THAI FOR. BULL. (BOT.) 37: 36–58. 2009.

# A synopsis of the genus *Callicarpa* L. (Lamiaceae) in Thailand

**CHARAN LEERATIWONG[1], PRANOM CHANTARANOTHAI[2] & ALAN J. PATON[3]**

ABSTRACT: A synopsis of the genus *Callicarpa* L. in Thailand is presented, including a key to the species, notes on distribution, ecology, vernacular names and descriptions for new taxa. Twelve species are recognized, including two new species, *C. kerrii* C.Leeratiwong & A.J.Paton and *C. phuluangensis* C.Leeratiwong & A.J.Paton. *C. glandulosa* H.R.Fletcher is placed as a new synonym of *C. bodinieri* H.Lév. Lectotypes of *C. bodinieri*, *C. lanceolaria* Roxb. and *C. rubella* Lindl. are also designated.

## INTRODUCTION

The genus *Callicarpa* L. (Lamiaceae) with ca 140 species is mainly distributed in temperate, subtropical and tropical Asia, America, Australia and the Pacific Islands (Harley *et al*., 2004). *Callicarpa* was first described by Linnaeus (1753), based on *C. americana* L. For this study, the genus *Geunsia* Blume was regarded as synonymous with *Callicarpa* following Cantino et al. (1992), Harley et al. (2004) and Bramley et al. (2009). Clarke (1904) was the first botanist who recorded a species of *Callicarpa* (*C. longifolia* Lam.) from Thailand (Chang Island, Trat). The first preliminary revision of the genus in Thailand was undertaken by Fletcher (1938). He enumerated 12 species and two varieties and also made a key to species. Later, Moldenke (1980), The Forest Herbarium, Royal Forest Department (2001) and Govaerts et al. (2007) published checklists of *Callicarpa* in Thailand with 18, 11 and 14 taxa respectively. Recently, Leeratiwong et al. (2007) reported *C. furfuracea* Ridl., as a new record for Thailand. In addition, they placed *C. villosissima* Ridl. and *C. poilanei* Dop in synonymy with *C. arborea* Roxb. and *C. angustifolia* King & Gamble respectively, and five names were typified, namely *C. angustifolia*, *C. furfuracea*, *C. maingayi* King & Gamble, *C. poilanei* and *C. villosissima*.

In the process of revising the Thai *Callicarpa* two new species, *C. kerrii* C.Leeratiwong & A.J.Paton and *C. phuluangensis* C.Leeratiwong & A.J.Paton are described and illustrated here. *C. glandulosa* H.R.Fletcher is placed as a new synonym of *C. bodinieri* H.Lév. Three taxa, *C. bodinieri*, *C. lanceolaria* Roxb. *C. rubella* Lindl. are also lectotypified.

## MATERIALS & METHODS

The account of *Callicarpa* is presented as a precursor for the Thai Lamiaceae account for the Flora of Thailand Project. Each taxon was investigated and compared

[1] Department of Biology, Faculty of Science, Prince of Songkla University, Songkhla 90112, Thailand.
[2] Applied Taxonomic Research Center, Department of Biology, Faculty of Science, Khon Kaen University, Khon Kaen 40002, Thailand.
[3] Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AE, UK.

with available literature, field collections and herbarium specimens at the following herbaria: AAU, ABD, BCU, BK, BKF, BM, C, CMU, E, HN, K, KKU, NY, PSU, QBG, P, SING, TEX, TCD, US and Department of Biology Herbarium, Chiang Mai University (abbreviations according to Holmgren et al. 1990).

## TAXONOMIC TREATMENT

### CALLICARPA

L., Sp. Pl.: 111. 1753 & Gen. Pl. ed. 5: 127. 1754; Lam., Encycl. Meth. Bot. 1: 562. 1783; Juss., Gen. Pl.: 107. 1789; Blume, Bijdr. Fl. Ned. Ind.: 817. 1826; Roxb., Fl. Ind. ed. 2, 1: 390. 1832. Type: *C. americana* L.— *Tomex* L., Nov. Pl. Gen. Diss. Dassow: 5. 1747. Type: *T. tomentosa* L.— *Spondylococcos* Mitch., Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur. 8: 218. 1748.–Type: not located.— *Johnsonia* T. Dale ex Mill., Gard. Dict. Abr. ed. 7. 1754, *nom. rej*.— *Burchardia* Heist ex Duhamel, Traité Arb. Arbust. 1: 111, t. 44. 1755, *nom. rej*.— *Illa* Adans., Fam. Pl. 2: 446. 1763. Type: not located.— *Porphyra* Lour., Fl. Cochinch. ed. 1, 1: 69. 1790. Type: *P. dichotoma* Lour.— *Rodschiedia* Dennst., Schlüssel Hortus Malab.: 31. 1818. Type: *R. serrata* Dennst.— *Aganon* Raf., Sylv. Tellur.: 161. 1838. Type: *A. umbellata* (Lour.) Raf.— *Amictonis* Raf., Sylv. Tellur.: 161. 1838. Type: *A. japonica* (Thunb.) Raf.— *Geunsia* Blume, Catalogus: 11. 1823 & Bijdr.: 819. 1826. Type: *G. farinosa* Blume.

Shrubs, scandent shrubs or trees, rarely woody climbers, branches usually obtusely 4-angled or terete with lenticels; hairs stellate, dendroid, floccose or simple sometimes glabrous or subglabrous. *Leaves* simple, petiolate or subsessile, opposite-decussate or apparently alternate in *C. pentandra* (see Notes below), possessing indumentum to glabrous and with yellow, brown or red subsessile glands; lateral veins usually curved and joined near margin. *Inflorescence* an indeterminate thyrse with opposite dichasial cymes (Fig. 1), except alternate dichasial cymes in *C. pentandra*; dichasial cymes axillary or supra-axillary, pedunculate, subtended by a leaf-like bract (see Notes below). *Calyx* campanulate or cupular, actinomorphic, apices 4 or (4–)5(–6) in *C. pentandra*, lobed or subentire, persistent in fruit. *Corolla* pink, violet or pinkish-violet, rarely white, campanulate or tubular, 4-lobed, (4–)5(–6)-lobed in *C. pentandra*, actinomorphic. *Stamens* 4(–5), equal, epipetalous, long or shortly exserted, filament usually slender, glabrous, inserted near the base of the corolla tube; anther elliptic, oblong or ovate, dorsifixed, 2-locular, locules parallel, dehiscing by longitudinal slit, except dehiscing by apical slit in *C. pentandra. Ovary* superior, mostly 2-carpellate or rarely 4–5-carpellate in *C. pentandra*, syncarpous, obovoid, ovoid, subglobose or globose, 2 (–4–5)-locular with 2 ovules per locule, glabrous to hairy, with subsessile glands; style terminal, glabrous, mostly slender, long exserted; stigma capitate or peltate, mostly obscurely bifid or rarely 4–5-fid. *Fruit* drupaceous, undivided, exocarp thin, mesocarp fleshy and juicy, endocarp strongly hard (bony), ripening fruits black, violet or pink, rarely white or red. *Seeds* 2–4, rarely 5–10, exalbuminous.

Distribution.— About 140 species, widespread in temperate, subtropical and tropical Asia, America, Australia and the Pacific Islands. Twelve species in Thailand.

Notes.— The alternate ‘leaves’ of *C. pentandra*, since they are subtending cymes,

are strictly bracts, not leaves, but are included here to avoid confusion, since they are identical in structure to the leaves, and are likely to be understood as such.

Since the leaf-like bracts (Fig. 1) are identical in form to the leaves, their description is covered under ‘leaves’.

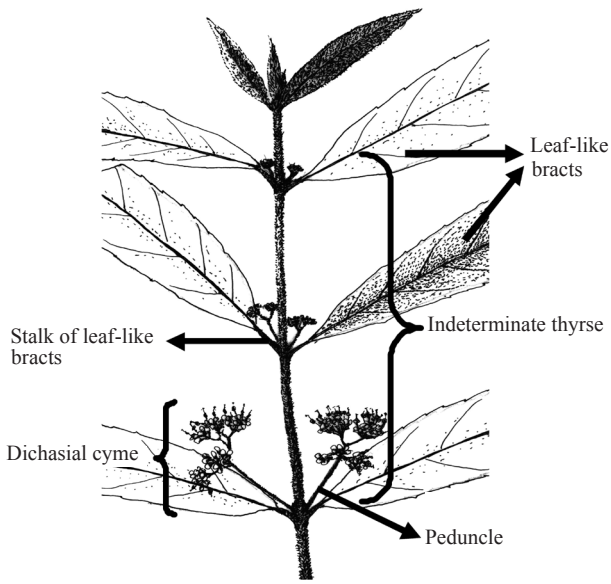



Figure 1. Inflorescence structure in *Callicarpa.*

KEY TO THE SPECIES OF *CALLICARPA* IN THAILAND

1. Corolla (4–)5(–6)-lobed; stamens 5, anthers dehiscing through a pore-like opening at the apex, which splits longitudinally towards the base as the anther matures; cymes alternate, more rarely opposite **10. C. pentandra**
1. Corolla 4-lobed; stamens 4, anthers dehiscing by a longitudinal slit; cymes opposite
  2. Leaf surfaces covered with red subsessile glands **3. C. bodinieri**
  2. Leaf surfaces covered with yellow to brown subsessile glands
    3. Subsessile glands on abaxial surface of leaves hidden by dense overlapping hairs
      4. Outer surface of corolla lobes glabrous or sparsely hairy; anthers and ripening fruit pink or violet **2. C. arborea**
      4. Outer surface of corolla lobes densely hairy; anthers yellow or pale yellow; fruits red or black
        5. Stem nodes without an interpetiolar woody ridge; ripening fruits red **9. C. maingayi**
        5. Stem nodes with an interpetiolar woody ridge; ripening fruits black
          6. Leaves usually elliptic, oblong or lanceolate; flowers 3–4 mm long, corolla whitish-pink to pink; ovary 2-locular, usually glabrous or rarely with sparse, stellate hairs **1. C. angustifolia**
          6. Leaves usually ovate, obovate or broadly elliptic; flowers 4–6 mm long; corolla creamy white to white; ovary 4-locular, with dense, stellate hairs **5. C. furfuracea**
    3. Subsessile glands on abaxial surface of leaves conspicuous, not hidden by hairs
      7. Adaxial surface of leaves covered with more simple hairs than stellate or dendroid hairs
        8. Leaf base cordate or oblique-cordate, simple hairs on adaxial surface of leaves pilose **12. C. rubella**
        8. Leaf base cuneate, attenuate or rounded, simple hairs on adaxial surface of leaves scabrid
          9. Abaxial leaf surface with dense, whitish-grey or grey stellate hairs; anthers violet; ovary hairless **8. C. macrophylla**
          9. Abaxial leaf surface with moderate to sparse, brown stellate hairs; anthers yellow; ovary sparsely hairy **11. C. phuluangensis**

7. Adaxial surface of leaves glabrous or covered with more stellate or dendroid than simple hairs
10. Outer surface of corolla lobes hairy; ripening fruits white **7. C. longifolia**
10. Outer surface of corolla lobes glabrous; ripening fruits black
11. Abaxial surface of leaves covered with whitish-grey or greyish hairs; leaf base attenuate; corolla pink, violet or pinkish-violet **4. C. candicans**
11. Abaxial surface of leaves covered with brownish hairs; leaf base cuneate or rounded; corolla white **6. C. kerrii**

**1. Callicarpa angustifolia** King & Gamble, Bull. Misc. Inform., Kew 1908: 106. 1908 & J. Asiat. Soc. Bengal 74: 804. 1908 & Mat. Fl. Malay. Penins.: 1014. 1909; H.J.Lam, Verben. Malay Archip.: 66. 1919; Bakh. in H.J.Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 19. 1921; Ridl., Fl. Malay Penins. 2: 616. 1923; H.R.Fletcher, Bull. Misc. Inform., Kew 1938: 413. 1938; Moldenke, Fifth Summary Verbenac. 1: 294. 1971 & Phytologia Mem. II: 284. 1980; Kochummen in Ng, Tree Fl. Malaya 3: 301. 1978; C.Leeratiwong, Chantar. & A.J.Paton, Thai. Forest Bull., (Bot.) 35: 75. 2007. Type: Malaysia, Perak, Jan. 1885, *King's Collector* 7036 (lectotype **K!**; lectotypified by Leeratiwong et al., 2007).— *C. poilanei* Dop, Bull. Soc. Hist. Nat. Toulouse 64: 502. 1932 & in M.H.Lecomte, Fl. Indo-Chine 4(7): 816. 1935; H.R.Fletcher, Bull. Misc. Inform., Kew 1938: 413. 1938; Moldenke, Fifth Summary Verbenac. 1: 294. 1971 & Phytologia Mem. 2: 284. 1980; Chen & M.G.Gilbert in Z.Wu & P.H.Raven, Fl. China 17: 8. 1994. Type: Cambodia, Kampot, Pum a rong, 13 June 1930, *Poilane* 17611 (lectotype **P!**; isolectotype **US!**; lectotypified by Leeratiwong et al., 2007). Fig. 2.

Thailand.— NORTH-EASTERN: Loei (Phu Kradueng), Nong Khai (Phu Wua), Sakon Nakhon (Phu Phan); EASTERN: Nakhon Ratchasima (Pak Thongchai, Sakaerat), Buri Ram, Si Sa Ket (Phanom Dongrak Wildlife Sanctuary), Surin; SOUTH-EASTERN: Prachin Buri (Krabinburi), Chonburi (Ko Chan), Chanthaburi (Makham, Khao Sabap, Pong Namron), Rayong (Khao Chamao), Trat (Ko Kut, Ko Chang, Ban Saphan Hin, Huai Rang); PENINSULAR: Chumphon (Kapoe, Tha Sae), Surat Thani (Nasan), Krabi (Ao Luek), Nakhon Si Thammarat (Khao Luang), Songkhla (Rattaphum), Satun (Ko Kabeng).

Distribution.— China, Cambodia, Vietnam, Peninsular Malaysia.

Ecology.— Mostly in both shady and open evergreen, dry evergreen, limestone or secondary forest, rarely in mangroves, mixed deciduous or dipterocarp forest; alt. 0–1,300 m; flowering: November to April; fruiting: January to October.

Vernacular.— Kalatang (กาละตัง) (Chanthaburi).

Notes.— *Callicarpa angustifolia* is characterized by a prominently interpetiolar woody ridge at the stem nodes, grey to brownish-grey on the abaxial surface of leaves and glabrous or with sparsely hairy ovary. The present study found that the ovary is either glabrous or hairy, not only hairy as described by King and Gamble (1908).

**2. Callicarpa arborea** Roxb., [Hort. Beng: 10. 1814, *nom. nud*.] Fl. Ind. 1: 405. 1820; Walp., Repert. Bot. Syst. 4: 125. 1845; Schauer in A.P. de Candolle , Prodr. 11: 641. 1847; Kurz, Forest Fl. Burma 2: 274. 1877; C.B.Clarke in J.D.Hooker, Fl. Brit. India 4: 567. 1885; Kuntze, Rev. Gen. Pl. 2: 503. 1891; Brandis, Indian Trees: 511. 1906; King & Gamble, J. Asiat. Soc. Bengal 74: 803. 1908 & Mat. Fl. Malay. Penins.: 1013. 1909; H.J.Lam, Verben. Malay. Archip. 21. 1919; Ridl., Fl. Malay Penins. 2: 614. 1923; P'ei, Mem.




Figure 2. *Callicarpa angustifolia*: A. flowering branch; B. stem node with an interpetiolar woody ridge; C1.–D1. hairs on the abaxial surface of leaves: C1.–C2. stellate hairs, D1. dendroid hair; E. flower; F. pistil with glabrous ovary; G. ovary with stellate hairs; H. fruit. All from *Leeratiwong* 06-275 (PSU). Drawn by C. Leeratiwong.

Sci. Soc. China 1(3): 21. 1932; Dop, Bull. Soc. Hist. Nat. Toulouse 64: 503. 1932 & in M.H.Lecomte, Fl. Indo-Chine 4(7): 792. 1935; H.R.Fletcher, Bull. Misc. Inform., Kew 1938: 412. 1938; Chang, Acta Phytotax. 1: 282. 1951; Moldenke, Fifth Summary Verbenac. 1: 294. 1971 & Phytologia Mem. 2: 284. 1980; Chen & M.G.Gilbert in Z.Wu & P.H.Raven, Fl. China 17: 6. 1994; Kochummen in Ng, Tree Fl. Malaya 3: 301. 1978; A.Rajendran & P.Daniel, Ind. Verbenaceae: 35. 2002; C.Leeratiwong, Chantar. & A.J.Paton, Thai Forest Bull., (Bot.) 35: 76. 2007. Type: The illustration in Icon. Roxb. t. 2033 (lectotype **K!**; lectotypified by Rajendran and Daniel, 2002).— *C. villosa* Roxb., Hort. Beng.: 10. 1814, *nom. nud*.— *C. magna* Schauer in A.P. de Candolle, Prodr. 11: 641. 1847; Merr., Enum. Philip. Fl. Pl. 3: 386. 1923. Type: The Philippines, 1841, *Cuming* 1266 (holotype **B**; isotypes **BM! K!**-2 sheets).— *C. arborea* var. *villosa* (Roxb.) King & Gamble, Mat. Fl. Malay. Penins.: 1013. 1909; Ridl., Fl. Malay Penins. 2: 615. 1923; H.R.Fletcher in Bull. Misc. Inform., Kew 1938: 413. 1938. Type: as *C. villosa* Roxb.— *C. villosissima* Ridl., J. Fed. Malay States Mus. 10: 110. 1920; Moldenke, Fifth Summary Verbenac. 1: 294. 1971 & Phytologia Mem. 2: 284. 1980. Type: Thailand, Surat Thani, Tasan, Jan.-Feb. 1919, *Kloss* 6851 (lectotype **K!**; isolectotype **SING!**; lectotypified by Leeratiwong et al., 2007).— *C. tectonifolia* Wall., Cat. No. 1827, *nom. nud.*

Thailand.— NORTHERN: Mae Hong Son (Muang, Pai, Pang Ma Pha), Chiang Mai (Chiang Dao, Chom Thong, Doi Inthanon, Doi Suthep, Fang, Mae Chaem, Mae Rim, Mae Taeng, Muang, Om Koi, Pha Hom Pok, Sameung), Chiang Rai (Doi Tung, Huai Chomphu, Khun Korn, Mae Fa Luang, Wiang Papao), Nan (Doi Phukha), Lamphun, (Doi Khun Tan), Lampang (Chae Son, Khun Tan, Ngao, Pan), Phrae (Mae Sai, Pakhui), Tak (Doi Hua Mot, Doi Musor), Sukhothai (Khao Luang), Kamphaeng Phet (Mae Wong); NORTH-EASTERN: Phetchabun (Phu Miang), Loei (Dan Sai, Phu Kradueng, Phu Luang, Phu Ruea, Wang Saphung), Nong Khai (Phonphisai), Sakon Nakhon (Phu Phan), Nakhon Phanom; SOUTH-WESTERN: Kanchanaburi (Kin Sayo, Sangkhaburi, Srisawat, Wangka), Prachuap Khiri Khan (Bang Saphan, Bang Saphanyai); CENTRAL: Saraburi (Phukhae); SOUTH-EASTERN: Chonburi (Khao Chalak, Sriracha), Chanthaburi (Khao Soidao); PENINSULAR: Chumphon (Ban Son, Khao Kapao), Ranong (Kapoe, Khlong Nakha, Kraburi (Lam Liang, La-Un), Surat Thani (Kanthuli, Kao Tum, Khao Sok, Tasan), Phangnga (Khuraburi, Takua Pa, Khao Tham Thong Lang, Thap Put), Trang (Khao Banthat, Khao Chong), Satun (Thung Wa, Thaleban), Songkhla (Ton Nga Chang), Pattani (Ban Kaung, Tomo), Yala (Bannang Sta, Betong, Kauloung), Narathiwat (Waeng).

Distribution.— Nepal, Bhutan, India, Sri Lanka, Bangladesh, Myanmar, China, Laos, Cambodia, Vietnam, Peninsular Malaysia, Indonesia (Sumatra), Philippines, New Guinea.

Ecology.— In open lowland evergreen to dry or hill evergreen forest; disturbed areas in mixed deciduous, dipterocarp or secondary forest, rarely occurs in limestone, pine, beach or savannah forest; alt. 0–1,800 m; flowering and fruiting: all year round.

Vernacular.— Katok chang (กะตอกช้าง), ta mong pasi (ตาโมงปะสี) (Yala); khlui (ขลุ่ย) (Karen-Chiang Mai); cha paen (ช้าแป้น), thap paeng (ทับแป้ง) (Saraburi); due da da pu (ดือดะดาปู) (Malay-Narathiwat); ten (เตน) (Loei); poe-khwui (เปอควุย), lae-thung (และทุ่ง) (Karen-Mae Hong Son); pha (ผ้า) (Central, Chiang Mai); fa (ฝ้า), fa khao (ฝ้าขาว), pha khao

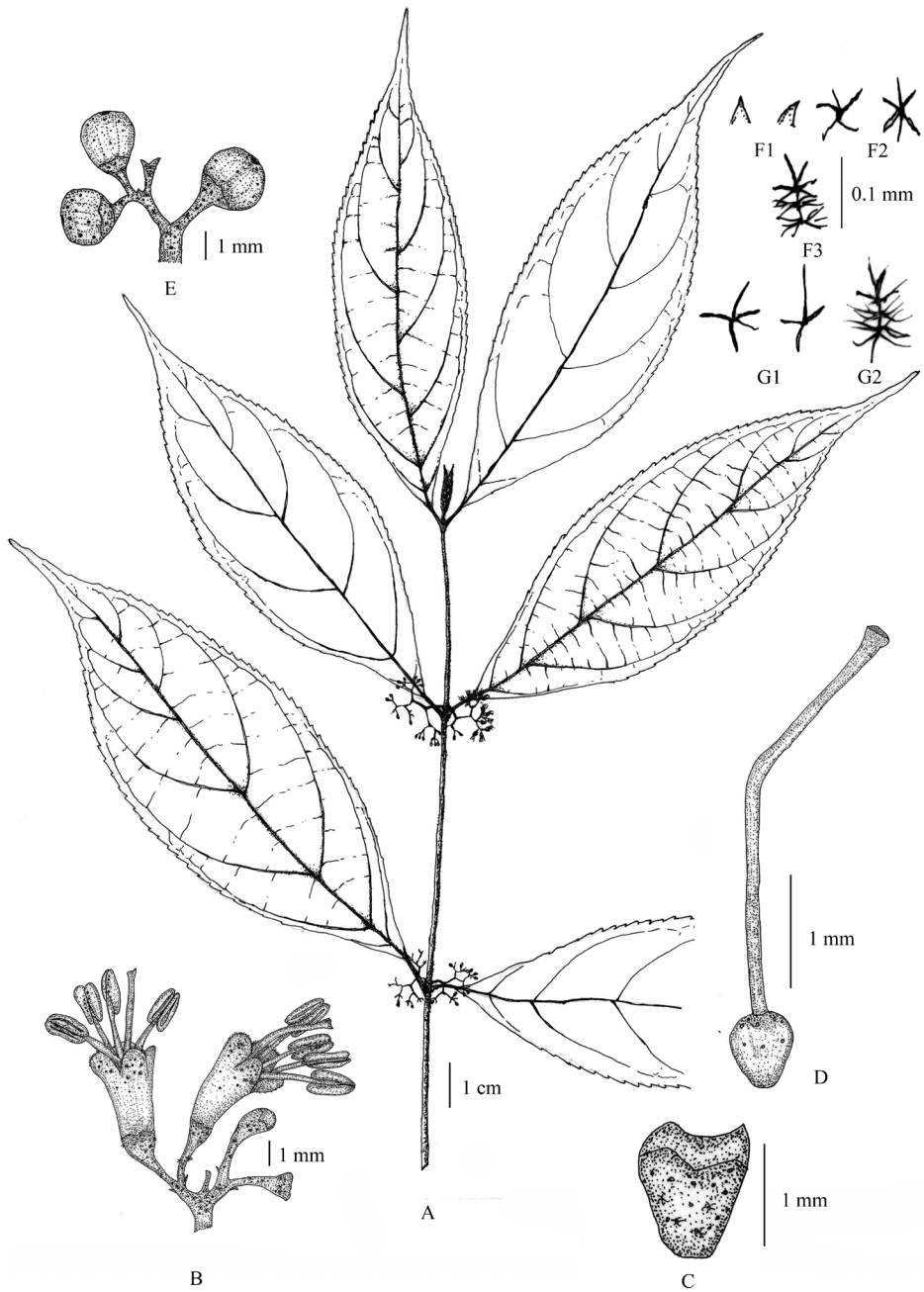



Figure 3. *Callicarpa bodinieri*: A. flowering branch; B. cyme; C. calyx; D. pistil; E. fruits; F1.–F3. hairs on the adaxial surface of leaves: F1. simple hairs, F2. stellate hairs, F3. dendroid hair; G1–G2. hairs on the abaxial surface of leaves: G1. stellate hairs, G2. dendroid hair. A–D., F1–F3. & G1–G2. from *Leeratiwong* 04-17 (PSU), E. from *Leeratiwong* 04-150 (PSU). Drawn by C. Leeratiwong.

(พ่าขาว) (Northern); pha lai (ผ้าลาย) (Peninsular); pha (พ่า) (Central); ma pha (มะผ้า) (Mae Hong Son); sak khi kai (สักขี้ไก่) (Lampang); siam (เสียม) (Chanthaburi); hu khwai (หูควาย) (Northern, Trang); hu khwai khao (หูควายขาว) (Surat Thani); hu khwai yai (หูควายใหญ่) (Chumphon).

Notes.— *Callicarpa arborea* is the most common species of the genus in Thailand. It is distinct in having mostly a tree habit, with dense, greyish-white to white dendritic-stellate or stellate hairs on the abaxial surface of leaves which obscure the subsessile glands, peduncle (>2.5 cm long) usually longer than the stalk of leaf-like bract, violet anthers, pubescent ovary and violet fruits.

**3. Callicarpa bodinieri** H.Lév. in Fedde, Repert. Spec. Nov. Regni Veg. 9: 456. 1911; Chang, Acta Phytotax. 1: 288. 1951; Chen & M.G.Gilbert in Z.Wu & P.H.Raven, Fl. China 17: 11. 1994. Type: China, Guizhou, Pin Fa, 23 June 1903, *Cavalerie* 1095 (lectotype **E!**; isolectotype **K!**, designated here).— *C. seguinii* H.Lév. in Fedde, Repert. Spec. Nov. Regni Veg. 9: 455. 1911. Type: China, Guizhou, Tou Chan, *Cavalerie* 2341 (holotype **E!**).— *C. feddei* H.Lév. in Fedde, Repert. Spec. Nov. Regni Veg. 10: 439. 1912. Type: China, Guizhou, June 1905, *Esquirol* 468 (holotype **E!**).— *C. giraldiana* Hesse, Mitt. Deutsch. Dendrol. Ges. 1912: 366. 1912; P'ei, Mem. Sci. Soc. China 1(3): 31. 1932. Type: not located.— *C. tsiangii* Moldenke, Phytologia 3: 109. 1949. Type: China, Kiangsi, Tunghuashan, Ihwang, 30 June 1932, *Tsiang* 10081 (holotype **NY!**).— *C. glandulosa* H.R.Fletcher, Bull. Misc. Inform. Kew 1938: 199 & 414. 1938; Moldenke, Fifth Summary Verbenac. 1: 294. 1971, **syn. nov.**–Type: Thailand, Chumphon, Ta Ngao, 16 Jan. 1927, *Kerr* 11469 (holotype **E!**; isotypes **BK!**, **BM!**, **K!**, **SING!**). Fig. 3.

Thailand.— NORTHERN: Chiang Mai (Doi Saket, Mae Klang), Chiang Rai (Ban Lang Lat), Lampang (Chae Son), Uttaradit (Phu Soi Dao), Sukhothai (Sok Pra Ruang), Phitsanulok (Thung Salaeng Luang); NORTH-EASTERN: Phetchabun (Nam Nao, Lom Sak), Loei (Phu Ruea, Wang Saphung), Sakon Nakhon (Phu Phan); EASTERN: Chaiyaphum (Ban Nam Phrom, Chulaphorn Dam, Phu Khieo), Nakhon Ratchasima (Khao Yai, Pak Thong Chai); SOUTH-WESTERN: Kanchanaburi (Srisawat, Thung Yai Naresuan, Thong Phaphum), Phetchaburi (Kaeng Krachan), Prachuap Khiri Khan (Kui Buri); PENINSULAR: Chumporn (Ta Ngao).

Distribution.— China, Laos, Cambodia, Vietnam.

Ecology.— In open and streamside areas in evergreen, dry evergreen, mixed deciduous or secondary forest, rarely in hill evergreen or dipterocarp forest; alt. 50–1,500 m; flowering: April to October; fruiting: May to January.

Notes.— *Callicarpa bodinieri* is distinguished by its red subsessile glands on stem, leaves and flowers, glabrous ovary and violet fruit. We have examined both type specimens of *C. bodinieri* and *C. glandulosa* and found that they are conspecific, therefore *C. glandulosa* is reduced as a synonym under *C. bodinieri*. The original description of *C. bodinieri* was based on *Cavalerie* 1095 (E, K), *Martin & Bodinier* 2365 (E) and *Martin & Bodinier* 1996 (E). *Cavalerie* 1095 deposited at E is designated as the lectotype, because it is the best preserved specimen.

**4. Callicarpa candicans** (Burm.f.) Hochr., Candollea 5: 190. 1934; Backer & Bakh., Fl. Java 2: 601. 1965; Moldenke, Fifth Summary Verbenac. 1: 294. 1971 & Phytologia Mem. 2: 284. 1980; Kochummen in Ng, Tree Fl. Malaya 3: 301. 1978; Munir, J. Adelaide Bot. Gard. 6(1): 19. 1982; Chen & M.G.Gilbert in Z.Wu & P.H.Raven, Fl. China 17: 6. 1994. Type: as *Urtica candicans* Burm.f.— *Urtica candicans* Burm.f., Fl. Ind.: 197. 1768. Type: Indonesia, Java (holotype **G**).— *Callicarpa cana* L., Mant. 2: 198. 1771; Willd., Sp. Pl. 1 (2): 620. 1798; Blume, Bijdr. Fl. Ned. Ind.: 817. 1826; Walp., Repert. Bot. Syst. 4: 127. 1845; Schauer in A.P. de Candolle, Prodr. 11: 643. 1847; Miq., Fl. Ned. Ind. 2: 885. 1858; Benth., Fl. Aust. 5: 56. 1870; C.B.Clarke in J.D.Hooker, Fl. Brit. India 4: 568. 1885; King & Gamble, J. Asiat. Soc. Bengal 74: 806. 1908 & Mat. Fl. Malay. Penins.: 1016. 1909; H.J.Lam, Verben. Malay. Archip.: 68. 1919; Bakh. in H.J.Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 20. 1921; Merr., Enum. Philip. Fl. Pl. 3: 382. 1923; Ridl., Fl. Malay Penins. 2: 616. 1923; P'ei, Mem. Sci. Soc. China 1(3): 25. 1932; Dop, Bull. Soc. Hist. Nat. Toulouse 64: 504. 1932 & in M.H.Lecomte., Fl. Indo-Chine 4(7): 793. 1935; H.R.Fletcher, Bull. Misc. Inform., Kew 1938: 413. 1938; Chang, Acta Phytotax. 1: 285. 1951. Type: Indonesia, Java, East Indies, *Köenig* s.n. (holotype **LINN**).— *C. tomentosa* (L.) Lam., Encycl. 1: 562. 1783, *nom. illeg*., non L., 1774.— *C. macrocarpa* Raeusch., Nomencl. Bot.: 37. 1797, *nom. nud*.— *C. bicolor* Juss., Ann. Mus. Hist. Nat. 7: 77. 1806; Schauer in A.P. de Candolle, Prodr. 11: 642. 1847; Miq., Fl. Ned. Ind. 2: 889. 1858. Type: not designated.— *C. adenanthera* R.Br., Prodr. Fl. Nov. Holl. 1: 513. 1810; Walp., Repert. Bot. Syst. 4: 129. 1845. Type: Australia, Queensland, *Brown* s.n. (syntypes **BM!**, **K!**).— *C. heynii* Roth, Nov. Pl. Sp.: 82 1821. Type: India, *Heyne* s.n.— *C. rheedii* Kostel., Alleg. Med.-Pharm. Fl. 3: 829. 1834. Type: India, Malabar, *Rheede* s.n.— *C. sumatrana* Miq., Fl. Ned. Ind. 2: 888. 1858. Type: Indonesia, Sumatra, Padang, *Teysman* s.n. (holotype **BOG**, microfiche!; isotype **U!**).— *C. cana* var. *dentata* H.J.Lam, Verben. Malay. Archip.: 73. 1919. Type: not designated.— *C. cana* var. *sumatrana* (Miq.) H.J.Lam, Verben. Malay. Archip.: 71. 1919.— *C. cana* var. *sumatrana* (Miq.) H.J.Lam, Verben. Malay. Archip.: 71. 1919; Bakh. in H.J.Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 20. 1921. Type: as *C. sumatrana* Miq.

Thailand.— NORTHERN: Chiang Mai (Doi Suthep), Uttaradit; NORTH-EASTERN: Loei (Phu Kradueng); EASTERN: Chaiyaphum (Ban Nam Phrom, Phu Khieo, Thung Ka Mang); SOUTH-WESTERN: Uthai Thani (Ban Rai), Kanchanaburi (Hin Dat, Sai Yok, Srisawat), Prachuap Khiri Khan (Bang Saphan, Pranburi); CENTRAL: Chai Nat, Saraburi (Sam Lan), Bangkok; SOUTH-EASTERN: Prachin Buri, Chonburi (Sriracha), Chanthaburi (Ta Mai), Trat (Ko Chang); PENINSULAR: Surat Thani (Kanthuli, Ko Samui), Krabi (Ao Luek), Nakhon Si Thammarat (Thung Song, Walailak University), Trang (Khao Chong), Phatthalung (Khao Pu Khao Ya), Songkhla (Kao Seng), Yala (Betong).

Distribution.— India, Bangladesh, China, Cambodia, Vietnam, Peninsular Malaysia, Indonesia (Sumatra, Java, Sumbawa, Sulawesi (Celebes)), East Timor, Philippines, New Guinea, Australia.

Ecology.— Along streams in evergreen and dry evergreen forests and in open secondary, dry evergreen, beach and mixed deciduous forests; 0–1,100 m; flowering: June to September; fruiting: October to April.

Vernacular.— Kato (กะเตาะ) (Surat Thani); kha pia (ขาเปีย), pha khi rio ho kham (ผ้าขี้ริ้วห่อคำ), pha hai (ผ้าห้าย), pha hai ho kham (ผ้าห้ายห่อคำ) (Loei); khi on don (ขี้อ้นดอน) (Phitsanulok); chap paeng lek (จับแปงเล็ก) (Chai Nat); tok dam (ตอกดำ) (Pattani); ma tue khrueang (มะตือเครื่อง) (Chiang Mai); ram nat (รำหนาด) (Yala); siap sai (เสียบไส้) (Nakhon Si Thammarat).

Notes.— *Callicarpa cana* is characterised by the ovate to broadly elliptic leaf shape, attenuate leaf base, violet corolla, glabrous ovary and with dense, greyish-white stellate hairs on the abaxial surface of leaves and on the outer calyx.

**5. Callicarpa furfuracea** Ridl., J. Fed. Malay States Mus. 10(2): 150. 1920 & Fl. Malay Penins. 2: 615. 1923; Kochummen in Ng, Tree Fl. Malaya 3: 301. 1978; C.Leeratiwong, Chantar. & A.J.Paton, Thai Forest Bull, (Bot.) 35: 73. 2007. Type: Malaysia, Pahang, Gunong Senyum, June 1917, *Evans* s.n. (lectotype **K!**; isolectotypes **K!**, **SING!**; lectotypified by Leeratiwong et al., 2007).— *C. maingayi* sensu H.R.Fletcher, Bull. Misc. Inform., Kew 1938: 413. 1938, non King & Gamble, 1908.

Thailand.— PENINSULAR: Chumphon (Lang Suan, Tha Sae), Ranong (Khlong Kam Phuan), Surat Thani (Chaiya, Khao Sok, Phanom), Phangnga (Thap Put), Krabi, Nakhon Si Thammarat (Krung Ching Waterfall, Chawang, Khao Luang, Tapchang, Thung Song), Krabi (Phanom Bencha), Phuket (Thalang), Trang (Khao Chong), Phatthalung (Khao Pu Khao Ya), Songkhla (Ton Nga Chang), Yala (Banang Sta, Thanto), Narathiwat (Bacho, Sisakhorn, Waeng).

Distribution.— Peninsular Malaysia.

Ecology.— In shaded and open areas or edge of evergreen, limestone or secondary forests; alt. 50–350 m; flowering: December to May; fruiting: March to October.

Vernacular.— To (เตาะ) (Krabi); plao khon (เปล้าขน), hu khwai khao (หูควายขาว) (Nakhon Si Thammarat), yan hu khwai (ยานหูควาย), i-ngop (อีโงบ) (Trang).

Notes.— *Callicarpa furfuracea* differs from other *Callicarpa* species in having an interpetiolar woody ridge at the stem nodes, overlapping stellate hairs on the abaxial surface of leaves and the outside of calyx and corolla, white corolla and hairy ovary. Most Thai specimens of *C. furfuracea* were previously misidentified as *C. maingayi* King & Gamble.

**6. Callicarpa kerrii** C.Leeratiwong & A.J.Paton, **sp. nov.** *C. tomentosa* affinis sed pilis foliorum subtus sparsis dispositis haud stellaris vel dendroideis, calycibus 0.6–1 mm longis (haud > 1 mm longis), corollis albis (haud roseis ad violaceis) 2.2–3 mm longis (haud 3.5–5 mm longis), antheris 0.6–0.8 mm longis (haud 1.5–2 mm longis) differt. Typus: Thailand, Sukhothai, Khao Luang, 3 May 1922, *Kerr* 5935 (holotypus **BK!**; isotypi **BM!**, **C!**, **K!**, **L!**). Fig. 4.

Shrubs or trees, 2.5–8 m high; branches bark brown or blackish-brown, obtusely 4-angled, with dense, dark brown or brown stellate and dendroid hairs when young, later brown or greyish-brownish, cylindrical, with lenticels, scaly, glabrescent. *Leaves* ovate, obovate, broadly elliptic, ovate-elliptic or obovate-elliptic, chartaceous or subcoriaceous,

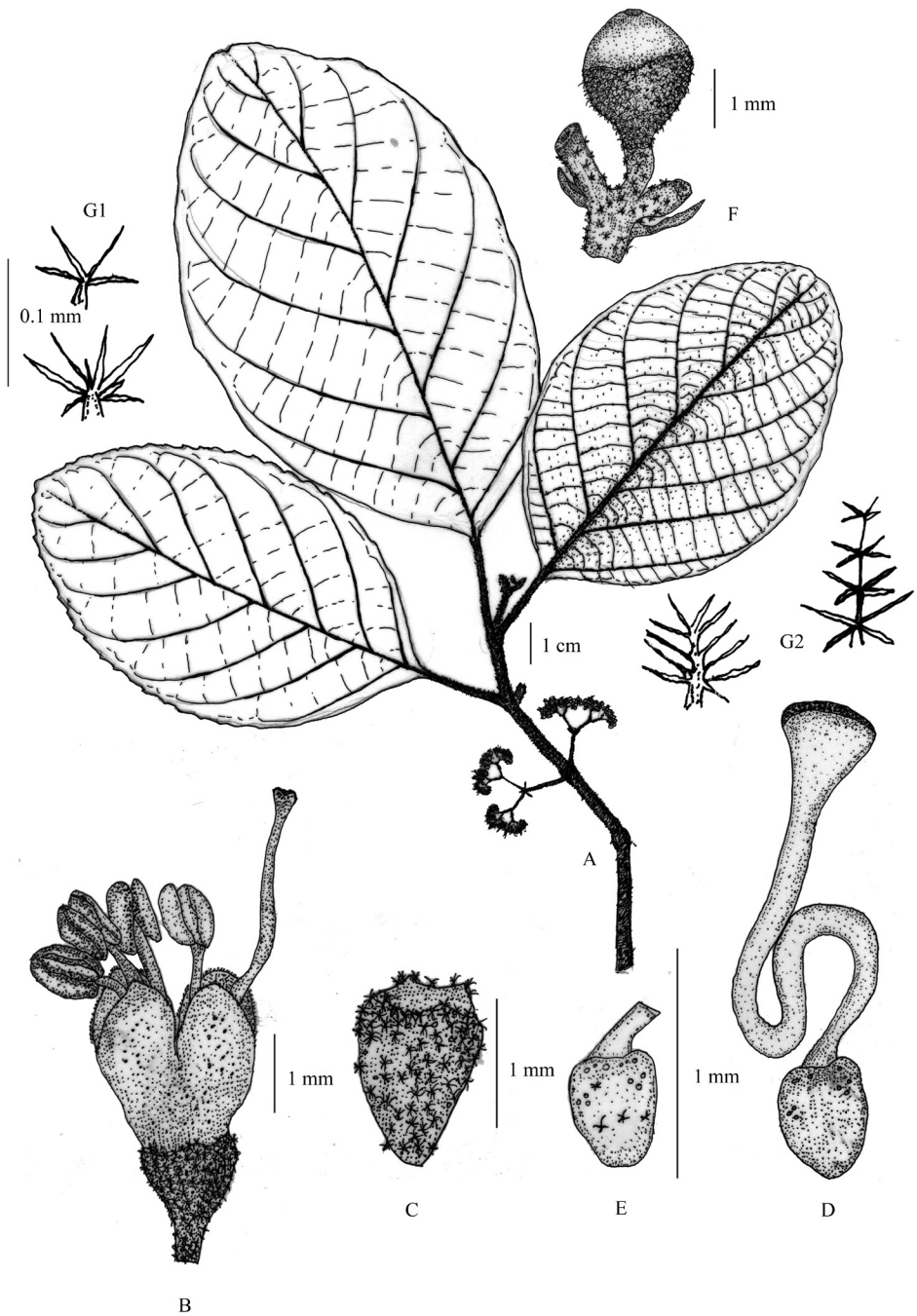



Figure 4. *Callicarpa kerrii*: A. flowering branch; B. flower; C. calyx; D. pistil with glabrous ovary; E. ovary with stellate hairs; F. fruit; G1–G2 hairs on the abaxial surface of leaves: G1. stellate hairs, G2. dendroid hairs. A–E. & G1–G2. from *Leeratiwong* 06-322 (KKU), F. from *Middleton, Suddee, Davies & Hemrat* 1040 (BKF). Drawn by C. Leeratiwong.

8–40 by 5–23 cm, apex acuminate or acute, rarely obtuse or retuse, base cuneate or rounded, margin entire or serrate distally; adaxial surface glabrous or with sparse, brown stellate hairs; midrib sunken with dense, dark brown dendroid or stellate hairs; abaxial surface with moderate or sparse, pale brown or brown stellate hairs mixed with sparse dendroid hairs, with moderate, yellow subsessile glands and with sparse, brown scale-like glands, midrib prominent, with dense, brown dendroid hairs mixed with stellate hairs; secondary veins 8–12-paired, distinct on both surfaces; tertiary veins reticulate, distinct beneath; petiole thickened, obtusely 4-angled, (1–)2–7 cm long, deeply furrowed on upper part. *Inflorescence* with axillary dichasial cymes, 3–6 cm long; peduncle brown or dark brown, thickened, cylindrical, 0.5–2.5 cm long, shorter than stalk of leaf-like bract; pedicels slightly slender, 0.5–1.5 mm long; bracteoles linear or narrowly lanceolate, 0.2–8 mm long, caducuous. *Calyx* brown or greyish-brown, cup-shaped, 0.6–1 mm long, outer surface with moderate to dense, greyish-brown or brown stellate hairs mixed with sparse dendroid hairs and with sparse, yellow subsessile glands, inner surface glabrous with sparse glands; tube 0.7–1 mm long; apex with 4 minute teeth, teeth ovate-triangular, 0.1–0.2 by 0.1–0.2 mm, apex acute. *Corolla* white, 2.3–3 mm long; tube 1.8–2 mm long, slightly swollen, glabrous with glands on outer surface, glabrous within; lobes ovate or rounded, 0.5–1 by 0.5–0.8 mm, apex rounded or obtuse, glabrous with sparse glands and with ciliate hairs at margin and apex on outer surface, glabrous with glands within. *Stamens* long exserted; filaments white, slender, 3–4.5 mm long; anthers yellow, ovate or broadly elliptic, 0.6–0.8 mm long. *Ovary* ovoid or subglobose, 0.3–0.5 mm long, glabrous sometimes with sparse, stellate hairs and with sparse, yellow subsessile glands; style white, slightly thickened, obscurely bifid. *Fruits* ovoid or subglobose, 1.8–2.5 mm long, depressed at the apex, glabrous, green when young, ripening black; persistent calyx 1–1.5 mm long; fruit stalks 1–3 mm long.

Thailand.— NORTHERN: Nan [Nam Muk, alt. 300 m, 26 July 1926, *Winit* 1773 (**BK!**, **BKF!**, **E!**)], Lampang [Mae Ping, alt. 150 m, 19 June 1926, *Winit* 1701 (**BK!**, **BKF!**, **E!**)], Phrae [Sungmen, 13 Jan. 1937, *Prachantasen* 25 (**US!**)], [Huai Tham, 7 Nov. 1939, *Somkhid* 128 (**BKF!**)], Tak [Doi Muser, Muser waterfall, Mae Sot, 12 Nov. 2005, *Leeratiwong* 05-279 (**KKU!**)], [Doi Muser, 24 Aug. 1961, *Chermsirivathana* 54 (**BK!**)], [Trail from Rahaeng to Pang Ma Kham Pom, 15 Dec. 1920, *Rock* 983 (**US!**)], [Doi Muser, 7 Dec. 1960, *Smitinand* 7057 (**BKF!**, **K!**, **TEX!**)], Sukhothai [Khao Luang, 3 May 1922, *Kerr* 5935 (holotype **BK!**; isotypes **BM!**, **C!**, **K!**, **L!**)] ; NORTH-EASTERN: Loei [Phu Kradueng, 30 Nov. 1965, *Tagawa, Iwatsuki & Fukuoka* T-894 (**BKF!**, **E!**, **L!**, **P!**)]; SOUTH-WESTERN: Phetchaburi [Kaeng Krachan National Park, Ban Krang Ranger substation, Kaeng Krachan, 10 Aug. 2002, *Middleton, Suddee, Davies & Hemrat* 936 (**BKF!**, Herb., Biology, Chiang Mai University!, **HUH!**, **K!**)], Prachuap Khiri Khan [Kaeng Krachan National Park, Pala-U, Hua Hin, 21 May 2005, *Leeratiwong* 05-232 (**KKU!**, **PSU!**)], [16 April 2006, *Leeratiwong* 06-322 (**KKU!**)], [14 Aug. 2002, *Middleton, Suddee, Davies & Hemrat* 1040 (**BKF!**, Herb., Biology, Chiang Mai University!, **K!**)], [Kaeng Krachan National Park, La-U forest, Hua Hin, 1 July 1997, *Wongprasert* s.n. (**BKF!** 2 sheets)].

Distribution.— Endemic.

Ecology.— In evergreen, dry evergreen to secondary forests, common along streams; alt. 150–1,100 m; flowering: April to July; fruiting: July to December.

Notes.— Most Thai specimens of *Callicarpa kerrii* were previously identified as an Indian species, *C. tomentosa* (L.) Murr. (*C. lanata* L.). *C. kerrii* differs from the latter by having moderate to sparse, brown stellate or dendroid hairs rather than dense, grey or greyish-brown stellate or dendroid hairs on the abaxial surface of leaves, a shorter calyx (0.6–1 mm long rather than > 1 mm long), a white and shorter corolla (2.3–3 mm long rather pink to violet 3.5–5 mm long and an shorter anther (0.6–0.8 mm long rather than 1.5–2 mm long). This species is named after A.F.G. Kerr who collected the type specimen.

**7. Callicarpa longifolia** Lam., Encycl. 1: 563. 1785; Willd., Sp. Pl.: 620. 1798; Roxb., Fl. Ind. 1: 409. 1820; Blume, Bijdr. Fl. Ned. Ind.: 817. 1826; Walp., Repert. Bot. Syst. 4: 128. 1845, Schauer in A.P. de Candolle, Prodr. 11: 645. 1847; Miq., Fl. Ned. Ind. 2: 887. 1858; Kurz, Forest Fl. Burma 2: 275. 1877; C.B.Clarke in J.D.Hooker, Fl. Brit. India 4: 570. 1885; Brandis, Indian Trees: 512. 1906; King & Gamble, J. Asiat. Soc. Bengal 74: 807. 1908 & Mat. Fl. Malay. Penins.: 1018. 1909; H.J.Lam, Verben. Malay. Archip.: 86. 1919; Bakh. in H.J.Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 26. 1921; Merr., Enum. Philip. Fl. Pl. 3: 385. 1923; Ridl., Fl. Malay Penins. 2: 616. 1923; P'ei in Mem. Sci. Soc. China 1(3): 30. 1932; Dop, Bull. Soc. Hist. Nat. Toulouse 64: 509. 1932 & in M.H.Lecomte Fl. Gén. Indo-Chine 4(7): 802. 1935; H.R.Fletcher, Bull. Misc. Inform., Kew 1938: 414. 1938; Chang, Acta Phytotax. 1: 290. 1951; Moldenke, Fifth Summary Verbenac. 1: 294. 1971 & Phytologia Mem. 2: 284. 1980; Kochummen in Ng, Tree Fl. Malaya 3: 301. 1978; Munir, J. Adelaide Bot. Gard. 6(1): 11. 1982; Chen & M.G.Gilbert in Z.Wu & P.H.Raven, Fl. China 17: 10.1994; A.Rajendran & P.Daniel, Ind. Verbenaceae: 39. 2002. Type: Malaysia, Malacca, *Sonnerat* s.n. (**P-LA**, microfiche!).— *C. lanceolaria* Roxb., [Hort. Beng.: 10. 1814, *nom. nud*.] & Fl. Ind. 1: 409. 1820 & Fl. Ind. ed.2, 1: 394. 1832; Walp., Repert. Bot. Syst. 4: 129. 1845. Type: The illustration in Icon. Roxb. T. 2178 (lectotype **K!**, designated here).— *C. albida* Blume, Bijdr. Fl. Ned. Ind.: 818. 1826. Type: not located.— *C. roxbughiana* Roem. & Schult., Mant. 3: 54. 1827. Type: Prince of Wales' Island, not located.— *C. attenuata* Wall. ex Walp., Repert. Bot. Syst. 4: 129. 1845. Type: Malaysia, Penang, 1822, *Wallich* Cat. No.1835.1 (holotype **K-W!**; isotypes **BM!**, **G-DC!**, **K!**-3 sheets, **NY!**).— *C. blumei* Zoll. & Moritzi, Syst. Verz.: 53. 1846. Type: not located.— *C. longifolia* var. *floccosa* Schauer in A.P. de Candolle, Prodr. 11: 645. 1847; H.J.Lam, Verben. Malay. Archip.: 89. 1919. Types: Prince of Wales peninsula, *Roxburgh* s.n. (syntype **G-DC** microfiche!); Singapore & Manilla, 1839, *Gaudichaud* s.n. (syntype **G-DC** microfiche!); Indonesia, Java, *Thunberg* s.n. (syntype **G-DC**, microfiche!); Indonesia, Java, *Blume* s.n. (syntype) & *Junghuhn* s.n. (syntype, not seen); Northern Hollandia Tropical, *Brown* s.n. (syntype).—*C. longifolia* Lam. var. *subglabrata* Schauer in A.P. de Candolle, Prodr. 11: 645. 1847; H.J.Lam, Verben. Malay. Archip.: 87. 1919; Bakh. in H.J.Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 26. 1921. Types: Bangladesh, Sylhet, *Wallich* Cat. No. 1829 (syntypes **G-DC** microfiche!, **K-W!**); Indonesia, Java, 1849, *Zollinger* 156 (syntypes **G-DC**, microfiche!, **K!**), 223 (syntypes **G-DC** microfiche!, **K!**), 349 (syntype **G-DC**, microfiche!); Indonesia, Java, *Blume* s.n., *Junghuhn* s.n.; Phillippines, *Cuming* 1330 (syntype **K!**).— *C. longifolia* var. *lanceolaria* (Roxb.) C.B.Clarke in J.D.Hooker, Fl. Brit. India 4: 570. 1885; H.R.Fletcher, Bull. Misc. Inform., Kew 1938: 414. 1938; Chang, Acta Phytotax. 1: 291. 1951; Chen & M.G.Gilbert in Z.Wu & P.H.Raven, Fl. China 10: 27. 1994. Type: as *C. lanceolaria* Roxb.— *C. attenuifolia* Elmer, Leafl. Philipp. Bot. 8: 2870. 1915. Type: Philippines,

Agusan, Mindanao, Cabadbaran, Mont Urdaneta, *Elmer* 13536 (holotype **PNH**?; isotypes **HUH**, **K!**, **NY!**, **US!**).— *C. longifolia* var. *areolata* H.J.Lam, Verben. Malay. Archip.: 90. 1919. Type: Kalao Toa Island, 5 May 1903, *Leeuwen & Reijnvaan* 1349 (**L**).

Thailand.— NORTHERN: Mae Hong Son (Pang Ma Pha), Chiang Mai (San Kam Phaeng), Chiang Rai (Mae Kok, Mae Chan), Nan (Doi Tiu), Phrae (Ban Namkai), Lampang (Chae Son, Mae Salop), Phitsanulok (Thung Salaeng Luang); NORTH-EASTERN: Phetchabun (Lomsak, Phu Miang, Thung Salaeng Luang), Loei (Phu Luang, Phu Ruea), Nong Khai (Phonpisai); EASTERN: Chaiyaphum (Phu Khieo), Nakhon Ratchasima (Pak Thongchai, Pakchong, Khao Yai); SOUTH-WESTERN: Kanchanaburi (Sangkhaburi, Srisawat, Thung Yai Naresuan, Wangka), Phetchaburi (Kaeng Krachan, Hua Hin), Prachuap Khiri Khan (Bang Saphan); SOUTH-EASTERN: Prachin Buri (Khao Yai), Chonburi (Sriracha), Chanthaburi (Kapoe, Khao Sabap, Khao Soi Dao, Mak Kham), Trat (Ko Chang, Huai Rang); PENINSULAR: Chumphon (Kapoe, Lang Suan, Thungraya Nasak, Tha Sae), Ranong (Khlong Kam Phuan, Muang, Khlong Nakha), Surat Thani (Bangbao, Khlong Saeng, Samui, Krasum), Phuket (Nai Chong), Krabi (Khao Phanom Bencha), Nakhon Si Thammarat (Khao Luang, Lansaka, Ronphibun), Trang (Khao Chong, Yan Ta Khao), Phatthalung (Pa Bon), Songkhla (Hat Yai, Kao Seng, Ko Yo, Nathawi, Ratthaphum), Satun (Tarutao), Pattani (Tomo), Yala (Bannang Sta, Wat Tham), Narathiwat (Bacho, Rangae, Sungai Padi, Waeng, Yi-ngo).

Distribution.— Pakistan, India, Bhutan, Bangladesh, China, South-East Asia through to New Guinea, Australia.

Ecology.— In open, streamside, disturbed or the edge of secondary including to primary evergreen, dry evergreen or mixed deciduous forest, rarely in dipterocarp, hill evergreen and beach forests; alt. 0–1,300 m; flowering and fruiting: all year round.

Vernacular.— Khao tok (ข้าวตอก) (Central, Northern); tok (ตอก), tok bai yai (ตอกใบใหญ่) (Trang); tok khao (ตอกเขา) (Pattani); chamot (ชะมด), khai pla (ไข่ปลา), lelo (เลโล), si se (สีเส) (Chanthaburi); hu khwai lek (หูควายเล็ก) (Chumphon), phlu yuan bai lek (พลูญวนใบเล็ก) (Trat).

Notes.— *Callicarpa longifolia* is variable in the indumentum of its leaf blade abaxial surfaces, which varies continuously from hairy to subglabrous. Similarly, the ovary can possess stellate pubescence or just sparse stellate hairs at the apex. The specimen *Collins* 1667 was misidentified as *C. psilocalyx* C.B.Clarke by Fletcher (1938); it is C. *longifolia*. *Callicarpa psilocalyx* is a distinct species which differs from *C. longifolia* through possessing simple cymes rather than divaricately branched cymes and glabrous outer corolla lobes rather than densely hairy outer corolla lobes. It does not occur in Thailand.

Roxburgh (1820) stated in the protologue that *C. lanceolaria* is a native plant in Sylhet forest which was collected by H. Koamoora, but he did not cite any specimen. As there is an illustration in Icon. Roxb. (T 2178), it is designated here as lectotype.

**8. Callicarpa macrophylla** Vahl, Symb. Bot. 3: 13, t. 53. 1794; Willd., Sp. Pl. 1: 621. 1798; Roxb., Fl. Ind. 1: 408. 1820 & Fl. Ind. ed. 2, 1: 393. 1832; Walp., Repert. Bot. Syst. 4: 126. 1845; Schauer in A.P. de Candolle, Prodr. 11: 644. 1847; Kurz, Forest Fl. Burma

2: 274. 1877; C.B.Clarke in J.D.Hooker, Fl. Brit. India 4: 568. 1885; Kuntze, Rev. Gen. Pl. 2: 503. 1891; Brandis, Indian Trees: 512. 1906; Bakh. in H.J.Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 23. 1921; P'ei in Mem. Sci. Soc. China 1(3): 23. 1932; Dop, Bull. Soc. Hist. Nat. Toulouse 64: 505. 1932 & in M.H.Lecomte, Fl. Indo-Chine 4(7): 795. 1935; H.R.Fletcher, Bull. Misc. Inform., Kew 1938: 414. 1938; Chang, Acta Phytotax. 1: 283. 1951; Moldenke, Fifth Summary Verbenac. 1: 294. 1971 & Phytologia Mem. 2: 284. 1980; Munir, J. Adelaide Bot. Gard. 6(1): 24. 1982; Moldenke & A.L.Moldenke in Dassan., Rev. Handb. Fl. Ceylon 4: 297. 1983; Chen & M.G.Gilbert in W.Z.Yi & P.H.Raven, Fl. China 17: 7. 1994; A.Rajendran & P.Daniel, Ind. Verbenac.: 43. 2002. Type: Eastern India, *Köenig* s.n. (holotype **C!)**.— *C. incana* Roxb. [Hort. Beng: 10. 1814, *nom. nud*.] Fl. Ind. 1: 407. 1820. Type: The illustration in Icon. Roxb. T. 914 (lectotype **K!**; lectotypified by Rajendran and Daniel, 2002).— *C. cana* Gamble, Darjeeling Pl. List: 60. 1878, non L. Type: not seen.— *C. macrophylla* var. *griffithii* C.B.Clarke in J.D.Hooker, Fl. Brit. India 4: 568. 1885. Type: Bhutan, 1837–1838, *Griffith* in Kew Distrib. No. 6041 (holotype **K!**).— *C. dunniana* H.Lév. in Fedde, Repert. Spec. Nov. Regni Veg. 9: 456. 1911. Types: China, Guizhou, Long Tchang, June 1906, *Esquirol* 869 (syntyes **E!**, **HUH**, **K!**); Hoang Ko Chou, 20 June 1898, *Séguin* 2439 (syntype **E!**).— *C. macrophylla* var. *kouytchensis* H.Lév., Fl. Kouy-Tchiou: 440. 1915. Type: China, Guizhou, 7 July 1911, *Esquirol* 3093 (syntype **E!**); Sept. 1909, *Cavalerie* 2703 (syntype **E!**).

Thailand.— NORTHERN: Chiang Mai (Fang), Chiang Rai, Lampang (Chae Son).

Distribution.— Nepal, Bhutan, India, Sri Lanka, Bangladesh, Myanmar, China, Laos, Vietnam, Singapore, New Guinea, Australia.

Ecology.— In secondary forest; rarely in dry evergreen forest; alt. 450–950 m; flowering: May to August; fruiting: September to Febuary.

Vernacular.— Phak wai (ผักไว), un on (อุนออน) (Northern).

Notes.— *Callicarpa macrophylla* closely resembles to *C. candicans* in its stem and inflorescences having stellate hairs, the abaxial surface of leaves covered with dense, soft, greyish-white to white stellate or dendroid hairs, pink to violet corolla and glabrous ovary. However, *C. macrophylla* is different from *C. candicans* through having an obtuse leaf base, peduncle mostly longer than the stalk of bract and white mature fruits. In contrast, *C. candicans* has attenuate leaf base, peduncle which is shorter than the stalk of bract and black mature fruits.

**9. Callicarpa maingayi** King & Gamble, Bull. Misc. Inform., Kew 1908: 106. 1908 & J. Asiat. Soc. Bengal 74: 804. 1908 & Mat. Fl. Malay. Penins.: 1014. 1909; H.J.Lam, Verben. Malay. Archip.: 63. 1919; Moldenke, Fifth Summary Verbenac. 1: 294. 1971 & Phytologia Mem. 2: 284. 1980; C.Leeratiwong, Chantar. & A.J.Paton, Thai Forest Bull., (Bot.) 35: 75. 2007. Type: Malaysia, Malacca, 21 Nov. 1865, *Maingay* in Kew Distribution 1192 (lectotype **K!**; isolectotypes **BM!**, **K!**; lectotypified by Leeratiwong et al., 2007).

Thailand.— PENINSULAR: Narathiwat (Waeng).

Distribution.— Peninsular Malaysia.

Ecology.— In shade or margins of evergreen or secondary forest; alt. 250–500 m; flowering: March to May; fruiting May to August.

Notes.— *Callicarpa maingayi* is very similar to *C. furfuracea* but differs in a tree-like habit, stem nodes without an interpetiolar woody ridge, shorter corolla (3–4 mm long), glabrous ovary and red ripening fruits. *C. furfuracea* is a scandent shrub or a woody climber, with an interpetiolar woody ridge on the stem nodes, longer corolla (4–6 mm long), hairy ovary and black ripening fruits. *C. maingayi* was first described based on the Malaysian material by King and Gamble (1908) which it has a hairy ovary, while in Thai materials the ovary is glabrous.

**10. Callicarpa pentandra** Roxb. [Hort. Beng.: 83. 1814, *nom. nud*.] Fl. Ind. 1: 409. 1820; Schauer in A.P. de Candolle, Prodr. 11: 646. 1847; Miq., Fl. Ned. Ind. 2: 885. 1858; Bakh. in H.J.Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 11. 1921; Merr., Enum. Philip. Fl. Pl. 3: 387. 1923. Type: Indonesia, Moluccas, not located.— *Geunsia farinosa* Blume, Catalogus: 12. 1823 & Bijdr. Fl. Ned. Ind.: 819. 1826; H.J.Lam, Verben. Malay. Archip.: 42. 1919; Ridl., Fl. Malay Penins. 2: 614. 1923; Moldenke, Fifth Summary Verbenac. 1: 296. 1971 & Phytologia Mem. 2: 286. 1980. Type: Indonesia, Buitenzorg, *Blume* s.n. (holotype **L**).— *Callicarpa cumingiana* Schauer in A.P. de Candolle, Prodr. 11: 664. 1847; Merr., Enum. Philip. Fl. Pl. 3: 383. 1923. Type: The Philippines, 1840, *Cuming* 1707 (holotype **B**; isotypes **K!**-2 sheets, **PNH**).— *C. acuminatissima* Teijsm. & Binn., Natuurk. Tijdschr. Ned.-Indië 25: 409. 1863. Type: Indonesia, Ceram, *de Vriese & Teijsmann* s.n. (holotype **L**; isotype **BOG**).— *C. hexandra* Teijsm. & Binn., Natuurk. Tijdschr. Ned.-Indië 25: 410. 1863. Type: Indonesia, Sulawesi (Celebes), Minahassae, Menado, *de Vriese & Teijsmann* s.n. (holotype **L**).— *G. cumingiana* (Schauer) Rolfe, J. Linn. Soc., Bot. 21: 315. 1884; H.J.Lam, Verben. Malay. Archip.: 35. 1919. Type: as *C. cumingiana* Schauer.— *G. hexandra* (Teijsm. & Binn.) Koord., Meded. Lands Pl. 19: 559. 1898; H.J.Lam, Verben. Malay. Archip.: 37. 1919. Type: *C. hexandra* Teijsm. & Binn.— *C. affinis* Elmer, Leafl. Philipp. Bot. 3: 864. 1910. Type: Philippines, Mindanao, Davao Island, Todaya (Apo Mount), June 1909, *Elmer* 10856 (syntypes **HUH**, **K!**, **L!**, **US!**), July 1909, *Elmer* 11102 (syntypes **HUH**, **K!**, **L!**, **US!**).— *G. hookeri* Merr., Philipp. J. Sci., C 7: 342. 1912. Type: Philippines, *Cuming* 1773 (holotype **HUH**; isotypes **K!**-2 sheets, **L!**).— *G. pentandra* (Roxb.) Merr., Philip. J. Sc. Bot. 11: 309. 1916; H.J.Lam, Verben. Malay. Archip.: 33. 1919; Moldenke, Fifth Summary Verbenac. 1: 296. 1971; Kochummen in Ng, Tree Fl. Malaya 3: 305. 1978; Moldenke, Phytologia Mem. 2: 286. 1980. Type: as *C. pentandra* Roxb.— *G. serrulata* Hallier f., Meded. Rijks-Herb. 37: 27. 1918.–Type: Indonesia, Borneo, Sambas, Sungai, 30 Oct. 1893, Hallier B 801 (syntypes **L!**, **U!**).— *G. acuminatissima* (Teijsm. & Binn.) H.J.Lam, Verben. Malay. Archip.: 32. 1919. Type: as *C. acuminatissima* Teijsm. & Binn.— *G. cumingiana* var. *pentamera* H.J.Lam, Verben. Malay. Archip.: 36. 1919. Type: not designated.— *C. pentandra* f. *celebica* Bakh., Bull. Jard. Bot. Buitenzorg III 3: 14. 1921. Types: Indonesia, Sulawesi (Celebes), Menado, near Gorontalo (Riedel, Ratahan, *Koord* 19488 (syntype **BOG**), 19714 (syntype **BOG**); Loeboe, *Koord* 19499 (syntype **BOG**), 19509 (syntype **BOG**).— *C. pentandra* var. *cumingiana* (Scahuer) Bakh., Bull. Jard. Bot. Buitenzorg, III, 3: 16. 1921. Type: *C. cumingiana* Schauer.— *C. pentandra* f. *farinosa* (Blume) Bakh., Bull. Jard. Bot. Buitenzorg, III, 3: 13. 1921. Type: as *Geunsia farinosa* Blume.— *C. pentandra* f. *hexandra* (Teijsm. & Binn.) Bakh., Bull. Jard. Bot. Buitenzorg, III, 3: 13. 1921. Type: as *C. hexandra* Teijsm. & Binn.— *C. pentandra* var. *cumingiana* f. *pentamera* (H.J.Lam) Bakh., Bull. Jard. Bot. Buitenzorg, III, 3: 17. 1921. Type:as *G. cumingiana* var. *pentamera* H.J.Lam.— *C. pentandra* var. *cumingiana* f. *dentata* Bakh., Bull. Jard. Bot. Buitenzorg, III, 3: 17. 1921.

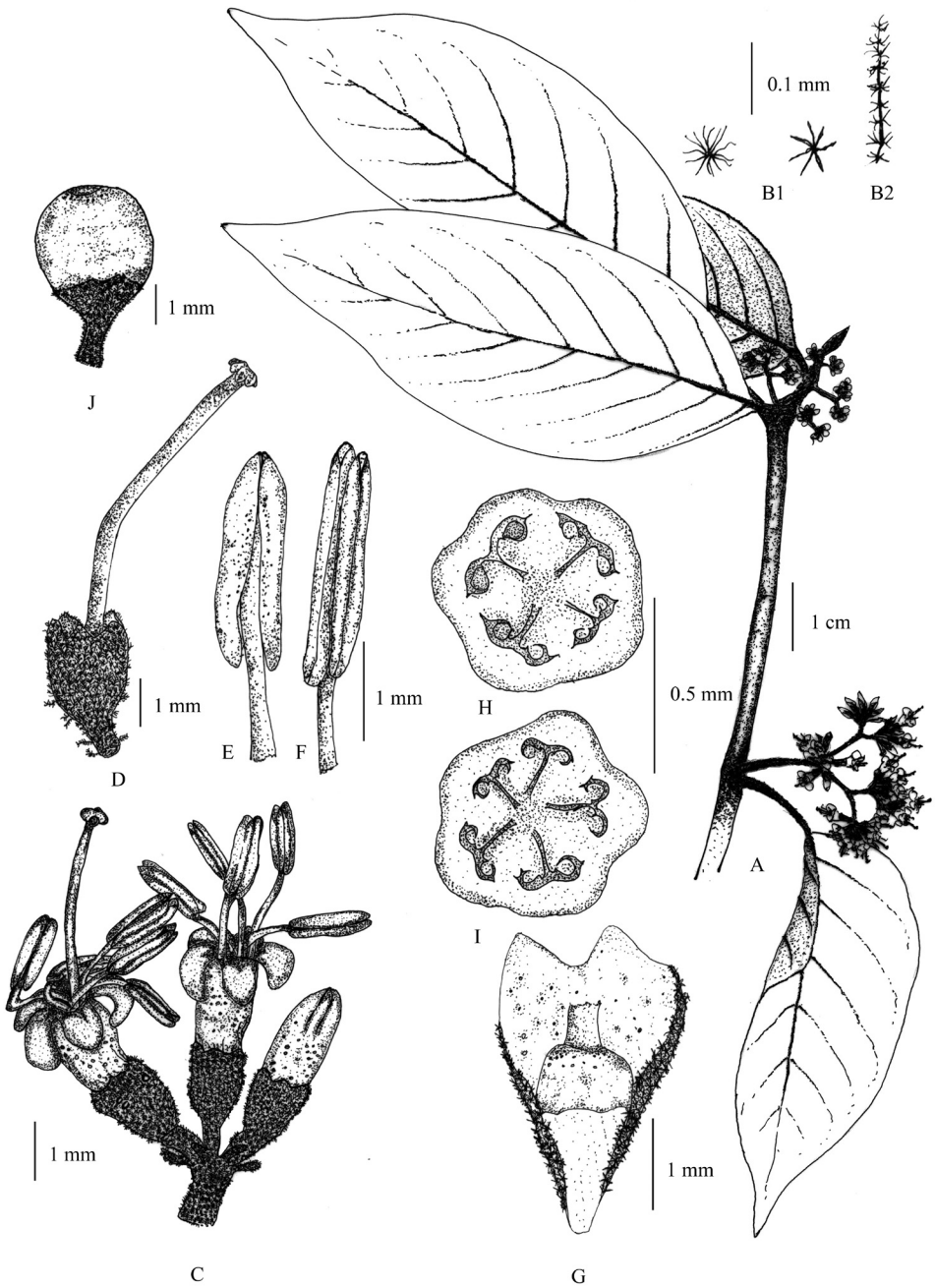



Figure 5. *Callicarpa pentandra*: A. flowering branch; B1–B2. hairs on the abaxial surface of leaves: B1. stellate hairs, B2. dendroid hairs; C. flowers; D. calyx and style; E. dorsal stamen; F. ventral stamen with anther opening by by a short apical slit; G. ovary; H. cross-section of ovary with 4 locules; I. cross-section of ovary with 5 locules; J. fruit. All from *Leeratiwong* 05-204 (PSU). Drawn by C. Leeratiwong.

Type: Indonesia, Sumatra, Tarabangie, Lamp, S.N. H.B. 4284 (**U!**).— *G. cumingiana* var. *dentata* (Bakh.) Moldenke, Phytologia 5: 8. 1954. Type: as *C. pentandra* var. *cumingiana* f. *dentata* Bakh.— *G. hexandra* f. *serrulata* Moldenke, Phytologia 5(1): 8. 1954. Type: Indonesia, Sulawesi (Celebes), *de Vriese & Teijsmann* s.n. (holotype **L!**).— *G. pentandra* var. *albidella* Moldenke, Phytologia 5: 10. 1954. Type: British Solomon Island, Quoimonapu, Malaita, 11 Dec. 1930, *Kajewski* 2340 (holotype **BOG**).— *G. farinosa* f. *serratula* Moldenke, Phytologia 44: 473. 1979. Type: Malaysia, Sabah, Sandakan, The logging area, Sg. Sakong Kechil, Sandakan Bay, 12 May 1967, *Fox* in SAN 57700 (holotype **Moldenke Herbarium**).— *G. hexandra* var. *macrophylla* Moldenke, Phytologia 49: 430. 1981. Type: Malaysia, Sabah, Tawau, The NBT logged over area at mile 26 from Luasong, 25 Feb. 1979, *Fedelis & Sumbing* in SAN 89702 (holotype **Moldenke Herbarium**).— *G. farinosa* var. *callicarpoides* H.J.Lam ex Moldenke, Phytologia 50: 220. 1982. Type: Malaysia, Borneo, Sabah, Kinabalu, Penokok, S.N. (holotype **L!**). Fig. 5.

Thailand.— PENINSULAR: Narathiwat (Waeng).

Ecology.— Common along the edge of evergreen forest; alt. 100–300 m; flowering: March to September; fruiting May to December.

Distribution.— Peninsular Malaysia, Indonesia (Sumatra, Java, Moluccas, Borneo, Sulawesi), Philippines, New Guinea.

Vernacular.— Po non (ปอนน) (Narathiwat).

Notes.— *Callicarpa pentandra* differs from other *Callicarpa* species by having flowers with 5-lobed corolla and 5 stamens and anthers which open at the apex at first.

**11. Callicarpa phuluangensis** C.Leeratiwong & A.J.Paton **sp. nov.** *C. pedunculata* affinis sed lobis corollis et ovaris sparsim pilis ornatis (nec glabis) differt; *C. longifolia* affinis sed pedunculis longior quam petiolus bractis (nec breviter) differt. Typus: Thailand, Loei, Phu Luang Wildlife Sanctuary, 17 June 2004, *Leeratiwong* 04-14 (holotypus **KKU!**; isotypi **BKF!**, **PSU!**, **QBG!**). Fig. 6.

Shrubs 1.5–2 m high, branches greenish-brown or brown, obtusely 4-angled, with dense, yellowish-brown or brown stellate hairs mixed with dendroid hairs when young, later brown, cylindrical with lenticels, glabrescent; nodes with an interpetiolar woody ridge. *Leaves* elliptic, lanceolate, lanceolate-elliptic or narrowly elliptic, chartaceous, (5–)10–18 by (2–) 3–4 cm, apex caudate or acuminate, base cuneate, margin dentate or serrate-dentate; adaxial surface with moderate, brown scabrid hairs mixed with dendriod, stellate or two-armed hairs, with sparse, yellow subsessile glands sometimes with sparse, brown scale-like glands, midrib flattened; abaxial surface with moderate or sparse, brown stellate hairs mixed with pubescent or dendroid hairs sometimes with two-armed hairs and with moderate, yellow glands, midrib prominent, with dense, brown stellate or dendroid hairs; secondary veins 6–10-paired, distinct on both surfaces; tertiary veins reticulate, distinct on both leaf surfaces; petiole slightly thickened, slightly 4-angled, 0.3–1 cm long, flattened on upper part. *Inflorescence* with dichasial cymes, supra-axillary, 2–3.5(–4) cm long; peduncle brownish-violet, slender, terete, 1.5–2 cm long, longer than stalk of leaf-like bract; pedicels slightly thickened, 0.8–1.2 mm long; bracteoles linear or lanceolate-linear, 0.5–5 mm, caducuous. *Calyx* greenish-violet, cup-shaped, 0.8–1.3 mm long, with

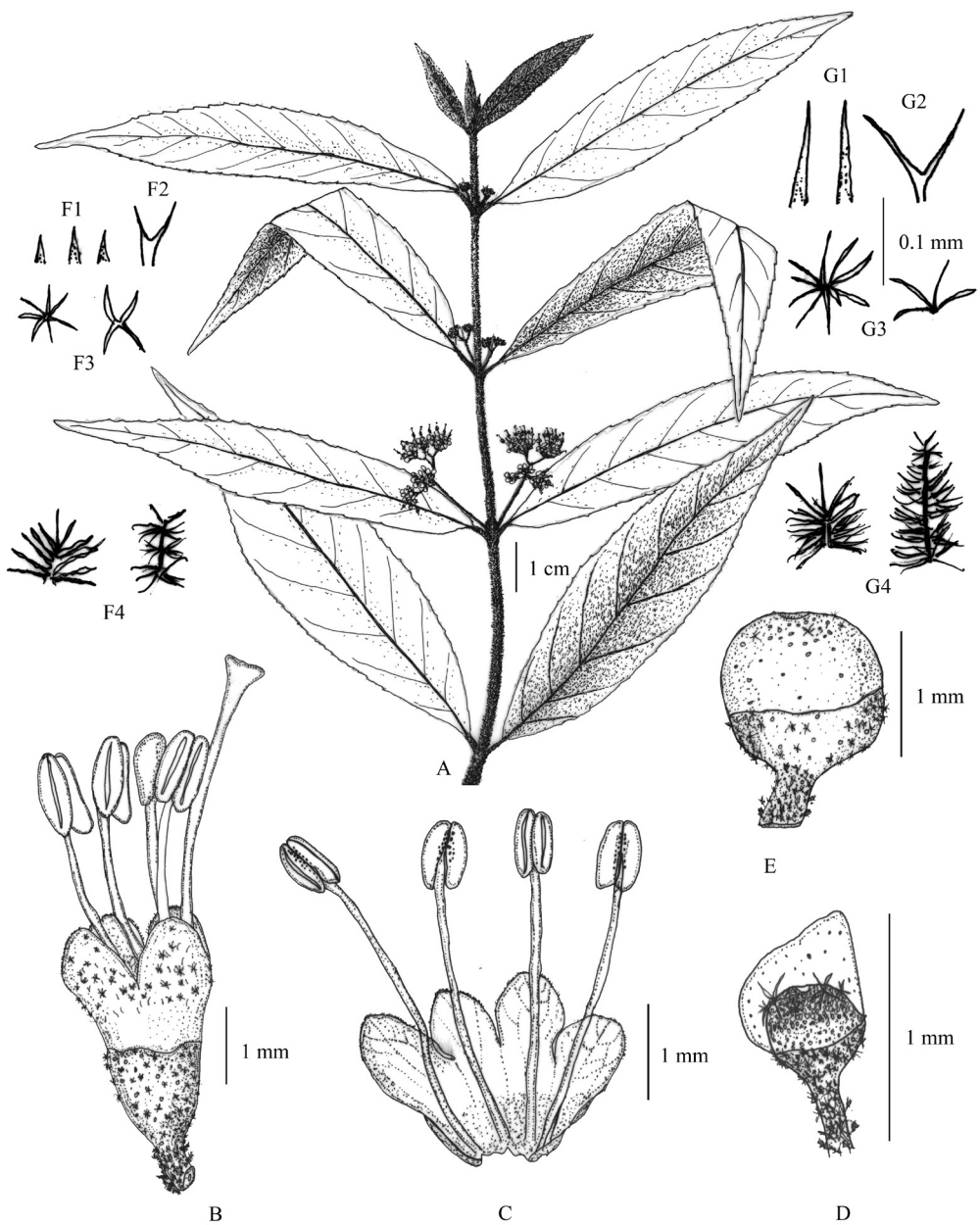



Figure 6. *Callicarpa phuluangensis*: A. flowering branch; B. flower; C. vertical section of corolla; D. pistil; E. fruit; F1.–F4. hairs on the adaxial surface of leaves: F1. simple hairs, F2. two-armed hair, F3. stellate hairs, F4. dendroid hairs; G1.–G4. hairs on the abaxial surface of leaves: G1. simple hairs, G2. two-armed hair, G3. stellate hairs, G4. dendroid hairs. All from *Leeratiwong* 04-14 (holotypus **KKU**). Drawn by C. Leeratiwong.

sparse, brown stellate hairs and with sparse, yellow glands without, glabrous with sparse subsessile glands inner; tube 0.7–1.2 mm long; apex with-minute or indistinct teeth, teeth ovate-triangular, 0.05–0.15 by 0.05–0.1 mm, apex acute or obtuse. *Corolla* violet-pink or pink, 2.3–3 mm long; tube 1.7–2 mm long, slightly swollen, with sparse, whitish-brown pubescent hairs distally without, glabrous within; lobes ovate or rounded-ovate, 0.8–1.2 by 0.7–1 mm, apex rounded or obtuse, with sparse to moderate pubescence or stellate hairs, with ciliate hairs at margin and with sparse glands without, glabrous with subsessile glands within. *Stamens* long exserted; filaments pinkish-white, slender, 4–6 mm long; anthers yellow, broadly elliptic, 0.8–1 mm long. *Ovary* ovoid or subglobose, 0.3–0.5 mm long, with sparse stellate hairs and with moderately dense, yellow glands at the apex; style slender especially thickened at the apex, obscurely bifid. *Fruits* subglobose, 1.8–2.5 mm long, glabrescent or glabrous and with sparse subsessile glands, green when young; persistent calyx 0.8–1.5 mm long; fruit stalks 0.8–2.5 mm long.

Thailand.— NORTH-EASTERN: Loei [Phu Luang Wildlife Sanctuary, 17 June 2004, *Leeratiwong* 04-14 (holotype **KKU!**; isotypes **BKF!**, **PSU!**, **QBG!**)].

Distribution.— Endemic.

Ecology.— In hill evergreen forest; alt. ca 1,300 m; flowering: May to July.

Notes.— *Callicarpa phuluangensis* is similar to *C. pedunculata* R.Br. from China, Philippines, Indonesia (Moluccas and Lesser Sunda Islands), New Guinea and Australia, but differs by having the outer surface of the corolla and ovary being hairy rather than glabrous. It is also close to *C. longifolia* Lam. var. *longifolia*, from which it differs in its peduncle, which is longer than the stalk of leaf-like bract. This species is only found in Phu Luang Wildlife Sanctuary, Loei.

**12. Callicarpa rubella** Lindl., Bot. Reg.: 11, t. 883. 1825; Walp., Repert. Bot. Syst. 4: 130. 1845; Schauer in A.P. de Candolle, Prodr. 11: 645. 1847; Kurz, Forest Fl. Burma 2: 274. 1877; C.B.Clarke in J.D.Hooker, Fl. Brit. India 4: 569. 1885; Kuntze, Rev. Gén. Pl. 2: 503. 1891; Brandis, Indian Trees: 512. 1906; H.J.Lam, Verben. Malay. Archip.: 53. 1919; P'ei, Mem. Sci. Soc. China 1(3): 38. 1932; Dop, Bull. Soc. Hist. Nat. Toulouse 64: 506. 1932 & in M.H.Lecomte, Fl. Indo-Chine 4(7): 796. 1935; H.R.Fletcher, Bull. Misc. Inform., Kew 1938: 414. 1938; Chang, Acta Phytotax. 1: 296. 1951; Moldenke, Fifth Summary Verbenac. 1: 294. 1971 & Phytologia Mem. 2: 284. 1980; Kochummen in Ng, Tree Fl. Malaya 3: 302. 1978; Chen & M.G.Gilbert in Z.Wu & P.H.Raven, Fl. China 17: 13. 1994; A.Rajendran & P.Daniel, Ind. Verbenac.: 50. 2002. Type: China, 1822, *Potts* s.n. (lectotype **CGE!**, designated here).— *C. sessilifolia* Wall. [Cat. No. 1837, *nom. nud.*] ex Walp., Repert. Bot. Syst. 4: 130. 1845. Type: Bangladesh, Pundua, Sylhet, *Wallich* Cat. no.1837 (holotype **G-DC**, microfiche!, isotype **K-W!**).— *C. tenuiflora* Champ. ex Benth., in Hook., J. Bot. Kew Gard. Misc. 5: 135. 1853; Walp., Ann. Bot. Syst. 5: 709. 1858. Type: China, Hong Kong, Saywan, *Champion* 443 (holotype **K!**).— *C. rubella* var. *hemsleyana* Diels, Bot. Jahrb. 29: 547. 1900; P'ei, Mem. Sci. Soc. China 1(3): 40. 1932. Type: China, Sichuan, *von Rosthorn* 390 (holotype **HUH**).— *C. panduriformis* H.Lév. in Fedde, Repert. Spec. Nov. Regni Veg. 9: 455. 1911. Type: China, Kouy-Tcheou, Kouy Yang, May 1898, *Chaffanjon* 2341 (syntype **E!**), Tsin Gay, 20 Nov. 1898, *Labode* 2507 (syntype **E!**).— *C. rubella* f. *angustata* C.P'ei, Mem. Sci. Soc. China 1: 39. 1932. Type: not located. Fig. 7.




Figure 7. *Callicarpa rubella*: A. flowering branch; B1.–B4. hairs on the adaxial surface of leaves: B1. pubescent hairs, B2. two-armed hair, B3. stellate hair, B4. dendroid hairs; C1.–C3. hairs on the abaxial surface of leaves: C1. pubescent hair, C2. stellate hairs, C3. dendroid hairs; D. cyme; E. calyx; F. pistil; G. fruit. A–F. from *Leeratiwong* 04-41 (PSU), G. from *Leeratiwong* 04-170 (PSU). Drawn by C. Leeratiwong.

Thailand.— NORTHERN: Mae Hong Son (Doi Huai Puling, Khun Yuam), Chiang Mai (Chom Thong, Doi Chang Kian, Doi Chiang Dao, Doi Inthanon, Doi Pha Hom Pok, Mae Chaem, Mae Taeng, Doi Suthep, Mae Rim, Samoeng), Chiang Rai (Doi Tung, Khun Korn, Phu Langka, Wiang Papao), Lampang (Doi Khun Tan), Nan (Doi Kunchang, Doi Phuka), Uttaradit (Nahm Pie), Tak (Umphang), Sukhothai (Khao Luang), Phitsanulok (Phu Hin Rong Kla, Phu Miang); NORTH-EASTERN: Phetchabun (Nam Nao, Thung Salaeng Luang), Loei (Phu Kradueng, Phu Luang); EASTERN: Chaiyaphum (Phu Khieo), Nakhon Ratchasima (Khao Yai); SOUTH-WESTERN: Kanchanaburi (Sangkhaburi, Thong Pha Phum), Phetchaburi (Khao Pha Noen Thung, Kaeng Krachan); CENTRAL: Nakhon Nayok (Khao Yai); SOUTH-EASTERN: Trat (Khao Kuap); PENINSULAR: Phangnga (Khao Phra Mi), Surat Thani (Phanom Bencha), Nakhon Si Thammarat (Khao Luang).

Distribution.— Bhutan, India, Bangladesh, Myanmar, China, Taiwan, Cambodia, Laos, Vietnam, Peninsular Malaysia, Indonesia (Sumatra, Java, Sulawesi (Celebes)), Philippines.

Ecology.— In open and streamside areas in seconday, evergreen, dry evergreen, mixed deciduous forests, rarely occur in hill evergreen, pine, dipterocarp and savannah forests; alt. 400–2,000 m; flowering: March to July; fruiting: May to December.

Vernacular.— Khapia dong (ขาเปียดง) (Tak, Loei), namlai phisuea (น้ำลายผีเสื้อ) (Loei); pha (ผ้า) (Central, Chiang Mai), choua di pho (Chiang Mai), no chwe di (Karen-Chiang Mai), si la (สีลา) (Chiang Mai).

Notes.— *Callicarpa rubella* is easily recognized by its cordate or obliquely cordate leaf base, the short petiole and the violet to pink ripening fruits. Lindley (1825) did not cite any specimens in the original publication but he stated that *C. rubella* was brought from China by John Potts in 1822 on a trip sponsored by the Horticultural Society and cultivated in a garden at Chiswick. Therefore, *Potts* s.n. deposited at CGE is chosen here as the lectotype.

## ACKNOWLEDGEMENTS

We would like to thank the curators and staff of the following herbaria for loans of specimens, information and their assistance during visit to their institutions: AAU, BCU, BK, BKF, CMU, HUH, K, KKU, L, NY, P, PSU, QBG, SING, US and Herb. Biology, Chiang Mai University. Financial support from the Royal Golden Jubilee Program (No. 4.B.KK/46/B.1) and Commission on Higher Education, Ministry of Education, Thailand are acknowledged.

## REFERENCES

Bramley, G.L.C. (2009). The genus *Callicarpa* (Lamiaceae) on Borneo. Botanical Journal of the Linnean Society 159: 416–455.

Cantino, P.D., Harley, R.M. & Wagstaff, S.J. (1992). Genera of Labiatae: Status and Classification. In: Harley, R.M. & Reynolds, T., Advances in Labiatae Science: 511–522. Royal Botanic Gardens, Kew.

Clarke, C.B. (1904). Verbenaceae. In: Schmidt, J., Flora of Koh Chang, part 8: 171– 175. Bianco Luno, Copenhagen.

Fletcher, H.R. (1938). The Siamese Verbenaceae. Bulletin of Miscellaneous Information, Kew 1938: 411–415.

Govaerts, R., Paton, A.J., Harvey, Y. & Navarro, T. (2007). World Checklist of Lamiaceae. The Board of Trustees of the Royal Botanic Gardens, Kew. Published on the Internet; http://www.kew.org/wcsp (accessed 6 July 2007).

Harley, R.M., Atkins, S., Budantsev, P.D., Cantino, P.D., Conn, B.J., Grayer, R., Harley, M.M., De Kok, R., Kresstovskaja, T., Morales, R., Paton, A.J., Ryding, O. & Upson, T. (2004). Labiatae. In: Kubitzki, K., The Families and Genera of Vascular Plants: Flowering Plant-Dicotyledons, 7: 267–268. Springer-Verlag, Germany.

Holmgren, P.K., Holmgren, N.H. & Barnett, L.C. (1990). The Herbaria of the World. 8th ed. New York Botanical Garden, U.S.A.

King, G. & Gamble, J.S. (1908). Plantarum Novarum In Herbario Horti Regii Conservatarum. Bulletin of Miscellaneous Information, Kew 1908: 106.

Leeratiwong, C., Chantaranothai, P. & Paton, A.J. (2007). Notes on the genus *Callicarpa* L. (Lamiaceae) in Thailand. Thai Forest Bulletin (Botany) 35: 73–79.

Lindley, J. (1825). *Callicarpa rubella*. Botanical Register 11: 883.

Linnaeus, C. (1753). Species Plantarum. 1st ed. Laurentius Salvius, Stockholm.

Moldenke, H.N. (1980). A sixth summary of the Verbenaceae, Avicenniaceae, Stilbaceae, Chloranthaceae, Symphoremataceae, Nyctanthaceae and Eriocaulaceae of the World as to valid taxa, Geographic Distribution and Synonymy. Phytologia Memoirs. 2: 284–285.

Roxburgh, W. (1820). Flora Indica. Vol. 1. The Mission Press, Serampore.

The Forest Herbarium, Royal Forest Department. (2001). Thai Plant Names, Tem Smitinand, Revised Edition. Prachachon, Bangkok.