

TAXONOMIC REVISION OF MYCETIA REINW. (RUBIACEAE) IN INDIAN SUBCONTINENT

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ABSTRACT

Taxonomic revision of *Mycetia* Reinw. (Rubiaceae) in Indian subcontinent is presented with typification, synonymy, illustrations, key, descriptions, distribution, phenology, ecology and citations of specimens etc. Nine species are described including one new species *Mycetia rodgeri* Deb et Mondal, sp. nov. and a species is reduced to subspecific status as *M. stipulata* Hook. f. subsp. *macrostachya* (Hook. f.) Deb comb. & stat. nov.

Key words : Taxonomy, *Mycetia*, revision, Indian subcontinent, 9 species.

INTRODUCTION

The genus *Mycetia* Reinw. (1826) was proposed on the basis of *M. cauliflora* Reinw. from Buitenzorg (=Bogor), which was relegated by De Candolle (1830) to a sectional status under *Bartiera* Aubl. (1775). The genus *Adenosacme* Wall. (1832) was named to accommodate *Rondeletia longifolia* Wall. (1824) from Nepal and Sylhet, and subsequently described by Endlicher (1838) and recognized by Hooker f. (1876) who reduced *Lawia* Wight (1846) to a synonym of this genus. *Bartiera* Blume (1826) was postulated for accommodating three species, without knowing probably that the name was preoccupied by *Bartiera* Aubl. (1775). Schumann (1891), however, corrected the generic name that is being followed by most of the workers since then.

No attempt has ever been made to evaluate the genus. Efforts of Bakhuizen f. (1965) and Hara (1977) to clarify the specific delimitation of *Mycetia longifolia* complex deserve appreciation. Deb (1965)

and Deb et Dutta (1965) described two new species under this genus. The present taxonomic study of the genus is made in connection with the National Flora of India. The study is based on specimens extant in K, LE, CAL, DD, ASSAM, MH, BSIS, ANC.

TAXONOMIC POSITION OF THE GENUS

The genus was placed under the tribe Mussaendeae by Hooker f. and is closely allied to *Coelospermum* Bl. and *Myroneuron* Wall. The flowers are umbellate in *Coelospermum* and capitate or corymbose in *Myroneuron*, besides other points of distinction. Because of the presence of raphides in the genus it comes under the subfamily Rubioideae Bremekamp.

TAXONOMIC SIGNIFICANCE OF MORPHOLOGICAL CHARACTERS

The plants are erect or bushy shrubs mostly with shiny yellowish corky bark, pale in *M. stipulata* and some plants of *M. longifolia*. Tender shoots are mostly pubescent, but glabrous in *M. stipulata*.

Leaves are usually elliptic-lanceolate to

oblanceolate or obovate and more or less hairy. They are ovate with truncate attenuated base in *M. nepalensis*, broadly linear in *M. listeri* and very variable in *M. longifolia*. Indumentum varies from scaberulous to densely tomentose, but glabrous in *M. stipulata* subsp. *macrostachya*, very variable, glabrescent, scaberulous, pilose or tomentose in *M. longifolia*. They are uniseriate in *M. longifolia*, and multiseriate in other species.

Stipules are interpetiolar, foliaceous or not. They are very large and foliaceous in *M. stipulata* but small in other species.

Inflorescence is axillary, extra-axillary or terminal, uniparous dichasial cyme, paniculate or rounded corymbose and is sometimes typical for a species. It is corymbose in *M. stipulata*, paniculate in *M. listeri*, extra axillary in *M. mukerjiana* or usually cauline in *M. radiculiflora*.

Bracts and bracteoles vary in shape from linear to ovate.

Flower is pentamerous with 2 carpels, but in *M. acuminata* (4)-5-6 carpels are present.

Calyx tube is short cupular; lobes 5, tooth like linear, deltoid or oblong-lanceolate. Calyx lobes are linear, longer than the ovary in *M. nepalensis*, ovate-triangular, shorter than the ovary in *M. longifolia*.

Corolla tube is salver-shaped, varying in length; lobes 5, valvate.

Stamens 5 sometimes 4 or 6, epipetalous at the base, middle or throat of the corolla, usually glabrous, but the filament is villous in *M. mukerjiana* and subpubescent in *M. radiculiflora*.

Gynoecium: Carpels 2, rarely 3, commonly heterostylous; but in *M. acuminata* there are 4, 5 or 6 carpels. Style is glabrous, but puberulous in *M. mukerjiana*.

Berries are dry. In *M. longifolia* it is sometimes fleshy, and vary in size.

Mycetia Reinw. in Bl. Bijdr. 986. 1826 & Sylb. Ratisb. 2 : 9. 1828; Schumann in

Engler & Prantl, Pflanzenfam. 4(4) : 66. 1891; Bakh. f. in Backer & Bakh. f. Fl. Java 2 : 305. 1965; Yamazaki in Hara, Fl. E. Himal. 312. 1966; Hara in Journ. Jap. Bot. 52 : 198. 1977 & in Hara & Williams, Enum. Fl. Pl. Nepal 205. 1979. *Bertiera* Bl. Bijdr. 987. 1826, non Aubl. 1775. *Bertiera* sect. *Mycetia* DC. Prodr. 4 : 392. 1830. *Adenosacme* Wall. ex Endl. Gen. 1 : 552. 1838; Hook.f. in Benth. & Hook.f. Gen. Pl. 2 : 69. 1876; Kurz, For. Fl. Brit. Burma 2 : 54. 1877; Hook.f. Fl. Brit. Ind. 3 : 95. 1880; Gamble, Fl. Pres. Madras 612 (repr. ed. 431) 1921; Kanjilal et al. Fl. Assam 3 : 49. 1939. *Lawia* Wight in Calc. Journ. Nat. Hist. 7 : 14. 1846 & Icon. 3(4) : 5. t. 1070. 1846.

Shrubs erect, sometimes bushy; branches with striking spongy swollen corky bark, shining yellowish, sometimes pale in colour. *Leaves* simple, opposite, decussate, petiolate, or sessile, sometimes anisophyllous, elliptic-lanceolate, oblanceolate, ovate or linear, glabrous, scaberulous, pilose or tomentose, pinnately nerved without domatia beneath; stipules interpetiolar, foliaceous or not. *Inflorescence* in terminal, axillary, extra-axillary or cauline, paniculate dichasial corymbose or capitate cymes, shorter or longer than leaves. *Flowers* bisexual, 5(-4-6) merous, bracts involucre or not usually conspicuously glandular-dentate with stalked ovoid glands or without glands. *Hypanthium* turbinate to oblong or globose. *Calyx* lobes 5, with or without stalked ovoid, oblong or capitate glands, persistent, ovate-triangular or linear, short or long, teeth sometimes with a few glands between the teeth. *Corolla* salver-shaped, yellow, rarely white; tube cylindric, longer or shorter than calyx, glabrous, villous or pubescent inside; lobe 5, valvate induplicate in bud. *Stamens* 5 (4-6) inserted at the base, middle or throat of the corolla, included; filaments usually glabrous, sometimes villous at base; anthers dorsifixed; disc glabrous. *Ovary* 2

or (4)-5-6 rarely 3 locular, with many ovules on axile fleshy median placenta; style filiform, glabrous or villous, bifurcated at or above the middle, with linear, glandular branches; stigma elongate. *Berry* globose, fleshy or coriaceous, white to purplish, glabrous or more or less pubescent, crowned with persistent calyx, indehiscent or splitting irregularly, 2 or 4-5-6 loculed; locules surrounded by 2 or 4 crescent-shaped air chambers. *Seeds* many, minute, cuneate; embryo minute, with fleshy endosperm, testa granular.

Type : *Mycetia cauliflora* Reinw.

Distribution : About 25 species from India to South China, Vietnam and W. Malesia, 9 species in Indian subcontinent.

Raphides are present in different parts;

common in apical and basal parts of the leaf. Trichomes are uniseriate or multi-seriate, $30 \times 6 \mu$ - $84 \times 30 \mu$ or $98 \times 3 \mu$ - $450 \times 30 \mu$; uniseriate, $120 - 250 \mu \times 11-24 \mu$ on the corolla.

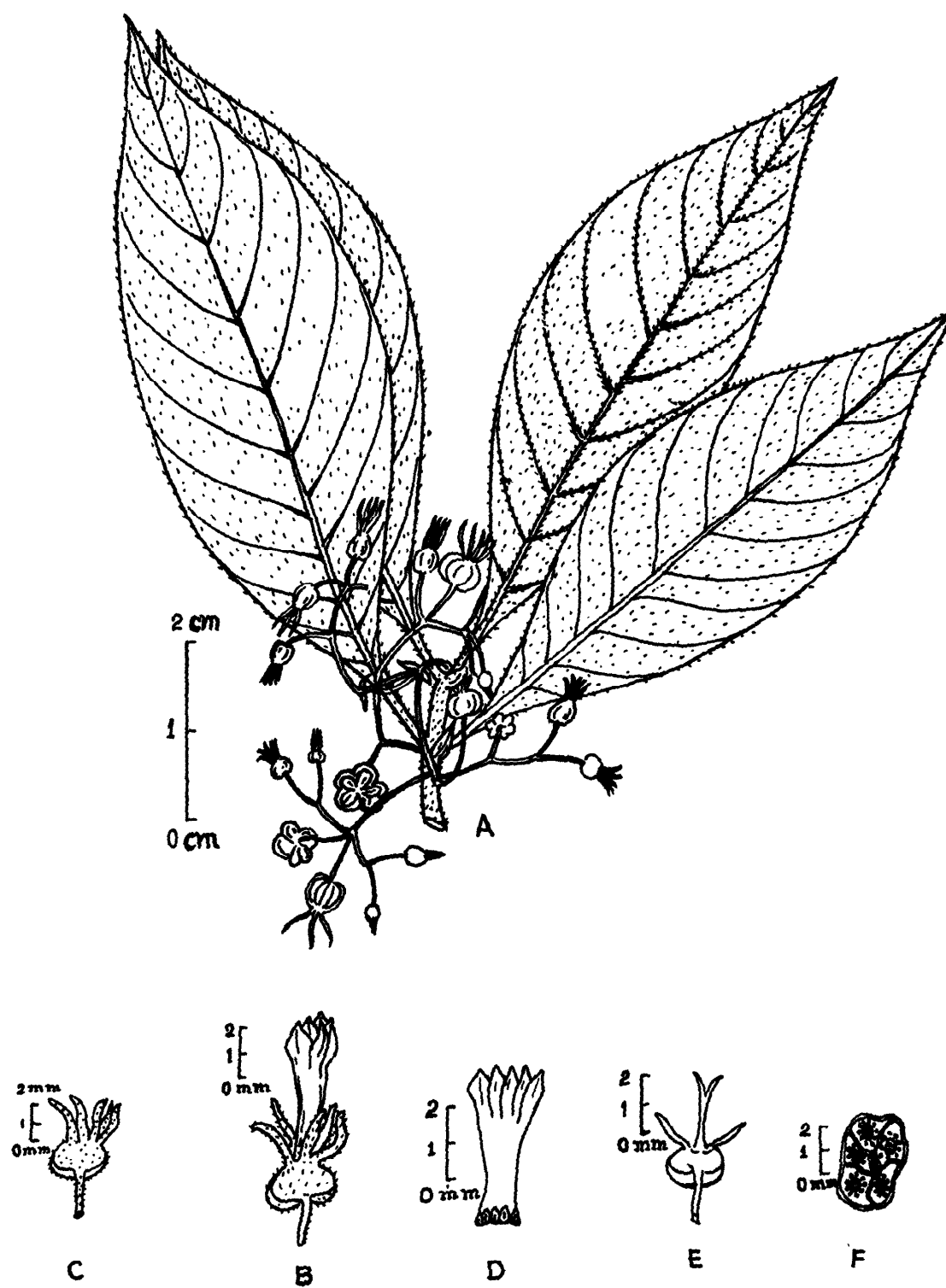
The stomata are prevalent on adaxial surface of leaves and are paracytic having the subsidiary cells, sinuous in their anticlinal walls or straight or very little sinuous. The stomata are of equal numbers on both surfaces of calyx lobes; stomata and raphides in stipules are like those of respective leaves.

The vascular traces arising from the base of thalamus extend one to each corolla lobe while other traces run each in between the lobes supplying the stamens.

1. *Mycetia acuminata* (Wight) O. Kuntze, Rev. Gen. Pl. 289. 1891; Gamble, Fl.

KEY TO THE SPECIES

- | | |
|---|---|
| 1a. Ovary 4-5-6-loculed | <i>M. acuminata</i> 1 |
| 1b. Ovary 2-loculed | |
| 2a. Stipules large, foliaceous; flowers in rounded corymbs at the ends of horizontal cyme branches | |
| 3a. Bracts subtending the inflorescence axis linear, leaves and inflorescence pubescent; panicles shorter than leaves | <i>M. stipulata</i> subsp. <i>stipulata</i> 9. |
| 3b. Bracts subtending the inflorescence axis ovate, leaves and inflorescence glabrous, panicles longer than leaves | <i>M. stipulata</i> subsp. <i>macrostachya</i> 9a |
| 2b. Stipules not large foliaceous, flowers not in rounded corymbs at the ends of horizontal cyme branches | |
| 4a. Inflorescence cauline or terminal | |
| 5a. Inflorescence cauline (rarely terminal). | |
| 6a. Leaves broadly elliptic, glabrous | <i>M. mukerjiana</i> 5 |
| 6b. Leaves oblong-elliptic, glabrescent or glabrous | <i>M. radiculiflora</i> 7. |
| 5b. Inflorescence terminal corymbose cyme, leaves lanceolate, corolla 14-16.5 mm long, rusty pubescent outside | <i>M. rodgeri</i> 8 |
| 4b. Inflorescence axillary or terminal | |
| 7a. Leaves broadly linear, glabrous | <i>M. listeri</i> 3. |
| 7b. Leaves oblong-lanceolate, to obovate, glabrescent or pubescent | |
| 8a. Calyx lobes linear-lanceolate, longer than the berry | <i>M. nepalensis</i> 6. |
| 8b. Calyx lobes ovate or triangular, mostly shorter than the berry | |
| 9a. Stipules broad, panicle terminal, hardly longer than the petiole | <i>M. javanica</i> 2 |
| 9b. Stipules small, oblong-lanceolate, inflorescence divaricate | <i>M. longifolia</i> 4 |



Mycetia acuminata (Wight) O. Kuntze.

A. Habit. B. Flower. C. Calyx. D. Corolla with stamens. E. Floral parts. F. Placentatim.

Pres. Madras 612 (rep. ed. 431) 1921; Gandhi in Saldanha, Fl. Hassan dist. 582. 1976. *Lawia acuminata* Wight in Cal. Journ. Nat. Hist. 7 : 15. 1846. & Icon. 3(4) : 5. t. 1070. 1846 (Type : Curtullum, Aug. 1835, R. Wight s.n. K!, MH!, LE!). *Adenosacme lawii* (Wight) Hook.f. Fl. Brit. Ind. 3 : 96. 1880.

Shrubs bushy, 2-2.5 m high; stem pubescent at the apical parts. **Leaves** 27-28 × 10-12 cm, elliptic-lanceolate to oblanceolate, chartaceous, glabrous above, puberulous beneath, shortly acuminate, attenuated to the base; lateral nerves 10-12 pair; petioles 2.5-4 cm long, puberulous; stipules interpetiolar, 1.5-6 × 0.5-1.5 cm, oblong-lanceolate, chartaceous, puberulous. **Inflorescence** 4-9.5 cm long, axillary or terminal, trichotomous corymbose cymes; bracts 0.3-0.5 cm long, linear, puberulous. **Flowers** 5-8 mm long, 5-(4-6) merous, puberulous; pedicel 3-4 mm long, puberulous. **Hypanthium** turbinate. **Calyx** persistent, ± 4 × 3.5 mm, cupular; lobes 5, linear, puberulous. **Corolla** yellow, tube salver-shaped, 4-6 mm long, 1-2 mm across, pubescent; lobes 5, short. **Stamens** 5, at the base of the tube, included; filaments very short; anthers 1-2 mm long. **Ovary** 3.0 - 3.5 × 2-3.5 mm, 5-(4-6) locular, with many ovules on median axile placentas; style short, glabrous; stigma 2 fid, 2.5 mm long. **Berry** 5-8 × 7-9 mm, fleshy, 5-(4-6) lobed. **Seeds** many, black, minute, laterally compressed, without wing; testa reticulate.

Flowers : July-August; **Fruits** : August-December.

Distribution : India : Tamil Nadu, Kerala and Karnataka. Endemic.

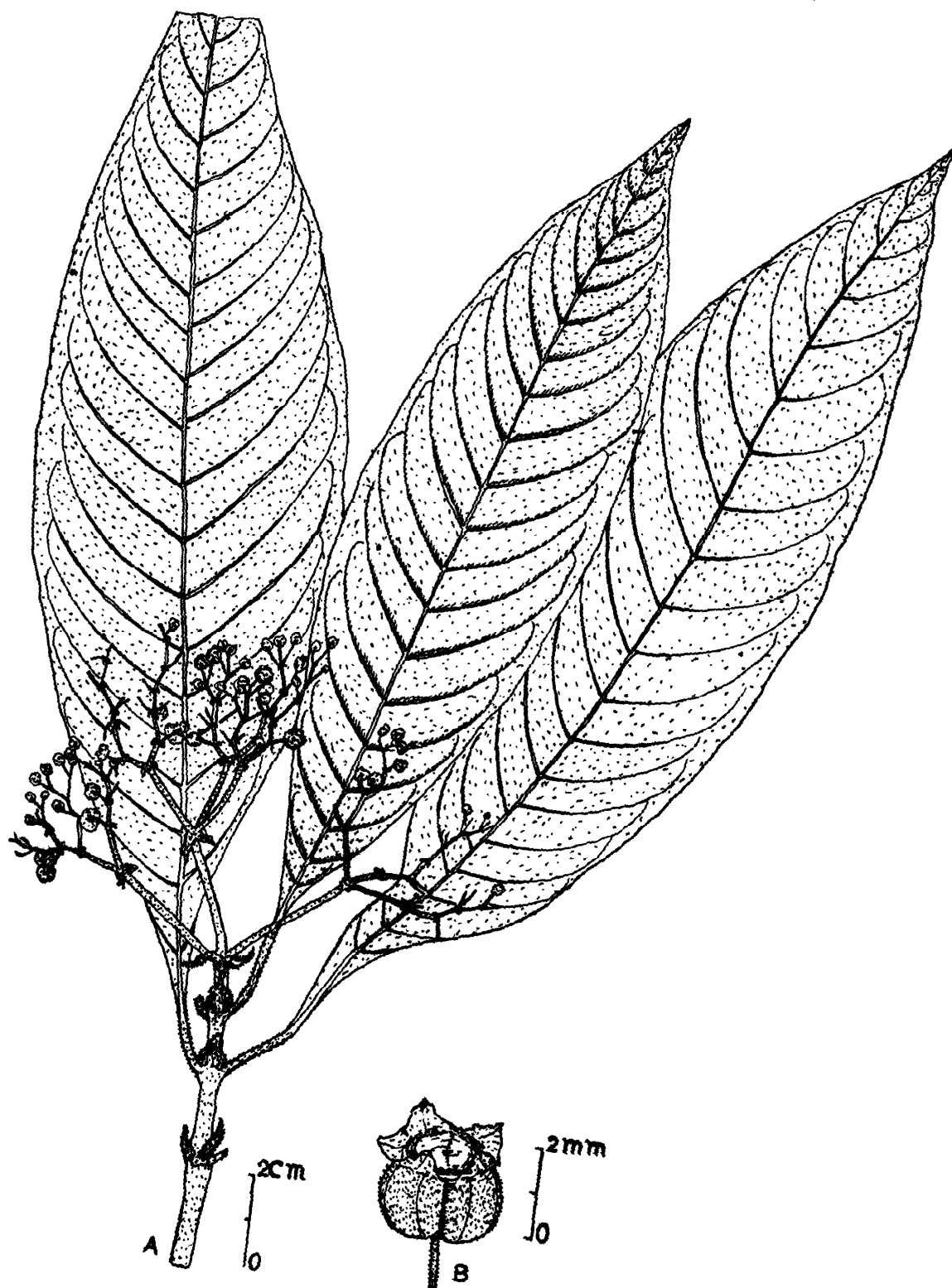
Ecology : In dense jungles in hill slopes.

Note : Stomata - 30 mμ - 78 mμ × 6 mμ - 24 mμ:

Exsiccata studied: Tamil Nadu : Courtallum, Wight s.n. (MH); Peninsular India, Wight s.n. (CAL); Attāpadi valley, C.E. Fischer 2485 (MH); Nilgiri, T. Thomson s.n. (CAL, MH); Devala Ghat, J. S. Gamble 15650 (MH). Kerala : Travancore, Murchiston Estate, J. S. Gamble s.n. (MH); Silent valley, E. Vajravelu 26055 & 33228 (MH). Karnataka : Chikmagalur dist., J. L. Ellis 29515 (MH); C.J. Saldanha 9736 & 5358 (CAL); Agumbe, R. S. Raghavan 69877 & 69529 (CAL, MH).

2. *M. javanica* (Bl.) Reinw. ex Korth. Netherl. Kruid. 118. 1841; Bakh. f. in Backer & Bakh. f. Fl. Java 2 : 305. 1965. *Bertiera javanica* Bl. Bijdr. 987. 1826 (Type : Penang, 1822, Wall. Cat. 6282 K!, CAL!, L, LE!), DC. Prodr. 4 : 392. 1830. *Wendlandia malayana* G. Don, Gen. Syst. 3 : 590. 1834. *Adenosacme javanica* Wall. (Cat. 6282. 1832, nom. nud.) ex Ridley, Fl. Mal. 2 : 63. 1923; Hook. f. Fl. Brit. Ind. 3 : 95. 1880. in syn. *M. malayana* (G. Don) Craib in Kew Bull. 1914 : 29. 1914, in obs. *A. malayana* Wall. ex Ridley, Fl. Mal. 2 : 63. 1923 (Type : Penang, 1822, Wall. Cat. 6282 K!, CAL!, LE! L).

Undershrub about 60 cm high; bark white. **Leaves** anisophyllous or not, 20-30 × 5-12 cm, elliptic-lanceolate or obovate, acute or acuminate at apex, narrowed at base, slightly decurrent along petiole, membranous, sparsely pubescent above, sparsely rather densely pubescent beneath, more so on the nerves; midrib sunken above; lateral nerves 12-20 pair; petiole 3-7 cm long; stipules 6-8 × 4 mm, ovate-triangular, acute or acuminate, sparsely short hairy outside, glabrous inside. **Inflorescence** terminal, panicle hardly longer than the petiole, rather shortly peduncled to glabrescent, branches slender; bracts along margin with stalked capitate or ovoid glands. **Flowers** yellow,



Mycetia javanica (Bil.) Reinw. ex Korth.
A. Habit. B. Fruit.

with longer slender pedicels. *Hypanthium* globose. *Calyx* persistent, tube globose, pubescent; lobes triangular, short, marginally with stalked ovoid or capitate glands. *Corolla* tube 10-15 mm long, short hairy outside; lobes ± 2 mm, oblong. *Stamens* inserted near the base of corolla tube; anthers 1.5-2 mm; disc small. *Ovary* 2 loculed, many ovuled on median axile placenta; style ± 4 mm long, glabrous. *Berry* white, depressed-globose, 4-6 mm across, pericarp thick, spongy. *Seeds* many, black, minute.

Flowering and fruiting : June-December.

Distribution : Andaman and Nicobar Islands to Malay Peninsula.

Exsiccata studied : S. Nicobars, shompen village, N. P. Balakrishnan 3964 & 3026/1 (CAL, ANC).

Malay : Sumatra, H. O. Forbes 2239 & 510a (CAL).

3. *M. listeri* Deb in Blumea 14(1) : 241. f. 1. 1966 (Type : Arunachal, Daphla hills, 1874, J. L. Lister s.n. CAL!). *Adenosacme listeri* King, non Burkill in Rec. Bot. Surv. Ind. 10 : 298. 1925. nom. nud.

Shrubs small, 2 m, branching; stem terete, brittle, swollen at nodes, pubescent when young. *Leaves* stipulate, opposite, unequal in pair, 9-28 $\times$ 0.7-3.5 cm with some intermediate ones diminutive in form, broadly linear, membranous, long acuminate, attenuated at base; petiole short, up to 8 mm long, puberulous; lamina slightly falcate, unequal at base; lateral nerves 12-20 pair, alternate, arching towards the apex; midrib, veins, and veinlets puberulous beneath, scarcely so above; stipules interpetiolar, foliaceous, ovate-elliptic or lanceolate, obtuse, ± 0.8 -1.5 cm long, puberulous, ciliate or glandular at margin. *Inflorescence* axillary and terminal, shorter than the leaf, di- and trichotomously branching panicle of cymes, up

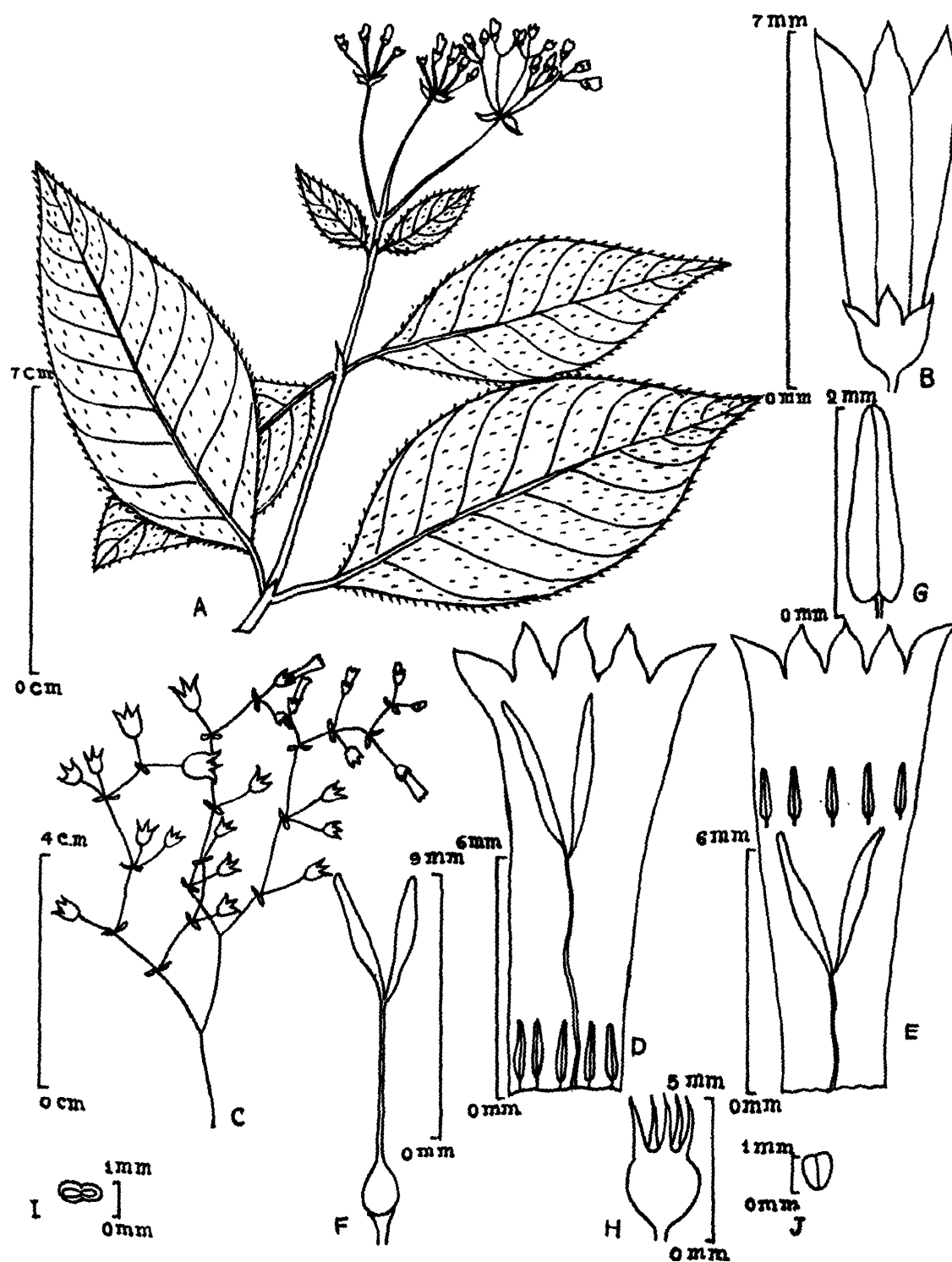
to 15 cm across; peduncle erect, up to 3.5 cm long; bracts deciduous, small, varying in shape, sometimes glandular and forming a rim like structure. *Flowers* pedicellate, about 8 mm long and 2 mm across; pedicel slender ± 3 -8 mm long. *Calyx* about 4.5-5 mm, long; lobes 5, persistent, chartaceous, about 3 mm long, with scattered oblong glands at the margin; tube hemispheric, ± 2 mm across. *Corolla* white, tubular, $\pm 6 \times 2$ mm; lobes 5, densely pubescent within about $\frac{1}{3}$ the length in the middle sector. *Stamens* 5, at the base of corolla lobes; filaments very short, ± 0.3 mm, anthers ± 2.25 mm, linear-oblong, 2-lobed. *Ovary* hemispherical, 2 celled with many ovules in axile placentation; stigma 2-lobed, puberulous; style 1, stigma and style ± 7.5 mm long. *Fruit* a berry, ovoid, ± 3 -4 mm in diam., 2-chambered. *Seeds* many, minute, angled, ± 0.3 mm.

Flowering and fruiting : January-June.

Distribution : Arunachal Pradesh, 250-1200 m. alt. Endemic.

Exsiccata studied : Arunachal : Shenguh, 1213 m. Daffla hills, J. L. Lister s.n. (CAL) & Badul Khan 55 a-d (CAL); Subansiri, Kimin, G. Panigrahi 19395 (ASSAM).

4. *M. longifolia* (Wall.) O Kuntze, Rev. Gen. Pl. 1 : 289. 1891; Schumann in Engler & Prantl, Pflanzenfam. 4(4) : 66. 1891; Yamazaki in Fl. E. Himal. 312. 1966; Hara in Hara & Williams, Enum. Fl. Pl. Nepal 205. 1979. *Rondeletia longifolia* Wall. in Roxb. Fl. Ind. 2 : 137. 1824; excl. Pl. Nepal. (Type : Sylhet, F. de Silva s.n. ex Wall. Cat. 6280! (K-W!, CAL!, LEI)). *Adenosacme longifolia* (Wall.) Hook. f. Fl. Brit. Ind. 3 : 95. 1880, p.p.; Kurz, For. Fl. Brit. Burma 2 : 160. 1877; Kanjilal et al. Fl. Assam 3 : 49. 1939. *Wendlandia longifolia* (Wall.) DC. Prodr. 4 : 412. 1830.



Mycetia longifolia (Wall.) O. Kuntze

A. Habit. B. Flower. C. Inflorescence. D. Corolla with stamens and long style. E. Corolla with stamens and short style. F. Gynoecium. G. A stamen. H. Fruit. I. Ovary-l.s. J. Seed.

Shrubs 1.85-2 m tall, bushy or sparingly branched; branches terete, or somewhat tetragonal, hollow, pithy, often with yellowish spongy bark covered with a soft shining white soft epidermis, gradually separating and at length falling off, leaving the woody part naked, tender branches alternately compressed, villous. **Leaves** usually anisophyllous, 4.5-34 × 2.5-13.5 cm, elliptic, oblong, elliptic-lanceolate to oblanceolate, tapering to a very narrowed base, slightly decurrent along the petiole, acute or acuminate at apex, chartaceous, sparsely covered with translucent hairs above, sparsely to rather densely villous, pubescent or scabridulous underneath, more so on the nerves; midrib sunken or prominent above; lateral nerves 12-17 pair, subopposite, oblique, parallel, with capillary reticulate veins; petioles 2-5 cm long, slender, glabrescent to tomentose; raphides present at the tip and base of matured leaf; stipules 0.5-1 × 0.4-0.5 cm, interpetiolar, withering, erect, ovate-oblong, lanceolate or triangular, acute or acuminate, often bidentate, with stalked ovoid or capitate glands at margin, membranous, sparsely short-hairy outside, glabrous inside. **Inflorescence** 20-35 cm long, terminal, or subterminal, sometimes axillary panicle, trichotomous, corymbose cymes, lax or compact, lowest flowers sometimes opposite, uppermost sub-umbelliform, glabrescent to tomentose; peduncle subtended at the base by 1 or 2 pair of floral bracts 2-4.5 cm long; bracts filiform, divaricate, supported at each division by a pair of fleshy, opposite, lanceolate, villous bracts, entire or 3 lobed at base, with yellow, subulate, fleshy glands at margin, those at the ends of the ramification very small, deeply divided into glandular laciniae, sometimes a minute pair of opposite bracts between their bases; bracteoles 0.5-1 cm long, ovate, glabrescent to tomentose, with stalked ovoid, oblong, campanulate or capitate glands. **Flowers** yellow or rarely

white, 0.8-1.8 cm long, small, heterostylous, pubescent; pedicels 0.3-0.5 cm long, slender, pubescent. **Hypanthium** subturbinate, cupular. **Calyx** persistent, 5-8 mm long, pubescent or glabrous; lobes ovate-triangular, erect or reflexed, shorter or longer than berries, 3 nerved, glabrous or pubescent, with stalked, ovoid, oblong, capitate or campanulate glands at margin. **Corolla** 0.5-1.5 cm long, salver shaped, sometimes swollen at the base and throat, glabrous outside, glabrescent to villous within. **Stamens** 5, epipetalous, included usually at the throat sometimes at the base or middle of the corolla tube; filament less than 1 mm long; anther 1-2 mm long; longitudinally dehiscent; disc small, sometimes protruding beyond the calyx limb. **Ovary** 3-5 × 0.2-0.3 cm, 2 (rarely 3) locular, many ovuled on peltate placenta; stigma bifid, 2-3 mm long, glabrous; style 2-4 mm or 4-6 mm, glabrous. **Berry** white, 0.4-0.7 × 0.2-0.5 cm, depressed-globose or globose, crowned with persistent calyx lobes; pericarp thick, spongy. **Seeds** numerous, minute, black, pyriform, without wing, testa dotted; embryo minute, with fleshy albumen.

Flowering : May-December.

Fruiting : July-February (March).

Ecology : Grows on highly moist regions upto 1650 m, in alt. frequent in southern and eastern slopes.

Distribution : India : Meghalaya to Arunachal, Nagaland, Manipur, Mizoram; Bangladesh and Burma.

Exsiccata studied : Meghalaya : Khasi hills, Griffith s.n. (CAL) & Kurz 240 & 327 (CAL), G. King s.n. (DD), J. D. Hooker & T. Thomson s.n. (CAL), Badul Khan s.n. (CAL), G. Mann 337 (CAL); H. K. Nandi s.n. (CAL); Cherrapunji, Gallatly 558 (CAL) & M. Collett s.n. (CAL); Jarain, N. P. Balakrishnan 46175 (ASSAM); Syndai, G. A. Gammie 464 (CAL), Nongklo, C. B.

Clarke 40174A, U. N. Kanjilal 2768 (CAL) & 6332 (DD), N. E. Parry 13 (CAL); Mukorziom forest, R. Sharma 9439 (ASSAM). Umsaw, R. Sharma 20039 (ASSAM); Shillong, K. Biswas s.n. (CAL) & N. L. Bor 16243 (DD) Assam : North Cachar : Haflong, W. G. Craib 198 (CAL); Lakhimpur dist., Upper Dehang, C. B. Clarke 530 (CAL); Assam, Kurz s.n. (CAL), King's collector s.n. (CAL) & Jirang, A. C. Chatterjee 377 (CAL); Jeypore, G. K. Deka 16966 (ASSAM); Assam, G. Mann 240 (DD), Jenkins s.n. (CAL), Masters s.n. (CAL). Manipur : Irang & Barak rivers' confluence, G. Watt 6907 & 1907 (BSIS). Mizoram : Mizo hills, J. C. Prazer 50 (CAL); Sakaclui, J. E. Leshi 70 (CAL); Aizaul Protected Forest, D. B. Deb 30522 (ASSAM). Nagaland, Kohima, D. Prain (CAL); Pelekema, N. L. Bor 6456 (DD); Arunachal Pradesh : Abor hills, Rotung, I. H. Burkill 37594 (CAL); Daffla hills, Badul Khan 69 (CAL); Rengging, I. H. Burkill 38162 (CAL); Zero, Panigrahi 11474 (CAL). Tirap dist. Rusa, Panigrahi 17034 (ASSAM); Subansiri dist., Amji, G. V. Subba Rao 24855 & 24958 (CAL); Kameng dist., Bhallukpong, J. Joseph 39801 (ASSAM). Sikkim : Punkhare, T. Anderson 317 (CAL); Sikkim, G. King s.n. (CAL), S. Kurz s.n. (CAL); Gangtok, Dr. Bor's collector 185 (DD); Sureil, C. W. Cousins 43 (CAL). Western Himalaya : Almorah, A. E. Osmaston 1529 (DD); Kafkote, Inayat 24492 (DD); Kumaon, Khar Bagar, Bis Ram 2138 (DD); West Bengal : Darjeeling, C. B. Clarke 12081 (CAL); Sukna, N. C. Sen Gupta 374k (DD); Lebong, C. B. Clarke s.n. (CAL); Bangladesh : Griffith s.n. (Kew Distrib. no. 2846 DD); Sylhet, Lowachera, G. K. Deka 18107 (ASSAM). Burma : Pegu, S. Kurz 3070 (CAL); Tenasserim, Mooljet, Gallatly 261 (CAL); Maymyo, J. H. Lessi 5497 (CAL); Kumalat, S. N. Toppin 4139 (CAL); Sankai Pai, S. N. Toppin 6088 (CAL); Sinan, S. N. Toppin 4411 (CAL); Myitkyina, Naw Mu Pa 17416 (DD); Thaton dist., Gathay

Laung, Clin 47247 (DD).

5. *M. mukerjiana* Deb et Dutta in Ind. For. 91(5) : 272 t.l. 1965 & in Sci. Cult. 33 : 60. 1967.

Small shrubs or undershrubs up to 60 cm high, semi-deciduous; stem terete, glabrous, glossy with spongy bark and considerable pith, sometimes glandular pubescent in tender parts. *Leaves* opposite, anisophyllous, 10-27.5 × 2.5-9 cm, elliptic or lanceolate, membranous, glabrous, acuminate at the apex, attenuated at base, sometimes one leaf of the opposite pair diminutive and variable in form; lateral nerves 10-20 pair, alternate, subparallel, arching at the apex and forming a submarginal vein; petiole 2-3 cm, stipules interpetiolar, oblong, obtuse, glabrous, 8-10 × 7-8 mm. *Inflorescence* on leafless nodes, lower down the branch, pedunculate, congested dichasial cyme or divaricate; peduncle up to 3 cm long, having 1-3 sterile uniseriate involucrel whorls of bracts connate at the base, branches usually short; bracts small, ovate, lanceolate, up to 6 mm long, scabrous. *Flowers* 1.0-1.8 cm long, pedicellate, heterostylous; pedicels up to 4 mm long, stout. *Calyx* almost hemispheric, glabrescent or downy, part of the tube protruding above the ovary; lobes 5, persistent, chartaceous, 8-11 × 2-2.5 mm, lanceolate, acute to acuminate, sometimes dissimilar, distinctly veined. Corolla salver form, yellow or whitish below, valvate in bud, glabrescent or scarcely hispidulous at the back, villous within up to throat or to a lesser extent, tube 8-15 mm long; lobes thick, short, orbicular-ovate, acute, *Stamens* 5, anthers situated at the throat (in short styled flowers) or at the base (in long styled ones) of the corolla tube, about 2.5-3 mm long, oblong, dorsifixed, introrse, obtuse at the apex, 2 lobed, 4 loculed, longitudinally dehiscent; pollen grains finely reticulate, 3 zonicolporate, triangular in polar

view, spherical in equatorial view, spheroidal in shape, of two sizes, those from the short styled flowers larger (29-31 m μ) than those from the long styled ones (23-24 m μ) filament villous, about 2 mm long, flattened in short styled flowers. *Ovary* 1.5-2 mm long, hemispheric, glabrescent or downy, 2 chambered; ovules very numerous on axile, more or less fleshy placentas; stigma 2 lobed, about 2.5 mm long, lobes diverging, narrowly elliptic, with papillate receptive surface; style solitary, villous, longer ones about 8 mm long, shorter ones about 2.5 mm long. *Fruit* a small hemispheric berry, 2 chambered. *Seeds* many, minute, angled, smaller than 0.5 mm across.

Ecology : Grows on calcareous mud mostly in shaded and moist situation; very scattered in occurrence and rare in distribution.

Distribution : Assam and Mizoram. Endemic.

Flowering and fruiting : June-July.

Exsiccata studied : Assam : Lakhimpur, Makum hills, G. K. Deka 16961 (Type : Holo.-CAL, Iso.-Assam). Mizoram : Lungleh, Zodlong, R. M. Dutta 33539 (CAL, ASSAM); Sairep, R. M. Dutta 33589 (CAL, ASSAM),

6. *M. nepalensis* Hara in Journ. Jap. Bot. 52 : 198. 1977 & in Hara *et al.* Enum. Fl. Pl. Nep. 2 : 205. 1979 (Type : Nepal, Chandragiri, July 1821, N. Wallich 6281 K-W!, CAL!). *Rondeletia longifolia* Wall. in Roxb. Fl. Ind. 2 : 137. 1824, Quoad pl. ex Nepal; D. Don, Prodr. Fl. Nepal. 138. 1825. *Andenosacme nepalensis* Wall. Cat. 6281, 1832, *nom. nud.* *A. longifolia* Hook.f. Fl. Brit. Ind. 3 : 95. 1888,

Shrubs 1.8-2.5 m tall, stem with corky bark, apical part thinly pubescent. *Leaves* 12.50 $\times$ 5.50-8 cm, ovate, abruptly atten-

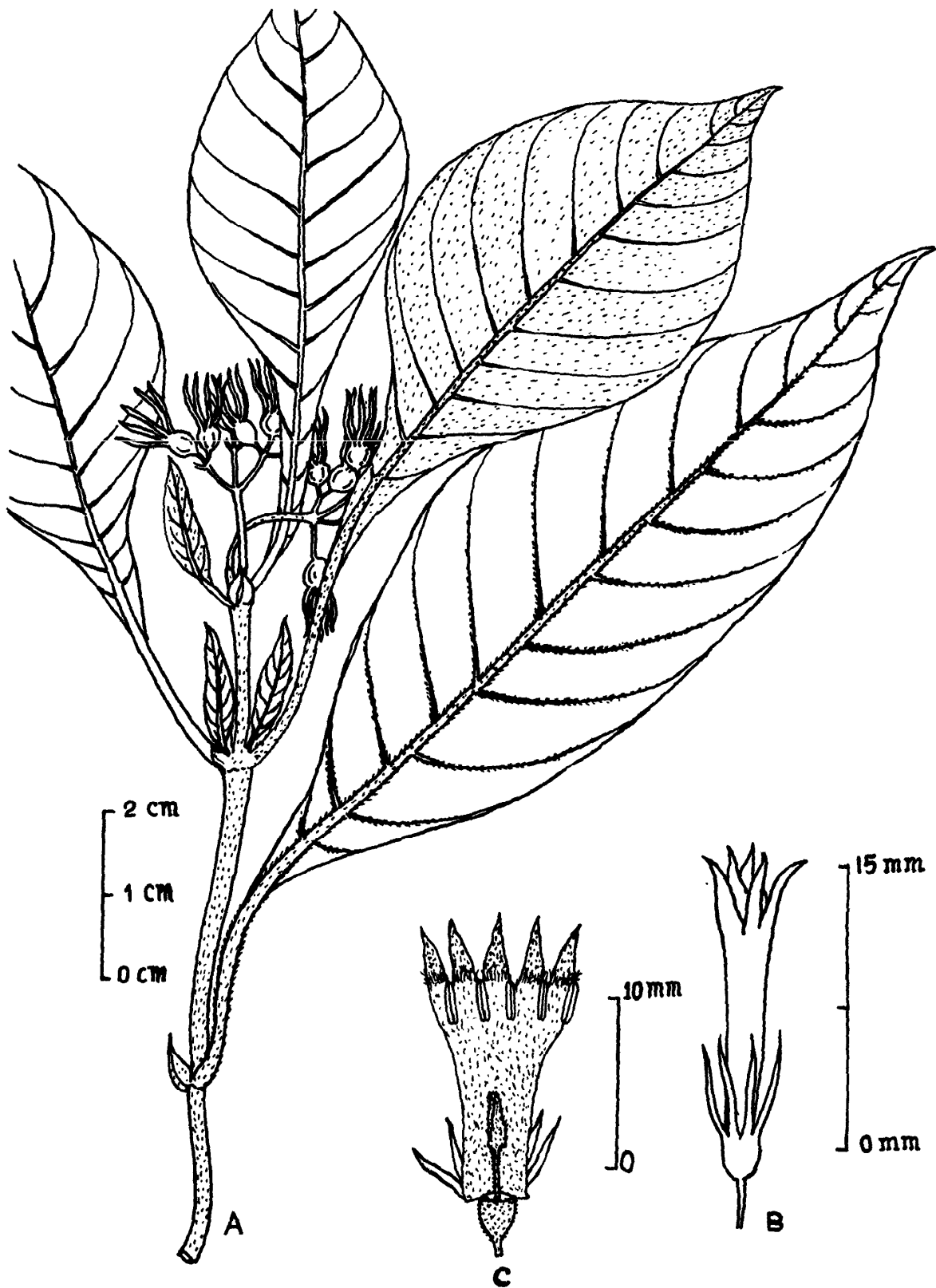
uated to the petiole, acuminate, puberulous above, tomentose beneath; petiole 2.0-4.50 cm long, puberulous. Inflorescence dichasial cyme, glabrescent; bract 5-10 mm long, scarious, lanceolate to triangular. *Flowers* small, yellow, pubescent; pedicel 3-5 mm long. *Calyx lobes* 5, 8-10 mm long, linear, glabrescent. *Corolla* tube with expanded limbs, glabrescent; lobes 5, glabrescent. *Stamens* 5, included; filament very short; anther 1-2 mm long. *Ovary* 2-3 mm long, globose, 2 locular, ovules many on peltate placenta; style 2-4 mm long, simple, slender; stigma 2-3 mm long, bifid, linear, glabrous. *Fruit* dry or semifleshy.

Flowering and fruiting : June-January.

Distribution : Kumaon to Arunachal, Meghalaya, Assam and Mizoram.

Exsiccata studied : Nepal, N. Wallich 6281 (CAL); Uttar Pradesh : Kumaon, H. Collett 101 (CAL); Sarju valley, J. F. Duthie 2991 (CAL), 62990; Almora, Inayat 24492 (DD) & A. E. Osmaston 1529 (DD). Sikkim, G. King 203909 & 203913 (CAL). Assam, Masters s.n. (CAL). Cachar, Sonai, J. E. Leshi 70 (CAL); Arunachal Pradesh : Dapla hills, I. H. Burkill 203956; Dikrug valley, J. L. Lister 277a (CAL); Lohit valley, G. V. Subba Rao 24, 958 & 53977 (ASSAM). Meghalaya : Khasi hills, J. D. Hooker & T. Thomson s.n. (CAL). Mizoram, Aizawl, J. C. Prazer 1890 (CAL) & N. E. Parry 13 (CAL).

7. *M. radiculiflora* (C. B. Clarke) Airy Shaw in Kew Bull. 19(3) : 509. 1965. *Silvianthus radiculiflorus* C. B. Clarke in Journ. Linn. Soc. Bot. 25 : 32. 1889 (Type : Nagaland, Kohima, 1800 m, 7.11.1885, C. B. Clarke 41805 K! selected as the lectotype; Neechugard, 150 m, 17.10.1885, C. B. Clarke 40847 K! para type), Burkill in Rec. Bot. Surv. Ind. 10 : 51, 78, 79, 297. (1924) 1925.



Mycetia nepalensis Hara
A. Habit. B. flower C. Flower split open



Mycetia radiciflora (C.B. Clarke) Airy Shaw
A. Habit. B. Fruit.

Undershrubs subherbaceous, weak; stem long, unbranched or scarcely branched, apparently decumbent, sinuate-ascending up to 65 cm long, 2.5 mm thick, lower naked, towards apex bearing few leaves in pair, bark notably straw-yellow, glabrous. *Leaves* 10-16 × 2-5.5 cm, narrowly oblong-elliptic, cuneate at base, decurrent to petiole, gradually narrowly acuminate at apex, membranous, on drying upper darkbrown green, lower pale or subglaucous, glabrous, sparsely papillose-setulose in young state; nerves slender, upper with narrow longitudinal grooves, lower scarcely prominent; lateral nerves 12-15, subopposite, slender, ascending, secondary ones very slender, irregularly transverse; petiole 0.5-3.5 cm long, slender, glabrous or sometimes minutely papillose-puberulous; stipules rotund, 3-8 mm in diam. very frequently reflexed, often revolute at margin, dark brown-green. *Inflorescence* very frequently long, situated below leaves or sometimes at the apex of the stem, long distant. *Flowers* many or sometimes few, white or yellow, 1-4 cm in diam., apparently dichotomous cymes; peduncle 0.5-1 cm long, glabrous; bracts many, membranous, elliptic, 5-6 mm long, unequally trifid in flowers, lower sometime small and connate; bracteoles linear-oblique, 5-6 × 1 mm; pedicel 2-3 mm long. *Hypanthium* turbinate. *Calyx* 7-8 mm long, 4 mm broad, glabrous; segments persistent, 5-(6), elliptic, 5-6 × 2-3 mm, acute, acuminate, membranous, nerved. *Corolla* cylindrical, slightly enlarged below and above, 1.3 cm long, 2-3 mm in diam., glabrous above, pubescent within; lobes 5; sometimes unequal, 2 × 1.5-2.5 mm, acute or acuminate. *Stamens* 5; filaments inserted at the base of the tube, subpubescent; anther dorsifixed, linear, 2 mm long. Disc annular, 1 mm broad. Style about 1 mm long, branches long, erect, about 3 mm long. *Fruit* white, hemispheric, 3 mm long, 4 mm broad. *Seeds* black, many,

minute, sublenticular, granular

Flowering and fruiting : July-January.

Distribution : Nagaland and Arunachal Pradesh, near river bank.

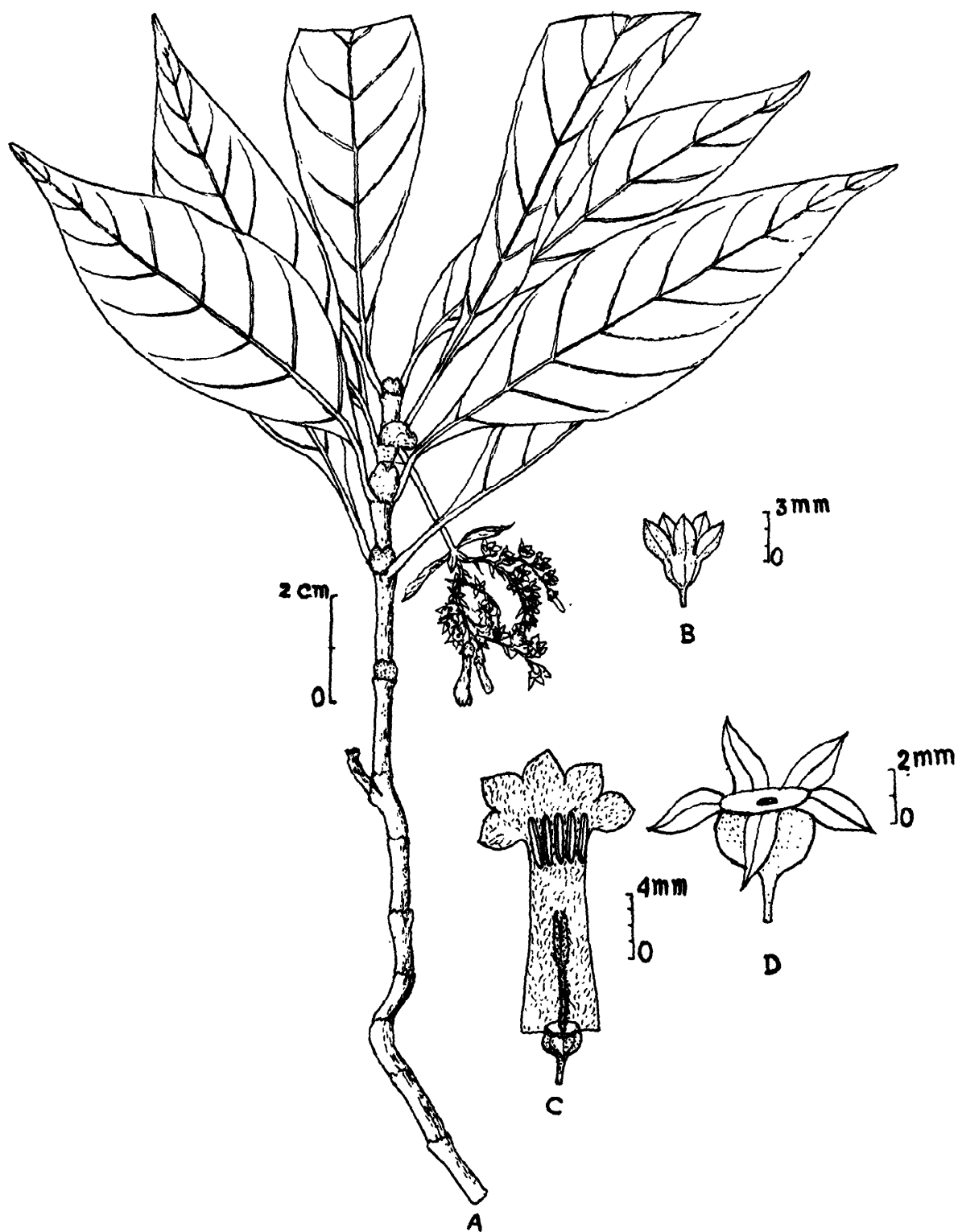
Exsiccata studied : Types already cited. Pulebudze, 1800 m, *N. L. Bor* 6331 (K). Arunachal Pradesh : Abor hills, 245 m, *Burkill* 37616 (K).

8. *M. rodgeri* Deb et Mondal, spec. nov.

Affinis *M. radiciflorae* sed foliis lanceolatis, inflorescentia terminali, corolla longiore, pubescenti inter alia differt: a *M. mukerjiana* sed foliis lanceolatis, nervis lateralibus in numero, corolla longiore pubescenti inter alia, differt.

Allied to *M. radiciflora* and *M. mukerjiana* differing from the former in terminal inflorescence, lanceolate leaves, shorter calyx lobes, longer corolla, and from the latter in lanceolate leaves, lesser number of lateral nerves and longer corolla amongst others.

Undershrubs herbaceous, stem with yellowish corky bark, puberulous. *Leaves* 7-17 × 3-3.5 cm, lanceolate, acuminate at apex, tapering at base, decurrent to the petiole, sparsely pubescent; lateral nerves 8-11 pair, petiole 0.7-2.5 cm long, pubescent; stipules 3-10 mm long, broadly ovate, often bifid at apex, pubescent. *Inflorescence* terminal panicle of cymes, 2-2.5 cm across; peduncle 2-3 cm long; bracts in pair, broad, elongated; bracteoles solitary, sometimes at the base of the pedicel, 3 × 1 mm, lanceolate, pubescent. *Flowers* 15-18 mm long; pedicels 1.5-2 mm long, pubescent. *Hypanthium* 1.5 × 2.5 mm, sparsely puberulous. *Calyx* persistent, lobes 5, 2.75-4 × 1-1.5 mm, lanceolate, acute or acuminate, puberulous outside. *Corolla* 14-16.5 mm long, tubular, constricted at the middle, expanded at the throat, pubescent on both sides; lobes 5, 1.5-2 mm, ovate, acute. *Stamens* 5, adnate at middle of the corolla; filaments



Mycetia rodgeri Deb et Mondal, spec. nov.

A. Habit. B. Calyx. C. Flower split open. D. Fruit.

0.5 mm long; anthers dorsifixed, 3 mm long, oblong-linear, longitudinally dehiscent. *Ovary* 2 loculed with many ovules on median axile placenta; style $\pm$ 4 mm long, pubescent; stigma $\pm$ 3.5 mm long, narrowly oblong, 2 lobed, papillose. Disc annular, 0.5 mm thick, entire. *Berry* 2-loculed, *Seeds* many, minute.

Raphides present in hypanthium, calyx lobes, corolla, leaves etc.

Flowering and fruiting : July-August.

Distribution : Burma.

Type : Burma, Ruby Mines Division, Mogak, July 1910, A. Rodger 148A Holo. (left hand specimen) CAL & B. Iso. CAL.

9. *M. stipulata* (Hook. f.) O. Ktze, Rev. Gen. Pl. 1 : 289. 1891. subsp. *stipulata*.

Adenosacme stipulata Hook. f. Fl. Brit. Ind. 3 : 95. 1880 (Type : East Nepal, 600-1500 m, J. D. Hooker s.n.! K-Lecto, CAL-Iso.).

Shrubs small, lax rooting, stem striate, pubescent; bark green opaque. *Leaves* simple, opposite, decussate, 13-24 $\times$ 5.50-10.5 cm, elliptic-lanceolate, acuminate, tapering to the base, glabrous, chartaceous, rarely coriaceous, puberulous along the veins beneath, unicostate with 18-20 alternate lateral veins; petiole 2-7.50 cm long, glabrous; stipules 2-2.50 $\times$ 1-1.5 cm, interpetiolar, foliaceous, sparsely pubescent. *Inflorescence* 5.50-20.50 cm long, terminal, corymbose cyme, pubescent. *Flowers* 5.5-6.00 $\times$ 3-4 mm, puberulous or pubescent; pedicel 3-4 mm long, pubescent, bracts whorled, sessile, 10-15 $\times$ 3-4 mm, medium in size, glabrous or pubescent, linear or ovate, acute or acuminate. *Calyx* 5-5.50 $\times$ 2.5-3 mm; tube oblong, glabrous or pubescent; lobes 5, oblong. *Corolla* tube very short; lobe 5, 2.5-3 $\times$ 2 mm, slightly united at the base, shorter than the calyx cup, pubescent. *Stamens* 5, epipetalous, 1.5 mm long;

filament 0.5 mm long, glabrous; anther 1-1.5 $\times$ 1.5 mm long, ovate, apiculate, dorsifixed. *Gynoecium* bicarpellary, syncarpous; style 2 - 3.8 mm long, simple, pubescent-glabrous; stigma bifid, 0.5 mm long, pubescent; ovary 5 $\times$ 3 mm, 2 locular, in axile placentation with many ovules in each locule. Disc 5 glandular. *Berries* 2 loculed, white.

Flowering : July.

Ecology : In very wet places.

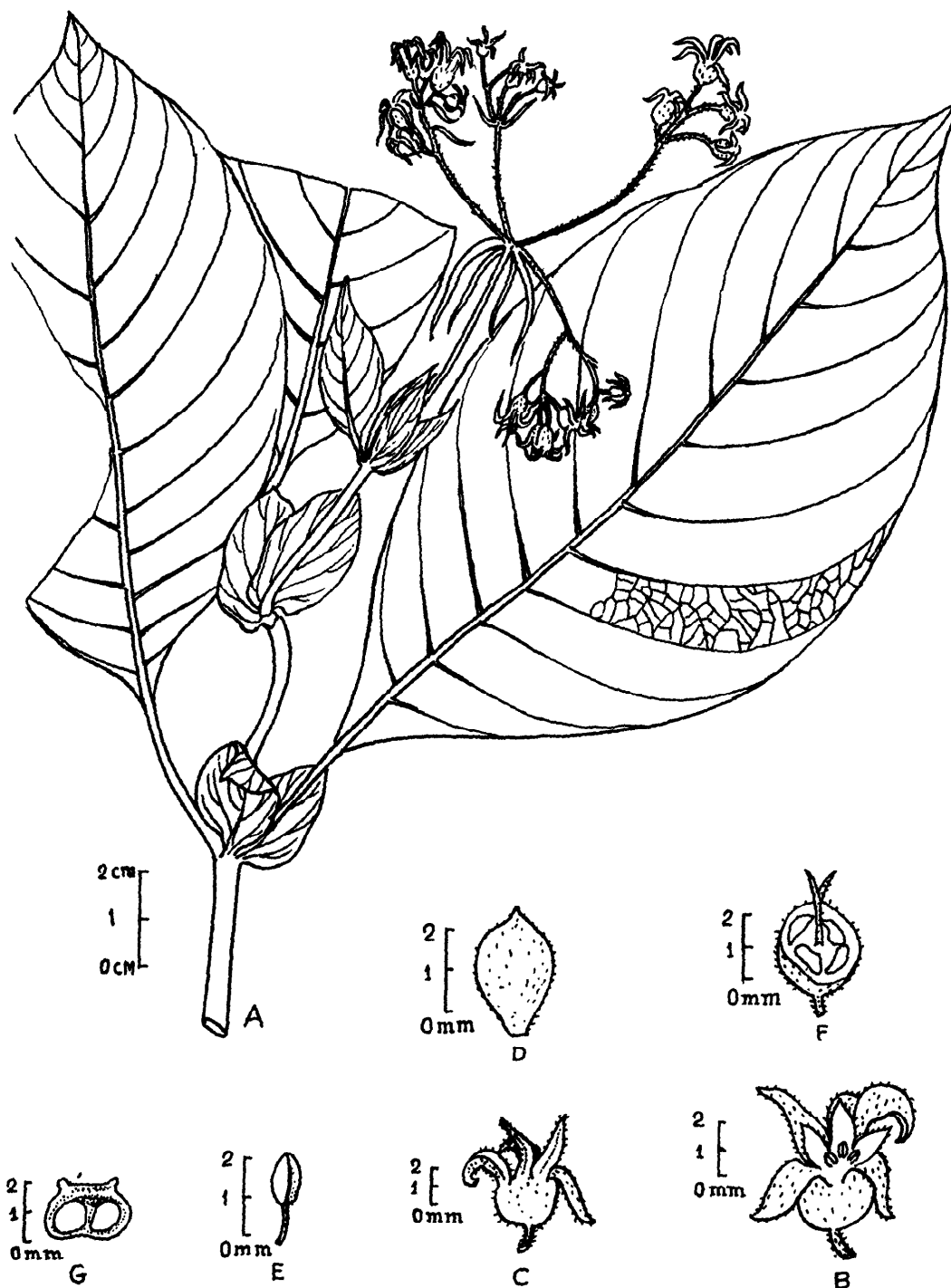
Distribution : East Nepal, Sikkim, Manipur, Arunachal Pradesh at 150-1000 m.

Exsiccata studied : Sikkim, T. Thomson s.n. (CAL), G. King 2849 (CAL) & S. Kurz s.n. (CAL). Arunachal : Abor hills : Rengging, I. H. Burkill 37321 (CAL); Egar stream, I. H. Burkill 36105 (CAL). Manipur : Barak, C. B. Clarke 42273 (CAL).

- 9a. *M. stipulata* (Hook. f.) O. Ktze. subsp. *macrostachya* (Hook. f.) Deb stat. et comb. nov.

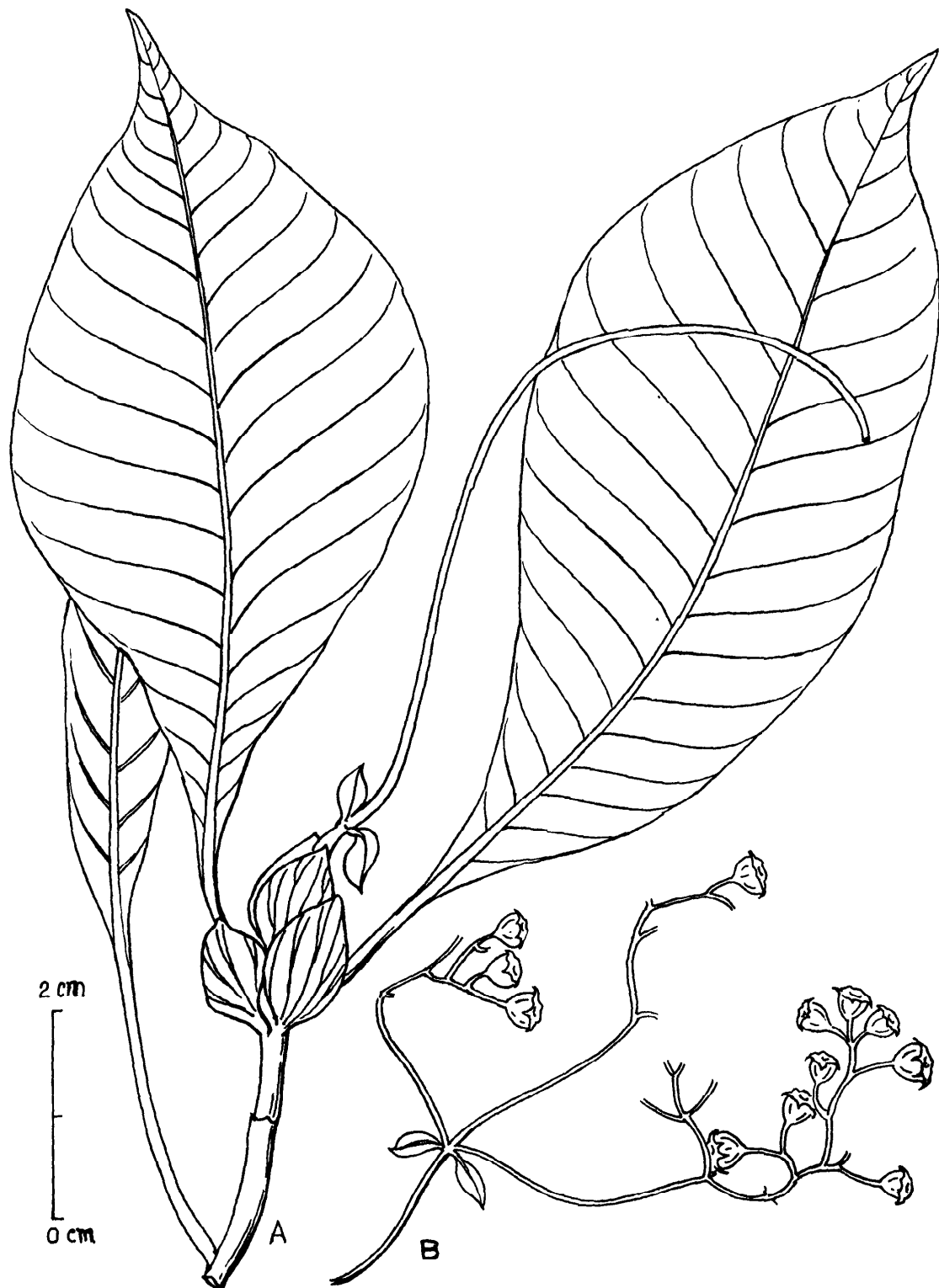
Basionym : *Adenosacme macrostachya* Hook. f. Fl. Brit. Ind. 3 : 96. 1880 (Type : Arunachal, Mishmi hills, Griffith s.n. K! — Lecto, Iso. CAL!). *Mycetia macrostachya* (Hook. f.) O. Kuntze, Rev. Gen. Pl. 1 : 289. 1891.

Shrubs or undershrubs up to 3 m. Stem striate, pubescent. *Leaves* simple, opposite, 13-24 $\times$ 5.50-10.5 cm, elliptic-lanceolate, acuminate, tapering at the base, glabrous, chartaceous, rarely coriaceous; petiole 2-7.50 cm long, glabrous; stipules 2-2.50 $\times$ 1-1.5 cm, interpetiolar, foliaceous, thinly pubescent. *Inflorescence* 5.50-20.50 cm long, terminal, corymbose cyme, pubescent. *Flowers* bracteate, medium in size, glabrous; bracts in a whorl, sessile, 10-15 $\times$ 3-4 mm, ovate, acute. *Calyx* 5, 5-5.50 $\times$ 2.5-3 mm, glabrous, lobes 5, oblong. *Corolla* tube short; lobes 5, 2.5-3 $\times$ 3 mm, shorter than the calyx cup, pubescent. *Stamens* 5, epipetalous, 1.5 mm long; filament 0.5 mm long, glabrous;



Mycetia stipulata (Hook f.) O. Ktze

A. Habit. B. Flower. C. Calyx. D. A petal. E. Stamen. F. Gynoecium-sectional view. G. Ovary-l. s.



Mycetia stipulata (Hk f.) O. Ktze subsp. *macrostachya* (Hk f.) Deb stat. et comb. nov.
A Habit B. Inflorescence

anther 1 mm long, ovate, apiculate, dorsifixed. *Ovary* 5 × 3 mm, 2 locular, many ovuled; style 2-3 mm long, glabrous; stigma bifid, 0.5 mm long, glabrous.

Flowering and fruiting : July-November.

Distribution : East Nepal, Sikkim, Arunachal.

Exsiccata studied : Arunachal : Mishmi hills, *Griffith* s.n. Kew Distrib. No. 2849 (CAL); *Masters* s.n. (CAL). Kameng dist., Bhalukpong 300 m, 11.9.1964, *J. Joseph* 39801 (CAL, ASSAM). Sikkim, *G. King* 2031 (CAL).

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