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TAXONOMIC STUDIES ON INDIAN GUTTIFERAE
II. THE GENUS *MESUA* LINN.

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ABSTRACT

The paper deals with the taxonomic treatment of *Mesua ferrea* complex in India. A high degree of polytypism is encountered in the Linnean species. In the present study 3 subspecific and 2 varietal taxa under the *Mesua ferrea* aggregate are recognized from India. A key to the subspecies and varieties is provided, together with notes on their systematics and distribution. *Mesua coromandeliana* Wt. is considered here as a part of *Mesua ferrea* complex and is, therefore, reduced to subsp. *pulchella* var. *coromandeliana* (Wt.) Maheshwari, stat. nov. The most common and widespread form of this tree is treated as *Mesua ferrea* Linn. subsp. *ferrea*.

INTRODUCTION

The genus *Mesua* was established by Carl Linné in the *Genera Plantarum* (ed. 1, 665, 1737) for a polymorphous woody tree (*Mesua ferrea* Linn.) of Ceylon. It is well described by Linné in his *Flora Zeylanica* (91, 1747) based mainly on descriptions by Rheede (Hort. Ind. Malab. 3 : 63, t. 53, 1682), Commelyn (Fl. Malab. 19, 1696), Hermann (Mus. Zeyl. 7, 1717) and Burmann (Thes. Zeyl. 28, 1737). Four more species have been described from the Indo-Malayan and Arabian region by Forskål (1775), Sprengel (1826), Planchon & Triana (1861) and T. Anderson (1874). Of these, *Mesua lepidota* T. Anders. has been transferred by Vesque (in DC. Mon. Phan. 8 : 626, 1893) to *Kayea lepidota* Pierre and *M. thwaitesii* Pl. & Tr. of Ceylon united by him with *M. ferrea* Linn. *sensu lato*. The species of this genus seem to be involved in considerable obscurity owing to lack of comparing specimens from different countries. In the Linnean species *Mesua ferrea*, the size of the leaves (5—17.5 cm long), their colour beneath (white, green, glaucous or pruinose) their form (lanceolate, linear-lanceolate, linear-oblong, ovate, elliptic-oblong; acute, acuminate or cuspidate), the diameter of the flowers (3.5—10 cm) and of the fruits (2.5—6.3 cm) are very variable. It appears that polytypism ('Rassenkreis' in the sense of Rensch, 1929) is involved in the *Mesua ferrea* complex. As a matter of fact, the high degree of polymorphism in the species led earlier workers to add several binomials and species viz., *M. speciosa* Choisy, *M. roxburghii* Wt., *M. coromandeliana* Wt., *M. salicina* Pl. & Tr., *M. walkeriana* P. & Tr., *M. pulchella* Pl. & Tr., *M. sclerophylla* Thw., *M. nagaha* Gardn. and *M. pedunculata* Wt. Vesque (1893), who has monographed the genus *Mesua* in De Candolle's *Monographiae Phanerogamarum*, united the whole complex into one single species, *Mesua ferrea* Linn. with 4 infra specific taxa. T. Anderson (in Hook.f. Fl. Brit. Ind. 1 : 277, 1874) described one species, *M. ferrea* Linn. from India and East Pakistan. In the present study 3 subspecific and 2 varietal taxa under the *Mesua ferrea* aggregate are recognized from India.

In a subdivision of the family Guttiferae, Engler (1925) has placed *Mesua* under subfamily—*Calophylloideae* Engl.; tribe—*Calophylleae* Engl., to which, besides *Mesua*, belong *Calophyllum*, *Mammea*, *Poeciloneuron* and *Kayea*. The tribe *Calophylleae* is characterized by embryo consisting of thick, fleshy cotyledons and very short radicle.

The main bulk of the material cited here is housed in the Central National Herbarium, Sibpore, near Calcutta. Living plants were examined in the Indian Botanic Garden, Sibpore. Specimens were also received on loan from different Circles of the Botanical Survey of India* at Dehra Dun, Coimbatore, Poona and Shillong. Grateful thanks are extended to the Regional Botanists of these Circles for their cooperation in the matter.

MESUA Linn. Sp. Pl. 515, 1753; Juss. Gen. Pl. 258, 1789; Choisy in DC. Prodr. 1 : 562, 1824; Cambess. in Mem. Mus. 16 : 426, 1828; Wt. & Arn. Prodr. 1 : 102, 1834; Endlicher, Gen. Pl. 5447, 1836-1840; Wt. Illustr. Ind. Bot. 1 : 127, 1840; Planchon & Triana in Ann. Sci. Nat. sér. 4, 15 : 298, 1861; Benth. & Hook. f. Gen. Pl. 1 : 176, 1862; T. Anderson in Hook. f. Fl. Brit. Ind. 1 : 277. 1874; Baillon, Hist. Pl. 6 : 424, 1877; Vesque in DC. Mon. Phan. 8 : 629, 1893; Cooke, Fl. Bomb. 1 : 81, 1901; Prain, Beng. Pl. 245, 1903; Brandis, Ind. Trees 55, 1907; Gamble, Fl. Madr. 1 : 76, 1915;

* CAL.——— Central National Herbarium, Sibpore, near Calcutta.
DD ——— Herbarium of the Forest Research Institute and College, Dehra Dun.
DEHRA DUN—Regional Herbarium of the Botanical Survey of India, Dehra Dun.
MH ——— Regional Herbarium of the Botanical Survey of India, Coimbatore (Formerly Madras Herbarium, Coimbatore).
POONA ——— Regional Herbarium of the Botanical Survey of India, Poona (Formerly Agricultural College Herbarium, Poona).
SHILLONG—— Regional Herbarium of the Botanical Survey of India, Shillong (Formerly Forest Herbarium, Assam).

Ridley Fl. Mal. Penins. 1 : 191, 1922; Engler in Nat. Pfam. 2 ed. 21: 188, 1925; Kirtikar & Basu, Ind. Med. Pl. ed. 2, 1 : 274, 1933.

Nagassari Adans. Fam. 2: 449, 1763.

Nagatampo Adans. Fam. 2 : 449, 1763.

Rhynea Scop. Introd. 262, 1777, non DC. (1837).

Rhyma Scop. Introd, 1185, 1777.

Naghas Mirb. ex Steud. Nom. ed. 2, 2 : 136 & 180, 1841.

Shrubs or trees. Branches often slender. Leaves polymorphic, lanceolate, opposite, petiolate, entire, coriaceous, pellucid, shining above, often pruinose or glaucous beneath; midrib conspicuous, lateral nerves slender, often obsolete, veins slender, polygonately reticulate. Foliar crystals subsimple, 2—pluri-geminate. Stomatal accessory cells broad, hardly conspicuous. Hypodermis absent. Mesophyll bifacial or subcentric.

Flowers hermaphrodite, often large, pretty, solitary, paired or subfasciculate, axillary or terminal, sessile or pedicellate. Sepals 4, decussate, imbricate, outer ones smaller than inner. Petals 4, large, alternate with sepals, imbricate. Stamens numerous, hypogynous; filaments filiform, free or connate at the base; anthers basifixed, linear-oblong or oblong, connective narrowly marginate, dehiscing by lateral vertical clefts. Ovary bilocular; style subulate or filiform, slightly flexuose; stigma peltate or irregularly patelliform, obscurely bilobed. Ovules 2 in each locule, erect, anatropous. Fruit a capsular nut, subtended by the lignified accrescent sepals, unilocular, dehiscing at last in 2-4 valves. Seeds 1-4, erect, often mutually pressed in an obtuse angle, exarillate; testa slender, fragile; hilum linear; micropyle not conspicuous. Embryo exalbuminous; cotyledons thick, free, fleshy, smelling; tigella (radicula) minute, punctiform.

Type species: *Mesua ferrea* Linn. Sp. Pl. 515, 1753.

Distribution: A small genus of 3 species, widely distributed in India, Burma, Ceylon, Malayasia, Cochin China, Thailand, Cambodia; often cultivated and naturalized. One species occurs in India.

Ecology: Common in tropical evergreen forests, often forming consociations.

The *MESUA FERREA* complex in India

Mesua ferrea Linn. Sp. Pl. 515, 1753; Burmann, Fl. Ind. 121, 1768; Choisy in DC. Prodr. 1 : 562, 1824; Wt. Icon. t. 118, 1839; Graham, Cat. Pl. Bomb. 26, 1839; Thw. Enum. Pl. Zeyl. 50, 1858; Miquel, Fl. Ind. Bat. 1 : 509, 1860; Planchon & Triana in Ann. Sci. Nat. ser. 4, 15 : 299, 1861; Dalzell & Gibson, Bomb. Fl. 31, 1861; Beddome, Fl. Sylv. t. 64, 1871; T. Anderson in Hook. f. Fl. Brit. Ind. 1 : 277, 1874; Kurz, For. Fl. Brit. Burma 1 :97, 1877; Gamble, Man. Ind. Timb. 27, 1881; Pierre, Fl. Coch.-Chine 7 : t. 97, 1885; Watt, Dict. Econ. Prod. Ind. 5 : 236, 1891; Vesque in DC. Mon. Phan. 8 : 630, 1893; Talbot, Trees Bomb. Pres. 16, 1894; Woodrow in J. Bombay. Nat. Hist. Soc. 11 : 126, 1897; Cooke, Fl. Pres. Bomb. 1 : 81, 1901; Prain, Beng. Pl. 246, 1903; Brandis, Ind. Trees 55, 1907; Gamble, Fl. Madr. 1 : 77, 1915; Haines, Bot. Bih. & Or. 2 : 55, 1921; Ridley, Fl. Mal. Penins. 1 : 192, 1922; Kirtikar & Basu, Ind. Med. Pl. ed. 2, 1 : 274, 1933; Kanjilal, Fl. Assam 1 : 111, 1934; Mooney, Suppl. Bot. Bih. & Or. 27, 1950; Bor, Man. Ind. For. Bot. 201, 1953; Kitamura in Fauna & Flora Nep. Him. 1 : 179, 1955; Sinclair in Bull. Bot. Soc. Bengal 9: 88, 1955; MacMillan, Trop. Pl. & Gard. ed. 5, 87, 1956; Wealth of India 6: 349, 1962.

An evergreen medium-sized handsome tree, 20-30 m high. Trunk erect, often buttressed at the base. Young branches twiggy, slender. Bark smooth, ash-coloured, grey, turning dark brown or cinnamon, exfoliating in large white flakes which expose a warty reddish-brown inner surface, coarsely fibrous and red inside, exuding an aromatic oleo-resin. Sapwood creamy-white or pinkish-brown. Heartwood dark red, dull on exposure, extremely hard, smooth, tough and heavy (sp. gr. 1.03; wt. 0.9 gm/cu. cm). Leaves opposite, decussate, very variable, 6-17.5 × 1.2-5 cm, linear-lanceolate, oblong-lanceolate, lanceolate or narrowly elliptic-oblong, acute, acuminate or cuspidate, obtuse or acute at the base, thinly but rigidly coriaceous, glabrous, shining above, glaucous and pruinose beneath, generally covered with a wax-like white powder beneath, red when young, then pink, gradually passing into dark green; midrib prominent, lateral nerves very fine, almost invisible, straight, nearly parallel, subhorizontal; petiole 5-12 mm long.

Flowers solitary axillary and terminal or in pairs, occasionally ternate, 4-10 cm in diam., sweet-scented, subsessile or shortly pedicellate, ebracteate; peduncle short, stout, rusty-tomentose, 8-15 mm long. Buds subglobose. Sepals 4, in two pairs, 12-15 mm long, orbicular, imbricate, thick, concave, velvety-puberulous outside, persistent, the inner pair much longer than the outer. Petals 4, pure white, much exceeding the sepals, cuneate, obovate or obcordate, curled and erose at the margins, very finely brown or purple-veined, caducous. Stamens numerous, forming a globose yellow mass in the centre of the flower; filaments very slender, filiform; anthers golden-yellow, linear, 2.5-3 mm long; loculi dehiscing laterally by marginal clefts. Ovary ovoid, bilocular, with 2 ovules in each locule; style nearly as long as ovary; stigma peltate. Fruit 2.5-3.2 × 3-4 cm, ovoid, with a conical point, striate, 1-celled, 1—4-seeded, supported by the persistent enlarged sepals; pericarp tough, semi-woody, at length 2-valved. Seeds

variously faceted, smooth, with a dark-brown shining horny testa; cotyledons fleshy, oily, pale yellow; radicle inferior.

The woods of *Mesua ferrea* are commercially classed under the trade name *MESUA*. It is one of the hardest and strongest woods in India, often known as Ceylon Ironwood or Ironwood of Assam. The chief source of supply of *mesua* or *nahor* is in Assam where *ca* 1524 m. tons are annually available in logs up to 9 × 1.2 m girth, especially from the Lakhimpur and Sibsagar districts. Madras, Coorg and Kerala also produce good amounts annually and Bengal has its small supplies in East Pakistan from Chittagong.

Flowers: Feb.-May. *Fruits*: May-Oct.

Distribution: Widely spread in India in the climax evergreen or semi-evergreen forests in East Himalayas, Assam, Bengal, Bombay, Maharashtra, Madras State, Andamn Islands etc., either scattered or in more or less pure patches or belts. In these forests it often forms consociations which may cover a considerable area; often planted near Buddhist temples, in avenues and near houses. Traces of its having formerly been found west of the Manas River in Bengal, occur sometimes in the name of places e.g. Nageshwarbari or Naksarbari, a town in the Sikkim Terai on the Nepal Frontier. *India*: Assam; Khasia Hills; Western Duars; North Bengal; Dinajpur; Chota Nagpur, planted; Orissa, Keonjhar State and Rebna forest at 450-480 m; Western Ghats from South Kanara to Kerala up to 1500 m; North Kanara, South Konkan; Andaman Islands. *World*: Tropical Asia; India, Nepal, Ceylon, Burma, Malaysia, Cochin China, Cambodia, Thailand, Malacca.

Vernacular names: Hindi: *Nagkesar, Naghas;* Beng.: *Nagesar, Nagkesar;* Uriya: *Nageshvoro, Nageswar;* Behar: *Nagkeshur;* Assam: *Nahor, Dieng-ngai, Ngai-ching*; Bomb.: *Nagchampa, Thorla-champa*; Mar.: *Nagachampa, Nagchapha*; Guj.: *Nagchampa*; Tam.: *Nangal, Naka, Mallay-nangal, Irul, Naga-chambagam, Shiru-nagap-pu, Nagashap-pu*; Tel.: *Nagakesara, Nagakesaramu, Geja-pushpam*; Kan.: *Naga sampigi, Nagsampige*; Mal.: *Nanga, Peri, Veluthapala*; Punj.: *Nagkesar*; Andamans: *Gangane*; Nep.: *Nari-su, Nagesuri*; Sans.: *Bhujangakhya, Kanchana, Kesara, Naga, Pushparachana*; Eng.: *Indian Rose Chestnut, Ceylon Ironwood, Ironwood of Assam, Mesua, Nagastree.*

Uses: The timber is used for railway sleepers, bridges, posts, beams and construction work. It is also used for cart-building, boat-building, walking sticks, pit-props, mining construction, agricultural implements and tool handles. It is a good fuel wood. The seed oil is suitable for soap-making. The dried flowers and flower-buds (*Flores Nag-Kassar*) are used in perfumery, cosmetics and medicine. The oil from the flowers known under the name of 'Otto of Nag Keshar' is used for perfuming soaps. The flowers are much admired both for their beauty and fragrance, and with bunches of the delicately coloured young leaves are used in Assam as hair decorations. In Madura pillows are filled with the stamens to import a pleasant scent. The fruit is sometimes eaten. The oleo-resin from the bark, roots and immature fruits has been suggested as a substitute for Canada balsam. The roots and bark are diaphoretic.

KEY TO THE SUBSPECIES AND VARIETIES

A.	Leaves white, glaucous or pruinose beneath; flowers 8-10 cm in diam.:	
B.	Leaves lanceolate, acuminate or cuspidate, 6-17.5 × 1.2-5 cm; flowers solitary or paired, shortly pedicellate	1. subsp. *ferrea.*
B.	Leaves linear-oblong, acuminate, 16-30 × 4-7 cm; flowers sessile or subsessile, peduncle 1-3-flowered	2. subsp. *thwaitesii.*
A.	Leaves green or pale beneath, scarcley glaucous; flowers ± 4 cm in diam.	3. subsp. *pulchella.*
C.	Leaves ovate or elliptic-oblong, cuspidate; flowers clustered, 3-5	3a. subsp. *pulchella* var. *pulchella.*
C.	Leaves narrowly lanceolate, ending in a long tapering acumen; flowers solitary, axillary ...	3b. subsp. *pulchella* var. *coromandeliana.*

Subsp. 1. **ferrea**

Syn. *Mesua speciosa* Choisy in DC. Prodr. 1:562, 1824. *Mesua roxburghii* Wt. Illustr. Ind. Bot. 1:127, 1840; Walp. Repert. Bot. Syst. 1:396, 1842. *Mesua walkeriana* Planchon & Triana in Ann. Sci. Nat. sér. 4, 15:301, 1861. *Mesua salicina* Planchon & Triana in Ann. Sci. Nat. sér. 4, 15:302, 1861. *Mesua ferrea* Linn. subsp. *vera* Vesque in DC. Mon. Phan. 8:631, 1893, nom. illegit. *Mesua ferrea* Linn. var. *salicina* Vesque in DC. Mon. Phan. 8:631, 1893. *Calophyllum nagassarium* Burm. Fl. Ind. 121, 1768. *Nagassarium* Rumph. Amboin. 7:3, t. 2, 1750.

Leaves narrowly lanceolate or lanceolate-oblong, gradually acuminate or cuspidate, base somewhat acute, white, glaucous or pruinose beneath. Lower epidermis papillate. Flowers solitary or paired, shortly pedicellate, 8-10 cm in diam. (Plate I).

Type: *Hermann* s.n., Ceylon (BM).

Flowers: Feb.-July. *Fruits*: Aug.-Jan.

Herbarium specimens examined: ASSAM: Golaghat, 90 m, *King's collector* 67, March 15, 1896 (CAL); Naga hills, 150 m, *H. Collett* 106, March 1, 1882 (CAL); Khasia, *sine lectae* (CAL); Khasia, *Oldham* s.n. (CAL); Nowgong, *Wight* s.n., April 1848 (CAL); without exact locality, *Jenkins* s.n. (CAL); Rangamura, Tipperah hill, 150-240 m, *P. M. Debbarmann* 566, Dec. 31, 1914 (CAL); Agartala, Tipperah hill, 150-240 m, *P. M. Debbarmann's coll.* 1077, April 27, 1916 (CAL); Kurseong, *E. A. C. Modder* 54, May 1915 (CAL); Mangaldai, *A. C. Chatterjee* s.n., March 1902 (POONA);

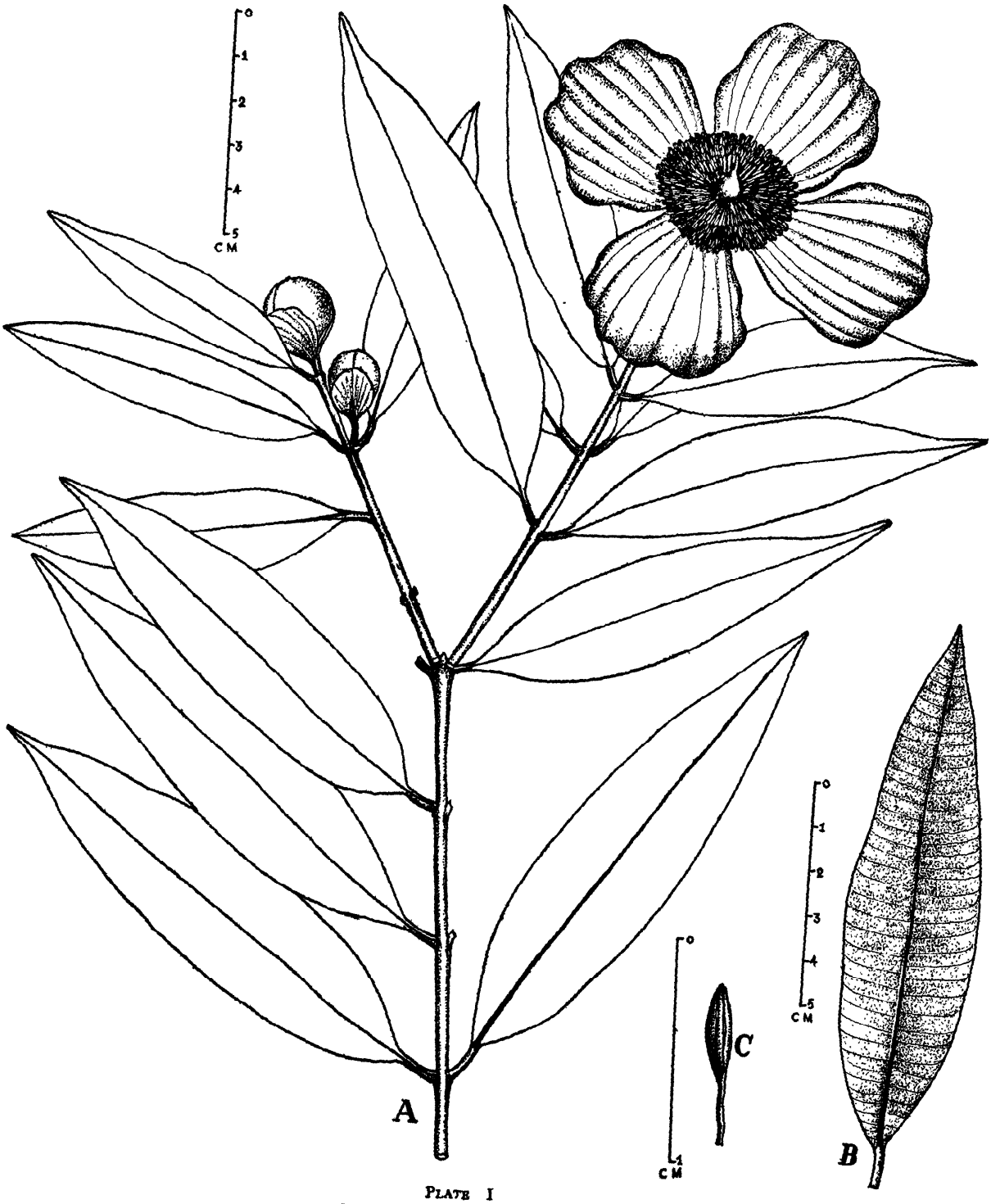

PLATE I

Mesua ferrea Linn. Subsp. *ferrea*

Fig. A. Flowering twig ; Fig. B. Leaf ; Fig. C. Stamen.

Nagajanka, Sibsagar, 90 m, *U. N. Kanjilal* 1658, April 23, 1911 (SHILLONG); Jrong, Manipur, 900 m, *A. Meebold* 5435, Feb. 1906 (CAL); Gouhati, *King's collector* s.n. (CAL); without exact locality, *S. N. Bal* 48 (CAL). EAST PAKISTAN: Sylhet, *Wallich* 4835 (CAL); *T. K. Gupta* s.n. (POONA, SHILLONG); Chittagong, *Wallich* 4835 D (CAL); Chittagong, *J. D. Hooker* s.n. (CAL); Burkill and Myani, Chittagong hill tracts, *J. L. Lister* 316, March 29, 1876 (CAL); Jhanduchiri hill, 64 km from Chittagong, *Badul Khan* 236, Jan. 1887 (CAL); Seetakoondu, Chittagong, *C. B. Clarke* 19990 D, Feb. 26, 1873 (CAL); Chitta gong hill tracts, *A. T. Gage* 3, March 1899 (CAL); Kodala hill, 46.6 km from Chittagong, *Badul Khan* 48, Aug. 1885 (CAL); Chittagong, *J. S. Gamble* 6815 D, March 10, 1879 (CAL). SIKKIM: without exact locality, *Ribu & Rhompoo* 3760 D, Feb. 25, 1910 (CAL). BENGAL: Dinajpur, *R.E.P.* 12424, March 27, 1897 (CAL); Indian Botanic Garden, near Calcutta, Acc. No. 47687 (CAL). BIHAR: Chota Nagpur, cult., *J. J. Wood* s.n., Oct. 1879 (CAL). UTTAR PRADESH: New Forest, Dehra Dun, cult., *M. B. Raizada* 18397, May 1939 (DD); office compound, Northern Circle, B.S.I., Dehra Dun, cult., *U. C. Bhattacharyya* 14868, July 20, 1961 (DEHRA DUN). PENINSULAR INDIA: without exact locality, *Herb. Wight* 133 (CAL); Bombay, *N. A. Dalzell*, Acc. No. 47699 (CAL); Castle Rock, Bombay, *P. K. Bhide* s.n., April 14, 1909 (POONA); Konkan, ex Cooke (POONA); Konkan, *Stocks & Law* s.n. (CAL); Kotgal, 90 m, *L. J. Sedgwick* 6901 (CAL); Malabar, *Gibson* s.n., July 27, 1855 (CAL); Yellapur, North Kanara district, *W. A. Talbot* s.n., March 15, 1887 (POONA); South Kanara, *R. H. Beddome* s.n. (MH); Northern Division, Madras, *Cleghorn* s.n. (CAL); Coonoor Ghat, Nilgiris district, Madras State 1200 m, *J. S. Gamble* 14373, June 1884 (POONA); Coonoor Ghat, Nilgiris district, *sine loctae*, May 1884 (MH); Runneymade, Nilgiris district, Madras State, 1833 m, *K. M. Sebastine* 3180, May 12, 1957 (MH.); Udumanparai, Annamalais, *C. A. Barber* 5775 & 5820 (MH); Agumbe, Mysore, *Puri* 19597 A (POONA); Varadimalai Sholas, Bolampatti hills, Coimbatore district, *C. E. C. Fischer* 2737, May 14, 1911 (CAL); Palode Reserve, Kerala, *Puri* 15182, Feb. 16, 1957 (POONA). ANDAMAN ISLANDS: Middle Andamans, *ca* 150 m, *C. E. Parkinson* 1086, March 1916 (CAL); Mt. Harriet, Port Blair, *King's collector* 27 (CAL); Mt. Harriet, South Andamans, *S. Kurz* s.n. (CAL); Cadell's Garden, Ross Islands, *King's collector* s.n. (CAL). NEPAL: Dumohan, East Nepal, *ca* 1200 m, *Herb. Banerji*, May 1953 (CAL).

Distribution: *India*: Assam, Sikkim, Bengal, Bombay, Konkan, Malabar, North and South Kanara, Madras State, Mysore, Kerala and Andaman Islands; planted in Uttar Pradesh, Bihar and Sikkim. *World*: India, Nepal, Ceylon, Burma, Malaysia, Cochin China, Thailand, Cambodia, Perak, Singapore, Malacca.

Subsp. 2. **thwaitesii** Vesque in DC. Mon. Phan. 8: 632, 1893. Syn. *Mesua thwaitesii* Planchon & Triana in Ann. sci. Nat. sér. 4, 15: 305, 1861; T. Anderson in Hook. f. Fl. Brit. Ind. 1: 278, 1874.

A small tree. Young branches twiggy. Leaves 20-30 × 3-5 cm, linear-oblong, acute or acuminate, base acute or obtuse, coriaceous, glaucous and faintly nerved beneath, petiolate. Lower epidermis papillate.

Flowers *ca* 10 cm in diam., subsessile, axillary, solitary or in pairs. Calyx with fulvescent coating, thinly hairy outside, adpressed by 2-3 bracteal leaves. Nut obovoid-globose, included in calyx (Plate II).

Type: *Thwaites* 2675, Ceylon (Herb. CAL).

Flowers: April–May. *Fruits*: December.

Herbarium specimens examined: PENINSULAR INDIA: Ayerpadi, Coimbatore district, *C. A. Barber* 3865, Oct. 25, 1901 (CAL); Iyerpadi, Annamalais, *C. A. Barber* 5451, April 23, 1903 (MH); Valparai, Annamalais, *C. A. Barber* 5481, April 29, 1903 (MH); between Poonachi and Monica, Annamalais, *C. A. Barber* 6009, May 30, 1903 (MH); Kulkuntal, Travancore, 1500 m, *A. Meebold* 972, Dec. 1910 (CAL).

Distribution: *India*: Annamalais, Coimbatore district, Kerala. *World*: India, Ceylon.

Subsp. 3. **pulchella** Vesque in DC. Mon. Phan. 8: 631, 1893.

Trees. Leaves ovate, elliptic-oblong or narrowly lanceolate, cuspidate, petiolate, base obtuse or rarely acute, coriaceous, concolor, non-pruinose below green or pale beneath; secondary nerves venose beneath, laxly reticulate, slender. Lower epidermis entire.

Flowers smaller in size, *ca* 4 cm in diam., solitary or in clusters of 3-5, axillary.

Var. 1. **pulchella**

Syn. *Mesua pulchella* Planchon & Triana in Ann. Sci. Nat. sér. 4, 15: 307, 1861. *Mesua coromandeliana* Thw. Enum. Pl. Zeyl. 50, 1858, non Wt. (1839).

A large tree. Leaves glabrous, petiolate, ovate or elliptic-oblong, cuspidate, non-pruinose beneath.

Flowers clustered, 3-5. Petals cuneate-obovate, twice or much longer than calyx (Plate III).

Type: *Thwaites* 3404, forests of Galle and Ratnapoora, Central Provinces, Ceylon (Herb. CAL).

Flowers: April. *Fruits*: Dec.

Herbarium specimens examined: PENINSULAR

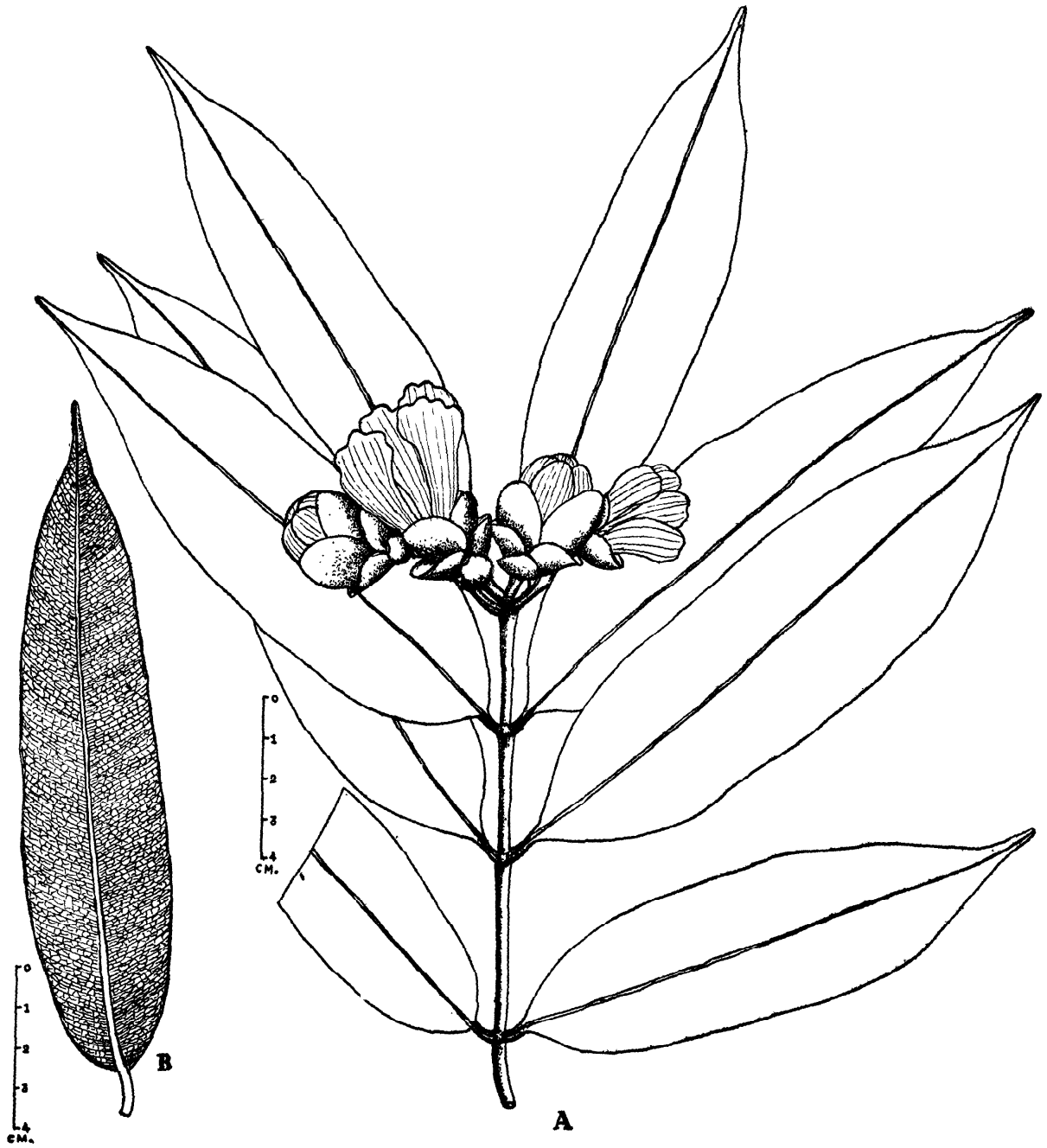

PLATE II
Mesua ferrea Subsp. *thwaitesii* Veaque
Fig. A. Flowering twig ; Fig.B. Leaf.

INDIA: Strathmore, 900 m., Travancore, *T. F. Bourdillon* 619, April 17, 1895 (CAL) and Acc. No. 47701 (CAL); Udambanshola, Travancore, *A. Meebold* 13113, Dec. 1910 (CAL).

Distribution: Evergreen forests of Travancore and Central Provinces, Ceylon at 900 m.

Var. 2. **coromandeliana** (Wt.) Maheshwari, stat. nov. Basi. *Mesua coromandeliana* Wt. Icon. t. 117, 1839 & Illustr. 129, 1840 ; Walp. Repert. Bot. Syst. 1: 396, 1842 ; Beddome, Fl. Sylv. t. 64, 1871. *Mesua ferrea* Wt. & Arn. Prodr. 1: 102, 1834, non Linn. (1753).

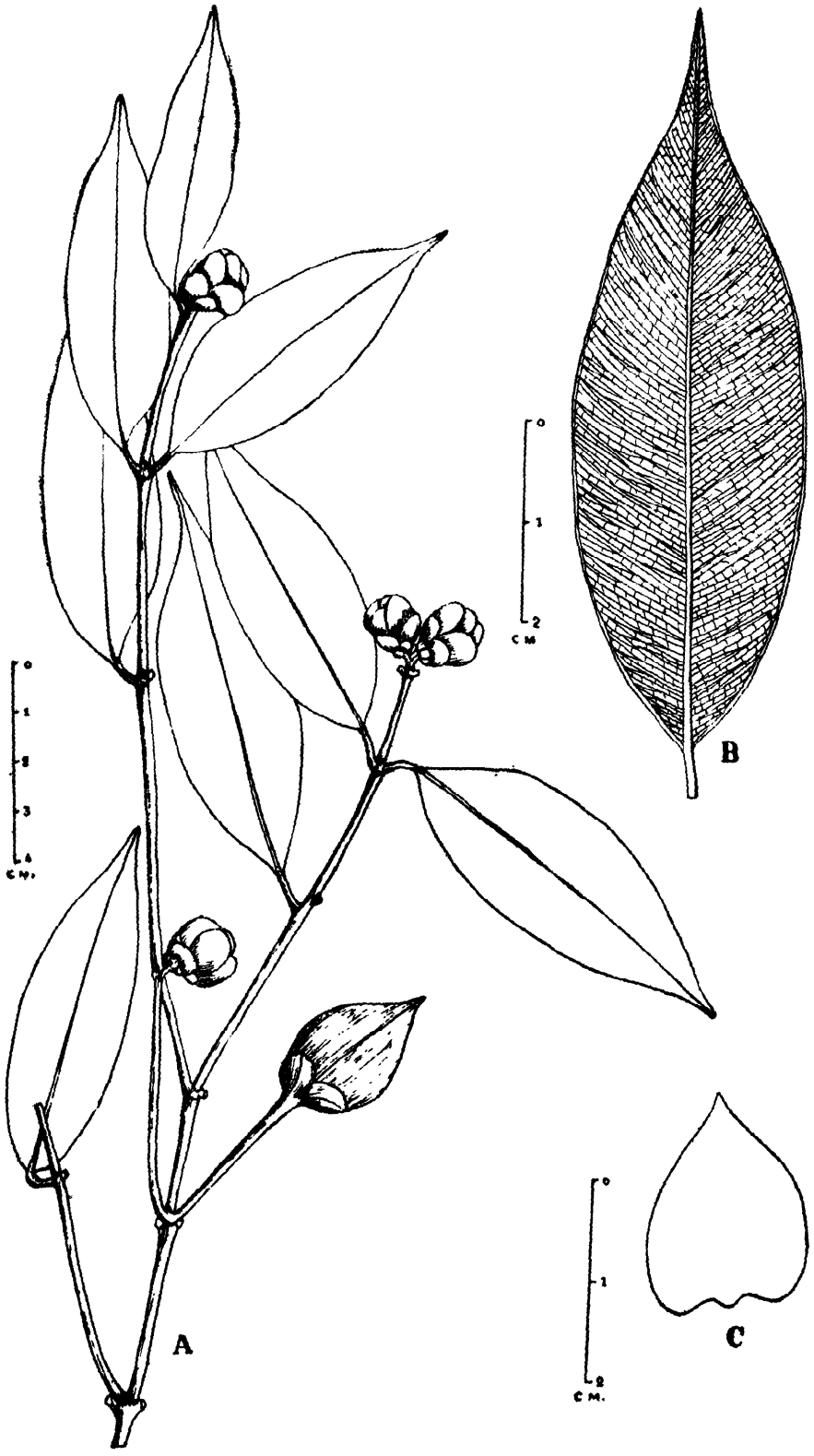

PLATE III

Mesua ferrea Subsp. *pulchella* Veaque var. *pulchella*.
Fig. A. Flowering and fruiting twig ; Fig.B. Leaf ; Fig. C. Seed.

A very handsome tree. Leaves *ca* 6.3 × 1.3 cm, glabrous, narrowly lanceolate, ending in a long tapering blunt acumen, shining green above, pale beneath but scarcely glaucous, petiolate; venation subscrobiculate.

Flowers solitary axillary, terminal, *ca* 4 cm in diam., pedicel shorter than petiole. Buds globose. Calyx lobes glabrous or softly pruinose. Petals twice as long as sepals (Plate IV).

Type: *Wight* 132, Courtallum (Herb. CAL).

Flowers: Dec., June. *Fruits*: Sept.-Feb.

Herbarium specimens examined: PENINSULAR INDIA: Courtallum, *Herb. Wight* 132 (CAL);

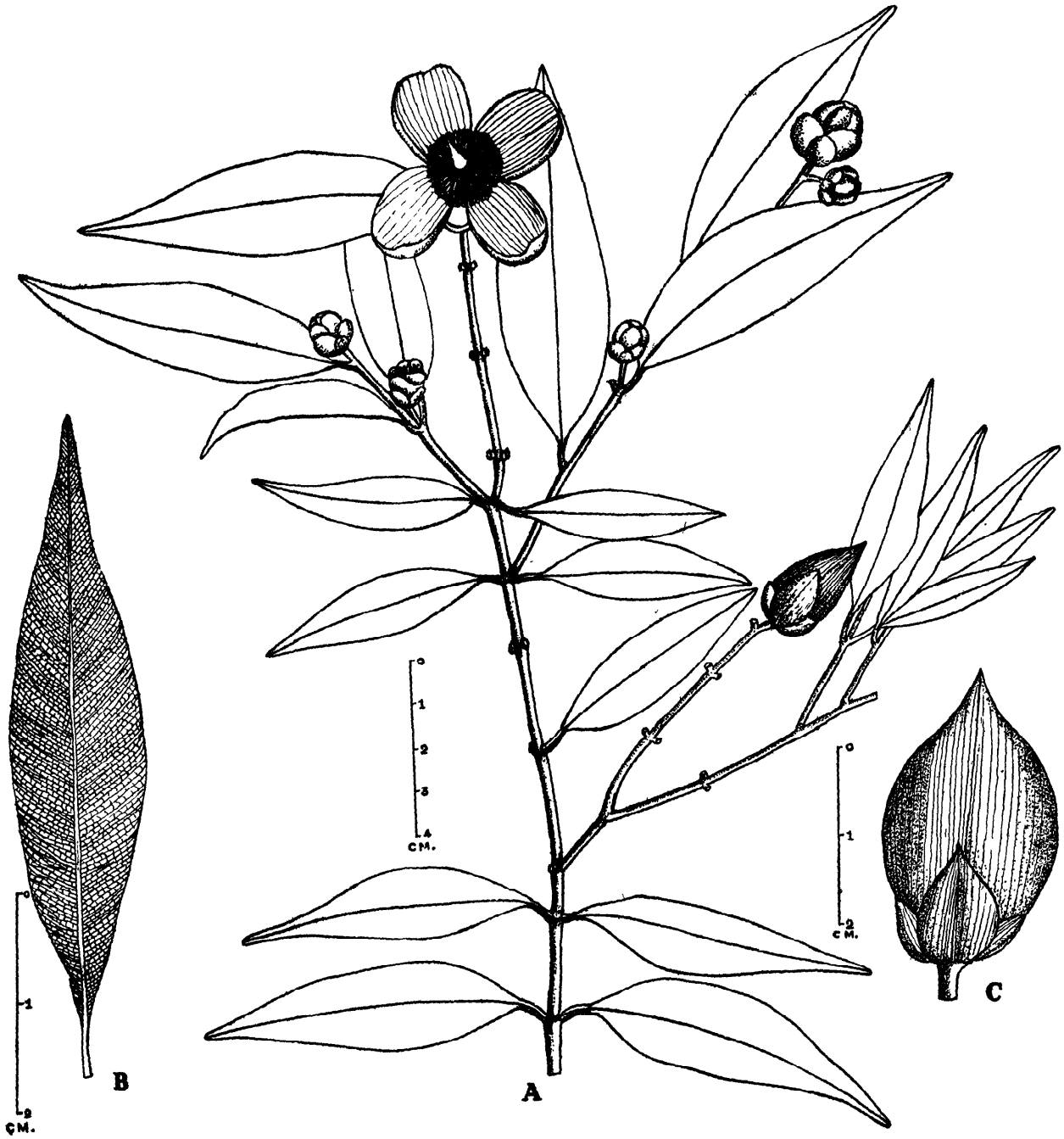

PLATE IV

Mesua ferrea Subsp. *pulchella* var. *coromandeliana* (Wt.) Mahesh.

Fig. A. Flowering and fruiting twig; Fig. B. Leaf; Fig.C. Fruit.

Sengalteri, Tinnevelly district, 810 m, *C. E. C. Fischer* 3883, Feb. 11, 1916 (CAL) and MH 12460, Sept. 23, 1915 (MH); Courtallum, Tinnevelly, *C. A. Barber* 3311, June 29, 1901 (MH); Main Falls, Courtallum, 433 m., Tinnevelly district, Madras State, *K. Subramanyam* 495, Dec. 16, 1957 (MH).

Distribution: PENINSULAR INDIA: Courtallum, Tinnevelly district; Mysore.

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