The Natural History Journal of Chulalongkorn University 9(2): 113-142, October 2009

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

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

[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, United Kingdom.*

ABSTRACT.– **A synopsis of the genus *Premna* in Thailand is taxonomically revised. Keys, notes on their distributional and ecological data, vernacular names and some illustrations are also provided. Twenty-three species and two varieties are enumerated, including seven endemic taxa: *P. annulata*, *P. garrettii*, *P. interrupta* var. *smitinandii*, *P. paniculata*, *P. repens*, *P. serrata* and *P. siamensis*. The former species *P. dubia*, *P. amplectans* & *P. macrophylla* var. *glaberrima*, *P. macrophylla* var. *thailandica* and *P. quadridentata* are reduced to the synonyms of *P. collinsiae*, *P. herbacea*, *P. nana* and *P. trichostoma*, respectively.**

KEY WORDS: Pupinidae, Taxonomy, Pollicaria mouhoti, Karyotype differentiation

INTRODUCTION

The genus *Premna* L. belongs to the family Lamiaceae with *ca.* 200 species worldwide and is distributed chiefly in tropical and subtropical Asia, Africa, Australia and the Pacific Islands (Harley et al., 2004). The genus was first described by Linnaeus (1771) with one species, *P. serratifolia* L. Subsequently, Fletcher (1938) carried out a preliminary revision of the genus in Thailand, recognising 24 species and seven varieties (30 taxa). Later, Moldenke (1980), The Forest Herbarium (2001) and Govaerts et al. (2008) reported the checklists of *Premna* with 39, 19 and 33 taxa, respectively. In the recent taxonomic works of this genus, Maxwell (2007) and Leeratiwong et al. (2008) found one (*P. subcapitata* Rehd.) and three new records for Thailand (*P. punctulata* C.B. Clarke, *P. rabakensis* Moldenke and *P. stenobotrys* Merr.), respectively. However, there is currently no available key to the species, whilst there are problems of doubtful or unknown species, synonymy and misidentification of species. Therefore, it is necessary to resolve these issues and to provide a complete revision of the genus in Thailand.

This is presented here as part of the process of the revision of the genera within the Lamiaceae family, including the genus *Prema*, for the Flora of Thailand. Seven endemic taxa and five new synonyms are presented. Keys to the species and varieties, notes on distribution, ecology, vernacular names, uses and some illustrations are provided.

* Corresponding author:
Tel: (6643)-342-908
Fax: (6643)-364-169
E-mail: pranom@kku.ac.th

MATERIALS AND METHODS

This study is based on an examination of both field collections and the 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), Chiangmai University Herbarium (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 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, 1998). Ecological and distributional data were also recorded.

Premna

Premna L, Mant. Pl. 2: 154. 1771, *nom. cons.*; R. Br., Prodr. Fl. Nov. Holl.: 512. 1810; Blume, Bijdr. Fl. Ned. Ind.: 815. 1826; Roxb., Fl. Ind. 3: 75. 1832; Schauer in A. DC., Prodr. 11: 630. 1847; Miq., Fl. Ned. Ind. 2: 890. 1858; Benth., Fl. Hongk.: 269. 1861 & Fl. Aust. 5: 58. 1870; Brandis, Ind. Trees: 509. 1906; King & Gamble, J. Asiat. Soc. Beng. 74: 810. 1909 & Mat. Fl. Malay. Pen.: 1020. 1909; Merr., Enum. Philip. Fl. Pl. 3: 389. 1923; H.J. Lam, Verb. Mal. Arch.: 101. 1919; Junell, Symb. Bot. Ups. 4: 84. 1934; Dop in M.H. Lecomte, Fl. Gén. Indo-Chine 4(7): 805. 1935; Backer & Bakh.f., Fl. Java 2: 602. 1965; Moldenke, Fifth Summary Verbenac. 1: 295. 1971; Moldenke, Phytologia Mem. 2: 284. 1980; Moldenke & A.L. Moldenke in Dassanayake & Fosberg, Rev. Handb. Fl. Ceyl. 4: 308. 1983; Munir, J. Adelaide Bot. Gard. 7: 3. 1984; A. Rajendran & P. Daniel, Ind. Verbenaceae: 213. 2002. Type: *P. serratifolia* L.

Cornutoides L., Fl. Zeyl.: 195. 1747. Type: *Sambucus zeylanica odorata aromatica.*

Appella Adans., Fam. Pl. 2: 84 & 519. 1763. Type: not located.

Cornutia Burm.f., Fl. Indica 132, pl. 41, f. 1. 1768, *nom. inval.* [not *Cornutia* Plum. ex L., 1754]. Type: *C. corymbosa* Burm.f.

Scrophularioides G. Forst., Fl. Ins. Austr.: 91. 1786, *nom. nud.* Type: *S. arborea* G. Forst.

Scobia Norona, Verh. Batav. Genootsch. Kunsten 5(4): 3. 1790. Type: not located.

Solia Norona, Verh. Batav. Genootsch. Kunsten 5(4): 3. 1790. Type: not located.

Baldingera Dennst., Schlüssel Hortus Malab.: 31. 1818. Type: *B. glandulosa* Dennst.

Holochiloma Hochst., Flora 24: 371. 1841. Type: *H. resinosum* Hochst.

Gumira [Rumpf, Herb. Amboin. 3: 208, t. 133. 1741] Hassk., Flora 25 (Beibl. 2): 26. 1842. Type: *G. domestica* Rumph. ex Hassk.

Phaenicanthus Thwaites, Enum. Pl. Zeyl.: 242. 1861, in syn. Type: *P. zeylanicus* Thwaites.

Tatea F. Muell., Trans. & Proc. Roy. Soc. S. Aust. 6: 33. 1883. Type: *T. subacaulis* F. Muell.

Pygmaeopremna Merr., Philipp. J. Sci., C 5: 225. 1910; H.J. Lam, Verb. Mal. Arch.: 160. 1919; Moldenke, Phytologia Mem. 2: 287. 1980; Moldenke & A.L. Moldenke in Dassanayake & Fosberg, Rev. Handb. Fl. Ceyl. 4: 344. 1983. Type: *P. humilis* Merr. *Surfacea* Moldenke, Phytologia 46 (1): 59. 1980. Type: *S. racemosa* (Wall. ex Schauer) Moldenke.

Scandent shrubs, woody climbers, shrubs or trees, rarely perennial herbs with a woody rhizome, stem usually obtusely four-angled or terete with lenticels, mostly hairy with simple hairs (except with stellate or dendriod hairs in *P. pyramidata*), rarely glabrous; stem nodes with or without an interpetiolar woody ridge. *Leaves* simple, mostly opposite-decussate or rarely ternate, exstipulate, mostly petiolate or rarely sessile or subsessile, hairy to glabrous, with subsessile glands (except eglandular in *P. paniculata*). *Inflorescence* a terminal determinate thyrse, mostly corymbose,rarely pyramidal or spike-like; flowers bisexual, zygomorphic. *Calyx* campanulate or cupular, persistent, two-lipped, each lip mostly equal or rarely unequal, with 4-5-lobed, entire or subentire apex; anterior lip mostly wih two lobes and posterior lip with three lobes or one lip with two lobes and another lip entire or subentire, rarely both lips with entire or subentire apex or both lips with two lobes. *Corolla* gamopetalous, four-lobed, mostly two-lipped or rarely almost actinomorpic; corolla tube short, swollen, gradually dilated from base towards throat or gradually dilated towards throat from midpoint, mostly covered with densely to sparsely white villous hairs distally; posterior lip single-lobed; anterior lip three-unequally lobed; corolla lobes glabrous or hairy, with subsessile glands, margins mostly ciliate. *Stamens* four, free, didynamous, epipetalous, filaments usually long exserted, rarely shortly exserted; anthers ovate, oblong, elliptic or cordate, dorsifixed, two-locular, divergent, mostly opening by longitudinal long slits, rarely opening by short longitudinal slits. *Ovary* superior, two-carpellate, syncarpous, ovoid, obovoid, subglobose, ellipsoid or ellipsoid-ovoid, two-locular with two ovules per locule, mostly glabrous or rarely hairy, mostly covered with subsessile glands; style terminal, mostly long exserted, rarely shortly exserted; style branches two (–three), equally long. *Fruits* drupaceous, obovoid, subglobose, ovoid, ellipsoid or obovoid-ellipsoid, young fruits mostly green, mature fruits mostly black, rarely violet-black, violet or reddish-brown; pericarp with thin exocarp, fleshy and juicy mesocarp and strongly hard endocarp, endocarp surface verrucose. *Seeds* 1-4, oblong, bean-shaped, exalbuminous.

KEY TO THE SPECIES

1. Leaf surfaces with stellate or dendroid hairs.....*P. pyramidata*
1. Leaf surfaces glabrous or with simple hairs
2. Calyx lobe 1-1.8 mm long.....*P. serrata*
2. Calyx lobe less than 1 mm long
3. Corolla red or pinkish-red.....*P. stenobotrys*
3. Corolla white, greenish-white, yellowish-white, yellow, pale yellow, creamy white or greenish-yellow
4. Inflorescences spike-like thyrse.....*P. interrupta*
4. Inflorescences corymbose thyrses
5. Stem node with a transversely interpetiolar woody ridge.....*P. annulata*
5. Stem node without a transversely woody interpetiolar ridge or with an inconspicuously interpetiolar ridge
6. Fruit ellipsoid or obovoid-ellipsoid
7. Abaxial surface of leaves with densely villous hairs; ovary glabrous
8. Both calyx lips entire or one lip with two lobes and another lip entire or subentire.....*P. garrettii*
8. Both calyx lips with two lobes.....*P. siamensis*
7. Abaxial surface of leaves glabrous or with pubescent or pilose (at midrib) hairs; ovary hairless
9. Style branch 0.5-1 mm long; flowers usually sessile, rarely on pedicels.....*P. trichostoma*
9. Style branch 0.2-0.4 mm long; flowers on pedicels
10. Calyx more than 1 mm long, moderately to densely pubescent outer; corolla 3.5-5 mm long.....*P. coriacea*
10. Calyx less than 1 mm long, usually glabrous or sparsely pubescent outer; corolla 2–3 mm long.....*P. scandens*
6. Fruit ovoid, obovoid or subglobose
11. Both calyx lips entire or one lip with two lobes and another lip entire or subentire
12. Inside of middle lobe of anterior corolla lip covered with villous hairs along base to apex; anthers blue.....*P. octonervia*
12. Inside of middle lobe of anterior corolla lip glabrous or only covered with villous hairs at the base, other part glabrous or with pubescent hairs; anthers brown, pale brown or whitish-brown
13. Tree; corolla almost actinomorphic.....*P. rabakensis*
13. Shrub, scandent shrub or woody climber; corolla distinctly two-lipped
14. Ovary hairy.....*P. punctulata*
14. Ovary grabrous
15. Ovary without subsessile gland; leaf base usually cuneate; growing on coastal areas.....*P. serratifolia*
15. Ovary with subsessile glands; leaf base cordate or rounded; on inland areas.....*P. cordifolia*
11. Both calyx lips with lobes

16. Apices of both calyx lips with two lobes
17. Inner surface of middle lobe of anterior corolla lip covered with villous hairs along base to above middle or apex; anthers blue.....***P. octonervia***
17. Inner surface of middle lobe of anterior corolla lip covered with villous hairs at base or glabrous; anthers brown
18. Both calyx lips equal, posterior lip mostly three-lobed; ovary with subsessile glands; growing on inland areas.....***P. collinsiae***
18. Both calyx lip unequal, posterior lip mostly entire; ovary without subsessile gland; growing on coastal areas.....***P. serratifolia***
16. Posterior calyx lip three-lobed, anterior calyx lip two-lobed
19. Leaf margin lobed.....***P. repens***
19. Leaf margin entire or serrate
20. Abaxial surface of leaves without subsessile gland.....***P. paniculata***
20. Abaxial surface of leaves with subsessile glands
21. Inside of the middle lobe of anterior corolla lip covered with villous hairs along base to above middle or apex
22. Both leaf surfaces hairy; anthers brown or whitish-brown; ovary with subsessile glands.....***P. mollissima***
22. Both leaf surfaces (except midrib) glabrous; anthers blue; ovary without subsessile gland.....***P. octonervia***
21. Inside of the middle lobe of anterior corolla lip covered with villous hairs at base or glabrous
23. Perennial herb with woody rhizome; staments shortly exserted
24. Abaxial surface of leaves glabrous or sparsely hairy; style less than 3.5 mm long.....***P. herbacea***
24. Abaxial surface of leaves densely hairy; style 3.5-6 mm long.....***P. nana***
23. Tree, shrub, scandent shrub or woody climber; stamens long exserted
25. Stem and leaf surfaces covered with golden-brown pilose hairs.....***P. fulva***
25. Stem and leaf surfaces covered with yellowish-brown, brown or reddish-brown pubescent, tomentose, villous hairs or rarely glabrous
26. Midrib on adaxial surface of leaves covered with villous hairs.....***P. hamiltonii***
26. Midrib on adaxial surface of leaves covered with tomentose or pubescent hairs
27. Both calyx lips unequal; ovary glabrous without subsessile gland; growing on coastal areas.....***P. serratifolia***
27. Both calyx lips equal; ovary glabrous with subsessile glands or hairy; growing on inland areas.....***P. collinsiae***

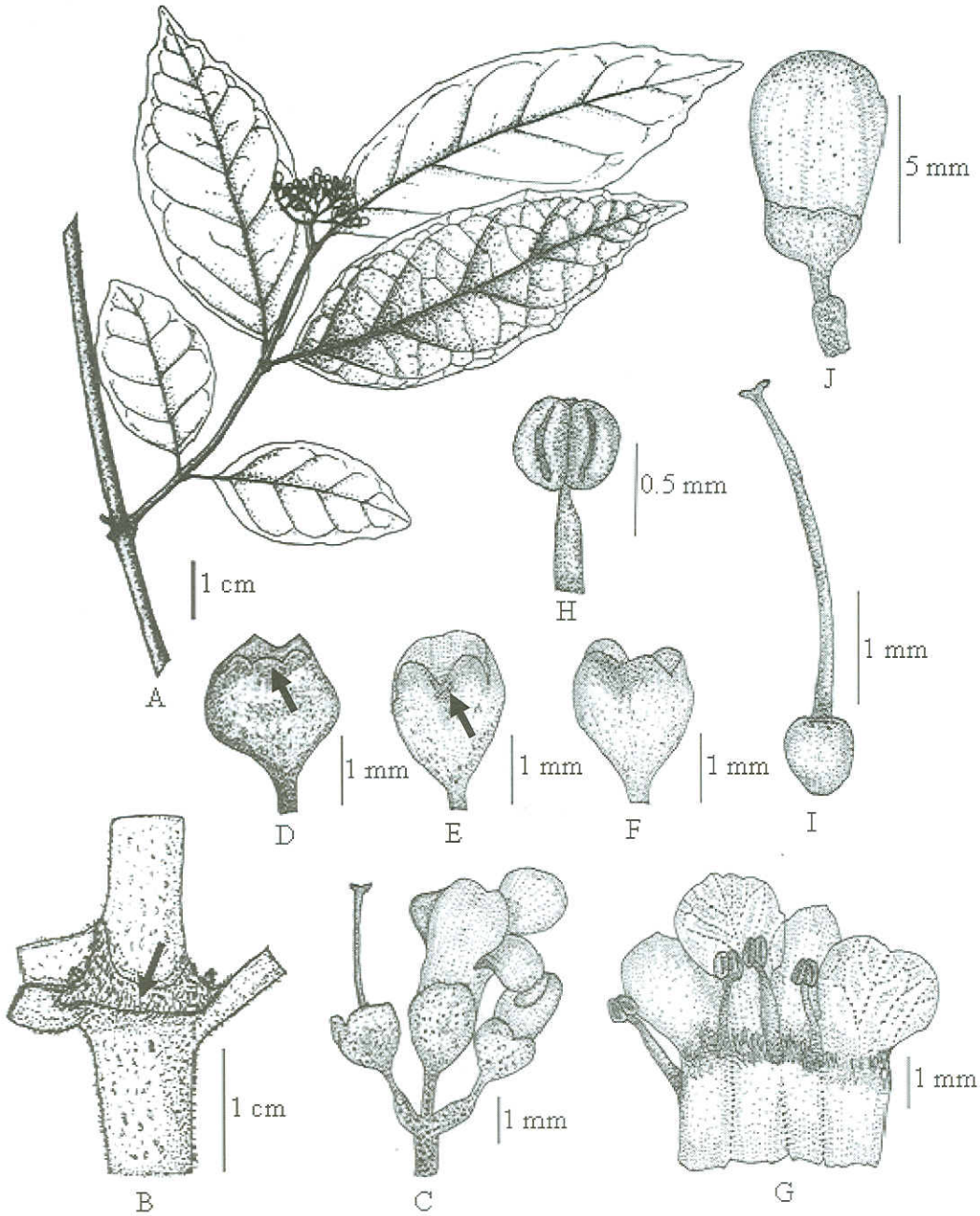

FIGURE 1. Line drawings of *P. annulata* showing; A. flowering branch; B. stem node with a transversely interpetiolar woody ridge (arrow); C. flowers; D. calyx showing the three-lobed apex of the posterior lip (arrow); E. calyx showing the subentire apex of the posterior lip (arrow); F. calyx showing the teo-lobed apex of both lips; G. vertical cut of corolla; H. stamen; I. pistil; J. fruit.

Premna annulata H.R. Fletcher (Fig. 1)

Premna annulata H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 199. 1938 & Bull. Misc. Inform., Kew 1938: 421. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 286. 1980. Type: Thailand, Phatthalung, Sak, alt. 50 m, 1 May 1930, *A.F.G. Kerr* 19269 (holotype E!; isotypes BK!, BM!, K!, TEX! (fragment)).

Thailand.– PENINSULAR: Surat Thani, Phatthalung, Songkhla.

Distribution.– Endemic to Thailand.

Ecology.– In secondary, swamp and limestone forests; alt. 0-100 m; flowering: May to July; fruiting: August to December.

Note.– *P. annulata* is distinguished by its an interpetiolar woody ridge on the stem nodes, elliptic or lanceolate leaf shape, yellow corolla and obovoid-elliptic or ellipsoid fruits.

Premna collinsiae Craib

Premna collinsiae Craib, Bull. Misc. Inform., Kew 1914: 283. 1914; Dop, Bull. Soc. Bot. France 70: 444. 1923 & in M.H. Lecomte, Fl. Gén. Indo-Chine 4(7): 812. 1935; H.R. Fletcher, Bull & Misc. Inform., Kew 1938: 419. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 286. 1980. Type: Thailand, Chonburi, Sriracha, 9 Jan. 1913, *D.J. Collins* 109 (holotype K!; isotypes K!, TCD!, TEX! (fragment)).

Premna dubia Craib, Bull. Misc. Inform., Kew 1914: 283. 1914; Dop, Bull. Soc. Bot. France 70: 443. 1923 & in M.H. Lecomte, Fl. Gén. Indo-Chine 4(7): 812. 1935; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 417. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 286. 1980, ***syn. nov.*** Type: Thailand, Nakhon Phanom (Lakawn), alt. 250 m, 30 April 1912, *A.F.G. Kerr* 2562 (holotype K!; isotypes BM!, K!, P!, TCD!, TEX! (fragment)).

Thailand.– NORTHERN: Lampang, Khamphaeng Phet and Nakhon Sawan; NORTH-EASTERN: Phetchabun, Loei, Nong Bua Lam Phu, Nakhon Phanom and Khon Kaen; EASTERN: Nakhon Ratchasima and Ubon Ratchathani; SOUTH-WESTERN: Kanchanaburi, Phetchaburi and Prachuap Khiri Khan; CENTRAL: Saraburi and Krung Thep Maha Nakhon; SOUTH-EASTERN: Prachinburi and Chonburi.

Distribution.– Thailand, Laos and Vietnam.

Ecology.– In open areas of mixed deciduous, dipterocarp and limestone forests; alt. 0-1,000 m; flowering: January to May; fruiting: May to October.

Uses.– The boiled juice of plants is used to treat children's fever.

Vernacular.– Kha Pia (ขาเปี๋ย) (Northern), Kha Pia Mae Mai (ขาเปี๋ยแม่ม่าย) (Lampang) and Sakhang Kruea (North-Eastern).

Note.– We have examined the type of *P. dubia* and it is conspecific with *P. collinsiae*. Therefore, *P. dubia* is reduced as a synonym of *P. collinsiae*.

Premna cordifolia Roxb.

Premna cordifolia Roxb., [Hort. Beng.: 95. 1814, *nom. nud.*] Fl. Ind. 3: 78. 1832; Walp., Repert. Bot. Syst. 4: 94. 1845; Schauer in A. DC., Prodr. 11: 632. 1847; Miq., Fl. Ned. Ind. 2: 895. 1858; C.B. Clarke in Hook.f., Fl. Brit. Ind. 4:

572. 1885; Brandis, Ind. Trees: 511. 1906; King & Gamble, J. Asiat. Soc. Beng. 74: 818. 1909 & Mat. Fl. Mal. Pen.: 1028. 1909; H.J. Lam, Verb. Mal. Arch. 111. 1919 & in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 36. 1921; Ridl., Fl. Mal. Pen. 2: 621. 1923; Dop, Bull. Soc. Bot. France 70: 830. 1923 & in M.H. Lecomte, Fl. Gén. Indo-Chine 4(7): 816. 1935; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 418. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971; Kochummen in Ng, Tree Fl. Mal. 3: 307. 1978; Moldenke, Phytologia Mem. 2: 286. 1980. Type: The Illustration in Icon. *Roxb.* T. 1462 (lectotype K!; selected by Rajendran and Daniel (1995)).

Premna perrottetii C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 572. 1885, *in nota.*

Gumira cordifolia (Roxb.) Kuntze, Rev. Gen. Pl., 2: 507. 1891. Type: as *P. cordifolia* Roxb.

Thailand.– PENINSULAR: Songkhla and Yala.

Distribution.– Thailand, Vietnam and Malay Peninsula.

Ecology.– In cleared areas of primary or secondary evergreen forests; 50-100 m; flowering: April to June; fruiting: July to October.

Vernacular.– Ya Yo (ยายอ) (Songkhla).

Note.– *Premna cordifolia* is easily recognised because of the cordate to ovate leaf shape, cordate or rounded leaf base and corymbose thyrse inflorescence.

Premna coriacea C.B. Clarke

Premna coriacea C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 573. 1885; Gamble, Man. Ind. Timb. ed. 2: 535. 1902; Prain, Bengal Pl. 2: 830. 1903; Brandis, Ind. Trees: 510. 1906; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 417. 1938; A. Rajendran & P. Daniel, Ind. Verbenaceae: 226. 2002. Type: India, Concan, *Law* s.n. (lectotype K!).

Premna cordifolia Wight, Icon. Pl. Orient.: t. 1483. 1849, *nom. illeg.*

Gumira coriacea (C.B. Clarke) Kuntze, Rev. Gen. Pl. 2: 507. 1891. Type: as *P. coriacea* C.B. Clarke.

Premna coriacea var. *oblonga sensu* H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 417. 1938, *non* C.B. Clarke, 1885.

Premna scandens sensu Dop, Bull. Soc. Bot. France 70: 831. 1923 & in M.H. Lecomte, Fl. Gén Indo-Chine 4(7): 817. 1935; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 417. 1938, *non* Roxb., 1832.

KEY TO THE VARIETIES

1. Abaxial surface of leaves glabrous except sparsely hairy at midrib; inside of corolla lobes mostly hairy; anthers opening by long longitudinal slit.....var. **coriacea**
1. Abaxial surface of leaves with moderately or sparsely pubescent hairs; inside of corolla lobes hairy at base only; anthers mostly opening by short longitudinal slit.....var. **villosa**

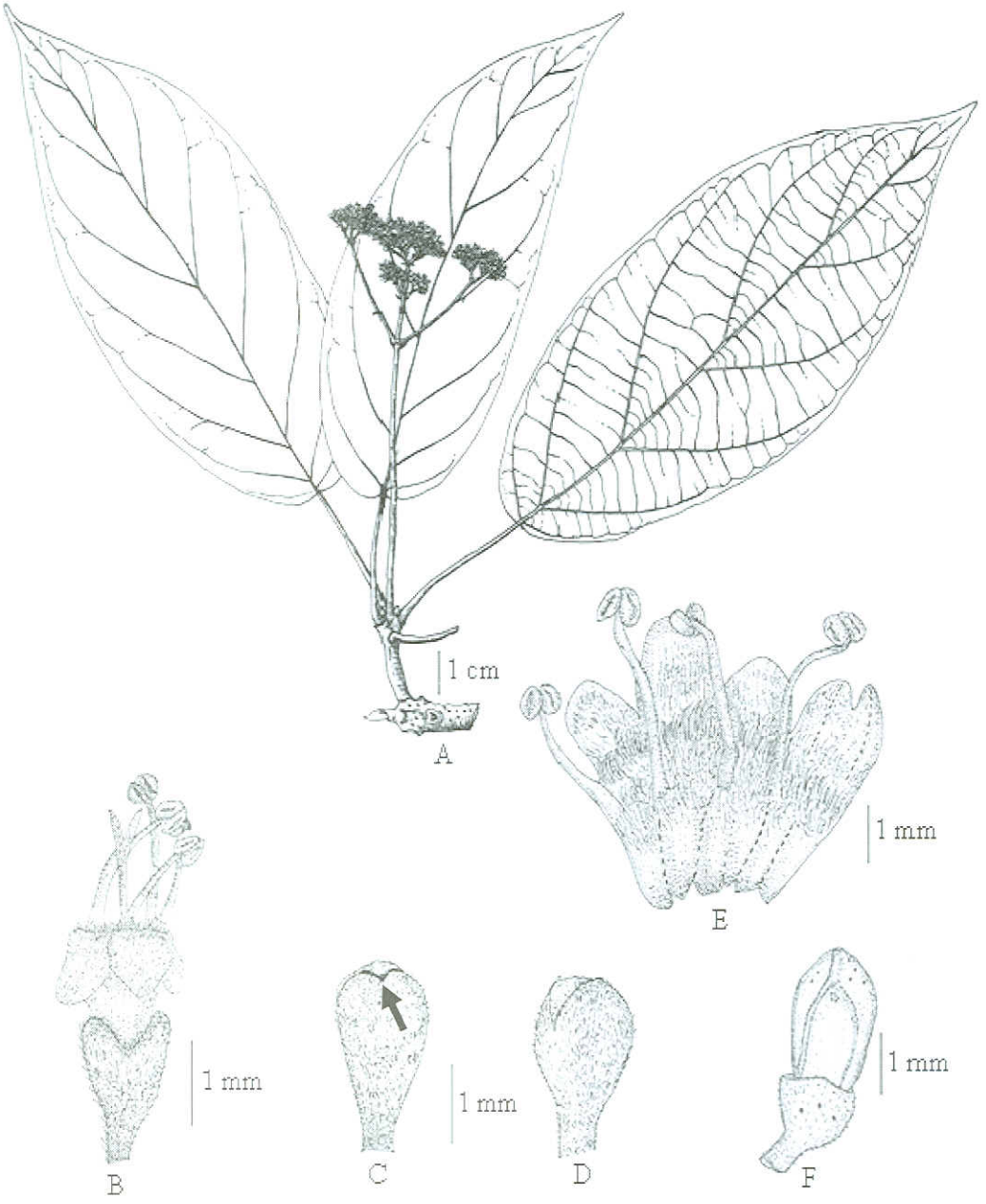

FIGURE 2. Line drawings of *P. coriacea* var. *coriacea*: A. flowering branch; B. flower; C. calyx showing the two-lobed apex of the anterior lip (arrow); D. calyx showing the entire apex of both lips; E. vertical cut of corolla; F. fruit.

Premna coriacea var. *coriacea* (Fig. 2)

Thailand.– NORTHERN: Chiang Mai and Phitsanulok; NORTH-EASTERN: Phetchabun, Nong Khai and Nakhon Phanom; SOUTH-WESTERN: Phetchaburi; PENINSULAR: Surat Thani.

Distribution.– India, Bangladesh, Bhutan, Myanmar, Thailand, Laos, Cambodia and Vietnam.

Ecology.– In dry evergreen or mixed deciduous forest by sandstone bedrocks near streams or clearing areas; 50-900 m; flowering: January to May; fruiting: May to August.

Note.– *Premna coriacea* var. *coriacea* is distinct in having the glabrous leaves, the apices of both calyx lips which are entire or posterior lip having two lobes and almost actinomorphic corolla.

Premna coriacea var. *villosa* (C.B. Clarke) A. Rajendran & P. Daniel

Premna coriacea var. *villosa* (C.B. Clarke) A. Rajendran & P. Daniel, Bull. Bot. Surv. India 38: 43. 1996; A. Rajendran & P. Daniel, Ind. Verbenaceae: 228. 2002.Type: as *P. villosa* C.B. Clarke.

Premna villosa C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 573. 1885; Brandis, Ind. Trees:510. 1906. Type: Bangladesh, Wynaad, alt. *ca.* 1,000 m, *Beddome* s.n. (lectotype K!, isolectotype BM!).

Gumira villosa (C.B. Clarke) Kuntze, Rev. Gen. Pl. 2: 507. 1891. Type: as *P. villosa* C.B. Clarke.

Thailand.– NORTHERN: Phitsanulok; NORTH-EASTERN: Nakhon Phanom, Mukdahan and Khon Kaen.

Distribution.– India, Bangladesh, Thailand and Vietnam.

Ecology.– In dipterocarp and mixed deciduous forests by sandstone bedrocks or streams; 200-350 m, flowering April to June; fruiting May to September.

Note.– *Premna coriacea* var. *villosa* differst from the typical variety by having moderate to sparse, spreading, pubescent hairs on the abaxial surface of leaves, a glabrous inner surface of the corolla lobes and anthers which mostly open by a short longitudinal slit.

Premna fulva Craib

Premna fulva Craib, Bull. Misc. Inform., Kew 1911: 442. 1911; Dop, Bull. Soc. Bot. France 70: 443. 1923 & in M.H. Lecomte, Fl. Gén. Indo-Chine 4(7): 809. 1935; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 420. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980; Chen & Gilbert in W.Z. Yi & P.H. Raven, Fl. China 17: 21. 1994. Type: Thailand, Chiang Mai, Doi Suthep, alt. *ca.* 700 m, 10 April 1910, *A.F.G. Kerr* 1085 (holotype K!, isotypes BM!, K!, TCD!).

Premna fortunate Dop, Bull. Soc. Bot. France 70: 444. 1923. Type: China, Guizhou, Houa Kiang, *Cavalerie & Fortunat* 2036 (holotype P!).

Premna longipila C. Pei, Mem. Sci. Soc. China 1(3): 75. 1932. Type: China, Yunnan, Simao, *A. Henry* 12113 (isotypes HUH, NY!).

Thailand.– NORTHERN: Chiang Mai, Chiang Rai, Phayao, Lampoon, Lampang, Phrae and Kamphaeng Phet; NORTH-EASTERN: Loei; EASTERN: Chaiyaphum.

Distribution.– China, Thailand, Laos and Vietnam.

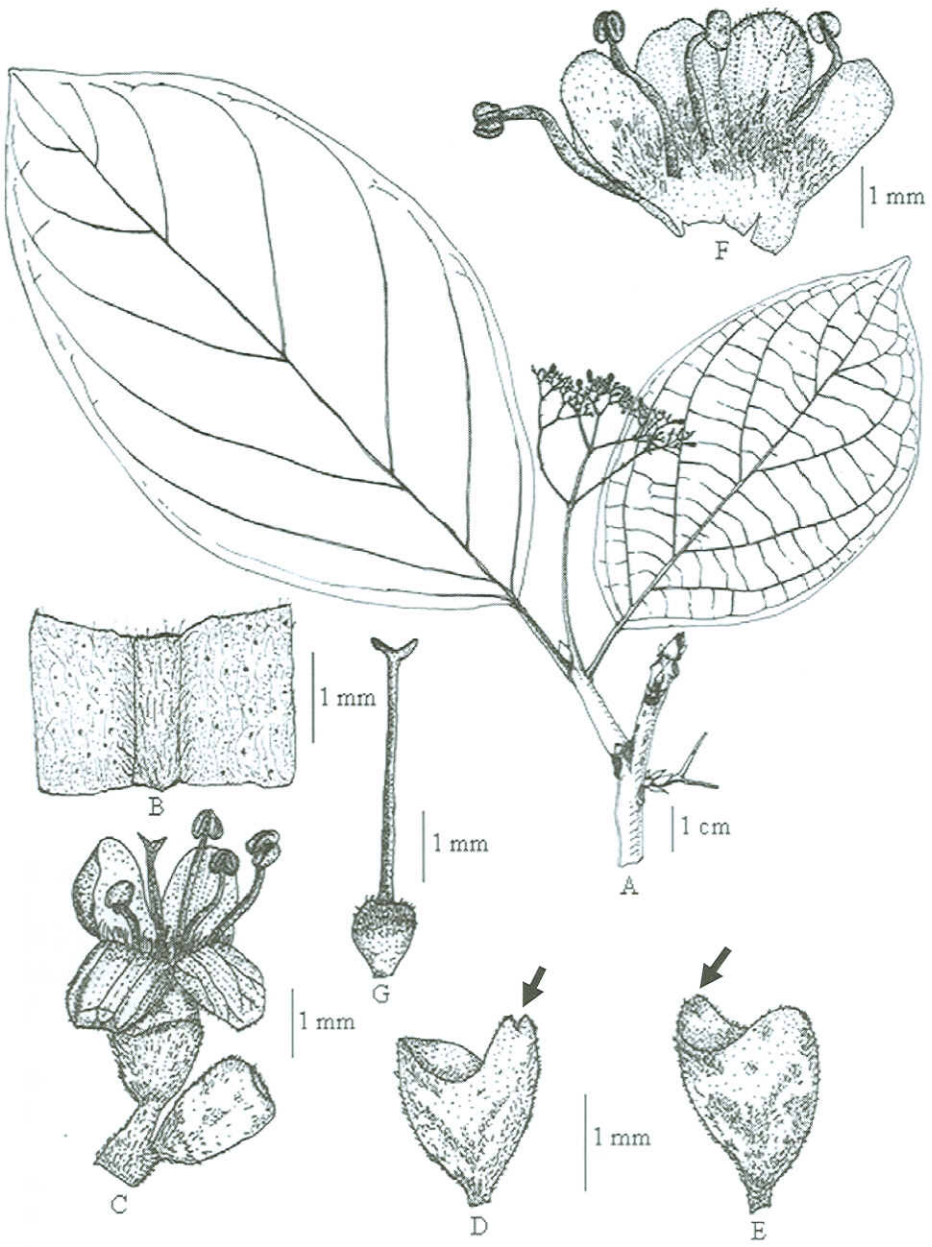

FIGURE 3. Line drawings of *P. garrettii* showing: A. flowering branch; B. the abaxial surface of a leaf; C. flower; D.-E. calyx showing the two-lobed apex of the posterior lip (arrow); F. vertical cut of corolla and G. pistil.

Ecology.– In evergreen, dry evergreen, secondary and mixed deciduous forests, especially on rocky, streamsides, open, edged and disturbed areas; alt. 500-1,150 m; flowering: March to May; fruiting: April to September.

Note.– *Premna fulva* differs from other *Premna* species by having golden-brown pilose hairs on the stem and the leaf surfaces.

Premna garrettii H.R. Fletcher (Fig.3)

Premna garrettii H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 200. 1938 & Bull. Misc. Inform., Kew 1938: 418. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980. Type: Thailand, Chiang Rai, Doi Tam Tu Pu, alt. *ca.* 530 m, *H.B.G. Garrett* 296 (holotype K!; isotypes BKF!, BM!, C!, E!, K!, SING!).

Thailand.– NORTHERN: Chiang Rai.

Distribution.– Endemic to Thailand.

Ecology.– In limestone forests; *ca.* 530 m; flowering May to July; fruiting: June to August.

Note.– *Premna garrettii* is characterised by the abaxial surface of leaves with densly villous hairs, corymbose-thyrsoid inflorescence, almost actinomorphic corolla and hairy ovary.

Premna hamiltonii J.L. Ellis

Premna hamiltonii J.L. Ellis, Bull. Bot. Surv. India 22: 193. 1980; A. Rajendran & P. Daniel, Ind. Verbenaceae: 242. 2002. Type: India, Goalpara, 5 June 1807, *Hamilton* s.n. (*Wallich,* Cat. No. 2649) (holotype K-W!).

Premna flavescens Buch.-Ham. ex C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 578. 1885, *nom. illeg.*, *non* Juss., 1806; Brandis, Ind. Trees: 511. 1906; H.J. Lam, Verb. Mal. Arch.: 136. 1919 & in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 41. 1921; Dop in M.H. Lecomte, Fl. Gén. Indo-Chine 4(7): 810. 1935; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 420. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 286. 1980; Chen & Gilbert in W.Z. Yi & P.H. Raven, Fl. China 17: 21. 1994.

Gumira flavescens (Buch.-Ham. ex C.B. Clarke) Kuntze, Rev. Gen. Pl. 2: 507. 1891. Type: as *flavescens* Buch.-Ham. ex C.B. Clarke.

Premna flavescens var. *glabrior sensu* H.J. Lam, Verb. Malay. Arch.: 137. 1919; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 420. 1938, Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 286. 1980, *non* C.B. Clarke, 1885.

Premna flavescens var. *rubens sensu* Dop, Bull. Soc. Bot. France 70: 443. 1923 & in M.H. Lecomte, Fl. Gén Indo-Chine 4(7): 810. 1935, *non* C.B. Clarke, 1885.

Thailand.– NORTH-EASTERN: Phetchabun; CENTRAL: Nakhon Nayok; SOUTH-EASTERN: Prachin Buri; PENINSULAR: Chumphon, Surat Thani, Nakhon Si Thammarat, Trang, Phatthalung, Yala and Narathiwat.

Distrubution.– India, Bangladesh, China, Myanmar, Thailand, Laos, Vietnam, Malay Peninsula, Sumatra and Java.

Ecology.– Scatterred through secondary forests, along streams in evergreen and open dry evergreen forests, limestone ranges and the edges in plantations; alt. 10-1,200 m; flowering December to April; fruiting May to August.

Vernacular.– Sam Di Nga (สำดีงา) (Surat Thani) and Ma Mok (มะโมก) (Chumphon).

Note.– Most Thai and Indo-Chinese materials of *Premna hamiltonii* were mistakenly identified to *P. flavescens* var. *glabrior* C.B. Clarke by Fletcher (1938). This taxon was then reduced to the synonym of *P. lucidula* Miq. by Rajendran & Daniel (2002). Later, Govaerts et al. (2008) reduced *P. hamiltonii* as a synonym under *P. lucidula*. However, from checking the type material, *P. hamiltonii* is different from *P. lucidula* by having longer hairs on the midrib of adaxial surface of leaves, the abaxial surface of leaves with both spreading villose and pubescent hairs and pubescent ovary, while the latter has mostly adpressed pubescent hairs on the midrib of adaxial surface of leaves, the abaxial surface of leaves occurring glabrous to sparse, pubescent hairs and glabrous ovary. Therefore, *P. hamiltonii* is treated as a distinct species in this study.

Premna herbacea Roxb.

Premna herbacea Roxb., [Hort. Beng.: 46. 1814, *nom. nud.*] Fl. Ind. 3: 80. 1832; Walp., Repert. Bot. Syst. 4: 96. 1845; Schauer in A. DC., Prodr. 11: 637. 1847; C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 581. 1885; Brandis, Ind. Trees: 511. 1906; Merr., Enum. Philip. Fl. Pl. 3: 390. 1923; P'ei, Mem. Sci. Soc. China 1(3): 71. 1932; Dop, Bull. Soc. Bot. France 70: 830. 1923 & in M.H. Lecomte, Fl. Gén. Indo-Chine 4(7): 815. 1935; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 421. 1938; Munir, J. Adelaide Bot. Gard. 7: 7. 1984; Chen & Gilbert in W.Z. Yi & P.H. Raven, Fl. China 17: 27. 1994; A. Rajendran & P. Daniel, Ind. Verbenaceae: 245. 2002. Type: The illustration in icon. *Roxb.* T. 1461 (lectotype K!).

Premna amplectans Wall. [Cat. No. 1762, *nom nud.*] ex Schauer in A.DC., Prodr. 11: 636. 1847; Miq., Fl. Ned. Ind. 2: 898. 1858; Kurz, For. Fl. Burma 2: 262. 1877; C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 580. 1885; Brandis, Ind. Trees: 511. 1906; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 421. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980, ***syn. nov.*** Type: Myanmar, Pegu, Aug. 1826, *Wallich*, Cat. No. 1762 (holotype G-DC., microfiche!; isotype K-W!).

Tatea acaulis F. Muell., Preprint Trans. Roy. Soc. S. Aust. April 1883. Type: Australia, Northern Territory, Arnhem's Land, road from Bridge Creek to McKinley River at twelve mile, March 1882, *R. Tate* s.n. (syntypes AD, K!); Australia, Northern Territory, Arnhem's Land, road from Bridge Creek to McKinley River at twelve mile, Dec. 1882, *Foelsche* s.n. (syntypes K!, MEL).

Tatea subacaulis F. Muell., Trans. & Proc. Roy. Soc. S. Aust. 6: 34. 1883. Type: as *T. acaulis* F. Muell.

Gumira amplectans (Wall. ex Schauer) Kuntze, Rev. Gen. Pl. 2: 507. 1891. Type: as *P. amplectans* Wall. ex Schauer.

Gumira herbacea (Roxb.) Kuntze, Rev. Gen. Pl. 2: 507. 1891. Type: as *P. herbacea* Roxb.

Pygmaeopremna humilis Merr., Philipp. J. Sci., C 5: 225. 1910; H.J. Lam, Verb. Mal. Arch.: 161. 1919 & in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 47. 1921. Type: Philippines, Luzon, Cagayan, 2 April 1909, *Ramos* 7841 (syntypes HUH (fragment), K!,

US!); Philippines, Luzon, Isabella, Ilagan, 29 April 1909, *Ramos* 8124, (syntypes K!, NY!, PNH).

Premna sessilifolia H.J. Lam, Verbenac. Malay. Arch.: 133. 1919 & in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 40. 1921. Type: New Guinea, Kenegia river, alt. 150 m, 29 Sept. 1908, *Schlechter* 18303 (syntype BR).

Premna timoriana H.J. Lam in Merr., Enum. Philipp. Pl. 3: 390. 1923, *pro. syn.*

Tatea herbacea (Roxb.) Junell, Symb. Bot. Upsal. 4: 85. 1934. Type: as *P. herbacea* Roxb.

Tatea humilis (Merr.) Junell, Symb. Bot. Upsal. 4: 85. 1934. Type: as *Py. humilis* Merr.

Pygmaeopremna herbacea (Roxb.) Moldenke, Phytologia 2 (2): 54. 1941; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980; Moldenke & A.L. Moldenke in Dassanayake & Fosberg, Rev. Handb. Fl. Ceyl. 4: 345. 1983. Type: as *P. herbacea* Roxb.

Pygmaeopremna subacaulis (F. Muell.) Moldenke, Phytologia 2 (2): 54. 1941. Type: as *T. acaulis* F. Muell.

Pygmaeopremna sessilifolia (H.J. Lam) Moldenke, Known Geogr. Distr. Verbenac. Avicenn.: 78. 1942. Type: *P. sessilifolia* H.J. Lam.

Premna aculis (F. Muell.) Merr., J. Arn. Arb. 32: 75. 1951. Type: as *T. acaulis* F. Muell.

Premna obovata Merr., J. Arn. Arb. 32: 77. 1951. Type: China, Yunnan, Shunning, Hila, 23 June 1938, *T.T. Yii* 16431 (holotype HUH).

Pygmaeopremna herbacea var. *thailandica* Moldenke, Phytologia 7(2): 84. 1959; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980. Type: Thailand, Phetchabun, Lom Sak, Namnao, alt. *ca.* 800 m, 21 May 1951, *T. Smitinand* 482 (holotype NY; isotype BKF!).

Premna macrophylla Wall. ex Schauer var. *glaberrima* Moldenke, Phytologia 8: 273. 1962; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980, ***syn. nov.*** Type: Thailand, Kanchanaburi, Ku Jae, alt. 100-150 m, 20 July 1946, *A.J.G.H. Kostermans* 1267 (holotype US!; isotypes HUH!, L!, P!, SING!,).

Thailand.– NORTHERN: Mae Hong Son, Chiang Mai, Phayao, Lamphun, Tak, Sukhothai, Phitsanulok and Nakhon Sawan; NORTH-EASTERN: Phetchabun, Udon Thani, Mukdahan and Khon Kaen; EASTERN: Chaiyaphum, Nakhon Ratchasima and Buri Ram; SOUTH-WESTERN: Kanchanaburi; SOUTH-EASTERN: Sa Kaeo and Chonburi.

Distribution.– Nepal, India, Sri Lanka, Bangladesh, Bhutan, Myanmar, China, Thailand, Cambodia, Laos, Vietnam, Sumatra, Java, Borneo, Timor, Philippines, Papua, New Guinea and Australia.

Ecology.– In open, sandy, dry places in mixed deciduous, dipterocarp, dry evergreen, pine, savannah or secondary forests; alt. 50-1,200 m; flowering: November to May; fruiting: June to October.

Uses.– This plant is used for medicinal purposes.

Vernacular.– Kha Pia Num (ขาเปี๋ยนุ่ม) (Central), Khang Hua Lek (ขางหัวเล็ก) (Chiang Mai), Phaen Din Yen (แผ่นดินเย็น) (Chiang Mai) and Yom teen ma (ย่อมตีนหมา) (Mae Hong Son).

Note.– *Premna herbacea* is characterised by being a perennial herb with a woody rhizome and style which is included in the corolla tube. Some specimens were misidentified as *P. macrophylla* Wall. ex

Schauer from Myanmar. However, *P. herbacea* differs from *P. macrophylla* in having a shorter stem (≤ 1 m high rather than 1-2 m high) and a shorter calyx (1.5-2.5 mm long rather than 3-4 mm long) in comparison with the description of *P. macrophylla* in the Indian Verbenaceae (Rajendran & Daniel, 2002). Examination of the type specimens of *P. amplectens* and *P. herbacea* revealed that their floral characters are similar and the leaves of *P. amplectens* (glabrous leaf surfaces and cordate or rounded leaf base shape) fall within the variation of *P. herbacea*. Therefore, *P. amplectens* is placed as a synonym of *P. herbacea*.

Kostermans 1267 was recognised by Moldenke (1962) as a new taxon, *Premna macrophylla* var. *glaberrima*. This type specimen was examined and it was found to be conspecific with *P. herbacea*. Therefore, this taxon is considered a synonym of *P. herbacea*.

Premna interrupta Wall. ex Schauer

Premna interrupta Wall. [Cat. No. 1778, *nom nud.*] ex Schauer in A. DC., Prodr. 11: 633. 1847; C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 572. 1885; Brandis, Ind. Trees: 508. 1906; P'ei, Mem. Sci. Soc. China 1(3): 88. 1932; Chen & Gilbert in W.Z. Yi & P.H. Raven, Fl. China 17: 27. 1994; A. Rajendran & P. Daniel, Ind. Verbenaceae: 247. 2002. Type: Nepal, 1821, *Wallich*, Cat. No. 1778 (holotype G-DC, microfiche!; isotypes BM!, E!, K!-2 sheets, K-W!).

Premna racemosa Wall. [Cat. No. 1777, *nom. nud.*] ex Schauer in A. DC., Prodr. 11: 633. 1847; Kurz, For. Fl. Burma 2: 263. 1877; C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 571. 1885; Brandis, Ind. Trees: 509. 1906; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 417. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980; Chen & Gilbert in W.Z. Yi & P.H. Raven, Fl. China 17: 27. 1994; A. Rajendran & P. Daniel, Ind. Verbenaceae: 276. 2002, ***syn. nov.*** Type: Bangladesh, Pundua, *F. de Silva* s.n. *(Wallich,* Cat. No. 1777) (holotype G-DC, microfiche!; isotypes BM!, E!, K!-3 sheets, K-W!-2 sheets).

Gumira interrupta (Wall. ex Schauer) Kuntze, Rev. Gen. Pl. 2: 507. 1891. Type: as *P. interrupta* Wall. ex Schauer.

Gumira racemosa (Wall. ex Schauer) Kuntze, Rev. Gen. Pl. 2: 507. 1891. Type: as *P. racemosa* Wall. ex Schauer.

Premna racemosa var. *sikkimensis* Moldenke, Phytologia 5 (1): 18. 1954. Type: India, Sikkim, alt. 2,000-3,000 m, *J.D. Hooker* s.n. (holotype NY).

Surfacea interrupta (Wall. ex Schauer) Moldenke, Phytologia 46 (1): 60. 1980. Type: as *P. interrupta* Wall. ex Schauer.

Surfacea racemosa (Wall. ex Schauer) Moldenke, Phytologia 46 (1): 60. 1980. Type: as *P. racemosa* Wall. ex Schauer.

Surfacea racemosa var. *sikkimensis* (Moldenke) Moldenke, Phytologia 46 (1): 60. 1980. Type: as *P. racemosa* var. *sikkimensis* Moldenke.

KEY TO THE VARIETIES

1. Abaxial surface of leaves glabrous..... .....var. **interrupta**
1. Abaxial surface of leaves with densely villous hairs.....var. **smitinandii**

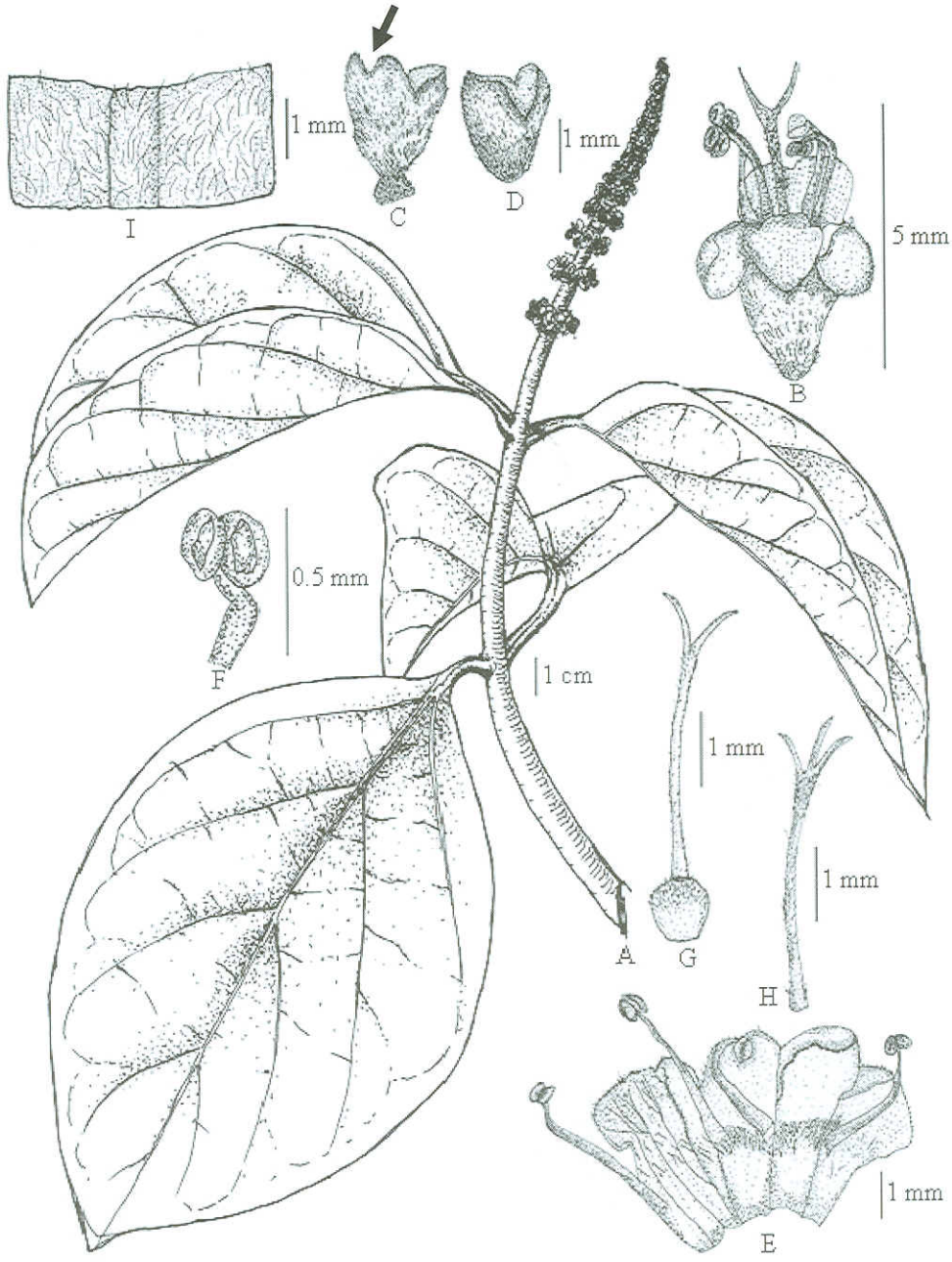

FIGURE 4. Line drawingsof *P. interrupta* showing: A. flowering branch; B. flower; C. calyx with the two-lobed apex of the posterior lip (arrow); D. calyx showing the entire apex of both lips; E. vertical cut of corolla; F. stamen; G. pistil with two-branched stigma; H. stigma with three branches; I. the abaxial surface of leaf of *P. interrupta* var. *smitinandii*: showing densely villous hairs.

Premna interrupta var. *interrupta* (Fig. 4A-H)

Thailand.– NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai and Phitsanulok; NORTH-EASTERN: Loei; EASTERN: Nakhon Ratchasima; CENTRAL: Nakhon Nayok.

Distribution.– Nepal, India, Bangladesh, Bhutan, China, Myanmar, Thailand, Laos and Vietnam.

Ecology.– In open and sandstone rock areas and ridges in hill evergreen forests; 600-1800 m; flowering: March to May; fruiting: May to August.

Vernacular.– Hawm duk (หอมดึก) (Loei).

Note.– *Premna interrupta* differs from other *Premna* species in having a spike-like inflorescence. Clarke (1885) stated that *P. racemosa* was similar to *P. interrupta* in most characters, but differed by having larger subsessile leaves, a somewhat larger inflorescence and shorter or broader fruits. However, these different characters are found to fall within the variation of *P. interrupta*. Therefore, *P. racemosa* is placed as a synonymy of *P. interrupta*.

Premna interrupta var. *smitinandii* Moldenke (Fig. 4I)

Premna interrupta var. *smitinandii* Moldenke, Phytologia 8 (4): 163. 1962. Type: Thailand, Chiang Mai, Doi Chiang Dao, alt. 1600-1800 m, 26 April 1960, *T. Smitinand & I. Alsterlund* 6783 (holotype TEX!; isotypes BKF!, K!, L!). Figure 4 I

Thailand.– NORTHERN: Chiang Mai.

Distribution.– Endemic to Thailand.

Ecology.– In open or rocky ridges of limestone forests; alt. 1,300-1,800 m; flowering: April to June.

Vernacular.– Premna (เปรมนา) (General).

Note.– *Premna interrupta* var. *smitinandii* differs from the typical variety in having a densely villous indumentum on the abaxial surface of leaves rather than being glabrous or sparsely pubescent. We do not agree with Govaerts et al. (2008) who places this taxon as a synonym of the typical variety.

Premna mollissima Roth

Premna mollissima Roth, Nov. Sp. Pl.: 286. 1821; Walp., Repert. Bot. Syst. 4: 95. 1845; Schauer in A. DC., Prodr. 11: 638. 1847. Type: India, *Heyne* s.n. (holotype B).

Premna latifolia Roxb., [Hort. Beng.: 46. 1814, *nom. nud.*] & Fl. Ind. 3: 76. 1832; Walp., Repert. Bot. Syst. 4: 94. 1845; Schauer in A. DC., Prodr. 11: 635. 1847; C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 577. 1885; Brandis, Ind. Trees: 511. 1906; H.J. Lam, Verb. Mal. Arch.: 150. 1919 & in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 44. 1921; P'ei, Mem. Sci. Soc. China 1(3): 77. 1932; Dop, Bull. Soc. Bot. France 70: 443. 1923 & in M.H. Lecomte, Fl. Gén. Indo-Chine 4(7): 808. 1935; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 420. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980; Moldenke & A.L. Moldenke in Dassanayake & Fosberg, Rev. Handb. Fl. Ceyl. 4: 317. 1983; Chen & Gilbert in W.Z. Yi & P.H. Raven, Fl. China 17: 21. 1994; A. Rajendran & P. Daniel, Ind. Verbenaceae: 252. 2002. Type: The illustration in icon. *Roxb.* T. 054 (lectotype K!).

Premna mucronata Roxb., [Hort. Beng.: 95. 1814, *nom. nud.*] Fl. Ind. 3: 80. 1832; Walp., Repert. Bot. Syst. 4: 95. 1845;

Schauer in A. DC., Prodr. 11: 635. 1847; Miq., Fl. Ned. Ind. 2: 897. 1858. Type: India, Silhet, *Roxburgh* s.n., not located.

Premna viburnoides Wall. [Cat. No. 3646 B, *nom. nud.*] ex Schauer in A. DC., Prodr. 11: 635. 1847; Kurz, For. Fl. Burma 2: 261. 1877. Type: India, Ginghee Hills, 1826, *Herb. Wight* s.n. (*Wallich*, Cat. No. 1778) (holotype G-DC, microfiche!; isotypes K!, K-W!).

Premna latifolia Roxb. var. *cuneata* C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 578. 1885; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 420. 1938; H.J. Lam, Verb. Mal. Arch.: 151. 1919 & in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 44. 1921; Dop in M.H. Lecomte, Fl. Gén. Indo-Chine 4(7): 809. 1935; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980; Moldenke & A.L. Moldenke in Dassanayake & Fosberg, Rev. Handb. Fl. Ceyl. 4: 319. 1983; Chen & Gilbert in W.Z. Yi & P.H. Raven, Fl. China 17: 21. 1994. Type: Myanmar, Pegu, *Kurz* s.n. (syntype K!); Myanmar, *Griffith* (Kew Distrib. No. 6035) (syntype K!).

Premna latifolia var. *mollissima* (Roth) C.B. Clarke in Hook.f. Fl. Brit. Ind. 4: 578. 1885; H.J. Lam, Verb. Mal. Arch.: 151. 1919 & in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 44. 1921; Dop, Bull. Soc. Bot. France 70: 443. 1923 & in M.H. Lecomte, Fl. Gén. Indo-Chine 4(7): 809. 1935; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980; Moldenke & A.L. Moldenke in Dassanayake & Fosberg, Rev. Handb. Fl. Ceyl. 4: 321. 1983; A. Rajendran & P. Daniel, Ind. Verbenaceae: 254. 2002. Type: as *P. mollissima* Roth.

Premna latifolia var. *mucronata* (Roxb.) C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 578. 1885; H.J. Lam, Verb. Mal. Arch.: 151. 1919 & in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 44. 1921; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 420. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980; A. Rajendran & P. Daniel, Ind. Verbenaceae: 255. 2002. Type: as *P. mucronata* Roxb.

Premna latifolia var. viburnoides (Wall. ex Schauer) C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 578. 1885; H.J. Lam, Verb. Mal. Arch.: 151. 1919 & in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 44. 1921; Dop, Bull. Soc. Bot. France 70: 443. 1923 & in M.H. Lecomte, Fl. Gén. Indo-Chine 4(7): 809. 1935; Moldenke & A.L. Moldenke in Dassanayake & Fosberg, Rev. Handb. Fl. Ceyl. 4: 323. 1983; A. Rajendran & P. Daniel, Ind. Verbenaceae: 257. 2002. Type: as *P. viburnoides* Wall. ex Schauer.

Gumira mollissima (Roth) Kuntze, Rev. Gen. Pl. 2: 508. 1891. Type: as *P. mollissima* Roth.

Gumira viburnoides (Wall. ex Schauer) Kuntze, Rev. Gen. Pl. 2: 508. 1891. Type: as *P. viburnoides* Wall. ex Schauer.

Premna latifolia var. *gamblei* Haines, Bot. Bihar Orissa: 717. 1925. Type: India, Northern Purneah, *Haines* 4596 (holotype K!; isotype K!).

Premna latifolia var. *major* Moldenke, Phytologia 41 (5): 346. 1979; Moldenke & A.L. Moldenke in Dassanayake & Fosberg, Rev. Handb. Fl. Ceyl. 4: 321. 1983. Type: Sri Lanka, Buthawa Bungalow, *Sohmer* 8986 (holotype PDA; isotype US!).

Premna latifolia var. *henryi* D. Naras. ex A. Rajendran & P. Daniel, Indian

Verbenac.: 253. 2002. Type: India, Tamil Nadul, Chingalpattu, *D. Narasimhan* 811 (holotype MH; isotype MH).

Thailand.– NORTHERN: Mae Hong Son, Chiang Mai, Phayao, Lamphun, Lampang, Phrae, Tak and Nakhon Sawan; NORTH-EASTERN: Loei, Nong Khai, Sakon Nakhon, Mukdahan and Khon Kaen; SOUTH-WESTERN: Kanchanaburi and Ratchaburi; CENTRAL: Suphanburi; SOUTH-EASTERN: Chonburi.

Distribution.– Pakistan, India, Sri Lanka, Bangladesh, China, Myanmar, Thailand, Cambodia, Laos, Vietnam, Java and Philippines.

Ecology.– In open, streamside secondary to dry evergreen, mixed deciduous, dipterocarp or secondary forests; 20-1,000 m; flowering: February to June; fruiting April to October.

Vernacular.– Hatsakun Pa (หัสคุณป่า) (Suphanburi), Khang Maeo (คางแมว) (Central, Lampang), Pu Pha (ปูผ้า) (Lampang), Man Kai (มันไก่), Man Mu (มันหมู), Khang Man Phrao (มันพร้าว) (Northern), Mu Man (หมูหมัน) (Chiang Mai), Sak Khe Kai (สักขี้ไก่) (Lampang) and Teng Bang Lah (Karen).

Note.– *Premna mollissima* is distinct from most species of the genus by having the inner surface of the middle lobe of the anterior corolla lip with densely villous hairs. This species was very poorly defined and was treated either as one variable species or divided into several varieties. There appears to be no clear discontinuity in the characters previously thought to be discrete and used to delimit varieties. Therefore, no infraspecific groups are recognised here. We agree with the work of Kuntze (1891) and Govaerts et al. (2008) who accepted *P. mollissima* Roth as the valid name (being the oldest validly published) for the species and *P. latifolia* Roxb. was reduced as a synonymy under *P. mollisima*.

Premna nana Coll. & Hemsl.

Premna nana Coll. & Hemsl., J. Linn. Soc., Bot. 28: 109. 1891; Brandis, Ind. Trees: 511. 1906; Dop, Bull. Soc. Bot. France 70: 830. 1923 & in M.H. Lecomte, Fl. Gén. Indo-Chine 4(7): 816. 1935; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 421. 1938; A. Rajendran & P. Daniel, Ind. Verbenaceae: 265. 2002. Type: Myanmar, Shan, alt. *ca.* 1000 m, May 1888, *H. Collett* 562 (holotype K!).

Pygmaeopremna nana (Coll. & Hemsl.) Moldenke, Known Geogr. Distr. Verbenac. Avicenn.: 78. 1942; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980.

Premna macrophylla Wall. ex Schauer var. *thailandica* Moldenke, Phytologia 35 (6): 419. 1977; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980, ***syn. nov***. Type: Thailand, Uthai Thani, Ban Rai, Huay Khakhaeng Reserve, alt. 200 m, 22 April 1976, *J.F. Maxwell* 76-274 (holotype AAU!; isotypes BK!, L!).

Premna macrophylla sensu Dop, Bull. Soc. Bot. France 70: 829. 1923 & in M.H. Lecomte, Fl. Gén. Indo-Chine 4(7): 814. 1935; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980, *non* Wall. ex Schauer.

Thailand.– NORTHERN: Mae Hong Son, Chiang Mai, Phayao, Lamphun, Lampang, Tak, Phitsanulok and Nakhon Sawan; NORTH-EASTERN: Phetchabun, Loei, Sakon Nakhon and Khon Kaen;

EASTERN: Chiayaphum; SOUTH-WESTERN: Uthai Thani, Kanchanaburi and Phetchaburi; CENTRAL: Lop Buri and Suphan Buri.

Distribution.– India, China, Myanmar, Thailand, Cambodia and Laos.

Ecology.– In open, degraded dipterocarp, mixed deciduous, dry evergreen or pine forests; occurs rarely in hill evergreen forests; 50-1200 m; flowering: April to June; fruiting: July to November.

Vernacular.– Ya Khao Yen (ยาเข้าเย็น) (Nakhon Sawan).

Note.– We do not agree with Govaert et al. (2008) who placed *Premna nana* as a synonymy of *P. herbacea*, because this species differs from *P. herbacea* in having densely villous hairs on the abaxial surface of leaves, a longer calyx (3-4 mm long vs 1.6-2.5 mm) and a longer and slightly exserted style (3.5-6 mm long vs. 0.8-2.5 mm). Therefore, *P. nana* is accepted in this study. *J.F. Maxwell* 76-274 (AAU, BK) was recognised as a new taxon, *P. macrophylla* Wall ex Schauer var. *thailandica* by Moldenke (1977). It has a more densely tomentose indumentum on the abaxial leaf surface than *P. nana*, but in other characters it seems to be similar. We conclude that the variation in this character is continuous within *P. nana*. Therefore, *P. macrophylla* var. *thialandica* is treated as a synonym under *P. nana*.

Few specimens of *P. nana* were mistakenly identified as *P. macrophylla* Wall. ex Schauer from Myanmar. However, *P. macrophylla* differs from *P. nana* in having a glabrous or sparse indumentum on the abaxial leaf (rather than a dense indumentum).

Premna octonervia Merr. & F.P. Metcalf

Premna octonervia Merr. & F.P. Metcalf, J. Arn. Arb. 20: 354. 1939; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980; Chen & Gilbert in W.Z. Yi & P.H. Raven, Fl. China 17: 21. 1994.

Premna acuminatissima Merr., Lingnan Sci. J. 6: 284. 1930; P'ei, Mem. Sci. Soc. China 1(3): 73. 1932, *nom illeg.* Type: China, Hainan, Lin Fa Shan and Nga Ping Shan, 27 Sept. 1927, *W.T. Tsang* 16469 (holotype LU; isotype NY!).

Premna latifolia var. *mucronata sensu* H.N. Fletcher, Bull. Misc. Inform., Kew 1938: 420. 1938, *non* (Roxb.) C.B. Clarke, 1885.

Thailand.– PENINSULAR: Surat Thani and Nakhon Si Thammarat.

Distribution.– Thailand and China.

Ecology.– At the edges of secondary to evergreen or beach forests; alt. 0-100 m; flowering April to August; fruiting: May to October.

Vernacular.– Chan Man (จันมัน) and Seman (เซมัน) (Nakhon Si Thammarat).

Note.– The materials of *Premna octonervia* in Thaliland were obviously identified as *P. latifolia* var. *mucronata* (synonym of *P. mollissima*). However, *P. octonervia* differs from *P. mollissima* in having glabrous on abaxial surface of leaves except midrib with sparsely, pubescent hairs, blue anthers and eglandular ovary.

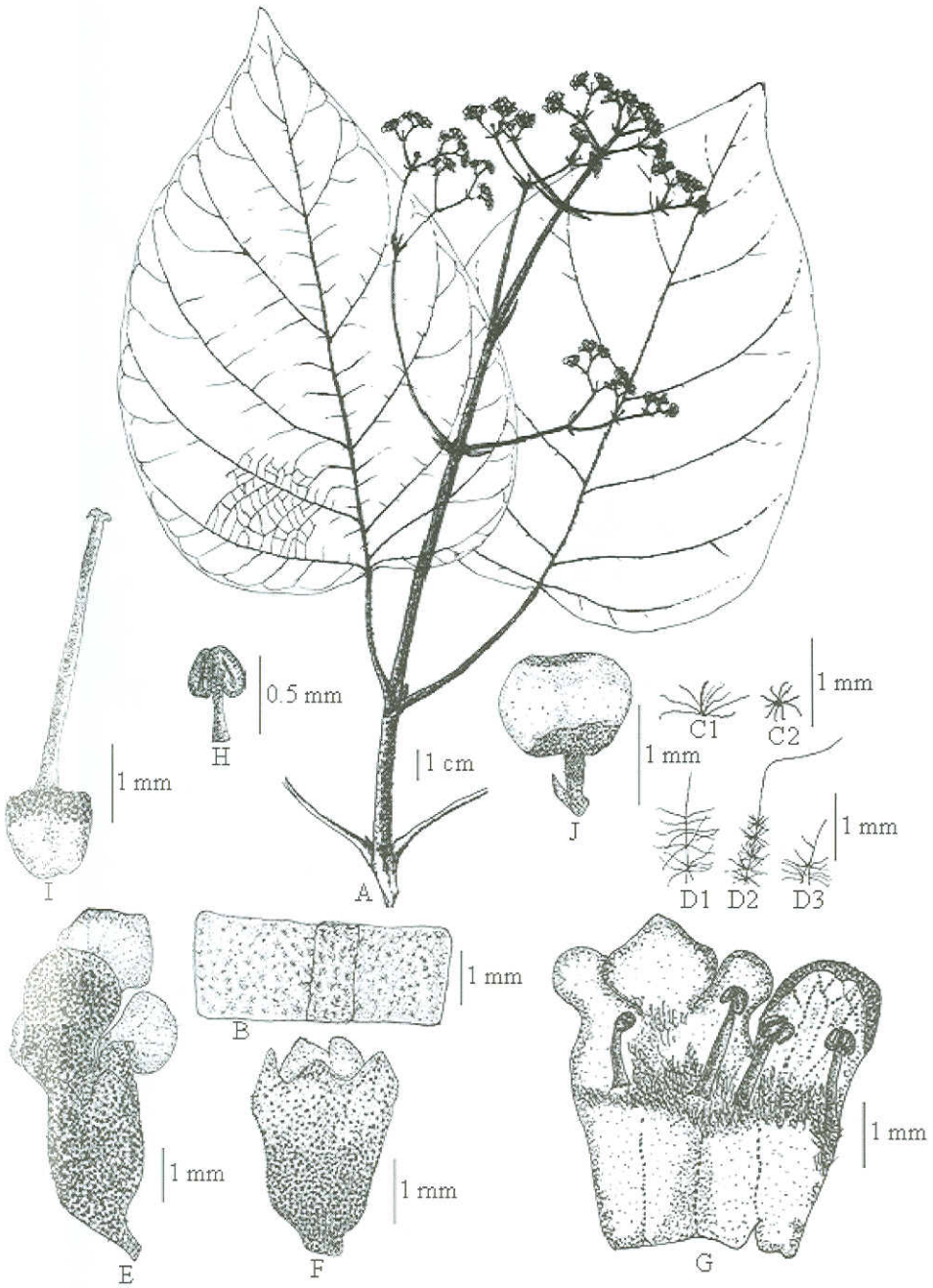

FIGURE 5. Line drawings of *P. pyramidata* showing: A. flowering branch; B. the abaxial surface of leaf with stellate and dendroid hairs; C1.-C2. stellate hairs; D1.-D3. dendroid hairs; E. flower; F. calyx; G. vertical cut of corolla; H. stamen; pistil and J. fruit.

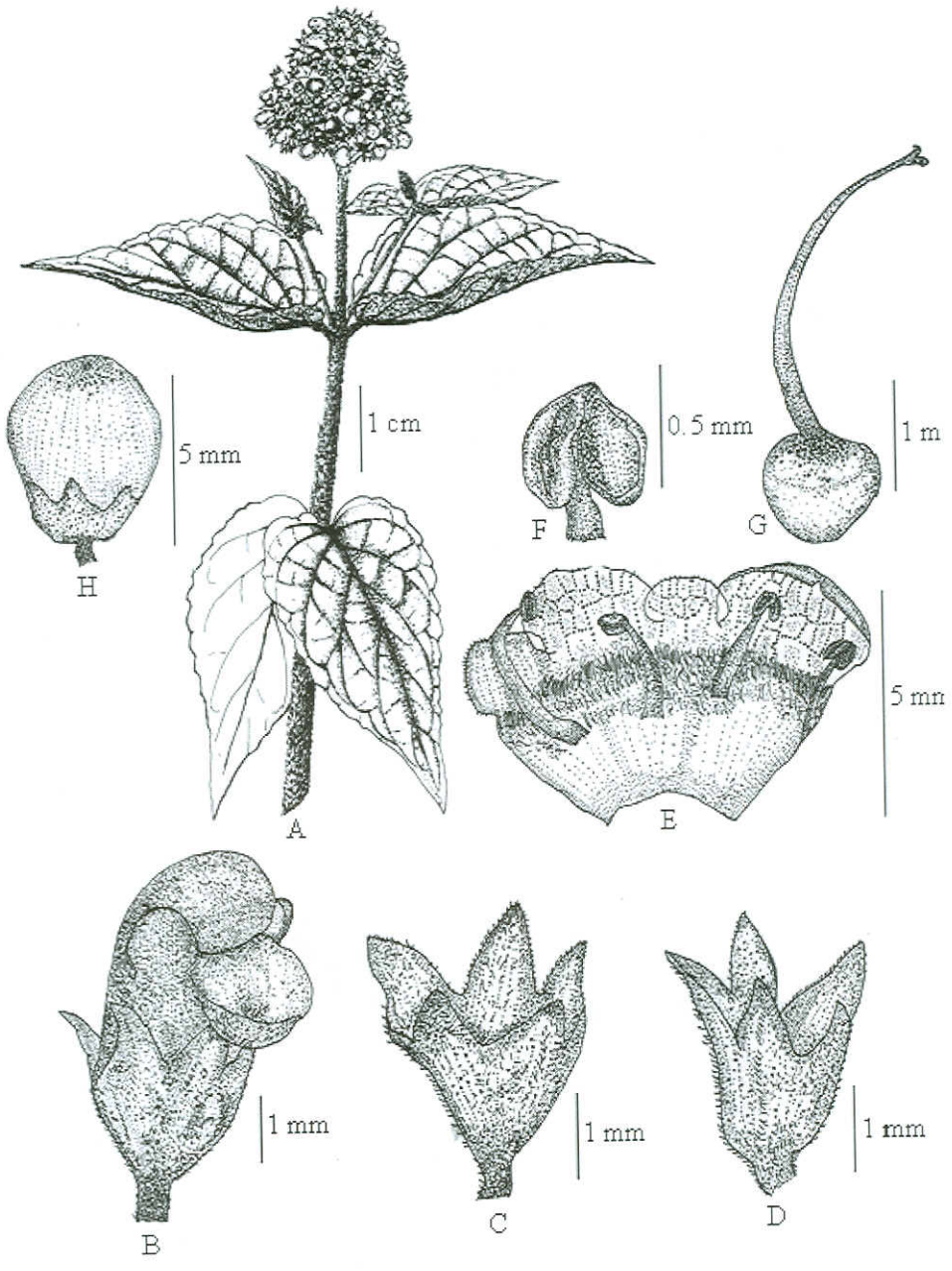

FIGURE 6. Line drawings of *P. serrata* showing: A. flowering branch; B. flower; C.-D. calyx; E. vertical cut of corolla; F. stamen; G. pistil and H. fruit.

Premna paniculata H.R. Fletcher

Premna paniculata H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 201. 1938 & Bull. Misc. Inform., Kew 1938: 421. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980. Type: Thailand, Prachuap Khiri Khan, Pak Tawan, alt. *ca.* 20 m, 1 Aug. 1931, *A.F.G. Kerr* 20536 (holotype E!; isotypes BK!, BM!, K!, SING!, TEX! (fragment)).

Thailand.– SOUTH-WESTERN: Prachuap Khiri Khan.

Distribution.– Endemic to Thailand.

Ecology.– In dry evergreen forests; 20-150 m; fruiting: June to September.

Note.– *Premna paniculata* resembles *P. annulata*, but can be distinguished from the latter by its stem node without an interpetiolar hairy ridge and eglandular leaf surface.

Premna punctulata C.B. Clarke

Premna punctulata C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 575. 1885; King & Gamble, J. Asiat. Soc. Beng. 74: 817. 1909 & Mat. Fl. Malay. Pen.: 1027. 1909; H.J. Lam, Verb. Mal. Arch.: 121. 1919; Ridl., Fl. Mal. Pen. 2: 620. 1923; Kochummen in Ng, Tree Fl. Mal. 3: 307. 1978; C. Leeratiwong, P. Chantaranothai & A. Paton, Nat. Hist. J. Chulalongkorn Univ. 8(1): 9. figs. 1 & 3. 2008. Type: Malaysia, Malacca, 6 June 1865, *Maingay* Kew Distribution No. 1200 (holotype K!).

Gumira punctulata (C.B. Clarke) Kuntze, Rev. Gen. Pl. 2: 508. 1891. Type: as *P. punctulata* C.B. Clarke.

Thailand.– PENINSULAR: Phatthalung and Narathiwat.

Distribution.– Malay Peninsula (Malacca).

Ecology.– On the edge of primary evergreen or dry evergreen forests; 100-500 m; flowering March to May.

Note.– *Premna punctulata* differs from Malaysian material in having sparsely pubescent hairs on the apex of the ovary.

Premna pyramidata Wall. ex Schauer (Fig. 5)

Premna pyramidata Wall. [Cat. No. 1779, *nom. nud.*] ex Schauer in A. DC., Prodr. 11: 633. 1847; Miq., Fl. Ned. Ind. 2: 897. 1858; C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 576. 1885; Brandis, Ind. Trees: 510. 1906; King & Gamble, J. Asiat. Soc. Beng. 74: 822. 1909 & Mat. Fl. Malay. Pen.: 1032. 1909; H.J. Lam, Verb. Mal. Arch.: 155. 1919; Ridl., Fl. Mal. Pen. 2: 622. 1923; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 419. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980; Chen & Gilbert in W.Z. Yi & P.H. Raven, Fl. China 17: 18. 1994; A. Rajendran & P. Daniel, Ind. Verbenaceae: 273. 2002. Type: Myanmar, Tavoy, 23 Sept. 1827, *Wallich*, Cat. No. 1779.2 (holotype G-DC, microfihe!, isotype K-W!).

Gumira pyramidata (Wall. ex Schauer) Kuntze, Rev. Gen. Pl. 2: 508. 1891. Type: as *P. pyramidata* Wall. ex Schauer.

Premna tomentosa sensu H.J. Lam, Verb. Mal. Arch.: 156. 1919 & in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 45. 1921; Dop in M.H. Lecomte, Fl. Gén Indo-Chine 4(7): 808. 1935;

Kochummen in Ng, Tree Fl. Mal. 3: 307. 1978, *non* Willd, 1800.

Thailand.– NORTHERN: Chiang Mai, Chiang Rai, Lamphun, Lampang, Tak, Phitsanulok and Kamphaeng Phet; NORTH-EASTERN: Loei; SOUTH-WESTERN: Kanchanaburi, Phetchaburi and Prachuap Khiri Khan; CENTRAL: Saraburi; EAST-WESTERN: Chanthaburi; PENINSULAR: Ranong, Surat Thani, Phangnga, Nakhon Si Thammarat, Krabi, Trang, Songkhla, Satun, Pattani and Narathiwat.

Distribution.– India, Bangladesh, Bhutan, China, Myanmar, Thailand, Cambodia, Vietnam, Malay Peninsula, Sumatra, Java, Philippines and East-Timor.

Ecology.– In shady, disturbed, cleared and degraded areas in secondary to evergreen, dry evergreen and mixed deciduous forests; sometime on the edge of plantations, roadsides, limestone bedrocks and streamsides; 0-1,500 m; flowering: March to July; fruiting: May to October.

Uses.– Wood is used for making charcoal, pots and paddles in the southern region.

Vernacular.–Ka Pep (กะเปป), Ka Piat (กะเปียด) (Prachuap Khiri Khan); Kia (เกีย) (Malay-Pattani); Po Fan (ปอฟาน) (Lampang); Piat (เปียด) (Peninsular); Sak Khi Kai (สักขี้ไก่), Sak Khi Khwai (สักขี้ควาย), Sak Phu (สักผู้) (Northern); Sam Pang (สามปาง) and Sam Pao (สามป้าว) (Chanthaburi).

Note.– *Premna pyramidata* is distinguished from other *Premna* species in Thailand and Indo-China by having both stellate and dendroid hairs. However, *P. pyramidata* is most closely allied to *P. tomentosa* Willd. from India, from which it differs by having a distinctly two-lipped corolla shape (vs. almost actinomorphic shape) and long exserted stamens (vs. short exserted stamens).

Premna rabakensis Moldenke

Premna rabakensis Moldenke, Phytologia 5: 88. 1954; C. Leeratiwong, P. Chantaranothai & A. Paton, Nat. Hist. J. Chulalongkorn Univ. 8(1): 12. figs. 2 & 4. Type: Cambodia, Rabak Ran Chien, Monts Kuang Krepeu, May 1870, *Pierre* 939 (holotype NY!; isotypes BKF!, HUH!, NY!, K!, P!, TEX! (fragment), US!-2 sheets).

Premna flavescens sensu H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 420. 1938, non Buch.-Ham. ex C.B. Clarke, 1885.

Premna villosa sensu H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 418. 1938, *non* C.B. Clarke, 1885.

Thailand.– NORTHERN: Mae Hong Son, Chiang Mai, Chiang Rai, Nan, Lamphun, Phrae, Lampang, Phitsanulok and Nakhon Sawan; NORTH-EASTERN: Loei; EASTERN: Nakhon Ratchasima and Ubon Ratchathani; SOUTH-WESTERN: Kanchanaburi; CENTRAL: Saraburi.

Distribution.– Thailand, Cambodia and Laos.

Ecology.–In disturbed, open and streamsides in secondary to evergreen, dry evergreen, mixed deciduous and dipterocarp forests, rarely in swamps or limestone forests; alt. 100-1,350 m; flowering January to May; fruiting March to Sepember.

Uses.–Wood is used for firewood.

Vernacular.– Haeo (แหว) (Nan), Mai Pop (ไม้ปบ) (Chiang Mai), Man Mu (มันหมู) (Northern), So Maeo (ซ้อแมว) (Chiang Rai, Lampang, Nan) and Mi Men (หมีเหม็น) (Nakhon Ratchasima).

Note.– *Premna rabakensis* shows a variable indumentum on the leaf abaxial surface by having a densely hairy to glabrous surface. Most material of *P. rabakensis* in Thailand was previously identified as *P. flavescens* (synonym of *P. hamiltonii*), *P. latifolia* (synonym of *P. mollissima*) and *P. villosa* (synonym of *P. coriacea* var. *villosa*). It differs from *P. mollissima* and *P. hamiltonii* by having reddish-brown subsessile glands mixed with yellow or brown subsessile glands on the leaf surfaces, and a calyx with two lobes at the apex of the anterior lip and entire at the apex of posterior lip. It is also separated from *P. coriacia* var. *villosa* in having a tree habit, both surfaces of leaves with reddish-brown subsessile glands mixed with yellow or brown subsessile glands and obovoid or subglobose fruits. This species shows a variable indumentum with a dense indumentum in Cambodia and, moderately to glabrous in Thailand.

Premna repens H.R. Fletcher

Premna repens H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 202. 1938 & Bull. Misc. Inform., Kew 1938: 421. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980. Type: Thailand, Prachuap Khiri Khan, Sam Roi Yot National Park, 12 July 1924, *A.F.G. Kerr* 10950 (holotype E!; isotypes BK!, BM!).

Thailand.– SOUTH-WESTERN: Prachuap Khiri Khan.

Distribution.– Endemic to Thailand.

Ecology.– In limestone forests, mostly growing near cliffs; 100-500 m; flowering: April to July; fruiting: May to October.

Vernacular.–Akkhi Thawan (อัคคีทวาร) (Central).

Note.–*Premna repens* is recognised by having a glabrous and lobed leaf margin, densely large lenticels along the stem and a short inflorescence (0.5-3 cm long).

Premna scandens Roxb.

Premna scandens Roxb., [Hort. Beng.: 95. 1814, *nom. nud.*] Fl. Ind. 3: 82. 1832; Walp., Repert. Bot. Syst. 4: 94. 1845; Schauer in A. DC., Prodr. 11: 632. 1847; Kurz, For. Fl. Burma 2: 263. 1877; C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 573. 1885 Brandis, Ind. Trees: 510. 1906; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 417. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980; Chen & Gilbert in W.Z. Yi & P.H. Raven, Fl. China 17: 26. 1994; A. Rajendran & P. Daniel, Ind. Verbenaceae: 282. 2002. Type: The Illustration in Icon. *Roxb.* T. 2305 (lectotype K!).

Premna cordifolia Brandis, Forest Fl. N.W. India: 367. 1847, *nom. illeg.*

Premna coriacea var. *cuneata* C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 573. 1885. Type: Bangladesh, Pundua, 7 June 1850, *J.D. Hooker & T. Thomson* s.n. (holotype K!).

Premna coriacea var. *oblonga* C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 573. 1885. Types: India, Silhet, *J.D. Hooker & T. Thomson* s.n. (syntype K!); Khasia, 16 June 1850, *J.D. Hooker & T. Thomson* s.n. (syntypes BM!, K!).

Gumira scandens (Roxb.) Kuntze, Rev. Gen. Pl. 2: 508. 1891. Type: as *P. scandens* Roxb.

Premna ramosa Wall., Cat. No. 1774, *nom. nud.*

Thailand.–NORTHERN: Tak; SOUTH- WESTERN: Kanchanaburi.

Distribution.– India, Bangladesh, Bhutan, Myanmar, Thailand, Vietnam and China.

Ecology.– In open sandstone places by streams in mixed deciduous or dry evergreen forest; 200–300 m; flowering: April to June; fruiting: May to September.

Vernacular.– Un Kua Luang (อุนเครือหลวง) (Tak).

Note.– *Premna scandens* is similar to *P. coriacea* var. *coriacea*, from which it differs in having chartaceous or submembranous leaves, a shorter calyx (< 1 mm) of which the outer surface is glabrous or sparsely covered with pubescent hairs, a shorter corolla (< 3.5 mm long) and the anther opening by a short longitudinal slit.

Premna serrata H.R. Fletcher (Fig. 6)

Premna serrata H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 202. 1938 & Bull. Misc. Inform., Kew 1938: 421. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980. Type: Thailand, Tak, Khao Hua Mod, alt. *ca.* 900 m, 12 June 1922, *A.F.G. Kerr* 6122 (holotype E!; isotypes BK!, BM!).

Thailand.– NORTHERN: Chiang Mai, Chiang Rai, Tak.

Distribution.– Endemic to Thailand.

Ecology.– Open areas in limestone, mixed deciduous or dry evergreen forests; alt. 800-1,800 m; flowering: June to August; fruiting: July to November.

Note.– *Premna serrata* differs from other *Premna* species in having the longest calyx lobes (1-1.8 mm long), a pyramidal-shaped inflorescence and stamens which are slightly exserted from the corolla tube. Many Thai specimens of *P. serrata* were identified as a Chinese species, *P. subcapitata*. However, *P. serrata* is different from *P. subcapitata* by having a glabrous ovary and fruit compared to a hairy ovary and fruit in *P. subcapitata*.

Premna serratifolia L.

Premna serratifolia L., Mant. Pl. 2: 253. 1771; Blume, Bijdr. Fl. Ned. Ind.: 815. 1826; Roxb., Fl. Ind. 3: 77. 1832; Walp., Repert. Bot. Syst. 4: 96. 1845; Schauer in A. DC., Prodr. 11: 632. 1847; Benth., Fl. Hongk.: 269. 1861; Kurz, For. Fl. Burma 2: 262. 1877; Munir, J. Adelaide Bot. Gard. 7: 13. 1984; Chen & Gilbert in W.Z. Yi & P.H. Raven, Fl. China 17: 26. 1994; A. Rajendran & P. Daniel, Ind. Verbenaceae: 284. 2002. Type: Sri Lanka, *Hermann* s.n. (Herb. Linn. 782-4) (holotype LINN, microfiche!).

Premna integrifolia L., Mant. Pl. 2: 252. 1771, *nom. Illeg*; Blume, Bijdr. Fl. Ned. Ind.: 815. 1826; Roxb., Fl. Ind. 3: 81. 1832; Walp., Repert. Bot. Syst. 4: 93. 1845; Miq., Fl. Ned. Ind. 2: 894. 1858; Benth., Fl. Aust. 5: 59. 1870;C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 574. 1885; Brandis, Ind. Trees: 510. 1906; H.J. Lam, Verb. Mal. Arch.: 140. 1919 & in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 42. 1921; Ridl., Fl. Mal. Pen. 2: 619. 1923; P'ei, Mem. Sci. Soc. China 1(3): 73. 1932; Dop, Bull. Soc. Bot. France 70: 832. 1923 & in M.H. Lecomte, Fl. Gén. Indo-Chine 4(7): 818. 1935.

Scrophularioides arborea Forst.f., Prodr.: 91. 1786, *nom nud.* Type: Societatis et Marchionis Insulae.

Premna obtusifolia R. Br., Prodr. Fl. Nov. Holl.: 512. 1810; Walp., Repert. Bot. Syst. 4: 93. 1845; Schauer in A. DC., Prodr. 11: 637. 1847; Benth., Fl. Aust. 5: 58. 1870; Merr., Enum. Philip. Fl. Pl.

3: 392. 1923; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980; Moldenke & A.L. Moldenke in Dassanayake & Fosberg, Rev. Handb. Fl. Ceyl. 4: 334. 1983. Type: Australia, Queensland, Prince of Wales Island, 6 Nov. 1802, *R. Brown* s.n. (*J.J. Bennett* no. 2324) (syntype BM!); 2 Nov. 1802, *R. Brown* s.n. (syntype BM).

Premna spinosa Roxb., [Hort. Beng.: 46. 1814, *nom. nud.*] Fl. Ind. 3: 77. 1832; Walp., Repert. Bot. Syst. 4: 93. 1845. Type: The Illustration Icon. *Roxb.* T. 961 (K!).

Premna foetida Reinw. ex Blume, Bijdr.: 816. 1826; Walp., Repert. Bot. Syst. 4: 96. 1845; Schauer in A. DC., Prodr. 11: 630. 1847; Miq., Fl. Ned. Ind. 2: 891. 1858; King & Gamble, J. Asiat. Soc. Beng. 74: 814. 1909 & Mat. Fl. Malay. Pen.: 1024. 1909; Ridl., Fl. Mal. Pen. 2: 619. 1923; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 418. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971; Kochummen in Ng, Tree Fl. Mal. 3: 307. 1978; Moldenke, Phytologia Mem. 2: 286. 1980; Moldenke & A.L. Moldenke in Dassanayake & Fosberg, Rev. Handb. Fl. Ceyl. 4: 315. 1983. Type: Indonesia, Java, Sylvis montosis Nederlandsch Indie, loc. Incert., *Reinwardt* s.n. (holotype L).

Premna gaudichaudii Schauer in A. DC., Prodr. 11: 631. 1847. Type:Archipelago Mariannae, 1830, *Gaudichaud* s.n. (holotype G-DC, microfiche!).

Premna sambucina Wall. [Cat. No. 1775, *nom. nud.*] ex Schauer in A. DC., Prodr. 11: 631. 1847; Kurz, For. Fl. Burma 2: 261. 1877. Type: India, Moalmyn, 1827, *Wallich,* Cat. No. 1775 (holotype G-DC, microfiche!; isotype K-W!).

Premna integrifolia var. *angustior* C.B. Clarke in Hook.f., Fl. Brit. Ind. 4: 574. 1885; King & Gamble, J. Asiat. Soc. Beng. 74: 813. 1909 & Mat. Fl. Malay. Pen.: 1023. 1909; Dop, Bull. Soc. Bot. France 70: 832. 1923 & in M.H. Lecomte, Fl. Gén. Indo-Chine 4(7): 819. 1935. Type: Malaysia, Malacca, Pulau Jawa, *Griffith* Kew Distribution No. 6030 (holotype K!).

Gumira foetida (Reinw. ex Blume) Hassk., Cat. Hort. Bot. Bogor.: 135. 1844. Type: as *P. foetida* (Reinw. ex Blume) Hassk.

Gumira integrifolia (L.) Hassk., Cat. Hort. Bot. Bogor.: 135. 1844. Type: as *P. integrifolia* L.

Gumira serratifolia (L.) Kuntze, Rev. Gen. Pl. 2: 507. 1891. Type: as *P. serratifolia* L.

Premna integrifolia subsp. *truncatolabium* H.J. Lam, Verbenac. Malay. Arch.: 142. 1919. Type: not located.

Premna integrifolia var. *minor* Ridl., Fl. Mal. Pen. 2: 619. 1923. Type: Malaysia, Pahang, Pekan, *Ridley* s.n. (holotype SING).

Premna integrifolia var. *obtusifolia* (R. Br.) C. P'ei, Mem. Sci. Soc. China 1(3): 75. 1932; Dop in M.H. Lecomte, Fl. Gén. Indo-Chine 4(7): 820. 1935. Type: as *P. obtusifolia* R. Br.

Premna angustior (C.B. Clarke) Ridl., Fl. Mal. Pen. 2: 619. 1923. Type: as *P. integrifolia* var. *angustior* C.B. Clarke.

Premna corymbosa (Burm.f.) Rottl. & Willd. var. *angustior* (C.B. Clarke) H.R. Fletcher, Notes Roy. Bot. Gard. Edinburgh 19: 178. 1936 & Bull. Misc. Inform., Kew 1938: 419. 1938. Type: as *P. integrifolia* var. *angustior* C.B. Clarke.

Premna corymbosa var. *minor* (Ridl.) H.R. Fletcher, Notes Roy. Bot. Gard. Edinburgh 19: 178. 1936 & Bull. Misc.

Inform., Kew 1938: 419. 1938. Type: as *P. integrifolia* var. *minor* Ridl.

Premna corymbosa var. *obtusifolia* (R. Br.) H.R. Fletcher, Notes Roy. Bot. Gard. Edinburgh 19: 178. 1936 & Misc. Inform., Kew 1938: 419. 1938. Type: as *P. obtusifolia* R. Br.

Premna corymbosa var. *sambucina* (Wall. ex Schauer) Moldenke, Known Geogr. Distr. Verbenac. Avicenn.: 68. 1942. Type: as *P. sambucina* Wall. ex Schauer.

Premna obtusifolia var. *angustior* (C.B. Clarke) Moldenke, Phytologia 5 (3): 87. 1954; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980. Type: as *P. integrifolia* var. *angustior* C.B. Clarke.

Premna obtusifolia var. *minor* (Ridl.) Moldenke, Phytologia 5 (3): 88. 1954; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980; Moldenke & A.L. Moldenke in Dassanayake & Fosberg, Rev. Handb. Fl. Ceyl. 4: 341. 1983. Type: as *P. integrifolia* var. *minor* Ridl.

Premna obtusifolia var. *gaudichaudii* (Schauer) Modenke, Phytologia 27: 69. 1973. Type: as *P. gaudichaudii* Schauer.

Premna obtusifolia var. *serratifolia* (L.) Moldenke, Phytologia 28 (4): 403. 1974. Type: as *P. serratifolia* L.

Premna obtusifolia f. *serratifolia* (L.) Moldenke, Phytologia 36 (5): 438. 1977; Moldenke & A.L. Moldenke in Dassanayake & Fosberg, Rev. Handb. Fl. Ceyl. 4: 342. 1983. Type: as *P. serratifolia* L.

Premna serratifolia var. *minor* Rajendran & Daniel, Bull. Bot. Surv. India 38: 44. 1996. Type: as *P. integrifolia* var. *minor* Ridl.

Premna corymbosa sensu Miq., Fl. Ned. Ind. 2: 894. 1858; H.J. Lam, Verb. Malay. Arch.: 117. 1919; Fletcher, Bull. Misc. Inform., Kew 1938: 418. 1938; Backer & Bakh.f., Fl. Java 2: 603. 1965; Kochummen in Ng, Tree Fl. Mal. 3: 307 & 308. 1978, *non* Rottl. & Willd, 1803.

Thailand.– SOUTH-WESTERN: Phetchaburi and Prachuap Khiri Khan; CENTRAL: Krungthep Mahanakhon and Samut Sakhon; SOUTH-EASTERN: Chonburi, Rayong, Chanthaburi and Trat; PENINSULAR: Chumphon, Ranong, Surat Thani, Phangnga, Phuket, Krabi, Trang, Songkhla, Satun and Narathiwat.

Distribution.– Widely distributed throughout the coast and the island regions of tropical and subtropical Asia, Africa and Australia.

Ecology.– On open, sandy soil and wet areas in beach or mangrove forests along the coast and islands; 0-150 m; flowering and fruiting all year round.

Uses.– Used for medicinal purpose.

Vernacular.– Cha Lueat (ช้าเลือด) (Trat); Sam Pra Nga (สามประงา), Sam Pra Nga Bai (สามประงาใบ) (Prachuap Khiri Khan); Akkhi Thawan Thale (อัคคีทวารทะเล) and Khet Nam Man (เค็ดน้ำมัน) (Narathiwat).

Note.– *Premna serratifolia* is a polymorphic taxon in leaf shape and size, and inflorescence size and calyx form. Most specimens were identified as an Indian species, *P. corymbosa* Rottler & Willd. However, Rajendran & Daniel (2002) stated that *P. corymbosa* had a very narrow distribution in inland areas of the States of Andhra Pradesh and Tamil Nadu in India and Northern Sri Lanka and does not have a foetid leaf when bruised, unlike *P. serratifolia* which is widespread as a littoral and insular species and has a strong smell when bruised. We placed this species under *P. serratifolia*.

Premna siamensis H.R. Fletcher

Premna siamensis H.R. Fletcher Bull. Misc. Inform., Kew 1938: 203. 1938 & Bull. Misc. Inform., Kew 1938: 421. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980. Type: Thailand, Chiang Mai, Pang Tawn, 29 April 1931, *Put* (holotype E!; isotypes BK!, BM!, K!, TEX! (fragment)).

Thailand.– NORTHERN: Chiang Mai, Chiang Rai and Phitsanulok; NORTH-EASTERN: Loei.

Distribution.– Endemic to Thailand.

Ecology.– In mixed deciduous or hill evergreen forests especially on sandstone areas; alt. 800-1,500 m; flowering: April to July; fruiting May to October.

Vernacular.– Cha Dok Un (ชาดอกอุน) (Chiang Mai).

Note.- *Premna siamensis* can be distinguished from most species of the genus by having villous hairs on leaf surfaces, both calyx lips with two lobes and the anther opening by a short longitudinal slit.

Premna stenobotrys Merr.

Premna stenobotrys Merr., J. Arnold Arbor. 21: 384. 1940. C. Leeratiwong, P. Chantaranothai & A. Paton, Nat. Hist. J. Chulalongkorn Univ. 8(1): 15. fig. 5. 2008. Type: Vietnam, Ninh Binh, Cho Ganh, Oct. 1923, *Petelot* 1179 (holotype HUH!).

Premna rubens sensu Brandis, Ind. Trees: 510. 1906; A. Rajendran & P. Daniel, Ind. Verbenaceae: 284. 2002.

Thailand.– NORTHERN: Chiang Mai; NORTH-EASTERN: Sakon Nakhon; SOUTH-WESTERN: Kanchanaburi and Phetchaburi.

Distribution.– India, Thailand, Laos and Vietnam.

Ecology.– Along the edge or streamside of evergreen, mixed deciduous or limestone forests, rarely in secondary forests; alt. 350-700 m; flowering June to December; fruiting July to Febuary.

Note.– *Premna stenobotrys* is distinct in having a red corolla.

Premna trichostoma Miq.

Premna trichostoma Miq., Fl. Ned. Ind. 2: 892. 1858; King & Gamble, J. Asiat. Soc. Beng. 74: 816. 1909 & Mat. Fl. Malay. Pen.: 1026. 1909; H.J. Lam, Verb. Mal. Arch.: 128. 1919 & in H.J. Lam & Bakh., Bull. Jard. Bot. Buitenzorg, ser. 3, 3: 39. 1921; Ridl., Fl. Mal. Pen. 2: 620. 1923; H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 418. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980. Type: Indonesia, Java, Banjoemas, Kendal Rambat Sund., *T. Horsfield* 678 (holotype L, isotypes K!-2 sheets).

Gumira trichostoma (Miq.) Kuntze, Revis. Gen. Pl. 1: 508. 1891. Type: *P. trichostoma* Miq.

Premna quadridentata H.R. Fletcher, Bull. Misc. Inform., Kew 1938: 201. 1938 & Bull. Misc. Inform., Kew 1938: 421. 1938; Moldenke, Fifth Summary Verbenac. 1: 297. 1971 & Phytologia Mem. 2: 287. 1980, ***syn. nov.*** Type: Thailand, Ranong, Koh Chang, 7 Jan. 1929, *A.F.G. Kerr* 16563 (holotype E!; isotypes BK!, BM!, K!, TEX! (fragment)).

Thailand.– EASTERN: Nakhon Ratchasima; CENTRAL: Nakhon Nayok; SOUTH-EASTERN: Chanthaburi and Trat;

PENINSULAR: Ranong, Phangnga, Surat Thani, Nakhon Si Thammarat, Songkhla and Narathiwat.

Distribution.– Thailand, Vietnam, Malay Peninsula, Borneo, Java and Philippines.

Ecology.– In evergreen or dry evergreen forests, usually growing on rocks and wet areas along streams or waterfalls; alt. 100-750 m; flowering: January to June; fruiting: April to August.

Note.– *Premna trichostoma* is characterized by having a posterior calyx lip with two lobes, the anterior calyx lips which are entire or two-lobed and the longest style branches (0.5-1 mm long). The type specimens of *P. trichostoma* and *P. quadridentata* H.R. Fletcher are similar in the morphological characters. Therefore, the latter species is reduced as a synonym under the former.

ACKNOWLEDGEMENTS

We are very grateful to the Royal Golden Jubilee Program (RGJ: grant No. 4.B.KK/46/B.1) and the Commission on Higher Education, Ministry of Education, Thailand, for financial support. We wish to express our sincere thanks to the curators and staff of the following herbaria for loans of specimens, information and their assistance during visits to their institutions: AAU, BCU, BK, BKF, CMU, HUH, K, KKU, L, P, PSU, QBG, SING and Herb. Biology, Chiang Mai University. We also thank the Applied Taxonomic Research Center, Department of Biology, Faculty of Science, Khon Kaen University, and the herbarium, the Royal Botanic Gardens, Kew for their facilities.

LITERATURE CITED

Clarke, C.B. 1885. Verbenaceae. In: J.D. Hooker (Ed.), Flora of British India, vol. 4, England: L. Reeve, 560-604 pp.

Fletcher, H. R. 1938. The Siamese Verbenaceae. Bulletin of Miscellaneous Information, Royal Botanic Gardens, Kew, 10: 401-445.

Govaerts, R., Paton, A., Harvey, Y. & Navarro, T. 2008. World Checklist of Lamiaceae. The Board of Trunsteens of the Royal Botanic Gardens, Kew. Published on the Internet; http://www.kew.org /wcsp/accessed 22 May 2008; 09.18 GMT.

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. and Upson, T. 2004. Labiatae. In: K. Kubitzki (Ed.), The Families and Genera of Vascular Plants: Flowering Plant-Dicotyledons, vol. 7, Germany: Springer-Verlag, 267-268 pp.

Holmgren, P. K., and Holmgren, N. H. 1998 [continuously updated]. Index Herbariorum: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. http://weetgum.nybg.org/ih/.

Kuntze, O. 1891. Revisio Generum Plantarum. Vol. 2. Leipzig, 636 pp.

Leeratiwong, C., Chantaranothai, P. and Paton, A. 2008. Three New Records of *Premna* L. (Lamiaceae) for Thailand. The Natural History Journal of Chulalongkorn University, 8: 7-18.

Linnaeus, C. 1771. Mantissa Plantarum. vol. 2, Laurentius Salvius, Stockholm, 587 pp.

Maxwell, J. F. 2007. Botanical Notes on the Flora of Northern Thailand: 8 new Records. The Natural History Bulletin of Siam Society, 55: 185-186.

Moldenke, H. N. 1962. *Premna macrophylla* var. *glaberrima* Moldenke *var. nov.* Phytologia, 8: 273.

Moldenke, H. N. 1977. Notes on new and noteworthy plants. Phytologia, 35: 419.

Moldenke, H. N. 1980. A sixth summary of the Verbenaceae, Avicenniaceae, Stilbaceae, Chloanthaceae, Symphoremaceae, Nyctanthaceae and Eriocaulaceae of the world as to valid taxa, geographic distribution and synonymy. Phytologia Memoirs, 2: 284-285.

Rajendran, A. and Daniel, P. 2002. The Indian Verbenaceae. Dehra Dun, India, 431 pp.

The Forest Herbarium. 2001. Thai Plant Names Tem Smitinand, revised edition, Royal Forest Department, 810 pp.

Received: 16 February 2009
Accepted: 15 July 2009