

A Synopsis of the Genus *Clerodendrum* L. (Lamiaceae) in Thailand

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ABSTRACT.— A synopsis of the 28 species and one variety of *Clerodendrum* occurring in Thailand is presented including the one endemic species, *C. lloydianum* Craib and the seven introduced and cultivated taxa, namely *C. calamitosum* L., *C. chinense* (Osbeck) Mabb. var. *chinense*, *C. laevifolium* Blume, *C. minahassae* Teijsm. & Binn., *C. quadriloculare* (Blanco) Merr., *C. splendens* G. Don and *C. thomsoniae* Balf.f. A key to the Thai species of *Clerodendrum* is provided together with their known distribution, ecological data and some illustrations. In addition, *C. longisepalum* Dop is lectotypified.

KEY WORDS: Synopsis, *Clerodendrum*, Lamiaceae, Thailand

INTRODUCTION

The genus *Clerodendrum* was first described by Linnaeus (1753) with one species, *C. infortunatum* L. Some authors of the 18th to early 20th century misspelled the name as ‘*Clerodendron*’ that was first used by Adanson (1763). *Clerodendrum* was previously placed in the family Verbenaceae, for example by Fletcher (1938), Kochummen (1978), Liang and Gilbert (1984) and Munir (1989), but was then placed in the family Lamiaceae following a recircumscription of family boundaries based on morphological and molecular phylogenetic evidence (Cantino et al., 1992; Harley et al., 2004). Some species formerly placed in *Clerodendrum*, subgen. *Cyclonema* (Hochst.) Gürke and *Clerodendrum* sect. *Konocalyx* Verdcourt, have been separated into the genus *Rotheca* Raf. (Steane and Mabberley, 1998; Harley et al., 2004). The different morphological characteristics between the two genera of

Clerodendrum and *Rotheca* (Steane and Mabberley, 1998; Harley et al., 2004) are presented in Table 1. In Thailand *Rotheca* is represented by the three species: *R. myricoides* (Hochst.) Steane and Mabb., *R. serrata* (L.) Steane and Mabb. and *R. vanprukii* (Craib) C. Leeratiwong and P. Chantaranothai (Leeratiwong and Chantaranothai, 2010).

Recently, phylogenetic studies of the genus *Clerodendrum* s.l. and related genera based on chloroplast DNA (cpDNA) restriction site data (Steane et al., 1997), nuclear ITS sequences (Steane et al., 1999) and the four relatively fast-evolving chloroplast DNA regions of *trnT-L*, *trnL-F*, *trnD-T* and *trnS-fM* (Yuan et al., 2010), strongly indicated that *Clerodendrum* s.l. is not monophyletic but rather is separated into three major clades that are, in general, associated with their geographical distribution: an Asian clade, an African clade and a Pantropical Coastal clade. Yuan et al. (2010) recognized the Pantropical Coastal

TABLE 1. Morphological comparison of the genera *Clerodendrum* and *Rotheca*.

Characters	<i>Clerodendrum</i>	<i>Rotheca</i>
Flowering bud	Both symmetrical and asymmetrical, if asymmetrical, corolla usually expanding abruptly on upper side due to resupination	Markedly asymmetrical, corolla expanding abruptly on lower side only
Anterior corolla lobe	Only slightly (if at all) larger than the others	Frequently much larger than the others
Anthers	Versatile	Usually basifixed (occasionally approaching versatile)
Stigma lobes	Equal	Frequently unequal

clade at the generic level, reviving the genus *Volkameria* L. for these species. A comparison of morphological characters of *Clerodendrum* s.s. and *Volkameria*, based upon Yuan et al. (2010) is given in Table 2. There is one species of *Volkameria* (*V. inermis* L.) in Thailand.

Clerodendrum comprises around 150 species that are confined to the tropical and subtropical areas of the Old World (Yuan et al., 2010). The first documented Thai collections of this genus were those of Schmidt in 1905 from Chang Island, Trat province, and named *C. schmidtii* by Clarke (1905). Since then more specimens have been collected and in particular by Kerr and Vanpruk. Several new species were described on the basis of this material, for example, *C. garrettianum* by Craib (1911) and *C. lloydianum* by Craib (1914). There have since been several revisions relevant to *Clerodendrum* in Thailand, such as those by Fletcher (1938), Moldenke (1980), Leeratiwong (2001) and The Forest Herbarium (2001). Currently, there are 20-35 recorded species of *Clerodendrum* in Thailand. This ambiguity in the actual number, however, is because of doubtful or unclear species delimitation, synonymy and misidentification of species. Therefore, it is necessary to provide a current reevaluated synopsis of the genus for the Flora of Thailand.

MATERIALS AND METHODS

This study is based on an examination of both field observations and examination of the collections and specimens kept at the following herbaria: Department of Systematic Botany, University of Aarhus (AAU), University of Aberdeen Herbarium (ABD), Kasin Suvathabandhu Herbarium, Chulalongkorn University (BCU); Bangkok Herbarium, Department of Agriculture, Bangkok (BK), Forest Herbarium, Bangkok (BKF), British Natural History Museum (BM), Botanical Museum, University of Copenhagen (C), Herbarium, Faculty of Pharmacy, Chiang Mai University (CMU), Royal Botanic Garden, Edinburgh (E), National Center for Natural Sciences and Technology, Hanoi (HN), Harvard University Herbarium, U.S.A. (HUH), Royal Botanic Gardens, Kew (K), Khon Kaen University Herbarium (KKU), National Herbarium Netherland University of Leiden branch (L); Linnean Society Herbarium (LINN), The New York Botanical Garden Herbarium (NY), Prince of Songkla University Herbarium (PSU), Queen Sirikit Botanical Gardens Herbarium (QBG), Muséum National d'Histoire Naturelle, Paris (P); Department of Botany, Herbarium and Nature Reserve, Singapore (SING), Trinity College, University of Dublin (TCD), The University of Texas at Austin (TEX), The

TABLE 2. Morphological comparison of the genera *Clerodendrum* s.s. and *Volkameria*.

Characters	<i>Clerodendrum</i>	<i>Volkameria</i>
Leaf blade	Frequently longer than 6 cm	Usually shorter than 6 cm
Inflorescence	Commonly terminal	Mostly axillary
Fruiting calyx	Accrescent, larger than fruits and brightly coloured	Rarely accrescent, smaller than fruits, enclosing the fruit base and not brightly coloured
Fruit	Often fleshy, with bright colour contrasting with calyx	Usually dryish, not brightly coloured

United States National Herbarium, Smithsonian Institution (US) and Department of Biology Herbarium, Chiang Mai University. Herbaria are abbreviated according to the Index Herbariorum (Holmgren and Holmgren, 2011).

All altitudes are cited in meters and refer to meters above the mean sea level.

SYSTEMATICS

Genus *Clerodendrum* L.

Clerodendrum L., Sp. Pl. 2: 637. 1753, as *Clerodendron*, Gen. Pl. ed. 5: 285. 1754 & Mant. Pl.: 90. 1767; Adans., Fam. Pl. 2: 199. 1763 (as *Klerodendron*); Burm.f., Fl. Indica: 137. 1768; Juss., Gen. Pl.: 106. 1789; Lour., Fl. Cochinch. 2: 387. 1790; Willd., Sp. Pl. 2: 658. 1809; Blume, Bijdr. Fl. Ned. Ind.: 807. 1826; Roxb., Fl. Ind. 3: 57. 1832; Endl. Gen. Pl. 1: 637. 1838; Walp., Repert. Bot. Syst. 4: 102. 1845; Schauer in A. DC., Prodr. 11: 658. 1847; Miq., Fl. Ned. Ind. 2: 867. 1858; Benth. in Benth. & Hook.f., Gen. Pl. 2: 1155. 1876; Kurz, Forest. Fl. Burma 2: 265. 1877; C.B. Clarke in Hook.f., Fl. Brit. India 4: 598. 1885; Briq. in Engl. & Prantl Nat. Pflanzenfam. 4 (3a): 174. 1895; Prain, Bengal Pl. 2: 883. 1903; Brandis, Indian Trees: 506. 1906; King & Gamble, J. Asiat. Soc. Bengal 74: 825. 1909; Merr., Fl. Manila: 401. 1912; H.J. Lam, Verben. Malay. Archip.: 239. 1919; Bakh. in H.J.

Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. III, 3: 9. 1921; Ridl., Fl. Malay Penins. 2: 623. 1923; P'ei, Mem. Sci. Soc. China 2: 122. 1932; Junell, Symb. Bot. Upsal. 4: 100. 1934; Dop in Lecomte, Fl. Indo-Chine 4(7): 849. 1935; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 424. 1938; Kanjilal et al., Fl. Assam 3: 485. 1939; Henderson, Malay Wild Flowers Dicot.: 385. 1959; Back. & Bakh.f., Fl. Java 2: 607. 1965; Zoku, Fl. Jap.: 765. 1965; Burkill, Econ. Prod. Malay Pen.: 589. 1966; Keng, Ord. & Fam. Mal. S. Pl.: 279. 1978; Kochummen in Ng, Tree Fl. Mal. 3: 302. 1978; Basu & Kirtikar, Ind. Med. Pl. 3: 1943. 1980; Moldenke & A.L. Moldenke in Dassan. & Fosberg, Rev. Handb. Fl. Ceyl. 4: 407. 1983; Corner, Wayside Tr. Malaya 2: 744. 1988; Munir, J. Adelaide Bot. Gard. 11(2): 104. 1989; Chen & M.G. Gilbert in Wu & Raven, Fl. China 17: 34. 1994; A. Rajendran & P. Daniel, Ind. Verbenaceae: 79. 2002; Harley et al. in Kubitzki, Fam. Gen. Vasc. Pl. 7: 199. 2004; Mabberley, Fl. Nouv. Caléd. 25: 53. 2004.

Siphonanthus L., Sp. Pl. 1: 109. 1753 & Gen. Pl. ed. 5: 47. 1754.

Cryptanthus Osbeck, Dagb. Ostind. Resa: 215. 1757, *nom. rej.*

Valdia Boehm., Defin. Gen. Pl.: 39. 1760.

Marurang Adans., Fam. Pl. 2: 226. 1763.

Bellevallia Scop., Intr. Hist. Nat.: 198. 1777, *nom. illeg.*

Montalbania Necker, Elem. Bot.: 273. 1790, *nom. illeg.*

- Shrub, small tree or woody climber, rarely perennial herb. *Stem and twigs*: mostly quadrangular and pubescent. *Leaves*: simple, decussate or rarely whorled (3-7 leaves), sometimes leaves of same pairs often unequal in size; exstipulate. *Inflorescence*: cymose, mostly elongate or pyramidal thyrsoïd (rarely corymb-thyrsoïd or compound cyme) usually terminal or rarely axillary, mostly erect or sometimes pendulous. *Flowers*: bisexual, resupinate, mostly zygomorphic, rarely slightly so, mostly loose or rarely compact, subtended by bracts or bracteoles. *Calyx*: of 5 fused sepals, campanulate, cup-shaped or tubular, variously 5-lobed or sometimes truncate, usually accrescent, usually exceeding fruit, persistent. *Corolla*: variously colored, sympetalous, tube mostly slender, lobes 5 (except more than 5 lobes in *C. chinense* var. *chinense*), unequal size. *Stamens*: 4, didynamous, inserted within corolla tube; filaments usually long-exserted, alternate with corolla lobes; anthers dorsifixed, 2-lobed, opening by longitudinal slits. *Ovary*: superior, bicarpellate, syncarpous,

1. Calyx lobes shorter than calyx tube.....**2**
– Calyx lobes longer than calyx tube.....**5**

2. Corolla tube less than 4 cm long.....**3**
– Corolla tube more than 4 cm long.....**4**

3. Shrub; abaxial surface of leaf base with large peltate glands; inflorescence corymb-thyrsoïd with compact flowers.....**C. colebrookianum**

– Perennial herb; abaxial surface of leaf base without large peltate glands; inflorescence elongate thyrsoïd with loose flowers.....**C. macrostachyum**

4. Calyx less than 1.5 cm long; corolla tube purple and whitish-purple; abaxial surface of leaves purple.....**C. quadriloculare (cultivated)**

– Calyx 1.5–3.5 cm long; corolla tube white; abaxial surface of leaves.....**C. minahassae (cultivated)**

5. Corolla tube more than 6 cm long.....**C. indicum**

– Corolla tube less than 6 cm long.....**6**

6. Inflorescence pendulous.....**7**
– Inflorescence upright.....**12**

7. Inflorescence corymb-thyrsoïd.....**8**
– Inflorescence an elongate or a pyramidal thyrsis.....**9**

8. Inflorescence with dense-compact flowers; calyx red or purplish-red, hairy outside; corolla tube hairy outside; fruiting calyx 5–8 mm long**C. deflexum**

- Inflorescence with loose flowers; calyx green or yellowish-green, hairy on both surfaces; corolla tube hairy on both surfaces; fruiting calyx 8–11 mm..... ***C. garetianum***
- 9. Leaf blade coarse to touch on both surfaces; calyx and corolla tube hairy on both surfaces..... ***C. schmidtii***
 - Leaf blade smooth on both surfaces; calyx and corolla tube glabrous or hairy outside and glabrous inside**10**
- 10. Calyx lobes elliptic, lanceolate, lanceolate-elliptic or oblong-lanceolate, ≤ 3 mm wide..... ***C. nutans***
 - Calyx lobes ovate or ovate-lanceolate, more than 3 mm wide.....**11**
- 11. Calyx 11.5–18 mm long, fruiting calyx 14–20 mm long; petiole (2.5–)4–12 cm long ***C. umbratile***
 - Calyx 8.5–11.5 mm long, fruiting calyx less than 14 mm long; petiole 0.5–2.5 cm long.....***C. laevifolium* (cultivated)**
- 12. Scandent shrub or woody climber.....**13**
 - Shrub or small tree.....**14**
- 13. Calyx 12–18 mm long, white..... ***C. thomsoniae* (cultivated)**
 - Calyx 5.5–10 mm long, red..... ***C. splendens* (cultivated)**
- 14. Stem nodes with a band of dense long hairs; abaxial surface of leaves with many peltate glands.....**15**
 - Stem nodes without a band of hairs; abaxial surface of leaves with few peltate glands or without.....**17**
- 15. Fruiting calyx 18–30 mm long; calyx 10.5–20 mm long; anthers 3.5–4 mm long..... ***C. japonicum***
 - Fruiting calyx 5–15 mm long; calyx 3.5–10 mm long; anthers 1.5–3.2 mm long....
.....**16**
- 16. Leaf blade mostly 3–7-lobed..... ***C. paniculatum***
- Leaf blade not lobed.....***C. intermedium***
- 17. Abaxial surface of leaves purple; petiole with purple or brownish-purple hairs..... ***C. haematolasium***
 - Abaxial surface of leaves green, greyish-green, grey or brownish-green; petiole without purple or brownish-purple hairs.....**18**
- 18. Inflorescence with dense-compact flowers; abaxial surface of leaf base with few large peltate glands..... ***C. chinense* (cultivated)**
 - Inflorescence with loose flowers; abaxial surface of leaf base without large peltate glands.....**19**
- 19. Calyx with glandular hairs.....**20**
 - Calyx without glandular hairs.....**21**
- 20. Corolla tube 10–18 mm long; adaxial surface of leaves villous; calyx lobes 1.2–3 mm wide..... ***C. lloydianum***
 - Corolla tube 20–28 mm long; adaxial surface of leaves tomentose; calyx lobes 0.5–1.5 mm wide..... ***C. godefroyi***
- 21. Leaf base cordate or rounded.....**22**
 - Leaf base cuneate or attenuate.....**23**
- 22. Leaf margins dentate; calyx 10–17 mm long; corolla tube 15–20 (–25) mm long; corolla lobes 11–20 mm long..... ***C. infortunatum***
 - Leaf margins entire; calyx 6–10 mm long; corolla tube 5–10 mm long; corolla lobes 4–9 mm long..... ***C. villosum***
- 23. Adaxial surface of leaves coarse to touch with hirsute hairs, abaxial surface of leaves densely hairy..... ***C. lankawiense***
 - Adaxial surface of leaves smooth without hirsute hairs, abaxial surface of leaves glabrous, sparsely hairy or densely hairy only on nerves.....**24**
- 24. Calyx tube 4–8 mm long; inflorescence corymb-thyrsoid..... ***C. smitinandii***
 - Calyx tube less than 4 mm long; inflorescence elongate or pyramidal thyrsoid.....**25**

25. Corolla yellow or greenish-yellow; leaves of same pairs often unequal in size..... ***C. disparifolium***
 – Corolla white, red or orange; leaves of same pairs usually equal in size.....**26**
26. Corolla white, tube more than 2 cm long**27**
 – Corolla red or orange, tube less than 2 cm long (1.5–1.8 cm)
***C. myrmecophyllum***
27. Base of corolla tube hairy outside; filaments 14–20 mm long; anthers 1–2 mm long; abaxial surface of leaf blade with distinct hairs.....
***C. calamitosum* (cultivated)**
 – Base of corolla tube glabrous outside; filaments 19–33 mm long; anthers 2–3.2 mm long; abaxial surface of leaf blade glabrous or with sparse hairs on nerves... ***C. longispalum***

1. *Clerodendrum calamitosum* L.

Clerodendrum calamitosum L., Mant. 1: 90. 1767; Blume, Bijdr. Fl. Ned. Ind.: 810. 1826; Walp., Repert. Bot. Syst. 4: 109. 1845; Schauer in A. DC., Prodr. 11: 663. 1847; Miq., Fl. Ind. Bat. 2: 870. 1858; C.B. Clarke in Hook.f., Fl. Brit. India 4: 591. 1885; King & Gamble, J. Asiat. Soc. Bengal 74: 827. 1909; Hall.f., Meded. Rijks-Herb. 37: 74. 1918; Merr., Fl. Manila: 403. 1912 & En. Philipp.: 400. 1923; H.J. Lam, Verben. Malay. Archip.: 256. 1919; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 82. 1921; Dop in Lecomte, Fl. Indo-Chine 4(7): 867. 1935; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 431. 1938; Back. & Bakh.f., Fl. Java 2: 610. 1965; Burkill, Dict. Econ. Prod. Malay Penins. 1: 590. 1966; A. Rajendran & P. Daniel, Ind. Verbenaceae: 89. 2002;

Phuong in N.T. Ban et al., Fl. Vietnam 3: 288. 2005.

Volkameria alternifolia Burm.f., Fl. Indica: 137. 1768.

Thailand.– CENTRAL: Krung Thep Maha Nakhon; SOUTH-EASTERN: Chon Buri; PENINSULAR: Satun and Songkhla.

Distribution.– India, Malaysia, Indonesia (Java-type) and Philippines.

Vernacular.– Ratree Sawan (Central).

Ecology.– Introduced as an ornamental plant; native to Indonesia. Flowering and Fruiting August-December.

Note.– *Clerodendrum calamitosum* has a distinctive leaf that is deeply serrated or with an incised margin, densely hairy on the lower surface and also hairy on the base of the corolla tube.

2. *Clerodendrum chinense* (Osbeck) Mabb.

Clerodendrum chinense (Osbeck) Mabb., Plant-book, Repr.: 707. 1989; Chen & M.G. Gilbert in Wu & Raven, Fl. China 17: 39. 1994; Phuong in N.T. Ban et al., Fl. Vietnam 3: 288. 2005.

Cryptanthus chinense Osbeck, Dagb. Ostind. Resa: 215. 1757.

Volkamannia japonica Jacq., Pl. Hort. Schoenbr. 3: 48. 1798.

Volkameria fragrans Vent., Jard. Malmaison: 2, t. 70. 1804.

Clerodendrum fragrans Hort. ex Vent., Jard. Malm.: 2, t. 70. 1804, *pro. syn.*; Schauer in A. DC., Prodr. 11: 664. 1847; Miq., Fl. Ind. Bat. 2: 875. 1858; C.B. Clarke in Hook.f., Fl. Brit. India 4: 589. 1885; Prain, Bengal Pl. 2: 835. 1903; Merr., Fl.

- Manila: 402. 1912 & En. Philipp.: 401. 1923; Hall.f., Meded. Rijks-Herb. 37: 71. 1918; H.J. Lam, Verben. Malay. Archip.: 259. 1919; P'ei, Mem. Sci. Soc. China 1(3): 133. 1932.
- Clerodendrum fragrans* Willd., Enum. Pl.: 659. 1809; Blume, Bijdr. Fl. Ned. Ind.: 811. 1826; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 88. 1921; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 430. 1938.
- Clerodendrum fragrans* (Vent.) R. Br. in W.T. Aiton, Hortus Kew. 4: 63. 1812, *nom. illeg.*; Walp., Repert. Bot. Syst. 4: 109. 1845; King & Gamble, J. Asiat. Soc. Bengal 74: 826. 1909; Merr., Fl. Manila: 402. 1912; Kanjilal et al., Fl. Assam 3: 487. 1939; Burkill, Dict. Econ. Prod. Malay. Penins. 1: 591. 1966.
- Clerodendrum fragrans* var. *multiplex* Sweet, Hort. Brit. 1: 32. 1826.
- Clerodendrum fragrans* var. *pleniflora* Schauer in A. DC., Prodr. 11: 666. 1847; Hall.f., Meded. Rijks-Herb. 37: 71. 1918; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 88. 1921; Back. & Bakh.f., Fl. Java 2: 607. 1965.
- Clerodendrum philippinum* Schauer in A. DC., Prodr. 11: 667. 1847; Miq., Fl. Ind. Bat. 2: 877. 1858; Hsiao in Fl. Taiwan: 423. 1978; Moldenke, Fifth Summary Verbenac. 1: 295. 1971 & Phytologia Mem. 2: 284. 1980; Keng, Con. Fl. Singapore: 193. 1990; A. Rajendran & P. Daniel, Ind. Verbenaceae: 133. 2002.
- Clerodendrum macradenium* Miq., Fl. Ned. Ind. 2: 874. 1858.
- Clerodendrum roseum* Poit., Rev. Hort. 1876: 80. 1876.
- Ovieda fragrans* (Vent.) Hitchc., Mem. Torrey Bot. Club 12: 63. 1902.
- Clerodendrum fragrans* f. *pleniflorum* Bakh., Bull. Jard. Bot. Buitenzorg, III, 3: 88. 1921, *nom. inval.*
- Clerodendrum fragrans* f. *pleniflorum* (Schauer) Standl. & Steyerl., Publ. Field Mus. Nat. Hist., Bot. Ser. 22: 272. 1940.
- Clerodendrum japonicum* var. *pleniflorum* (Schauer) Maheshw., Taxon 15: 43. 1966.
- Clerodendrum philippinum* f. *subfertile* Moldenke, Phytologia 25: 368. 73.
- Clerodendrum philippinum* f. *multiplex* (Sweet) Moldenke, Phytologia 41: 10. 1978; Moldenke & A.L. Moldenke in Dassan. & Fosberg, Rev. Handb. Fl. Ceyl. 4: 469. 1983; Hô, Cáyco Vietnam 2: 1048. 1993.
- Clerodendrum philippinum* f. *pleniflorum* (Schauer) Moldenke, Phytologia 40: 260. 1978.

Key to the varieties

1. Corolla tube 8–18 mm long, pubescent inside; corolla lobes more than 5 ***C. chinense* var. *chinense***
- Corolla tube 20–35 mm long, glabrous inside; corolla lobes 5 ***C. chinense* var. *simplex***

2a. *Clerodendrum chinense* var. *chinense*

Thailand.— NORTHERN: Mae Hong Son and Chiang Mai; NORTHERN-EASTERN: Khon Kaen; SOUTH-WESTERN: Kanchanaburi and Prachuap Khiri Khan; EASTERN: Nakhon Ratchasima; SOUTH-EASTERN: Chon Buri, Rayong and Chanthaburi; PENINSULAR: Nakhon Si Thammarat and Satun.

Distribution.— Native to China (type) and cultivated throughout the tropics.

Ecology.— Cultivated plants, alt. 350–400 m. Flowering and Fruiting January–December.

Vernacular.— Ka Um Poe (Karen-Kanchanaburi), Nang Yaem (Central), Ping Cha Mot, Ping Son (Northern), Ping Samut (Chiangmai) and Suan Yai (Nakhon Ratchasima)

Note.— *Clerodendrum chinense* var. *chinense* is recognized by its ovate, rounded-ovate or cordate leaves, large peltate glands on the abaxial surface of the leaf base, corymb-thyrsoïd inflorescence, double flowers with more than 5 corolla lobes and sterile stamens and ovary.

**2b. *Clerodendrum chinense*
var. *simplex* (Moldenke) Chen**

Clerodendrum chinense var. *simplex* (Moldenke) Chen, Novon 1: 58. 1991; Chen & M.G. Gilbert in Wu & Raven, Fl. China 17: 39. 1994; C. Leeratiwong & P. Chantaranothai, Thai For. Bull. (Bot.) 31: 44. 2003; Phuong in N.T. Ban et al., Fl. Vietnam 3: 288. 2005.

Clerodendrum lasiocephala C.B. Clarke in Hook.f., Fl. Brit. India 4: 594. 1885; Brandis, Indian Trees: 507. 1906; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 430. 1938; Kanjilal et al., Fl. Assam 3: 489. 1939.

Clerodendrum philippinum var. *simplex* Moldenke, Phytologia 20: 338. 1970 & Phytologia Mem. 2: 284. 1980.

Clerodendrum philippinum var. *simplex* C.Y. Wu & R.C. Fang, in Fl. Yunnanica 1: 470. 1977, *nom. illeg.*

Clerodendrum fragrans Vent., Jard. Maml.: 2, t.70. 1804; Dop in Lecomte, Fl. Indo-Chine 4(7): 857. 1935.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai, Lampang, Tak and Ban Musseo (between Tak and Mae Sot, *F. Floto* 7634, holotype Moldenke Personal

herbarium, Plainfield, New Jersey); NORTHERN-EASTERN: Loei; SOUTH-WESTERN: Kanchanaburi.

Distribution.— India, Myanmar, China, Laos, Cambodia and Vietnam.

Ecology.— Lower montane rain, lower montane pine-oak and mixed deciduous forests or on roadsides, 400–1,600 m. Flowering and Fruiting December-July.

Vernacular.— Naang Yam (Northern).

Note.— Although closely related to the typical variety, *C. chinense* var. *simplex* differs consistently in the longer length of corolla tube, having only 5 corolla lobes and fertile anthers and ovary.

**3. *Clerodendrum colebrookianum*
Walp.**

Clerodendrum colebrookianum Walp., Repert. 4: 114. 1845; Schauer in A. DC., Prodr. 11: 672. 1847; C.B. Clarke in Hook.f., Fl. Brit. India 4: 594. 1885; Brandis, Indian Trees: 507. 1906; King & Gamble, J. Asiat. Soc. Bengal 74: 837. 1909; Hall.f., Meded. Rijks-Herb. 37: 78. 1918; H.J. Lam, Verben. Malay. Archip.: 271. 1919; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. III, 3: 87. 1921; P'ei, Mem. Sci. Soc. China 2: 158. 1932; Dop in Lecomte, Fl. Indo-Chine 4(7): 860. 1935; Kanjilal et al., Fl. Assam 3: 488. 1939; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 286. 1980; Hô, Câyco Vietnam 2: 1049. 1993; Chen & M.G. Gilbert in Wu & Raven, Fl. China 17: 40. 1994; A. Rajendran & P. Daniel, Ind. Verbenaceae: 93. 2002. Phuong in N.T. Ban et al., Fl. Vietnam 3: 289. 2005.

Clerodendrum glandulosum Colebr., *nom. nud.*, non Lindl., Edwards's Bot. Reg. 30: t. 19. 1844; Schauer in A. DC., Prodr. 11: 672. 1847; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 430.

Clerodendrum speciosissimum Schauer in A. DC., Prodr. 11: 672. 1847, *nom. illeg.*

Clerodendrum colebrookianum var. *denticulatum* C.B. Clarke in Hook.f., Fl. Brit. India 4: 594. 1885; A. Rajendran & P. Daniel, Ind. Verbenaceae: 96. 2002.

Clerodendrum colebrookianum var. *henryanum* Moldenke, Phytologia 52: 330. 1983.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Phayao, Nan, Lamphun, Lampang, Phrae, Tak, Kamphaeng Phet and Nakhon Sawan; NORTH-EASTERN: Phetchabun, Loei, Udon Thani, Nong Khai and Khon Kaen; EASTERN: Chaityaphum; CENTRAL: Saraburi; SOUTH-WESTERN: Kanchanaburi and Phetchaburi; PENINSULAR: Chumphon, Ranong, Phangnga, Nakhon Si Thammarat and Trang.

Distribution.— Nepal, India, Bangladesh (type), Bhutan, Myanmar, China, Laos, Vietnam, Malaysia and Indonesia (Sumatra, Java).

Ecology.— Tropical evergreen rain, dry evergreen, lower montane rain, lower montane pine-oak and mixed deciduous forests, 50–1,800 m. Flowering and Fruiting June-January.

Vernacular.— Khem Paa (Phrae), Khoh Kho Do, Dok Ping, Nom Sawan Khao (Nakhon

Si Thammarat), Bae Bi See, Pho Kwaa (Karen-Mae Hong Son), Phuangphee Khaao (Loei), Ping Khaao (Central) and Pingsamut.

Note.— *C. colebrookianum* is distinguished by having broadly ovate or cordate leaf blade with large peltate glands or glands on the abaxial surface of the leaf base and corymb-thyrsoid inflorescence.

4. *Clerodendrum deflexum* Wall. (Figure 1)

Clerodendrum deflexum Wall. [Cat. no. 1808. 1829, *nom. nud.*] Pl. As. Rar. 3: 10, t. 215. 1832; Walp., Repert. Bot. Syst. 4: 104. 1845; Schauer in A. DC., Prodr. 11: 665. 1847; Miq., Fl. Ind. Bat. 2: 875. 1858; C.B. Clarke in Hook.f., Fl. Brit. India 4: 593. 1885; King & Gamble, J. Asiat. Soc. Bengal. 74: 828. 1909; H.J. Lam, Verben. Malay. Archip.: 263. 1919; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 82. 1921; Ridl., Fl. Malay Penins. 2: 624. 1923; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 426. 1938; Burkill, Dict. Econ. Prod. Malay Penins. 1: 590. 1966; Kochummen in Ng, Tree Fl. Mal. 3: 304. 1978. Moldenke, Fifth Summary Verbenac. 1: 295. 1971; Moldenke, Phytologia Mem. 2: 284. 1980; Corner, Wayside Tr. Malaya 2: 745. 1988; Keng, Con. Fl. Singapore: 192. 1990.

Clerodendrum deflexum var. *bracteatum* Ridl., Fl. Malay Penins. 2: 625. 1923.

Clerodendrum deflexum var. *villosulum* Moldenke, Phytologia 33: 372. 1976.

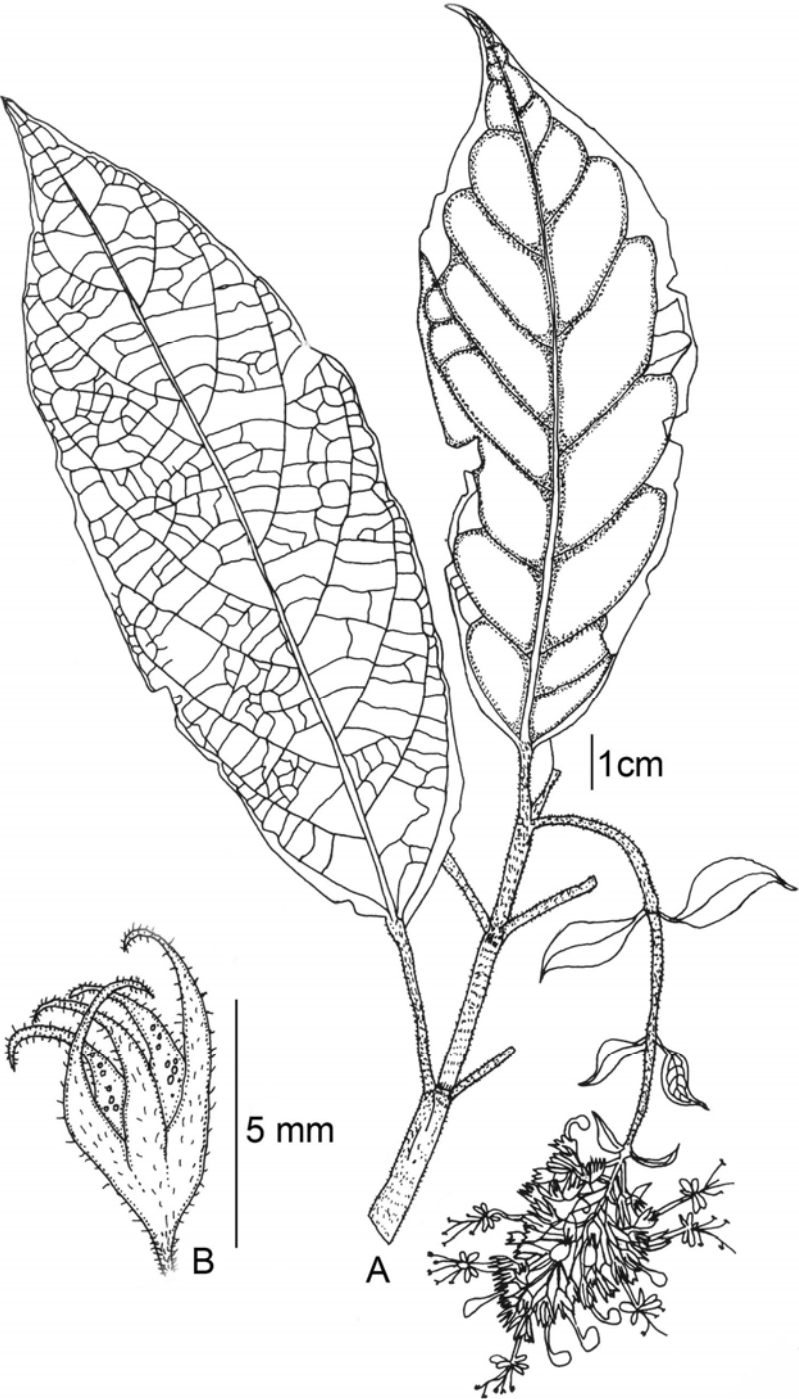


FIGURE 1. Drawing of *Clerodendrum deflexum* showing the: (A) flowering branch and (B) calyx.

Thailand.— PENINSULAR: Pattani, Yala and Narathiwat.

Distribution.— Malaysia (type), Singapore and Indonesia.

Ecology.— Tropical evergreen rain forest, on wetland areas, 5–600 m. Flowering and Fruiting August–December.

Note.— *Clerodendrum deflexum* is characterized by its pendulously corymb-thyrsoid inflorescence with dense compact flowers.

5. *Clerodendrum disparifolium* Blume

Clerodendrum disparifolium Blume, Bijdr. Fl. Ned. Ind.: 809. 1826; Walp., Repert. Bot. Syst. 4: 109. 1845; Schauer in A. DC., Prodr. 11: 672. 1847; Miq., Fl. Ind. Bat. 2: 871. 1858; C.B. Clarke in Hook.f., Fl. Brit. India 4: 589. 1885; King & Gamble, J. Asiat. Soc. Bengal 74: 829. 1909; Hall.f., Meded. Rijks-Herb. 37: 73. 1918; H.J. Lam, Verben. Malay. Archip.: 250. 1919; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 83. 1921; Ridl., Fl. Malay. Penins. 2: 625. 1923; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 426. 1938; Back. & Bakh.f., Fl. Java 2: 609. 1965; Burkill, Dict. Econ. Prod. Malay. Penins. 1: 591. 1966; Moldenke, Fifth Summary Verbenac. 1: 295. 1971; Moldenke, Phytologia Mem. 2: 284. 1980.

Clerodendrum acuminatum Wall. ex Schauer in A. DC., Prodr. 11: 662. 1847.

Clerodendrum eriosiphon Schauer in A. DC., Prodr. 11: 662. 1847.

Clerodendrum obtusidens Miq., Fl. Ned. Ind. 2: 870. 1858.

Clerodendrum laevifolium auct., non Blume (1826); Kochummen in Ng, Tree Fl. Mal. 3: 305. 1978; Corner, Wayside Tr. Malaya 2: 740. 1988; Keng, Con. Fl. Singapore: 193. 1990

Thailand.— SOUTH-WESTERN: Phetchaburi; PENINSULAR: Surat Thani, Nakhon Si Thammarat, Phuket, Satun, Songkhla, Pattani, Yala and Narathiwat.

Distribution.— Malaysia, Singapore and Indonesia (Java, type).

Ecology.— Tropical evergreen rain forest, 50–700 m. Flowering and Fruiting March–August.

Vernacular.— Dang Waai (Yala).

Note.— *Clerodendrum disparifolium* is easily recognized by having leaves of the same pairs often being unequal in size and having yellow or greenish-yellow corolla.

6. *Clerodendrum garrettianum* Craib

Clerodendrum garrettianum Craib, Bull. Misc. Inform., Kew 1911: 443. 1911; Dop in Lecomte, Fl. Indo-Chine 4(7): 868. 1935; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 427. 1938; Moldenke, Fifth Summary Verbenac. 1: 295. 1971 & Phytologia Mem. 2: 284. 1980; Chen & M.G. Gilbert in Wu & Raven, Fl. China 17: 36. 1994; C. Leeratiwong & P. Chantaranothai, Thai For. Bull. (Bot.) 31: 45. 2003; Phuong in N.T. Ban et al., Fl. Vietnam 3: 289. 2005.

Thailand.— NORTHERN: Chiang Mai (Doi Suthep, A.F.G. Kerr 1435, lectotype K!; isolectotypes BM!, K!; lectotypified by Leeratiwong and Chantaranothai, 2003),

Chiang Rai, Phayao, Nan, Lamphun, Lampang and Phrae; NORTH-EASTERN: Loei.

Distribution.— Laos and China.

Ecology.— Lower montane rain, lower montane pine-oak and mixed deciduous forests, 200–1,200 m. Flowering and Fruiting July–February.

Vernacular.— Baa Taai Waai Paa (Chiang Mai).

Note.— *Clerodendrum garrettianum* is different from *C. deflexum* in having inflorescences with loose flowers (dense-compact flowers in *C. deflexum*), a green to yellowish-green calyx, a calyx and corolla tube with hairs on both surfaces (hairs only on outside in *C. deflexum*), and a longer fruiting calyx (8–11 mm long vs. 5–8 mm long in *C. deflexum*).

7. *Clerodendrum godefroyi* Kuntze

Clerodendrum godefroyi Kuntze, Rev. Gen. Pl.: 505. 1891; Dop in Lecomte, Fl. Indo-Chine 4(7): 870. 1935; Moldenke, Fifth Summary Verbenac. 1: 295. 1971 & Phytologia Mem. 2: 284. 1980; Hô, Cáyco Viêtnam 2: 1051. 1993; Phuong in N.T. Ban et al., Fl. Vietnam 3: 290. 2005.

Thailand.— EASTERN: Nakhon Ratchasima, Si Sa Ket and Ubon Ratcha-thani; SOUTH-WESTERN: Kanchanaburi; CENTRAL: Saraburi; EASTERN: Sa Kao.

Distribution.— Laos, Cambodia and Vietnam (type).

Ecology.— Deciduous dipterocarp and mixed deciduous forests, 75–400 m. Flowering and Fruiting September–October.

Note.— *Clerodendrum godefroyi* is distinguished from the most species of genus by having glandular hairs on both surfaces of calyx and corolla tube.

8. *Clerodendrum haematolasium* Hall.f. (Figure 2)

Clerodendrum haematolasium Hall.f., Meded. Rijks-Herb. 37: 69. 1918; Lam, Verb. Malay. Arch.: 286. 1919; Moldenke, Phytologia 60: 138. 1986.

Clerodendrum hispidum M.R. Hend., Gard. Bull. Straits Settle. 7: 118. 1933; Moldenke, Fifth Summary Verbenac. 1: 295. 1971 & Phytologia Mem. 2: 284. 1980; Kochummen in Ng, Tree Fl. Mal. 3: 304. 1978.

Thailand.— PENINSULAR: Songkhla and Narathiwat.

Distribution.— Malaysia and Indonesia (type).

Ecology.— Tropical evergreen rain and dry evergreen forests, 70–970 m. Flowering and Fruiting September–November.

Note.— *Clerodendrum haematolasium* is characterised by having a short corolla tube (9–12 mm long) a membranous leaf blade, a mostly cordate leaf base and a purple color on the abaxial surface.

9. *Clerodendrum indicum* (L.) Kuntze

Clerodendrum indicum (L.) Kuntze, Rev. Gen. Pl.: 586. 1891; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser.

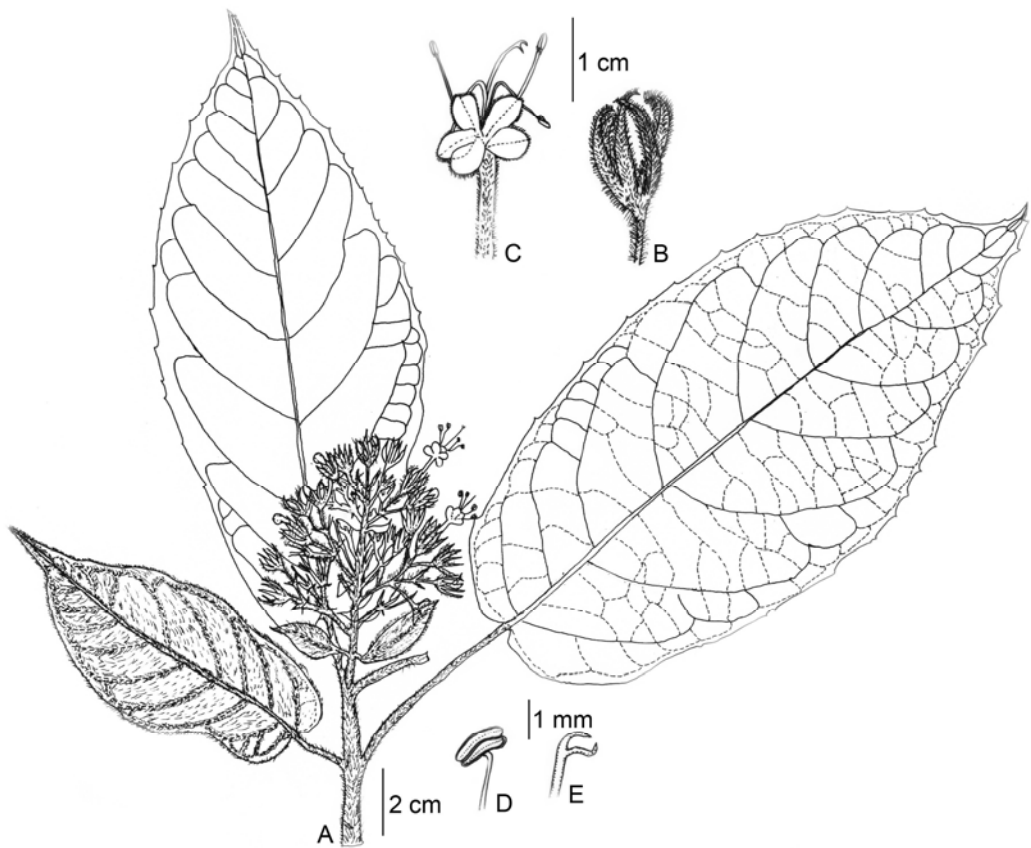


FIGURE 2. Drawing of *Clerodendrum haematolasium* showing the (A) flowering branch, (B) calyx, (C) flower without calyx, (D) stamen and (E) stigma.

3, 3: 85. 1921; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 431. 1938; Bor, Man. Ind. For. Bot.: 304. 1953; Back. & Bakh.f., Fl. Java 2: 608. 1965; Burkill, Dict. Econ. Prod. Malay Penins. 1: 592. 1966; Moldenke, Fifth Summary Verbenac. 1: 295. 1971 & Phytologia Mem. 2: 284. 1980; Kochummen in Ng, Tree Fl. Mal. 3: 304. 1978; Congdon in Nat. Hist. Bull. Siam Soc. 30(2): 185. 1982; Moldenke & A.L. Moldenke in Dassan. & Fosberg, Rev. Handb. Fl. Ceyl. 4: 426. 1983; Keng, Con. Fl. Singapore: 192. 1990; Hô, Câyco

Việt Nam 2: 1053. 1993; Chen & M.G. Gilbert in Wu & Raven, Fl. China 17: 36. 1994; A. Rajendran & P. Daniel, Ind. Verbenaceae: 109. 2002; Phuong in N.T. Ban et al., Fl. Vietnam 3: 290. 2005.
Siphonanthus indicus L., Sp. Pl. 1: 109. 1753.
Ovieda mitis L., Sp. Pl., ed. 2, 2: 889. 1763.
Siphonanthus angustifolia Willd., Sp. Pl. 1: 606. 1798.
Clerodendrum siphonanthus R. Br. in W.T. Aiton, Hortus Kew. 4: 65. 1812, *nom. illeg.*; Walp., Repert. Bot. Syst. 4: 103. 1845; Miq., Fl. Ind. Bat. 2: 883. 1858;

C.B. Clarke in Hook.f., Fl. Brit. India 4: 595 1885 & Fl. Koh Chang: 325. 1900-1916; Prain, Bengal Pl. 2: 836. 1903; Brandis, Indian Trees: 508. 1906; King & Gamble, J. Asiat. Soc. Bengal 74: 839. 1909; H.J. Lam, Verben. Malay. Archip.: 306. 1919; Ridl., Fl. Malay Penins. 2: 628. 1923; P'ei, Mem. Sci Soc. China 2(3): 125. 1932; Dop in Lecomte, Fl. Indo-Chine 4(7): 853. 1935; Kanjilal et al., Fl. Assam 3: 492. 1939; Basu & Kirtikar, Ind. Med. Pl. 3: 1951. 1980.

Clerodendrum longicolle G.Mey., Prim. Fl. Esseq.: 217. 1818.

Ovieda verticillatum Roxb. ex D. Don, Prodr. Fl. Nepal.: 102. 1825, *nom. inval.*

Clerodendrum semiserratum Wall. [Cat. no. 1785. 1829, *nom. inval.*].

Clerodendrum mite (L.) Vatke, Linnaea 43: 537. 1882.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai, Nan, Lampang, Tak and Kamphaeng Phet; NORTHERN-EASTERN: Loei; EASTERN: Buri Ram, Surin and Ubon Ratchathani; SOUTH-WESTERN: Prachuap Khiri Khan; CENTRAL: Ang Thong, Nakhon Nayok and Krung Thep Maha Nakhon; EASTERN: Prachin Buri, Chanthaburi and Trat; PENINSULAR: Phuket, Trang, Satun and Songkhla.

Distribution.— India (type), Sri Lanka, Bhutan, Nepal, Myanmar, China, Laos, Cambodia, Vietnam, Malaysia and Indonesia.

Ecology.— Tropical evergreen rain, lower montane rain, deciduous dipterocarp and mixed deciduous forests, on roadsides, 0–1,600 m. Flowering and Fruiting throughout the year.

Vernacular.— Kaasalong, Keam Paa, Khoh-kho-do (Northern), Chrot Phra Thoranee, Dok Khaan (Yala), Thao Yaa Mom (Chanthaburi, Central), Ping Khom, Ping Khaao, Ping Luang (Northern), Phayaa Raak Dieo (Peninsular), Phayaa Leng Chon (Chiang Mai), Phomphee (Udonthani), Pho Kwo (Karen-Kamphaeng Phet), Pho Kwaa (Mae Hong Son), Phinphee (Loei), Pho Phing (Ratchaburi), Maithao Yaa Mom (Peninsular), Maithao Ruesee (Loei), Leng Chon Tai (Chiang Mai) and Yaa Lin Chon (Prachuap Khiri Khan).

Note.— *Clerodendrum indicum* is distinctive in having narrow or linear leaves which are whorled (3–8 leaves) or rarely decussate and a long corolla tube (7–14 cm long). In “*Thai plant names*” book (The Forest Herbarium, 2001), this species was mistaken as *C. petasites* (Lour.) S. Moore.

10. *Clerodendrum infortunatum* L.

Clerodendrum infortunatum L., Sp. Pl. 2: 637. 1753; Burm.f., Fl. Indica: 137. 1768; Gaertn., Fruct. Sem. Pl. 1: 271, t. 57, f. 1. 1788; Blume, Bijdr. Fl. Ned. Ind.: 811. 1826; Walp., Repert. Bot. Syst. 4: 107. 1845; Schauer in A. DC., Prodr. 11: 667. 1847; Miq., Fl. Ind. Bat. 2: 876. 1858; Kurz, Fl. Burm.: 267. 1877; Brandis, Indian Trees: 507. 1906; King & Gamble, J. Asiat. Soc. Bengal 74: 835. 1909 & Hall.f., Meded. Rijks-Herb. 37: 64. 1918; H.J. Lam, Verben. Malay. Archip.: 284. 1919; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 91. 1921; Dop in Lecomte, Fl. Indo-Chine 4(7): 859. 1935; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 430. 1938; Kanjilal et al., Fl. Assam 3: 487. 1939; Moldenke, Fifth Summary Verbenac. 1: 295. 1971 & Phytologia Mem. 2: 284. 1980; Basu &

Kirtikar, Ind. Med. Pl. 3: 1950. 1980; Moldenke & A.L. Moldenke in Dassan. & Fosberg, Rev. Handb. Fl. Ceyl. 4: 461. 1983; A. Rajendran & P. Daniel, Ind. Verbenaceae: 116. 2002.

Clerodendrum viscosum Vent., Jard. Malmaison: t. 25. 1803, *nom. superfl.*; Walp., Repert. Bot. Syst. 4: 108. 1845; Hall.f., Meded. Rijks-Herb. 37: 63. 1918; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 90. 1921; P'ei, Mem. Sci. Soc. China 2(3): 130. 1923; Moldenke & A.L. Moldenke in Dassan. & Fosberg, Rev. Handb. Fl. Ceyl. 4: 473. 1983; Back. & Bakh.f., Fl. Java 2: 611. 1965; Hô, Càyco Vietnam 2: 1057. 1993

Clerodendrum calycinum Turcz., Bull. Soc. Imp. Naturalistes Moscou 36(2): 222. 1863.

Ovieda infortunata (L.) Baill., Hist. Pl. 11: 95. 1891.

Thailand.— NORTHERN: Chiang Mai, Nan, Lamphun, Lampang, Phrae, Tak, Sukhothai, Phitsanulok and Nakhon Sawan; NORTHERN-EASTERN: Phetchabun, Loei, Udon Thani, Nong Khai and Khon Kaen; EASTERN: Chaiyaphum; SOUTH-WESTERN: Uthai Thani, Kanchanaburi and Prachuap Khiri Khan; PENINSULAR: Chumphon, Ranong, Surat Thani, Phangnga and Nakhon Si Thammarat.

Distribution.— India, Sri Lanka (type), Myanmar, China, Laos, Vietnam, Malaysia and Indonesia.

Ecology.— Tropical evergreen rain, dry evergreen, deciduous dipterocarp and mixed

deciduous forests, on limestone bedrock, roadsides and open areas, 5–1,100 m. Flowering and Fruiting November–May.

Vernacular.— Kum Khue, Kham Phee, Khee Khom (Peninsular), Som See (Sukhothai), Som Phee, Taang Kai Daeng (Khon Kaen), Nom Sawan, Nang Yaem Paa (Phitsanulok), Ping, Ping Daeng Dokkhaao, Ping Hep (Chiang Mai), Phanom Sawan Paa, Pho Khwong (Karen-Kanchanaburi), Honho Daeng (Loei) and Huanho.

Note.— *Clerodendrum infortunatum* is easily distinguished by its coriaceous leaf blade with dense brownish hairs, ovate-cordate or cordate, serrate margin, calyx lobes being ovate or ovate-lanceolate, corolla tube length 15–20 (–25) mm long and persistent calyx length 2–2.7 cm long and longer than fruit.

11. *Clerodendrum intermedium* Cham. (Figure 3)

Clerodendrum intermedium Cham., Linnaea 7: 105. 1832; Walp., Repert. Bot. Syst. 4: 114. 1845; Schauer in A. DC., Prodr. 11: 669. 1847; Miq., Fl. Ned. Ind. 2: 880. 1858; Merr., Fl. Manila: 402. 1912 & En. Philipp.: 402. 1923; Hall.f., Meded. Rijks-Herb. 37: 80. 1918; H.J. Lam, Verben. Malay. Archip.: 298. 1919; Hsiao, Fl. Taiwan: 423. 1978; Chen & M.G. Gilbert in Wu & Raven, Fl. China 17: 36. 1994.

Volkameria casopanguil Blanco, Fl. Filip., ed. 2: 356. 1845.

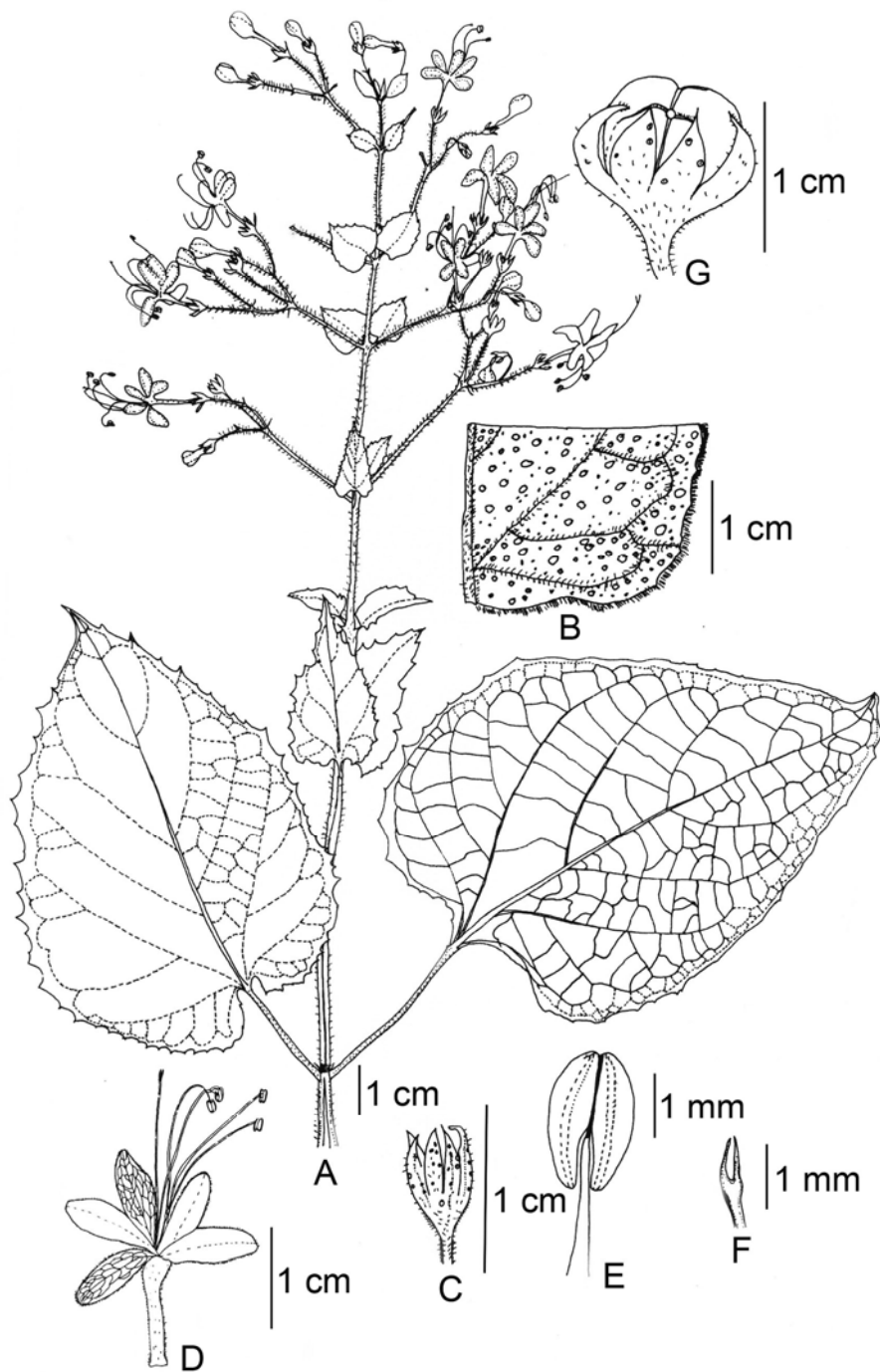


FIGURE 3. Drawing of *Clerodendrum intermedium* showing the: (A) flowering branch, (B) abaxial surface of leaves, (C) calyx, (D) flower without calyx, (E) stamen, (F) stigma and (G) fruit with persistent calyx.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai, Phayao, Nan, Lamphun, Lampang, Phrae, Tak, Sukhothai, Phitsanulok, Kamphaeng Phet and Nakhon Sawan; NORTH-EASTERN: Loei and Khon Kaen; SOUTH-WESTERN: Uthai Thani and Kanchanaburi.

Distribution.— India, Sri Lanka, China, Taiwan, Laos, Vietnam, Malaysia, Indonesia and Philippines (type).

Ecology.— Dry evergreen, lower montane rain, lower montane pine-oak and mixed deciduous forests, 150–1,300 m. Flowering and Fruiting June–January.

Vernacular.— Ping Daeng, Ping Taakai (Northern), Ping Phee Khaao, Ping Phee Daeng (Loei) and Po Kwo (Karen-Mae Hong Son).

Note.— *Clerodendrum intermedium* is characterised by having a dense band of long hairs on the stem nodes, many peltate glands on the abaxial surface of leaves and red to reddish-orange corolla. Most Thai materials of this species were identified as *C. kaempferi* (synonym of *C. japonicum*) and also given the name as *C. urticaefolium* (Roxb.) Wall. ex Schauer in the “*Thai plant names*” book (The Forest Herbarium, 2001).

12. *Clerodendrum japonicum* (Thunb.) Sweet (Figure 4)

Clerodendrum japonicum (Thunb.) Sweet, Hort. Brit.: 322. 1826; P’ei in Mem. Sci. Soc. China 2(3): 141. 1932; Back. & Bakh.f., Fl. Java 2: 609. 1965; Rueda, Ann. Miss. Bot. Gard. 80: 880. 1993; Chen & M.G. Gilbert in Wu & Raven,

Fl. China 17: 36. 1994; Phuong in N.T. Ban et al., Fl. Vietnam 3: 290. 2005.

Volkameria japonica Thunb., Nova Acta Regiae Soc. Sci. Upsal. 3: 203. 1780 & Fl. Jap.: 255. 1784 & in J.A. Murray, Syst. Veg., ed. 14: 578. 1784.

Volkameria kaempferi Jacq., Collect. 3: 207. 1789 & Icon. Pl. Rar. 3: t. 500. 1794.

Clerodendrum squamatum Vahl, Sysb. Bot. 2: 74. 1791; Walp., Repert. Bot. Syst. 4: 107. 1845; Schauer in A. DC., Prodr. 11: 669. 1847; Miq., Fl. Ind. Bat. 2: 878. 1858; C.B. Clarke in Hook.f., Fl. Brit. India 4: 593. 1885; Brandis, Indian Trees: 508. 1906; King & Gamble, J. Asiat. Soc. Bengal 74: 827. 1909; Hall.f., Meded. Rijks-Herb. 37: 81. 1918; H.J. Lam, Verben. Malay. Archip.: 302. 1919; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 93. 1921; Ridl., Fl. Malay Penins. 2: 628. 1923; Dop in Lecomte, Fl. Indo-Chine 4(7): 862. 1935; Kanjilal et al., Fl. Assam 3: 491. 1939; Bor, Man. Ind. For. Bot.: 304. 1953; Burkill, Dict. Econ. Prod. Malay Penins. 1: 594. 1966.

Clerodendrum kaempferi (Jacq.) Sieb. ex Steud., Nomencl. ed. 1: 207. 1821; Siebold ex Hassk., Cat. Hort. Bot. Bogor.: 136. 1844; Moldenke & A.L. Moldenke in Dassan. & Fosberg, Rev. Handb. Fl. Ceyl. 4: 415. 1983; Hô, Câyco Vietnam 2: 1052. 1993; A. Rajendran & P. Daniel, Ind. Verbenaceae: 121. 2002.

Volkameria dentata Roxb., Fl. Ind. 3: 61. 1832.

Volkameria coccinea (D. Dietr.) Schauer in A. DC., Prodr. 11: 669. 1847.

Clerodendrum imperialis Carrière, Rev. Hort.: 110. 1874.

Clerodendrum illustre N.E. Br., Gard. Chron. 2: 424. 1884.

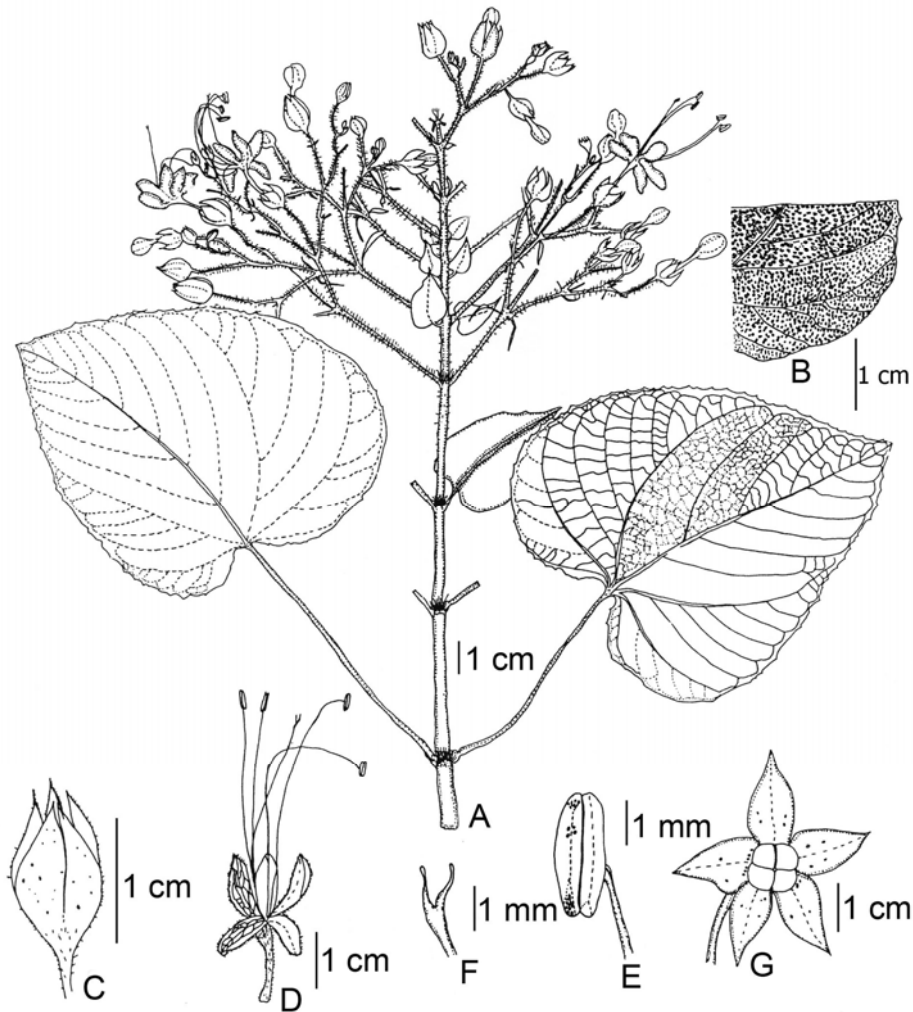


FIGURE 4. Drawing of *Clerodendrum japonicum* showing the: (A) flowering branch, (B) abaxial surface of leaves, (C) calyx, (D) flower without calyx (E) stamen, (F) stigma and (G) fruit with persistent calyx.

Clerodendrum dentatum (Roxb.) Steud.,
Nomencl. Bot., ed. 2, 1: 382. 1840.

Clerodendrum coccineum D. Dietr., Syn. Pl.
3: 616. 1842.

Clerodendrum darrisii H. Lév., Repert.
Spec. Nov. Regni Veg. 11: 301. 1912.

Clerodendrum esquirolii H. Lév., Repert.
Spec. Nov. Regni Veg. 11: 302. 1912.

Clerodendrum speciosum Teijsm. & Binn.
ex Wigman, Teysmannia 23: 285. 1912,
nom. Illeg.

Clerodendrum leveillei Fedde ex H. Lév., Fl.
Kouy-Tchéou: 442. 1915.

Clerodendrum squamatum var. *typicum* H.J.
Lam., Verben. Malay. Archip.: 303. 1919,
nom. illeg.

Clerodendrum coccineum H.J. Lam, Verben.
Malay. Archip.: 296. 1919.

Clerodendrum japonicum var. *album* P'ei,
Mem. Sci. Soc. China 1(3): 144. 1932.

Clerodendrum kaempferi var. *album* (P'ei)
Moldenke, Phytologia 1: 167. 1935.

Clerodendrum japonicum (Jacq.) Gandhi in C.J. Saldanda & D.H. Nicolson, Fl. Hassan Distr.: 487. 1976, *nom. illeg.*

Clerodendrum japonicum f. *album* (P'ei) Moldenke, Phytologia 61: 332. 1986.

Clerodendrum kaempferi f. *salmoneum* Moldenke, Phytologia 34: 18. 1976.

Clerodendrum kaempferi f. *album* (P'ei) Moldenke, Phytologia 61: 398. 1986.

Thailand.— NORTHERN: Mae Hong Son, Chiang Rai and Lampang; NORTHERN-EASTERN: Phetchabun; SOUTH-WESTERN: Kanchanaburi; SOUTH-EASTERN: Prachin Buri.

Distribution.— India, Bangladesh, Bhutan, China, Japan (type), Laos, Vietnam, Malaysia, Singapore and Indonesia.

Ecology.— Dry evergreen and mixed deciduous forests, 500–1,300 m. Flowering and Fruiting June–November.

Note.— *Clerodendrum japonicum* is distinguished from *C. intermedium* by having a longer calyx (10.5–20 mm long vs. 3.5–6.5 mm long), anthers (3.5–4 mm long vs. 1.5–3.2 mm long) and fruiting calyx (18–30 mm long vs. 5–10 mm long).

13. *Clerodendrum laevifolium* Blume

Clerodendrum laevifolium Blume, Bijdr. Fl. Ned. Ind.: 808. 1826; Schauer in A. DC., Prodr. 11: 674. 1847; Miq., Fl. Ind. Bat. 2: 872. 1858; H.J. Lam, Verben. Malay. Archip.: 266. 1919; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 80. 1921; Kochummen in Ng, Tree Fl. Mal. 3: 305. 1978; Moldenke, Fifth Summary Verbenac. 1: 295. 1971; Moldenke, Phytologia Mem. 2: 284. 1980.

Clerodendrum nutans Wall. [Cat. no. 1793. 1829, *nom. nud.*] ex D. Don, Prod. Fl. Nepal: 103. 1825, *nom. illeg.*; Walp., Repert. Bot. Syst. 4: 104. 1845; Kurz, Fl. Burm. 2: 268. 1877; Prain, Bengal Pl. 2: 835. 1903; Brandis, Indian Trees: 508. 1906; Hall.f., Meded. Rijks-Herb. 37: 72. 1918; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 81. 1921; Dop in Lecomte, Fl. Indo-Chine 4(7): 871. 1935; Kanjilal et al., Fl. Assam 3: 491. 1939.

Clerodendrum ellipticum Zipp. ex Span., Linnaea 15: 329. 1841.

Clerodendrum wallichii Merr., J. Arn. Arb. 33: 220. 1952; Back. & Bakh.f., Fl. Java 2: 611. 1965; Moldenke & A.L. Moldenke in Dassan. & Fosberg, Rev. Handb. Fl. Ceyl. 4: 440. 1983; Chen & M.G. Gilbert in Wu & Raven, Fl. China 17: 36. 1994; Hô, Cáyco Viêtnam 2: 1058. 1993; Phuong in N.T. Ban et al., Fl. Vietnam 3: 292. 2005.

Clerodendrum laevifolium var. *pubiflorum* Bakh. ex Moldenke, Phytologia 61: 461. 1987.

Thailand.— NORTHERN: Chiang Mai.

Distribution.— India, Bangladesh, Sri Lanka, Nepal, Bhutan, Sikkim, Myanmar, China, Vietnam, Malaysia, Singapore, Indonesia (Java, type) and widely cultivated in tropical and subtropical regions.

Ecology.— Cultivated as ornamental shrub. Flowering and Fruiting September–December.

Vernacular.— Raya-Kaew (Central).

Note.— *Clerodendrum laevifolium* is morphologically similar to *C. nutans*, but differs in having an ovate or ovate-lanceolate

shaped calyx lobe (more than 3 mm wide vs. 1–2.6 mm wide). It is also closely allied to *C. umbratile*, but differs in having a shorter calyx (8.5–11.5 mm long vs. 11.5–18 mm long), fruiting calyx (less than 14 mm long vs. 14–20 mm long) and petiole (0.5–2.5 cm long vs. (2.5–) 4–12 cm long).

**14. *Clerodendrum lankawiense*
King & Gamble
(Figure 5)**

Clerodendrum lankawiense King & Gamble, Bull. Misc. Inform., Kew 1908: 110. 1908 & J. Asiat. Soc. Bengal 74: 830. 1909; H.J. Lam, Verben. Malay. Archip.: 249. 1919; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 95. 1921; Ridl., Fl. Malay Penins. 2: 625. 1923; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 426. 1938; Congdon, Nat. Hist. Bull. Siam Soc. 30(2): 185. 1982; Kochummen in Ng, Tree Fl. Mal. 3: 304. 1978.

Thailand.— PENINSULAR: Chumphon, Ranong, Surat Thani, Phangnga and Satun (Tarutau).

Distribution.— Malaysia (Keda, type).

Ecology.— Tropical evergreen rain forest, sometimes along seashore and rubber plantation, 0–500 m. Flowering and Fruiting October–March.

Note.— *Clerodendrum lankawiense* differs from *C. godefroyi* in its leaf blade, which is coarse to touch and is covered with hirsute hairs on the adaxial surface of leaves, and having a reddish calyx (green in *C. godefroyi*).

**15. *Clerodendrum lloydianum* Craib
(Figure 6)**

Clerodendrum lloydianum Craib, Bull. Misc. Inform., Kew 1914: 284. 1914; Dop in Lecomte, Fl. Indo-Chine 4(7): 871. 1935; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 427. 1938; C. Leeratiwong & P. Chantaranothai, Thai For. Bull. (Bot.) 31: 45. 2003.

Thailand.— NORTHERN: Lamphun, Lampang, Phrae (alt. 180 m, *Vanpruk* 499, lectotype K!; isolectotype K!; lectotypified by Leeratiwong & Chantaranothai, 2003), Tak, Sukhothai, Phitsanulok, Kamphaeng Phet and Nakhon Sawan; NORTH-EASTERN: Phetchabun, Loei and Khon Kaen; EASTERN: Chaiyaphum and Nakhon Ratchasima; SOUTH-WESTERN: Uthai Thani and Kanchanaburi; CENTRAL: Saraburi.

Distribution.— Endemic to Thailand.

Ecology.— Dry evergreen and mixed deciduous forests, sometimes on limestone bedrock, 150–1,000 m. Flowering and Fruiting August–January.

Vernacular.— Kabuea Khaao (Loei), Chaa Hom (Lamphun) and Phing Noi.

Note.— *Clerodendrum lloydianum* is distinguishable from *C. godefroyi* by its villous hairs on the adaxial leaf surface (tomentose hairs in *C. godefroyi*) and shorter corolla tube (less than 20 mm long vs. 20–28 mm long).

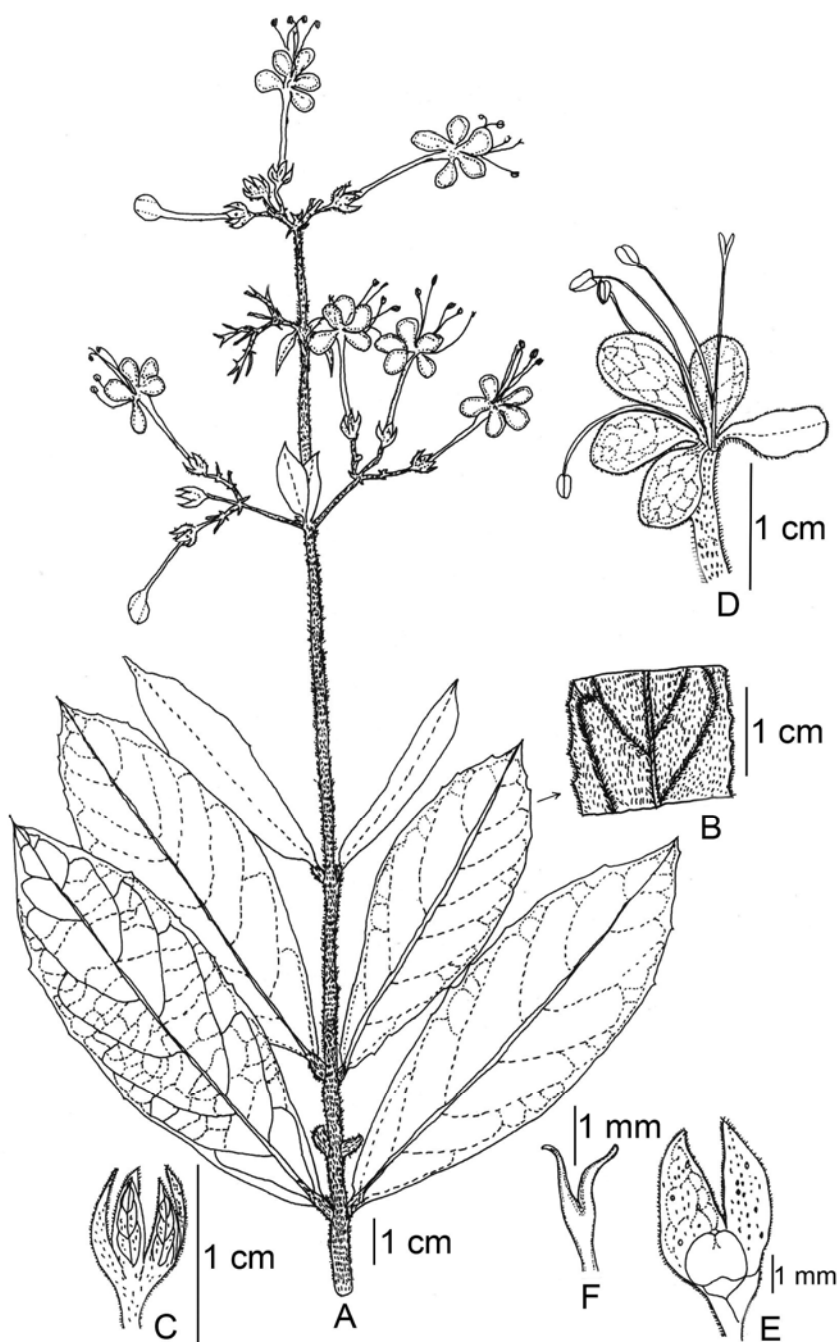


FIGURE 5. Drawing of *Clerodendrum lankawiense* showing the: (A) flowering branch, (B) abaxial surface of leaves, (C) calyx, (D) flower without calyx, (E) ovary with calyx and (F) stigma.

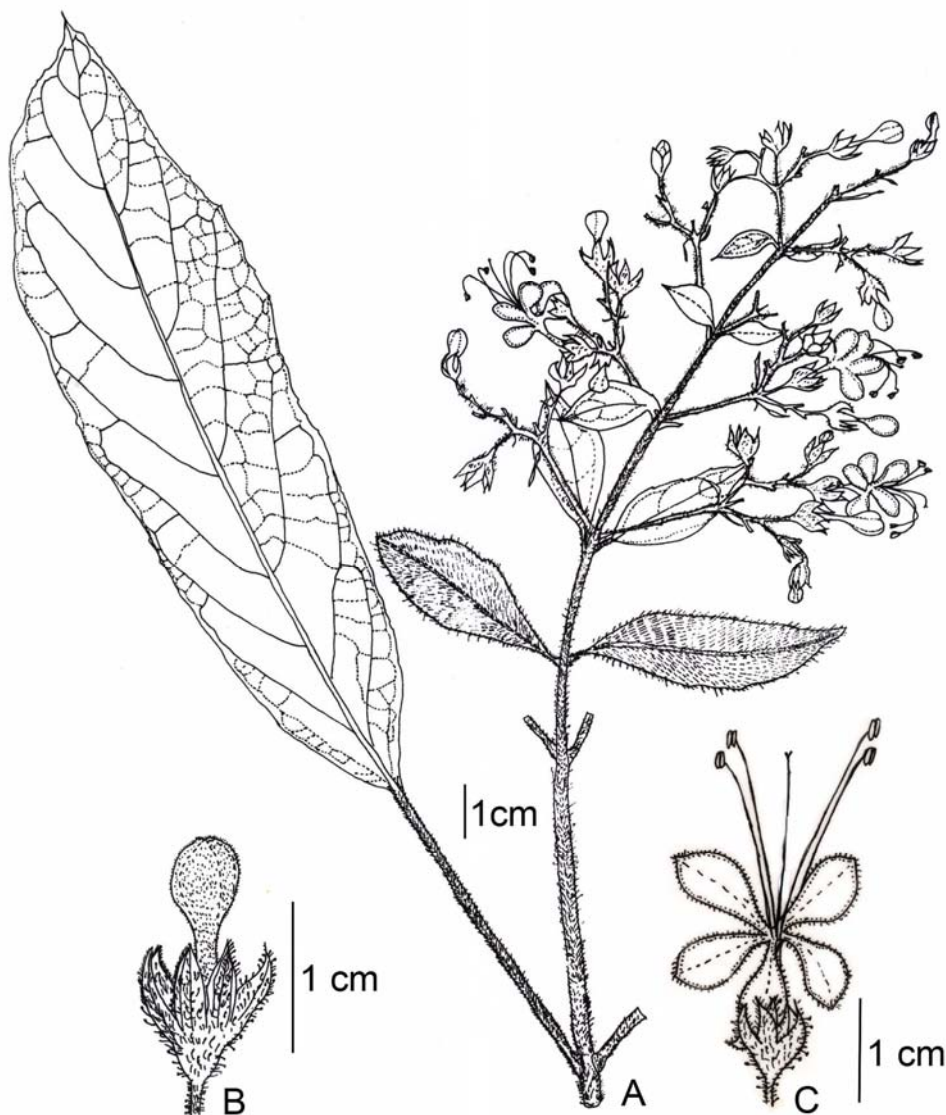


FIGURE 6. Drawing of *Clerodendrum lloydianum* showing the: (A) flowering branch, (B) young flower and (C) opening flower.

**16. *Clerodendrum longisepalum* Dop
(Figure 7)**

Clerodendrum longisepalum Dop, Not. Syst. 4: 11. 1920 & in Lecomte, Fl. Indo-Chine 4(7): 866. 1935; Hô, Câyco Việt Nam 2: 1053. 1993; Phuong in N.T. Ban et al., Fl. Vietnam 3: 291. 2005.

Thailand.— NORTHERN: Chiang Mai, Lampang and Phrae; NORTH-EASTERN: Maha Sarakham and Khon Kaen; EASTERN: Ubon Ratchathani (Kemmarath, 1806-1868, *Thorel* 2767, lectotype K!, selected here; isolectotype P!); SOUTH-WESTERN: Uthai Thani; CENTRAL: Ang Thong, Phra Nakhon Si Ayutthaya and

Krung Thep Maha Nakhon; SOUTH-EASTERN: Chon Buri and Chanthaburi.

Distribution.— Laos, Cambodia and Vietnam.

Ecology.— Mixed deciduous and freshwater swamp forests, 0–1,000 m. Flowering and Fruiting November–March.

Vernacular.— Kaa Salong, Kaa Salong Thet (Northern), Khoi Dam and Khom Phlee.

Note.— *Clerodendrum longisepalum* is closely related to *C. calamitosum* from Indonesia and was introduced as an ornamental plant, but it differs in being glabrous or sparsely hairy on the abaxial surface of leaves, glabrous at the outside of the corolla tube base, and having longer filaments (1.9–3.3 cm long vs. 1.4–2 cm long). However, most Thai specimens of this species were previously identified as *C. laevifolium* Blume. The type specimen of both species have been examined, which revealed that *C. longisepalum* is different from *C. laevifolium* in having both terminal and axillary upright inflorescence (rather than only pendulously terminal) narrowly oblong, narrowly lanceolate and linear-oblong calyx lobes (rather than lanceolate-ovate or ovate) and more narrowly calyx lobes (0.8–2.5 mm wide rather than more than 2.5 mm wide).

17. *Clerodendrum macrostachyum* Turcz.

Clerodendrum macrostachyum Turcz., Bull. Soc. Imp. Naturalistes Moscou 36(2): 220. 1863; C.B. Clarke in Hook.f., Fl. Brit. India 4: 591. 1885; Brandis, Indian Trees: 508. 1906; H.J. Lam, Verben. Malay. Archip.: 264. 1919; Kanjilal et

al., Fl. Assam 3: 492. 1939; A. Rajendran & P. Daniel, Ind. Verbenaceae: 215. 2002.

Clerodendrum subscaposum Hemsl. in Hook. Icon. Pl. 27: t. 2675. 1900; P'ei, Mem. Sci. Soc. China 2(3): 128. 1932; Dop in Lecomte, Fl. Indo-Chine 4(7): 855. 1935; Hô, Câyco Viêt Nam 2: 1057. 1993; Chen & M.G. Gilbert in Wu & Raven, Fl. China 17: 42. 1994; Leeratiwong & Chantaranothai, Thai Forest Bull. (Bot.). 29: 25. 2001; Phuong in N.T. Ban et al., Fl. Vietnam 3: 292. 2005.

Thailand.— NORTHERN: Chiang Mai and Chiang Rai.

Distribution.— India, Myanmar, China, Vietnam and Singapore (type ?).

Ecology.— Lower montane rain and mixed deciduous forests, on limestone bedrock 1,100–1,800 m. Flowering and Fruiting September–January.

Note.— *Clerodendrum macrostachyum* can be distinguished from all other species by its short calyx (1.8–2.5 mm long) with truncate or with 5 minute triangular teeth at the apex.

18. *Clerodendrum minahassae* Teijsm. & Binn.

Clerodendrum minahassae Teijsm. & Binn., Natuurk. Tijdschr. Ned.-Indië 25: 409. 1863; Merr., Fl. Manila: 402. 1912; Hall.f., Meded. Rijks-Herb. 37: 76. 1918; H.J. Lam, Verben. Malay. Archip.: 314. 1919; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 85. 1921; Merr., En. Philipp.: 403. 1923; Back. & Bakh.f., Fl. Java 2: 608. 1965; Moldenke & A.L. Moldenke in Dassan.

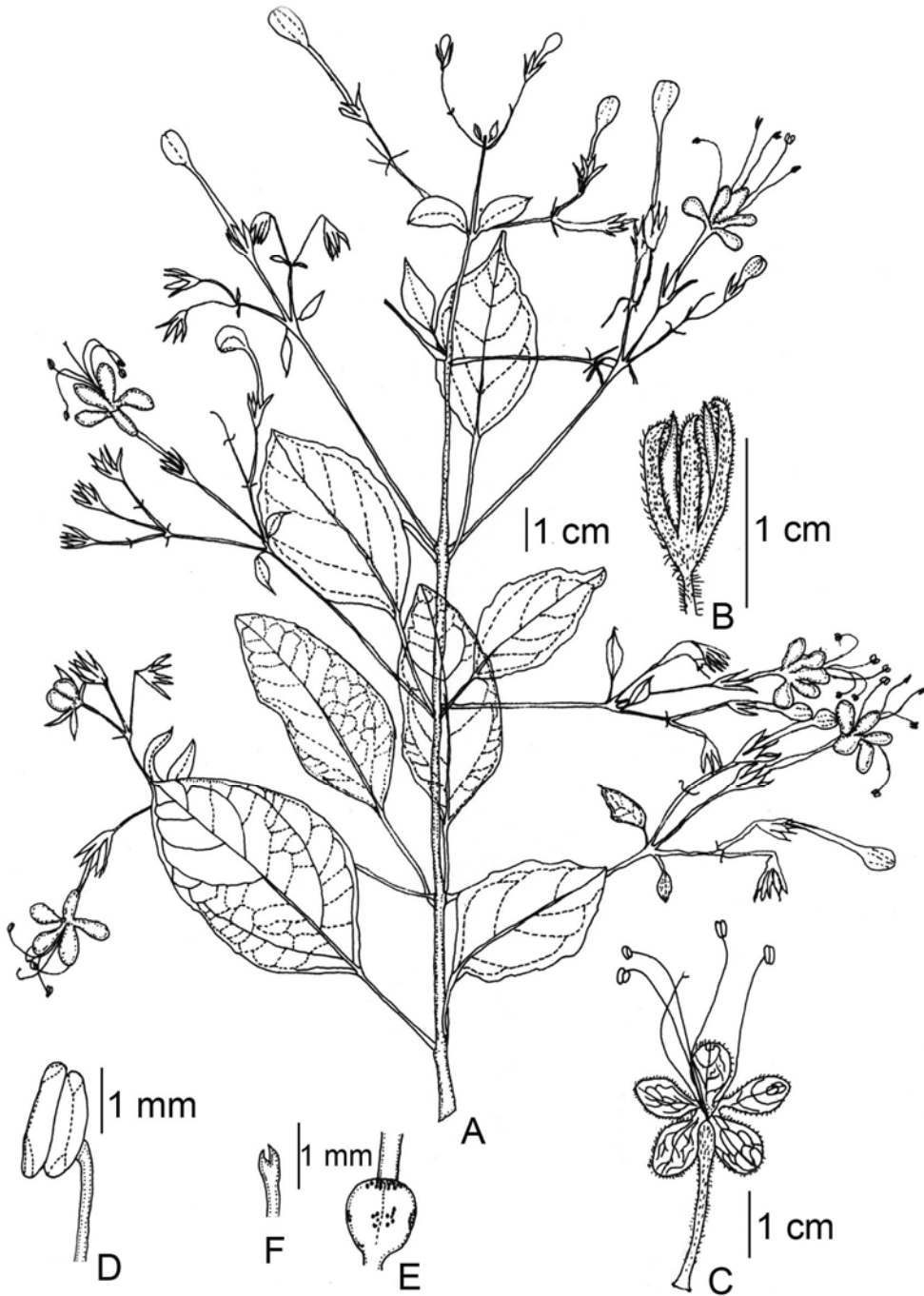


FIGURE 7. Drawing of *Clerodendrum longisepalum* showing the: (A) flowering branch, (B) calyx, (C) flower without calyx, (D) stamen, (E) ovary and (F) stigma.

& Fosberg, Rev. Handb. Fl. Ceyl. 4: 442. 1983.

Clerodendrum blancoi Náves ex Fern.–Vill. in F.M. Blanco, Fl. Filip., ed. 3, 4(13A): 161. 1880.

Siphoboea commersonii Baill., Bull. Soc. Linn. Paris 1: 722. 1888.

Clerodendrum minahassae var. *grandicalyx* Moldenke, Phytologia 23: 315. 1972.

Thailand.— NORTHERN: Chiang Mai; CENTRAL: Krung Thep Maha Nakhon.

Distribution.— Native to the Philippines and Indonesia (type), cultivation in many parts of tropical Asia, Hawaiian Islands, Florida, the West Indies and Europe.

Ecology.— Cultivated as an ornamental outdoors. Flowering and Fruiting November–May.

19. *Clerodendrum myrmecophila* Ridl. (Figure 8)

Clerodendrum myrmecophilum Ridl., J. Bot. 33: 42. 1895; Hook.f., Bot. Mag.: t. 7887. 1903; King & Gamble, J. Asiat. Soc. Bengal 74: 832. 1909; H.J. Lam, Verben. Malay. Archip.: 280. 1919; Ridl., Fl. Malay Penins. 2: 628. 1923; Henderson, Malay. Wild Flowers, Dicot.: 386. 1959.

Clerodendrum phyllomega Steud., Nomencl. Bot., ed. 2, 1: 383. 1840 var. *myrmecophila* (Ridl.) Moldenke, Phytologia 4: 51. 1952; Keng, Con. Fl. Singapore: 193. 1990.

Clerodendrum macrophyllum Blume, Bijdr. Fl. Ned. Ind.: 811. 1826 var. *myrmecophilum* (Ridl.) Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 82. 1921.

Thailand.— PENINSULAR: Narathiwat.

Distribution.— Malaysia, Indonesia, Singapore (type) and Philippines.

Ecology.— Tropical evergreen rain forest, 200–970 m. Flowering and Fruiting August–November.

Note.— *Clerodendrum myrmecophilum* is characterised by having a swollen stem, a glabrous and gluacous on the abaxial leaf surface, entire leaf margins and red to reddish-orange corolla.

20. *Clerodendrum nutans* Wall. ex Jack

Clerodendrum nutans Wall. ex Jack, Mal. Misc. 1(1): 17. 1820; Merr. in J. Arn. Arb. 33: 220. 1952; Henderson, Malay. Wild Flowers, Dicot.: 386. 1959; Kochummen in Ng, Tree Fl. Mal. 3: 304. 1978; Hô, CÂYCO VIỆT NAM 2: 1054. 1993; Keng, Con. Fl. Singapore: 193. 1990.

Clerodendrum jackianum Wall., Cat. no. 1794. 1829, *nom. superfl.*

Clerodendrum penduliflorum Wall. [Cat. no. 1795. 1829, *nom. nud.*] ex Walp., Repert. Bot. Syst. 4: 104. 1845; Schauer in A. DC., Prodr. 11: 664. 1847; Miq., Fl. Ind. Bat. 2: 873. 1858; C.B. Clarke in Hook.f., Fl. Brit. India 4: 591. 1885; Brandis, Indian Trees: 508. 1906; King & Gamble, J. Asiat. Soc. Bengal 74: 830. 1909; H.J. Lam, Verben. Malay. Archip.: 265. 1919; Ridl., Fl. Malay Penins. 2: 626. 1923; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 427. 1938.

Thailand.— NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai and Tak; SOUTH-WESTERN: Kanchanaburi; CENTRAL: Krung Thep Maha Nakhon; EASTERN: Chon Buri, Rayong, Chanthaburi and Trat;

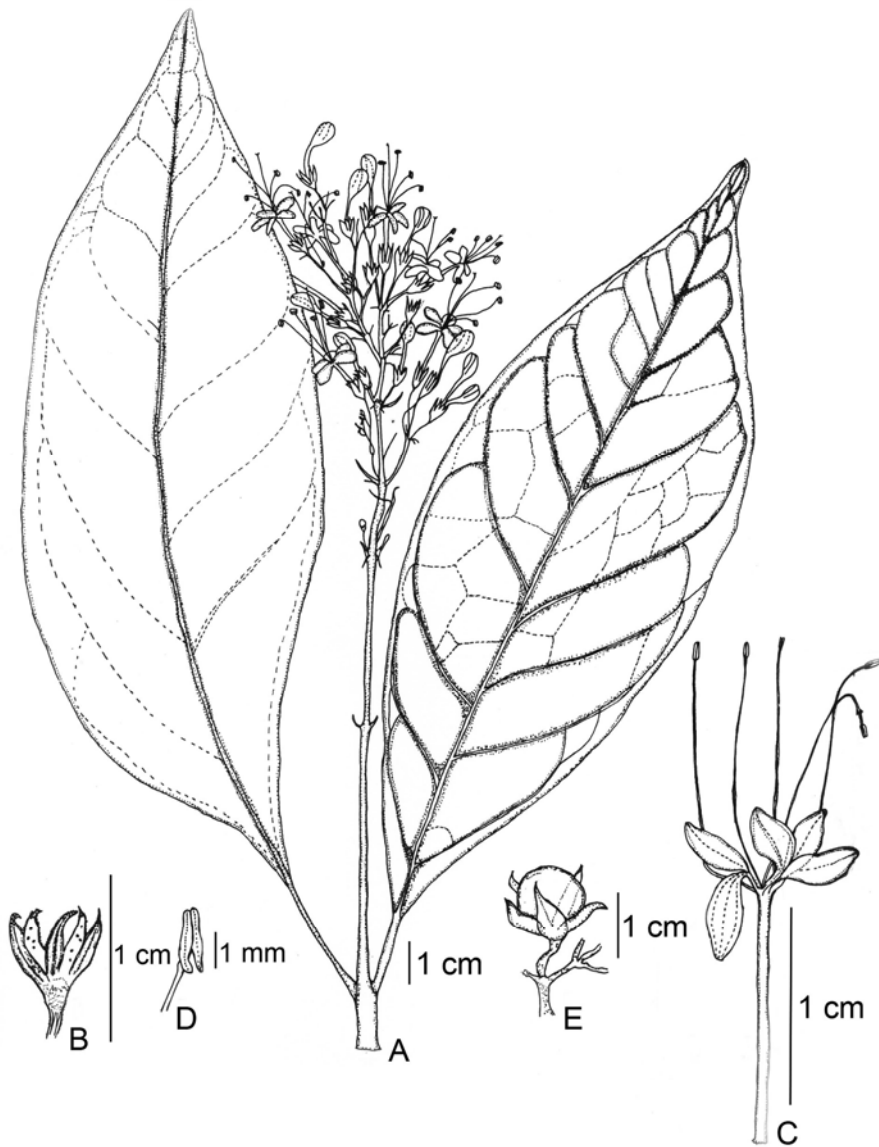


FIGURE 8. Drawing of *Clerodendrum myrmecophyllum* showing the: (A) flowering branch, (B) calyx, (C) flower without calyx, (D) stamen, (E) fruit with persistent calyx.

PENINSULAR: Chumphon, Ranong, Phuket, Nakhon Si Thammarat, Trang, Satun, Songkhla, Yala and Narathiwat.

Distribution.— India, Myanmar, Vietnam, Malaysia (type) and Indonesia (Sumatra).

Ecology.— Tropical evergreen rain, dry evergreen and mixed deciduous forests, sometimes on limestone bedrock, 50–1,800 m. Flowering and Fruiting throughout the year.

Vernacular.— Dang Waai, Pang Phuang, Phlik Yaan, Yaai Klung Dokkhaao (Peninsular) and Yaai Klang.

Note.— *Clerodendrum nutans* is characterized by the leaf which is membranous (mostly black in dried specimens) and an elongate thyrsoïd and pendulous inflorescence. Merrill (1952) and Kochummen (1978) accepted that *C. penduliflorum* is a synonym of *C. nutans*, however Govaerts et al. (2011) recorded *C. penduliflorum* as a synonym of *C. wallichii* (synonym of *C. laevifolium*). From examination of these type specimens, we found that *C. penduliflorum* is different from *C. wallichii*. Therefore, *C. penduliflorum* is considered as a synonym of *C. nutans*. This species can be distinguished from *C. laevifolium* by its elliptic, lanceolate, lanceolate-elliptic or oblong-lanceolate (ovate to ovate-lanceolate in *C. laevifolium*) and narrower calyx lobes (1–3 mm wide vs. more than 3 mm wide).

21. *Clerodendrum paniculatum* L.

Clerodendrum paniculatum L., Mant. Pl. 1: 90. 1767; Blume, Bijdr. Fl. Ned. Ind.: 811. 1826; Walp., Repert. Bot. Syst. 4: 102. 1845; Schauer in A. DC., Prodr. 11: 668. 1847; Miq., Fl. Ind. Bat. 2: 879. 1858; C.B. Clarke in Hook.f., Fl. Brit. India 4: 593. 1885; Brandis, Indian Trees: 508. 1906; King & Gamble, J. Asiat. Soc. Bengal 74: 838. 1909; Hall.f., Meded. Rijks-Herb. 37: 81. 1918; H.J. Lam, Verben. Malay. Archip.: 295. 1919; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 92. 1921; Ridl., Fl. Malay Penins. 2: 628. 1923; P'ei, Mem. Sci. Soc. China 2(3): 144. 1932; Dop in Lecomte, Fl. Indo-Chine 4(7): 864. 1935; H.R. Fletcher, Bull.

Misc. Inform., Kew 1938: 429. 1938; Back. & Bakh.f., Fl. Java 2: 609. 1965; Burkill, Dict. Econ. Prod. Malay Penins. 1: 593. 1966; Congdon, Nat. Hist. Bull. Siam Soc. 30(2): 185. 1982; Hsiao, Fl. Taiwan: 423. 1978; Kochummen in Ng, Tree Fl. Mal. 3: 304. 1978; Moldenke & A.L. Moldenke in Dassan. & Fosberg, Rev. Handb. Fl. Ceyl. 4: 417. 1983; Keng, Con. Fl. Singapore: 193. 1990; Hô, CÂYCO VIỆT NAM 2: 1055. 1993; Chen & M.G. Gilbert in Wu & Raven, Fl. China 17: 36. 1994; A. Rajendran & P. Daniel, Ind. Verbenaceae: 128. 2002; Phuong in N.T. Ban et al., Fl. Vietnam 3: 293. 2005. *Volkameria angulata* Lour., Fl. Cochinch.: 389. 1790. *Volkameria diversifolia* Vahl, Symb. Bot. 2: 75. 1791. *Clerodendrum diversifolium* Vahl, Symb. Bot. 2: 75. 1791. *Clerodendrum pyramidale* Andrews, Bot. Repos. 10: t. 628. 1811. *Cleianthus coccineus* Lour. ex B.A. Gomes, Mem. Acad. Real Sci. Lisboa, 2 Cl. Sci. Moraes, n.s., 4(1): 28. 1868. *Clerodendrum paniculatum* var. *diversifolium* (Vahl) C.B. Clarke in Hook.f., Fl. Brit. India 4: 593. 1885. *Clerodendrum citrinum* Ridl., J. Fed. Malay States Mus. 5: 165. 1915.

Thailand.— NORTHERN: Chiang Mai, Chiang Rai and Lampang; NORTH-EASTERN: Loei, Sakon Nakhon, Nakhon Phanom, Mukdahan, Kalasin and Khon Kaen; EASTERN: Nakhon Ratchasima and Ubon Ratchathani; SOUTH-WESTERN: Uthai Thani, Ratchaburi, Phetchaburi and Prachuap Khiri Khan; CENTRAL: Saraburi, Nakhon Nayok and Krung Thep Maha Nakhon; SOUTH-EASTERN: Chon Buri, Rayong, Chanthaburi and Trat; PENINSULAR: Ranong, Surat Thani, Krabi,

Phangnga, Nakhon Si Thammarat, Trang, Phatthalung, Satun, Songkhla, Pattani, Yala and Narathiwat.

Distribution.— India (type), Bangladesh, Sri Lanka, Myanmar, China, Taiwan, Laos, Cambodia, Vietnam, Malaysia, Indonesia and Australia.

Ecology.— Tropical evergreen rain, dry evergreen, deciduous dipterocarp and mixed deciduous forests, common along roadsides or sometimes near limestone areas, 0–800 m. Flowering and Fruiting throughout the year.

Vernacular.— Chat Faa, Nom Sawan (Central, Peninsular), Ping-chong Waa (Khmer-Surin), Phanom Sawan (Central), Phanom Sawan Doklueang, Phuang Phee Khaao, Phuang Phee Lueang (Loei), Phuu Muak (Bangkok), Saa Sawan (Nakhon Ratchasima) and Hua Ling (Saraburi).

Note.— *Clerodendrum paniculatum* is closely related to *C. intermedium* and *C. japonicum*, but differs in having leaf blades with 3–7 shallow or deep lobes.

22. *Clerodendrum quadriloculare* (Blanco) Merr.

Clerodendrum quadriloculare (Blanco) Merr., Philipp. Gov. Lab. Bur. Bull. 35: 63. 1905 & Fl. Manila: 402. 1912; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 85. 1921; Merr., En. Philipp.: 404. 1923.

Ligustrum quadriloculare Blanco, Fl. Filip.: 10. 1837.

Clerodendrum blancoanum Fern.–Vill. in F.M. Blanco, Fl. Filip., ed. 3, 4(13A): 161. 1880.

Clerodendrum navesianum Vidal, Cat. Met. Pl. Leños.: 398. 1880.

Thailand.— NORTHERN: Chiang Mai; CENTRAL: Nakhon Nayok and Krung Thep Maha Nakhon; PENINSULAR: Songkhla.

Distribution.— Philippines (type) and New Guinea.

Ecology.— Widely cultivated as ornamental shrub or tree, 70–600 m. Flowering and Fruiting November–April.

Vernacular.— Choraka (Northern), Rachinee Sansaai and Saa Sansaai (Central).

Note.— *Clerodendrum quadriloculare* is recognized by its purple abaxial surface of the leaves, corymb-thyrsoïd inflorescence, calyx lobes which are shorter than the calyx tube and 7–12 cm long corolla.

23. *Clerodendrum schmidtii* C.B. Clarke (Figure 9)

Clerodendrum schmidtii C.B. Clarke, Bot. Tidsskr. 26: 173. 1905 & Fl. Koh Chang: 325. 1900–1916; Dop in Lecomte, Fl. Indo-Chine 4(7): 877. 1935; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 428. 1938. Moldenke, Fifth Summary Verbenac.1: 295. 1971 & Phytologia Mem. 2: 284. 1980; Hô, Câyno Viêt Nam 2: 1057. 1993; C. Leeratiwong & P. Chantaranonthai, Thai For. Bull. (Bot.) 31: 45. 2003.

Clerodendrum hastato-oblongum C.B. Clarke, Bot. Tidsskr. 26: 174. 1905 & Fl. Koh Chang: 326. 1900–1916; Dop in Lecomte, Fl. Indo-Chine 4(7): 877. 1935.

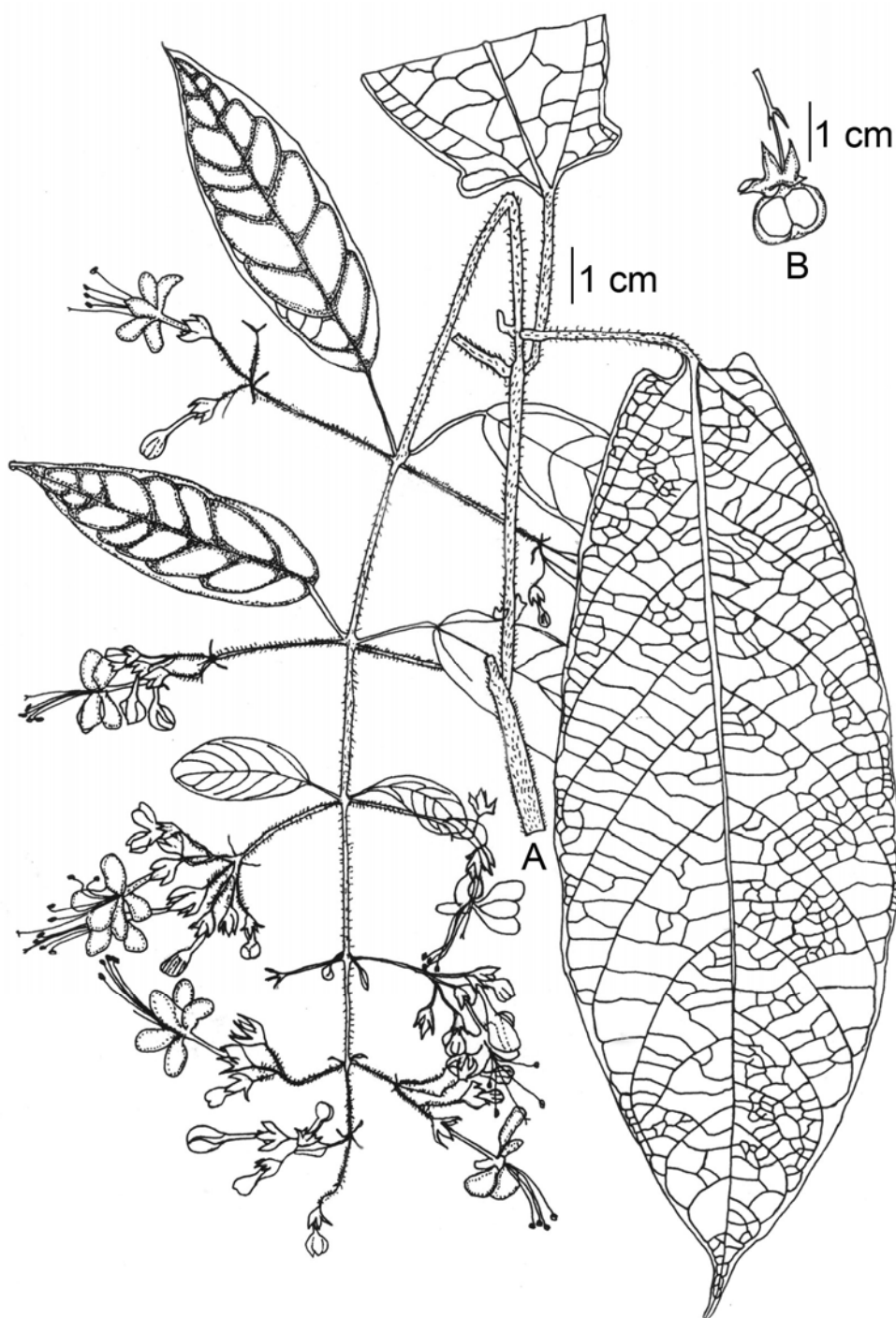


FIGURE 9. Drawing of *Clerodendrum schmidtii* showing the: (A) flowering branch and (B) fruit with persistent calyx.

Clerodendrum schmidtii var. *macrophyllum*
Moldenke, Phytologia 23: 180. 1972.

Clerodendrum schmidtii var. *glanduliferum*
Moldenke, Phytologia 43: 196. 1979.

Thailand.— NORTH-EASTERN: Sakon Nakhon, Mukdahan and Khon Kaen; EASTERN: Nakhon Ratchasima, Surin, Amnat Charoen, Si Sa Ket and Ubon Ratchathani; SOUTH-WESTERN: Prachuab Khiri Khan; CENTRAL: Saraburi and Nakhon Nayok; SOUTH-EASTERN: Prachin Buri, Chon Buri, Rayong, Chanthaburi and Trat (Chang Island, Klawng Nonsi, Schmidt 740, lectotype K!; isolectotypes C!, BM; lectotypified by Leeratiwong and Chantaranothai, 2003).

Distribution.— Laos and Cambodia.

Ecology.— Tropical evergreen rain, dry evergreen, mixed deciduous and deciduous dipterocarp forests, 0–485 m. Flowering and Fruiting June–March.

Vernacular.— Taai Bai, Thao Yaai Mom Paa and Put Raa Chaa (Chanthaburi).

Note.— *Clerodendrum schmidtii* differs from most other Thai *Clerodendrum* species in being coarse to touch on the leaf surfaces, a cordate to auriculate leaf base, pedulous inflorescence and calyx covered with hairs on both surfaces.

24. *Clerodendrum smitinandii* Moldenke (Figure 10)

Clerodendrum smitinandii Moldenke, Phytologia 7: 79. 1959; C. Leeratiwong & P. Chantaranothai, Thai For. Bull. (Bot.) 31: 45. 2003.

Thailand.— SOUTH-EASTERN: Chachoengsao and Chanthaburi (Pong Namrawn Smitinand 3197, holotype Moldenke Personal Herbarium, New York).

Distribution.— Cambodia and Vietnam.

Ecology.— Tropical evergreen rain and dry evergreen forests, 600–1,500 m. Flowering and Fruiting January–July.

Vernacular.— Nom Sawan Ton (Chanthaburi).

Note.— *Clerodendrum smitinandii* is characterised by being a small tree (7–15 m tall), and having a corymb-thyrsoid inflorescence and red calyx.

25. *Clerodendrum splendens* G. Don

Clerodendrum splendens G. Don in James, Edin. New Philos. J. 11: 349. 1824; Walp., Repert. Bot. Syst. 4: 113. 1845; Schauer in A. DC., Prodr. 11: 662. 1847; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 80. 1921; Back. & Bakh.f., Fl. Java 2: 611. 1965; Moldenke & A.L. Moldenke in Dassan. & Fosberg, Rev. Handb. Fl. Ceyl. 4: 435. 1983.

Siphonanthus splendens (G. Don) Hiern, Cat. Afr. Pl. 1: 841. 1900.

Clerodendrum aurantium G. Don, in James, Edin. New Philos. J. 11: 349. 1824.

Clerodendrum rollisonii Rollison, Cat. 1870–1871: 56. 1870.

Clerodendrum giletii De Wild. & T. Durand, Bull. Soc. Roy. Bot. Belgique, Compt. Rend. 38: 113. 1899.

Clerodendrum splendens var. *giletii* (De Wild. & T. Durand) B. Thomas, Bot. Jahrb. Syst. 68: 58. 1963.

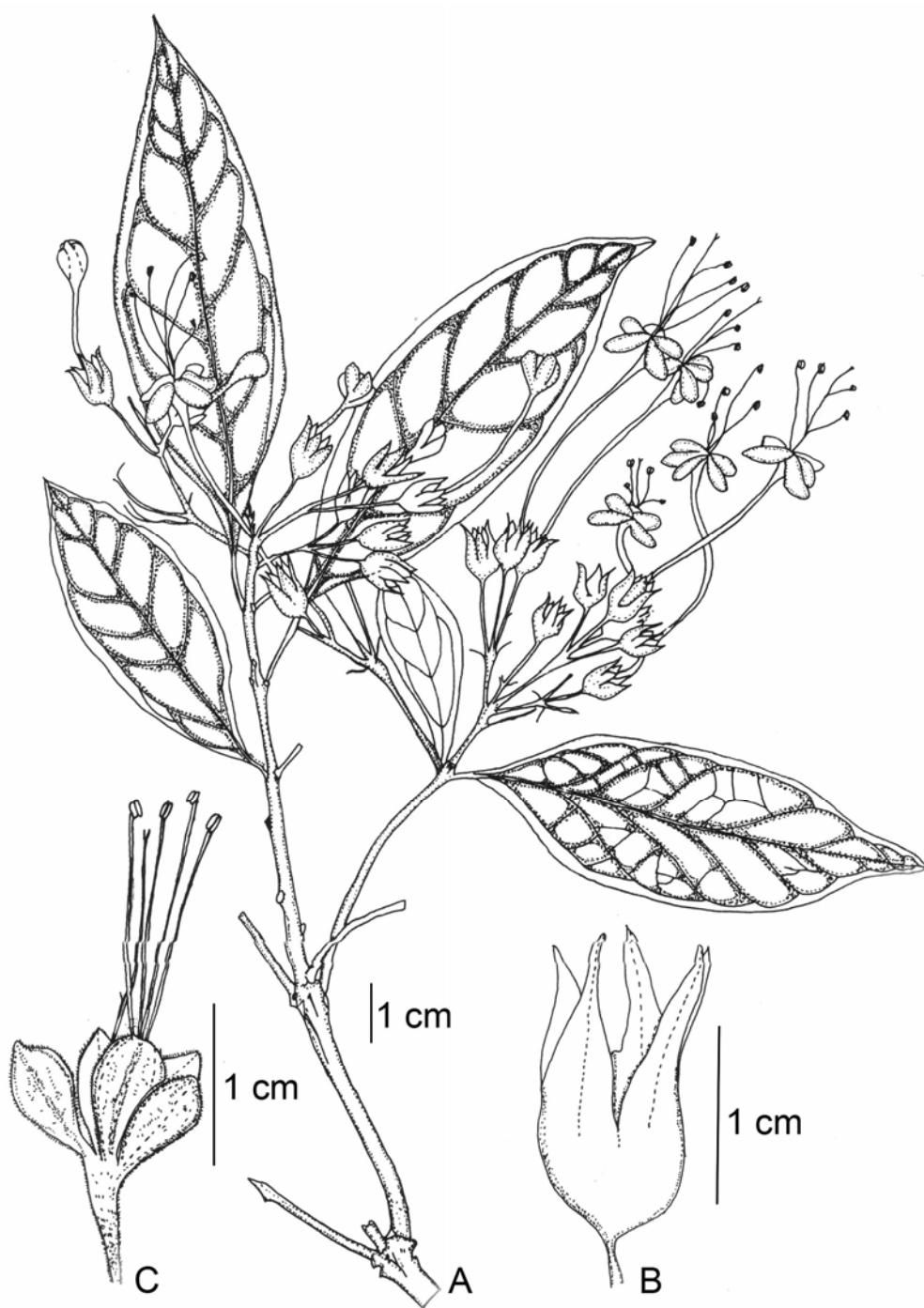


FIGURE 10. Drawing of *Clerodendrum smitinandii* showing the: (A) flowering branch, (B) calyx and (C) flower without calyx.

Thailand.— CENTRAL: Saraburi and Krung Thep Maha Nakhon.

Distribution.— Native to central and western Africa (Sierra Leone, type), now rather widely cultivated in temperate parts of Asia, Africa, Australia, Europe, North America and the West Indies.

Ecology.— Introduced species as an ornamental plant; Flowering and Fruiting December-May.

Vernacular.— Phuang Kao Daeng (Bangkok) and Phuang Naak (Central).

Note.— *Clerodendrum splendens* is recognised as a scandent shrub with a red colour on the calyx and corolla.

26. *Clerodendrum thomsoniae* Balf.f.

Clerodendrum thomsoniae Balf.f., Edinburgh New Philos. J., ser. 2, 15: 233, pl. 2. 1862; King & Gamble, J. Asiat. Soc. Bengal 74: 827. 1909; Merr., Fl. Manila: 402. 1912; Hall.f., Meded. Rijks-Herb. 37: 72. 1918; H.J. Lam, Verben. Malay. Archip.: 255. 1919; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 80. 1921; Merr., En. Philipp.: 405. 1923; Dop in Lecomte, Fl. Indo-Chine 4(7): 880. 1935; Bor, Man. Ind. For. Bot.: 845. 1953; Back. & Bakh.f., Fl. Java 2: 611. 1965; Hsiao, Fl. Taiwan: 424. 1978; Moldenke & A.L. Moldenke in Dassan. & Fosberg, Rev. Handb. Fl. Ceyl. 4: 433. 1983; Keng, Con. Fl. Singapore: 193. 1990; Hô, Cáyco Viêtnam 2: 1048. 1993; Phuong in N.T. Ban et al., Fl. Vietnam 3: 292. 2005.

Clerodendrum thomsoniae var. *balfourii* B.D. Jacks. ex Dombrain, Fl. Mag. (London) 4: t. 255. 1865.

Clerodendrum balfourii (B.D. Jacks. ex Dombrain) Dombrain, Fl. Mag. (London) 8: t. 432. 1869.

Thailand.— NORTHERN: Chiang Mai; NORTH-EASTERN: Maha Sarakham and Khon Kaen; PENINSULAR: Satun and Songkhla.

Distribution.— Native to west tropical Africa ranging from Senegal and Gambia to Zaire, now cultivated throughout tropical and subtropical regions. Type specimen was collected from a living plant at the Edinburgh Botanical Garden (E).

Ecology.— Introduced for ornament. Flowering and Fruiting throughout the year.

Vernacular.— Puang Keaw, Phuang Ngueng, Mangkon Khaap Kao (Chiang Mai) and Hua Chaai Taek.

Note.— *Clerodendrum thomsonae* is close to *C. splendens*, but differs in having a white rather than red, longer calyx (more than 1 cm long vs. 0.5–1 cm long). A hybrid species, *C. x speciosum* Teijsm. & Binn. is possibly a cross between *C. splendens* and *C. thomsoniae* and is often mistaken as *C. thomsoniae*. The difference is the former has a white calyx while the latter has pink to whitish-pink.

27. *Clerodendrum umbratile* King & Gamble

Clerodendrum umbratile King & Gamble, Bull. Misc. Inform., Kew 1908: 110. 1908 & J. Asiat. Soc. Bengal 74: 831. 1909; H.J. Lam, Verben. Malay. Archip.: 265. 1919; Ridl., Fl. Malay Penins. 2: 627. 1923; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 428. 1938; Burkill,

Dict. Econ. Prod. Malay Penins. 1: 594. 1966; Kochummen in Ng, Tree Fl. Mal. 3: 302. 1978; C. Leeratiwong & P. Chantaranothai, Thai For. Bull. (Bot.) 31: 45. 2003.

Thailand.— PENINSULAR: Chumphon, Ranong, Surat Thani, Phangnga and Narathiwat.

Distribution.— Malaysia (Perak, type) and Indonesia.

Ecology.— Tropical evergreen rain and lower montane rain forests, 60–1,300 m. Flowering and Fruiting October–March.

Note.— *Clerodendrum umbratile* is close to *C. nutans* but differs from *C. nutans* in having ovate or ovate-lanceolate shaped calyx lobes (rather than lanceolate, elliptic-lanceolate or lanceolate-oblong), a longer calyx (11–18 mm long vs. 5–9 mm long) and more than 3 mm wide calyx lobes (rather than 1–2.6 mm wide).

28. *Clerodendrum villosum* Blume

Clerodendrum villosum Blume, Bijdr.: 811. 1826; Walp., Repert. Bot. Syst. 4: 106. 1845; Schauer in A.DC., Prodr. 11: 667. 1847; Miq., Fl. Ind. Bat. 2: 877. 1858; Kurz, Forest. Fl. Burma 2: 268. 1877; C.B. Clarke in Hook.f., Fl. Brit. India 4: 595. 1885 & in Fl. Koh Chang: 325. 1900–1916; Brandis, Indian Trees: 507. 1906; King & Gamble, J. Asiat. Soc. Bengal 74: 836. 1909; Hall.f., Meded. Rijks-Herb. 37: 62. 1918; Merr., En. Philipp.: 404. 1923; H.J. Lam, Verben. Malay. Archip.: 289. 1919; Bakh. in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 89. 1921; Merr., En. Philipp.: 405. 1923; Ridl., Fl. Malay

Penins. 2: 627. 1923; Dop in Lecomte, Fl. Indo-Chine 4(7): 861. 1935; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 429. 1938; Kanjilal et al., Fl. Assam 3: 488. 1939; Back. & Bakh.f., Fl. Java 2: 611. 1965; Burkill, Dict. Econ. Prod. Malay Penins. 1: 594. 1966; Kochummen in Ng, Tree Fl. Malaya 3: 304. 1978; Congdon, Nat. Hist. Bull. Siam Soc. 30(2): 185. 1982; Corner, Wayside Tr. Malaya: 746. 1988; Keng, Con. Fl. Singapore: 193. 1990; Chen & M.G. Gilbert in Wu & Raven, Fl. China 17: 41. 1994; Phuong in N.T. Ban et al., Fl. Vietnam 3: 292. 2005.

Clerodendrum molle Jack, Malayan Misc. 1(1): 15. 1820, *nom. illeg.*

Clerodendrum infortunatum Dennst., Schlüssel Hortus Malab.: 27. 1818, *nom. illeg.*

Clerodendrum ferrugineum Turcz., Bull. Soc. Imp. Naturalistes Moscou 36(2): 221. 1863.

Clerodendrum velutinum B.Thomas, Bot. Jahrb. Syst. 68: 60. 1936.

Thailand.— NORTHERN: Chiang Mai, Lampang and Phitsanulok; NORTH-EASTERN: Loei, Udon Thani, Sakon Nakhon and Khon Kaen; EASTERN: Chaiyaphum and Nakhon Ratchasima; SOUTH-WESTERN: Kanchanaburi and Phetchaburi; CENTRAL: Saraburi and Nakhon Nayok; SOUTH-EASTERN: Chon Buri, Rayong, Chanthaburi and Trat; PENINSULAR: Chumphon, Ranong, Surat Thani, Phangnga, Phuket, Nakhon Si Thammarat, Trang, Phatthalung, Satun, Songkhla, Yala and Narathiwat.

Distribution.— India, Myanmar, China, Laos, Cambodia, Vietnam, Malaysia and Indonesia (Java-type).

Ecology.— Tropical evergreen, dry evergreen, lower montane rain and mixed deciduous forests, common along roadsides, forest edges or clearing areas, 0–1,650 m. Flowering and Fruiting throughout the year.

Vernacular.— Khee Khom, Chum Wan, Nom Wan (Ranong), Naang Yaem Paa, Falamee (Trang), Phanom Sawan Paa (Yala), Phuang Phee Daeng (Loei), Ma Pang Nge (Malay-Narathiwat) and Sa Mut (Chanthaburi).

Note.— *Clerodendrum villosum* differs from *C. infortunatum* in its dense villous hairs on the abaxial surface of leaves (rather than roughly pubescent hairs), having an entire leaf margin (rather than dentate) and a 5–10 mm long corolla tube (rather than 15–25 mm long).

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