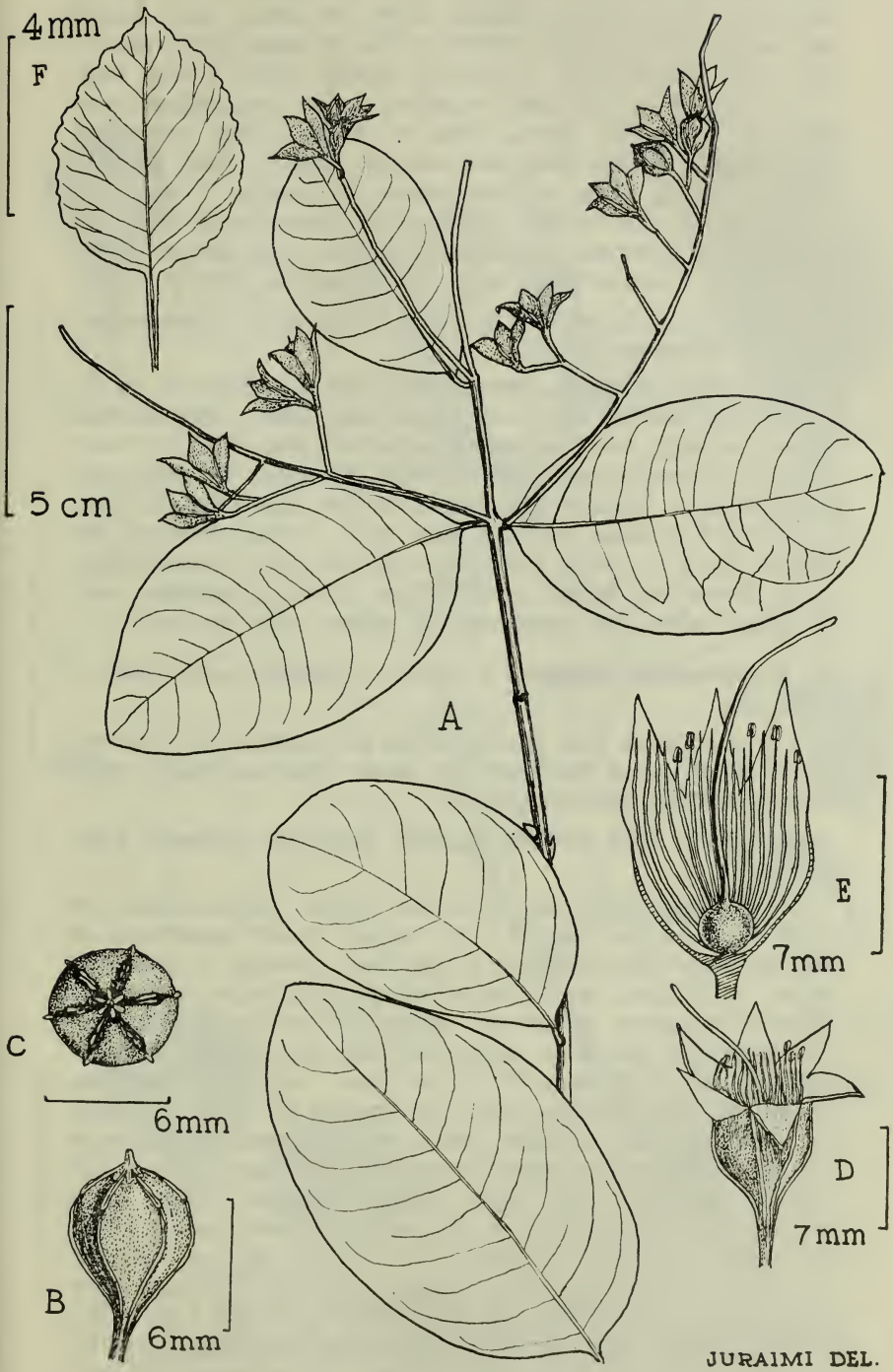


Fig. 19. *L. cristata* (A-F: Carr. 12,270 in SING — holotype).

A, Fertile twig. B-C, Flower bud. D, Flower after anthesis. E, Longitudinal section of flower. F, Petal.

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prominently nipped at the apex; ridges 6, prominent straight in the calyx tube, slightly undulate above the sinus, much raised and sulcate near the apex, shortly callose between the sutures at the sepal tips to form a crest-like nipple about 1 mm long. *Calyx*: tube 9–11 mm long (including 3 mm long pedicelliform base), 6–7 mm in diam., lobes 6, 4 mm long, somewhat longitudinally folded along the margins outside. *Petal* broadly elliptic, abruptly acute at apex, sinuate in margin, 8 mm long, 4–5 mm broad with the claw 2–3 mm long. *Stamen* many subequal. *Ovary* ovate, glabrous, somewhat pustulate; style slender about 19 mm long. *Capsules* young only seen, verruculose, often pustulate.

PAPUA: Koitaki alt. 450 m (Carr 12,270: BM — **isoholotype**, SING — **holotype**).

This species is easily distinguished from *L. piriformis* in the flower-buds without the pedicelliform base being rhombical in outline, its ridges being prominent in the tube and above the sinus, raised and conspicuously sulcate near the apex, the sepal tips being callused between the sutures at the sepal tips to form a sort of a conical, 6-ridged crest with 6 bases between the sutures. From *L. callosa* which is much closer, this species differs in its flower-buds being slightly larger, distinctly apiculate, and its ridges raised and conspicuously sulcate near the apex.

18. *Lagerstroemia inopinata* Furtado et Montien spec. nov. — **Fig. 20.**

A *L. paniculata* haec species differt alis alabastri brevioribus, minus undulatis vel fere rectis, ad sinum haud auriculatis, secus suturam alatulis, linearis elevatis.

Holotypus: PHILIPPINE: Luzon, Bosoboso (Ahern's Coll. 204: A).

A tree, apparently not common. *Leaves* elliptic-oblong or ovate, 3.5–11.5 cm long, 2–5 cm broad, usually acuminate at the apex, curvedly narrowed to the base, greenish or greenish-brown and glabrous above, paler and glabrous below, sometimes sparsely pubescent on nerves, generally dotted dark beneath; 7–9 nerved on each side; petiole 2–5 mm long. *Panicle* terminal pyramid, 10–25 cm long, 8–12 cm broad; axis and branchlets deciduously and minutely velutinous, angular and slightly winged on the axis and branches, often bearing smaller deciduous leaf-like bracts, primary lateral branches 5–12 cm long. *Flower bud* broadly obtrullate with ridges slightly undulate in the tube, gibbose but not auriculate at the sinus, undulately raised along the suture, prominently nipped (1 mm long) at the apex; pedicel 2–3 mm long. *Calyx* funnel shaped, abruptly narrowed into pedicelliform base, 10–12 mm long (including 3 mm long base), 7 mm in diam., lobes 6, erect, 3 mm long, triangular, acute at the apex, thinly folded along the margin. *Petal* obovate, 9–10 mm long (with 1–2 mm long claw), 6–7 mm broad, shortly acute at the apex, undulate in the margin. *Stamens* 5–6 longer and thicker filamented, others many, shorter, subequal. *Ovary* ovate, glabrous, style long, slender.

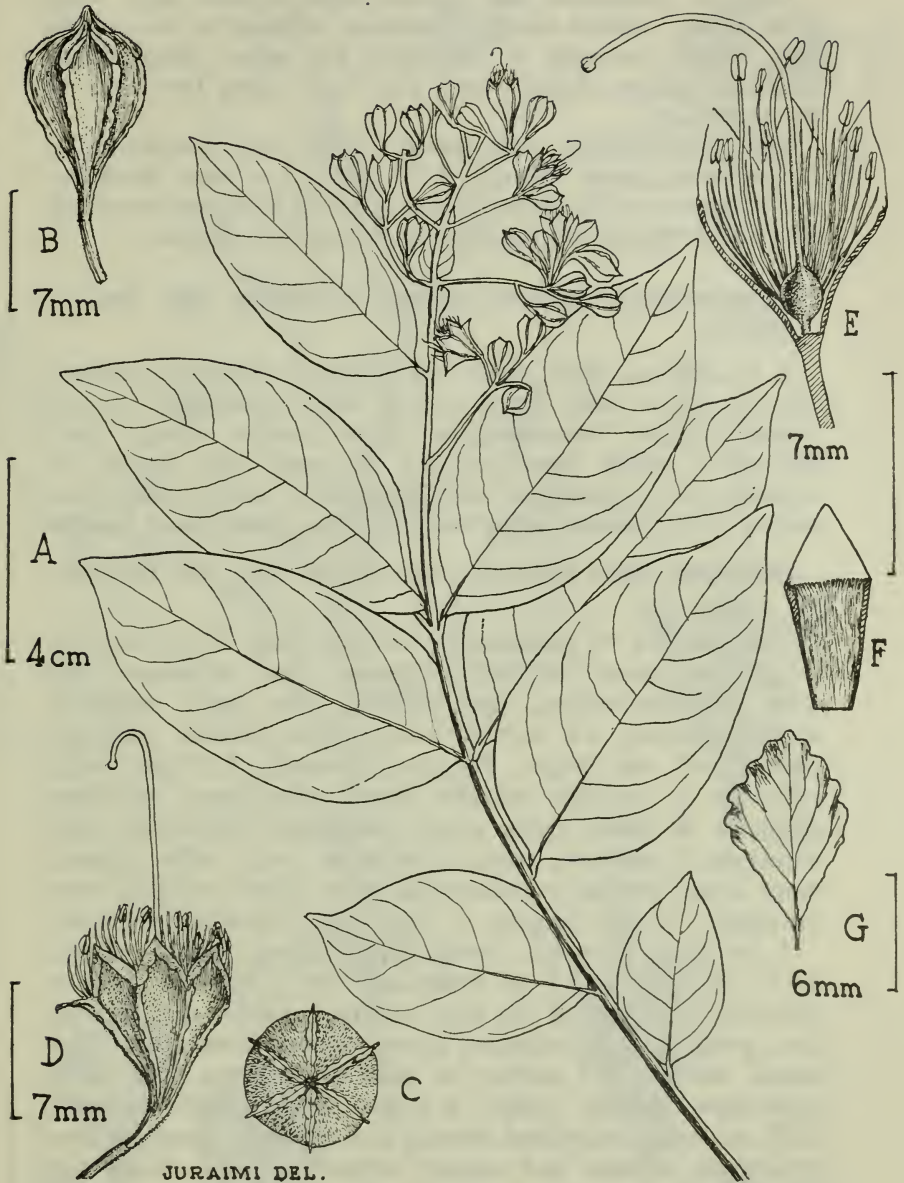


Fig. 20. *L. inopinata* (Ahern 204 in A — holotype).

A, Fertile twig. B-C, Flower bud. D, Flower after anthesis. E, Longitudinal section of flower. F, Part of calyx, interior view. G, Petal.

PHILIPPINES: Luzon, Prov. Rizal, loc. incert (Ahern's coll. 3,127: SING); Bosoboso (Ahern's coll. 204: A — **holotype** and UC — **isoholotype**); Prov. Tayabas, loc. incert (Varges 25,556: A).

From *L. paniculata* this species differs in the calyx wings being shorter, almost straight somewhat undulate in the younger buds, hardly enlarged at the sinus but never conspicuously auriculate though slightly raised and linear along both sides of the suture.

The specimens of this species have been distributed as *L. piriformis* except Ahern's 3,127 which has been distributed as *L. paniculata*. The former and its varieties have very superficial ridges as compared with *L. paniculata* and *L. inopinata*.

19. *Lagerstroemia aruensis* Furtado et Montien **spec. nov.** —
Fig. 21.

A *L. alatulata* valde affinis, sed alabastro conspicue apiculato, ejusdem costis basin versus altiore alatis sinustisque, ex sinu sursum abrupte evanescentibus, secus suturas sulcatis haud incrassatis, sepalis apice, callosis vel non, haec species sat distincta. A *L. inopinata*, cui aliquantulum similis, differt haec species costis alabastri magis undulatis supra sinum haud elevatis.

Holotypus: Insula Kobroor, prope Djierlaj (Ned. Ind. For. Serv. bb. 25,424: A).

Folia elliptica vel lanceolata, 4–11.5 cm long, 2.5–5.5 cm lata, in partibus ramuli inferioribus minora, apice acuminata, basi acuta vel subrotundata, supra coffeata, infra badia, minute et dense punctulata, 6–8 nervata, nervis inferne deciduo puberulis; petiolus 4–8 mm longus. *Panicula* terminalis, 5–17 cm longa, cylindrica in ramulos laterales breves, paucifloros, puberulos, angulares et leviter alatos divisa. *Alabastrum* puberulum, basi cuneatum, 6 costatum, costis infra sinum paulo alatis, sinuatis, supra sinum abrupte evanescentibus secus suturas sulcatis, haud incrassatis, 10 mm longum, 5 mm diam., summo apiculatum.

A tree about 15 m tall. *Leaves* elliptic oblong, or ovate elliptic, 4–11.5 cm long, 2.5–5.5 cm broad, smaller in the lower part of branches, acuminate at the apex, acute or sub-rounded at base, dirty green or coffee coloured above, chestnut brown and black dotted beneath, 6–8 nerved on each side; nerves deciduously puberulous beneath; petiole 4–8 mm long. *Panicle* terminal, 5–17 cm long, cylindrical, shortly and remotely branched, grey puberulent, angular and slightly winged in axis. *Flower-bud* funnel shaped in the lower part, 10 mm long, 5 mm in diam.; ridges 6, undulate or crispate in the tube, somewhat gibbose at the sinus, evanescent in the suture, greyish brown velutinous with a short nipple about 0.5 mm long, often callose at apex between the sutures. *Calyx* 9–14 mm long, 5 mm in diam., ridges crispate or undulate, tube gradually cuneate into a 5–7 mm long base; lobes 6, thickened in the margin, patent. *Petal* ovate about 8 mm long (including 3 mm long claw) 4 mm broad,

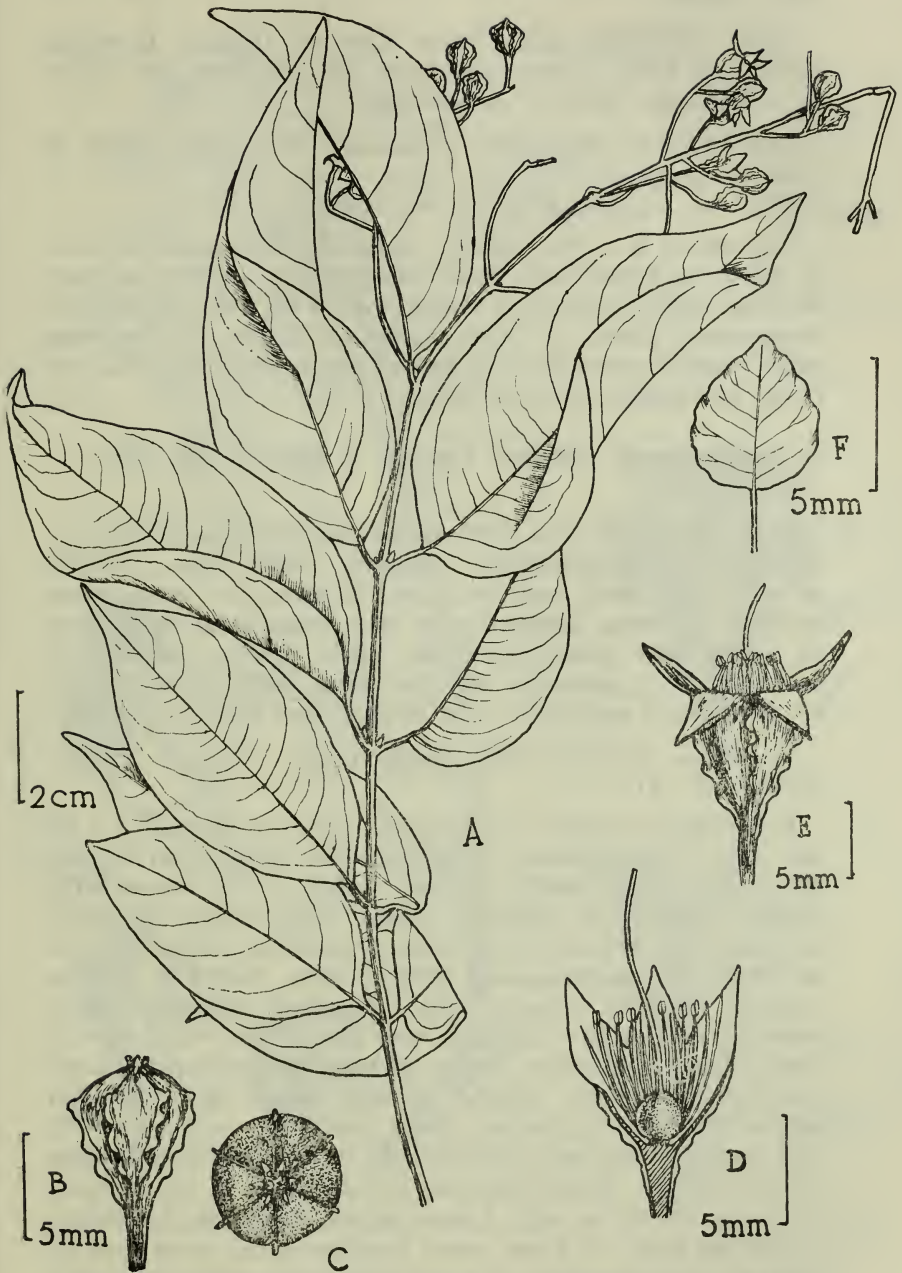


Fig. 21. *L. aruensis* (Neth. Ind. For. Serv. bb. 25,424 in A — holotype).

A, Fertile twig. B-C, Flower bud. D, Longitudinal section of flower. E, Flower after anthesis. F, Petal.

undulate in the margin. *Stamens* many, 3–6 thicker and longer filaments, others subequal. *Ovary* ovate with about 12 mm long style, glabrous.

ARU ARCHIPELAGO: Pulau Kobroor, Dijierlaj. (Buwalda 5,290: A & PNH — paratypes; Neth. Ind. For. Serv. bb. 25,424: A — **holotype**, SING — **isoholotype**).

MOLUCCAS: Halmahera, Gamsungi (Pleyte 199: PNH & SING — paratypes).

(The Aru Archipelago is near New Guinea).

This species is a close ally of *L. alatulata*, from which, however, it differs in flower buds being conspicuously nipped at apex, its ridges being broader and sinuate towards the base and abruptly disappearing above the sinus along the suture. *L. inopinata* which resembles somewhat this species, has its ridges conspicuously raised and sinuate above the sinus.

20. *Lagerstroemia alatulata* Furtado et Montien **spec. nov.** — **Fig. 22.**

Inter species cum foliis viridescentibus subtus fusco-punctulatis, inflorescentiis pyramidalibus, alabastris costis secus suturam elevatulis haud alatis haec species sat distincta; folii costa subtus interdum puberula, alabastris costis infra sinum alatis sinuatisque, ad sinum plus minusve gibbosis, secus suturam sulcatis vix incrassatis. A *L. paniculata* cui valde affinis, differt costis alabastris ad sinum haud auriculatis secus suturam non alatis nec elevatis.

Holotypus: PHILIPPINES, Insula Luzon, Provincia Laguna (Sulit 8,173: A).

Folia elliptico-oblonga vel lanceolata, 4.5–13 cm longa, 2.5–5 cm lata, acuta vel acuminata, in petiolum 4–6 mm longum breviter decurrentia, supra viridia, subtus pallidiora vel fusciscentia, utrinque glabra vel interdum subtus secus costam puberula, utrinsecus 7–9 nervata. *Inflorescentia* pyramidalis, 12–30 cm longa, densiflora, axi quadrangularis breviter alata, minute et deciduo velutina, bracteis foliaceis saepe praedita. *Alabastra* griseo puberula, ambitu late obrullata, cum basi 9 mm alta, 5 mm in diam., alis 6, ad sinum paullo gibbosis saepe crispatis, haud conspicue auriculatis, inferne sinuatis, supra secus suturam incrassatulis sulcatis praedita. *Petala* cum 2 mm unguiculo 9–10 mm longa, 6–7 mm lata, suborbicularia, margine undulata. **Fructus** (Vidal 356 — C: A) late ellipticus, 15 mm longus, 11 mm in diam.

A tree 15–18 m tall. *Leaves* elliptic-oblong or lanceolate, 4.5–13 cm long, 2.5–5 cm broad (smaller in the lower part of inflorescence), acuminate or acute at the apex, shortly decurrent into petiole, green, slightly paler and brown dotted beneath, glabrous on both sides or deciduously puberulous in the midrib beneath, 7–9 nerved on each side; petiole 4–6 mm long. *Panicle* a densely flowered, terminal pyramid, 12–30 cm long, 8–18 cm broad, deciduously and minutely velutinous when young, angular and slightly winged in axis and branchlets, often bearing leaf-like

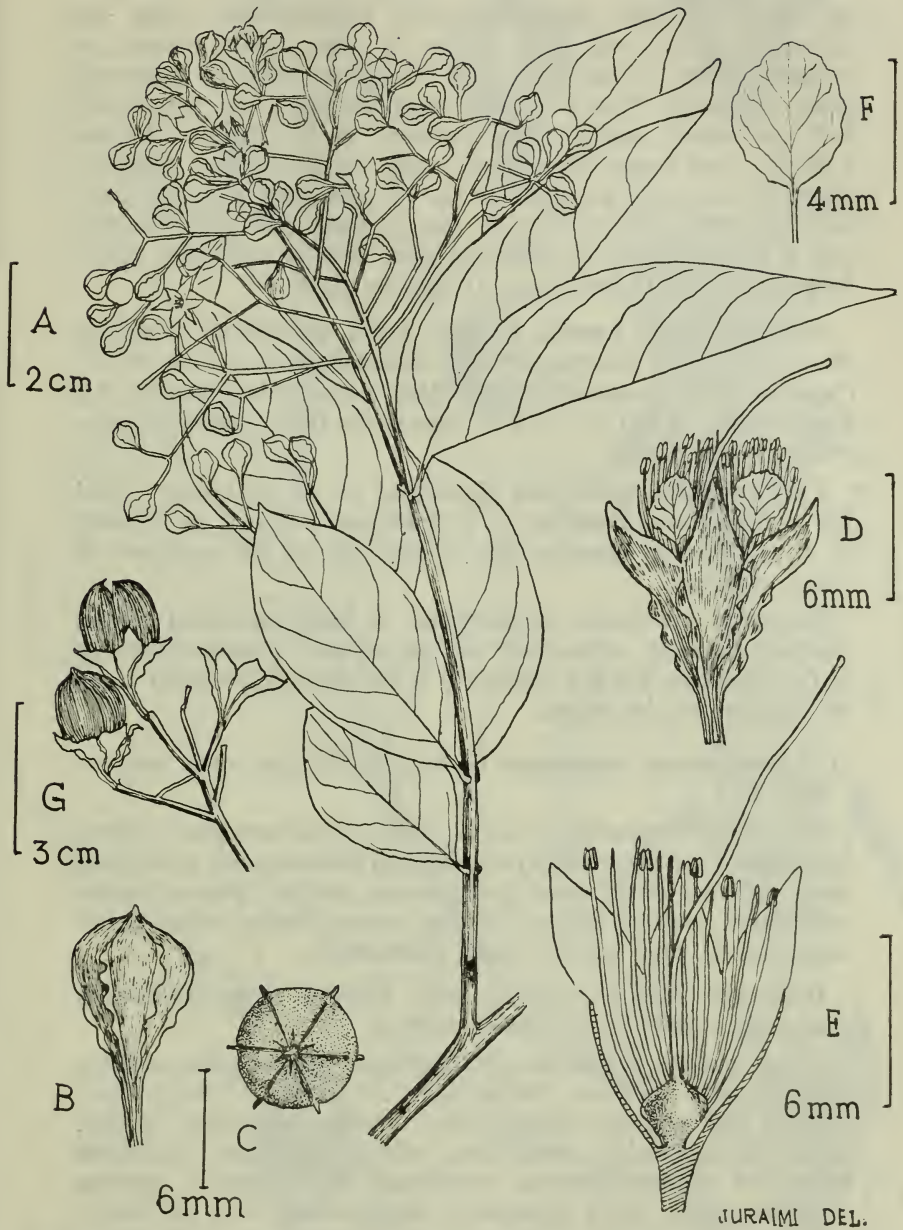


Fig. 22. *L. alatulata* (A-F: Sulit 8,173 in A — holotype; G: Vidal 356^c in A).

A, Fertile twig. B-C, Flower bud. D, Flower. E, Longitudinal section of flower. F, Petal. G. Twig with capsules.

bracts. *Flower bud* 9 mm long (including 2 mm long pedicelliform base), 5 mm in diam., turbinate, grey puberulous; ridges 6, winged and sinuate in the tube, slightly gibbose and crispate at the sinus and very slightly thickened and furrowed along the suture. *Calyx* 10 mm long, 5 mm in diam., with crispate or undulate ridges; lobes 6, 3 mm long, very slightly thickened along the margin. *Petal* 9–10 mm long (including 2 mm long claw), 6–7 mm broad, suborbicular, undulate in the margin. *Stamen* 6 thicker and longer filamented, others smaller many, subequal. *Ovary* ovate, style glabrous, about 17 mm long. *Fruiting calyx* (in Vidal 346 c) 10 mm long, 11 mm in diam., narrowed abruptly into a pedicelliform 4.5 mm long base, lobe 6, spreading. *Fruit* broadly elliptic, 15 mm long, 11 mm in diam.

PHILIPPINES: **Luzon**, Laguna Prov. on Mount Makiling (Sulit 8,173: A — **holotype**; PNH — **isoholotype**, & 22,870: PNH); Cagayan Prov. (Bernardo: 20,449: BM); Albay (Vidal 784 bis: A). **Panay**, Hoilo (Vidal 356 c: A — **type** of the fruit). **Samar** (Ramos 1705: GH & SING).

The specimens have been distributed as *L. piriformis*; Vidal 784 bis has been identified as *L. batitanan* Vidal & so reduced to *L. piriformis*; however this is not one of the syntypes of Vidal's species.

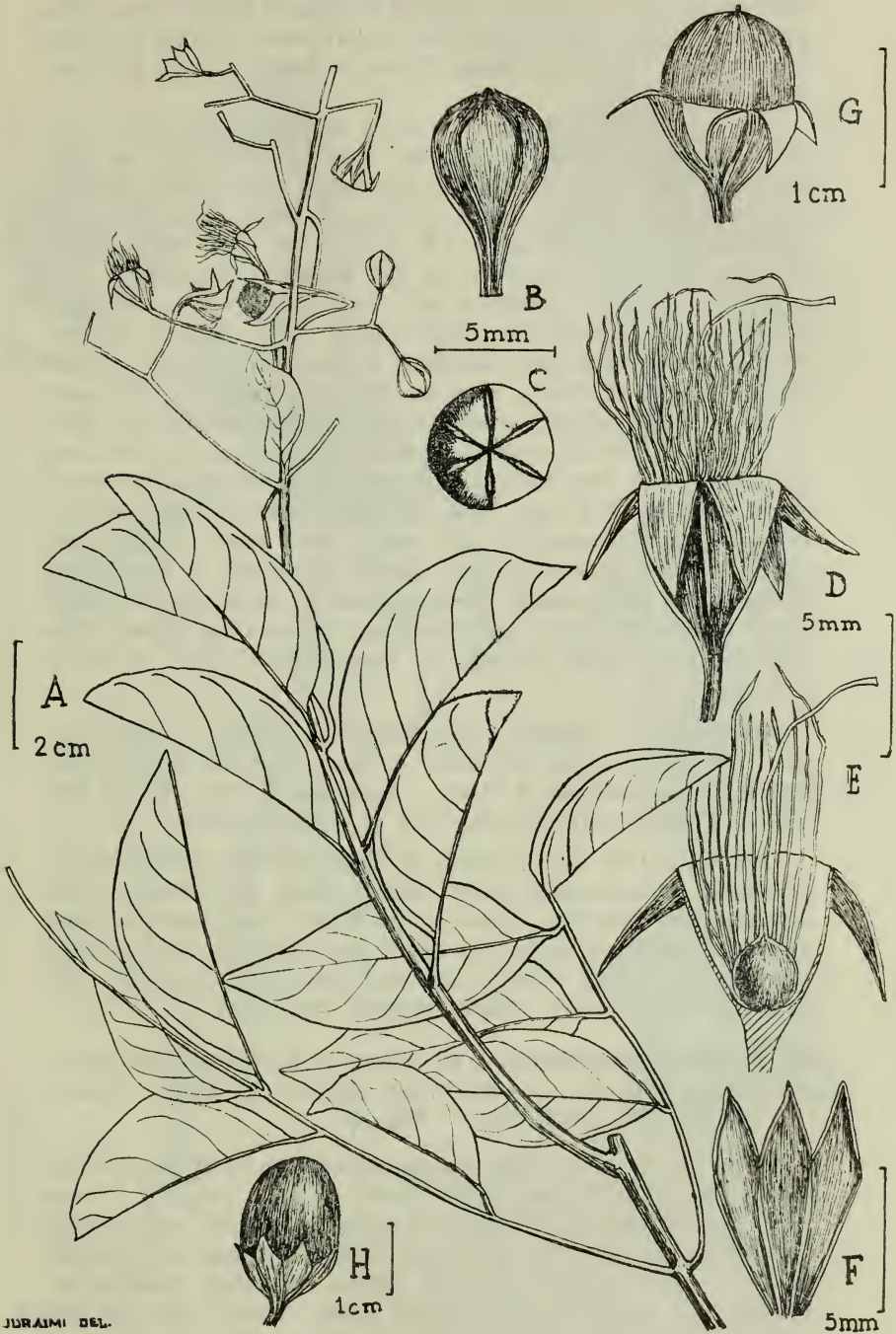
Further *L. piriformis* is described to have superficial ridges, whereas the calyx ridges here are deeper and sinuate almost as in *L. paniculata*, but not auriculate at the sinus and winged along the margins of the sepals.

21. **Lagerstroemia moluccana** Furtado et Montien **spec. nov.** — **Fig. 23.**

Ad gregem specierum cum foliis viridescentibus subtus densissime nigro-punctulatis pertinens, sed inflorescentiis cylindricis, costis alabastri infra sinum leviter alatis, paullulo sinuatis, supra sinum late sulcatis, apicem obscure mammillatam versus sulcis angustissimis haec species facile distinguenda.

Holotypus: MOLUCCAS, in prov. Morotai prope Totodokoe (Tangkilian 108 = bb. 33,802: SING).

Arbor, ramulis hornotinis quadrangularis, minute pubescentibus, secus angulas alatulatis. **Folia** 5–11 cm longa, 2.5–5 cm lata, elliptica vel oblongo-elliptica, basi breviter angustata, glabra, supra viridia lucida glandulosa, subtus pallidiora densissime fusco vel nigro-punctulota, utrinsecus 5–8 nervosa; petiolus 5–9 mm longus, supra applanatus. **Inflorescentia** 7–15 cm longa, cylindrica, breviter ramulosa; ramuli pedunculi pedicellique eodemodo pubescentes et angulati; pedicelli circa 7 mm longi. *Alabastra* 7–9 mm longa, 5–6 mm lata obovata obscure mammillata vel non, 6-costata, costis infra sinum brevissime alatis, paulo sinuatis, supra sinum late sulcatis, sulcis apicem versus angustissimis. *Calyx* abrupte in pedicelliformem basin 3 mm longam angustatus, tubo circa 7 mm longus, 7 mm in diam., minute griseo pubescens, lobis reflexis, 3–4 mm longis secus



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Fig. 23. *L. moluccana* (Tangkilian 108 = bb. 33,802 in SING — holotype).

A, Fertile twig. B-C, Flower bud. D, Flower after anthesis. E, Longitudinal section of flower. F, Part of calyx, exterior view. G-H, Capsule.

marginem paulo incrassatis. *Stamina* 6 longiora et crassiora, altera subequalia, plura. *Calyx fructiferus* pateriformis, 12 mm in diam., lobis reflexis. *Capsula* oblonga 16 mm in longa, 13 mm in diam., 5-valvata.

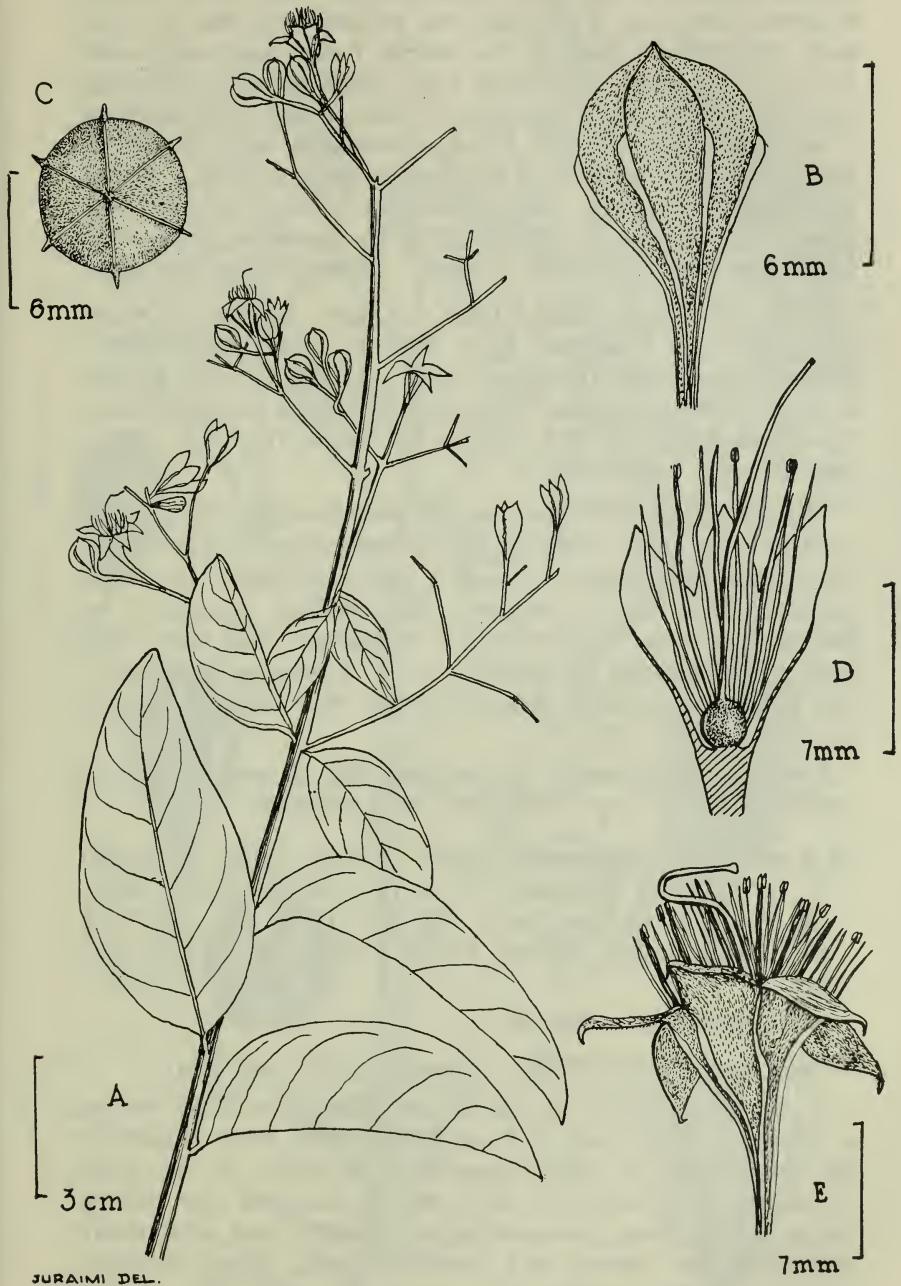
A tree 22–30 m high. *Leaves* 5–11 cm long, 2.5–5 cm broad, oblong or elliptic-oblong, acuminate or acute at the apex, curvedly narrowed and shortly angustate at base, dark green, shining, minutely gland dotted above, paler and black dotted beneath, glabrous on both surfaces; 5–8 nerved on each side; petiole 5–9 mm long, flat, furrowed in the middle. *Inflorescence* 7–15 cm long, minutely pubescent all over, cylindrically branched; branchlets and peduncles quadrangular with shortly winged; pedicel about 7 mm long, similarly angled. *Flower bud* 7–9 mm long, 5–6 mm in diam., obovate, shortly nipped at the apex, 6 ridged; ridges slightly undulate, broadly furrowed at the sinus above. *Calyx* tube abruptly narrowed into the base, 10 mm long (including 3 mm long base), 7 mm broad, minutely grey pubescent; lobes reflexed, 3–4 mm long, slightly thickened into margin. *Petal* rhomboidal about 9 mm long, 4 mm broad, acute at the apex, undulate in the margin. *Stamen* subequal, 6 longer and thicker ones, others many. *Ovary* globose or ovate. *Fruiting calyx* adpressed to the fruit, saucer-shaped, 12 mm in diam., lobes reflexed. *Fruit* short oblong, 16 mm long, 13 mm in diam., 5-valved.

MOLUCCAS: Morotai, Totodokoe at Tobelo (Tangkilian 14 = bb. 33,726: PNH & SING & No. 108 = bb. 33,802: BM & PNH — **isoholotypes** & SING — **holotype**, & 205 = bb. 33,878: SING); Totodokoe (Kostermans 614: A, PNH & SING).

This taxon falls into a group of *Pterocalymma* species having cylindrical inflorescences, green leaves which are densely black dotted below, and the ridges of the flower bud hardly winged and nearly straight below the sinus, but is readily distinguished in having its ridges broadly furrowed above the sinus but soon narrowed and closely sulcate towards the apex.

22. *Lagerstroemia koehneana* K. Schum. in K. Schum. and Hollr., Fl. Kais.-Wilh.-Land (1889) 85: Koehne in Engl., Pflanzr. 17 — IV. 216 (1903) 266. — **Fig. 24.**

A tree up to 42 m high. *Leaves* lanceolate or elliptic-oblong, sometimes sub-orbicular in the lower part of twigs, 7–10 cm long, 3–4.5 cm broad, acuminate or acute at the apex, sub-rounded or shortly narrowed at the base, slightly bicolorous greenish at first, later turning greenish brown, minutely puberulous, densely and minutely gland dotted above, densely black dotted below; 6–9 nerved, nerves more prominent above; petiole 3–5 mm long. *Panicle* terminal sub-pyramidal with short and distant lateral branches 10–25 cm long, 8–25 cm broad; axis minutely velutinous when young, angular and slightly winged; bracteoles greenish, largest 5 mm long, deciduous. *Flower bud* 12–18 mm long (including 5–7 mm long pedicelliform base), 7 mm in diam., turbinate, 6 ridged, apiculate, whitish puberulous when young,



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Fig. 24. *L. koehneana* K. Schum (Darbyshire & Hoogland 8,037. SING).
A, Portion of an inflorescence. B-C, Flower bud. D, Longitudinal section of flower. E, Flower after anthesis.

yellowed later; ridges darker, 6 ridged, somewhat winged and slightly undulate in the tube, evanescent above the sinus; pedicel of lateral flowers \pm 5 mm long and pedicelliform base 4–5 mm long, pedicelliform base of the middle 7 mm long and sessile flower, nipple about 1 mm long. *Calyx* lobes patent, 5 mm long, slightly thickened along the margin. *Petals* 10 mm long (including 3 mm long claw), 7 mm broad, suborbicular with a slightly acute at the apex, undulate in the margin. *Stamens* many, 6 thicker and longer filamented, others subequal. *Ovary* obovate with about 17 mm long style, glabrous. *Capsule* (according to Koehne) 13–15 mm long, 10–13 mm in diam., oblong-globose, apiculate.

NEW GUINEA: **Sepik Distr.**, Aitape Subdistr., Goiniri (Darbyshire and Hoogland 8,037: BM, E, LAE, PNH, SING). **Madang Distr.**, Sein (Hoogland 4,868: A, BM, LAE); Koropa in Ramu Valley (Hoogland 5,073: A, LAE); Silau in Gogal Valley (Hoogland 4,908: A, BM, LAE); loc. incert (leg? s.n.: A — clastoholotype apparently).

The portion quoted above as the clastoholotype (part of the holotype) was taken from the Berlin Herbarium by Koehne for his private herbarium. It bears a piece of paper on which "Lagerstroemia sp." is written, and identified apparently by Schumann first as "*L. fordii* Oliver et Koehne", and then it has been crossed to name the specimen as "*L. koehneana* Schumann". The holotype was from former German New Guinea collected by Hollrung No. 704.

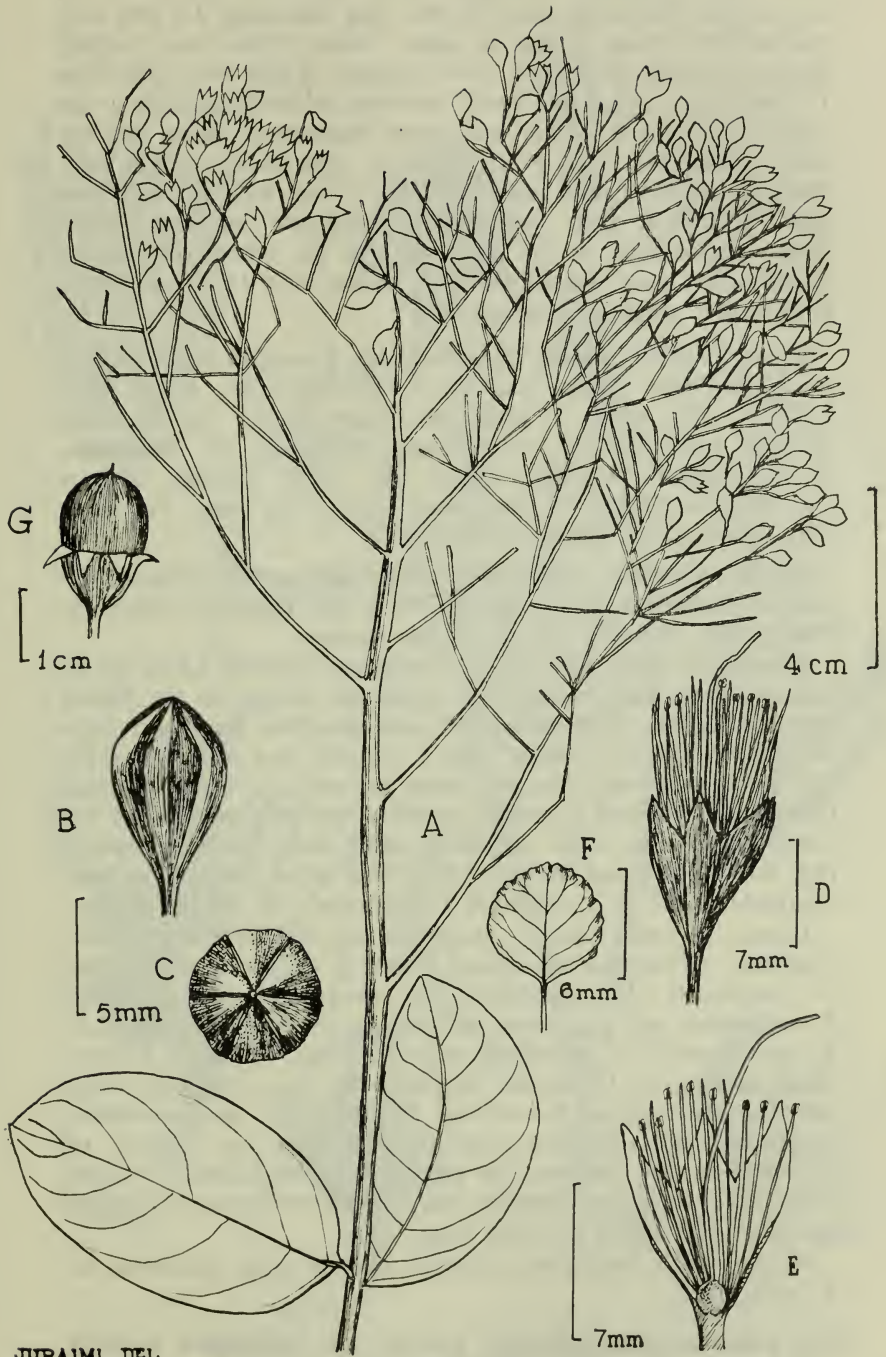
Koehne had apparently accumulated bits of many authentic specimens for his own herbarium on Lythraceae.

23. **Lagerstroemia piriformis** Koehne in Engl. Jahrb. IV (1883) 23 and in Engl. Pflanzenr. 17 = IV 216 (1903) 267; Merr. and Rolfe in Philipp. Journ. Sci. III (1908) Bot. 116 excl. syn.; Merr., Enum. Philipp. Pl. III (1923) 137 pp. and excl. syn.

forma **piriformis** — Fig. 25.

Holotypus: PHILIPPINES: (Cuming 1,675, not seen).

A tree about 15–20 m tall. *Leaves* elliptic or elliptic-oblong or ovate, 3–12 cm long, 2–5 cm broad (often much smaller in the lower part of twigs), acuminate or acute at the apex, cuneate or sub-rounded at base, shortly decurrent into petiole, greyish green above, brownish green, minutely and deciduously puberulous on nerves and minutely dark dotted beneath, undulate in the margin, 6–9 nerved on each side; petiole 2–4 mm long. *Panicle* terminal, pyramidal, 7–20 cm long, 7–15 cm broad, minutely grey velutinous, angular and slightly winged in the axis and branchlets when young. *Flower bud* 9–12 mm long (including 3–5 mm long pedicelliform base), 5 mm in diam.; obscurely nipped at apex; ridges 6, superficial, straight in developed buds, somewhat angular earlier in the



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Fig. 25. *L. piriformis* Kochne form. *piriformis* (A-F Sulit 14,565: A; Wenzel 1,459: A).

A, Fertile twig. B-C, Flower bud. D, Flower after anthesis. E, Longitudinal section of flower. F, Petal. G, Capsule.

lower parts, slightly thickened along the suture on the top, very slightly furrowed. *Calyx* 8 mm long (including 3.5 mm long pedicelliform base), 5 mm in diam.; lobes 3 mm long, slightly thickened along the margin. *Petal* obovate, 6 mm long (including 1–2 mm long claw), 4 mm broad, fimbriate or much undulate in the margin. *Stamens* 6 thicker and longer filamented, others smaller, many, subequal. *Ovary* ovate, glabrous; style about 15 mm long. *Fruiting calyx* 10 mm long (including 4 mm long pedicelliform base), 10 mm in diam., narrowed abruptly into the base, slightly ridges and straight in the lower half of the tube; lobes patent or reflexed. *Capsule* broadly elliptic, 15 mm long, 11 mm in diam., prominently nipped (2 mm long).

PHILIPPINES: **Samar**, Catarman, Mt. Cansayao (Sulit 14,565: A, BM, PNH). **Leyte**, loc. incert. (Wenzel 297: A, E, GH, 1,254: A, GH; 1,459: A, BM, GH; Franco 25,759: A); Tacloban (Wenzel 1,653: SING); Palo (Elmer 7,128: A, E). **Mindanao**, Prov. Cotabato (Ferraris 23,038: A); Prov. Surigao (Ramos and Pasgasio 34,776: A, Mallonga 27,001: A); Prov. Davao at Mati (Ramos and Edano 48,974: UC).

Sterile specimens representing young new growth collected by Conklin under nos. 39,195 and 39,234 at Mt. Yagaw, E. Mindoro, Philippines, probably belong to this species.

Though we have not seen the holotype (Cuming 1,675) or its duplicates, we have ventured to typify the species on the details given by Koehne (1883 and 1903) who described the flower buds as *piriform*, *slightly costate with a rounded, not apiculate apex*. Specimens answering this description are many in the Philippines though it is difficult to decide whether the type represented the *batitinan* form or what we have called here forma *piriformis* (e.g. Sulit 14,565 and Wenzel 1,653). But other forms have been separated either as varieties of *L. piriformis* or definite species.

It may be noted that *L. piriformis* and its varietus or forms (*batitinan*, *callosa* and *valleculata*) as well as the species *L. cristata*, *L. inopinata*, *L. crassifolia*, *L. borneensis*, *L. alatulata*, *L. moluccana* and *L. aruensis* are closely allied and are linked to *L. pterosepala*, *L. paniculata* and *L. crispa* to form a large macro-species. *L. koehneana* seems to fall also into this group, but it has much larger flower buds. Similarly vars. *novoguineensis*, *riedeliana* and *apiculata* and perhaps also var. *minor* of *L. ovalifolia* may fall into this group. A thorough study of these forms based on better flowering and fruiting specimens are needed to clarify the status of these taxa.

Merrill (1923) including under this species some specimens of *L. paniculata*.

23a. *Lagerstroemia piriformis* Koehne var. *valleculata* Furtado et Montien var. nov. — Fig. 26.

A var. **piriforme** haec varietas facile distinguitur alabastris haud apiculati costis secus suturas applanatis haud incrassatis, mature valleculatis infra sinum paullo prominentibus rectis, inflorescentiis fere cylindricis.

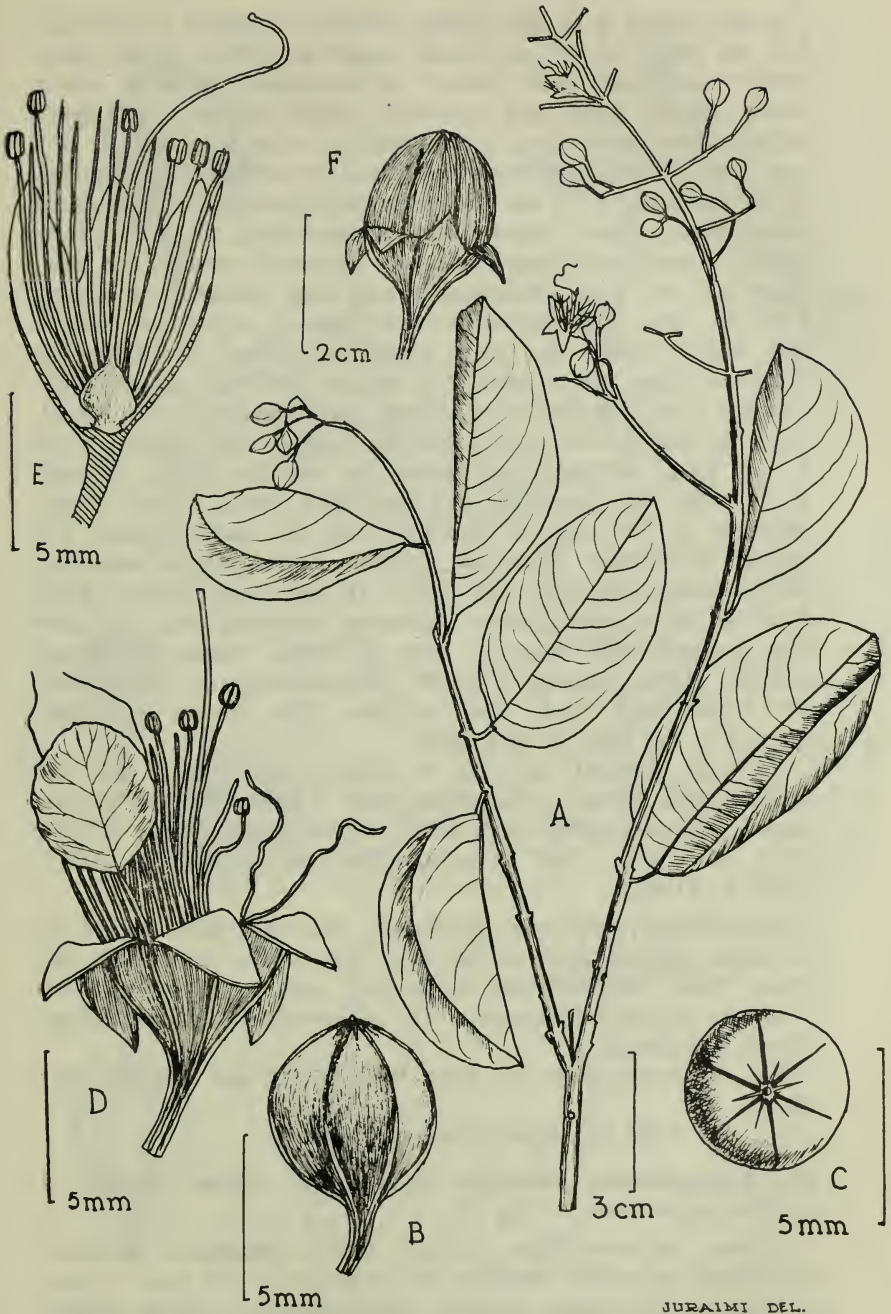


Fig. 26. *L. piriformis* Koehne var. *vallecullata* (A-E: Carr. 12,043 in SING — holotype; F: Carr. 12,628 in SING).

A, Fertile twig. B-C, Flower bud. D, Flower. E, Longitudinal section of flower. F, Capsule.

Holotypus: PAPUA: Koitaki (Carr 12,043: SING).

A tree about 9 m tall. *Leaves* oblong or elliptic or obovate, 5–8 cm long, 2.5–4.5 cm broad, acute or obtuse at the apex, rarely acuminate, dark brown or sometimes greenish above (badly dried), paler and minutely dotted beneath with lower midrib often puberulous, 6–8 nerved on each side; petiole 3–5 mm long. *Panicle* terminal, cylindrical or obscurely pyramidal, 10–30 cm long, 4–10 cm broad, brown puberulous; pedicels of lateral flowers short, about 2 mm or more long, the mid flowers sessile, *Flower bud* clavate, abruptly narrowed towards the base, about 10 mm long (including 3 mm long pedicelliform base), 5 mm in diam., not nipped at apex; ridges 6, superficial, straight and angular below the sinus, evanescent above, not raised or thickened along the suture, but broadly furrowed on maturity. *Calyx* 8 mm long (including 3 mm long base), 5–6 mm broad, larger in mid-flowers (about 12 mm long, 6 mm broad); lobes 4 mm long, not thickened along the margins. *Petal* obovate, 10–11 mm long (including 3–5 mm long claw), 5 mm broad, undulate in the margin, decurrent into the claw. *Stamen* 3–6 thicker and longer filamented, others smaller, many, subequal. *Ovary* ovate, glabrous with about 18 mm long slender style. *Fruiting calyx* saucer-shaped, abruptly narrowed into 3–5 mm long pedicelliform base, 12 mm in diam., ridges superficial, straight; lobes patent. *Capsule* short-oblong or subglobose, 15–17 mm long, 12–14 mm in diam., light brown in colour, nipped at the apex (1 mm long).

PAPUA: Koitaki, alt. 450 m (Carr 12,043: A & BM — **isoholotypus**; SING — **holotype**; Carr 12,628: BM & SING); Sogeri (Heather 2,806: A & LAE). Olive Ridge (Millar 23,520: LAE & SING). Port Moresby (Eddowes & Kumul 13,081: LAE & SING).

This variety, like var. *piriformis*, has superficial ridges in the tube and no apex in the bud, but differs from it in the flower buds flattened, not thickened, and broadly channelled along the sutures when mature. The inflorescence is subpyramidal, almost cylindrical.

The specimens have all been badly dried and became very black.

Heather 2,806 has slightly elongate fruits.

23b. *Lagerstroemia piriformis* Koehne var. *callosa* Furtado et Montien var. nov. — Fig. 27.

A var. *piriforme* haec varietas facile distinguitur alabastro calviforme, apice fere truncato vel rotundato, costis basin versus, conspicuis, ad sinum utrinque evanescentibus, prope apicem elevatis sulcatis, sepalis inter suturas apice callosis.

Holotypus: PAPUA: Maipa (Darbyshire 928: LAE).

A tree about 18 m tall. *Leaves* elliptic or broadly elliptic or obovate-elliptic, 5–10 cm long, 2.5–4.5 cm broad, lower leaves in a twig often smaller, acuminate or acute or sometimes obtuse at apex, shortly narrowed at base, glabrous, shining and green

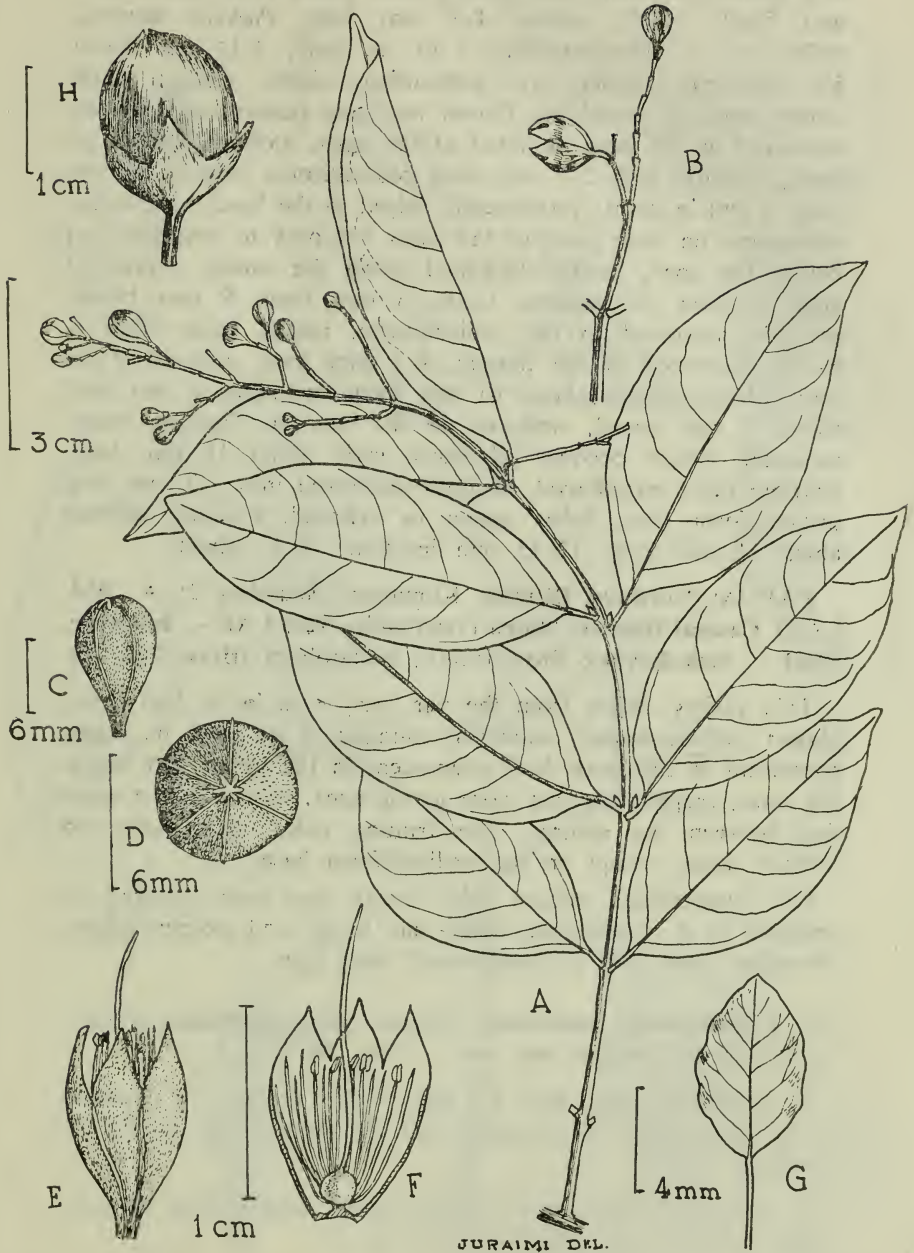


Fig. 27. *L. piriformis* Koehne var. *callosa* (A-G: Darbyshire 928 in LAE — holotype; H: Saunder 2 in A).

A, Fertile twig. B, Part of inflorescence. C-D, Flower bud. E, Flower after anthesis. F, Longitudinal section of flower. G, Petal. H, Capsule.

above, paler, densely dotted and puberulous at the nerves beneath, 6–9 nerved on each side; dots minute green first, later brown and finally black; petiole 4–7 mm long. *Panicle* terminal, cylindrical or sub-pyramidal, 5–30 cm long, 3–15 cm broad, few flowered, minutely grey puberulous, slightly winged in the young axis and branchlets. *Flower bud* grey puberulous, abruptly narrowed in the base, rounded at the apex, globose without its basis, together with 2–3 mm long pedicelliform base, 8–10 mm long, 6 mm in diam., prominently ridged in the basal half, ridges evanescent on both sides of the sinus but only to reappear just before the apex, hardly thickened along the suture, callose at apex between the sutures. *Calyx* 6 mm long, 5 mm broad, abruptly narrowed to the pedicelliform, ridged base; lobes 6, hardly thickened in the margin, 4–5 mm long, reflexed. *Petal* short oblong-elliptic about 10 mm long (including 4 mm long claw), 5 mm broad, undulate in the margin. *Stamens* many, subequal. *Ovary* obovate, glabrous; style about 18 mm long. *Fruiting calyx* cup-shaped, abruptly narrowed into 3–7 mm long pedicelliform base; lobes patent or reflexed. *Capsule* globose about 15 mm long, 12–13 mm in diam., 4–5 valved.

PAPUA: Northern District: Komabun (Saunders 2: A, BM, LAE). **Central District:** Maipa (Darbyshire 928: LAE — **holotype**, PNH — **isoholotype**); Prov. incert., Budatobara (Brass 748: A).

This variety differs from the var. *piriformis* in its bud being almost balloon-shaped, somewhat rounded at its apex, its ridges prominent in the basal half, evanescent in the upper half below the sinus, reappearing just close to the apex, callose at the sepal tips between the sutures. The fruiting calyx also shows no distinct ridges except on the pedicelliform base.

On geographical ground this variety has been referred in herbaria to *L. koehneana* which has larger and deeper ridges, obtrullate buds with a conspicuously long apex.

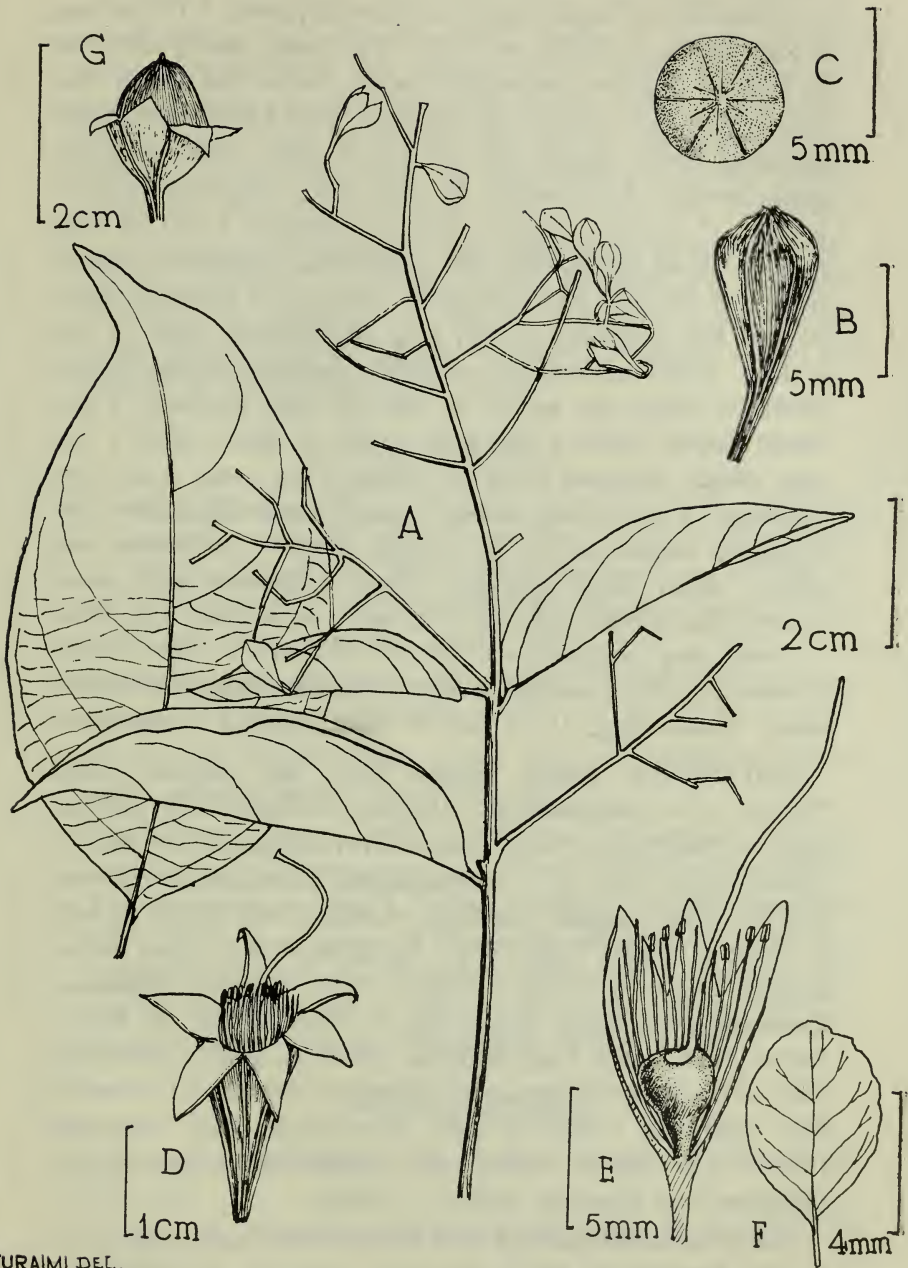
23c. Lagerstroemia piriformis Koehne forma **batitinan** (Vidal) Furtado et Montien **stat. nov.** — **Fig. 28.**

L. batitinan Vidal, Rev. Pl. Vasc. Filip. (1886) 139; Koehne in op. cit. (1903) 267; Ceron, Cat. Pl. Herb. Filip. (1892) 85 **basinym.**

L. hexaptera Mig. *sensu* F.-Vill., Noviss. App. (1880) 92 p.p.; Vidal, Sinops, Atlas (1883) 27 t. 50 fig. A.

L. piriformis Koehne sec. Merr. et Rolfe in Philipp. Journ. Sci. III (1908) 116 p.p.; Merr. Enum. Philipp. Pl. III (1923) 137 p.p.

A *L. piriforme* forma *piriforme* hoc taxon recedit alabastro minore obscurissime apiculato vel non, ejusdem tubo obconoideo quam cupola pyramidalis vel quam pedicelliformis basis subduplo longiore, costis basin versus altioribus interdum leviter sinuatis, costis calycis fructiferi eodemmodo instructis.



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Fig. 28. *L. piriformis* Koehne forma *batitinan* (A-F: Vidal 356 bis in A — lectoholotype; G: Williams 2,497 in GH).

A, Fertile twig. B-C, Flower bud. D, Flower after anthesis. E, Longitudinal section of flower. F, Petal. G, Capsule.

Lectoholotypus: PHILIPPINES: **Luzon**, Prov. Laguna, prope San Antonio (Vidal 356 bis: A).

A tree 5–20 m high. *Leaves* lanceolate or ovate, 5–16 cm long, 3–5 cm broad, acuminate or obtuse at the apex, shortly decurrent at base, at first grey puberulous on the midrib and nerves later glabrous on both surfaces, densely black dotted beneath, minutely glandular above, usually grey or greyish green above, brownish green beneath; 6–12 nerved on each side, prominent beneath; petiole 4–7 mm long. *Panicle* terminal pyramidal, 10–30 cm long, 5–20 cm broad, deciduously grey puberulous, angular and slightly winged in the axis and branchlets. *Flower bud* turbinate about 10 mm long (including 2 mm long pedicelliform base), 5 mm in diam.; ridges 6, prominent, or slightly undulate, straight, slightly thickened along the suture on the top and furrowed. *Calyx* funnel shaped, about 9 mm long, 6 mm in diam.; lobes 3 mm long, slightly thickened along the margin. *Petal* ovate, 8 mm long (including 2 mm long claw), 5 mm broad, undulately and irregularly denticulate in the margin. *Stamen* 3–6 thicker and longer, others many subequal. *Ovary* subglobose with about 15 mm long slender style. *Fruiting calyx* cup-shaped with about 3–4 mm long pedicelliform base, 10–12 mm in diam., much prominently ridged, straight or slightly undulate. *Fruit* short-oblong about 15 mm long, 11–12 mm in diam., nipped at the apex.

PHILIPPINES: **Luzon**, Laguna Prov., San Antonio (Vidal 356 bis: A — **lectoholotype**), Makiling National Park (Salvoza 1,005 = PNH 3,223: PNH). Tayabas Prov. (Jillran 25,659: SING), Unisan (Vidal 784: A — **lectoparatype**), Guinayangan (Escritor 20,832: SING). **Samar** (Sherfesee, Cenabre and Cortes 21,049: A, BM); I. Parasan (Vidal 784C: A). **Leyte**, Ormoc, Lake Danao (Edano 2,335 = PNH 11,964: PNH, SING). **Mindanao**, **Zamboanga** del Norte (Frake 866 = PNH 38,422: A, PNH); Davao Prov., Santa Cruz (Williams 2,947: A, GH), Zamboanga Distr. (Foxworthy, Demesa and Villamil 13,907 bis: E); Misamis Prov. (Miranda 17,981: A, GH); Zamboanga Distr., Malangas (Ramos and Edano 37,399: A); Agusan Prov., San Roque (Mendoza and Convocar 10,415: A, PNH).

This forma is distinguished from the type form (forma *piriformis*) by its flower-buds being obscurely apiculate, its pyramidal cupola being almost equal to its pedicelliform base but about half the size of the bud's obconoidal part representing the calyx tube, its ridges being distinctly higher and sometimes slightly sinuate especially in the lower part both in the flower bud and in the fructiferous calyx.

Fernandex-Villar included also *L. paniculata* under this.

Vidal 356 bis has been erroneously cited as 365 bis by Koehne and Merrill and Rolfe, but Ceron gives the number 356 bis, as written on the specimen's label. Under *L. hexaptera* only Vidal's specimen from San Antonio in the Laguna Province was cited without any number both by Fernandex-Villar and by Vidal. The syntypes Vidal 356 bis and 784 are not represented in the Philippine Herbarium and so we have selected the lectoholotype out of the duplicates distributed in 1959 from the Philippines.

According to a note from the Herbarium of the Botanic Gardens, Madrid, Vidal 784C from Samar Prov. is identified as *L. batitanan*, but neither this number nor its locality was included in the protolog of the species nor in Ceron's Catalogue; hence it cannot be included as the syntype of the species.

Sect. **Adambea**

Section **Adambea** DC. in Mem. Sect. Helv. III, 2 (1826) 70 et Prodr. III (1828) 93; Miq., Fl. Ind. Bat. I (1855) 623 (subgen) p.p.; Bl. Mus. Lugd. Bat. II (1856) 126 (subgen.) p.p.; Clarke in Hk. f. Fl. Brit. Ind. II (1879) 577 p.p. (ex altera parte = Sec. *Trichocarpidium*, etc.) **stat. nov.**

Munchhausen Koehne in Engl. Jahrb. IV (1883) 15 et Engl., Pflanzenr. 17 = IV. 216 (1903) 260.

Calyx with distinct ridges, ridges twice the number of sepals; sepals glabrous within. Ovary glabrous.

Section *Munchhausia* DC. (1826) was created for species having no ridges on the calyces and was based on a misidentification of *Munchhausia speciosa* L. with *L. indica* L. and *L. grandiflora* Roxb. which is a species of Duabanga. Blume (1856) excluded *L. speciosa* L. (sensu *L. indica*) from the section or subgenus and reserved it entirely for *L. grandiflora* Roxb. As restricted by Koehne, *Adambea* is the oldest name for the section.

Subsection **Adambea**

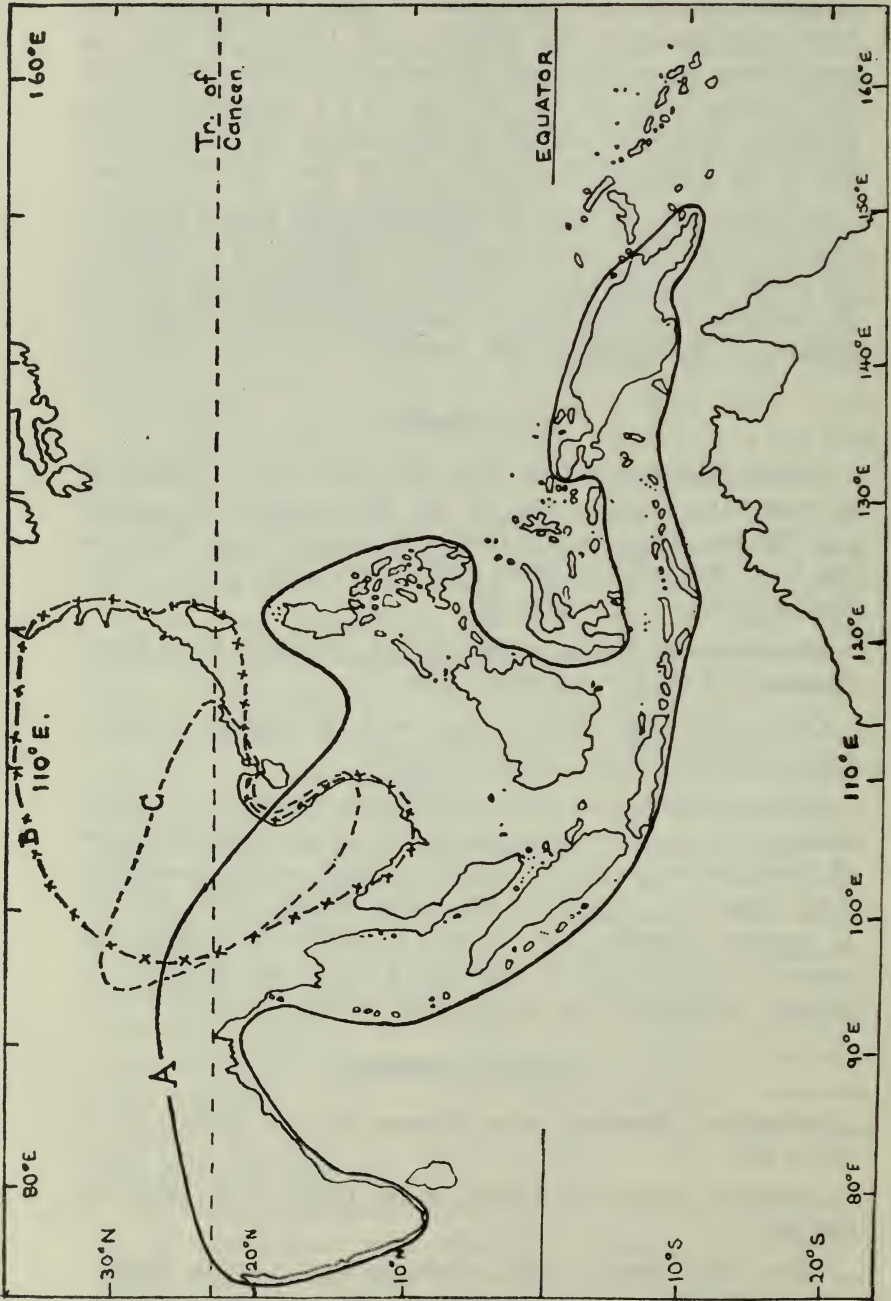
Subsection: **Adambea** sensu Koehne op. cit. (1883) 15 & (1903) 260.

Subsection *Adambeola* Koehne op. cit. (1883) 15 & (1903) 262 **syn. nov.**

Calyx with distinct ridges; sepals glabrous. Capsule large.

DISTRIBUTION: India, Andamans, Malaysia, China, Burma, Thailand, Indochina, Indonesia, Philippines & New Guinea.

TYPE SPECIES: **Adambea glabra** Lam. (= *Lagerstroemia reginae* Roxb.).



Map 2. Distribution of Section Adameba: Subject Adameba (—A—); Subject Microcarpum (-x-B-x-); Subject Banglamea (---C---)

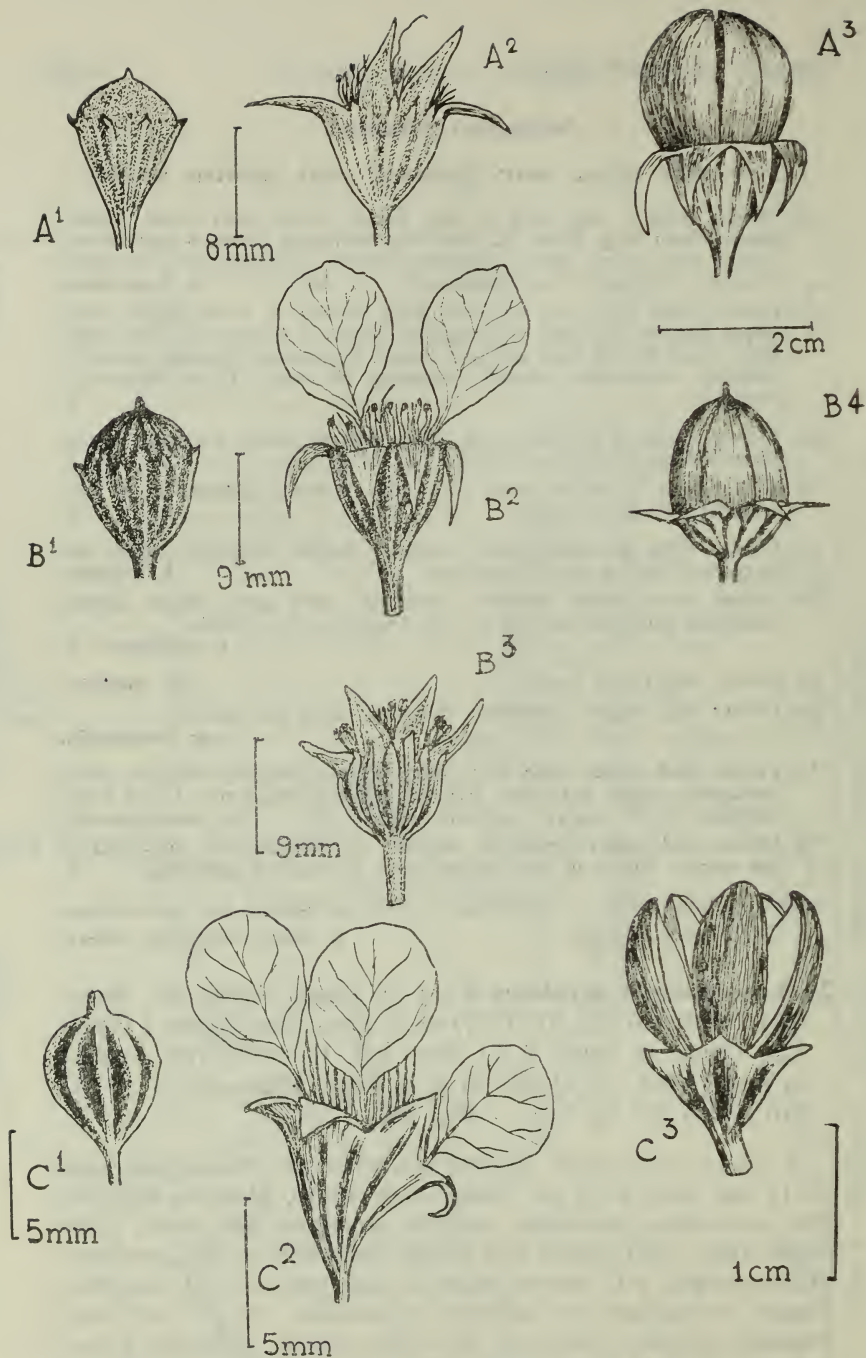
Subsection **Adambea**

(12 or more ridges, ovary glabrous, sepal glabrous within)

- 1a. Flower buds 8 mm long, 6 mm broad. Calyx with acute ridges; sepals 3 mm long. Petals 12 mm long (including claw), 8 mm broad. Leaves dark colour above, glaucous beneath. Fruiting calyx spreading or slightly reflexed. (Fruit elongate 20 x 13 mm) **L. hypoleuca.**
- 1b. Flower buds 8–12 mm or more long, 8 mm or more broad, with ridges flattish, rounded or irregular; sepals 4–6 mm or more long. Petals over 20 mm long and also broad. Leaves not glaucous beneath. Fruiting calyx-lobes reflexed, spreading or erect. (Fruit globose or elongate) 2.
- 2a. Flower buds 10–12 mm long, 8–11 mm in diam. Capsules about 20 mm long, 17–20 mm in diam 3.
- 2b. Flower buds 13–16 mm long, 12–15 mm in diam. Capsules 27–35 mm long, 25–30 mm in diam. 5.
- 3a. Flower buds generally ashy coloured. Sepals thickened along the margins. Fruiting calyx spreading **L. reginae.**
- 3b. Flower buds mostly reddish, sometimes ashy grey. Sepals lightly thickened along the margins or not. Fruiting calyx reflexed
..... **L. speciosa** — 4.
- 4a. Flower bud ridges deep **var. speciosa.**
- 4b. Flower bud ridges superficial. (Fruiting calyx not known)
..... **var. intermedia.**
- 5a. Flower bud ridges deep and rough mostly laterally dentate, teeth deciduous or few persistent; ligulate at the sinus or not. Calyx lobes thickened in the margin, in fruit erect. **L. costa-draconis.**
- 5b. Flower bud ridges superficial, smooth. Calyx lobes not thickened in the margin. Lobes of the fruiting calyx reflexed or spreading 6.
- 6a. Calyx lobes erect or spreading **L. macrocarpa var. macrocarpa.**
- 6b. Calyx lobes reflexed **L. macrocarpa var. reflexa.**

24. ***Lagerstroemia hypoleuca*** Kurz. in Journ. Asiat. Soc. Beng. XLI (1872) 307, XLVI (1877) 88 & For. Flor. Burma I (1877) 523; Clarke in Hook. f. Fl. Brit. Ind. II (1879) 577; Koehne in Engl. Jahrb. IV (1883) 30 & in Engl., Pflanzenr. 17 = IV. 216 (1903) 262 fig. 56c. — **Fig. 29C.**

A tree ± 12 m high. *Leaves* lanceolate or oblong-lanceolate, 10–12 cm long, 4–10 cm broad, dark above, glaucous beneath, thin coriaceous, sometimes oblique, acuminate and rarely acute at the apex, sub-rounded and slightly decurrent at base, undulate in the margin, 6–14 nerved on each side; petiole 4–10 mm long. *Panicle* cylindrical or narrowly pyramidal, 10–45 cm long, minutely greyish puberulous all over; pedicel in lateral flower 2–5 mm, the mid-flower sessile. *Flower buds* 10 ridged, turbinate abruptly into 2–4 mm long pedicelliform base, 7–9 mm long, 5–7 mm broad, shortly nipped at the apex. *Calyx* in flower campanulate; tube about 7 mm deep, 7 mm broad; lobes 5, erect, slightly thickened in the margin, 3–4 mm long. *Petals* oblong about 14 mm long (including 5–6 mm long claw), 10 mm broad, undulate in the margin. *Stamens* 4–6 stouter and longer, others many, subequal. *Ovary* subglobose, glabrous. *Fruiting calyx* obconical, tube 8 mm deep, 10–12 mm broad; lobes patent. *Capsule* oblong 13–18 mm long, 11–13 mm in diam., 5-valved.



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Fig. 29. A. *L. speciosa* (L.) Pers. (A¹-A²: Koorders 22,798β in SING. & A³: Backer 16,959 in B).

A¹, Flower bud. A², Flower after anthesis. A³, Capsule with calyx lobes reflexed.

B. *L. reginae* Roxb. (B¹-B³: Roxburgh = Wight Cat 1,036 in E — holotype; B⁴: Hort. Miss. 92 in E).

B¹, Flower bud. B², Fertile flower. B³, Flower after anthesis. B⁴, Capsule with patent calyx lobes.

C. *L. hypoleuca* Kurz (C¹-C²: Kurz s.n. in CAL — lectoholotype; C³: Kurz s.n. in CAL).

C¹, Flower bud. C², Fertile flower. C³, Capsule with short calyx lobes.

INDIA: **Andamans** (King 329: BM); Mt. Stariet (Osmaston 7: CAL). **South Andamans** (Heinig 31: A; s.n.: SING); Port Blair (Kurz s.n.: CAL — **lectoholotype** (flower) & **lectoparatype** (fruit); Rogers s.n.: E); Bajajag valley (Heinig 8: A). **Great Cocos Island** (Prain s.n.: CAL).

CULTIVATED: Hort. Bot. Calcutta (s.n.: BM & CAL).

25. *Lagerstroemia reginae* Roxb., Pl. Corom. I (1795) 46, t. 65; Willd. Sp. Pl. II (1800) 1178; Pers., Syn. Pl. II (1807) 11; DC. Prodr. III (1828) 93; Roxb., Fl. Ind. II (1832) 505; Wight & Arn., Prodr. I (1838) 308; Wight, Ic. Pl. II (1843) t. 413; Miq. Fl. Ind. I (1855) 623 & Suppl. 1090; Bl., Mus. Lugd. Bat. III (1856) 126, excl. var. *costata* Bl.; Bedd., Fl. Sylv. I (1869) A. 29 (*omnino pro parte*) **stat. nov.** — **Fig. 29B.**

L. flos-reginae Retz: all citations *pro parte* under this in the synonymy of *L. speciosa*.

L. flos-reginae Retz var. *augusta* Clarke (sphalm. *augusta*) in Hk. f. Brit. India II (1879) 577, **syn. nov.**

L. macrocarpa Wall. Cat. (1828) 2114; Voigt. Hort. Suburb. Calc. (1845) 1832: nom. nudum (non *L. macrocarpa* Kurz).

Adambea glabra Lam, Encycl., I (1783) 39; Hassk., Cat. Bogor (1844) 256 not *L. glabra* (Koehne) Koehne, 1907.

L. hirsuta (Lam.) Willd. Spec. Pl. I (1799); DC., Prodr. III (1828) 93; Koehne in Engl. Jahrb. IV (1883) 31 & Engl. Pflanzenr. 17 = IV. 216 (1903) 263: **syn. nov.**

Adamboe Rheede, Hort. Mal. IV (1683) 45 tt. 20 & 21.

Adambea hirsuta Lam. Enc. I (1783) 39 p.p.

A tree \pm 10 m high. *Leaves* oblong or elliptic-oblong, 10–23 cm long, 4–8 cm broad, acuminate or acute rarely obtuse at apex, rounded or gradually narrowed toward base, chartaceous, glabrous, 7–15 nerved on each side; petiole 5–10 mm long. *Panicle* greyish or cinereous brown all over, sub-cylindrical, 10–40 cm long, 5–20 cm broad. *Flower bud* often grey, sub-globose or pyriform, 8–14 mm long, 7–10 mm broad, nipped at the apex; base pedicelliform 3–12 mm long. *Calyx* in flower generally cup-shaped, 3–5 mm deep, 6–10 mm in diam.; lobes 6, thickened in the margin, erect or spreading, sometimes reflexed, 12 or more ridged; ridges dorsally sub-rounded often sulcate, longer ones often gradually narrow in the sepals. *Petals* sub-orbicular, \pm 30 mm long (excluding \pm 3 mm long claw), \pm 25 mm broad, gradually narrowed into the claw, undulate in the margin. *Stamens* numerous, subequal. *Ovary* subglobose, glabrous with long slender style. *Fruiting calyx* saucer-shaped, \pm 4 mm deep, \pm 18 mm broad; lobes erect or spreading, thickened along the margin. *Capsule* subglobose, 15–25 mm long, 12–23 mm in diam., woody, 6-valved.

INDIA: **North India**, Dehra Dun (Singh 51: A & UC); Orissa (Mooney s.n.: SING); Patna (Hamilton 1,150² = Wall. Cat. 2114-9 partly). **Konkan and Malabar**, loc. incert. (Wight 298: E); Kerala (Subramanian 71,017; Vasavala 36,001 & Subramanian 70,383: BIP); Goa (Rolla 88,133: Kanodia 89,547 & 89,657; Raghavan 103,479: BIP; Fernandes 1,532: A); Courtallum (Wight 1,036: E). **Eastern Coast**, Circars (Roxburgh = Wight Cat. 1,036: E — **holotype**); Tranquebar (Hort. Miss. 92: E); Chalakudi (Meebold 12,489: CAL). **Eastern Bengal & East Pakistan** (Griffith 2,236: A, GH & 433: GH); Manipur (Meebold 7,285: E); Chittagong (Cowan 274, 1,383, 58,114 & s.n.: E; Gamble 7,831: CAL); Agartala (Debbaran 1,053: CAL); Assam (Jenkins 160 & s.n.: E; Griffith 730: BM; Master s.n.: E); Khasis & Jynteah Hills (Ruse 414: A; Gallatly s.n.: SING; Das 34,978: CAL).

BURMA: Pinyinmana (Srenander 3,057: E; Sirivarna 61: BKF). Hantawaddy, Okkau (Lace 2,896: E); Rangoon (McClelland s.n.: E — syntype of *L. flos-reginae* var. *augusta*; Smith 26: GH; Parkinson 14,682: A). **Tavoy**, Tenasserim (Keenan, Aung & Rule 1,311: E). Pegu, Irrawaddy & Sittang Valley (Brandis 1,383: CAL); loc. incert. (Kurz s.n.: CAL).

NEW GUINEA: **South N. Guinea**, along the river Digoel (Versteigh BW 4,857: LAE & SING). loc. incert. (leg. ? s.n.: PNH). **Papua** (Brass 6,580: A & 8,160: LAE).

CULTIVATED: **China**, Canton (Hooker s.n.: E). **India**, Calcutta (Wall. Cat. 2114-e: E; Voigt 129: A; Kurz in Madras (Jeffrey s.n.: E & Hunter: E; Elliot 64: E); Napatry in Madras? (Wight = Wall. Cat. 2114-10: E). **Ceylon** (Thwaites 1,554: GH); Allagalla (Worthington 243: BM); Kalugammane (Imsilva 26: BM). **America**, St. Vincents (Smith 925: E & GH). **Jamaica** (Orcutt 2,011: UC). **Martinique** (Hahn 1,439: UC). **Indonesia**, Batavia (Kollmann s.n.: BM).

The specimens from New Guinea give an unusual distribution for this species and may represent a recent invasion or naturalisation of the species in the area. Brass 6,580 was collected on the Daru island where it was rare in 1936, only one mature tree being seen. Versteigh BW. 4,857 was found in 1957, also in South New Guinea along the Digoel river near Wage in the secondary forest, inundated in the rainy season, the lowland being almost continuous from the Daru island.

L. reginae Roxb. was described and depicted from specimens of plants growing wild on the mountains of Northern Circars, India, and a progeny of which was growing and flowering in his garden (at Samulcottah?). Since *L. flos-reginae* Retz (1789), which was mainly described from a Javanese plant collected by

Bladh and named earlier as *L. major (Javanensis)* Retz. Obs. I (1779) 20, had also a reference on Koenig's authority "in sylvis Calcuttae" where Calcutta is meant a very large region or province, Roxburgh had to include this name in his synonymy, at least this was the procedure current in his time. However, Roxburgh excluded Javanese specimens by saying that his species was a native of the Circars that flowered in the hot season and seeded in August. Another probable reason for Roxburgh's rejecting Retz's species was that its name was published as a triverbal with "flos reginae" as the specific epithet. This decision was followed by almost all systematists like Willdenow, De Candolle, Blume, Wight and Beddome until Kurz (1877) adopted it as the correct name for the species by changing the *triverbal* into the *biverbal*, a procedure now valid under the 1961 Code.

But as Roxburgh had restricted his name to an Indian species and had moreover given coloured plate of his type and as the type of the species is extant, we think that under Art. 7 Note 4 of 1961 Code, *L. reginae* may be typified on Roxburgh's type and plates and exclude from it Retz's synonym.

In doing so we restrict the name to the portion of the plate that depicts the flowers. Since Roxburgh could not obtain the fruits at the same time as the flowers, it is obvious he obtained a fruit of a species, which is identical with *L. speciosa*.

L. speciosa var. *augusta* Clarke is only a larger form of *L. reginae* with a larger calyx and more conspicuous ridges.

L. hirsuta (Lam.) Willd. with its basynym *Adambea hirsuta* Lam. is based entirely on Rheed., Hort. Mal. IV (1683) 45 t. 22, Rheede himself states that the tree resembles *L. reginae* as also the flowers and fruits, but in the text the plant is said also to be like a Malvaceous plant drawn and described to have 5 stamens and the leaves and twigs to be lanuginous and hirsute. Obviously a confusion has been made in the text, and there is no *Lagerstroemia* species wild in South India, which has lanuginous and hirsute leaves. A specimen which Rottler tried to identify in the herbarium as Rheede's t. 22 and which was named by Clarke as *L. rottleri* is *L. loudonii* which has no grooved calyx as in *L. reginae* or Rheede's picture and does not occur wild in South India. If we ignore the badly drawn sepals in the figure and ignore Rheede's text, Rheede's fig. 22 is nothing but *L. reginae*. In fact the drawing shows no signs of tomentum on the leaves and twigs. De Candolle (1828) ignoring that the author had described the species with 5 stamens, placed *L. hirsuta* with *L. reginae* among the species that have many subequal stamens. However since *L. hirsuta* is apparently *mixtum compositum* it has not been given a priority right over *L. reginae* Roxb.

26. *Lagerstroemia speciosa* (L.) Pers., Synops. II (1807) 72; Koehne in Engl., Jahrb. IV (1883) 28, in Engl. and Prantl, Pflanzenf. III, 7 (1893) 14 fig. 5P-T & in Engl., Pflanzr. 17 = IV. 216 (1903) 261 figs. 55P-T & 56B; Koord. et Valet., Bijdr. I (1894) 190; Merr. in Journ. Arnold Arb. XXV (1954) 146: *omnino pro parte* — **Fig. 29A.**

L. flos-reginae Retz., Obs. V (1789) 25; Kurz, in Journ. Asiat. Soc. Beng. XLVI, 2 (1877) 88 and For. Fl. Burma I (1877) 524; Clarke in Hk. f., Fl. Brit. Ind. II (1879) 577; King, Mat. Fl. Mal. Pen. III (1898) 352; Duthie, Fl. Upper Gang. — Plain I (1903) 353; Gamble, Fl. Madras I (1919) 513; Gagnep. in Fl. Gen. Indoch. II (1921) 941; Haines, Bot. Bihar & Oriss. 3 (1922) 375; Craib, Fl. Siam. Enum. I (1931) 723; Kanjilal et al., Fl. Assam II (1938) 311; Corner in Gard. Bull. Straits Settl. X (1939) 272: *omnino pro parte.*

Munchausia speciosa L. in Munchhausen's Der Hausvater V, 1 (1770) 357 t. 2; Murray, Prodr. Stirp. Goll. (1770) Praep; Linn., Mantissa II (1771) 243 pp; Blanco, Fl. Filip. ed. 3, III (1873) 413 t. 314 *pro parte typica*: **basinym.**

Katou-Adamboe Rheede, Hort. Mal. IV (1683) 45 t. 22 *pro parte.*

Trees. *Leaves* oblong or elliptic-oblong, glabrous on both sides, acute or obtuse at apex, nearly rounded at base, 5–19.5 cm long, 4–8.5 cm broad, often greyish green above, brown underneath, 10–15 nerved on each side; petioles 4–9 mm long. *Panicle* erect, 15–40 cm long, deciduously ashy or ferruginous pubescent; pedicels upto 1.5 cm in length. *Flower bud* subglobose or pyriform, 7–12 mm long, 6–10 mm in diam. (excluding about 3 mm long pedicelliform base), short nipped at the apex, 12–14 ridged; episepalous ridge almost as long as the alternisepalous ones or abruptly narrowed into a thin ridge in the sepal. *Calyx* campanulate, cinereous or ferruginous pubescent; lobes 6, spreading or reflexed, not or slightly thickened along the margin. *Corolla* petals 6, sub-orbicular, slender clawed, 1.5–3 cm long, 1–2 cm broad. *Stamens* numerous subequal, adnate to the calyx in the upper half of the tube. *Ovary* globose, glabrous or slightly scaly; style filiform, capitate stigma. *Fruiting calyx* glabrous or slightly pubescent, with recurved sepals. *Capsule* ± 22 mm long, ± 22 mm in diam., woody, globose, glabrous, apiculate, usually 6-valved.

BURMA: **Haka** (Dickason 7,811: SING); **Yamethin**, Mintyin (Smales s.n.: A, E); **Pyinma** (leg.? 28: A); Mintyin (Lace s.n.: E); **Zigon** (Ba Pe 9,700: A); **Tharrawaddy** (Smales 42: E); South **Pegu** (Ba Pe 10,576: A; Kurz 1,974: CAL); **In Sein** (Ba Pe 10,439: A); Rangoon (Dickason 6,805: Parkinson 14,161: A); **Ataran** (Lace 4,776: E & CAL); Mergui (Lace s.n.: E). loc. incert. (Hooker 1,598: GH).

THAILAND: *Northern*: **Tak**, Me Sawt (Kerr 6,158: BM). **Kampeng Pet** (Kerr 5,965: BM: UC; 6,158: UC). *South-Eastern*: **Prachinburi** (Phan 4: BKF 1,211: BKF). **Chantaburi**, Chantaboon (Vesterdal s.n.: SING). *South Western*: **Kanburi**, Wang Yai

(Charoenmayu 413 = BKF 5,472: A, KEP); loc. incert. (Boon-Krong 84 = BKF 26,312: KEP & SING); near Neeckey & Wangka (Bloembergen 8: A, PNH & SING). **Prachubkirikhan**, Bangtaphan (Keith 247: SING). **Peninsula Surat** (Luangsamarn s.n. = BKF 1,213 = BKF 1,216: BKF). **Trang** (Put 264 = BKF 1,214: BKF; Winit s.n. = BKF 1,215 BKF; Boongird 17 = BKF 2,487: A & SING). **Pattani** (Kerr 7,495: BM). loc. incert. (Rabil 379: E).

INDOCHINA: **Vietnam**, Anam, Dalat (Squires 822: A, BM, & SING); Dongai (Pierre 4,996: A & SING); Bang-lang-misc, Chanh-yen (Robert 13: A, BM, E, & UC); Bien Hoa (Vinot s.n.: GH). **Cambodia**, Kg. Cham (Bejiand 220: A).

MALAYSIA: **Kedah**, Kulim (Kuabdulla 89,103: SING); Sik (Ahmad Tajuddin 74,952: SING); Sungai Terap, Selama (Henderson 35,433: A, PNH & SING); Alor Star (Ridley 15,030: SING); Ulu Pantai Mulik (Sow 34,604: SING); Selok Pendiet (Kedah 32,975: SING); loc. incert. (Meh 17,851: KEP); Bandar Baling (Meh 10,081: KEP); Sungai Patani (Meh 10,152: SING); Pondok Tanjong (Mat. Gani 9,764: SING); **Kelantan** (Corner s.n.: SING). **Perak** loc. incert. (Scortechini s.n.: SING; 461: SING); Parit (Parit 9,578: SING); Kuala Kangsar (Dolman 12,073: KEP); Sungei Raya (Burkill & Haniff 13,396: SING); Changkat Terin (Wray 1,873: SING); Kuala Kampar (Haniff 15,578: SING); Batu Gajah (Burkill & Haniff 13,413: SING); Kuala Kangsar, Kola Lama (Haniff 10,350: SING); S. Anson (Haniff 15,941: SING); Pondok Tanjong, Taipeng (Salih 9,764: KEP); Ulu Kenderong Grik (Hamid 11,607: KEP); Kuala Kangsar (Ridley 2,996: SING); Pondok Tanjong (Salleh 9,791: SING); Sungei Siput (Bonar 8,823: KEP); Sungei Krian Estate (Spare 34,489: SING); Grik (Corner s.n.: SING). **Trengganu**, Ulu Brang (Moyses & Kiah 33,870: A & SING); S. Kemamair (Corner s.n.: SING); Kuala Trengganu-Besut Rd. (Sinclair & Kiah 40,740: E & SING). **Pahang**, Kuala Lipis (Nong 4,005 & Lipis 29,386: SING; Henderson 10,760: KEP; Machado 11,583: SING; Marchall 16,972: KEP & SING; Burkill & Haniff 15,786, 15,792 & 16,900: SING); Pekan (Burkill & Haniff 17,109: SING & UC; 17,277: SING); Sungai Mai (Kadim & Mahmood 112: SING;) Tembeling (Henderson 24,536: A & SING); Temerloh (Kassim 0715: SING; Md. Said & Idris 6,302: SING; Hamid 4,765, 5,169: SING); Rompin (Mohamud 15,551: E; 17,131: E & SING); Kuala Tahan (Seimund 834, 835, 828, 906: SING); Pekan (Hairlau s.n.: SING); Kuala Tehui (Webber 23,306: KEP); Kuantan (Burn-Murdoch s.n.: SING; Mahamud 3,736: SING; Awang 78,305: SING). **Selangor**, Bangi (Saaf 14,824: KEP & SING; Hamid & Jaamat 10,982: KEP); Ampang (Hamid 9,985: KEP); Kelambu (Hamid 3,296: SING). **Negri Sembilan** between Gemas and Rompin (Burkill 2,123: SING); Durian Tawar state (Tahir 0601: SING); Sungei Lyong (Alvies 1,818 SING); Seremban (Kinsey 1,999: SING); K. Pilol (Dusih 1,917: SING). **Tioman Isl.**, East Coast (Kloss 13,157: BM & SING). **North Borneo**: Kinabatangan (Kadir 16,985: KEP & SING; Arsat 1,155 &

Evangelista 887: SING); Lokan (Ampuria 35,333: SAN & SING); Takala River (Puasa 48,883: KEP & 10,109: SING); Batu Puteh (Ibrahim 3,271: A); Lamag (Ampuria 35,251: SAN); Kaba Tasan (Balajadia 36,384: KEP); Muan region near Sg. Riko (Kostermans 4,381: BM & PNH & SING); Atas Bukit, Masulit, Lahad Datu (Benedick A 3057: SING); Segaliud River (Balajadia 7,097: SING); loc. incert. (Castro & Melegrito 1,712: UC); Tumbang Hiang (Grabowsky 5: BM) Bunguey Isl. (Wood 1,115: A). St. Lucia, Tawau (Kadir A 2,087: KEP & SING). loc. incert. (Villamil 366: A). **Sandakan** Sagaluid, Elopura (Kadir A 2764: PNH & SING & Austin A 1017: PNH, KEP & SING); near road to Sabah Hotel (Madani 56,905: SING, Sinanggul 36,625: SAN); Kudat, Kg. Limbuak Darat, Banggi Island (Ampuria 40,751: SAN); Elopura, loc. incert. (Cuadra A 2220 KEP, PNH & SING); Atas Bukit (Benidick 3,057: KEP); Banguey Island (Wood 1,105: UC); Kudat, Mamang Banggi Island (Ampuria 42,124: SAN). **Sarawak** (For. Dept. Coll. 2,667: A & SING; Brooke s.n.: SING); Kuching (Jais 78: KEP & SING; Haviland s.n.: SING; Sinclair 1,871: SAR & SING; GDSL. 319: SING); Sibu (Clemens 21,112: A & SAR); Santubong (Ashtons 21,478: KEP, SAR & SING).

INDONESIA: **Sumatra** (East Coast), Batoe Bahra (Yates 2,128: UC); North Sumatra (Lorzing 11,824: A); Sibolangit (Fairchild & Dorsett 733: UC). **Java**, Rembang (Buesgen 39: B); Tjibunar, Ujung Kulon (Kostermans 71: A, PNH & SING); loc. incert. (Blume s.n.: A & B; Zollinger 607: UC; Forbes 1,286: BM); Bantam, Pulau Peutjang (Sinclair 10,005: E & SING); West Sumbawa (Kostermans 18,645: A); Peutjang, Ujung Kulon (Wirawan 389: SING); Batavia, Swangan (Bakh v/d Brink 5,732: UC); Bodjong Lapang Backer 16,959: B); Tjratiap, Triangan (Backer 17,399: SING); Kediri (Kooders 22,687 β : B; 22,798 β : SING); Kangean, Ardjasa (Backer 26,839: B) Klambangan Penins., Besuki (Jacobs 4,946: SING); Pakalongan (Koorders 27450 β : B). **Celebes**, Manado, Gorontalo, Dambalo alt. 25 m (Neth. Ind. For. Serv. bb. 20,017: A & SING).

PHILIPPINES: **Luzon**, Cagayan (Bernardo 15,140: E; Velasco 24,864: UC); La Union (Escristor 21,109: A; Lete 164: UC); Principe, Baler (Merill 1,111 GH; & SING); Bataan (Borden 755, 1,283: SING; Williams 188: GH; Ranario 27,770: SING); Mt. Mariveles (Elmer 6,770: E); Pangasinan, Mt. San. Isidro (Finix 29,993: GH); Tarlac (Ahun 701: UC); Tayabas (Vidal 786: A); Pampanga (Bolsta 25: UC); Rizal (Elmer 17,441: A. GH & UC); Laguna (Elmer 8,145: E); Batangas (Ramos 1,882: GH & SING); Albay (Menoza 18,578: SING); Apayao (Fenix 28,156: A). **Mindoro**, Pandurocan (Zaldua 29,851: UC); Sablayan (Gachalian 13,842: PNH); Mt. Mansuy (Conklin 17,519: A & PNH); loc. incert. — (Merritt 8,653: SING). **Samar**, Matuguinao (Edano 15,604: PNH); Tagaslian Borongan (Castro 5,822: A &

PNH). **Leyte** (Wenzel 1,224: A, BM & GH); Palo (Elmer 7,095: E). **Culion** (Herre 1,067: A & UC). **Palawan**, Tay Tay (Merrill: Species *Blanocanae* 377: A & GH); Puerto Princesa (Ebaló 574: A, PNH & UC); Lipuun, Quezon (Cordero & Espiritu 91,512: KEP & PNH; 91,524: PNH). loc. incert (Canabre 29,968: UC; 29,974: SING & UC). Nigros, Tolong (Abella 13,862: PNH). **Mindanao**, Butuan (Ponce 20,499: GH); Tungao, San Mateo (Mendoza 42,270: PNH); Agusan (Miras, Sabino & Oliveros 24,478: A); Lanao (Cruz 23,891: GH; Guerrero 30,373: UC); Zamboanga del Norte (Frake 38,409, 38,441: A & PNH); Surigao (Wenzel 2,739: A & UC).

CULTIVATED: **Thailand**, Bangkok (Kerr 4,400: BM; 6,771 A; BM); Aumphornsatan Palace (Smitinand s.n.: BKF). **Malaya**, Penang, Bot. Gardens (Flippance s.n. & Curtis s.n.: SING); Batu Feringi (Fox s.n.: SING). Selangor, Kepong, Forest Research Institute (Sow & Ariffin 64,967; Lindong 55,779; Ahmad 70,453; Awang 52,094 & 52,082: SING). **North Borneo** (Burbidge s.n.: BM & GH); Sandakan, along the main road to Hospital (Kadir A. 1,813: KEP, PNH & SAN). **Singapore**, Tanglin (Burkill s.n.: SING; Md. Nur s.n.: SING); Old Tamil Lines (Md. Nur s.n.: SING); Bot. Gardens (Furtado s.n., 34,816: SING; Md. Nur s.n., 91, 1,608: SING; Pg. s.n.: SING); Gardens (Flippance s.n.: SING); Grange Road (Haniff s.n.: SING); loc. incert. (Teruya 1,243: SING); Sungei Yu (Hardial & Nor 29: SING). **Australia** Bot. Gardens (White 11,715: A). **Java**, Hort. Bot. Bogor (Leg.? s.n.: B, GH; Beumee s.n.: SING). **Philippines**, Luzon, Laguna (Sulit & Columbres s.n.: A); Mt. Makiling (Sulit 1: A; 8,170: PNH; Lagrimas 479: PNH). **America**, Brazil, Campinas (Pacheco 8,160: UC); Venezuela, Aragua (Pittier 8,829: GH); West Indies, Tobago, Scarborough (Broadway s.n.: E).

Munchhausia speciosa was found on specimens collected from a plant grown in the Botanic Garden, Goettingen. The descriptions, both generic and specific, and a plate were made by Linnaeus. Muenchhausen, in printing the descriptions and the plate in Muenchhausen der Hausvater V (1770) 357 t. 2, recorded Linnaeus as the author and stated that the latter had seen only dried specimens. The Javanese vernacular name *boengoer* was included in the specific description and its habitat was indicated to be Java and China. These descriptions without the plate were reprinted by Murray, Prodr. Stirp. Gotting. (1770) Praef.

However in 1771 Linnaeus (Mantissa II p. 243) credited the species to China only and noted it as a shrub (*arbuscula*), and this despite the fact that in the two above quoted descriptions it was described as a tree (*arbor*) that its Javanese vernacular name was mentioned and that Muenchhausen (l.c.) had indicated in the remarks that the plant, being of hot regions, had difficulties in acclimatizing itself in a wintry climate of Europe.

Merrill (Journ. Arn. Arb. XXXV, 1954 p. 147), after examining the types of *Munchhausia* in the Linnean herbarium, noted that two out of three sheets in *Munchhausia* cover represented *M. speciosa* L., that either of these sheets could have been used in drawing the plate given in the protolog, and that one of these two sheets bears the name *boengoer* in Linnaeus' own hand-writing. He does not mention anything about the third species and may represent a Chinese plant.

This means that both the generic and specific descriptions were based on the specimens of a plant from Java and so also the plate. It is not permissible to exclude the main characters from a protolog if there are specimens to vouch for their accuracy, even when the third syntype represent different species.

Apparently because Linnaeus had changed the description in 1771 from "arbor" to "arbuscula" or for some other reason De Candolle (Prodr. III, 1828 p. 93) identified the Linnean species with *L. indica* which is a shrub and has an almost smooth calyx, overlooking the fact that Linnaeus had described *M. speciosa* as having "calyces torulis sex canaliculatis" and depicted a plant having 12 ridges. De Candolle's misinterpretation of the species has contributed to obscure its status and has led many to reject the name as ambiguous, despite Koehne's note showing De Candolle's confusion on the matter (Koehne in Engl. Bot. Jahr. LV, 1883 p. 28 footnote and p. 19 in synonyms of *L. indica*).

Hence following Koehne (1883 and 1903) *L. flos-reginae* Retz is reduced here to *L. speciosa*.

It may be noted that this species is known to flower when quite young even in pots.

26a. ***Lagerstroemia speciosa* var. *intermedia* (Koehne) Furtado et Montien comb. nov. — Fig. 30B.**

L. intermedia Koehne in Engl. Pflanzenr. 17 = IV. 216 (1903) 260 fig. 56 A; Gagnep. in Fl. Indoch. II (1921) 962: **basinym.**

This differs from the other varieties of the species in having smallest flower buds, about 9 mm long, 8 mm in diam. Fruiting specimens not seen.

CHINA: Yunnan Prov; Szemao, Western mountains, alt. 1,300 m (Henry 11,912: E — **isolectotype**); Lan-Tsang Hsien (Wang 76,665: A).

BURMA: Myitkyina distr., Dahwinchaung, alt. 280 m (Rogers 217: E); Pyinma, alt. 100–150 m (Po Kyaw 23: E); Yunnan frontier, Takaw alt. 650 m (Kingdon-Ward 12,761: BM).

The calyx bears a conspicuous ligule at the sinus and may be only a mountain form of var. *ligulata*. Only specimens in flowering stages are known, which have somewhat small leaves.

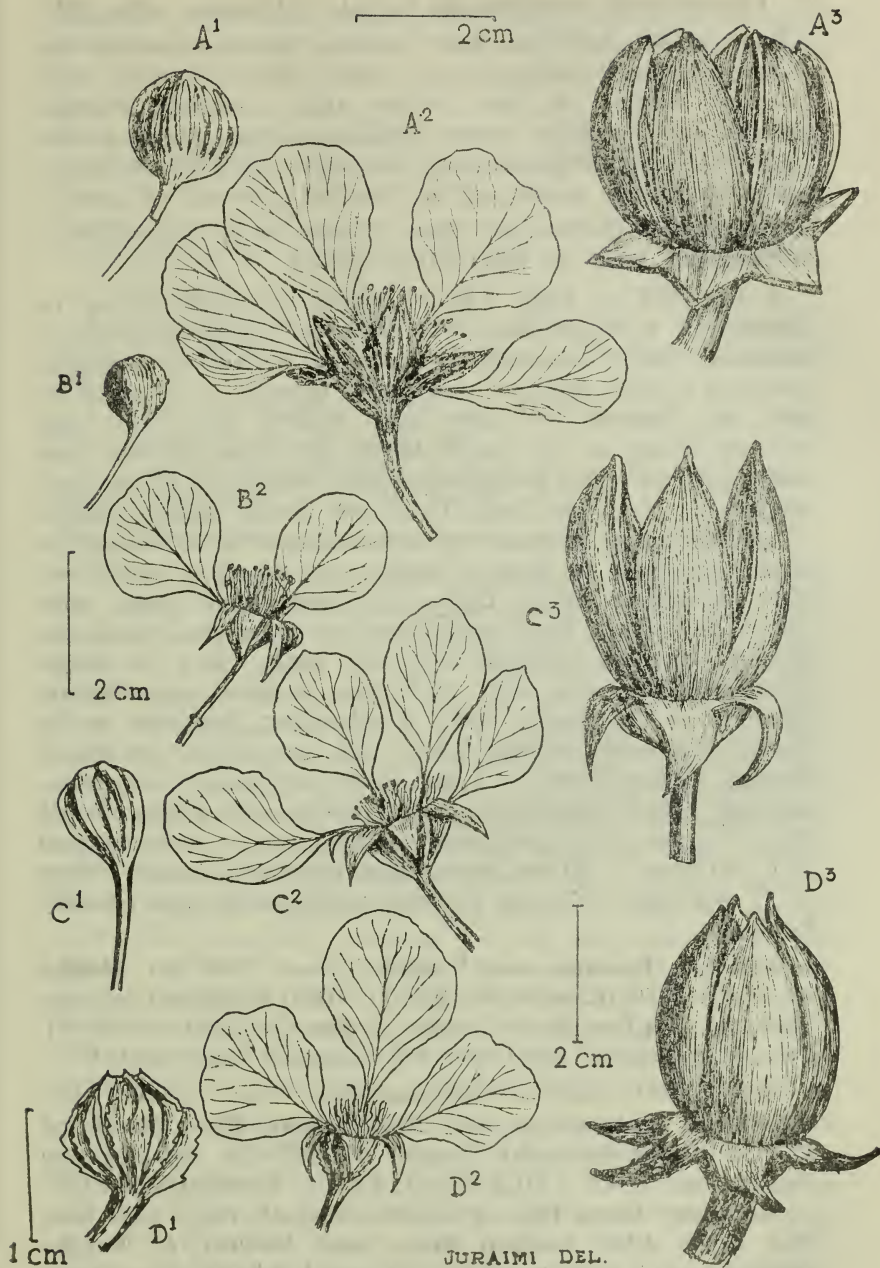


Fig. 30. A, *L. macrocarpa* Kurz var. *macrocarpa* (A1-A2: Kurz 1,972 in CAL — lectotype; A3: Rock 9,665 in A).

A1, Flower bud. A2, Fertile flower. A3, Mature capsule.

B, *L. speciosa* (L) Pers. var. *intermedia* (B1-B2: Henry 11,912 in E — isolectotype). B1, Flower bud. B2, Flower.

C, *L. macrocarpa* Kurz var. *reflexa* (C1-C2: Chaweng 9,872: BKF). C1, Flower bud. C2, Flower. C3, Mature fruit.

D, *L. costa-draconis* (D1-D3: Kosterman 1,131: SING). D1, Flower bud. D2, Flower. D3, Mature fruit.

27. *Lagerstroemia costa-draconis* Furtado et Montien — Fig. 30D.

Inter species *Adambeae* cum fructibus maximis ponenda sed alabastro juvenili sulcato, dorso basin versus vel secus sulci margines dentato vel inter sulcos costis minoribus deciduis dentatis sitis, dentibus saepe deciduis, calycis costis asperis gracilibus dorso plerumque acutis, interdum prope ejustem sinum conspicue ligulati, sepalis calycis fructiferi porrectis vel patulis.

Holotypus: THAILAND: Prov. Srisaket prope Khantharohm (Suvanakoses 1,592 = BKF 26,441: SING).

A tree 5–8 m high. *Leaves* oblong or elliptic-oblong or oblanceolate 6–40 cm long, 5–14 cm broad, obtuse or acute or sometimes shortly acuminate at the apex, rounded or gradually narrowed at base, glabrous, much paler beneath, 7–14 nerved on each side; petiole 7–15 mm long. *Panicle* 10–30 cm long, 5–20 cm broad; at first greyish-brown puberulous all over then nearly glabrous with a few flowered, short branchlets. *Flower buds* subglobose, 11–13 mm long, 11–13 mm broad, sulcate forming 12 or more ridges, ridges more or less dentate in the margins or dentate growth in the furrows, margins and growth in the furrows often deciduous; ridges finally thin and often acute; apex star-shaped with 6 short forms from the tip of the lobe to the summit; base pedicelliform 6–9 mm long. *Calyx* in flower cup-shaped, 8–12 mm deep, 10–13 mm in diam., often ligulate below or at the sinuses; lobes 6, triangular, thickened in the margin. *Petals* sub-orbicular 3.5–6.0 mm long, 3.0–4.5 cm broad, abruptly narrowed into \pm 5 mm long claw. *Stamens* numerous, subequal. *Ovary* subglobose or short oblong with a long slender style. *Fruiting calyx* thickened, woody, cup or saucer-shaped \pm 6 mm deep, \pm 20 mm broad, lobes spreading. *Capsule* oblong \pm 35 mm long, \pm 25 mm in diam., nipped at the apex, usually 6-valved.

BURMA: **Taungoo**, near Kyaukkyi (Lace 5,396: E). **Mendat** alt. 3,000'–3,750' (Kingdon-Ward 22,177: BM). **Rangoon** (Dickason 5,049: A). **Tha Byn** (Ba Pe 10,445: A). **Kan Gyi** (Ba Pe 9,673: A). **Pegu**, Yoma (Kurz 1,345: CAL); Mt. Victoria (Cooper 6,074: E).

THAILAND: *Eastern:* **Chiyapum Prov.** (Kerr 19,967: BM). **Ubol Prov.** (Lakshnakara 881: BM). **Srisaket Prov.** (Smitinand 12,158: SING); Kantralak (Prayad 272: SING); Khantharohm (Suvanakoses 1,592 = BKF 26,441: KEP — **isoholotype** & SING — **holotype**). **Korat Prov.** (Nakornrachasima), Ban Chum Seng (Put 2,540: BM). **Kanburi Prov.**, near Neeckey & Wangka (Bloembergen & Kostermans 295: A); near Kin Sayok (Kostermans 1,131: SING).

CAMBODIA: Strung-Streng (Leg? 2,161: GH).

This species of *Adambea* section has very large capsules and may be placed among the *L. macrocarpa* group, but is distinguished by its young flower buds being often dorsally dentate at base or along the margins of the furrows and also bearing frequently short dentate deciduous ridges in the furrows. Most of the teeth and the marginal growths fall off making the flower

buds and calyces later rough, thinly ridged. Sometimes the calyx bears a conspicuous ligule at or below the sinus. The calyx lobes are thickened in the margin and are patent or spreading in the mature capsule.

28. *Lagerstroemia macrocarpa* Kurz in Journ. Asiat. Soe. Beng. XLII, 2 (1873) 234, XLVI, 2 (1877) 88, & For. Fl. Burma I (1877) 524; King in Mat. Fl. Mal. Pen. III (1898) 353 sub obs.; Brandis, Ind. Trees (1911) 339; Craib in Kew Bull. (1911) 53; Gagnep. in Fl. Indoch. II (1921) 942; Ridl., Fl. Mal. Pen. I (1922) 824 pp.; Craib, Fl. Siam. Enum. I (1931) 725.

L. hossei Koehne in Engl. Jahrb. XLII Beibl. 97 (1908) 50; Craib in Kew Bull. (1911) 53; Gagnep. in Fl. Indoch. II (1921) 960.

L. intermedia Koehne var. *oblonga* Craib in Kew Bull. (1911) 53; Gagnep. in op. cit. (1921) 962.

L. speciosa sensu Koehne in Engl. Jahrb. IV (1883) 28 et. Engl. Pflanzenr. 17 = IV. 216 (1903) 261 pp.

28a. *Lagerstroemia macrocarpa* var. *macrocarpa* — Fig. 30A.

A tree ± 8 m high. *Leaves* oblong or ovate-oblong, 10–47 cm long, 5–20 cm broad, acute at the apex when young later sub-rounded, obtuse or gradually narrowed at base, chartaceous, glabrous 8–12 nerved on each side; petiole 5–18 mm long. *Panicle* greyish brown velvety all over, sub-cylindrical 10–30 cm long. *Flower buds* sub-globose 10–13 mm long, 9–12 mm broad, obscurely nipped or not, pedicelliform base 8–12 mm long. *Calyx* in flower generally cup-shaped, tube 6–10 mm deep, 8–12 mm in diam.; lobes 6, erect or spreading, 8–12 mm long; ridges sulcate with broad, somewhat flattened spaces or ridges between, the shorter and bigger often marked with a furrow amidst. *Petals* short-oblong, orbicular and abruptly narrowed into the claw, 20–45 mm long (including 4–8 mm long claw), 15–40 mm broad, undulate in the margin. *Stamens* numerous, subequal. *Ovary* subglobose with a long slender style. *Fruiting calyx* thickened, woody, saucer-shaped, 3–5 mm deep, 25–30 mm broad; lobes spreading. *Capsule* 25–40 mm long, 20–35 mm in diam., short oblong or subglobose, thickened; woody, usually 6-valved.

BURMA: **Upper Burma**, loc. incert. (leg. s.n.: A). **Maymyo** (Lace 5,803: E). **Pyinma** (Din s.n.: E). **Southern Shan State**, Taungyi (Abdul Khalil s.n. = CAL 177, 101: CAL). **Tha-byin** (Ba Pe 10,445: A). **Kan Gui** (Ba Pe 9,665: A). **Myingyan** (Lace s.n.: E). **Henzada**, Migon (Lace s.n.: E). **Pegu** (Kurz 1,972: CAL — **lectotype**); Littang side (Kurz 1,972: CAL — **syntypes**); Yoma (Kurz 1,345: CAL — **syntypes**); Tonkyeghat, F. Pagoda (Kurz 1,345 & 1,347: CAL — **syntypes**). **Martaban** (Kurz 1,345: CAL — **syntypes**). Tharrawaddy, Tyinmyok (Smales 41: E).

THAILAND: **Northern: Chiangmai**, Me Ping (Kerr 5,634: BM); loc. incert. (Kerr 578: BM — **holotype** of *L. intermedia* var. *oblonga*); Chiangmai to Chieng Rai, Wieng Papao (Rock 1,665: A).

INDOCHINA: **Laos** (Talbot de Malahide 1: SING).

28b. *Lagerstroemia macrocarpa* var. *reflexa* Furtado et Montien
— Fig. 30C.

A var. *macrocarpa* sepalis calycis fructiferi valde reflexis differt.

Holotypus: THAILAND: Prae (Bhusayallanit 18,079: BKF).

This variety differs from the type form in having sepals of the fruiting calyx reflexed.

BURMA: **Haka** (Dickason 7,592: SING). **Maymyo Plateau** (Lace s.n.: E; 5,520: E). **Shan States**, Keng Tung (MacGregor 668: E); Taungyi (Abdul Khalil s.n.: E). **Henzada** (Lace s.n.: E). **Rangoon**, Mt. Popa (Dickason 5,460: A). loc. incert. (Prazer 19: E).

THAILAND: Northern: **Chiengmai**, Chiengdao (Khantchai 12,706: BKF & KEP). **Lumpang** (Krajang 9,826: BKF; Stan 9,854: BKF; Chaweng 9,872: BKF; Sukrit 11,270: BKF; Vithun 11,294: BKF). **Prae** (Bhusayallanit 18,079: BKF — **holotype**); East Mae-Yom Forest (Thai For. Dept. Coll. 2,510: A). **Muang Lom** (Kerr 5,734: UC). **Bitsanulok** (Groff 6,065: UC). **Nakawn Sawan** (Kerr 5,975: CAL). *North Eastern:* **Loie**, Wang Sphung (Khantchai 12,474: BKF & KEP). **Khonkaen** (Din 5,644: SING).

INDOCHINA: **Laos**, Vientiane (Addis 1: SING).

CULTIVATED: **Bangkok** (William s.n.: SING).

Often many calyces are diseased even in the buds in which case the calyx ridges may wholly disappear and both the calyx and fruit remain small. Some such calyces have reflexed sepals and others erect, and it is possible that such forms might be confused with *L. speciosa* or *L. reginae*. However a large whitish pouch-like mark at the sinus, suggests that the specimens have to be referred to *L. macrocarpa* var. *reflexa*.

Subject. **Microcarpidium**

Subsection **Microcarpidium** Furtado et Montien.

Sect. *Velaga* sec. Koehne op. cit. (1883) 15 & (1903) 257. quoad *L. subcostata*.

Alabastra globosa vel subglobosa, circa 2-4 mm (sine basi) in diam., costis superficialibus; sepala intus glabra saepe appendice apicali penicillata. Capsula minora fere globosa, majora ellipsoidea, 4-8 mm longa. Folia 1.5-5 cm longa, interdum subduplo longiora, 2-5 cm lata.

DISTRIBUTION: China, Japan, Indonesia, Formosa and Philippines.

TYPUS: *L. subcostata* Koehne.

This subsection is unique in having very small, globose or subglobose flower buds, 2-4 mm in diam., with 12 or more superficial ridges; small carpels, globose ones about 4 mm long. and ellipsoid ones about 6-8 mm long, 3-4 mm wide. Leaves usually small.

Excepting in *L. micrantha*, the calyx in the other species of this subsection has an annular band within, on which petals are seated and in this respect, these species resemble *L. indica*, a larger flowered species and belonging to the section *Sibia*.

Key to the Species

- 1a. Calyx distinctly auriculate at the sinus *L. limii*.
- 1b. Calyx without auricles 2.
- 2a. Calyx without an annular band within *L. micrantha*.
- 2b. Calyx annulate within 3.
- 3a. Petal linear or elliptic, narrow *L. glabra*.
- 3b. Petal nearly as broad as long, ovate or cordate 4.
- 4a. Petal deltoid-oblong, truncate or slightly cordulate towards the base, slightly undulate. Capsule dark when mature, subglobose *L. yangii*.
- 4b. Petal as long as broad, often crispate in the margin and cordulate. Capsule oblong or ellipsoid *L. subcostata*.

29. *Lagerstroemia limii* Merr. in Philipp. Journ. Sc. XXVII (1925) 165. — **Fig. 31a, 31b.**

L. chekiangensis Cheng in Contrib. Biol. Lab. Sc. Soc. China (1932) 73 fig. 2: **syn. nov.**

A shrub or small tree. *Leaves* elliptic or oblong-elliptic, thin coriaceous, 6–9 cm long, 2.5–4 cm broad, minutely pubescent above, densely pubescent on the midrib and reticulation beneath, acute or shortly acuminate at the apex, gradually cuneate or sometimes sub-rounded at base, 9–12 nerved on each side; petiole pubescent 2–4 mm long. *Panicle* terminal, pyramidal, 8–15 cm long, pubescent all over. *Flower bud* subglobose about 4 mm long (excluding \pm 2 mm long pedicelliform base), 4 mm broad, pubescent, broadly auriculate at the sinus, 12–14 ridged, nipped at the apex. *Calyx* in flower cup-shaped, 3–4 mm deep, 4 mm broad; lobes usually 6, triangular 3–3.5 mm long; appendages persistent at each sinus, about 2 mm long, 3 mm broad. *Petals* ovate or sub-orbicular 4–5 mm long (not including \pm 5 mm long claw), 4–5 mm broad, undulate in the margin. *Stamens* many, 5–7 longer and thicker, the others subequal. *Ovary* globose, glabrous with a long slender style. *Fruiting calyx* obconical, slightly pubescent, 2 mm deep, 6 mm broad with \pm 2 mm long base; lobes 6 erect, often pubescent along the ridge and the rim. *Capsule* \pm 10 mm long, 6–7 mm in diam., oblong or elliptic-oblong, glabrous, 4–6 valved.

CHINA: **Szechuan & Hepeh** (Hwa 33: UC). **Chekiang**, Tatze Chiao (Mayer 1,512 & 1,513: A); Han-Chow (Mayer 431: UC). **Fukien**, Amoy (Chung 801: UC; 1,644: A, E & SING — **isoholotypes**, UC — **holotype** & 1,682: UC; 1,770: A & UC; 4,656, 4,790, 4,882, 4,951, 5,093 & 6,096: A; & s.n.: BM & SING). Hinghwa (Lin Pi 6,286: UC; Fung Hom 19,180: A; Dunn 2,729: A).

L. chekiangensis is only a more vigorous and hairy form of *L. limii*. Apparently younger side shoots of *L. limii* produce obovate leaves, and glabrous leaves and calyx, the last with very short auricles (cf. Dunn 2,729, Chung 6,096 & Fung Hom 19,180 from Amoy).

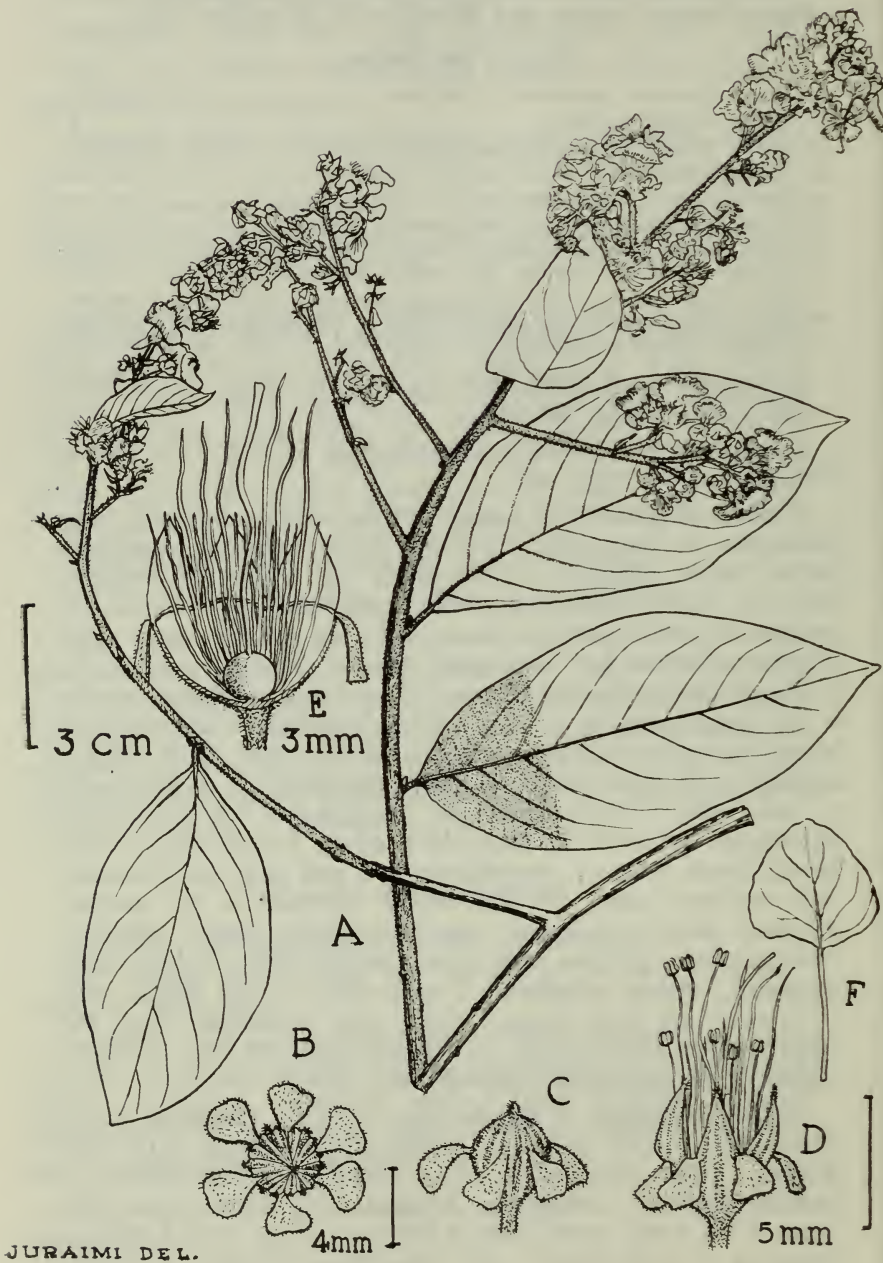
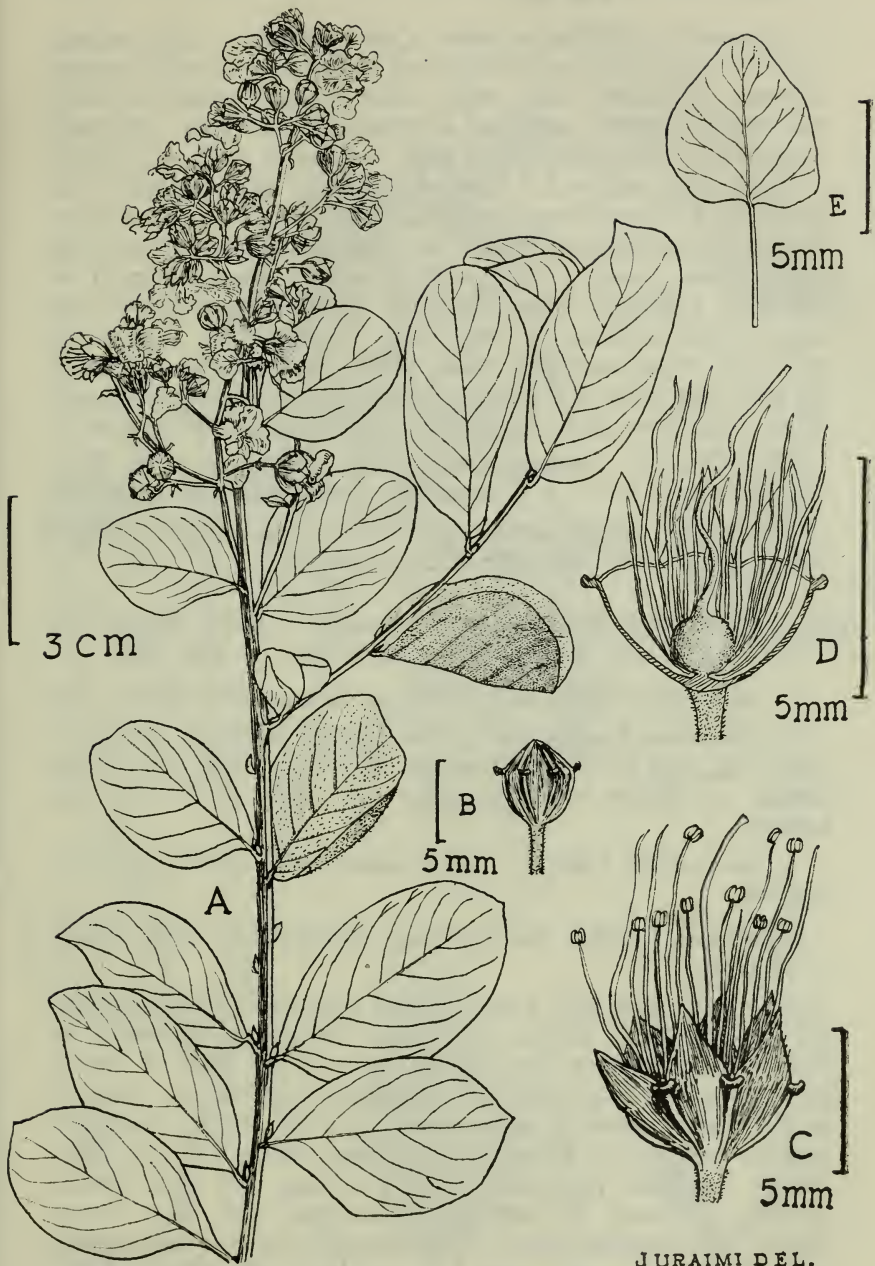


Fig. 31a. *L. limii* Merr. (A-F: Chung 1,644 in SING — isoholotype).

A, Fertile twig. B-C, Flower bud with appendages. D, Flower after anthesis. E, Longitudinal section of flower. F, Petal.



JURAIMI DEL.

Fig. 31b. *L. limii* Merr. (A form with almost glabrous calyx, shorter calyx, auricles and obovate leaves). Chung s.n. in SING.

A, Fertile twig. B, Flower bud. C, Flower after anthesis. D, Longitudinal section of flower. E, Petal.

30. **Lagerstroemia micrantha** Merr. in Journ. Arn. Arb. XXI (1940) 379. — **Fig. 32.**

Apparently small tree or shrub. *Leaves* elliptic or short oblong, 5–8 cm long, 3.0–4.5 mm broad, dark brown above, paler beneath, minutely pubescent when young, later sparsely pubescent along the midrib beneath, acute or acuminate at the apex, gradually narrowed or sub-rounded and often unequal at base, 4–6 nerved on each side; petiole 2–3 mm long. *Panicle* subpyramidal, 7–12 mm long, 4–12 mm broad, terminal, brownish pubescent all over. *Flower bud* subglobose about 3 mm long (including 1.5 mm long pedicelliform base), 1.5–2.0 mm in diam., shortly nipped at the apex, 12 faintly ridged. *Calyx* in flower campanulate, 2 mm deep, 2 mm in diam.; 6 lobes, erect, 1.5 mm long, deciduously pubescent. *Petal* undulate, ovate, about 1.8 mm long (including 0.8 mm long claw), 0.8–1.0 mm broad. *Stamens* many, subequal. *Ovary* subglobose, glabrous; style 3–5 mm long. *Capsule* (not seen).

INDOCHINA: **Annam**, Quang Binh Prov., at Kim Bang Village (Petelot 3,743: A — **holotype**). **Formosa** (Faurie 8,076: A).

The species has unusually small flowers and shortly clawed petals. It is a very close ally of *L. subcostata*.

31. **Lagerstroemia glabra** (Koehne) Koehne in Engl., Jahrb. XLI (1907) 102, non. *L. glabra* Gagnep (1918). — **Fig. 33.**

L. microcarpa Wight *sec.* Hance in Journ. XVI (1879) 107.

L. subcostata Koehne var. *glabra* Koehne in Engl., Jahrb. IV (1883) 20, and in Engl., Pflanzenr. 17 = IV. 216 (1903) 260; Rehder et Wilson in Journ. Arn. Arb. VIII (1927) 179 p.p. **basinym.**

L. stenopetala Chun in Sunnyatsenia VII (1943) 8 pl. 2. **syn. nov.**

Holotypus: CHINA, Sai Shi Chan (Sampson in Herb. Hance n. 15,619).

A shrub or small tree. *Leaves* elliptic lanceolate or ovate-elliptic, 5.0–11.5 cm long, 2.5–4.0 cm broad, chartaceous, glabrous on both sides, sometimes with a few hairs at the axils of lateral nerves beneath, long acuminate sometimes acute or sub-rounded at the apex, cuneate to sub-rounded at base, slightly decurrent into the petiole, 5–7 nerved on each side; petiole 2–7 mm long. *Panicle* terminal, pyramidal, 5–12 cm long, 2–8 mm broad, sparsely pubescent or glabrous, rectangular with short acute angles, often bearing linear bracteoles. *Flower bud* top-shaped with abruptly narrowed into 1–2 mm long pedicelliform base, obscurely 12–14 ridged, shortly nipped. *Calyx* in flower funnel-shaped, 3–4 mm deep, 3 mm broad; lobes 6, erect or spreading, about 1.5 mm long. *Petals* oblong or elliptic about 3 mm long (excluding 2–3 mm long claw), 3 mm broad, undulate in the margin. *Stamens* many, 3–6 thicker and longer, the others subequal. *Ovary* subglobose, glabrous with a long slender style. *Capsule* ellipsoid, 6–8 mm long, 4–5 mm in diam.

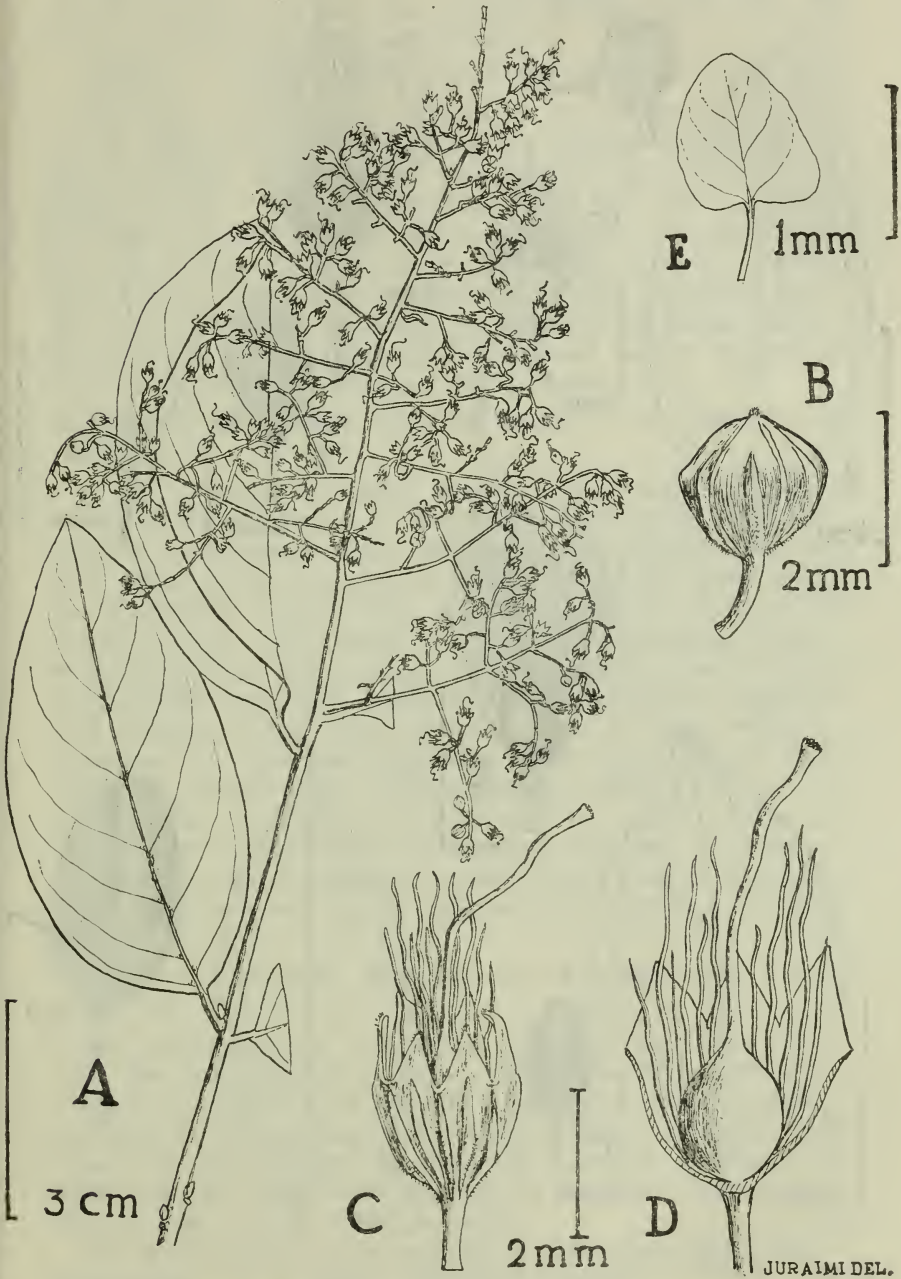
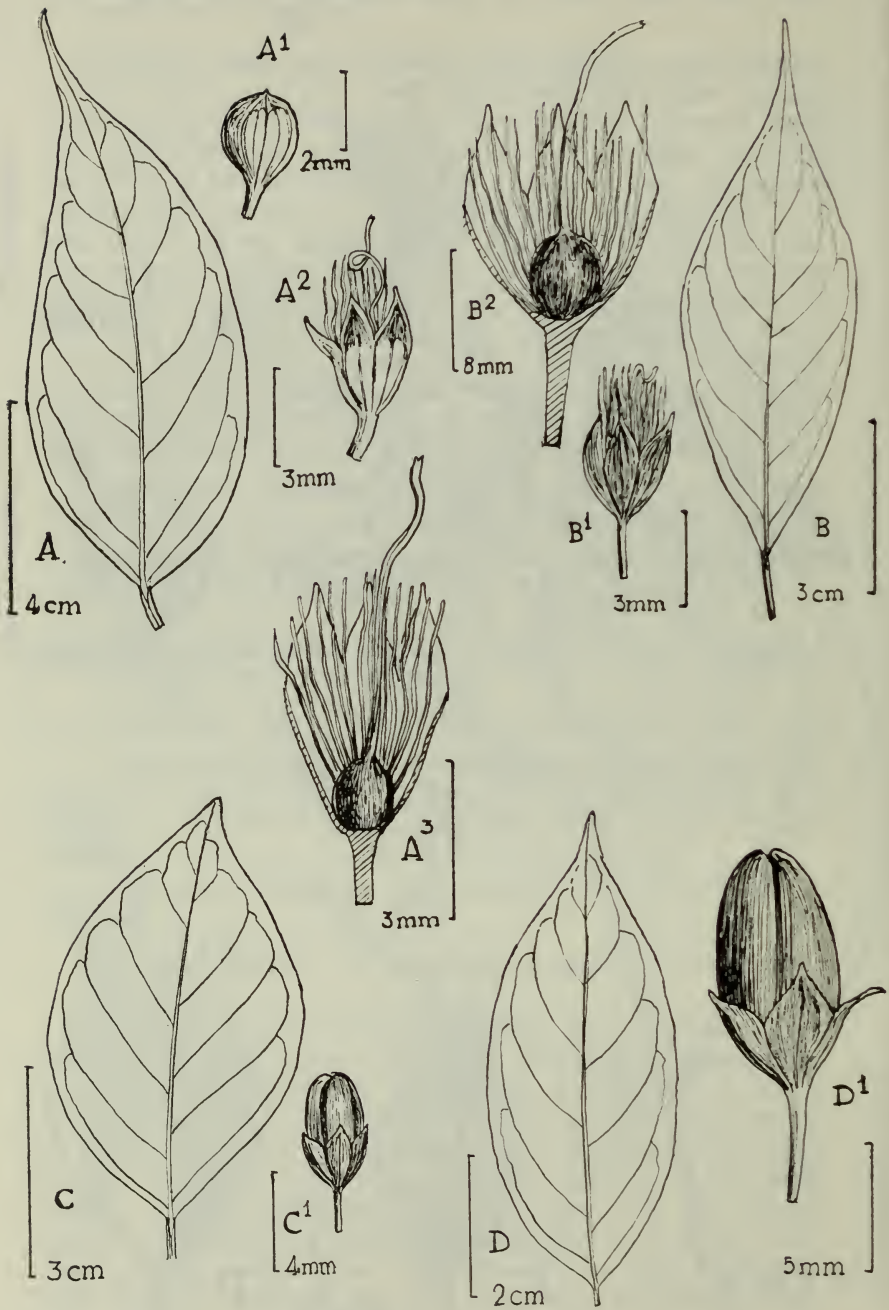


Fig. 32. *L. micrantha* Merr. (A-E: Petelot 3,743 in A — holotype).
 A, Fertile twig. B, Flower bud. C, Flower after anthesis. D,
 Longitudinal section of flower. E, Petal.



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Fig. 33. *L. glabra* Koehne (A–A³. Tsang 20,543 in SING — isoholotype of *L. stenopetala*; B–B² Chow 536 in A; C–C¹ Henry 7,169 in A. D–D² Tsang 23,000 in A).

A, B, C, D, Leaves. A¹, Flower bud. A², B¹, Flower after anthesis. A³, B², Longitudinal section of flower. C¹, D¹, Capsules.

CHINA: Kwangsi, Pa Yam Shan on Kwangtung border (Tsang 23,000: A); Hupeh (Henry 7,169: A, BM, E & GH); Patung Hsien (Chow 536: A & E). Kwangtung, Fan Shiu Shan (Lau 2,593: A); Sam Koh Shan (Tsang 20,543: A, E, SING & UC — isoholotypes of *L. stenopetala*).

JAPAN: Lui Kiu Islands (Yokohama Nursery — s.n.: A).

There is a great deal of variation in the specimens referable to this species and without having the holotype to consult we are not able to separate them into varieties. Henry 7,169 from Hupeh, China, represents a broader leafed form as was noted by Koehne (1903) himself, and his *L. fauriei* may also be a form or variety referable here. *L. stenopetala* has ovate slightly curved leaves with a long acuminate or caudate acuminate apex. Chow 536 from Hupeh has elliptic acuminate or caudate-acuminate leaves. Tsang 23,000 has sessile leaves and may be the typical form as described by Koehne (1907 p. 104).

32. *Lagerstroemia yangii* Chun in Sunyats. VII (1948) 7. — Fig. 34.

A tree, branches pubescent, brown. *Leaves* obliquely elliptic, widest above the base, 7–10 cm long, 3–4 cm broad, narrowed at base, acuminate at apex, undulate in the margin, hairy on both surfaces when young, later glabrous and dark above, paler and glabrescent beneath, hairs persistent along the nerves, 7–9 nerved on each side; petiole 2–4 mm long, puberulous. *Panicle* terminal, 6–7 mm long or longer with lateral long branches borne in leaf axils; branchlets angled, brownish, pubescent, congested with flowers. *Flower buds* about 2 mm in diam., globose, superficially 12 costulate, puberulous. *Calyx* tubular, 2 mm deep with lobes slightly shorter, hairy, glabrous within, except at the appendicular tips. *Petals* ovoid, undulate in margin, obtuse at apex, roundedly cordulate at base, slightly decurrent in the claw. *Stamens* unequal, 6 longer, all inserted at the base of the calyx tube. *Ovary* glabrous. *Capsule* subglobose 5–7 mm long, 5–6 mm in diam., black.

CHINA: Kwangtung Prov. by the Lunchow river (Ford 1,719: A).

We have interpreted this species from the description only. The type was collected by Lieut. Yang Ching Hseng from an old dying tree about 25 m. tall with a trunk of one metre in diam., growing near a monastery in Kweichow Province of China. The capsule in the holotype was obviously not fully developed, a reason why the seeds were described as not being fully mature. The capsules in Ford 1,719 are larger.

The species appear to be very like *L. subcostata* though easily distinguished by its black, subglobose capsules.

var. **ambigua** (Pamp.) Furtado et Montien. — Fig. 35b (b).

L. subcostata Koehne var. *ambigua* Pampini in Nueva Gorn. Bot. Ital. XVII (1910) 676: **basinym**.

Differs from the type variety in the leaves being much narrower, fewer nerved (3–5 nerved), more hairy.



Fig. 34. *L. yangii* Chun (Ford 1,719 in A).

A, Fertile twig. B, Flower after anthesis. C, Longitudinal section of flower. D, Petal. E, Twig with capsules. F, Fruit enlarged.

CHINA: Hupeh Prov. mountains, alt. 1,950 m (Silvestri 1,558a: A — lectotype & 1,558: A). Chekiang Prov. (Leg.? no. 1,740 = Lingnan Univ. Herb. No. 77,778 — A).

Silvestri's collections were the syntypes of Pampini's variety which are probably in Florence, the Arnold Arboretum's collections being the fragments (clastotypes) of the original specimen.

33. *Lagerstroemia subcostata* Koehne in Engl., Jahrb. IV (1883) 20; Engl. Pflanzenr. 17 = IV. 216 (1903) 260 *pro parte typica* & in Engl. Jahrb. XLI (1907) 102; Matsum et Hay., Enum. Pl. Form. (1906) 152 p.p.; Hui-Lin, Ic. Pl. Form. II (1912) 27; Rehder & Wilson in Journ. Arn. Arb. VIII (1927) 179 p.p.; Kanehira, Form. Trees (1936) 487 fig. 450; Hui-Lin, Woody Fl. Taiw. (1963) 927 fig. 247; Ohwi, Fl. Jap. (1965) 648. — **Fig. 35a, 35b (a).**

L. subcostata Koehne var. *hirtella* Koehne in op. cit. (1883) 21 & (1903) 260 (nom. illeg.).

L. unguiculosa Koehne in Engl. Bot. Jahrb. XLI (1907) 103; Hayata, Mat. Fl. Form. (1911) 116 & Ic. Pl. Form. II (1912) 27.

A shrub or small tree. *Leaves* ovate, elliptic or obovate-elliptic 3–9 cm long, 1.5–5.0 cm broad, often opposite or sub-opposite, distichous, glabrous above, glabrous or minutely pubescent beneath, chartaceous, acuminate at the apex, gradually cuneate to the base or sub-rounded, 4–7 nerved on each side; petiole 2–4 mm long. *Panicle* minutely greyish brown pubescent all over; pyramidal 10–30 cm long, terminal or axillary. *Flower bud* subglobose about 2 mm long (excluding \pm 3 mm long pedicelliform base), 2 mm broad, 12–14 faintly ridged, shortly nipped at the apex. *Calyx* in flower cup-shaped, 2 mm deep, 3 mm broad; lobes 6 or sometimes more, erect. *Petals* broadly ovate, retuse above the claw, undulate in the margin, about 3 mm long, 4 mm broad (claw 3.5 mm long). *Stamens* many, 3–6 longer and thicker, the rest subequal. *Ovary* glabrous, subglobose with a long slender style. *Fruiting calyx* obconical, 2 mm deep, abruptly narrowed into \pm 5 mm long pedicelliform base. *Capsule* elliptic-oblong, 7–9 mm long, 4–6 mm in diam., 4–6 valved.

CHINA: **Kiangsu**, Ihsing-Wu-Fu (Ling 12,286: UC). **Anhwei**, Chu Hwa Shan (Ching 2,891: A & E); Chemen (Ching 3,202: A, E & UC). **Kiangsi**, Yuen Shan Hsien (Hu 1,302: A & UC); Kiennan near Tung Lei (Lau 4,116: A); Wu-ning (Hsing 5,038: A). **Chekiang**, Chun-an Hsien (Keng 656, 745: A & UC); Kai-Hwa Hsien (Hu 512: SING).

FORMOSA: Taihoku (Sasaki & Hsieh 224?: A & PNH; Sasaki 21,470: A & UC; Wilson 10,263: A); Chichijima, Yanku (Wilson 8,246: A); Takao (Wilson 9,875: A); Bankinsing (Henry 43: E; 561: A & E; 438: BM); Tamsui (Henry 1,736: BM); Tehow (Henry s.n.: A); South Cape (Henry 958: A; 966: A & BM; 1,220: A); Sylruta Paehiran? (Faurie 56: A); Sepibus,

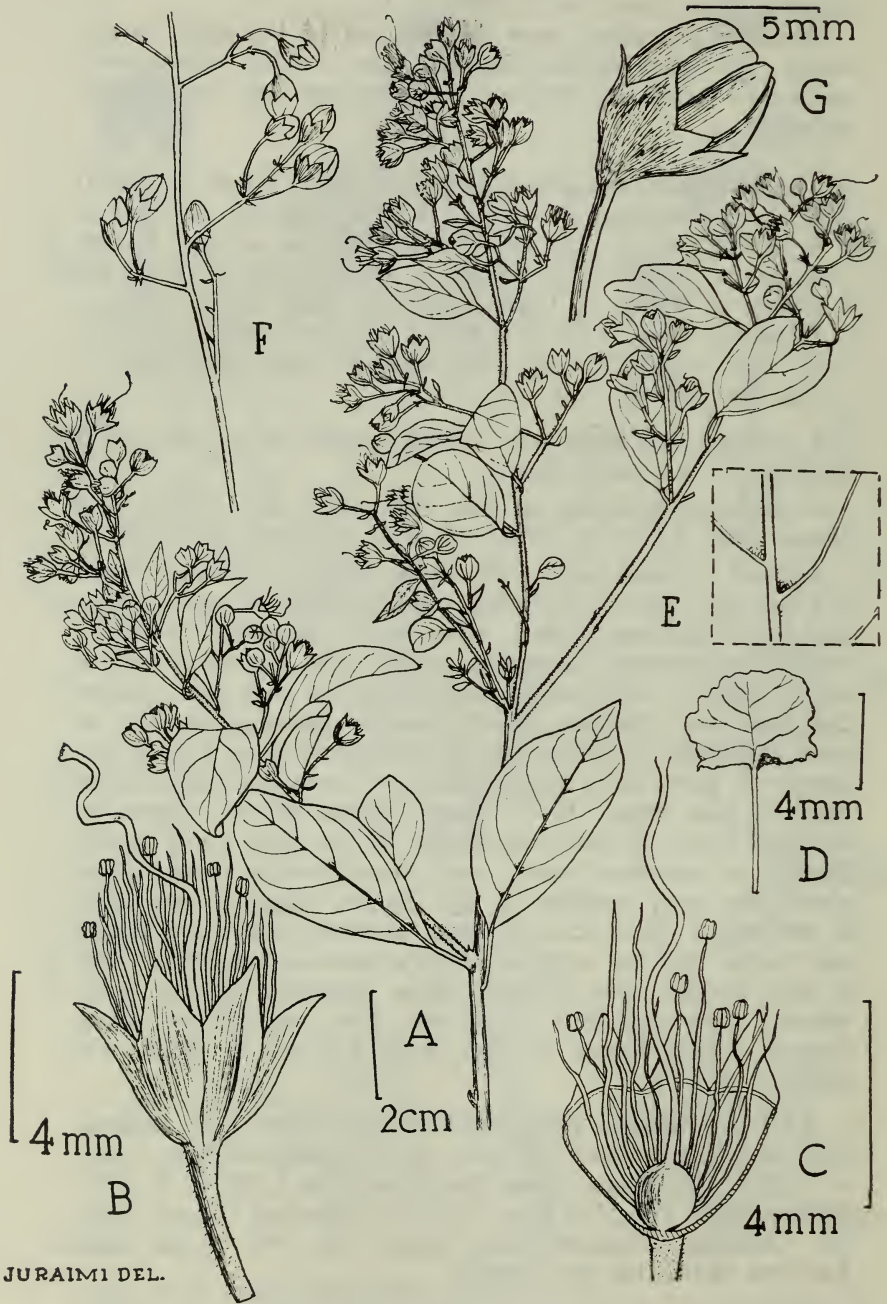


Fig. 35a. *L. subcostata* Koehne (Gressitt 433 in A).

A, Fertile twig. B, Flower. C, Longitudinal section of flower. D, Petal. E, Nerves to show hairy. F, Capsule.

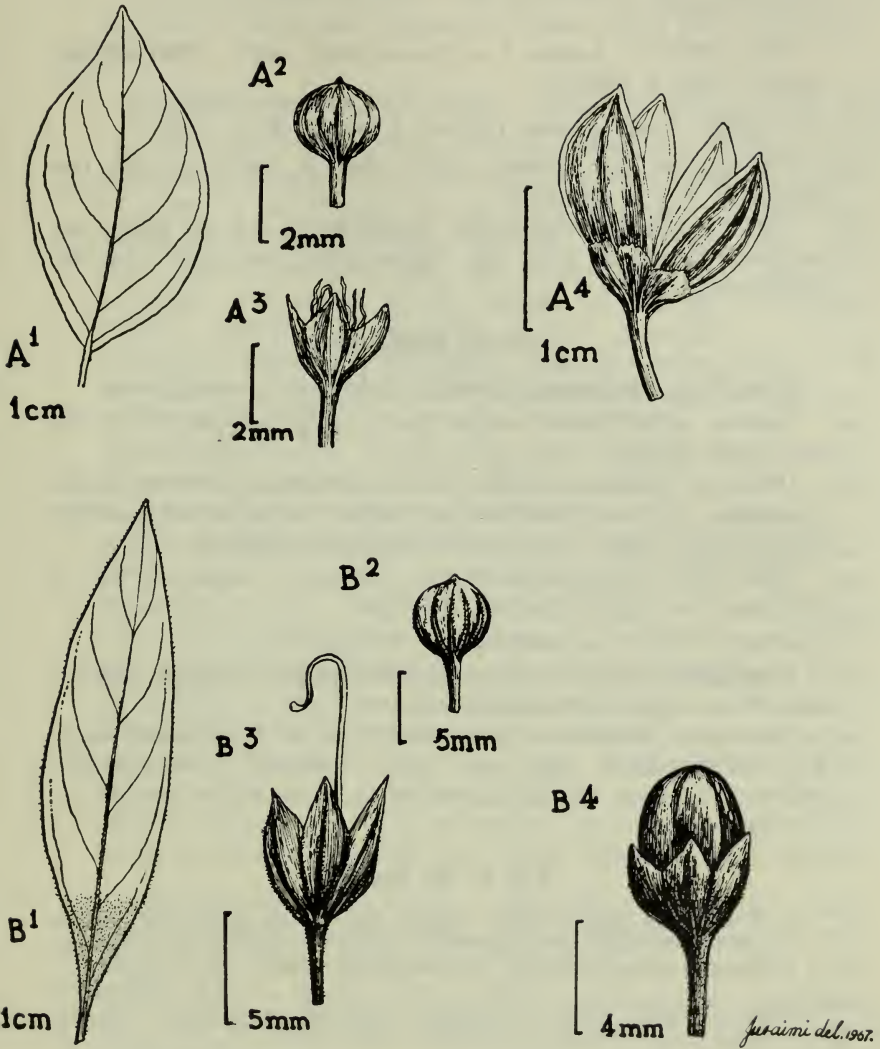


Fig. 35b. (a) *L. subcostata* Koehne (A¹–A³ Oldham 111/1 in GH; A⁴ Oldham 119/2 in GH).
 (b) *L. yangii* var. *ambigua* (B¹–B³: Silvestri 1,558a in A lectotype; B⁴: Leg.? 1,740 in A).
 A¹, Leaf. A², Flower bud. A³, Flower after anthesis. A⁴, Capsule with longitudinal dehiscence. B¹, Leaf show the hair. B², Flower bud. B³, Flower after anthesis. B⁴, Capsule.

Mokuto (Faurie 1,018: A); loc. incert. (Ream 413: UC; Tanaka 49: GH & UC; Henry 1,491: A); (Oldham 111/1 & 119/2 GH — **syntypes?**) Canyon (Gressitt 433: A & BM); Tamali, Taitung (Keng K. 1,400: A); Senzyo-zan, Taihoku-si (Tanaka 17,819: A, E, GH & SING).

PHILIPPINES: Luzon, Los Bonos (Sulit 3,408: SING; Steiner 40,084: PNH & SING).

JAPAN: **Bonin Islands** (Wilson 8,246: A & s.n.: A).

We support Li's opinion (1963) that in Formosa only one species is known as wild.

There are some large leafed forms which do not show any material differences from the typical ones and there are also intermediate forms.

Subsect. *Banglamea*

Subsection *Banglamea* Furtado et Montien subsect. nov.

Subsect. *Adambeola* Koehne op. cit. (1833) 30 & (1903) 262 pro parte atypica.

Ovarium glabrum. Calyx costis sepalorum numero duplo praeditus, vel costis indistinctis tomento tectis et infra sinum corniculatus. Sepala intus supra medium tomentosa.

DISTRIBUTION: Subhimalayan region of Eastern India & Pakistan, China, Indochina & Thailand.

HOLOTYPE: *L. fordii* Oliv. et Koehne.

This differs from the subsection *Adambea* in having the superior half of the sepals tomentose within.

The name *Banglamea* is latinized form of Indochinese name for *Lagerstroemia* spp. of this subsection. Unfortunately *Adambeola* is not available here, since it has to be typified on *L. hypoleuca*.

Key to the Species

- 1a. Flower buds slightly 12–14 ridged, light brown tomentose, with a wart-like cornicle at the base of each sinus of sepals, long pedicellate. (Fruiting calyx completely reflexed. Fruit elongate 17 × 10 mm) *L. duperreana*.
- 1b. Flower buds without cornicles, minutely pubescent, distinctly ridged 2.
- 2a. Leaves up to 12 cm long, 6 cm broad, oblong or ovate-lanceolate, dark-green above, greenish beneath, rounded or nearly rounded at the base, deciduously puberulous beneath with tuft of persistent hair in the nerve axils. (Side nerves 8–10. Petiole 8–9 mm long. Fruiting calyx thin, erect. Fruit 5 mm long, 3 mm broad. No flower) *L. minuticarpa*.
- 2b. Leaves rhomboidally ovate, elliptic or obvate, glabrous on both surfaces 3.
- 3a. Leaves elliptic or obovate, attenuate obtuse or almost acute at base, rounded or shortly apiculate at apex, 8–12 cm long, 3–5 cm broad, with about 10 nerves on each side; petiole 3–4 mm long *L. gagnepainii*.
- 3b. Leaves rhomboid elliptic ovate or elliptic, more or less cuneate on both sides, acuminate or acute at apex, 7 cm long, 3.5 cm broad, with 4–6 nerves on each side; petiole 7 mm long *L. fordii*.

34. ***Lagerstroemia duperreana*** Pierre ex Gagnep. in Lec. Nat. Syst. III (1918) 358 et Flor. Indoch. II (1921) 948; Craib, Fl. Siam. Enum. I (1931) 721. — **Fig. 36.**

L. thorelii Gagn. in Nat. Syst. III (1918) 362 et Flor. cit. II (1921) 947; Pham and Nguyen, Fl. Vietn. (1960) 350 t. 126 fig. C; **syn. nov.**

Lectoholotype: COCHINCHINA: Dinh. Mts. (Pierre 4,998: P).

A tree about 25 m high. *Leaves* oblong, or elliptic-oblong, sometimes obovate, 15–17 cm long, 2.5–5.5 cm broad, acuminate or acute or sub-rounded at the apex, gradually cuneate when young, later sub-rounded at the base, glabrous on both sides, 6–11 nerved on each side, not prominent above but quite prominent and reddish brown beneath as also the reticulations reddish; petiole 3–5 mm long. *Panicle* pyramidal or almost cylindrical, deciduously puberulous with light brown hairs, 10–30 cm long, 5–15 cm broad, with ultimate branchlets dichotomous or trichotomous; the mid-flower sessile with a very long pedicelliform (up to 15 mm long base); pedicel 5–8 mm long. *Flower bud* whitish tomentose, turbinate, lateral one 10–15 mm long (including 4–7 mm long pedicelliform base), obscurely 12 ridged or more, often bearing a wart at each sinus, mammillate at the apex. *Calyx* in flower cup-shaped, 13–15 mm long (including 5–9 mm long pedicelliform base), 6 mm in diam.; lobes 6, 3 mm long, patent or reflexed, tomentose in the superior half within. *Petal* obovate, about 15 mm long (including 2–3 mm long claw), 10 mm broad, undulate in the margin. *Stamen* many, subequal. *Ovary* short, oblong, glabrous. *Fruiting calyx* cup-shaped, ridgeless or nearly so, tube 5 mm deep, 10 mm in diam.; lobes reflexed more or less tomentose in the superior half within; stalk 7–12 mm long. *Capsule* oblong, 15–17 mm long, 10 mm in diam.; usually 6 valved, each valve slightly grooved dorsally.

THAILAND: *North-Eastern: Ubon Prov.* (Chirn 18 = BKF 24,193: SING). *Eastern: Korat Prov.,* Chantuk on the Kao Sisiat (Kerr 9,089: BM & E & PNH). *Central: Saraburi Prov.* (Rananand 9 = BKF 10,754: SING). *South-eastern: Trat Prov.* (B.S. 176 = BKF 9,660: SING and Smitinand 1,373 = BKF 7,324: SING).

INDOCHINA: **Cochinchina,** Prov. Baria, Dinh Mountains (Pierre 4,998: GH — **lectoholotype**); Prov. Bien-Hoa at Bao-Chiang (Pierre 4,998: SING — **lectoparatype**). **Cambodia,** Kampong Cham (Bejoud 696: A); Stung-Streng (Thorel 2,241: E — isosyntype of *L. thorelii*). **Laos,** Khon Isle (Thorel 2,241: A & BM — isosyntypes of *L. thorelii*).

Both Thorel & Pierre seem to have numbered their specimens after a preliminary study in the herbarium so that different collections bear the same number. Thus the isolectotype of *L. duperreana* was collected in May 1866 in the Baria Province,

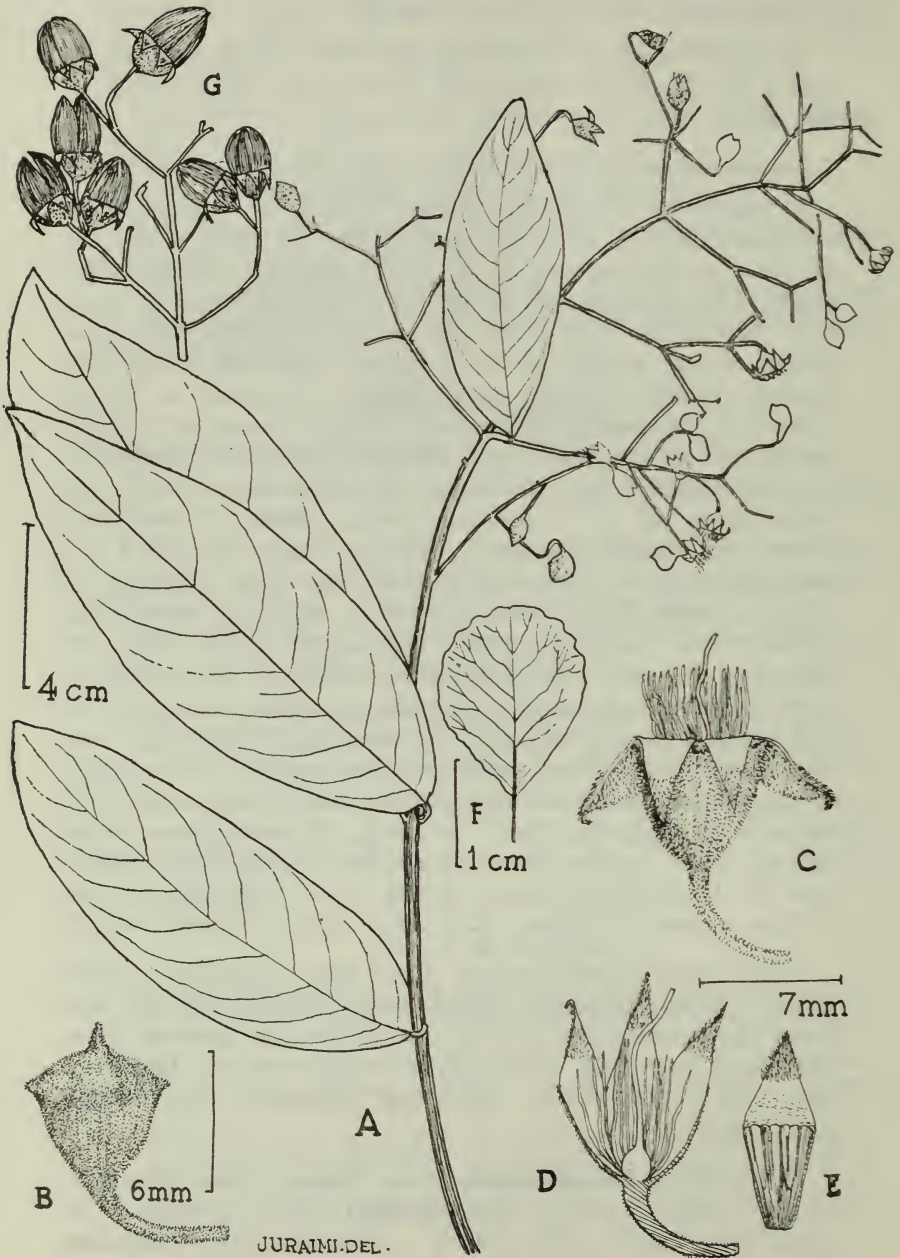


Fig. 36. *L. dupereana* Pierre ex Gagnep. (A-F. Thorel. 2241 in E — isosytype of — *thorelii*; G: Pierre 4,998 in GH — lectoholotype).
 A, Fertile twig. B, Flower bud with warts at each sinus and a nipple at the apex. C, Flower after anthesis. D, Longitudinal section of flower. E, Calyx dissected. F, Petal. G, Twig with capsules.

while the specimen at Bao Chiang in Bien-hoa province were collected in September 1861, but both collections bear Pierre n. 4,998.

There is a great deal of difference in the leaves and flowers of this species, depending upon ecological factors and some flower buds have short or long nipples in the same inflorescence.

35. *Lagerstroemia minuticarpa* Debberm. ex P.C. Kanj. in Assam For. Rec. Bot. I (1934) 9; Kanj., Kanj. & Das, Flor. Assam II. (1938) 311. — **Fig. 37.**

A tree. *Leaves* elliptic or oblong-elliptic, 7–13 cm long, 4–6 cm broad, greenish, glabrous above, paler beneath and often pubescent in the axil of side nerves and mid nerve, acuminate at apex, sub-rounded at base, 8–12 nerved on each side; petiole about 8 mm long. *Panicle* subpyramidal, about 15 cm long, 15 cm broad, brownish pubescent all over. *Calyx* whitish tube about 6 mm long, broadly campanulate, thinly pubescent, tube about 2 mm deep, 12 ribbed; lobes 6, deltoid, acuminate, slightly pubescent towards the apex within. *Petals* 6, white, oblong, about 2.5 mm long, crumpled, margins crisp, claw minute. *Stamens* about 12; filament filiform, 6 stouter than the others. *Ovary* subglobose, style curved, exserted, ovules numerous. *Fruiting calyx* funnel-shaped, ± 1 mm deep, (excluding 2–4 mm long pedicelliform base), ± 3 mm broad, 6 lobes about 1–1.5 mm long; 12 ridged, puberulous. *Capsule* ellipsoid, ± 5 mm long, ± 3 mm in diam., brownish in colour, 3–5 valved.

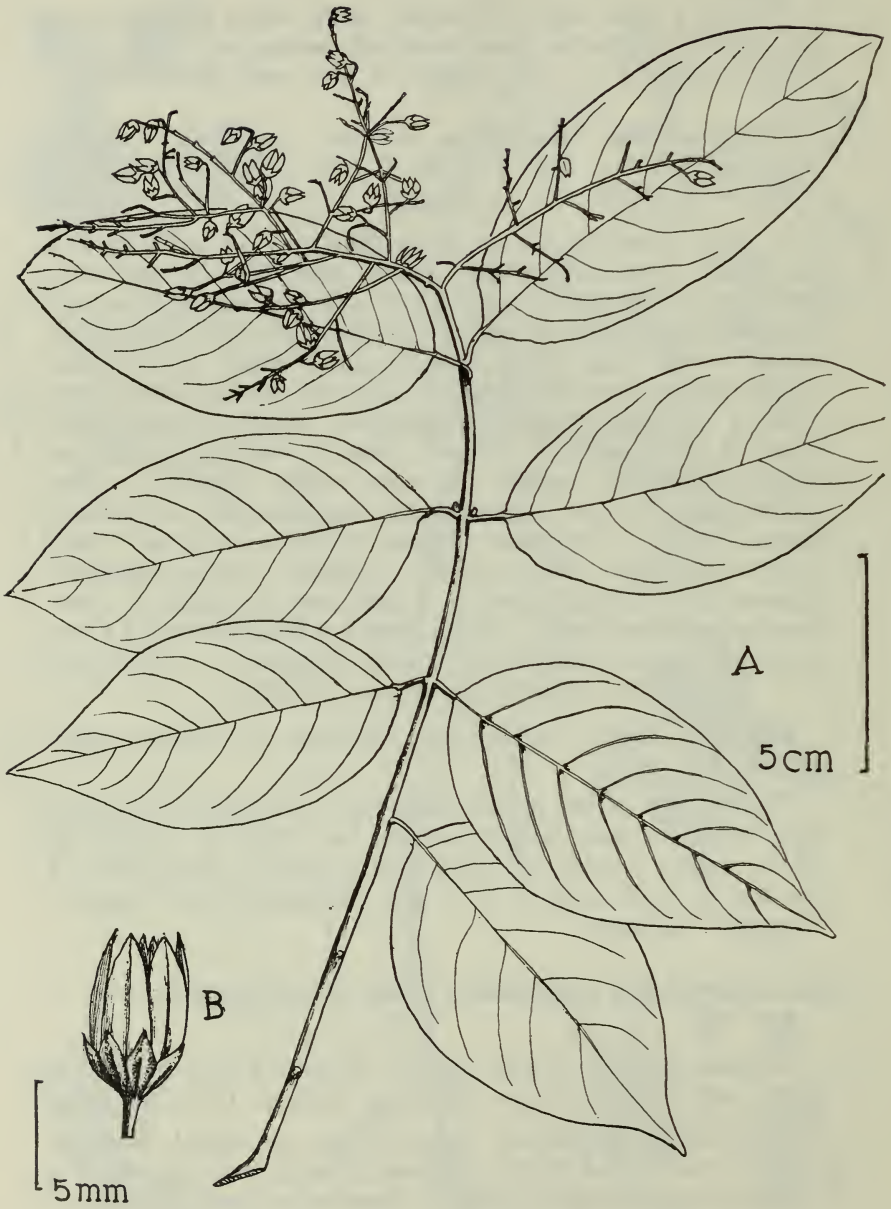
INDIA: Assam, North East Frontier at Kerim (Deka 17,041: E).

The holotype of the species which was collected in North East Frontier region near Bonjur, has not been seen by us, but the above quoted fruiting specimen was collected subsequently in the Kerim forest in June 1938 and distributed from Assam as “co-type” specimen.

36. *Lagerstroemia gagnepainii* Furtado et Montien **nom. nov.** — **Fig. 38.**

L. glabra Gagnep. in Not. Syst. III (1918) 359 et Fl. Indoch. II (1921) 949: (not *L. glabra* (Koehne) Koehne, 1907); **basynym.**

Tree, branchlets glabrous. *Leaves* elliptic or oboval, attenuate at base, rounded and shortly apiculate at the tip, 8–12 cm long, 3–5 cm wide, subcoriaceous, glabrous, 10-nerved on each side; petiole 3–4 mm long, glabrous. *Inflorescence* terminal, 20 cm long or more, glabrous or sparsely pilose, with leafy bracteoles in the lower parts; lower branches up to 8 cm long. *Flower buds* globose, slightly costulate, thinly cinereous tomentose. *Calyx* tomentose, 12 costulate, ridges almost indistinct because of the tomentum outside, costulate and annulate within, 6–7 mm long in the tube; lobes triangular, shortly appendiculate, 4–5 mm long, somewhat tomentose below the apex within. *Petals* obovate,



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Fig. 37. *L. minuticarpa* Debberm. ex. P.C. Kanj. (Deka 17,041 in E).
A, Twig with capsules. B, Capsule.

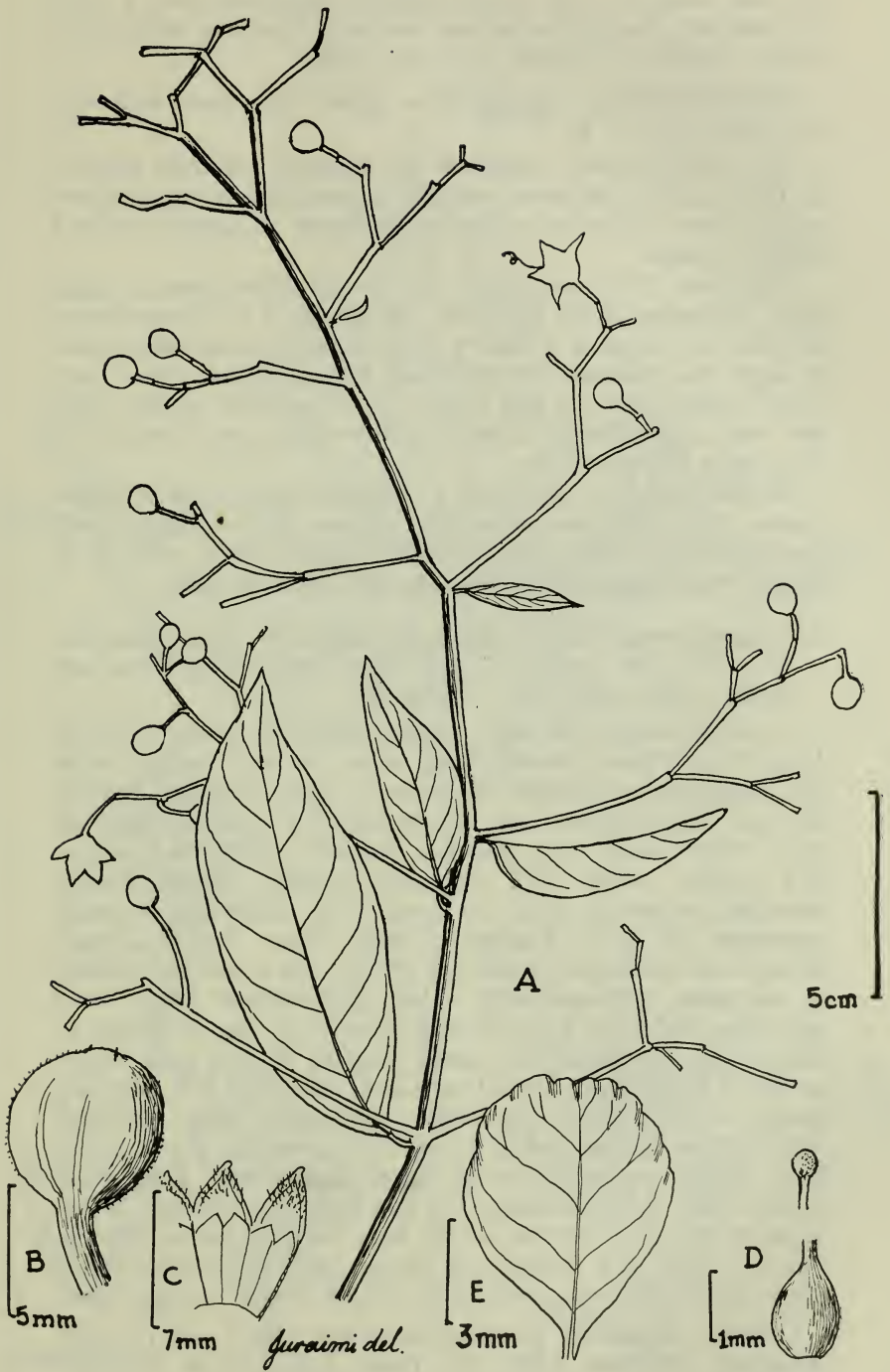


Fig. 38. *L. gagnepainii* Furtado et Montien (Lecomte & Finet s.n. in P — Photolog from Paris).

A, Fertile twig. B, Flower bud. C, Calyx dissected. D, Ovary and stigma. E, Petal.

15 mm long, 12 mm wide, gradually narrowed into a claw 1.5 mm long. *Stamens* numerous, inserted at the base of the tube. *Ovary* glabrous, 6 locular. *Fruit* not known.

COCHINCHINA: loc. et lector ignoti, sub. nom. vern. *Cay Tau Vang* (s.n. — P).

This species known only from the holotype collection received in Paris in 1912. We have seen only a photocopy of the specimen with a flower diagnosis made by Gagnepain. It appears to be a distinct species.

Gagnepain (1918) states that this species differs from *L. fordii* Oliv. et Koehne in the following: (1) petiole is 2–3 times shorter and the leaf lamina is without a long acumen; (2) the inflorescence is larger and glabrous; (3) the flower-bud is globose with a very small nipple at the top and without any cornicules; (4) the ridges are very slight, hardly distinct; (5) the petals are obovate, the claw being 2 times shorter.

He differentiates it also from *L. thorelii* Gagnep.: (1) in elliptic leaves; (2) in much less dense inflorescence; (3) by globose flower buds having 12 faint ridges without any cornicules and (4) in petals being neatly obovate and its claw twice as short.

37. *Lagerstroemia fordii* Oliv. and Koehne in Engl. Pflanzenr.

17 = IV. 216 (1903) 262. fig. 56D; Chung, Cat. Trees and shrubs China (1924) 181. — **Fig. 39.**

A shrub about 3 m high. *Leaves* elliptic or ovate, 3–10 cm long, 2–4 cm broad, usually dirty colour on both surfaces when dry, acuminate or caudate acuminate at apex, narrowed towards the base and decurrent into petiole, minutely pubescent on both sides when young, later glabrous, minutely gland-dotted above, 5–8 nerved; petiole 5–12 mm long, slightly winged. *Panicle* terminal, pyramidal, 8–20 cm long, 3–12 cm broad, minutely pubescent all over, bearing a small linear leaf-like bract. *Flower-bud* deciduously pubescent all over and somewhat bearded at the sinus, turbinate with a long pedicelliform base, 10–12 mm long (including 4–7 mm long base), 3–4 mm in diam., 12 ridged and 12 channelled, shortly nipped at the apex. *Calyx* in flower funnel-shaped, 9–11 mm long (including 5–8 mm long base), 4–5 mm broad, the middle one sessile, lateral provided with a short pedicel; lobes 6, erect or spreading, about 2 mm long, slightly pubescent in the upper half within. *Petal* ovate about 8 mm long (including 3–4 mm long claw), 4 mm broad, acute at the apex, cordate at the base undulate in the margin. *Stamen* many, 3–6 thicker and longer, the rest shorter. *Ovary* short, oblong, glabrous; style about 10 mm long. *Fruit* (not seen).

CHINA: **Hongkong** in D'Aguilar Cape (Leg.? 1,011: BM); Aberdeen (Bodinier 1,261: E; Taam 1,401: A & UC and 9,206: A).

The holotype was collected by Ford in Lan Tao island near Hongkong. No. 1,011 in BM (D'Aguilar Cape) differs slightly from other specimens in shorter petiole and in glabrescent flower buds and calyces.



Fig. 39. *L. fordii* (Bodinier 1,261 in E).

A. Fertile twig. B. Flower bud. C. Flower. D. Longitudinal section of flower. E. Part of calyx.

Section **Trichocarpidium**

Section **Trichocarpidium** Koehne in Engl. Pflanzr. 17 = IV. 216 (1903) 263; Sect. 2 *Adambea* Subsect. 3 *Trichocarpidium* Koehne in Engl. Jahrb. IV (1883) 31.

Ovary tomentose.

Subsect. **Trichocarpidium**

Ovary tomentose, but calyx lobes glabrous within.

DISTRIBUTION: China, Burma, Thailand, Indochina, Flores Archipelago, New Guinea & N. Australia.

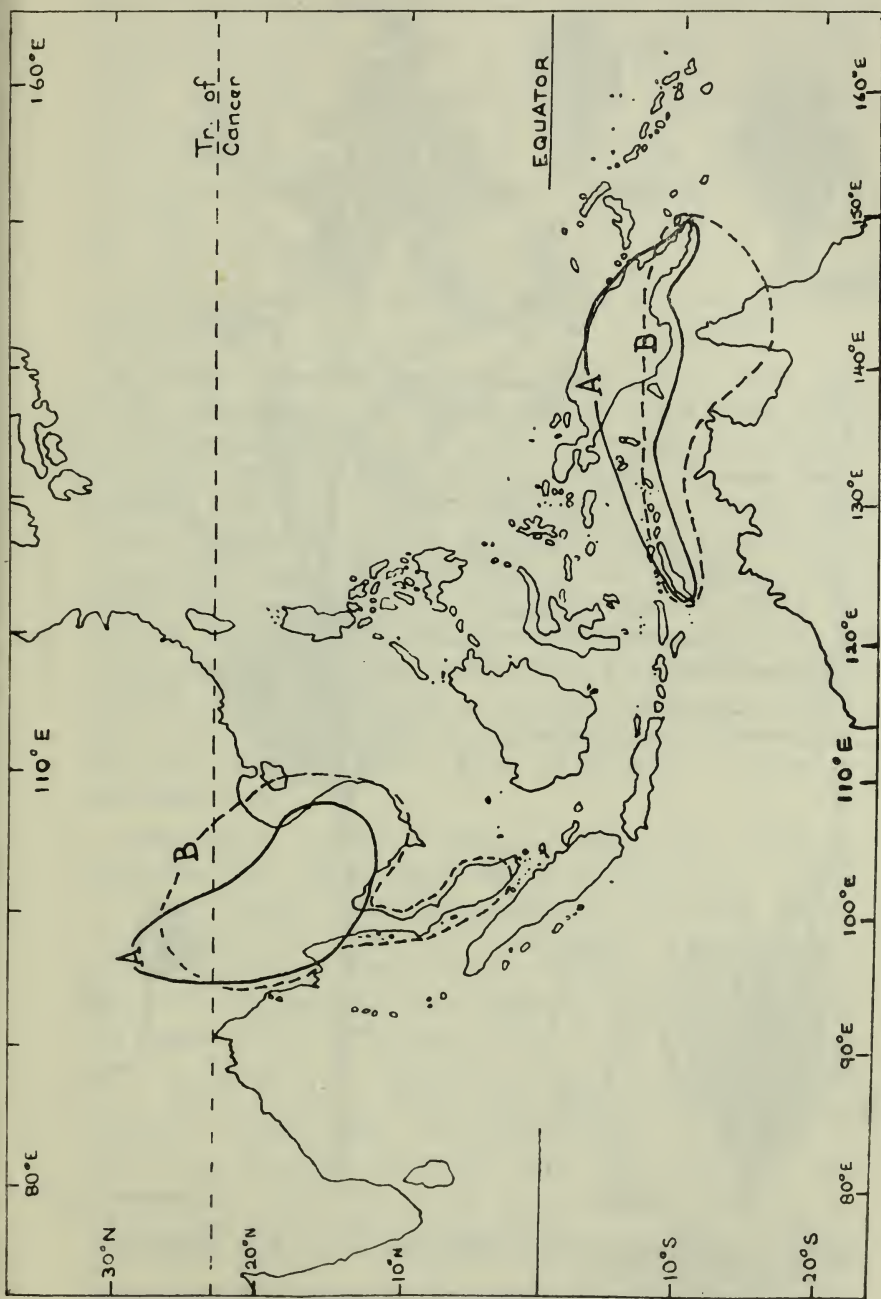
TYPE SPECIES: *L. tomentosa* Presl.

Key to the Species

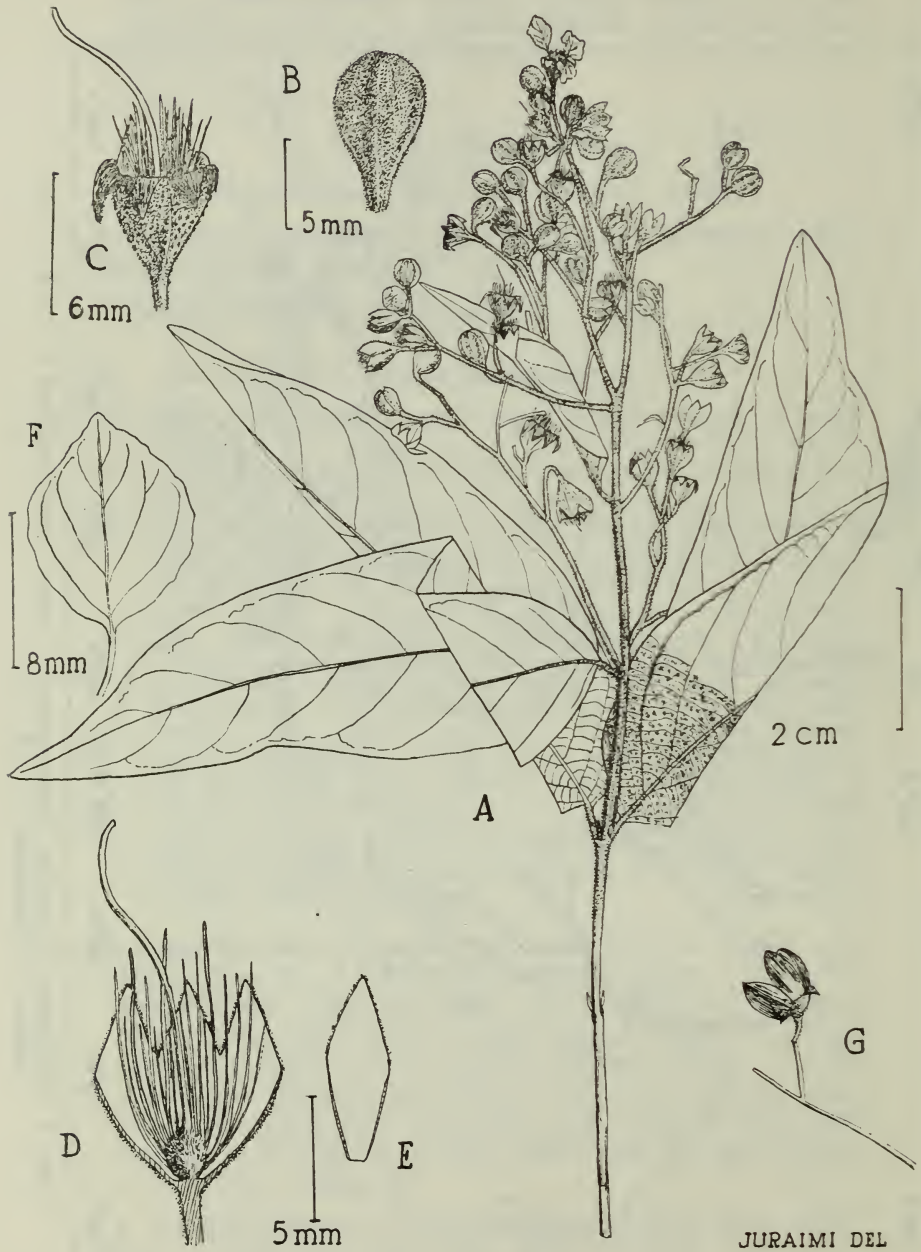
- 1a. Calyx yellow tomentose with 12 ridges. (Leaves lanceolate or ovate-elliptic) 2.
 - 1b. Calyx glabrous or ferruginous yellow tomentose with 6 ridges. (Leaves tomentose or not) 3.
 - 2a. Calyx light yellow tomentose. Fruiting calyx with ridges prominent. (Leaves lanceolate up to 17 cm long, 6 cm broad, acuminate or acute, tomentose on both sides when young later pubescent beneath along the veins and reticulations, side nerves 8–12)
..... *L. tomentosa*.
 - 2b. Calyx yellow tomentose. Fruiting calyx ridges unequal, 6 obtuse and 6 winged. (Leaves ovate-elliptic, 7–16 cm long, 5–10 cm broad, round or subcordate at base, shortly acuminate at the apex, coriaceous, yellow pilose on nerves above, tomentellose below, side nerves about 10) *L. dielsiana*.
 - 3a. Fruiting calyx obscurely ridged, glabrous; stalk 8 mm long; lobes $\frac{3}{4}$ long as the calyx tube, reflexed. (Leaves glabrous, obtuse or emarginate at the apex) *L. petiolaris*.
 - 3b. Fruiting calyx prominently ridged, ferruginous yellow tomentose; stalk short 3–4 mm long; lobes less than $\frac{1}{2}$ of calyx tube. (Leaves yellow tomentose beneath, glabrescent later, obtuse at the apex; hairs on the sepals within often fall off) *L. archeriana*.
38. ***Lagerstroemia tomentosa*** Presl, Bot. Bemerck. (1844) 142; Walp., Ann. Bot. I (1848) 295; Kurz, Fl. Burma I (1877) 522 and in Journ. Asiat. Soc. Beng. XLVI (1877) 88; Clarke in Hook. f., Flor. Brit. Ind. II (1879) 578 p.p.; Koehne in Engl. Jahrb. IV (1883) 237 and Engl., Pflanzenr. 17 = IV. 216 (1903) 264; Brandis, Ind. Trees (1911) 339; Gamble, Man. Ind. Trees (1912) 375; Traup, Silv. Ind. Trees II (1921) 601; Gagnep. in Fl. Indoch. II (1931) 958; Craib, Fl. Siam. Enum. I (1931) 726. — **Fig. 40.**

L. tomentosa Presl. var. *caudata* Koehne in Engl. Jahrb. XLII, Berbl. 97 (1908) 51; Craib in Kew Bull. (1911) 54.

A tree \pm 14 m high. *Leaves* lanceolate or elliptic, 5–24 cm long, 2–8 cm broad, acuminate or acute usually obtuse, yellow stellately tomentose on both surfaces when young, later glabrescent along the midrib above and pilose beneath; 7–12 nerved on each side; petiole 4–8 mm long. *Panicle* terminal, pyramidal, 6–20 cm long, 4–15 cm broad, yellow tomentose with deciduous linear bracteoles. *Flower bud* 5–6 mm long, 4–5 mm in diam.,



Map 3. Distribution of Section *Trichocarpidium*: Subject, *Trichocarpidium* (—A—); Subject, *Trichosepalum* (---B---).



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Fig. 40. *L. tomentosa* Presl. (A-E: Helfer 2239 in K — Prob. isoholotype; G: Griffith 2,238 in K).

A, Fertile twig. B, Flower bud. C, Flower. D, Longitudinal section of flower. E, Part of calyx shows inside. F, Petal. G, Capsule.

turbinate, 12 or more ridged, shortly pedicelliform at base, often having a wart-like growth at each sinus. *Calyx* 5–6 mm long 4–5 mm in diam., cup-shaped, abruptly narrowed into short 1–2 mm long pedicelliform base; lobes 6, reflexed, glabrous inside. *Petal* obovate about 15 mm long (including 5 mm long claw) 9 mm broad, undulate in the margin. *Stamens* many, 3–6 thicker and longer, others subequal. *Ovary* subglobose yellow tomentose, style slender about 15 mm long. *Fruiting calyx* saucer-shaped about 3 mm deep, 9 mm in diam., adpressed to the fruit, deciduously yellow tomentose; pedicelliform base 2–3 mm long; lobes reflexed, brittle. *Capsule* oblong, 12–17 mm long, 9–12 mm in diam., usually 6 valved.

CHINA: **Yunnan** (Wang 77,837 & 78,608 & 79,202 & 80,708 & 80,843: A).

BURMA: **Yamethin**, Pyinmana, Tetshien (Lace 4,558: E); Mintyin (Smales s.n.: E); Ngalaik Chaung (Lace 4,554: CAL & E). **Shan State** (Collett 563: CAL); Meh Len (Rock 2,102: A & UC); Nam Live (Kingdom-Wqrd 8,870: A). **Salween Distr.** (Meebold 16,718: CAL). **Pegu**. Meaday (Scott s.n.: E & GH); Yomah, Rangoon (Kurz 1,344: CAL, E & 1,956 & 1,976: CAL); Hautawaddy (Lace 2,894: E); Pakokku, Saw (Dickason 8,627: SING). **Rangoon** (Weiste s.n.: BM & Parkinson 14,058: A & Dickason 5,587 & 5,837a: A). **Tenasserim** (Meebold 15,145 & 15,253: CAL); Below Tayet (Griffith 2,238: K). **Moulmein** (Helfer Kew distr. 2,239: A, GH & K — probably **isoholotype** & Reliq. Helf. n. 30: A, BM & E — probably **isoholotypes**); Yauaungmyin (Mg. Kyaw Zan 17: A); loc. incert. (Tottingham s.n.: CAL & Mg. Khaw 2: E).

THAILAND: *Northern*: **Chiengmai Prov.**, Doi Chiengdao (Khantchai 161 = BKF 12,389: BKF & KEP; K.B. 332 = BKF = 17,133: SING); Huay Tat (Smitinand 4,192: BKF); Muang Fang (Hosseus 600: BM & E — **isosyntypes of var caudata**); Mae Patang (Garrett 1,208: A & E); Doi Sutep (Hosseus 512: BM & E — **isosyntypes of var caudata**); Chiengmai to Chieng Rai (Rock 1,832 & 1,853: A & 1. 694: A & UC). **Lampoon Prov.**, Mae Lee (Vanpruk 93: BKF). **Prae Prov.** (Pramual 2 = BKF 2,503: BKF; Pis 13 = BKF 1,224: BKF); Huay Rai (Opus Promdet 5: BKF); Huay Yen (Yam Trykhao 16 = BKF 9: BKF); East Mae-Yom (Thai For. Dept. Coll. 2,503: A); Pak Kawng (Kerr 2,554: BM & E); Ban Pa-Dang (Tongbi 4 = BKF 5: SING); Mae Had (Vibulvonakit s.n. = BKF 10: BKF), loc. incert. (Srichun 4 = BKF 2,503: SING). **Utaradit Prov.** (Kerr 5,884: BM). **Kampeng Pet Prov.** (Kerr 5,961: UC). **Nakawn Sawan Prov.** (Vanpruk 268: BKF). **Tak**, Raheng (Kerr 5,884: E). *Central*: **Nakawn Chaisee** (Winit 513: BKF; Kerr 5,884: E). *South-Western*: **Kanburi Prov.** Sai Yok (Kai Larsen 8,923: A, BKF & E; Kostermans 1,120: A & SING); Bangkokasi (Kostermans

1,463: A); Wang Yai (Charoenmayu 5,473: A, BKF & KEP); Kao Tok (Kerr 19,537: BM); loc. incert. (Kerr 10,113; BM); Tripagodas (Kostermans 447: PNH, SING); Tasadet (Leg.? s.n.: BKF). loc. incert. (Thai For Dept. Coll. 13,334: BKF).

INDOCHINA: **Hue** (Square 294: A, BM, E, SING & UC & 337: A, BM, E, SING & UC).

CULTIVATED: Parks or Botanic Gardens: **India**, Dehra Dun Mani s.n.: SING). **Ceylon**, Peradeniya Gardens (Cult. Peradeniya 821: UC). **Malaysia**, Penang Bot. Gardens (Kamaradin 307: SING). **Singapore**, Bot. Gardens (Holttum 66: SING).

Helfer who collected near Moulmein in Burma and in the Andamans between 1832–38, sent some of his specimens to his native city, Prague, to be worked out by Presl at the University there (Munir in Gard. Bull. SING. XXI, 1966 p. 336). Many new taxa based on Helfer's specimens were published by Presl who quoted in his protolog the type locality but not the collector of the holotype. Now *L. tomentosa* does not occur in the Andamans and in any part of Bengal or India. Hence Helfer's specimens distributed under No. 30 from the Prague National Museum in 1837 as being from Bengal near Calcutta are probably the duplicates of the holotype from Moulmein as also Helfer's specimens of the species distributed from Kew under n. 2239. They are all therefore to be regarded as probable isoholotypes of the species.

In a specimen of Helfer's collection preserved in Kew the field label bears the following data: "In November 1937 Moulmein", and Koehne quotes "257" being Helfer's n. in a Kew specimen.

Clarke had stated that *L. pubescens* Wall. Cat. 2,112 was a mixture being *L. tomentosa* for its greater part but one specimen being *L. villosa*. But Koehne has quoted all Wallich 2,112 under the latter species. We have not seen Wallich's specimens.

As Clarke has noted, the fruiting specimens of the two species might be easily confused, but the leaves of *L. tomentosa* are stellately hairy beneath, while those of *L. villosa* are simple pubescent.

39. *Lagerstroemia dielsiana* Mansf. in Engl., Jahrb. LXI (1927) 24.

Tree 3–5 m tall, branchlets ochraceous tomentulose. *Leaves* broadly ovate or elliptic, 7–16 cm long, 5–10 cm broad, rounded and slightly acuminate at apex, rounded or subcordate at base, coriaceous, excepting the pilose nerves, glabrous above, tomentulose beneath, about 10 nerved on each; petiole 5 mm long, yellow tomentulose. *Panicle* terminal, 24–29 cm long, about 25 cm broad at base, with densely ochraceous tomentulose in branchlets. *Flower buds* rounded, subdepressed at apex, shortly apiculate, shortly pedicellate, tomentulose, calyx 6–7 mm deep, 12 ridges,

ridges unequal, 6 obtuse and 6 winged; lobes 2 mm long glabrous inside, reflexed. *Petals* 6, up to 4 mm long, suborbicular in the limb, not ciliate. *Stamens* unequal, 6 episepalous thicker and longer. *Ovary* densely pilose. *Capsule* 6 valved, 10 mm long, 8 mm diam., pilose at apex.

NEW GUINEA: *North-East Sepik* in the wet alluvial region (Ledermann 10,745: B — **holotypus**).

We have not seen the type, but from the description this species appears to be a form or variety of *L. archeriana*.

40. ***Lagerstroemia petiolaris*** Pierre ex Laness. Pl. Util. Col. Franc. (1883) 321; Koehne in Engl., Jahrb. XLI (1907) 102 *nom. nudum*; Gagnep in Not. Syst. III (1918) 360 & Fl. Indoch. II (1921) 359 — **Fig. 41**.

Tree 10–15 m tall, with glabrous branchlets. *Leaves* ovate or oblong, strongly rounded and sometimes shorter on one side, subacuminate or rounded at apex with an obtuse or sometimes emarginate tip, coffee brown in colour, glabrous on both sides, 6–10 nerved on each side, whitish in the margin, 6–13 cm long, 4.5–8 cm broad; petiole 15–20 mm long. *Inflorescence* terminal, short, few flowered, 3–6 cm long and as much broad. *Flower-buds* pyriform 12 mm long, glabrous, narrowed gradually into the base; pedicels 3–4 mm long. *Calyx* campanulate, glabrous, glaucescent-pruinose; tube 10–12 mm long, slightly 6 ridged; lobes 6, glabrous inside. *Petals* 6, orbicular or elliptic, long clawed, 3 cm long, 2–3 cm broad; claw 5 mm long. *Stamens* numerous, slightly exsert, with orbicular anthers. *Ovary* stellate tomentose, 6 locular; style twice longer than stamens with discoid stigma. *Fruiting calyx*, cup-shaped, abruptly narrowed into a 5–8 mm long base; tube 5–8 mm deep, 10 mm diam., glabrous, slightly 6 ridged, often a slight intermediate ridge at base, strongly reticulated outside; lobes glabrous inside, narrowly triangular, often apiculate. *Capsule* subglobose, 12 mm long, 10 mm in diam., 6 valved, tomentose at the top, surmounted with a 1–2 mm long apex.

INDOCHINA: **Cambodia**: Prov. Samrong-Tong on the Reang-Kong mountains (Pierre 928: SING — **isoholotype**).

Particulars about the inflorescence and flowers are taken from the protolog, since the isoholotype examined had only fruits just before their dehiscence. The fruiting calyx shows alternisepalous ridges reaching to the sinus, while its base has often vestiges of another ridge between the alternisepalous ones. The calyx tube bears many reticulations outside and also little warts which suggest bases of hairs. In view of this, this plant appears to have been evolved from one that had a 12 ridged hairy calyx.

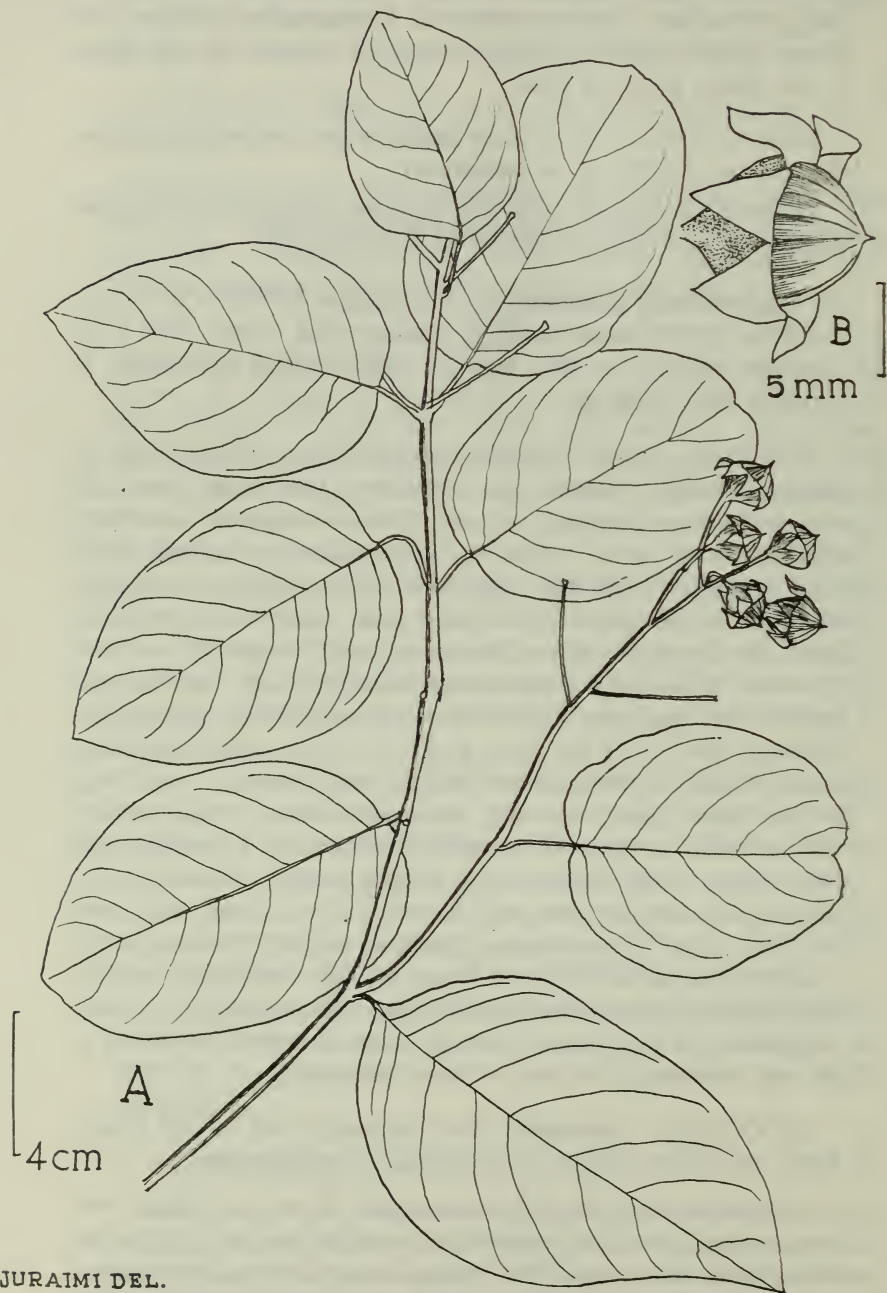


Fig. 41. *L. petiolaris* Pierre (Pierre 928 isoholotype in SING).

A, Fertile twig. B, Capsule.

41. *Lagerstroemia archeriana* Bailey, Synops, Queensl. Fl. I (1883) 196 & 809; Koehne in Engl., Jahrb. IA (1883) 408; Bailey, Queensl. Fl. II (1900) 678 t. 24; Koehne in Engl., Pflanzenr. IV. 216 = Heft 17 (1903) 264. — **Fig. 42.**

L. engleriana Koehne in op. cit. (1883) 24 & (1903) 267; Forschungsreise S.M.S. Gazelle IV (1889) 7 Siph. p. 38 t. 14; Koehne in Engl., Jahrb. XLI (1908) 104; Mansf. in Engl., Jahrb. 61 (1927) 25 **syn. nov.**

L. floribunda Jack *sensu* Bl., Mus. Lugd. Bat. II (1852) 126 t. 41B excl. holotypus; koehne *op. cit.* (1883) 34 & (1903) 266 quoad tab. Blumeana.

A shrub or tree 3–12 m high. *Leaves* oblong or elliptic or lanceolate 7–17 cm long, 4–9 cm broad, acute or shortly acuminate or sometimes obtuse at apex, obtuse or almost cordulate at base, ferruginous tomentose on both sides when young, later glabrous or glabrescent along the nerves, 5–11 nerved on each side; petiole 3–6 mm long. *Panicle* pyramidal or sub-pyramidal, 10–40 cm long, 4–22 cm broad, ferruginous tomentose, bearing small, deciduous bracteoles. *Flower bud* turbinate, abruptly pedicelliform at base, 10–12 mm long (including 3–4 mm long base), 6-ridged, prominent with 1 mm long nipple at apex. *Calyx* in flower 10–13 mm long (including 4–6 mm long base), 5–6 mm in diam., (longer and larger in the mid-flowers); lobes 6, 3 mm long, patent or reflexed, thickened along the margin outside, glabrous within, often provided at the sinus inside with a short reniform pouch. *Petal* oblong about 16 mm long (including 5–6 mm long claw), 10 mm broad, rounded or retuse at base. *Stamens* many, subequal. *Ovary* sub-globose, tomentose. *Fruiting calyx* sparsely tomentose, cupular or funnel-shaped above the pedicelliform base, 10–15 mm long (including 5–10 mm long base), with prominent straight ridges. *Capsule* oblong or elliptic, 15–18 mm long, \pm 10 mm in diam., somewhat with a brittle nipple, 5–6 valved.

AUSTRALIA: Mitchell & Hodgkinson Rivers (Carr s.n.: A).

NEW GUINEA: **Northern Territory**, Morobe Distr., Lowe's Ford (Brass 32,313: A & LAE); Gusap (Womersley 4,746: A & LAE). **Papua**, Port Moresby, Trans-Laloki (Womersley 4,504: LAE & SING; Havel 17,377: LAE; Havel & School NGF 17,377: SING); loc. incert. (Brass 888: A); Obu (Carr 11,442: BM & SING); Mt. Lawes (Schodde 2,645: LAE); Brown River (Gray 12,907A: LAE); Daru Isl. (Brass 6,239: BM & LAE).

ARCHIPELAGOS IN THE FLORES SEA: **Tanimber islands**, Ilgnei-Otimmer (Neth. Ind. For. Serv. b.b. 24,246: A & SING); Jamdena island at Norkese (Borssum Waalkes 3,249: BM). **Timor**, Kupang, Noil Mina (Neth. Ind. For. Serv. b.b. 27,083: A & SING).

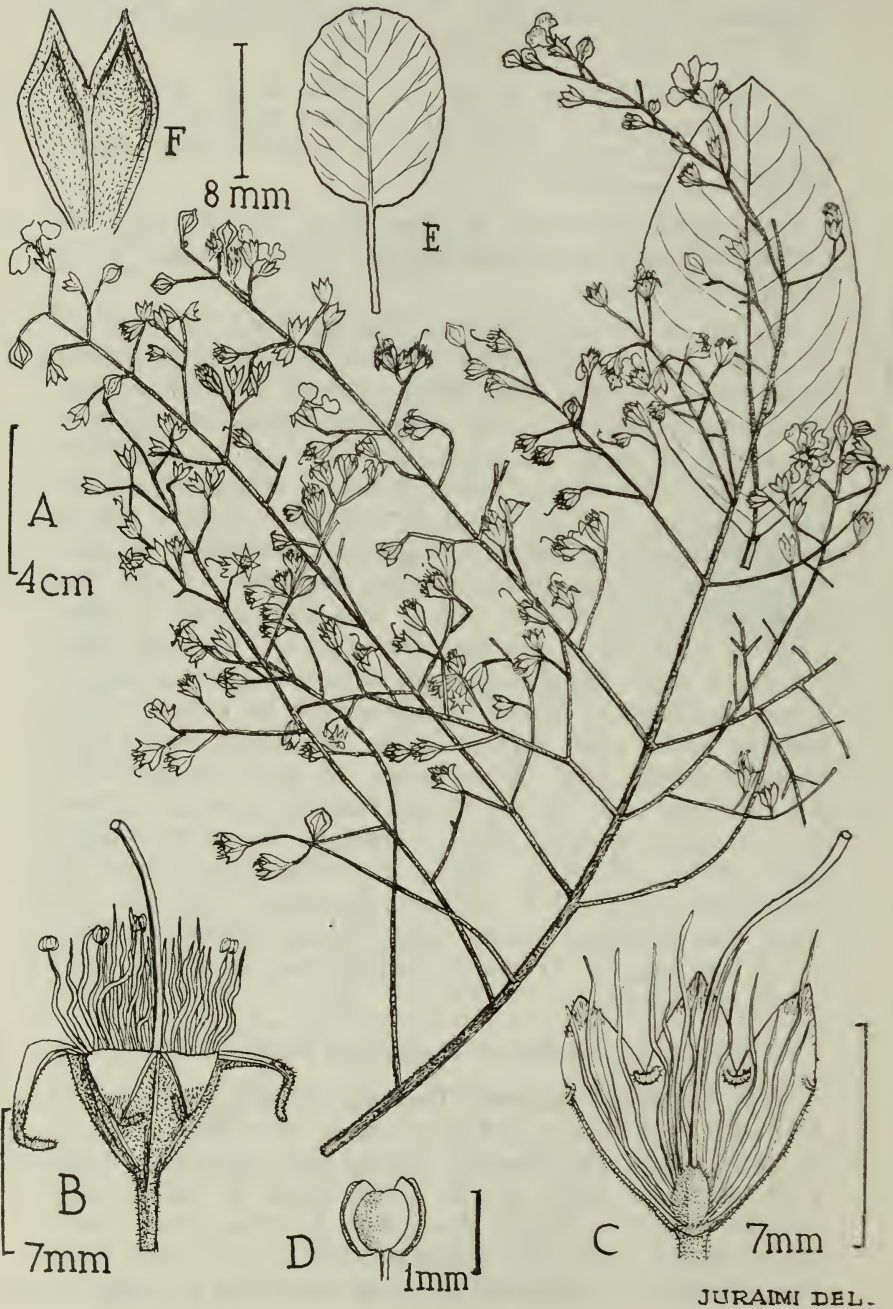


Fig. 42. *L. archeriana* Bailey (Brass 888 in A).

A, Fertile twig. B, Flower. C, Longitudinal section of flower. D, Anther. E, Petal. F, Part of calyx to show external structure.

Koehne (1883 p. 24 obs.) recognized that the tomentum on the inflorescence of *L. engleriana* is not of the type of Section *Pterocalymma*, but was akin to that of *L. floribunda*. However he had only a fruiting specimen and it is not rare to see the fruits and leaves becoming completely glabrous with age. The calyx lobes also have various stages of pubescence along the margins and the tips of the sepals within, even in the same inflorescence, but they cannot be said to be tomentose; the hairs on the lobes are few and fall off soon and some become completely glabrous within. Blume's t. 41B identified by Koehne as that of *L. floribunda* Jack is also this species.

The holotype of *L. engleriana* was Zeyl's collection from Kupang, Timor, but Mansfeld has erroneously stated it to be Taffenback 80 from New Guinea. In Koehne's t. 14 (1889) quoted above the filaments are shown adhering to the capsule, a condition seen also in younger capsules of *L. archeriana* and sometimes also in the fully mature ones. Bailey (Queensl. Agric. Journ. XV, 1905 p. 898) described a glabrescent variety (var. *glabrescens*) with glabrous or nearly glabrous leaves and smaller flowers, a description that agrees partly with our Timor and Tanimbar specimens. But since the branches in this species tend to root and from a shrubby clump, we are including to believe that specimens from shrubby growth have more cordate and hairy leaves and bear slightly larger flowers, while when the tree grows tall and woody (it would happen thus in a thick jungle) the specimens are glabrescent or nearly glabrous and the flowers somewhat smaller stalked. A field inquiry is therefore needed.

The episepalous costae seen in the flowering calyx are not of a permanent nature and seems to be due to a bulging caused in shrinking of the calyx. Even in the type depicted by Bailey has six-redged fruiting calyx, though the flower-buds seem to have a multicostate calyx. Hence *L. dielsiana* Mansf. in Engl., Bot. Jahrb. 61 (1927) 24 may belong here. I have not seen any authentic specimen but there is no material difference in the description.

Subsect. **Trichosepalum**

Subsection. **Trichosepalum** Furtado et Montien.

Ovarium dense pilosum. Calycis lobi intus supra medium dense tomentosi, interdum tomento deciduo.

DISTRIBUTION: Burma, North Malaya, Thailand, Indochina, & South China.

TYPE SPECIES: **L. loudonii** Teysm. et Binn.

This subsection differs from Subsect. *Trichocarpidium* in that the calyx lobes are tomentose in the superior half within, but sometimes bear a few hairs along the margins and the tips of the puberulous or even glabrous.

The sepals in the species of Subsect. *Trichocarpidium* might sometimes the tomentum falls off to make the sepal look like sepals.

Key to the Species

- 1a. Calyx obscurely ribbed or nearly smooth with ferruginous tomentose. Inflorescence shortly pyramidal or cylindrical with a few branches 2.
- 1b. Calyx with prominent ribs or wings. Inflorescence large with many long, irregular branches 9.
- 2a. Inflorescence terminal or sometimes axillary at the end of a large side branch. Calyx without ribs or nearly so. Flower-buds funnel-shaped. Leaves pubescent when young, later glabrous or glabrescent; adult leaves upto 18 cm long, 2.2–7 cm broad, narrow, generally broadest below the middle 3.
- 2b. Inflorescence on axillary branches. Calyx slightly ribbed. Flower-buds turbinate. Leaves large 15–27 cm long, 8–12 cm broad, broadly elliptic, almost rounded at apex or acute, sometimes broader in the upper half, yellow tomentose on both sides when young, later sparsely tomentose on the midrib above and pubescent beneath. (Fruiting calyx 12 mm long, narrowed abruptly into a pedicelliform base, base 4–6 mm long, lobes 6–7. Capsule subglobose upto 15 mm × 12 mm) *L. loudonii*.
- 3a. Inflorescence with dirty brown tomentum. Flower obconical, sessile. Capsules about 8 mm long, 5 mm in diam. *L. calyculata*.
- 3b. Inflorescence with rusty ferruginous or yellowish tomentum. Flower buds abruptly narrowed into a pedicelliform base, pedicellate. Capsules larged 4.
- 4a. Adult leaves glabrous. Tomentum on flowers usually lighter coloured. Flower buds with a nipple over 1.5 mm long (*L. collinsae* shorter) 6.
- 4b. Adult leaves hairy or glabrescent beneath. Tomentum rusty coloured. Nipple in flower buds shorter, up to 1 mm long 5.
- 5a. Leaves elliptic or narrow lanceolate, acuminate or acute at apex, grey and glabrous above, dark brown and hairy beneath, 5–7 cm long, 2–3 cm broad *L. cochinchinensis* var. *cochinchinensis*.
- 5b. Leaves broadly ovate or ovate oblong, subacuminate and obtuse at apex; glabrous and grey or brown above, yellowish or light coloured and glabrescent beneath, specially with persistent hairs and some tomentum in the lower nerves and midribs; 4–11 cm long, 2–6 cm broad *L. cochinchinensis* var. *ovalifolia*.
- 6a. Flower buds shortly nipped, nipple less than 1 mm long. (Capsule 12–13 mm long, 10–11 mm in diam., tomentose at apex)..... *L. collinsae*.
- 6b. Flower buds with a nipple over 1 mm long 7.
- 7a. Inflorescence long. Petioles more than 3 mm long 8.
- 7b. Inflorescence short about 3 mm long. Petiole up to 2 mm long. (Leaves 6–8 cm long, 3–4 cm (broad). Nipple 2 mm long *L. noei* var. *noei*.
- 8a. Leaves ovate-elliptic, usually larger and elongate. Inflorescence usually pyramidal, many branched, generally thinly tomentose and with long, slender peduncles. Nipple of flower bud 2 mm long. Capsule 16 mm long, 12 mm in diam., tomentose all over *L. noei* var. *longifolia*.
- 8b. Leaves narrow elliptic. Inflorescence generally shorter, fewer branched with thicker tomentum and thicker peduncles. Alabaster nipple up to 1.5 mm long. Capsule 14 mm long, 10 mm in diam., glabrous except at the top *L. balsanae*.
- 9a. Calyx 12–14 permanently ridged, equal or unequal; (lobes not thickened in the margin) 10.
- 9b. Calyx with 6 permanent ridges, any ribs, if intervening superficial, not seen in fruit. (Fruiting calyx reflexed) *L. lecomtei*.
- 10a. Calyx acutely ridged with auriculate appendices at the sinuses 11.
- 10b. Calyx broadly ribbed without any auriculate appendix at the sinus 14.
- 11a. Auricles patent or knobbed; calyx ridges not winged 12.
- 11b. Auricles incurved above the sinus; ridges winged at least in part *L. spireana*.
- 12a. Auricles slightly knobbed or warted at the sinus or slightly patent *L. anisoptera*.

- 12b. Auricles patent 13.
- 13a. Leaves oblong about 10–14 cm long, 5–7 cm broad. Calyx tube in fruit about 7 mm deep, 10–12 mm broad. Capsule about 14 mm long, 10 mm broad *L. siamica*.
- 13b. Leaves lanceolate or shortly oblong, 8–18 cm long, 2.5–6 cm broad. Fruiting calyx larger, tube about 10 mm deep, 10–14 mm broad. Capsule 15–22 mm long, 10–13 mm broad *L. langkawiensis*.
- 14a. Fruiting calyx conspicuously ridged *L. floribunda*.
- (i) Leaves somewhat shorter; indumentum of the calyx, pale yellowish rusty. The ridges unequally prominent in the calyx tube var. *brevifolia*.
- (ii) Leaves longer, indumentum ferruginous coloured. Ridges equally prominent in calyx tube var. *floribunda*.
- 14b. Fruiting calyx obscurely ridged.
- (i) Fruiting calyx almost ridgeless var. *sublaevis*.
- (ii) Fruiting calyx slightly ridged var. *subecostata*.

42. ***Lagerstroemia loudonii*** Teysm. et Binn. in Nat. Tijdschr. Nederl.-Ind. XXV (1863) 425 et Cat. Hort. Bog. (1866) 241; Kurz in Journ. Asiat. Soc. Beng. XLVI (1877) 88 & For. Fl. Burma I (1877) 523; Koehne in Engl. Jahrb. IV (1883) 32 & Engl. Pflanzenr. 17 = IV. 216 (1903) 264; Gagnep. in Fl. Indoch. II (1921) 954; Craib, Fl. Siam. Enum. I (1931) 724. — **Fig. 43.**

L. tomentosa Presl. var. *loudonii* Clarke in Hook. f., Fl. Brit. Ind. II (1879) 578.

L. rotleri Clarke in op. cit. II (1879) 576; Koehne op. cit. (1883) 22 et (1903) 263; Gamble, Fl. Madras I, 3 (1919) 513.

Tree. *Leaves* oblong or elliptic-oblong, sometimes sub-orbicular, variable in length 4–20 cm long, 3.5–8 cm broad, paler beneath, acute or sub-rounded at apex, often mucronate, acute or rounded and even subcordate at base, densely yellow stellately tomentose on both surfaces when young, later glabrous above with a tomentulose midrib, and tomentose beneath, 6–12 nerved on each side; petiole 2–5 mm long. *Panicle* subpyramidal, terminal or axillary, 10–30 cm long, 8–20 cm broad, deciduous yellow tomentose, bracteate and bracteolate. *Flower bud* subglobose long attenuate towards the base, 7–12 mm long (including \pm 3 mm long pedicelliform base), 5–8 mm in diam., obscurely ridged, curved above, shortly nipped at apex. *Calyx* in flower about 10 mm long (including \pm 5 mm long base), 7 mm in diam.; lobes 6–8, acute, \pm 6 mm long, patent or reflexed, whitish yellow tomentose in the superior half within. *Petal* obovate, slightly narrowed to the top and the base about 25 mm long (including \pm 4 mm long claw), \pm 18 mm broad, undulate and fringed in the margin. *Stamens* many, subequal, 5–8 thicker and longer stamens. *Ovary* subglobose with densely whitish yellow tomentose, style long, slender. *Fruiting calyx* cup-shaped, about 10 mm long (\pm 4 mm long base), 9 mm in diam., tomentulose, slightly ridged; lobes usually patent or slightly curved upwards at the tip, often glabrous inside, 5–6 mm long. *Capsule* varying in size 12–20 mm long, 9–15 mm in diam., elliptic or oblong, almost glabrous or sparsely tomentulose, 4–6 valved.

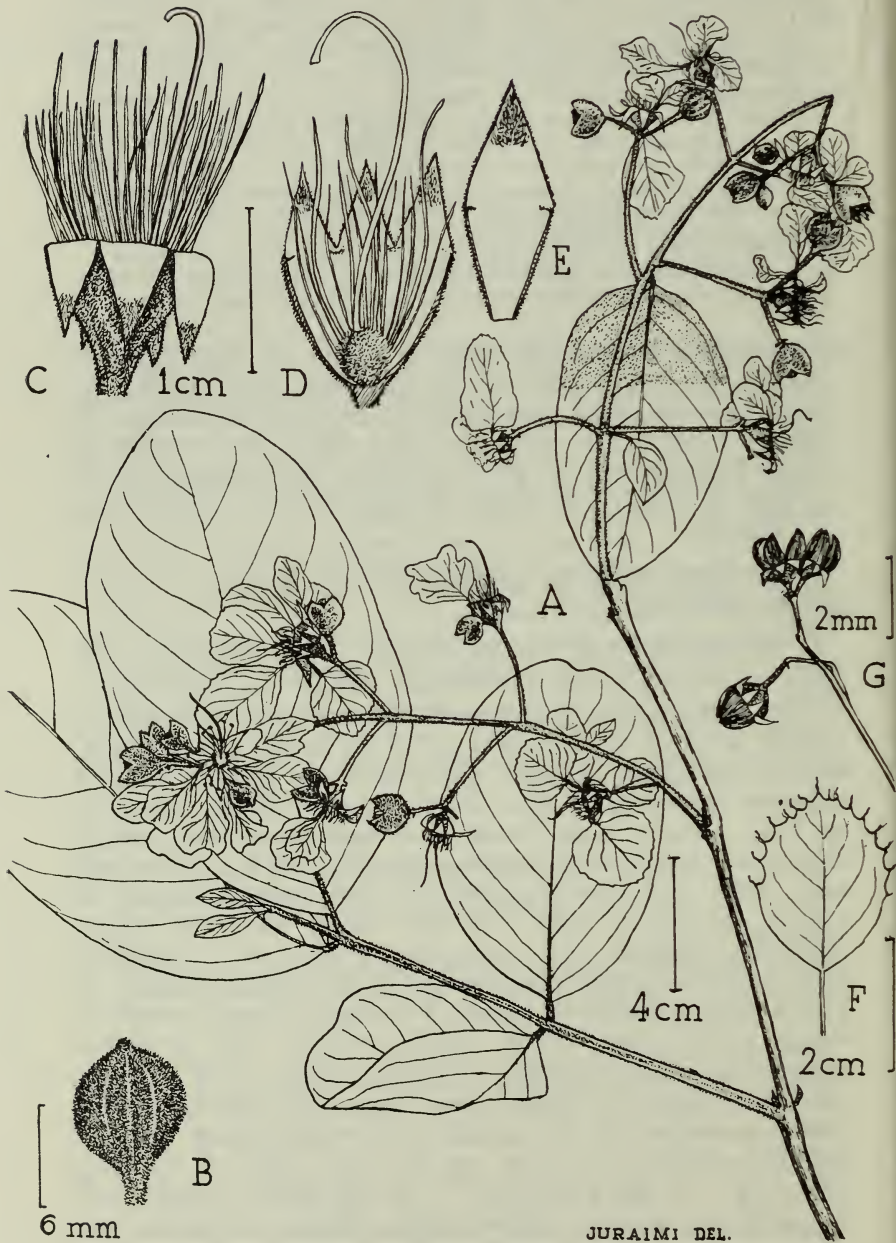


Fig. 43. *L. loudonii* Teysm. et Binn. (A-G: Alston 17,075 in PNH).

A, Fertile twig. B, Flower bud. C, Flower. D, Longitudinal section of flower. E, Lobe to show inside. F, Petal. G, Twig with capsules.

THAILAND: *Central*: **Nakhon Sawan Prov.**, (King 5,420: GH & UC). **Saraburi Prov.**, (Dec 4 = BKF 1,217: BKF); Chibadan (Kerr 8,030: BM & UC). **Petchaburi Prov.**, (Marcan 622: BM). **Prachuabkirikhan Prov.**, Hui Wa Toon (Winit 662: BKF); Kaw Lak (Hamid 3,795: SING); Kao Tao (Marcan 2,458: BM); Huay Yang (Kerr 10,879: BM & E); Limestone hill (Put 233: E). *North-Eastern*: **Chiyapum Prov.**, King Ban Zang (Kerr 20,190: BM). **Nakornracha-sima Prov. (Korat)**, (Smitinand 2,501: BKF); Ban Chun Seng (Put 2,838: BM & E). **Burirum Prov.**, Nang Rong (Suksakorn 940: BKF). *Eastern*: **Prachinburi Prov.**, Krabin, Kao Sakan (Kerr 9,755: SING). **Cholburi Prov.**, (Din 175 = BKF 8,346: BKF & 232 = BKF 7,107: BKF; Chit 259 = BKF 14,363: BKF, 259 = BKF 7,079: BKF; Sriracha (Kerr s.n.: BM & 2,082: E; Collins s.n.: E; Marcan 122: BM; Din 175 = BKF 8,346: KEP); Nong Nam Kio (Collins 961: E). **Chamburi Prov.**, (Dec 1,144 = BKF 21,153: SING, & BS 648 = BKF 18,243: SING); Pong Nam Rawn (Smitinand 3,376 = BKF 15,646: SING). *Prov. & loc. incert* (Haase s.n.: BM, Kerr s.n.: BM; Bradley 219: UC).

INDOCHINA: **Laos**, Strung-Streng (Thorel 2,181: A, E & GH). **Cambodia**, *Prov. Pen-Lovier et Samrong-tong* (Pierre 503: A).

CULTIVATED: **Thailand**, Bangkok, (Kerr 6,769: BM; Charoon, Thai For. Dept. No. 146,650: BKF). **Malaysia**, Penang Hort. Bot. (Abdul Kadin s.n.: SING; Uppaveé s.n.: SING; Kamarudin 295: SING). **Singapore** Hort. Bot. (Mazuki s.n.: SING; Furtado 34,895: PNH & SING). **Indonesia**, Hort. Bot. Bogor (Alston 17,075: BM & PNH; Beumee' VII. D. 31: SING; Wit s.n.: PNH & SING). **Philippines**, Mt. Makiling, Laguna Prov. (Mendoza 7,708: A, Sulit 81,715: SING).

L. rottleri has been correctly reduced by Craib to *L. loudonii*, and certainly this is not native of the Deccan in India. It must have been a cultivated plant.

Fruiting specimens of *L. loudonii* and *L. tomentosa* might also be easily confused since both these have forms which produce large and small fruits. However in *L. loudonii* fruiting calyx is saucer-shaped, its ridges often almost obscure, and lobes 5–6 mm long and capsule normally subglobose, upto 17 mm long, 14 mm in diam. Leaves also are generally acute or mucronate. In *L. tomentosa* the leaves are acuminate, fruiting calyx cup-shaped, ridges generally prominent, its lobes about 3 mm long, and capsule elongate 10–15 mm long, 8–10 mm in diam.

The holotype was collected by Teysmann on a hill at Petchaburi or Phetburi near Kanburi Province of Siam. Apparently from the seed of this type specimen plants were grown in the Bogor Gardens. There are plants in Bogor numbered VII. D. 31, XV, JA XIII and others. In 1941 De Wit distributed as type specimens from one of these plants growing in the private garden of the Hortulanus House.

43. *Lagerstroemia calyculata* Kurz in Journ. As. Soc. Beng., XLI. 2, (1872) 307 & For. Fl. Burma I (1877) 522; Clarke in Hookf., Fl. Brit. Ind. II (1879) 576; Koehne in Engler, Pflanzenr., 17 = IV. 216 (1903) 257; Brandis in Ind. Trees (1911) 339; Gagnep in Fl. Indoch. II (1921) 959; Craib, Fl. Siam. Enum. I (1931) 719. — **Fig. 44.**

L. angustifolia, Pierre ex Laness., Pl. Util. Col. Fr., (1886) 322 et Koehne in Engl. Jahrb. XLI (1907) 102 — nom. nud.; ex Gagnep. in Not. Syst. III p. 355 (1918); Fl. Indoch. II (1921) 956, fig. 103.

A tree. *Leaves* 10–20 cm long, 2–8 cm broad, lanceolate, long acuminate or acute at the apex, obtuse or rounded at base, entire or slightly undulate in the margin, hairy brown on both sides when young, later excepting glabrescent midrib, glabrous above, hairy beneath, 8–16 nerved on each side, reticulation more prominent beneath; petiole 5–10 mm long, ferruginous hairy. *Panicle* brown tomentose in axis, 10–30 cm long with oblique or nearly horizontal branchlets; bearing sessile or subsessile flowers. *Flower bud* pyriform 4–5 mm long, 3 mm in diam., slightly nipped at apex. *Calyx* in flower, funnel shaped, \pm 6 mm long, \pm 4 mm broad, brown tomentose, obscurely 12 ridged; lobes 6 erect, not thickened in the margin. *Petal* obovate but acute at apex, 5–8 mm long (including 2–3 mm long claw), \pm 5 mm broad, undulate in margin. *Stamens* many, subequal, exert. *Ovary* oblong, slight tomentose. *Fruiting calyx* \pm 6 cm long, \pm 6 cm in diam., not ridged, adpressed to the fruit; lobes 6, patent or reflexed, brittle. *Capsule* about 10 mm long, 6 mm in diam., oblong, black, 5–6 valved.

BURMA: **Yamethin**, Mintyin (Lace 4,524: CAL & E); Yanaungmyin (Smales s.n.: A, CAL & E). **Pegu** (Kurz 1,344/6: CAL); loc. incert. (Mg Kha No. 1: E).

THAILAND: *Northern*: **Mae Hong Sorn Prov.**, Muang Pai (Kerr 5,505: BM & E); Pang-Mu (Smitinand 4,612: BKF). **Lampoon Prov.**, Mae Lee (Winit 191: BM & E). **Lampang Prov.**, Ngao, Ban Pong (Bunnak 74 = BKF: 9,841: KEP & SING). **Prae Prov.**, Mae Yom (Swat 9 = 2,518: A & SING; Vanpruk 198: BKF); Pang Pui (Kerr 3,616: E). **Kampang Pet Prov.** (Kerr 5,967: BM, E, PNH & UC & Thaew BKF 8,761: BKF). *South-Western*: **Kanburi Prov.**, Kawe Noi River at Wang ka (Kostermans 82: A, PNH & SING). *Eastern*: **Ubol Prov.** (Rananand 17 = BKF 11,895: SING). **Srisaket Prov.**, Kantralak (Prayad 271: SING). *North-Eastern*: **Korat Prov.** = Rachasima (Pong 32 = BKF 22,897: SING & Phengkklai 565: BKF — 28,672: BKF). **Loei Prov.**, (Din 121 = BKF 5,306: SING). **Nong Khai Prov.** Phonpisai (Adisai 433: SING). *South-Eastern*: **Cholburi Prov.**, loc. incert. (Din 236 = BKF 8,328: SING & 179 = BKF 8,347: BKF & KEP); Sriracha, Kaw Loi (Collins 392: E). **Chanburi Prov.**, Pong Nam Rawn (Smitinand 3,345 = BKF 8,347: BKF & 3,375 = BKF 14,714: SING); Chantabun (Noe 62: E). *Southern*: **Surattani Prov.**, Ban Kawp Kep (Kerr 13,341: E). Trang (Vanpruk 811 = Flor. Siam. No. 5,378: BKF).

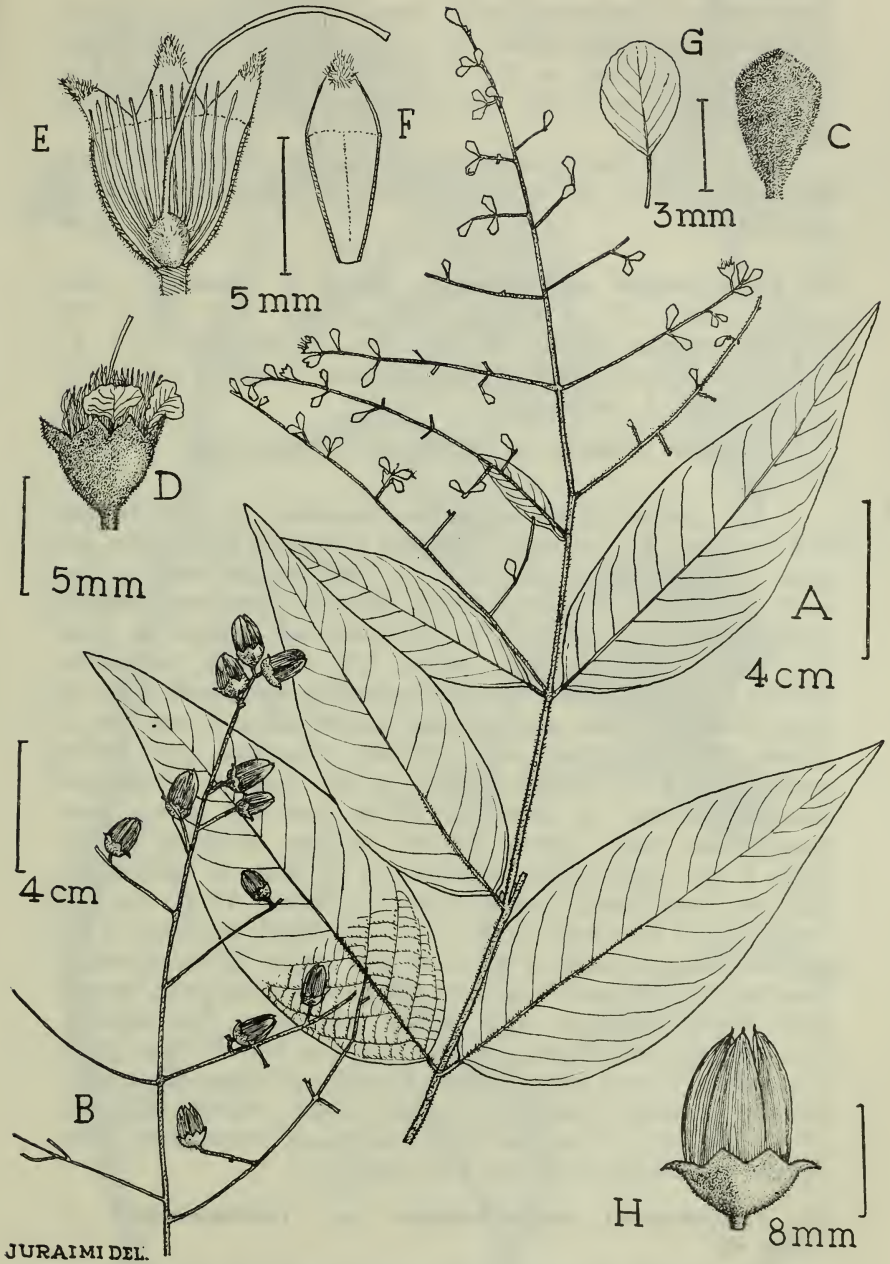


Fig. 44. *L. calyculata* Kurz (A-H: Swat 2,518 in SING).

A, Fertile twig. B, Twig with capsules. C, Flower bud. D, Flower. E, Longitudinal section of flower. F, Lobe to show inside. G, Petal. H, Capsule.

INDOCHINA: **Anam**, Dalat (Squires 820: A. BM & SING). **Cochinchina**, Prov. Bien Hoa at Bao Chiang (Pierre 4,993: A. BM & GH — isosyntypes of *L. angustifolia*). Tayninh at Souida (Pierre 4,993; perhaps 4,994: A — isosyntypes of *L. angustifolia*); Thanh-uyen (Robert 14: A, E & UC). **Laos**, Borikhane near Weing Chan (Kerr 21,305: BM). **Cambodia**, loc. incert. (Bejeaud 698: A).

This is easily distinguished by its sessile or subsessile flowers. Gagnepain (1921) placed *L. calyculata* as insufficiently known species.

44. **Lagerstroemia cochinchinensis** Pierre in Lanessan, Plant. Util. (1886) 321 et Koehne, Engl. Jahrb. XLI (1907) 102 *nom. nudum*; Gagnep. in Not. Syst. III (1918) 356 et Fl. Indoch. II (1921) 956; Craib, Fl. Siam. Enum. I (1931) 719 sub observ. *L. balansae*.

L. balansae Koehne *sec.* Craib, Fl. Enum. Siam. I (1931) 718 p.p.

A tree. *Leaves* elliptic or narrow-lanceolate, or ovate oblong, 5–9 cm long, 2.5 cm broad, greenish brown or grey above and paler beneath, stellate tomentose on both surfaces when young, later glabrous or glabrescent above, hairy or glabrescent beneath, shortly acuminate or acute at the apex, sub-rounded at base, 6–9 nerved on each side; petiole 2–5 mm long, tomentose. *Panicle* terminal, densely ferruginous stellate tomentose, 8–15 cm long; branchlets stout and unequal; pedicel about 5 mm long in lateral flowers. *Flower bud* pyriform, obconical and almost truncate at first, shortly nipped at tip, thickly ferruginous tomentose. *Calyx* in flower, obconical, narrowed into a short pedicelliform base, usually smooth or very obscurely ridged; lobes 4 mm long, yellow tomentose in the superior half within, glabrous lower down. *Petal* orbicular or obovate, 15–20 mm long (with 3.5–5.0 mm long claw), 8–13 mm broad, undulate in the margin. *Stamens* many, 4–6 thicker and longer, others subequal, inserted at the bottom of the calyx tube. *Ovary* subglobose, densely light yellow tomentose; style slender and longer than stamens. *Fruiting calyx* cup-shaped, abruptly narrowed into the base, about 6 mm deep, 12 mm broad, densely ferruginous tomentose outside; lobes 6, reflexed triangular. *Capsule* short, oblong or ovoid, 15–17 mm long, 12 mm in diam., deciduous tomentulose, often densely tomentose at the tip, 6–7 valved.

44a. **Lagerstroemia cochinchinensis** var. **cochinchinensis** — **Fig. 45.**

Leaves elliptic or narrow lanceolate, acute or acuminate at apex, more or less rounded at base, dark brown or grey and glabrous above, lighter and hairy beneath, 5–7 cm long, 2.5–3 cm broad; petiole 2–3 mm long (in the lectotype) and up to 5 mm in the other.

INDOCHINA: *Cochinchina*: Tayninh at Souida, cult. in Hort. Bot. Saigon (Pierre 820: BM — **isolectotype**).

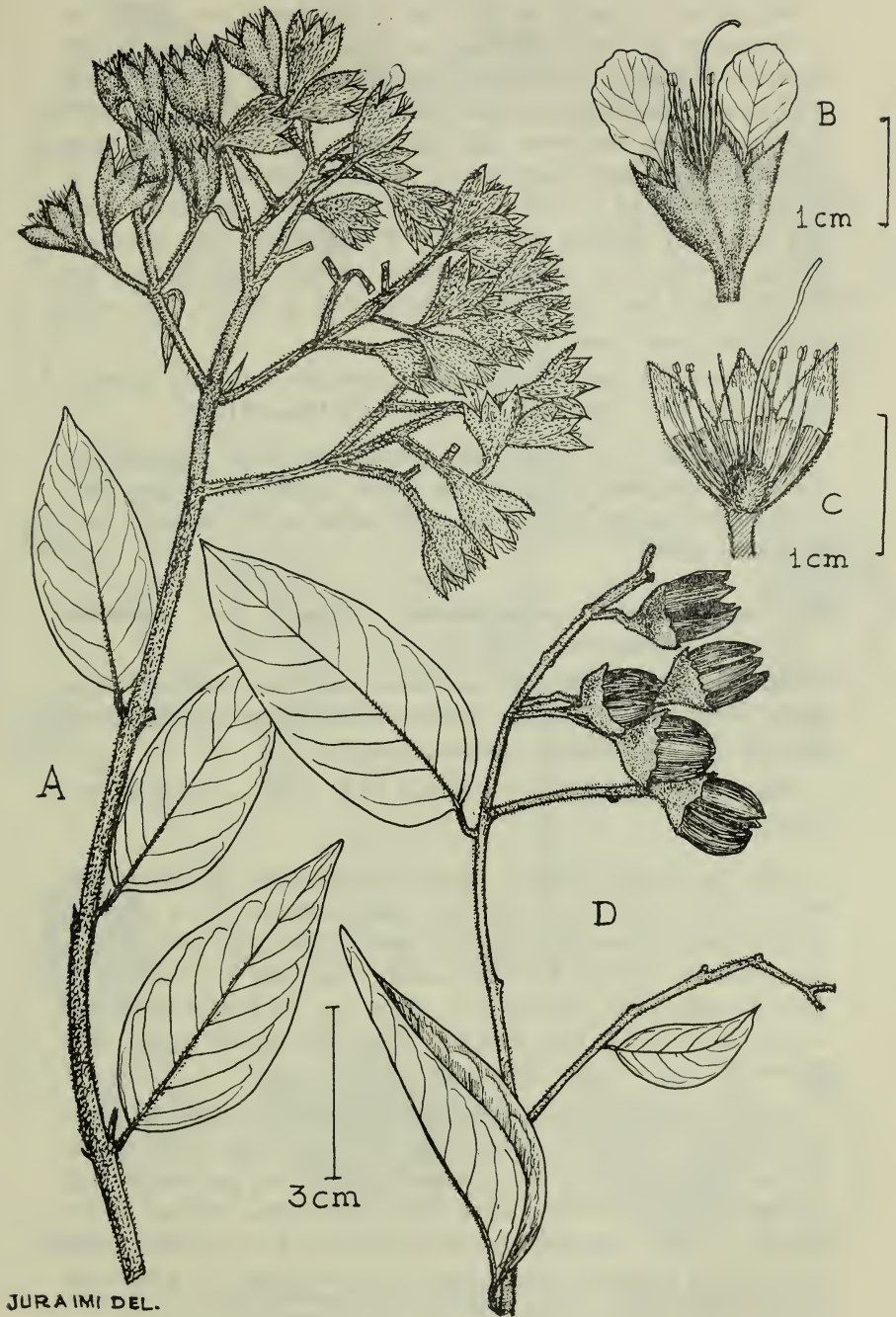


Fig. 45. *L. cochinchinensis* var. *cochinchinensis* (Cult. in Bot. Saigon 820 in BM-isolectotype; D: Winit 515 in BKF).

A, Fertile twig. B, Flower. C, Longitudinal section of flower. D, Twig with capsule.

THAILAND: *Central*: Nakawn-Chaisee (Winit 515: BKF).

We are very grateful to Mlle. M. F. Capitaine for sending us a photocopy of the lectoholotype from the herbarium of the Museum National D'Histoire Naturelle of Paris. It agrees well with its duplicate in the British Museum though differing in that the leaves here are loose and the main inflorescence is more branched and bears open flowers. Mlle. Capitaine also sent us a line drawing of a young bud which shows a depressed apex and a similar drawing of a fruit. Young buds with depressed apices are also seen in the specimens of var. *ovalifolia* and the fruiting calyx has lobes which shows that it has a very short nipple to flower bud.

The lectotype specimen and its duplicate bear only flowers; and so we have described the fruit from Winit 515.

L. balansae with which this species has been confused by Craib has narrower and glabrous leaves (adult) and flower buds with longer nipples so that the calyx lobes of the capsules have elongated apices.

44b. *Lagerstroemia cochinchinensis* Gagnep. var. *ovalifolia* Furtado et Montien — Fig. 46.

Differt a var. *cochinchinensis* foliis latioribus ovato-oblongis, supra virido-griseis, subtus glabrescentibus luteo-viridescentibus, tomento stellato ochraceo deciduo praeditis.

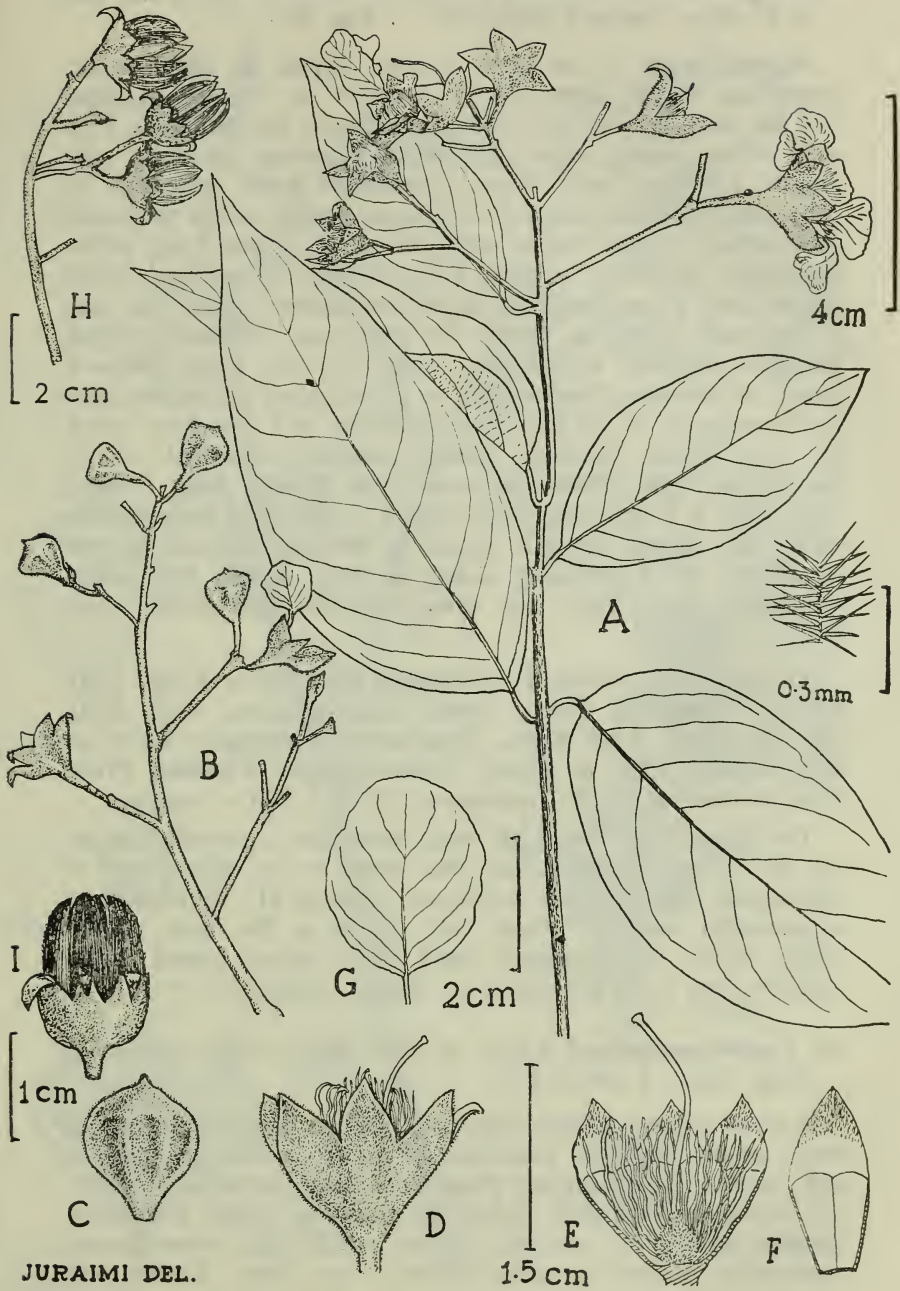
Holotypus: THAILAND: Kanburi (P.S. 2,101 = BKF 28,791: SING).

Folia late ovato elliptica, apice subacuminata vel acuta, basi subrotundata, 6–9 cm longa, cm lata, utrinsecus 7–11 nervata, supra glabra griseo-viridia, subtus luteo-viridescencia glabrescentia cum tomento deciduo ochraceo stellato; petiolus 3–5 cm longus. *Inflorescentia* 6–10 cm longa, in ramos 3–6 cm longos subdivisa. *Alabastrum* 10–12 mm longum, 7–8 mm latum, apice cum mamnillo circa 1 mm longo.

Leaves broadly ovate elliptic, subacuminate or acute at apex, subrounded at base, 6–9 cm long, 3–6 cm wide, 7–11 nerved on each side, glabrous and greenish grey above, glabrescent and yellowish green beneath often with ochraceous stellate hairs; petiole 3–5 mm long. *Inflorescence* terminal, 6–10 cm long, with 3–6 cm long branches. *Flower bud* 10–12 mm long, 7–8 mm broad with a nipple about 1 mm long.

THAILAND: *Northern*: **Chiangmai**, Doi-Sutep (Kerr 718: BM). *South-Western*: **Kanburi** (P.S. 2,101 = BKF 28,791: SING — **holotype**); Ta-Salao (Marcan 2,511: BM; Kerr 19,490: BM).

INDOCHINA: **Laos**, Pakse (Jeffrey 5,104: UC).



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Fig. 46. *L. cochinchinensis* var. *ovalifolia* (A-G: Smitinand 28,791 in SING — holotype; Jeffrey 5,104 in UC).

A, Fertile twig. B, Twig with flower buds and flowers. C, Flower bud. D, Flower. E, Longitudinal section of flower. F, lobe shows inside. G, Petal. H, twig with capsules. I, Capsule.

45. *Lagerstroemia collinsae* Craib in Kew Bull. (1914) 282 and in Fl. Siam. Enum. I (1931) 720. — Fig. 47.

A tree about 15 m high. *Leaves* elliptic or ovate-elliptic, acuminate at the apex, nearly rounded or cuneate at base, 4–8 cm long, 1.5–3.5 cm broad, deciduously tomentose on both sides when young, later glabrous, 6–9 nerved on each side; petiole 3–8 mm long. *Panicle*, terminal, borne generally on congested branchlets, about 5 cm on each branch, yellow tomentose with axillary cymes; bracts small, linear, \pm 7 mm long, yellow tomentose, deciduous; pedicels 5–7 mm long. *Flower buds* about 9 mm long, 8 mm broad ochraceous tomentose; nipple less than 1 mm long. *Calyx* in flower 7–9 mm long, obscurely ridged, abruptly narrowed into a short base (2–3 mm long); lobes 6, patent or recurved. *Petals* oblong or sub-rounded, purple, undulate in the margin, \pm 16 mm long (including 4–5 mm long claw), 10 mm broad. *Stamens* many, exserted, subequal. *Ovary* subglobose, light yellow tomentose; style slender, long. *Fruiting calyx* tube 6–8 mm long (including \pm 3 mm long pedicelliform base), cup shaped, lobes 6, patent or reflexed. *Capsule* globose or oblong, 10–14 mm long, 10 mm in diam., usually light brown tomentose at the apex, and sometimes also tomentulose lower down, 5–6 valved.

THAILAND: *Northern*: **Petchabun Prov.** (Kerr 6,378: BM). *Central*: **Saraburi Prov.**, Muok Lek (Marcan 813: BM). *North-Eastern*: **Loei Prov.**, Phukrading (Smitinand 2,142 = BKF 9,628: KEP & SING). *South-Eastern*: **Cholburi Prov.**, Sriracha (Collins 38: E — **syntype** & 190: E & BM — **syntypes**).

The flowers are borne on small branchlets crowded together on the top of a branch and this seems to be easiest way to distinguish the species in herbarium. Marcan 813 is taken from a cultivated tree in "Muok Lek" which is the name of the Public Park; this specimen bears larger leaves having larger petioles. The fruits are borne on leafless branchlets.

46. *Lagerstroemia noi* Craib in Kew Bull. (1930) 327 et Fl. Siam. Enum. I (1931) 725.

A shrub about 1 m high. *Leaves* 5.0–7.5 cm long, 2–4 cm broad, ovate or ovate-elliptic, acuminate at apex, gradually cuneate or sub-rounded at base, slightly glabrescent along the midrib beneath, 4–7 nerved on each side; petiole 2–3 mm long, yellow tomentose. *Panicle* terminal 3.0 cm long, 2.5 cm broad, light brown stellate tomentose; pedicel in lateral flower 5 mm long. *Flower bud* turbinate, narrowed abruptly into a 2 mm long, pedicelliform base, light brown or yellowish, stellate-tomentose, apiculate with about 2 mm long nipple. *Calyx* in flower obconical, obscurely ridged, light yellow tomentose in the superior half within; lobes 6, 5–7 mm long. *Petals* suborbicular, 12–15 mm long (including \pm 5 mm long claw), \pm 11 mm broad, undulate in the margin. *Stamens* many, subequal. *Ovary* pilose, surmounted with a long slender filament.

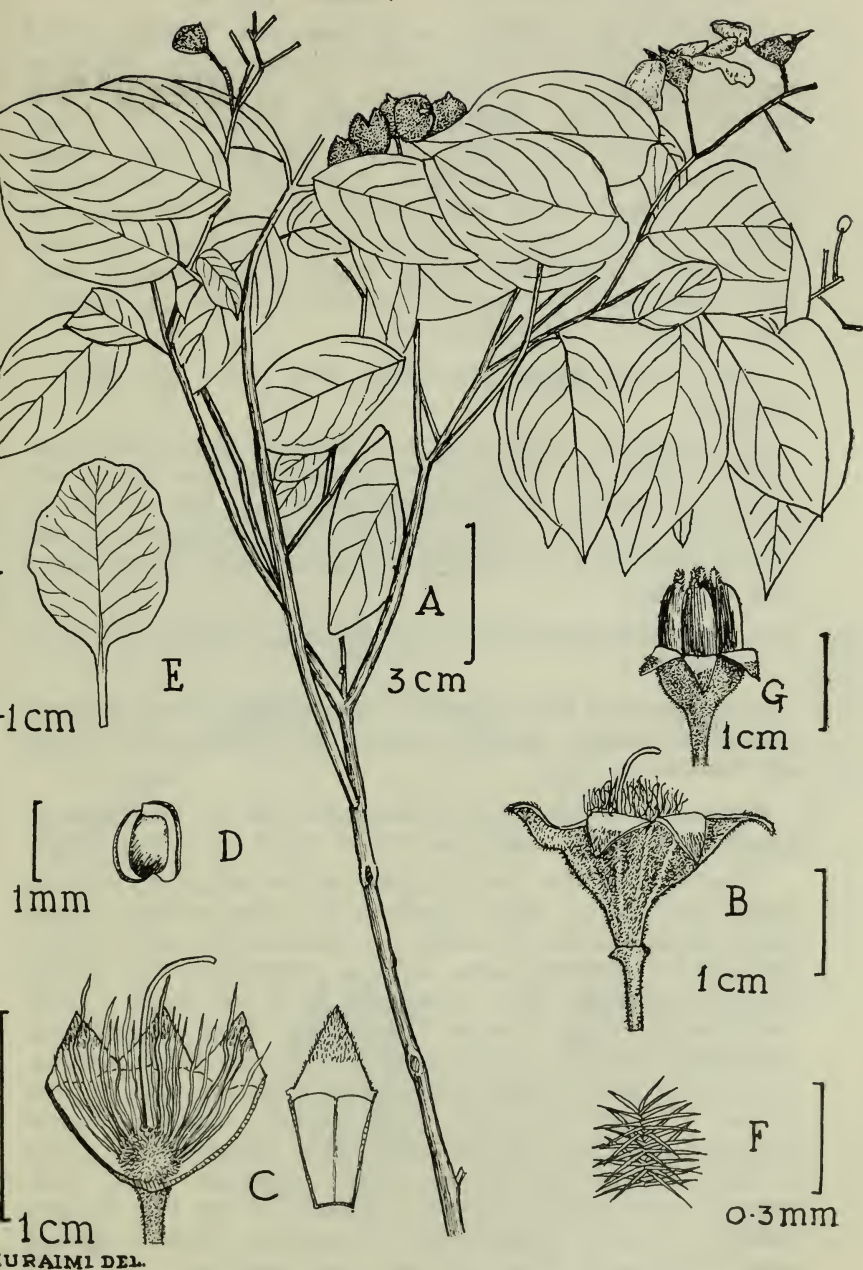


Fig. 47. *L. collinsae* Craib. (A-F: Collins 190 in E — syntype G: Smitinand 2,142 in SING).

A, Fertile twig. B, Flower. C, Longitudinal section of flower. D, Anther. E, Petal. F, Hair. G, Capsule.

- 46a. *Lagerstroemia noei* Craib in Kew Bull. (1930) 327 & in Fl. Siam. Enum. I (1931) 725. var. *noei* — Fig. 48.

A shrub about 1 m high. *Leaves* green, paler beneath, 2.5–7.5 cm long, 1.5–3.6 cm broad, elliptic or ovate-elliptic, acuminate or subacuminate at apex, obtuse or sub-rounded at base, glabrous or slightly stellate puberulous beneath, 4–9 nerved, petiole 2–3 mm long. *Panicle* short 3 cm long, brown stellate tomentose. *Flower bud* turbinate, 10 mm long, 8–9 mm broad, obscurely ridged, brown with stellate tomentum, apiculate with about 2 mm long nipple. *Calyx* in flower obconical, tube about 8 mm deep, 8 mm broad, slightly ridged at base; lobes 6, erect, paler tomentose in the superior half within, 5 mm long. *Stamens* many, subequal. *Ovary* tomentose.

THAILAND: Korat, Ban Chum Seng (Noe 246: BM — holotype).

This appears to represent an early flowering stage of the plant. Further studies are necessary to see whether this species will grow and become var. *longifolia* which has similar flowers. Sometimes the sepals remain united to give the appearance of 5 as described in the protologue and as seen in the above quoted type specimen.

- 46b. *Lagerstroemia noei* Craib var. *longifolia* Furtado et Montien — Fig. 49.

L. noei var. *noei* foliis majoribus fusco brunneis, glabris paniculis longioribus ramosis, floribus longiore pedicellatis haec varietas sat distincta.

Holotypus: THAILAND: In Provincia Loei ad Wangsaphung prope flumen Huay Som (Dee 707 = BKF n. 12,388: SING).

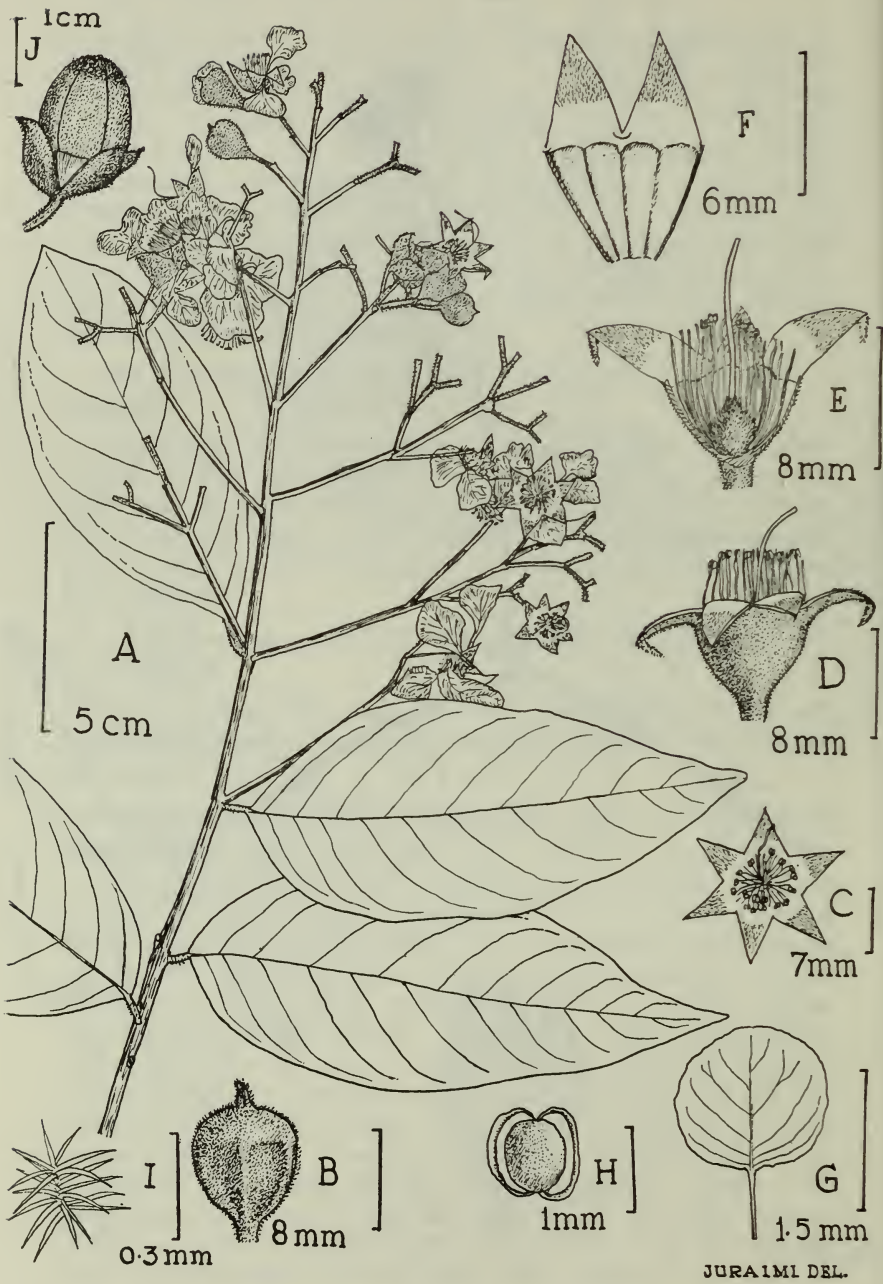
Arbor 5–10 m alta. *Folia* elliptica vel ovato-elliptica, 5–15 cm longa, 2–4 cm lata, apice acuminate vel subacuminata, obtusa, basin versus curvato angustata vel subrotundata, imo obtusa, utrinque 7–11 nervata, primo utrinque glabrescentia dein glabra. *Panicula* terminalis, saepe pyramidalis, 7–20 cm longa, ramosa basin versus saepe breviter foliata axi fusco tomentulosa; pedunculis circa 0.5–3 cm et pedicellis 0.5–2 cm longis praedita. *Alabastrum*, fulvo tomentosum, obscure costatum, circa 10 mm longum, 7 mm in diam., basin versus cuneatum, apice rotundato-convexum, summo circa 7 mm mammillatum. *Calyx* 6 lobatus, lobis intus apicem versus tomentosus. *Petala* (cum unguiculo circa 5 mm longo) 12–15 longa, 11 mm lata, margine undulata. *Ovarium* subglobosum, tomentosum. *Capsula* oblonga circa 17 mm longa, 12 mm in diam. apice tomentosa.

A tree 5–10 m or more tall. *Leaves* dark brown, paler beneath, elliptic or ovate elliptic 5–15 cm long, 2–4 cm broad, acuminate or subacuminate at apex, sub-rounded at base, eventually glabrous on both sides, 7–11 nerved on each side; petiole 4–7 mm long. *Panicle* terminal, often pyramidal, 7–20 cm long, tomentulose in the axis; peduncles distant once or twice dichotomous, up to 3 cm long, pedicel up to 2 cm long in lateral flowers. *Flower bud*



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Fig. 48. *L. noi* var. *noi* (A-B: Noe 246 in BM — holotype).
A, Fertile twig. B, Flower.



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Fig. 49. *L. noei* var. *longifolia* Furtado et Montien (A-I: Dec 707 = BKF 12,388 in SING holotype J: Smitinand 4,813 in BKF).

A, Fertile twig. B, Flower bud with long nipple at the apex. C-D, Flower. E, Longitudinal section of flower. F, Lobes to show inside. G, Petal. H, Anther. I, Hair. J, Capsule.

turbinate 10 mm long, \pm 7 mm broad, slightly ridged, fulvous stellate tomentose; nipple \pm 2 mm long at apex. *Calyx* in flower tube 8 mm deep, 8 mm in diam., obconical, slightly 12 ridged; lobes 6, light brown tomentose in the superior half within. *Petal* sub-rounded, 12–15 mm long (including \pm 5 mm long claw), \pm 11 mm broad, undulate in the margin. *Stamens* many, subequal. *Ovary* subglobose, densely light yellow tomentose. *Fruiting calyx* cup-shaped, 8–10 mm long (including \pm 2–3 mm long base), \pm 12 mm in diam., abruptly narrowed into the base, lobes 6, recurved. *Capsule* oblong, about 17 mm long, 12 mm wide, tomentose at apex.

THAILAND: *Northern*: **Chiengmai**, Doi Sutep (Smitinand 4,184: BKF); Chieng Mai to Chieng Rai (Rock, 1554: A & UC; 1,640: A). **Lumpang** (Winit 645: BKF). **Lumpoon** (Luan 6 = BKF 11,207: BKF). **Prae** (Pricha 2 = BKF 1,202: BKF); Ma chwa (Vanpruk 54: BKF). *Central*: Saraburi (Dee 103 = BKF 3,705: BKF); Chaibadan at Dong Pya Yen (Kerr 8,028: BM). *North-Eastern*: **Udon**, Nong-Harn (Lakshnakara 1,039: BM). **Loei**, Wangsaphung (Dee 5 = BKF 8,634: SING, & 707 = BKF 12,388: BKF & KEP — **isoholotypes** & SING — **holotype**; Din 19 = BKF 3,441: BKF); Phu Krading (Thai For. Dept. n. 344 = BKF 2,495: A & BKF); Pha Nok Kao (B.S. 32 = BKF 936: BKF); loc. incert (Dee 918 = BKF 16,149: SING); Nawng Bua, Kwawnkaen (Smitinand 4,813: SING — **type of fruit**).

INDOCHINA: **Tonkin**, Hoa Binh at Cho Bo (Petelot 1,596: A). **Laos**: Mekong Bank (Talbot de Malahide 46: BM & SING).

The holotype of *L. noei* var *noei* was a shrub whereas *L. noei* var. *longifolia* is a tree 5–10 m long. Possibly the var. *longifolia* represents the adult form of var. *noei*.

47. ***Lagerstroemia balansae*** Koehne in Engl. Jahrb. XXIII Beibl. 57 (1897) 35, & in Engl. Pflanzn. 17 = IV 216 (1903) 263; Gagnep. in Fl. Indoch. II (1921) 957; Craib, Fl. Enum. Siam. I (1931) 718 p.p. — **Fig. 50a, 50b.**

Shrub or tree. *Leaves* elliptic, acuminate or acute at apex, narrowed and acute or sometimes nearly obtuse at base, 7–11 cm long, 2.5–4.5 cm broad, ferruginous tomentose on both sides when young, later glabrous or glabrescent; nerves 7–10 pairs; petiole 4–10 mm long. *Panicle* terminal, thickly ferruginous tomentose, 8–15 cm long, few branched, longest branchlets about 5 cm long, slightly curved upward; pedicel short \pm 4 mm long. *Flower bud* turbinate, slightly ridged with ferruginous tomentose with a brush-like nipple at apex. *Petals* subglobose 15–20 mm long (including 4–6 mm long claw), 14–17 mm broad, undulate in the margin. *Stamens* many, subequal. *Ovary* subglobose, tomentose. *Fruiting calyx* cup-shaped 10–15 mm long, 10 mm in diam., lobes 6, slightly recurved at the top with a short acuminate apex about 1 mm long. *Capsule* ovate, 12 mm long, 10 mm in diam., glabrescent, tomentose at apex, 6 valved.

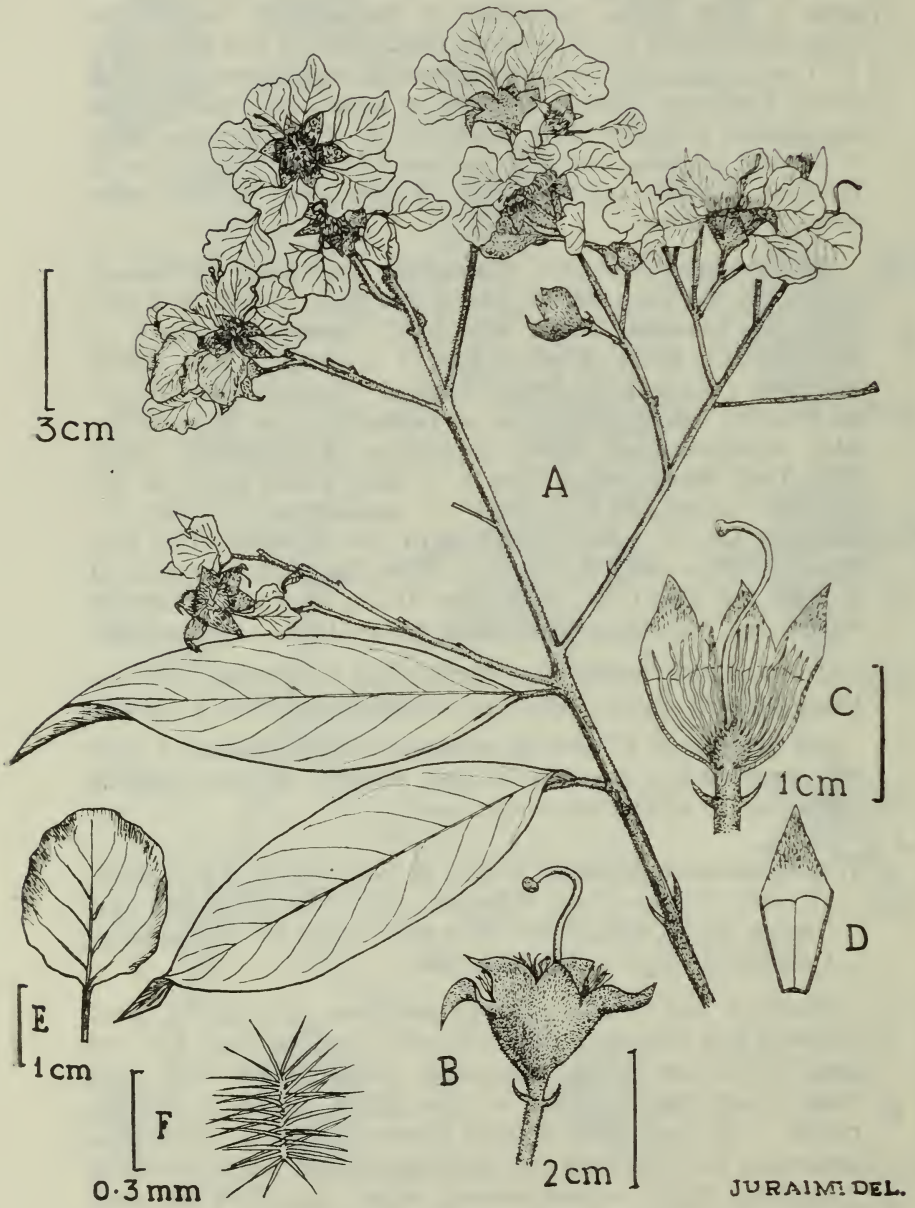


Fig. 50a. *L. balansae* Koehne (Petelot 5,914 in A).

A, Fertile twig. B, Flower. C, Longitudinal section of flower. D, Lobe shows inside. E, Petal. F, Hair.

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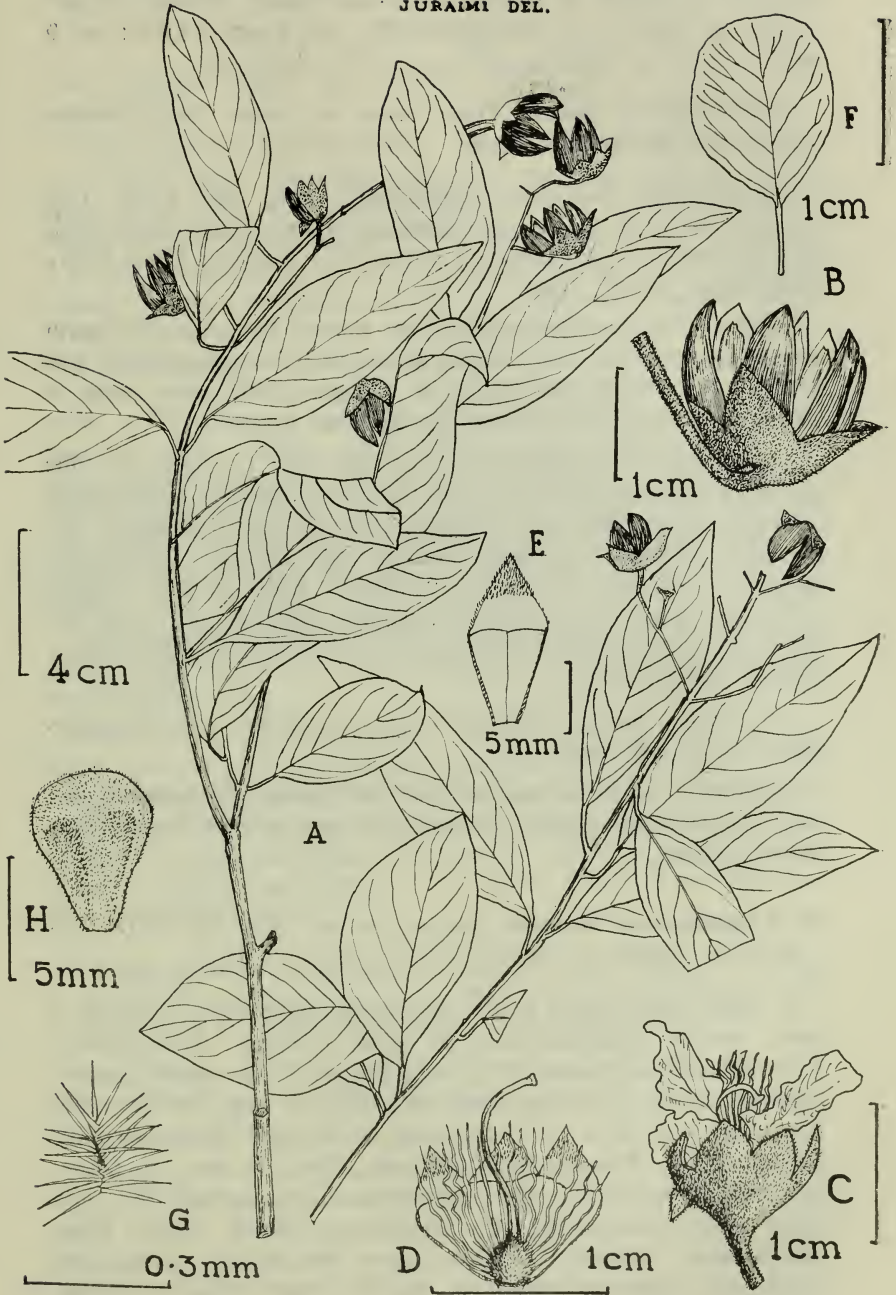


Fig. 50b. *L. balansae* Koehne (A-B: Liang 66,032 in E; C-F: Lau 27,491 in A; Lau 27,241 in A).

A, Twig with capsules. B, Capsule enlarged. C, Flower. D, Longitudinal section of flower. E, Part of calyx to show inside. F, Petal. G, Hair. H, Flower bud.

CHINA: **Hainan**, Ch'ang-Kiang (Lau 1,210: A & BM); Lok Tung (Lau 27,241 & 27,491: A); loc. incert. (Wang 33,163, 33,500 & 33,875: A; McClure 8,325: A; Liang 63,927: A & 66,032: E); Lai (McClure 709 = L.U. 18,243: A).

INDOCHINA: **Sontoy Prov.** route to Notre Dame Rocks, humid plot (Petelot 5,914: A).

THAILAND: Northern: **Chiengmai Prov.**, Me Klang Fall (Prayad 14: SING). *Central*: **Saraburi Prov.**, Khao Sawng-Phi-Nawng (Smitinand & Sleumer 1,359: SING). *Eastern*: **Ubun Prov.**, Chiet (Kerr 21,552: BM).

Petelot 5,914 was collected in the Sontoy Province of Tonkin on the route to the Notre Dame Rocks in a humid spot, the tree being 4-5 m high. The holotype Balansa 3,865 (seen only in photocopy) was also collected in the same region.

The nipple of the flower buds varies from 1-2 mm, but this species is easily separated from *L. noei* by its thicker, ferruginous coloured indumentum on the buds, long petioled and longer and narrower elliptic, acuminate leaves and smaller, glabrescent capsules. Generally the ridges of flower buds do not become visible because of the thick indumentum, whereas in *L. noei* the buds have thinner indumentum and so the ridges usually become slightly conspicuous.

Apparently young vegetative twigs are winged, but the wings seem to fall off soon.

Gagnepain seems to have referred the fruiting specimens of this to *L. cochinchinensis*. But we have not seen two of the syntypes of this species.

48. **Lagerstroemia lecomtei** Gagnep. in Nat. Syst. III (1918) 360 & in Fl. Indoch. II (1921) 949 fig. 102 — 1 & 2.

A short tree. *Leaves* ovate acuminate, rounded or cordate at base, shortly acuminate-acute at apex, glabrous, concolourous, 7 nerved on each side; 2.5-5.5 cm long, 2-3 cm broad; petiole glabrous, about 1 mm long. *Inflorescence* 5 cm long, few flowered; branchlets 1-2, about 10-15 mm long, shortly yellowish tomentose, 1-2 flowered. *Flower buds* globose, about 8 mm in diam., 5-6 ridged, apiculate, yellow tomentose. *Calyx* sessile, 5-6 mm deep, yellow-tomentose, 10-12 sulcate within, with wings conspicuous, abruptly desinent near the sinus; lobes 5-6, triangular, tomentose above the middle within. *Petals* orbicular, subcordate at base, undulate in the margin. *Stamens* numerous, subequal. *Ovary* tomentose with stellate hairs. *Fruit* not known.

INDOCHINA: **Annam** between Phan-rang & Tourcham (Lecomte et Finet 1,406: P — **holotype**).

We have not seen any representatives of this species.

49. *Lagerstroemia spireana* Gagnep. in Nat. Syst. III (1918) 362 et. in Fl. Ind. II (1921) 951 Ic. 102 fig. 4-6; Craib. Fl. Siam. Enum. I (1931) 726. — **Fig. 51.**

L. spireana Gagn. var. *armata* Craib op. cit. (1931) 726 syn. nov.

Type Specimen: INDOCHINA: Laos, Cam-Keut (Spire 326: P).

A tree. *Leaves* oblong-elliptic, 4-12 cm long, 4-5 cm broad, acute or rounded at the apex, slightly cuneate or rounded at the base, glabrous above, tomentose beneath then glabrous; nerves 5-8 pairs, prominent on both surfaces; petiole 2-4 mm long. *Panicle* terminal cylindrical, 20-30 cm long with branches about 5 cm long or less. *Flower bud*, ridged and winged, tomentose with stellate hairs, alternisepalous ridges with appended incurved. *Petals* 6, oboval, attenuate at base, wavy margined, 12 mm long (with a 2.5 mm long claw), 8 mm broad. *Stamens* placed at the base of calyx. *Fruiting calyx* 7-9 mm long (including 2-4 mm long pedicelliform base), 10-12 mm in diam., broadly undulated wing from each sinus to the base and also amidst of the lobes but not reached to the apex, not decurrent into the base, lobes 6, reflexed. *Capsule* short oblong, 12-14 mm long, 8-11 mm in diam., slightly short brownish hairy; 6 valved.

THAILAND: *North-Eastern*: Nakawn Panom Prov., Ta Uten (Kerr 8,466: BM); Tat Panom (Kerr 8,423: E — **isoholotype** of var. *armata*).

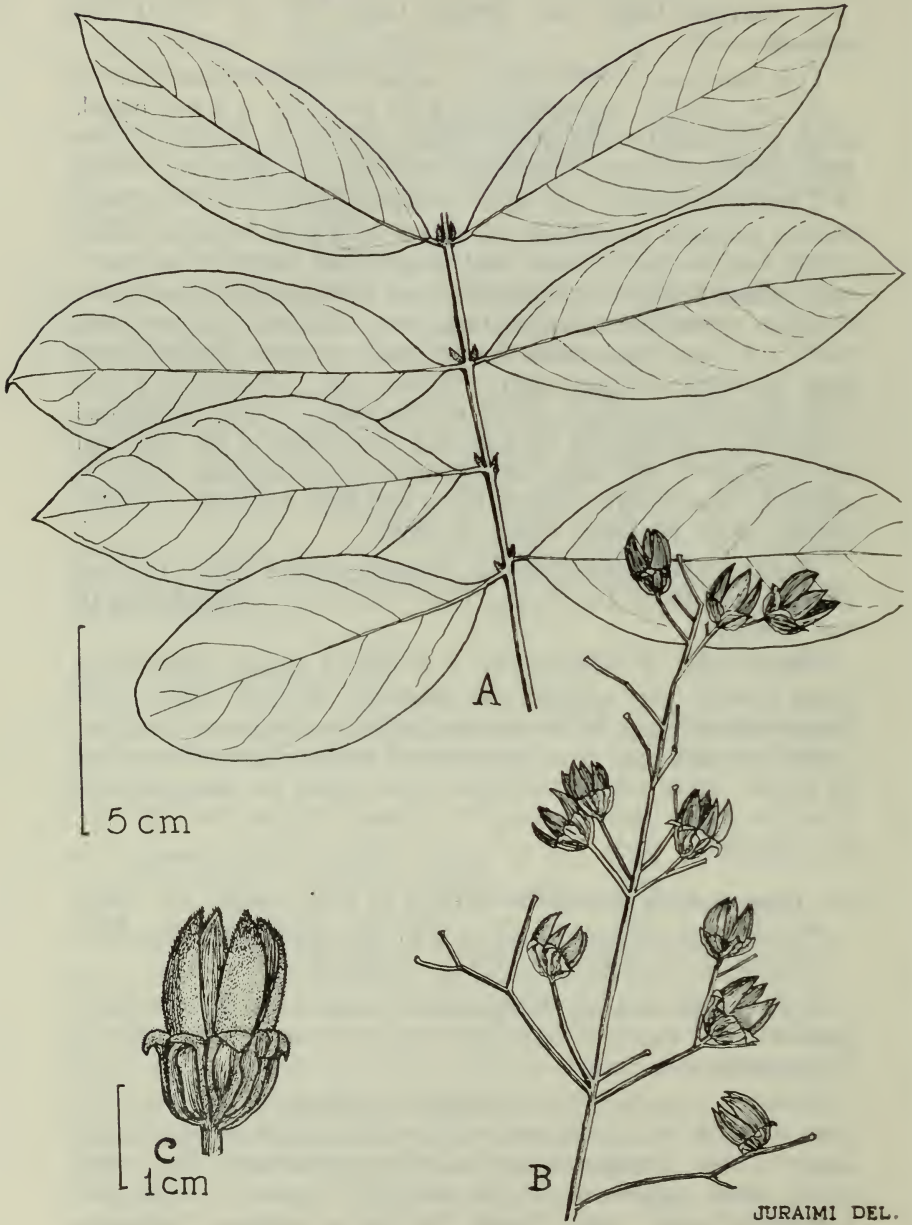
Differs from *L. siamica* by 5-7 nerved leaves, flower bud being globose and winged, non decurrent at base, wings twice larger at the top and by its stamens arising at the base of the tube.

We have had only poor specimens of these varieties. According to Craib's notes the *armata* bears stout spines on the trunk and is an evergreen plant growing by a creek, whereas the type var. is a deciduous plant.

50. *Lagerstroemia anisoptera* Koehne in Engl. Jahrb. IV (1883) 407 & Engl. Pflanzenr. 17 = IV. 216 (1903) 264 fig. 57B; Gagnep. in Fl. Indoch. II (1921). — **Fig. 52.**

L. floribunda Jack sec. King, Mat, Fl. Mal. Pen. III (1898) 351; Ridl. Fl. Mal. Pen. I (1922) 823; Craib, Fl. Siam. Enum. I (1931) 721 omnino pro parte.

A tree \pm 10 m tall. *Leaves* oblong or elliptic-oblong, 10-20 cm long, 4-10 cm broad, obtuse or acute at apex, sub-rounded rarely acute at base, ferruginous stellate-tomentose on both sides when young, later glabrescent or glabrous, 6-11 nerved on each side; petiole 3-5 mm long. *Panicle* ferruginous stellate tomentose, terminal, subpyramidal, 10-35 cm long, 8-25 cm broad; branchlets up to 25 cm long; pedicel unequal \pm 5 mm long in lateral flower. *Flower bud* similarly tomentose, 8-11 mm long (including \pm 3 mm long pedicelliform base), 6-7 mm in diam., turbinate above the base, sub-rounded at the top, brush-like nipple at apex, usually 12 ridged, alternisepalous ridges longer, warted at the sinus outside. *Petal* obovate, gradually cuneate at



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Fig. 51 *L. spircana* Gagnep. (Kerr 8,466 in BM).

A, Twig. B, Twig with capsules. C, Capsule.

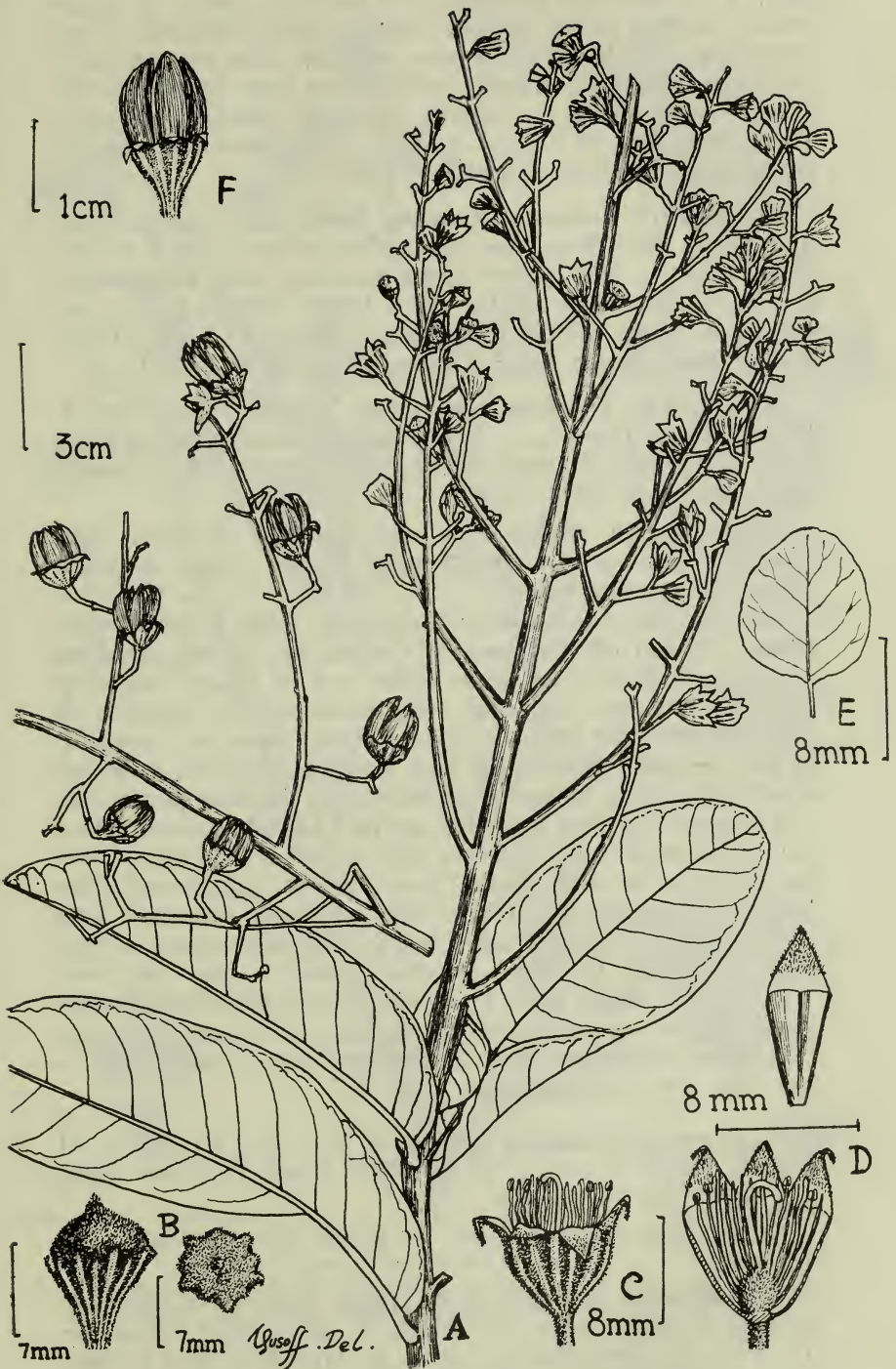


Fig. 52. *L. anisoptera* Koehne (Curtis 2,602 in SING).

A, Fertile twig. B, Flower bud. C, Flower. D, Longitudinal section of flower. E, Petal. F, Capsule.

base, \pm 15 mm long (including 3–4 mm long claw), \pm 8 mm broad, undulate in the margin. *Stamens* many, subequal. *Ovary* subglobose, densely tomentose with yellowish hairs. *Fruiting calyx* cup-shaped above the abruptly pedicelliform base; lobes recurved. *Capsule* short-oblong or slightly narrowed towards the apex, 10–12 mm long, 8–9 mm in diam., glabrescent but densely ferruginous tomentose at apex, 5–6 valved.

THAILAND: *Peninsula: Ranawng Prov.*, Kao Talu (Vanpruk 813: BKF). *Surat Prov.*, loc. incert. (Sanan 391 = BKF 15,262: SING & 480 = BKF 18,259: SING; Kerr s.n.: BM). *Trang Prov.*, loc. incert. (Smitinand 2,969 = BKF 17,205: SING); Huay Yawt (Smitinand 4,136: SING); Chong (Burn Murdoch? 3,840: SING). *Pattani Prov.*, Bukit Besar (Gwynne Vaughan 442: UC).

MALAYSIA: *Langkawi*, loc. incert. (Curtis 2,602: CAL & SING); Kuah (Curtis s.n.: SING). *Kedah*, Gunong Raya (Idris Kep. 33,175: SING); Bukit Wang (Din 33,009: SING). *Penang*, road side (Curtis 1,514: SING).

We have seen neither type nor authentic specimen from Indochina and so our identification of the species is based entirely on the description.

The holotype was Lanessan's collection from Condor island (Pulau Condor) off the Coast of Cochinchina. It was described as having both its calyx lobes within and its leaves completely glabrous. However Gagnepain who examined the holotype in Paris described the species as having leaves which are tomentose at first and then glabrous on both surfaces; the calyx lobes are described as being fugaceously tomentose in the third part within.

It appears therefore Koehne's had only an old specimen where the indumentum on the leaves and inside of the calyx lobes had fallen off to make them "very glabrous" (*glaberrimi*). The important character on which this species is separated from *L. floribunda* is that the calyx bud is unequally costate so that only 6 out of 12 ridges become visible in the top view. *L. anisoptera* differs from *L. siamica* in that the alternisepalous ridges (longer ones) are warty at the end, not patently cuspidate.

Gagnepain mentions here a specimen from Chiung-duing in the Tran Prov. of Cambodia.

51. *Lagerstroemia siamica* Gagnep. in Not. Syst. III (1918) 361 & Fl. Indoch. II (1921) 950 fig. 102–3; Craib. Fl. Siam. Enum. I (1931) 726. — **Fig. 53.**

L. cuspidata (Clarke) Craib. Fl. Enum. Siam. I (1931) 721; **syn. nov.**

L. floribunda Jack *sec.* Griff., Posth. Pap. IV (1854) 509; Koehne in Engl. Jahrb. IV (1883) 34 & in Engl. Pflanzenr. 17 = IV. 216 (1903) 266 fig. 55U & fig. 57D; King, Mat. Fl. Mal. Pen. III (1898) 351 p.p.; Ridl., Fl. Mal. Pen. I (1922) 823 p.p.; Craib, Fl. Siam. Enum. I (1931) 721 p.p.

L. floribunda Jack var. *cuspidata* Clarke in Fl. Brit. Ind. II (1879) 577: **syn. nov.**

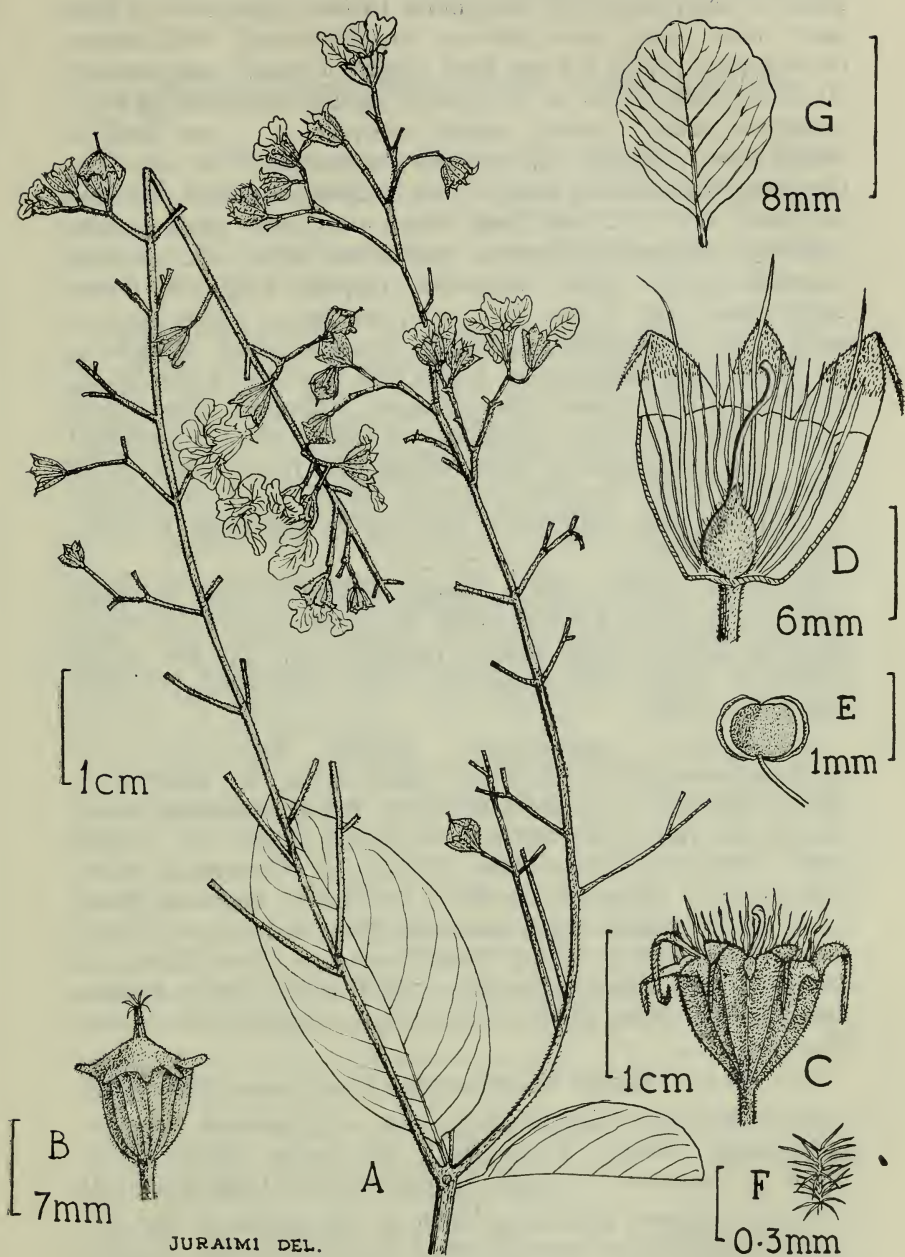


Fig. 53. *L. siamica* Gagnep. (Thaew 3,899 in BKF).

A, Fertile twig. B, Flower bud. C, Flower. D, Longitudinal section of flower. E, Anther. F, Hair. G, Petal.

A tree \pm 12 m high. *Leaves* elliptic-oblong or oblong, 9–23 cm long, 4–10 cm broad, acute or obtuse at apex, sub-rounded or acute at base, yellow or ferruginous stellate tomentose on both sides when young, later glabrous or glabrescent, 7–12 nerved on each side; petiole 3–6 mm long. *Panicle* terminal, subpyramidal 20–50 cm long, yellow or ferruginous stellate tomentose all over, branchlets usually curved; pedicel unequal \pm 3 mm long in lateral flower. *Flower bud* similarly tomentose, 8–10 mm long (including pedicelliform base), 6 mm in diam., turbinate, abruptly narrowed into \pm 3 mm long base, with 12–14 acute ridges, equilateral, episealous broader, epipetalous acuter and patently cuspidate at the sinus; brush-like nipped. *Calyx* in flower campanulate with 3 mm long base, bearing a patent cusp at each sinus; lobes usually 6, slightly recurved. *Petal* subglobose, \pm 12 mm long (including \pm 2 mm long claw), \pm 9 mm broad, undulate in the margin. *Stamens* many, subequal. *Ovary* short oblong, densely yellow tomentose. *Fruiting calyx* cup-shaped above the pedicelliform base; epipetalous ridges much more prominent; lobes recurved. *Capsule* oblong \pm 15 mm long, 10 mm in diam., glabrescent but densely tomentose at apex, usually 6 valved.

BURMA: *South:* Tavoy District (Keenan, Aung & Rule, 1,046, 1,283, 1,321, 1,348 & 1,404: E; Parker 2,173: A); Karen (Brandis 1,368: CAL); Mergui (Griffith 105: E); loc. incert. (Griffith K 2,235: GH; Kurz s.n.: CAL; Blinkworth 21: BM; Leg.? s.n.: BM).

THAILAND: *South-Eastern:* **Kanburi Prov.,** Sai Yok (Kostermans 1,036 & 1,150: A; Larsen 8,706: A; BKF; E & SING); Ban Kar (Larsen 8,156: BKF). **Prachuabkirikhan Prov.,** Bangtaphan (Keith 363: SING); loc. incert. (Thaew 53 = BKF 3,899: BKF); Hua Hin (Kerr 13,468: E). **Chumphon Prov.,** Ban La Ngan (Kerr 11,448: BM). *Peninsular:* **Ranawng Prov.,** La-un (Kerr 16,462: BM). **Surattani Prov.** loc. incert. (Sanan 470 = BKF 14,935: SING); Ban Kawp Kep (Kerr 13,188: E). **Trang Prov.,** loc. incert. (Put 250 = BKF 1,203: SING). **Songkla Prov.,** Natawi (Kerr 15,818: BM & E); loc. incert. (Van Nooten 18: A).

MALAYSIA: **Kedah,** Bukit Tanjong Terai (Ishak 7,654: KEP).

CULTIVATED: **Formosa** (Leg. ? s.n.: A). **Thailand,** Bangkok canal bank (Marcan 2,136: BM); loc. incert. (Kerr 11,026: BM & E). **Australia,** Brisbane, Kangaroo Point (Trapnell s.n.: A).

There is a great deal of variation in this species so that it is extremely difficult to separate neatly the form on the characters of calyx ridges, leaves and twigs. Some forms which have very prominent cusps to the ridges, have broad, almost cordulate leaves, while others have narrower leaves rounded or somewhat cuneate at base. Some specimens named by Craib as *L. cuspidata* cannot be separated from those he has named as *L. siamica*. Also their separation on any of these characters give a mixed distribution.

Griffith K. No. 2,235 in GH is probably a duplicate of Griffith 105 in E, on which Griffith (1854) had apparently based his description of *L. floribunda*.

52. *Lagerstroemia langkawiensis* Furtado et Montien **sp. nov.** —
Fig. 54.

A *L. floribunda* sensu lato cui affinissima, calycibus majoribus, costis subaequalibus, eis apice alternisepalis patenter appendiculatis, alteris ad sepalis basin evanescentibus, fructibus majoribus, foliis ovato-lanceolatis saepe obliquis, costis nervisque subtus rubescente brunneis haec species facile distinguenda.

Arbuscula ut videtur. *Folia* utrinque glabra, ovate lanceolata, basi saepe oblique rotundata, obscure cordulata vel infima breviter angustata, apicem sensim angustata, margine sinuata, summo acuta vel obtusa, 6–18 cm long, 2.5–6 cm lata, nervis utrinsecus 7–11, ascuatis, subtus rubescentibus; petiolus 3–5 mm longus, glaber. *Infructescentia* terminalis, subpyramidalis vel cylindrica, ramulis primo brunneo tomentosa, dein glabrescens; flores ignotae. *Calyx* fructiferus, 12–16 costatus, brunneo tomentosus, campanulatus 15 mm latus, circa 10 mm altus, costis alternisepalis apice patenter cuspidatis, alteris ad sepalis basin evanescentibus; sepala 3–4 mm longa, reflexiuscula vel patentia. *Capsula* glabrescentis, apice tomentosa, 20–25 mm longa, oblonga vel ovato-oblonga, cum segmentis 6 divisi. *Pedicellus* 2–5 mm longus, tomentosus.

A treelet. *Leaves* lanceolate or oblong, 6–18 cm long, 2.5–6.0 cm broad, acute at the apex, sub-rounded or obtuse at base, glabrous on both surfaces, 7–11 nerved on each side; petiole 3–5 mm long. *Panicle* terminal, subpyramidal, flower not seen. *Fruiting calyx* ferruginous stellate tomentose, campanulate, 10–15 mm long (including 4–5 mm long pedicelliform base), 11–14 mm in diam.; 12–16 acute ridged, not decurrent into the base; 6–8 lobes with cusps often persistent at each sinus. *Capsule* glabrescent, elliptic-oblong, 20–25 mm long, 10–13 mm in diam., usually brown stellate tomentose at apex; 6 valved, each valve sometimes bearing at its apex a vestige of the style.

MALAYA: **Langkawi**, Pulau Timun (Henderson 29,119: SING — holotypus); Batu Ayam (Corner s.n.: SING — sterile); loc. incert. (Dolman 21,468: SING & KEP).

In the type specimen which is taken from a plant growing in quartzite and shale beach the leaves and the fruits are larger, while Corner's sterile specimen has smaller leaves. Apparently Dolman's collection is also from a limestone hill; it has smaller leaves and fruits.

This is the closest species to *L. siamica*. This species differ from *L. siamica* in having larger capsules and fruiting calyces, with more conspicuous cusps at the sinus, and ovate-lanceolate leaves. *L. floribunda* has also smaller capsules and calyces.



Fig. 54. *L. langkawiensis* Furtado et Montien (Henderson 29,119 in SING — holotype).

A, Twig with capsules. B, Capsule. C, Hair.

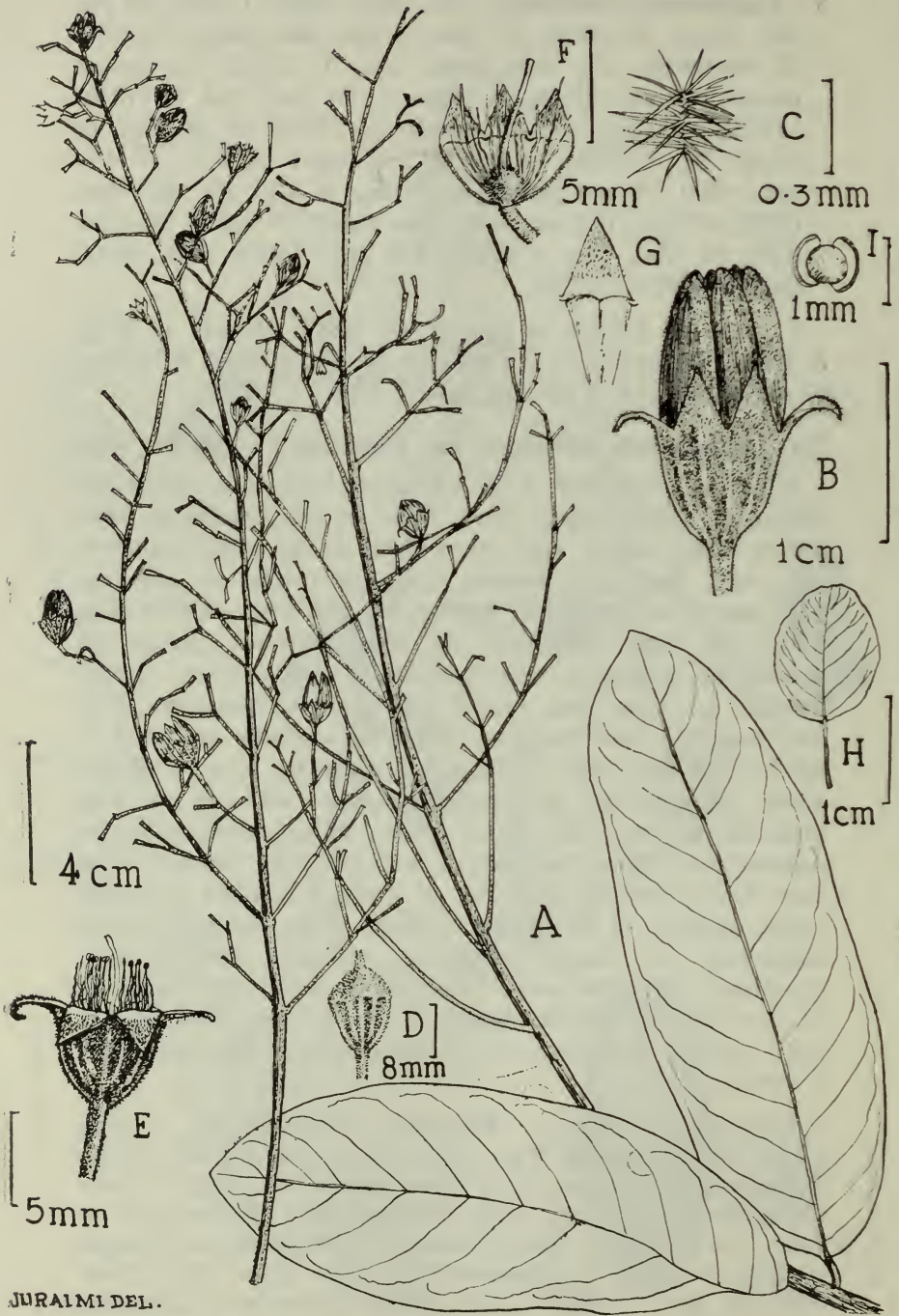
53. *Lagerstroemia floribundia* Jack, Malay. Misc. I (1820–22) 38; DC., Prodr. III (1828) 93; Jack in Hk., Bot. Misc. II (1831) 82 (reprinted); Bl., Mus. Ludg. Bat. II (1852) 126 quoad partem typicam; Clarke in Hook. f., Fl. Brit. Ind. II (1879) 577 p.p.; Koehne in Engl. Jahrb. IV (1883) 34, in Engl. & Prantl. III. 7 (1891) 14 & Engl., Pflanzenr. Heft. 17 = IV. 216 (1903) 266 pro parte typica; King in Mat. Fl. Mal. Pen. (1898) 345 p.p.; Gagnep. in Fl. Gen. Indoch. II (1921) 953 p.p.; Ridl. Fl. Mal. Pen. I (1922) 823 p.p.; Craib, Flor. Siam. Enum. I (1931) 721 p.p.

L. turbinata Koehne in op. cit. IV (1883) 34, and in Engl. & Prantl, Pflanzenf. III, 7 (1891) 14 fig. 5-v, et Engl. Pflanzenr. 17 = IV. 216 (1903) 266 figs. 55-v & 57-c.

53a. *Lagerstroemia floribunda* var. *floribunda* — Fig. 55, 56D.

A tree \pm 10 m high. *Leaves* 6–23 cm long, 3–10 cm broad, oblong or elliptic-oblong, rarely ovate or sub-rounded at base, obtuse, rarely acute at apex, when young stellate pubescent above and along the nerves beneath, later glabrescent or glabrous, 6–12 nerved on each side; petiole 3–7 mm long. *Panicle* large 20–40 cm long, cylindrical on each branchlet, short and deciduously tomentose with ferruginous, stellate hairs; pedicel unequal \pm 3 mm long. *Flower bud* similarly tomentose, 9–10 mm long, 6–7 mm in diam., turbinata, abruptly narrowed in the 2–3 mm long base, 10–12 ridged, up to the sinus, 6 sutured above, nipped. *Calyx* in flower campanulate with 3–4 mm long pedicelliform base; lobes 6, ferruginous stellate tomentose in the superior half within. *Petal* oblong with gradually cuneate to the base, 10–16 mm long (including \pm 3 mm long claw), 7–12 mm broad, undulate in the margin. *Stamens* many, subequal. *Ovary* subglobose with densely ferruginous tomentose. *Fruiting calyx* cup-shaped above the abrupt pedicelliform base; lobes patent or recurved. *Capsule* elliptic-oblong, 12–16 mm long, 7–11 mm in diam., sparsely tomentose all over, but densely at the top, usually 6 valved.

THAILAND: *Northern*: **Prae Prov.** (Tawngbai s.n. = BKF 1,205: BKF). **Sukothai Prov.** (Silp s.n. = BKF 1,209: BKF). **Kumpeng Pet Prov.**, Meh Ping River (Kerr 2,034: BM). *Central*: **Chinat Prov.** (Put 2,643: BM). **Saraburi Prov.** (Rananand 8 = BKF 10,719: BKF). *South-Eastern*: **Cholburi Prov.**, Sriracha (Collins 23: BM & E). **Chanburi Prov.** (B.S. 182 = BKF 9,648: SING & 461 = BKF 12,210: SING); Chantaboon (Vesterdal 10-L: SING). *Peninsular*: **Surat Prov.** (Luaangsamarn 21 = BKF 1,201: SING). **Ranaung Prov.**, Kao Talu (Kerr 11,784: BM). **Songkla Prov.**, Hat Yai (Kingdon Ward 37,501: SING). **Yala Prov.** (Leg. ? 1,210: BKF & Thieb 25 = BKF 1,209: BKF). **Pattani Prov.** Banang Sta (Kerr 7,315: E).



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Fig. 55. *L. floribunda* var. *floribunda* Jack (A-C: Hooker 5,112 in GH; D-I: Collins 23 in BM).

A, Twig with capsules. B, Capsule. C, Hair. D, Flower bud. E, Flower. F, Longitudinal section of flower. G, Lobe to show inside.

MALAYSIA: **Kedah**, Alor Star (Allen s.n.: SING & Corner 31,518: SING); Kuala Muda (Hanafi 91,704: KEP, PNH & SING); Kuala Getil (Meh 10,185: E); **Perlis** (Saad 89,407: KEP & Ku-Ibrahim 89,405 & 89,406: KEP & Henderson 22,855: SING). **Penang** (Wallich 2,115A: BM), base of Penang Hill (King s.n.: SING — **neotopotype**). **Malacca** (Maingay Kew n. 653/2: GH).

CULTIVATED: **Thailand**, Bangkok, Temple (Marcan 294: BM); Wat Nong Kut (Smitinand 3,442: BKF). **Borneo**, Sabah, Jesselton (Mikil 41,940: SAN & SING). **Singapore**, Hort. Bot. (Kiah s.n.: SING). **East Indies**, loc. incert. (Hooker 5,112: GH). **Indonesia**, Java, Cult. in Hort. Bogor. (Sutrisno 107: SING & Van Nooter s.n.: SING); West Java, Bodjong Gedeh (Nedi et Idjan 450: SING).

Though no type specimen has been traced of this species, from Jack's description one has to agree with Gagnepain, Ridley and Craib as to its typification. Jack described the calyx being "turbinate, regularly marked with many deep longitudinal furrows or ribs"; also he stated that "before expansion, the calyx is obconical and nearly flat at top", or again that "the flower buds flat and even depressed at top."

Koehne's *L. floribunda* is the form that was described by Clarke as var. *cuspidata*, where the calyx ridges are irregular, the alternisepalous ones being cuspidate, and the flower buds cannot be said to be flat at the top. It is referred here to *L. siamica*.

Jack's type was from Penang which is apparently lost. Hence King's collection from Penang may be regarded as *neotopotype*.

53b. *Lagerstroemia floribunda* Jack var. *brevifolia* Craib, Fl. Siam. Enum. I (1931) 722. — **Fig. 56A.**

L. floribunda Jack v. *floribunda* sec. Gagnep. in Fl. Ind. II (1921) 955 pp; Craib op. cit. p. 721 pp.

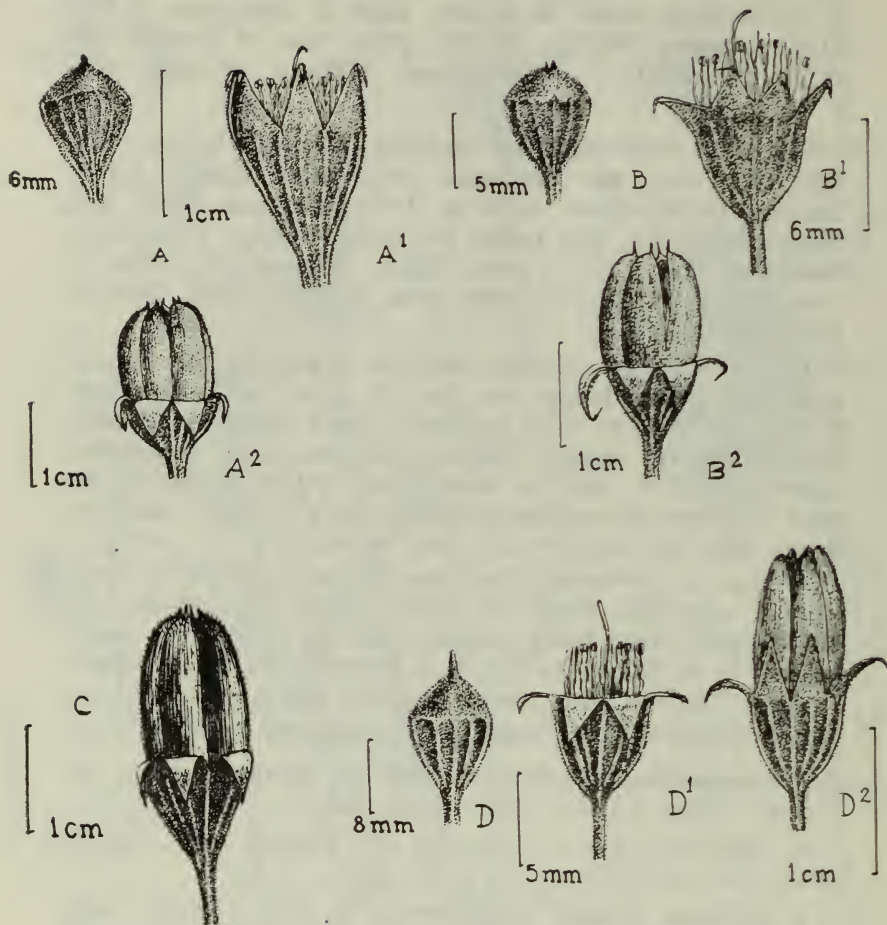
L. turbinata Koehne sec. Hosseus in Bot. Centrabl. Beih. XXVII, 2 (1910) 475 & XXVIII, 2 (1911) 416 pp; Craib in Kew Bull. (1911) 54.

This var. differs from var. *floribunda* in having smaller flower buds with golden or pale yellow tomentum, more acute and uniform ridges, the alternisepalous ones being slightly more prominent at the sinus, a prominence noticed also in fruits. The fruit is slightly smaller (12-14 mm long, 8-10 mm broad).

CHINA: Loc. incert. (cult.?) (Macartney s.n.: BM).

INDOCHINA: **Cochinchina**, Baria (Pierre 1,819: A, PNH & SING); Tintinh (Pierre 1,819: A); Bien-hao (Thorel 173 = 1,819: GH). **Cambodia**, Prov. Pen-Lover (Pierre 1,819: A).

THAILAND: *Northern:* **Prae Prov.**, East Mae-Yom (Thai For. Dept. no. 2,507: A). *Eastern:* **Srisaket Prov.**, Kantralak (Prayed 191 & 273: SING); Sisaket by the Menam (= river), (Hosseus 4: BM & E). *Central:* **Nakawn Nayok Prov.** (Smitinand 7,796: BKF). loc. incert. (Haase s.n.: BM).



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Fig. 56. A, *L. floribunda* var. *brevifolia* (A-A²: Hosseus 4: BM).

A, Flower bud. A¹, Flower to show distinctly ridges. A², Capsule.

B, *L. floribunda* var. *sublaevis* (B-B¹: Vanaprak 958 in BKF; B²: Kerr 9,166 in E — isoholotype).

B, Flower bud. B¹, Flower obscurely ridged. B², Capsule.

C, *L. floribunda* var. *subecostata* (C: Kerr 13,618 in BM — holotype).

C, Capsule with faint ridges in calyx.

D, *L. floribunda* var. *floribunda* (D-D²: Tawngbi 1,205 in BKF).

D, Flower bud. D¹, Flower bud subequally ridged. D², Capsule.

CULTIVATED: **West Pakistan**, Lahore, Govt. Gardens, (Parker s.n.: A). **Thailand**, Bangkok (Marcan 2,134: BM — isoparatype). **Indochina**, Tonkin, Hanoi, Bot. Gardens (McClure s.n.: A). **Philippines**, Rizal City (Quisumbing 2,108: SING).

Thorel's specimen was numbered 173 which has been crossed and made to 1,819 which is given also to Pierre's collection. Pierre's 1,819 is given to three different collections, one from Baria and one from Tintinh near Sang — both in South Cochinchina, and the third from Province of Pen-Lover in Cambodia.

The leaves are sometimes short, the sole character given by the author to distinguish this variety, but larger-leafed specimens are also found; the latter specimens were cited by Craib under var. *floribunda*.

53c. *Lagerstroemia floribunda* Jack var. *sublaevis* Craib Fl. Siam. Enum. I (1931) 722. — **Fig. 56B.**

This variety differs from var. *floribunda* in having dirty ferruginous tomentum in flower buds which are also obscurely ridged, the ridges remaining also obscure in fruit.

The lobes of the fruiting calyx are longer, reaching nearly to the base of the cup. Capsule is oblong, almost truncate above.

THAILAND: South-Eastern: Trat Prov., Koh Chang, Tung-Klong-Makok (Smitinand 2,235: BKF), loc. incert. (Vanpruk 958: BKF — isoparatype); Klawng Nonsi (Kerr 9,166: E — **isoholotype**).

From plant geographical reasons Craib thinks that Schmidt 628^a listed under *L. floribunda* Jack in Schmidt, Fl. Koh Chang VI p. 243 in this variety. The holotype and one paratype were collected in Koh (= Kau) Chang, while the third paratype was from a cultivated plant in Bangkok.

53d. *Lagerstroemia floribunda* Jack var. *subecostata* Craib, Fl. Siam. Enum. I (1931) 722. — **Fig. 56C.**

This variety has the longest capsules among the varieties of *L. floribunda* and though one may describe the capsules as oblong, they are much more curved at the tip so that they are not truncate at the top. The ridges in fruiting calyx are more prominent than those in var. *sublaevis* but much less than in the other two varieties. The cup of the fruiting calyx is deeper than in all the other varieties, while its lobes are short, about $\frac{1}{3}$ to $\frac{1}{2}$ as long as the cup.

THAILAND: Padang Besar (Kerr 13,618: BM — **holotype**).

The collector notes that the tree is about 20 m high and quite common in the evergreen forest.

The tomentum in the fruiting calyx is light brown, and capsules in the specimen are also tomentose.

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Some new desmid taxa from Malaya and Singapore

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The Malay Peninsula and Singapore have generally acid waters and because of this the aquatic flora is rich in desmids. From the material now being studied I estimate that there are at least 200 taxa, some of which are undoubtedly new. A number differ in detail from forms already described and therefore need more critical study. The nine taxa being described here are however so distinctive that I feel it worthwhile publishing them in advance of a general paper.

All the specimens were examined under an Ortholux microscope, and the drawings, my own including the inking, were made with a camera lucida on the same microscope, corrected where necessary by direct observation. Thus any defects in the drawings are my own responsibility. The photographs were taken through the same microscope using the Orthomat automatic camera, and I am grateful to Mr. Mathew Chow Tian Pow of this Institute for developing and printing the film for me.

***Pleurotaenium burmense* (Josh) Krieg var. *elegans*, var. nov.**

Varietas a planta typica differens multo brevior, tenuior, 7 undulationes aequabiles in quaque semicellula habens; poli plus minusve recti, a undulationes aequae lati vel paululum angustiores, circulo dentium 6 vel 7 acutissimorum praediti. Cellulae 260–280 μ long., undulationes 23–24 μ lat., depressiones et isthmus 17 μ lat., ad polos 22–24 μ lat.

This variety differs from the species in being much shorter and narrower, with 7 uniform undulations on each semicell. The poles are more or less straight, equal to or only slightly narrower than the width of the undulations, and are surrounded by 6–7 sharp teeth. Cells 260–280 μ long, undulations 23–24 μ wide, depressions and isthmus 17 μ wide and the poles 22–24 μ wide. Malacca river (2 specimens only), Tasek Bera (Negri Sembilan). Fig. 1 (a), Pl. 1.

This beautiful variety first appeared in a plankton net haul taken in 1956 when the Malacca river was in flood. Only two specimens were seen in this sample, identical in measurements, and one was immediately drawn using the camera lucida. The variety did not recur until 1967, this time in samples from Tasek Bera, a forest swamp lake 50 miles distant from the Malacca. A number of specimens have been examined, although they are not common, and there appears to be no difference in size and

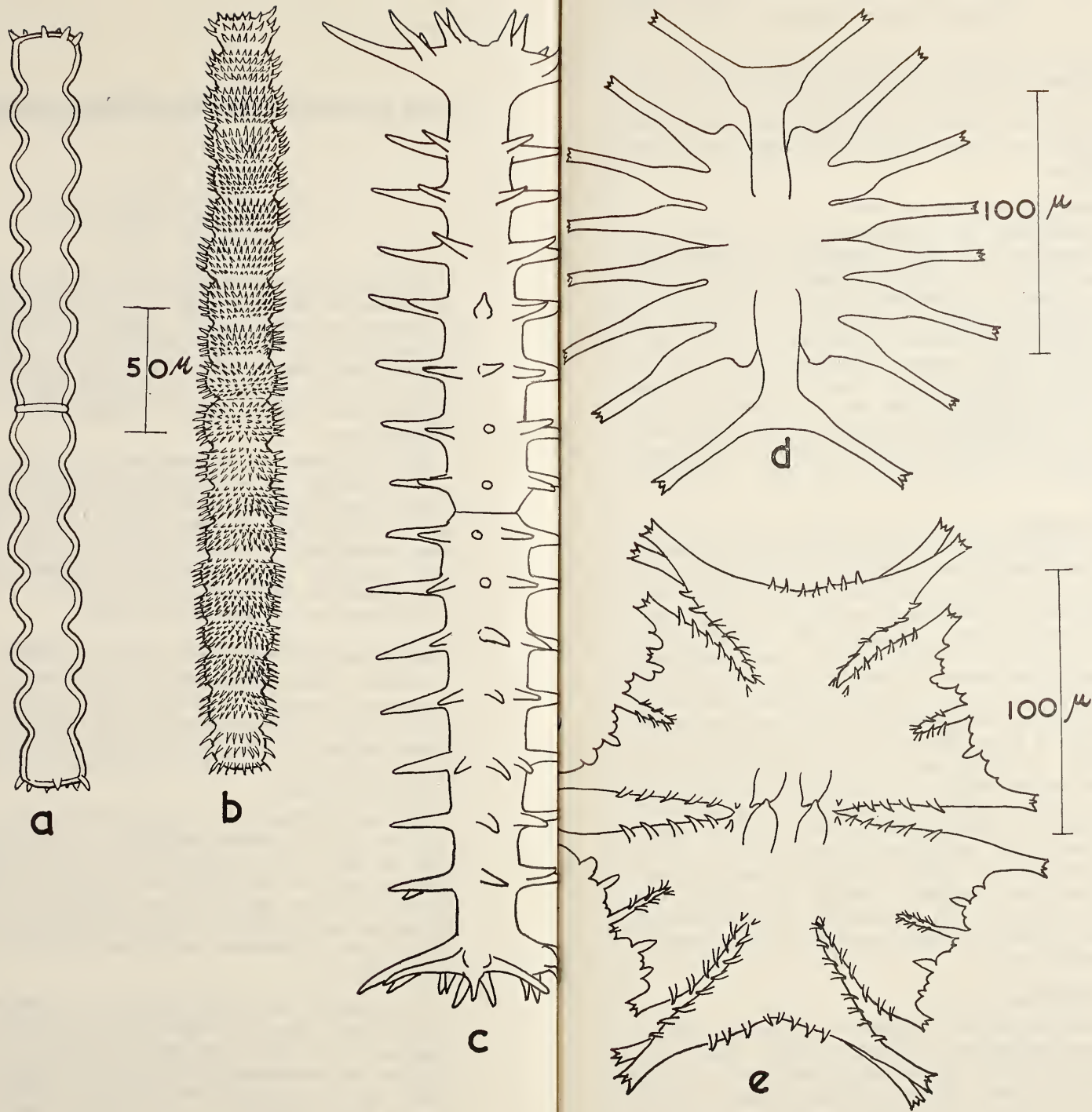


Fig. 1. (a) *Pleurotaenium burmanni* Krieg, var. *elegans* var. nov.
 (b) *Pleurotaenium spinosum* sp. nov.
 (c) *Triploceras splendens* sp. nov.
 (d) *Micrasterias alata* Womida fa. nov.
 (e) *Micrasterias americana* Ralfs var. *macrodon* var. nov.

proportions from the Malacca specimens. The figure and plate are from the Tasek Bera material. Scott & Prescott (1958) have described a variety from Arnhem Land, but this present variety differs in the extreme uniformity of the undulations, and the fact that the poles are more or less straight and hardly narrower than the undulations.

Pleurotaenium spinosissimum, sp. nov.

Cellula spinosissima, in quaque semicellula 9 undulationes aequalibes habens ad polos parum angustiores, rotundati. Spinae 4–5 μ longae, seriales, ad undulationes juxta isthmum 6-seriebus, ad polos 3-seriebus, ad undulationes sub-polis 4-seriebus, et ad ceteros undulationes 5-seriebus. Cellula 286 μ long., undulationes 26 μ lat., depressiones et isthmus 22 μ lat., ad polos 24 μ lat.

Cell very spiny, with 9 uniform undulations on each semi-cell, the poles slightly narrower, rounded. Spines 4–5 μ long, arranged in rows on the undulations, 6 rows next to the isthmus, 3 rows at the poles, 4 on the sub-polar undulations and 5 on all the others. Cell 286 μ long, undulations 26 μ wide, depressions and isthmus 22 μ and poles 24 μ wide. Malacca river (only 1 specimen).

Fig. 1 (b).

Only one specimen was found in a net haul taken during the flooding of the Malacca river in 1956, but it was so distinctive that it was immediately drawn with the aid of the camera lucida. Unfortunately no photographic equipment was available, so this description is based on notes taken at the time and on the drawing. Normally I would not erect a species on the basis of a single specimen, but it was so strikingly different from other species described that I feel justified in giving it specific status. Other species which occurred as 1 or 2 specimens in the same sample have since turned up again, particularly in the forest swamp lake Tasek Bera, so it is possible that this species will recur. The only previously described species with which *Pleurotaenium spinosissimum* can be compared is *Pleurotaenium spinulosum* first described by Wolle in 1884 and redescribed by Brunel (1949) as *P. spinulosum* (Wolle) Brunel together with its variety *madagascariense* Brunel. Both differ markedly from this species in having fewer and less uniform undulations, and the spines finer and much more irregularly arranged. The regular rows of prominent spines is very characteristic of *Pleurotaenium spinosissimum*, as are the uniform undulations, and it is therefore worthy of specific rank.

Triploceras splendens, sp. nov.

Species crassa, in quaque semicellula 6–7 undulationes habens, spinas longos prominentes verticillatim ferens, spinae juxta isthmum paulo breviora. Poli 3-partibus procurrentibus divisi, unusquisque ferens unam spinam terminalem longam extrorsus curvam et 4 spinas breviores binatim dispositas sursum curvas. Cellulae 250–300 μ long., undulationes sine spinis 30–50 μ lat., cum spinis 50–90 μ lat., depressiones et isthmus 25–30 μ lat.

A stout species, with 8 undulations on each semicell and bearing whorls of long prominent spines, those next to the isthmus being shorter. Each pole divided into three projecting parts, each of which bears a long terminal spine curving outwards, and four shorter spines arranged in pairs and curving upwards. Length 250–300 μ long, undulations without spines 30–50 μ wide, with spines 50–90 μ , depressions and isthmus 25–30 μ .

Tasek Bera Fig. 1 (c) Pl. 2.

This magnificent species has occurred only in the forest swamp lake Tasek Bera and nowhere else. It is much stouter than other species, and is clearly a member of the genus *Triploceras* by virtue of the division into three parts at the poles. Borge (1897) has described from Australia a plant which he called *Docidium australianum*, later transferred by Krieger (1937) to the genus *Triploceras*. Scott & Prescott (1958) rightly point out that it has rounded poles and have renamed it *Pleurotaenium australianum*. This species has occurred together with *Triploceras splendens* in the same samples and there is no possibility of confusing them. The species described here is clearly a *Triploceras* while the other species is clearly a *Pleurotaenium*.

Micrasterias alata Wall fa. **tumida**, fa. nov.

Forma a planta typica differens lobis subterminalibus tumescens juxta lobum terminalem. 200–212 μ long., 175–185 μ lat., isthmus 25–30 μ lat.

This form differs from the species by a bulge at the base of the subterminal lobes next to the terminal lobe. 200–212 μ long, 175–185 μ wide, isthmus 25–30 μ wide.

Tasek Bera. Fig. 1 (d) Pl. 3.

Although this form occurred together with the typical species in the same samples it was much commoner and there were no intermediate forms. I therefore feel justified in separating it off as a definite form.

Micrasterias foliacea Bail. var **spinosa**, var. nov.

Varietas formis ceteris differens isthmo multo apertiore, spatia inter lobos subterminales et lobos terminales latius hians. Juxta isthmum et ad basim lobi terminali utrinque dentes acutissimos prominentes binatim ferens, dentes ad extremitates loborum acutissimi. Cellulae 72–75 μ long., 68–70 μ lat., isthmus 8 μ lat.

This variety differs from all other forms in the wide open isthmus and the wide gap between the subterminal and terminal lobes. Pairs of prominent sharp teeth are borne on either side of the isthmus and on both sides of the base of the subterminal lobe, with sharp teeth at the ends of the lobes. 72–75 μ long, 68–70 μ wide, isthmus 8 μ wide.

Tasek Bera Fig. 2 (a) Pl. 4.

This variety is unmistakable, particularly for the wide isthmus, large gap between the terminal and subterminal lobes, and prominent teeth which are so thickened and often brown as to

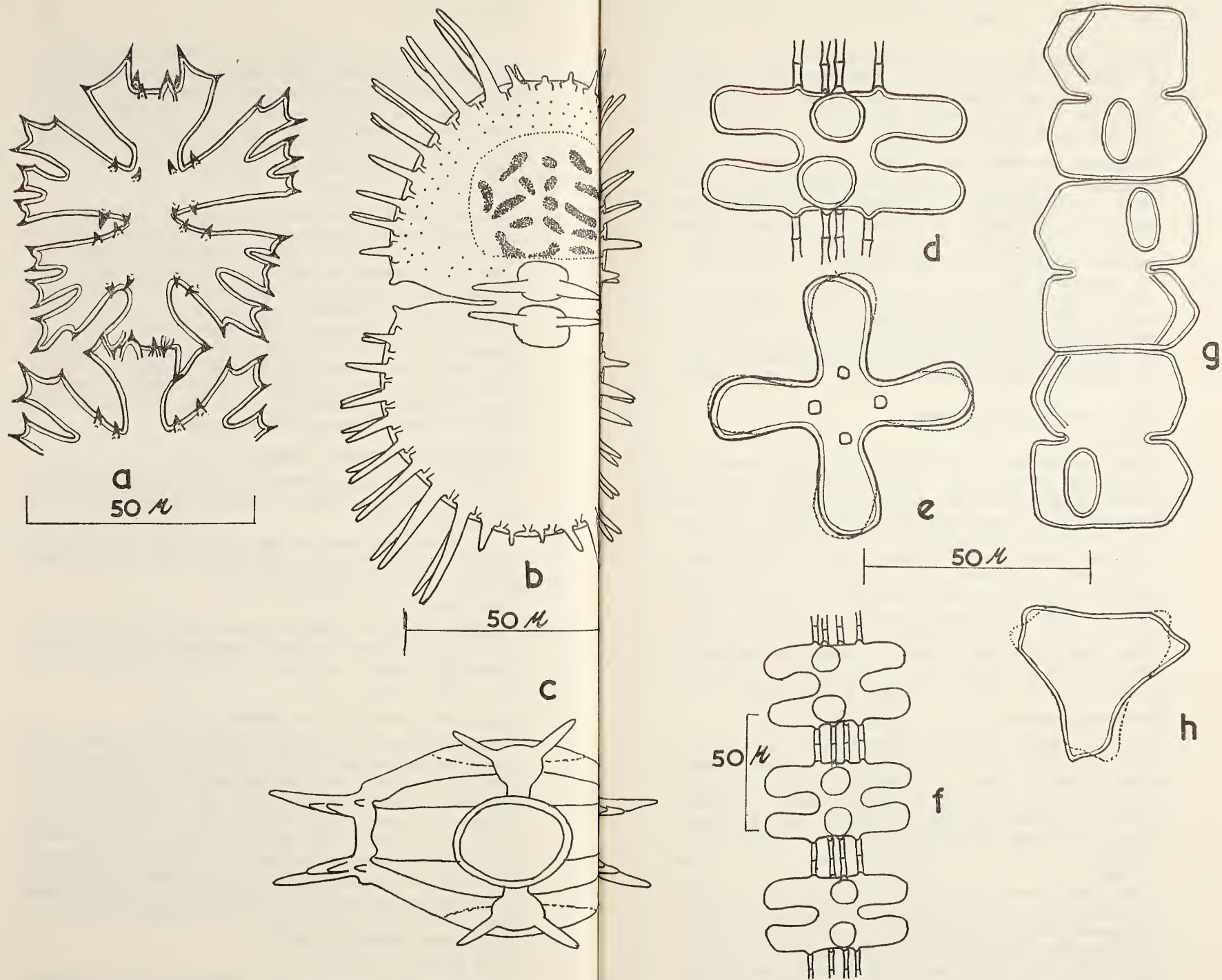


Fig. 2. (a) *Micrasterias foliata* var. *spinosa* var. nov.
 (b, c) *Xanthidium foliata* var. *centricornis* var. nov.
 (d, e, f) *Streptonema maris* sp. nov.
 (g, h) *Phymatodochina* Wolle var. *triangularis* var. nov.

give the whole plant a spiny appearance. There are a number of varieties of *Micrasterias foliacea* which have been described, but none have such an open appearance or such prominent teeth. The variety has so far occurred nowhere else in Malaya, but appears to be common in Tasek Bera.

***Micrasterias americana* (Ehrbg.) Ralfs var. *macrodon*, var. nov.**

Varietas a planta typica et formis ceteris differens, ad aperturas isthmi, et juxta aperturas inter medi-lobos et lobos subterminales dentes curvos manifestos ferens, similiter ad extremitates loborum terminalium. Ad isthmum ferens duo paria tumorum superpositorum unusquisque in dentem terminans. $115\ \mu$ long., $108\ \mu$ lat., isthmus $21\ \mu$ lat.

This variety differs from the species and all other forms in bearing a row of prominent curved teeth either side of the isthmal and midlobar openings and along the end of the terminal lobe. At the isthmus are two pairs of over-lapping swellings, each ending in a tooth or spine. $115\ \mu$ long, $108\ \mu$ wide, isthmus $21\ \mu$.

Malacca river (only two specimens.)

Fig. 1 (e).

Only two specimens were found in a net haul taken after floods in the Malacca river in 1956, and one of these was immediately drawn with the aid of the camera lucida and measured. With no photographic equipment available at the time it was not possible to photograph the specimens, and this description is taken from notes and the drawing. Although forms of *Micrasterias mahabuleshwariensis* Hobs. are quite common in Malaya this form is clearly quite different in shape and proportions, and comes close to *Micrasterias americana*. Accordingly I have placed it under the latter species, and since it has features distinct from any previously described form I feel justified in separating it off as a new variety. It is hoped that like other desmid forms found in the same sample it may eventually recur.

***Xanthidium superbum* Elfv. var. *centricornis*, var. nov.**

Varietas a planta typica differens spinas longas plus numerosas (utrinque 8 paria) ferens, ad isthmum duo tumores oppositos habens, uterque duo, raro 3-4, spinas longos ferens. In quaque semicellula aream centralam inspissatam habens irregulatim ochraceam maculatam. Cellulae sine spinis $85-100\ \mu$ long., cum spinis $125-140\ \mu$ long., sine spinis $55-60\ \mu$ lat., cum spinis $85-90\ \mu$ lat., isthmus $10\ \mu$ lat., tumor centralis sine spinis $10\ \mu$ lat., spinae $10\ \mu$ long.

This variety differs from the species in having more numerous long spines (8 pairs on each side), and bearing at the isthmus two opposite swellings each bearing a pair, rarely three or four, prominent spines. The central area of each semicell is thickened with irregular yellowish-red areas. Cells without spines $85-100\ \mu$ long, with spines $125-140\ \mu$ long, without spines $55-60\ \mu$ wide, with spines $85-90\ \mu$ wide, isthmus $10\ \mu$ wide, central swellings without spines $10\ \mu$ wide, spines $10\ \mu$ long.

Tasek Bera. Fig. 2 (b) (c) Pl. 5.

This particular variety of *Xanthium superbum* was fairly common in the Tasek Bera, but the type species has not yet been seen in Malaya.

Phymatodocis nordstedtiana Wolle var. **triangularis**, var. nov.

Varietas a planta typica differens a vertice visa triangularis, paries cellulae et vagina mucilagina ferruginei. Cellulae 40 μ long., 35 μ lat., isthmus 18 μ lat.

This variety differs from the species in the triangular end view, and the rusty iron coloured cell wall and mucilage sheath. 40 μ long, 35 μ wide, isthmus 18 μ wide.

Singapore, Sungai Besi Selangor, Malacca. Fig. 2 (g) (h). Pl. 6.

When this was first discovered in the mass in a shallow stream in Singapore, it looked much more like some rusty coloured blue-green algae, and only the microscope revealed its desmid nature. The normal form of *Phymatodocis nordstedtiana* also occurs in Malaya, but it is never impregnated with iron to give the rusty colour, and it has never occurred in the same water or even the same vicinity as the triangular form. I feel justified in describing the new plant as a definite variety and not as a mere form.

Streptonema quadrangularis, sp. nov.

Species a *Streptonema trilobatum* differens a vertice visa semper quadrangularis, processus mucilagini intercalares longiores, aperturae isthmi latiores. Brachia semicellularum leviter a se ex adverso flexae. Cellulae 28–30 μ long., 60 μ lat., isthmus 17 μ lat., aperturae isthmi 10–12 μ lat., processus intercalares 10–12 μ long.

This species differs from *Streptonema trilobatum* in the end view always being quadrangular, in the longer intercalary mucilage processes, and the wider isthmal openings. Arms of semicells lightly curved in opposite directions. Cells 28–30 μ long, 60 μ wide, isthmus 17 μ wide, isthmal opening 10–12 μ wide, intercalary processes 10–12 μ long.

Malacca, Negri Sembilan, Singapore, Johore. Fig. 2 (d) (e) (f). Pl. 7.

Streptonema trilobatum occurs in Java, in Sumatra and Northern Australia, but has not been seen at all in Malaya and Singapore. On the other hand *Streptonema quadrangularis* is the only form which occurs here and does not appear to extend into Indonesia and Australia. Although taxonomic status might be debatable, because of the restricted range and the distinguishing morphological characters I would prefer to regard it as a new species.

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Also consulted was the comprehensive collection of illustrations of algae gathered by the late F. E. Fritsch and housed in the Freshwater Biological Association, Windermere but here available as I.D.C. microfiche 1-1133.

Numerous other published works on desmids were consulted, but as these proved to have no immediate relevance to the taxa described here they are not cited.

Acknowledgements

I wish to thank all those who have helped in collecting material — Dr. J. Richardson, George Tay Seng Hock and Lim Teck Jin. My thanks are also due to Mathew Chow Tian Pow for developing and printing the photographs, and to Mr. Hong Por Kang for numbering and lettering the drawings and plates. To Mr. Humfrey Ball I am grateful for his checking my Latin diagnoses. Finally to the Director of the Botanic Gardens, Singapore, I express my gratitude for permission to publish this paper in the Gardens' Bulletin.



Plate 1. *Pleurotaenium burmense* (Josh), Krieg. var. *elegans* var. nov. x 800.



Plate 2. *Triploceras splendens* sp. nov. x 340.



Plate 3. *Micrasterias alata* Wall. fa. *tumida* fa. nov. x 420.

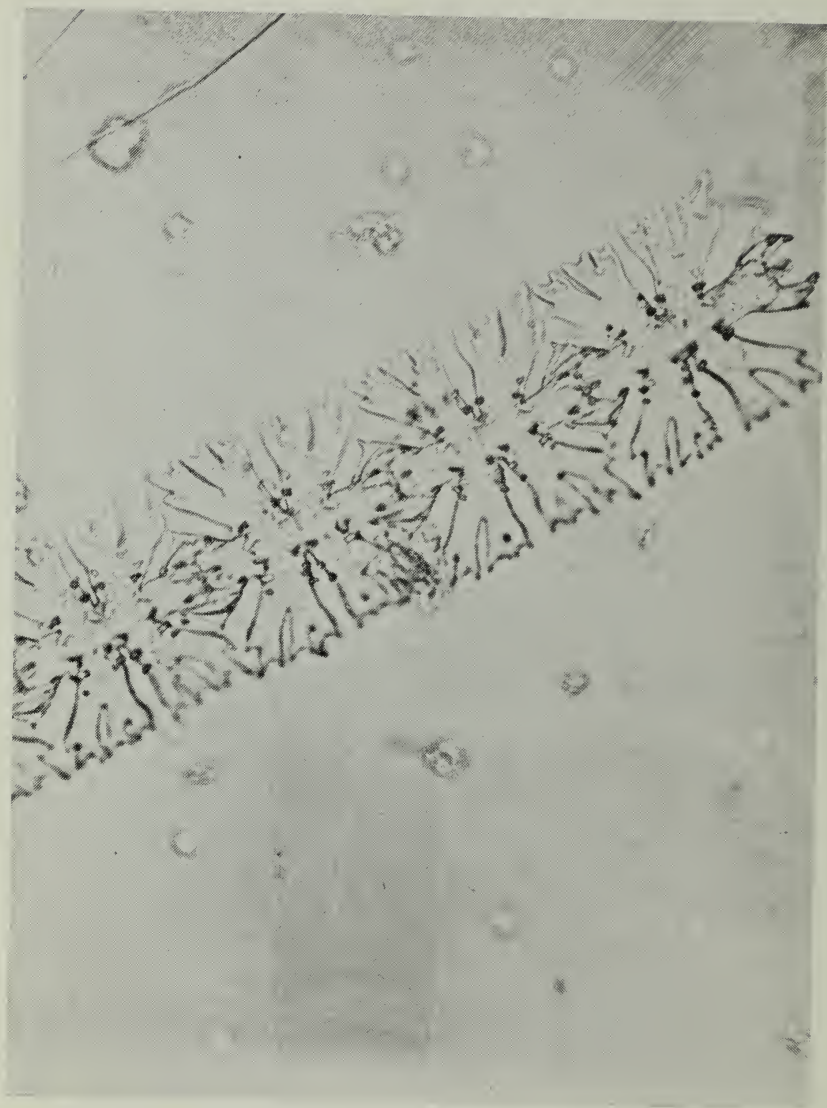


Plate 4. *Micrasterias foliacea* Bail. var. *spinosa* var. nov. x 400.

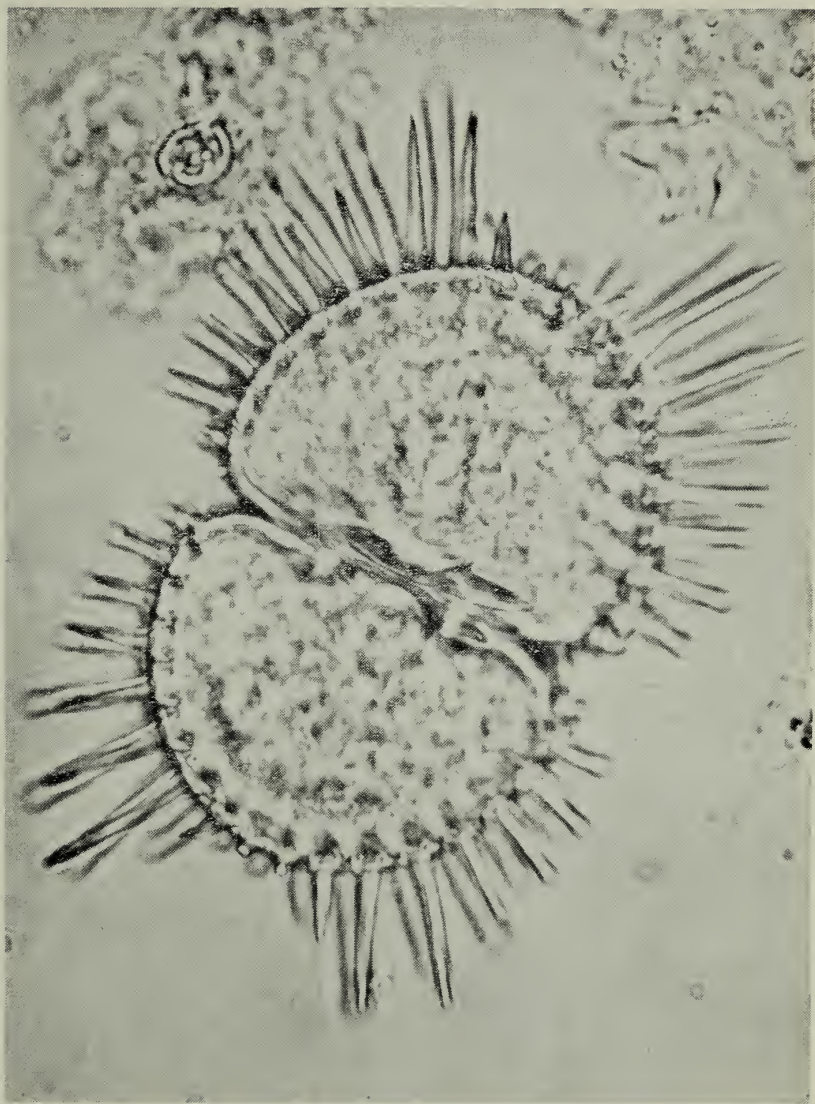


Plate 5. *Xanthidium superbum* Efv. var. *centricornis* var. nov. x 850.



Plate 6. *Phymatodocis nordstedtiana* Wolle var. *triangularis* var. nov. x 500.

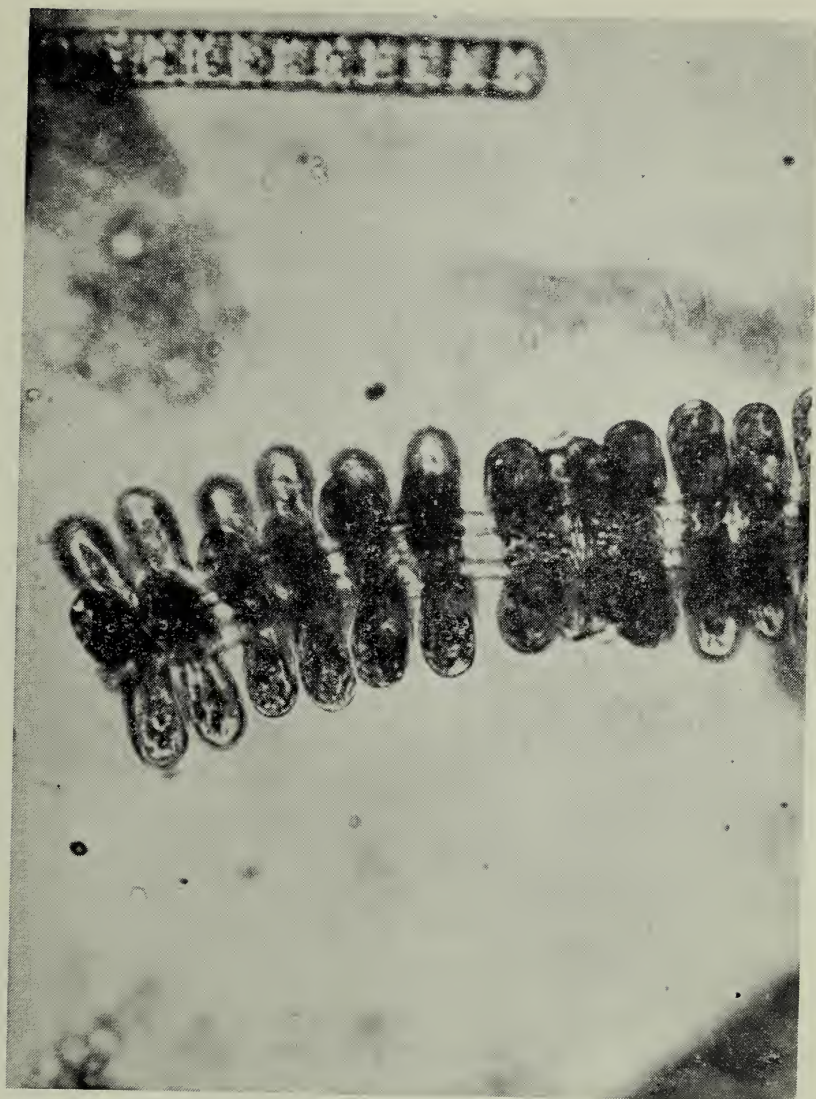


Plate 7. *Streptonema quadrangularis* sp. nov. x 450.

Notes on the flowers of *Orchidantha longiflora* (Lowiaceae)

by

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The monogeneric family Lowiaceae (or according to some authors, the subfamily Lowioideae of the Musaceae, e.g. Winkler 1930) is represented by the genus *Orchidantha* N. E. Brown. It comprises of only three* species: one, *O. borneensis* N. E. Brown from Borneo; two, *O. longiflora* (Scort.) Ridl. and *O. maxillarioides* (Hook. f.) K. Schum., from the Malay Peninsula. This distribution pattern can be best interpreted as one of the botanical evidences to illustrate that Borneo was once directly connected with the East coast of Malaya during the later Tertiary period (cf. Merrill 1923, Ridley 1937).

Following the description of *Orchidantha longiflora*, Ridley (1924) noted: "(This species is) common in forests in wet spots, but rarely flowering". It is indeed very true that most plants of this species encountered in the damp forests in Malacca, Selangor and Perak appear to be sterile all the time.

Between February and March, 1968, the author observed that six pots of *Orchidantha longiflora* in the Botany Department, University of Singapore, were sporadically in blooming. The two or three flowered cymes are at ground level on a short underground stalk, and are hidden by the leafbases, only the stout, needle-shaped flower buds emerged above the surface, one at a time, with the intervals of about ten days to two weeks. These flowering buds are subtended and tightly wrapped by the stiff, deep-purple coloured bracts and bracteoles.

Although each flower possesses six perianth-lobes, the most conspicuous part of the flower, however, is the lip — the enlarged and specialized median perianth-lobe. It is spoon-shaped, pale lilac in colour, prominently veined, more or less wrinkled even in full expansion; the central portion of which is strongly ridged. The upper part is shallowly trilobed; the mid-lobe is broadly dentate, with a medial tail-like projection (i.e., a continuation of the central ridge) on the notch. The lower margin is entire, and narrowed towards the base into a claw which is dark purple in colour. The lip expanded and remained rigid for only about six to eight hours, usually from late morning to afternoon, then turned yellow and curled up and withered immediately

* A fourth species, *O. calcarea* Henderson (in Gard, Bull. Str. Settl. 7:125, 1933) from the limestone hill in Upper Perak, Malaya, is probably not specifically distinct from *O. longiflora*.

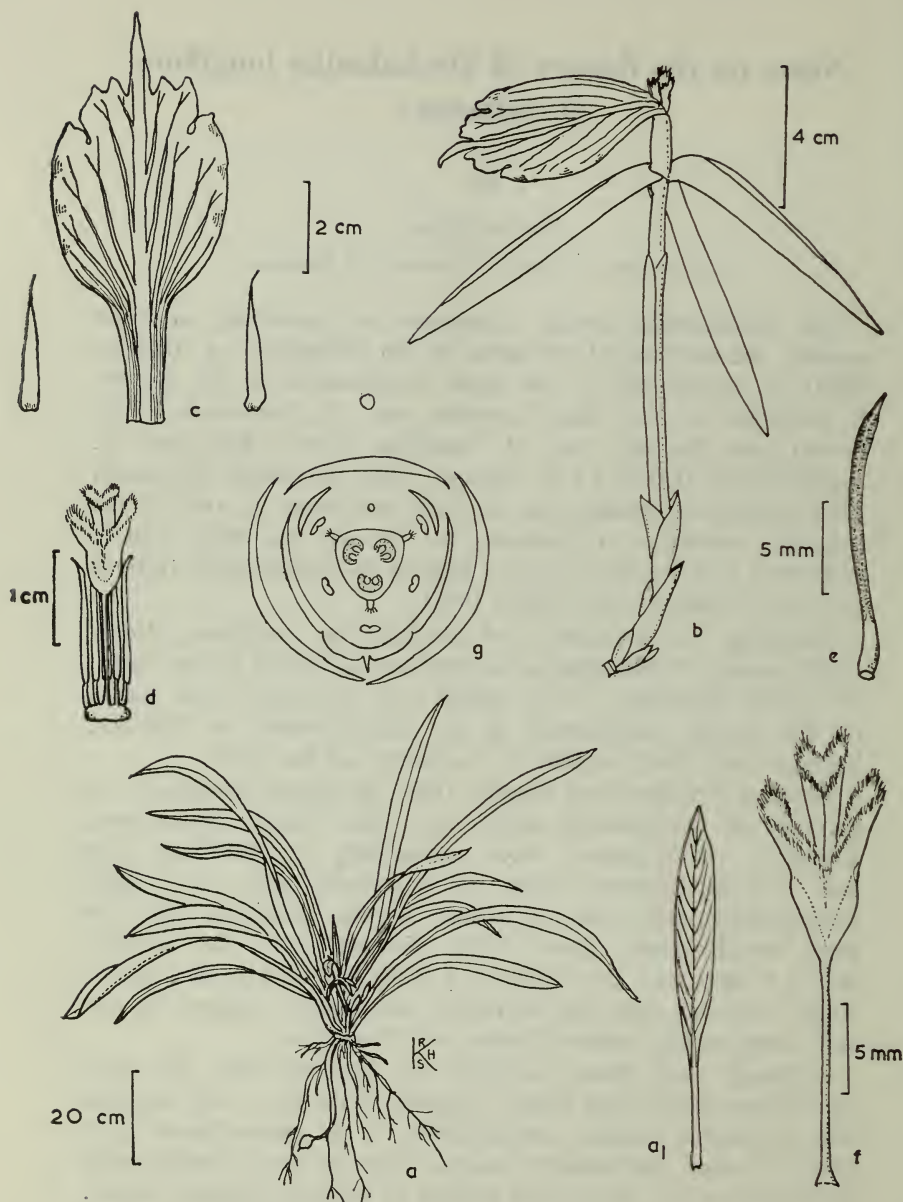


Fig. 1. *Orchidantha longiflora* Ridley (Labiaceae)

a. flowering plant; a₁ leaf; b. flower (showing, from top, the feathery stigmas, lip, three outer perianth-lobes, and the inferior ovary) and subtending bracts and bracteoles; c. lip (note the prominent central ridge and the dentate midlobe with a tail-like extension) and two much smaller inner perianth-lobes; d. androecium and upper part of gynoecium; e. stamen; f. style and stigmas; g. floral diagram. (drawings by Mrs. R. S. Keng).



Plate 1. *Orchidantha longiflora* Ridley.

A. Habit; B. a flower. (Scale: 1 cm divisions) Photo by Mr. D. Teow.

afterwards. Therefore the flower of this plant is ephemeral, and this likely accounts for the fact that it is "rarely flowering".

No fruit or seed was set after flowering, possibly due to the lack of necessary pollinating agents under cultivated condition.

Line drawings based on, and photographs taken from the fresh material, are presented. (see Fig. 1, and Plate 1).

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The Status of the Genus *Catanthera* F.v.Muell (Melastomataceae)

by

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The genus *Catanthera* was founded by Baron F. v. Mueller (in Journ. Bot. 24: 289 (1886)) on the basis of specimens *Forbes 451* and *Forbes 419* from New Guinea and he named the type species as *Catanthera lysipetala*. According to F. v. Mueller the "perfectly separated" petals and "completely bent" anthers of the taxon "demand for this vacciniaceous plant a distinct generic position." Mueller (*l. c.*) however, did not mention the reasons for assigning this taxon to the family *Vacciniaceae*, but he indicated its anomalous position by mentioning that the inwardly resupinate anthers of the taxon was "quite exceptional in the tribes *Ericaceae* and *Vaccinieae*". Mueller's description of the genus was quite good, but he erroneously assigned the genus *Catanthera* to the family *Vacciniaceae*. The family *Vacciniaceae* is characterised by sympetalous corolla, by its baccate and drupaceous fruits and presence of copious fleshy endosperm.

Nine years later, Stapf (in Hook. f. Ic. Pl. 25: t. 2415 & 2416 (1895)) proposed a new genus *Hederella* on the basis of *Hederella multiflora* Stapf, *H. tetrandra* Stapf, *H. quintuplinervis* (Cogn.) Stapf and *H. forbesii* Stapf. Stapf (*l. c.*) appropriately assigned the genus *Hederella* to the family Melastomataceae because of its polypetalous corolla, the presence of 2 or more side nerves parallel to the margins and the appendaged stamens; and Stapf further placed the genus in the tribe *Dissochaeteae* because of its baccate fruits with numerous seeds, axile placentation and apical porose dehiscence. According to Stapf this homogenous group of species is characterised by 4 or 8 stamens (if 8 with dimorphic anthers), ivy-like habit and the prominent staminal appendages. Gilg (in Engl. & Prantl, Pflanzenfam. 3.7: Nachtr. 266 (1897)) referred *Hederella* Stapf to *Dissochaeta* Bl. Mansfeld [in Engl. Bot. Jahrb. 60: 113, (1925)] while describing the Melastomataceae of Papua, combined *Hederella* with *Medinilla* since his concept of *Medinilla* was a broad one. Bakhuizen fil. [in Meded. Bot. Mus. & Herb. Utrecht, No. 91: 26 (1943)] with hesitation referred *Hederella* to a section of *Medinilla*, since in his opinion it is more closely allied to *Medinilla* than to *Dissochaeta*; however he did not study the genus in detail on account of insufficient material. Nayar (in Kew Bull. 20: 235 (1966)) considered that Stapf's concept of the genus *Hederella*

is justified. It is seen that, among the four species proposed by Stapf (*l. c.*) while establishing the genus *Hederella*, *Hederella forbesii* Stapf was found to be conspecific with the type species of *Catanthera* F. v. Muell. i.e. *C. lysipetala* F. v. Muell. Since a validly published earlier generic name *Catanthera* F. v. Muell. (1886) is available, it is proposed to consider *Hederella* Stapf (1895) as a synonym of the former.

Mansfeld (in Engl. Bot. Jahrb. 60: 113 (1925)) proposed the monotypic genus *Phyllapophysis* on the basis of specimen *Schlechter 20117* from New Guinea. In the key to the Papuan *Dissochaeteae* he grouped the new genus with *Omphalopus* Naud. The nature of anthers and the shape and orientation of the phylloid staminal appendages in the genus *Omphalopus* are quite characteristic. The genus *Omphalopus* has reticulate and bullate anthers, whereas in the genus *Phyllapophysis* the anthers are not reticulate. It is presumed that Mansfeld might have been misled by the shrivelled anthers in the herbarium material. The nature of the staminal appendages, the presence of extra-ovarial chambers descending to the base of the ovary and the ivy-like habit indicate that the taxon *Phyllapophysis schlechteri* Mansf. should be transferred to the genus *Catanthera*. Hence it is proposed to reduce the monotypic genus *Phyllapophysis* Mansf. to a synonym of *Catanthera* F. v. Muell. The nomenclature and the synonymy of the genus *Catanthera* are as follows:

***Catanthera* F. v. Muell.** in Journ. Bot. 24: 289, 1886.

Hederella Stapf in Hook. f., Ic. Pl. 25 Lt. 2415, 1895. *Synon. nov.*

Phyllapophysis Mansf. in Engl. Bot. Jahrb. 60: 113, 1925. *Synon. nov.*

Enumeration of species of *Catanthera*

1. ***Catanthera lysipetala* F. v. Muell.** in Journ. Bot. 24: 289, 1886.

Type: syntypes. *Forbes 419 & Forbes 451* (BM.).

Medinilla anomala Cogn., in DC., Monogr. Phan. 7: 1185, 1891. Type: *Forbes 451* (K., BM.).

Hederella forbesii Stapf in Hook. f., Ic. Pl. 25: t. 2415, 1895. Type: *Forbes 451* (K., BM.).

Hederella lysipetala (F. Muell.) Nayar in Kew Bull. 20: 237, 1966.

2. ***Catanthera multiflora* (Stapf) Nayar** comb. nov.

Hederella multiflora Stapf in Hook. f. Ic. Pl. 25: t. 2415, 1895; Merrill in Journ. St. Br. Roy. As. Soc. 1921, Spec. No.: 446, 1921; Nayar in Kew Bull. 20: 236, 1966. Type: *Haviland 154* (K.).

Medinilla multiflora (Stapf) Mansf., Engl. Bot. Jahrb. 60: 124, 1926.

3. ***Catanthera quintuplinervis*** (Cogn.) Nayar comb. nov.
Dissochaeta quintuplinervis Cogn. in DC., Monogr. Phan. 7: 556, 1891. Type: *Beccari 1802 & 3274* (isotypes K.).
Hederella quintuplinervis (Cogn.) Stapf in Hook. f. Ic. Pl. 25: t. 2416, 1895; Merrill in Journ. Str. Br. Roy. As. Soc. 1921, Spec. No.: 446, 1921; Nayar in Kew Bull. 20: 236, 1966.
4. ***Catanthera tetrandra*** (Stapf) Nayar comb. nov.
Hederella tetrandra Stapf in Hook. f. Ic. Pl. 25: t. 2415, 1895; Merrill in Journ. Str. Br. As. Soc. 1921, Spec. No.: 446, 1921; Nayar in Kew Bull. 20: 237, 1966. Type: *Beccari 304* (isotype K.).
5. ***Catanthera kinabaluensis*** (Nayar) Nayar comb. nov.
Hederella kinabaluensis Nayar in Kew Bull. 20: 237, 1966. Type: *R.S.N.B. No. 76* (holotype K.).
6. ***Catanthera longistylis*** (Mansf.) Nayar comb. nov.
Medinilla longistylis Mansf. in Engl. Bot. Jahrb. 60: 113, 1925. Type: *Schlechter 19258* (isotype K.).
Hederella longistylis (Mansf.) Nayar in Kew Bull. 20: 238, 1966.
7. ***Catanthera brassii*** (Nayar) Nayar comb. nov.
Hederella brassii Nayar in Kew Bull. 20: 238, 1966. Type: *Brass 7044* (holotype K.).
8. ***Catanthera ovata*** (Nayar) Nayar comb. nov.
Hederella ovata Nayar in Kew Bull. 20: 238, 1966. Type: *Brass 12726* (holotype K.).
9. ***Catanthera paniculata*** (Nayar) Nayar comb. nov.
Hederella paniculata Nayar in Kew Bull. 20: 239, 1966. Type: *Carr 14189* (holotype BM., isotype K.).
10. ***Catanthera endertii*** (Nayar) Nayar comb. nov.
Hederella endertii Nayar in Kew Bull. 20: 240, 1966. Type: *Endert 4390* (holotype K.).
11. ***Catanthera schlechteri*** (Mansf.) Nayar comb. nov.
Phyllapophysis schlechteri Mansf. in Engl. Bot. Jahrb. 60: 114, 1925; Ohwi in Jap. Bot. Mag. 57: 5, 1943. Type: *Schlechter 20117* (isotype K.).

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I wish to express my gratitude to Sir George Taylor, Director, Royal Botanic Gardens, Kew, for all facilities and kindness during my stay in U.K. from 1961–67. I must gratefully acknowledge

the helpful discussions I have had with Mr. H. K. Airy Shaw, Kew on the nomenclature and the status of *Catanthera* F. v. Muell. Later on Dr. R. D. Hoogland, CSIRO, Canberra, has also kindly informed me about the status of *Catanthera* and I must thank him for the information. I wish to extend my thanks to the Directors and Staff of the Herbarium, Royal Botanic Gardens, Edinburgh, The British Museum (Nat. Hist.), London, and the Rijksherbarium, Leiden, Netherlands, for their hospitality and help during my visits there. My thanks are also due to Dr. K. Subramanyam, Director, Botanical Survey of India for his encouragement.

Discocnide (Urticaceae)

by

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This very small genus of Central America was first established by Liebmann who named it *Discocarpus* in 1851, quite unaware of the fact that this name had already been used by Klotzsch for an euphorbiaceous genus also of the same region. This genus, however, was not acceptable to Weddell who reduced it to a section of *Laportea* in 1856.

Having studied the latter genus on a monographic basis, I found that Liebmann was quite correct in keeping this separate from *Laportea*. In my paper in 1965, reasons were given for maintaining its generic status. It suffices here to merely mention that *Discocnide* distinguishes itself from all the others of the family in the achenes being very thin and disc-like with a hyaline pericarp.

This genus, now found to have only one species, is quite closely related to *Urera* with which it has many characters in common such as the habit of growth, leaf-form and size, twigs and the female flowers. The somewhat ligulate stigma is perhaps the only link between this and *Laportea* or *Dendrocnicide*.

Due to the fact that the bulk of the materials here listed were not available for my study till end of 1965, a full treatment of this genus could not be presented in my preliminary paper of that year. This short paper is based on the materials of the following herbaria:

Jardin Botanique National de Belgique, Bruxelles, Belgium (BR).

Botanical Museum & Herbarium, Copenhagen, Denmark (C).

Chicago Natural History Museum, Chicago, U.S.A. (F).

The Royal Botanic Gardens, Kew, U.K. (K).

University of Michigan Herbarium, Ann Arbor, Michigan, U.S.A. (MICH).

New York Botanical Garden, New York, U.S.A. (NY).

Museum National d'Histoire Naturelle, Paris, France (P).

Naturhistoriska Riksmuseum, Stockholm, Sweden (S).

Smithsonian Institution, Washington DC., U.S.A. (US).

Botanischer Garten, Zurich, Switzerland (Z).

Opportunity is here taken to thank the Directors and Curators of these institutes for their generosity in the loan of their valuable materials.

DISCOCNIDE Chew

in Gard. Bull. Sing. 21: 207 (1965). — *Discocarpus* Liebm. in Dansk. Vidensk. Selsk. Skrift. ser. 5. 2: 308 (1851), non Klotzsch (1841). — *Laportea* sect. *Discocarpus* Wedd. in Arch. Mus. Hist. Nat. Paris 9: 132 (1856) et in DC. Prodr. 16 (1): 84 (1869).

Monoecious ligneous shrubs or small trees with irritant hairs. *Leaves* simple, petiolate, chartaceous, alternate, with symmetrical lamina. *Stipules* wholly connate, intrapetiolar. *Inflorescences* unisexual, pedunculate, axillary, branched racemes with minute peduncular bracts. *Male flowers* 5-merous, with a rudimentary ovary. *Female flowers* 4-merous, with ovoid ovaries and ligulate stigmas; pedicels simple. *Achenes* flat, very thinly chartaceous, with smooth pericarp, reflexed over elongated pedicels.

Species 1: *D. mexicana*

Discocnide mexicana (Liebm.) Chew in Gard. Bull. Sing. 21: 208 (1965). — *Discocarpus mexicanus* Liebm. in Dansk. Vidensk. Selsk. Skrift. ser. 5. 2: 309 (1851). — *D. nicaraguensis* Liebm. in *op. cit.* (1851). — *Urera platycarpa* Wedd. in Ann. Sc. Nat. ser. 3. 18: 202 (1852). — *Laportea platycarpa* (Wedd.) Wedd. in Ann. Sc. Nat. ser. 4. 1: 182 (1854) et in Arch. Mus. Hist. Nat. Paris 9: 132 (1856). — *L. liebmannii* Wedd. in Arch. Mus. Hist. Nat. Paris 9: 133 (1856). — *L. mexicana* (Liebm.) Wedd. in DC. Prodr. 16 (1): 84 (1869). — *L. nicaraguensis* (Liebm.) Wedd. in *op. cit.* (1869). — *Urticastrum mexicanum* (Liebm.) O.K. & *nicaraguense* (Liebm.) O.K. Rev. Gen. Pl. 635 (1891).

Distribution: Mexico, Yucatan, Guatemala, El Salvador and Nicaragua.

Small trees or shrubs to 5 metres high. *Twigs* puberulous, sparsely covered with fairly long, rigid irritant hairs; petiolar scars very prominent. *Lamina* (5-) 10-13 (-16) cm. long, (3-) 5-8 (-12) cm. broad, ovate, chartaceous; the upperside sparsely covered with short irritant hairs, the lowerside densely covered with rather long ones, both sides dense with punctiform cystoliths; base rounded to slightly truncate; apex acute; margin crenate; lateral veins 5-7 pairs, the basal pair most prominent, reaching to about half the length of the lamina; intercostals few, faint. *Petioles* 4-7 (-10) cm. long, dense with long irritant hairs. *Stipules* less than 1 cm. long, light puberulous, with very short irritant hairs. *Inflorescences* unisexual, rarely bisexual, branched racemes, to 25 cm. long, 10 cm. broad, axillary, solitary to numerous; peduncle dense with long irritant hairs. *Male flowers* pedicellate; perianth ca. 2 mm. long and broad, puberulous to pubescent, the apex usually with a few long irritant hairs, 5-tepalled; stamens 5, with slightly reflexed filaments; pistillode ca. 0.5 mm. long, 0.75 mm. broad, cup shape; interfloral bracts minute; pedicels to 2 mm. long. *Female flowers* pedicellate, arranged in loose fascicles; perianth ca. 0.4 mm. long, 0.3 mm. broad, 4-lobed, puberulous, the lateral tepals slightly long and broader than the medial ones; ovary ca. 0.8 mm. long, 0.5 mm. broad, somewhat ovoid; stigma ligulate, ca. 0.8 mm. long; interfloral bracts minute; pedicels ca. 1 mm. long, simple, puberulous to glabrous. *Achenes* to 4 mm. long and broad, very shortly stipitate, somewhat sigmoid, flat and thin chartaceous, with a smooth often hyaline pericarp; the perianth forming a minute cupule at the base; pedicel 2 to 3 mm. long.

Vernacular names: Chichicaste and Ortiga.

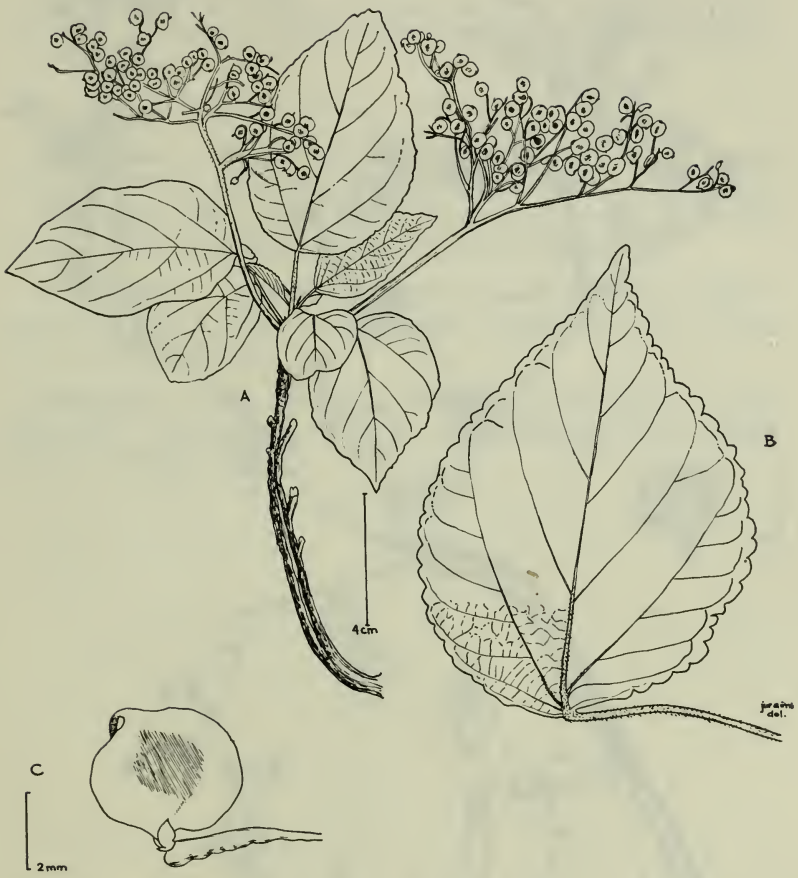


Fig. 1. — *D. mexicana*:
A = fruiting twig; B = leaf;
C = achene.



Fig. 2. — *D. mexicana*:
A = twig with male inflorescences
B = male flower.

Mexico: — Hidalgo Distr.: Huejustla: *Seler* 921, April 1888 (F). — Oaxaca Distr.: Cerro de S. Felipe: *Liebmann herb.* 14222 (holotype in C, isotype in F.) — Marquesado: *Conzatti* 5231, Feb. 1937 (MICH). — Sine Loc.: *Galeotti* 7128 (holotype of *U. platycarpa*: in P). — Temascaltepec Distr.: Manchititla: *Hintou* 3417, Feb. 1933 (Z). Temascaltepec: *Hintou* 634, May 1932 (Z) & 3676, March 1933 (NY). — Vera Cruz Distr.: Orizaba: *Botteri* 793 (US). — Cordova Valley: *Bourgeau* 2280, April 1866 (BR, P, S, US).

Yucatan: — Sine loc.: *Gaumer* 501 (US).

Guatemala: — Peten Distr.: La Libertad: *Lunell* 3104, April 1933 (F, MICH). Uaxactum: *Bartlett* 12763, April 1931 (MICH). — Santa Rosa Dept.: Santa Rosa: *Heyde & Luz* 1467, April 1892 (US). — Lake Omatitlan: *Pittier* 109, April 1905 (US).

El Salvador: — near San Salvador: *Standley* 22403 & 22797, April 1922 (NY & US). — Ahuachapan: *Padilla* 323 (US). — Sine loc.: *Renson* 204 (US).

Nicaragua: — near Managua: *Gardiner* 1068 (US). — near Matagalpa: *Orsted herb.* 14223, Jan. 1848 (holotype of *D. nicaraguensis*: holotype in C).

Nothocnide (Urticaceae) in Malesia

by

W.-L. CHEW (CHEW WEE-LEK)

Blume established this genus in 1856 with one species *N. repanda* which he had previously described as *Urtica repanda*. Weddell in his Monograph of the *Urticaceae* considered this congeneric with *Pipturus* and had it reduced accordingly. Here in *Pipturus* the genus *Nothocnide* stayed and was subsequently forgotten.

It was not till 1933, that the genus (though not its name) was brought out again. Skottsberg, while revising the genus *Pipturus*, discovered, independently and quite unaware of Blume's publication, that that genus was unnatural and that a small group of climbing species could easily be distinguished from the others as a distinct genus. Thus *Pseudopipturus* was established to accommodate these climbers with Blume's *Urtica repanda* as the type species. This was followed by all subsequent authors including the compilers of *Index Genericorum* without their realising that the name *Pseudopipturus* is quite superfluous.

Credit for the discovery of this "lost" name goes to Backer and Bakhuizen who, in their joint work *Flora of Java* (1965) quite rightly re-established it in place of *Pseudopipturus*. Only one combination, however, was made by them.

It is partly for this reason that this paper is now presented i.e. to effect the remaining combinations. At the same time, opportunity is here taken to have the malesian species of the genus revised as a further material towards an ultimate monograph of the whole family.

Nothocnide Blume

Mus. Bot. Lugd. Bat. 2: tab. 14 (1856); Backer & Bakh. v/d. Brink, Fl. Java, 2: 49 (1965). — *Pipturus* Wedd. in Ann. Sc. Nat. ser. 4. 1: 196 (1854), *partim*. — *Pseudopipturus* Skottsberg in Acta Hort. Gothoburg. 8: 117 (1933); Hutchinson, Genera Flow. Pl. 2: 191 (1967).

Closely related to *Pipturus* from which it differs in the following characters:— (a) climbers or scramblers, (b) lamina margin smooth, not toothed, (c) except for *N. discolor*, undersides of lamina without the white felt, (d) the female perianth fleshy and adnate to the ovary.

Species 5, mainly Malesia. Type species: *N. repanda* (B1.) B1.

Dioecious soft-woody climbers devoid of irritant hairs. *Leaves* spirally arranged, stipulate, petiolate, simple. *Lamina* elliptic to obovate, prominently 3-veined, with fine intercostals almost perpendicular to the midrib; margin smooth; the upperside side often

dense with punctiform cystoliths, usually strigose. *Stipules* connate, intrapetiolar, bifid at the apex, the two ridges on the outside strigose. *Inflorescences* spicate, axillary, with flowers in glomerules at regular intervals all the usually unbranched peduncle. *Male flowers* sessile to subsessile, ca. 1 mm. long and broad, 4-merous; the rudimentary ovary surrounded by long thin white hairs. *Female flowers* sessile; perianth minutely toothed at the apex, ca. 1 mm. long, adnate to the ovary; stigma long ligulate. *Achenes* 1–1.5 mm. long and broad, obovoid often spherical.

Key to the Species

- 1–a. Undersides of lamina covered with a dense
while felt **N. discolor**
- b. Undersides of lamina glabrous to villose but without the
dense white felt **2.**
- 2–a. Undersides of lamina dense pubescent to villose; twigs,
petioles and peduncles densely strigose **N. mollissima**
- b. Not this combination of characters **3.**
- 3–a. Lamina with only one pair of main lateral veins arising from
the base and reaching to the apex **N. melastomatifolia**
- b. Lamina with 2 to 3 pairs of main lateral veins; one pair
arising from the base as in (3a) above but the others arising
from the mid-rib near the apex **N. repanda**

1. Nothocnide repanda (Bl.) Bl. Mus. Bot. Lugd. Bat. 2: tab. 14 (1856); Backer & Bakh. v/d Brink f. Fl. Java, 2: 49 (1965). — *Urtica repanda* Bl. Bijdr. 501 (1825); Steud. Nom. Bot. ed. 2. 2: 736 (1841). — *Boehmeria repanda* (Bl.) Hasskl. Cat. Hort. Bot. Bog. 79 (1844). — *Boehmeria trinervis* Miq. Pl. Jungh. 36 (1851). — *Pipturus repandus* (Bl.) Wedd. in Ann. Sc. Nat. ser. 4. 1: 196 (1854) et in Arch. Mus. Hist. Nat. Paris 9: 448 (1857) et in DC. Prodr. 16(1): 235¹⁹ (1869). — *Pipturus ellipticus* Wedd. in Ann. Sc. Nat. ser. 4. 1: 197 (1854). — *Pipturus succulentus* Elm. Leafl. Philip. Bot. 3: 897 (1910); Robinson in Philip. J. Sc. Bot. 6: 15 (1911); Merr. Enum. Phil. Fl. Pl. 2: 95 (1923). — *Pseudopipturus repandus* (Bl.) Skottsb. in Acta Hort. Gothob. 8: 117 (1933). — *Pseudopipturus succulentus* (Elm.) Skottsb. in *op. cit.* (1933). — *Pipturus subalpinus* Elm. Leafl. Philip. Bot. 9: 3221 (1934).

Woody climber with obovate lamina, scarbrous on the lower side and on the veins only of the upper side, with at most 3 pairs of main lateral veins, 2 of which branching off above the mid-point and usually towards the apex. — **Fig. 1.**

Distribution: Sumatra, Java, Bali, Borneo, Philippines, Celebes, Moluccas, New Guinea, Bismark Archipelago and Solomon Islands.

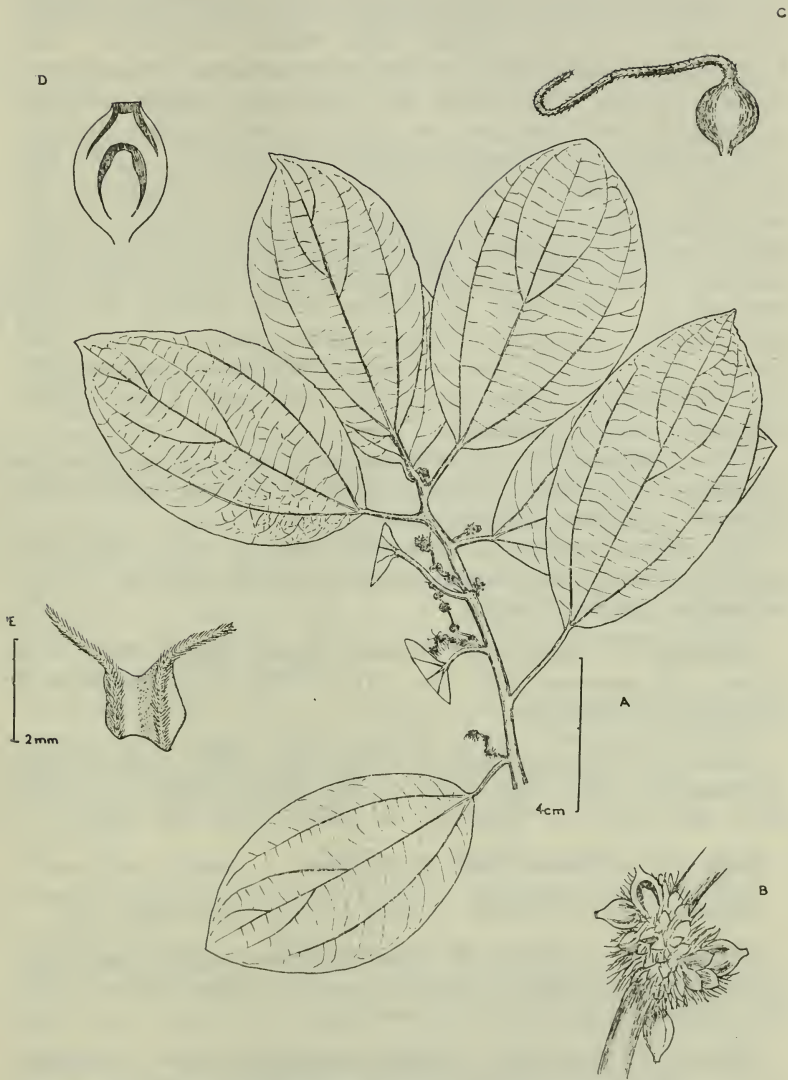


Fig. 1. — *N. repanda*:

A = twig; B & C = female flowers;

D = female flower (v.s.); E = stipule.

Twigs closely strigose. *Lamina* ca. 12–15 cm. long, 5–7 cm. broad, obovate; the upperside strigose only on the veins, dense with punctiform cystoliths; the lowerside generally strigose, more so on the veins, also dense with punctiform cystoliths; main lateral veins at most 3 pairs, one pair at the base, the other 2 near the apex; margin lightly crenate; apex shortly acuminate; base cuneate. *Petioles* ca. 3 cm. long, usually dense strigose. *Stipules* to 6 mm. long, 1.5 mm. broad, lightly strigose, early caducous. *Inflorescences* axillary, 2 to 4 at each axil, to 10 cm. long, spicate, peduncle sparsely to closely strigose, the females usually longer than the males. *Male flowers* shortly pedicellate; perianth ca. 1 mm. long and broad, 4-tepalled, closely strigose at the apex; stamens 4, with very long reflexed filaments; rudimentary ovary thin, ca. 0.8 mm. long, the base with long white hairs; pedicel to 0.4 mm. long, densely covered with long white hairs. *Female flowers* subsessile; perianth ca. 1 mm. long, ca. 0.8 mm. broad, minutely 4-toothed and strigose at the apex, obovoid; stigma ligulate, to 3 mm. long, usually early caducous; the very short pedicels bearing numerous long white hairs. *Achenes* ca. 1.25 mm. long, 1 mm. broad, obovoid to almost spherical.

I have studied the type materials of Elmer's *succulentus* and *subalpinus* very closely but have failed to find any valid reason for their separation from this species.

This merges somewhat imperceptibly into the next, particularly in West Sumatra where some plants have been observed to have somewhat pubescent lamina.

Sumatra: — Bengkoelen: Soeban Ajam: *Ajoeb* 294. — G. Merapi: *Bunne Meyer* 5040, Oct. 1918. — Sine loc.: *Junghuhn* 10 (isotype of *B. trinervis*).

Java: — Madioen: *Koorders* 23336, June 1896. — Mt. Muria: *Kostermans* 6242, Nov. 1951. — Mt. Salak: *Bakh. v/d Brink* 3641, May 1920. — Tjibodas: *van Steenis* 2669, Jan. 1929.

Bali: — *van Steenis* 8145, April 1936.

Borneo: — West Koetai: *Endert* 2512 & 3339, Sept. 1925.

Philippines: — Luzon: Mt. Pinatubo: *Elmer* 22016, May 1927 (isotype of *P. subalpinus*). — Mindanao: Mt. Apo: *Elmer* 10739, May 1909 (isotype of *P. succulentus*).

Celebes: — Talaud Isls.: Pulau Karakelang: *Lam* 2583, April 1926. — Menado: sine loc.: *Koorders* 19064 & 19069, Jan.–Feb. 1895.

Moluccas: — Amboina: Robinson, *Pl. Rumph. Amboin* 321 & 322, July–Nov. 1913. — Ceram: *Rutten* 2063, Feb. 1919. — Ternate: Goeni Senang: *Beguïn* 1277 & 1322, Jan. 1921.

West New Guinea: — Rouffaer River: *Docters van Leeuwen* 9742 & 10080, Aug. 1926.

East New Guinea: — Sepik Distr.: Blini River: *Darbyshire & Hoogland* 8285, July 1961.

Papua: — Milne Bay: Goodenough Island: *Brass* 25119, Oct. 1953.

Bismark Archip.: — New Britain: Torlu River: *Sayers* NGF. 24216, March 1965. — Mussau Isl.: *Koie & Sandermann* 1407 & 1605, Jan.–Feb. 1962.

Solomon Islands: — Kolombangana Isl.: *Hunt* RSS. 2461, Aug. 1965. — San Cristobal Isl.: *Whitmore* RSS. 6138, July 1965.

2. *Nothocnide melastomatifolia* (K. Sch.) Chew, comb. nov. — *Pipturus melastomatifolius* K. Sch. Fl. Kais. Wilhelm. 37 (1889), basionym; Winkl. in Bot. Jahrb. 57: 593 (1922). — *Pseudopipturus melastomatifolius* (K. Sch.) Skottsbo. in Acta Hort. Gothob. 8: 117 (1933).

Closely related to the preceding species from which it can easily be distinguished by (a) the plant almost glabrous and (b) the main lateral veins near the apex of the lamina very faint or absent. — **Fig. 2.**

Distribution: New Guinea.

Twigs sparsely strigose to subglabrous. *Lamina* (5–) 8–10 (–15) cm. long, 2–5 cm. broad, elliptic, rarely ovate, almost glabrous, dense with punctiform cystoliths; main lateral veins 1 pair, arising from the base, reaching to the apex; margin smooth to undulate; apex shortly acuminate; base broadly cuneate to rounded. *Petiole* 3–4 cm. long, very sparsely strigose to subglabrous. *Stipules* to 5 mm. long, ca. 1.5 mm. broad, subglabrous, caducous. *Inflorescences* axillary, 2 to 4 at each axil, to 10 cm. long, spicate, peduncle subglabrous, the females usually longer than the males. *Flowers and achenes* as in *N. repanda*.

Hatusima (ined. 1944) considered this conspecific with *N. repanda*, an opinion I cannot entirely agree. I find no difficulty in distinguishing these two species on the characters mentioned in the diagnosis above. This occurs from sea-level to ca. 1,500 metres in altitude.

West New Guinea: — Vogelkop Peninsula: Kebor Valley: *van Royen & Sleumer* 7328, Nov. 1961. — Hollandia: Lake Sentani: *Versteegh* BW. 3921, Sept. 1956.

East New Guinea: — Sepik Distr.: Sepik River: *Hollrung* 802 (isotype of *P. melastomatifolius*). — Morobe Distr.: near Bulolo: *Millar* NGF. 23006, Jan. 1964.

Papua: — Central Division: Koitaki: *Carr* 11963, April 1935. — Northern Division: Isuarara: *Carr* 15424, Feb. 1936.

3. *Nothocnide mollissima* (Bl.) Chew, comb. nov. — *Urtica mollissima* Bl. Bijdr. 501 (1825), basionym. — *Pipturus mollissimus* (Bl.) Wedd. in Arch. Mus. Hist. Nat. Paris 9: 449 (1857) et in DC. Prodr. 16(1): 235–19 (1869); Hk. f. Fl. Br. Ind. 5: 589 (1888); Ridl. Fl. Mal. Pen. 3: 367 (1924). — *Pipturus repandus* var. *Rufescens* Winkl. in Bot. Jahrb. 57: 593 (1922). — *Pseudopipturus mollissimus* (Bl.) Merr. in Papers Mich. Acad. Sc. 23: 177 (1938).



Fig. 2.— *N. melastomatifolia*.

This species distinguishes itself by the twigs, petioles and peduncles being densely strigose and the undersides of the lamina dense pubescent to villose.

Distribution: Borneo, Malay Peninsula, Sumatra, Java, Bali, New Guinea and Solomon Islands.

Twigs densely strigose. *Lamina* ca. 10–15 cm. long, 6–9 cm. broad, broad elliptic to slightly obovate; the upper side dense appressed strigose, the lower side dense pubescent to villose; main lateral veins ca. 3 pairs, one pair at the base, the others near the apex; margin smooth; apex bluntly acuminate; base broadly cuneate. *Petioles* to 4 cm. long, densely strigose. *Stipules* to 5 mm. long, ca. 2 mm. broad, subglabrous, caducous. *Inflorescences* axillary, 2–4 at each axil, less than 9 cm. long; peduncle densely strigose, the females slightly longer. *Flowers and achenes* as in *N. discolor*.

I do not agree with J. J. Smith and Bakhuizen v.d. Brink that this species is conspecific with *N. repanda*. These two are very easily separated from each other on the characters enumerated above.

From collections available for my study, this species seems more common in the Malay Peninsula than in Java where the holotype was collected.

Borneo: — Sarawak: Bau Distr.: *Chew Wee-Lek CWL. 554 & 564*, July 1963; *Sinclair 38461*, March 1949. — sine loc.: *Ridley 12326*, Sept. 1909.

Malay Peninsula: — Kedah: Inchong Estate: *Spare 37606*, Aug. 1941. — Penang: Balik Pulau: *Ridley 8024*, March 1896. — Perak: Larut River: *Wray 2464*, July 1888. — Selangor: Batu Caves: *Ridley 395*, June 1889. — Johore: Kukub: *Burkill 118*, Aug. 1913.

Sumatra: — Asahan: Hoela Padang: *Krukoff 4446*, Dec. 1932. — Lampong: Wai Lima Estate: *Iboet 444*, Dec. 1921. — Sibolangit: *Lorzing 5466*, Dec. 1917.

Java: — Bantam: Danoe-moeras: *Koorders 40603*, May 1912. — Besoeki: Djember: *Koorders 20736*, Nov. 1895. — Kurupang: *Blume s.n.* (Leiden herb. 908-189-1402, type of *Urtica mollissima*).

Bali: — Mt. Batukau: *Kostermans et al. KKSS. 121*, June 1958.

New Guinea (West): — Geelvink Bay: near Nabire: *Kanehira & Hatusima 11772*, Feb. 1940.

New Guinea (Papua): — Milne Bay: Mt. Daymanu: *Brass 23336*, July 1953.

Solomon Islands: — Santa Ysabel: *Beer BSIP. 7723*, Jan. 1967.

4. **Nothocnide discolor** (C. B. Rob.) Chew, **comb. nov.** — *Pipturus discolor* C. B. Rob. in Philip. J. Sc. Bot. 6: 15 (1911) **basionym**; Merr. Enum. Phil. Fl. Pl. 2: 95 (1923). — *Pseudopipturus discolor* (C. B. Rob.) Skottsb. in Acta Hort. Gothob. 8: 117 (1933).

This species distinguishes itself by the lamina being covered on the underside with a white felt and the petioles and twigs densely strigose, often with reddish-brown hairs.

Distribution: Philippines & New Guinea.

Twigs densely reddish-brown strigose. *Lamina* (5-) 8-12 (-15) cm. long, (3-) 4-6 (-8) cm. broad, obovate, rarely broad elliptic; the upperside strigose only on the veins, dense with punctiform cystoliths; the lowerside densely strigose on the veins and intercostals, the interspaces covered with a fine dense white felt; main lateral veins 2 to 3 pairs, one pair arising from the base, the other 2 near the apex; margin smooth to undulate; apex blunt acuminate to acute. *Petioles* ca. 3-4 cm. long, dense reddish-brown strigose. *Stipules* less than 5 mm., densely woolly, caducous. *Inflorescences* axillary, 2 to 4 at each axil, up to 8 cm. long, spicate, peduncle dense reddish-brown tomentose, both sexes of about the same length. *Male flowers* fairly dense strigose at the apical half, the rest as in *N. repanda*. *Female flowers and achenes* as in *N. repanda*.

I have compared the New Guinea populations with those of the Philippines and am quite satisfied that they are conspecific. The disjunct distribution is probably due to lack of collections from the Celebes and the Moluccas.

Philippines: — Mindanao: Lake Lanao: *Clemens* 676, Sept.-Oct. 1906 (type of *P. discolor*).

New Guinea (North-East): — Morobe Distr.: Kipu: *Streimann & Kairo* NGF. 26146, Jan. 1966.

New Guinea (Papua): — Northern Div.: Isuarara: *Carr* 15911, March 1936.

Extra — Malesian Species

Pseudopipturus rotundifolius (Poir.) Skottsb. in Acta Hort. Gothoburg. 8: 117 (1933). — *Urtica rotundifolia* Poir. Encycl. 4: 644 (1798). — *Pipturus rotundifolius* (Poir.) Wedd. in Ann. Sci. Nat. ser. 4. 1: 197 (1854).

Distribution: Mauritius

This climbing species is claimed to belong to this genus. As I have not seen it, I refrain from having it transferred.

INDEX OF COLLECTIONS EXAMINED

Ajoeb:		
294	=	repanda
Backer, C. A.:		
1794	=	repanda
4357	=	repanda
7369	=	mollissima
7513	=	repanda
8776	=	repanda
11862	=	repanda
11928	=	repanda
16266	=	repanda
33012	=	repanda
Bakhuizen v.d. Brink, R. C.		
3248	=	repanda
3641	=	repanda
Beer, W.:		
BSIP. 5104	=	mollissima
BSIP. 7723	=	mollissima
Beguín, V.:		
1277	=	repanda
1322	=	repanda
Blume, C. L.:		
L. herb. 908-189-1402	=	mollissima
L. herb. 908-189-1434	=	mollissima
Boerlage, J. G.:		
118	=	repanda
125	=	repanda
252	=	repanda
Brass, L. J.:		
23336	=	mollissima
25119	=	repanda
Bunnemeyer, H. A. B.:		
5040	=	repanda
Burkill, I. H.:		
118	=	mollissima
Carr, C. E.:		
11963	=	melastomatifolia
13972	=	melastomatifolia
15424	=	melastomatifolia
15911	=	discolor
16145	=	melastomatifolia
16475	=	melastomatifolia
Carrick, J.:		
JC. 1493	=	mollissima
Chew Wee-Lek:		
CWL. 554	=	mollissima
CWL. 564	=	mollissima

Clemens, M. S.:		
676 (type!)	=	discolor
Curtis, C.:		
673	=	mollissima
1032	=	mollissima
Danser, B. H.:		
6722	=	repanda
Darbyshire & Hoogland:		
8285	=	repanda
Dissing et al.:		
2362	=	repanda
Docters van Leeuwen, W. M.:		
9742	=	repanda
10080	=	repanda
12158	=	repanda
Elmer, A. D. E.:		
7468	=	repanda
7786	=	repanda
10043	=	repanda
10241	=	repanda
10739 (type!)	=	repanda
13859	=	discolor
14467	=	repanda
17531	=	repanda
17639	=	repanda
22016	=	repanda
Endert, F. H.:		
2512	=	repanda
3339	=	repanda
Eyma, P. J.:		
2398	=	repanda
3172	=	repanda
Hollrung, M.:		
802	=	melastomatifolia
Holttum, R. E.:		
19881	=	mollissima
Hume, H. L.:		
7134	=	mollissima
Hunt, P. F.:		
RSS. 2461	=	repanda
Iboet:		
27	=	repanda
254	=	mollissima
378	=	repanda
444	=	mollissima
Junghuhn, Fr.:		
10	=	repanda

Kanchira & Hatusima:		
11772	=	mollissima
14219	=	melastomatifolia
Koens, A. J.:		
306	=	repanda
Koie & Sandermann:		
1407	=	repanda
1605	=	repanda
Koorders, S. H.:		
19064	=	repanda
19069	=	repanda
20736	=	mollissima
23336	=	repanda
23939	=	repanda
24426	=	repanda
29109	=	mollissima
32241	=	repanda
40464	=	repanda
40543	=	mollissima
40603	=	mollissima
Kornassi:		
908	=	repanda
1003	=	repanda
1086	=	repanda
1550	=	repanda
Kostermans, A.:		
6242	=	repanda
Kostermans et al.:		
KKSS. 121	=	mollissima
Krukoff, B. A.:		
4446	=	mollissima
Lam, H. J.:		
2583	=	repanda
Lorzing, J. A.:		
5466	=	mollissima
Mendoza, D. R.:		
18362	=	repanda
Millar, A. N.:		
NGF. 23006	=	melastomatifolia
Millard, A. H.:		
1670	=	mollissima
Mousset, J. P.:		
743	=	repanda
Nakissi, A.:		
BSIP. 8078	=	repanda
Nur, Md.:		
SFN. 33968	=	mollissima

Oldenborgh, J. van:		
24	=	repanda
Pleyte, D.:		
735	=	melastomatifolia
Rahmat si Toroos:		
55	=	mollissima
Ramos, M.:		
39404	=	repanda
Ramos & Edano:		
30760	=	repanda
49545	=	discolor
75310	=	repanda
Rant, A.:		
155	=	repanda
804	=	repanda
Ridley, H. N.:		
395	=	mollissima
3360	=	mollissima
8024	=	mollissima
10199	=	mollissima
12326	=	mollissima
Robinson, C. B.:		
Pl. Rumph. 321	=	repanda
Pl. Rumph. 322	=	repanda
Royen, P. van:		
NGF. 18249	=	repanda
Royen & Sleumer:		
7328	=	melastomatifolia
Rutten, L. M. R.:		
330	=	repanda
336	=	repanda
1586	=	repanda
2063	=	repanda
Sayers, C. D.:		
NGF. 18070	=	melastomatifolia
NGF. 24216	=	repanda
Schlechter, R.:		
14603	=	melastomatifolia
Sinclair, J.:		
38461	=	mollissima
Spare, G. H.:		
37606	=	mollissima
Steenis, C. G. G. J. van:		
2669	=	repanda
8145	=	repanda
12667	=	repanda

Streinmann & Kairo:		
NGF. 26146	=	discolor
Sulit, M. D.:		
2769	=	repanda
Teona, R.:		
BSIP. 6219	=	repanda
Teysmann, J. E.:		
6758	=	repanda
Versteeg, G.:		
1733	=	repanda
Versteegh, Chr.:		
BW. 3921	=	melastomatifolia
Vesterdal, A.:		
19	=	mollissima
Whitmore, T. C.:		
BSIP. 2270	=	repanda
RSS. 6138	=	repanda
Winckel, W .F.:		
1440	=	repanda
Womersley & Taylor:		
4786	=	repanda
Wray, L.:		
2464	=	mollissima

