

A checklist of Acanthaceae subfamily Nelsonioideae in Thailand

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ABSTRACT

A checklist of Acanthaceae subfamily Nelsonioideae in Thailand is presented. Two genera (*Nelsonia* and *Staurogyne*) and 29 species are considered native to Thailand, including new species *Staurogyne kaengkrachanense*. Ecological and distributional data, together with a key to the species, are provided.

KEYWORDS: *Nelsonia*, *Staurogyne*, taxonomy, Thailand.

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INTRODUCTION

Acanthaceae subfamily Nelsonioideae comprises seven genera and 170 species of herbs and shrubs that occur primarily in tropical regions of both the Old and New Worlds. In Thailand, Craib (1912) recorded three genera (*Nelsonia* R.Br., *Ophiorrhizophyllum* Kurz and *Staurogyne* Wall.), with one species in each. Ridley (1923) recorded two genera (*Nelsonia* and *Staurogyne*) and 29 species in the Malay Peninsula. Benoist (1935) studied the taxonomy of Acanthaceae in the Indo-Chinese region, primarily based on characters of the sepals, corolla lobes, number of stamens, shape of the corolla tube and number of pollen apertures. He recorded three genera (*Nelsonia*, *Ophiorrhizophyllum* and *Staurogyne*) and 27 species in the region. Imlay (1939) listed 10 species of *Staurogyne* for Thailand. Hansen (1995) published on Southeast Asian Acanthaceae: *Staurogyne parvicaulis* B.Hansen was described as a new species, *Staurogyne longeciliata* Bremek. and *S. lanceolata* var. *scabridula* Bremek. were reduced to the synonymy of *S. lanceolata* (Blume) Kuntze, and *Ebermaiera subcapitata* C.B. Clarke, *Staurogyne malaccensis* C.B. Clarke and *S. malaccensis* var.

stenophylla Bremek. were listed in the synonymy of *Staurogyne setigera* (Nees) Kuntze. In the Thai Plant Names List (Forest Herbarium, 2001), one species in each of *Nelsonia* and *Staurogyne* was recorded for Thailand. Based on a revised study of this subfamily (Choopan, 2013), the list of taxa in *Nelsonia* (1 species), *Ophiorrhizophyllum* (1 species), and *Staurogyne* (26 species) has been revised (Pooma & Suddee, 2014), moreover, *S. longeciliata* has been reinstated according to the traits distinguish from *S. lanceolata* (Choopan, 2013). However, the genus *Ophiorrhizophyllum* has now been reduced to a synonym of *Staurogyne* based on phylogenetic data (Daniel & McDade, 2014). Therefore, in the present work we provide an updated checklist for the 29 species in the subfamily occurring in Thailand.

MATERIALS AND METHODS

Specimens collected from Thailand were examined in the following herbaria: AAU, BK, BKF, BM, C, E, K, KKU, L and QBG. Field collection and phenological observations of the species were made throughout Thailand. Morphological and taxonomic investigations were made directly from

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either living specimens in their natural habitats or from herbarium specimens. Observations of plant parts were made directly by eye or by using a binocular microscope.

TAXONOMIC ACCOUNT

ACANTHACEAE SUBFAM. NELSONIOIDEAE

Herbs or shrubs. *Leaves* simple, opposite or nearly opposite at the shoot apex; leaf blade elliptic, ovate or lanceolate, lacking cystoliths. *Inflorescence*

terminal or axillary, racemose, a spike, or rarely capitate, simple or compound, pubescent or glandular hairy. *Calyx* synsepalous, 4- or 5-parted. *Corolla* cylindrical, lobes equal, sometimes 2-lipped. *Stamens* 2 or 4 (didynamous), exerted or included. *Staminodes* 0–2. *Capsules* 2-celled, lacking retinacula. *Seeds* 12–60, flat or globose.

The subfamily Nelsonioideae consists of approximately 170 species of herbs and shrubs. Two genera and 29 species are known from Thailand.

KEY TO THE GENERA

1. Inflorescences spicate; bracteoles absent; calyx 4-partite; corolla 2-lipped; fertile stamens 2; staminodes absent **Nelsonia**
 1. Inflorescences racemose or capitate; bracteoles 2; calyx 5-partite; corolla cylindrical, usually 5-partite, sometimes 2-lipped; fertile stamens 4 (didynamous) or rarely 2; staminodes absent or 1 (–2) **Staurogyne**

NELSONIA

R.Br., Prodr. Fl. Nov. Holland. 1: 480. 1810; Nees in Wall., Pl. Asiat. Rar. 3: 75. 1832; Endl., Gen. Pl. 697. 1839; Nees in A.DC., Prodr. 11: 65. 1847; Miq., Fl. Ned. Ind. 2: 770. 1856; T.Anderson, J. Linn. Soc. Bot. 9: 450. 1867; Benth. in Benth. & Hook.f., Gen. Pl. 2: 1073. 1876; C.B.Clarke in Hook.f., Fl. Brit. India 4: 394. 1885; Lindau in Engl. & Prantl, Nat. Pflanzenfam. 4(3b): 289. 1895; Burkill & C.B.Clarke in Oliver *et al.*, Fl. Trop. Afr. 5: 28. 1899; C.B.Clarke, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 74(3): 633. 1908; Ridl., Fl. Malay Penin. 2: 558. 1923; Benoist in Lecomte, Fl. Indo-Chine 4: 621. 1935; Bremek., Reinwardtia 3: 247. 1955; Leonard, Contr. U.S. Natl. Herb. 31: 10. 1951; Scotland & Vollesen, Kew Bull. 55(3): 586. 2000; C.C.Hu *et al.* in C.Y.Wu *et al.*, Fl. China 19: 371. 2011; T.F.Daniel & McDade, Aliso 32(1): 25. 2014.

— *Banjolea* Bowdich, Exc. Madeira 1: 258. 1825.

Herbs, diffuse, softly villous. *Leaves* simple, opposite, entire, petiolate; leaf blade pinnately veined. *Inflorescences* spicate, ovate or cylindrical, terminal or axillary; bracts ovate, glandular-villous, alternate or spirally scattered; bracteoles absent. *Calyx* 4-partite, unequal, lanceolate. *Corolla* 2-lipped, purple or white; tube slender, apically curved; lobes 5, obtuse. *Stamens* 2, inserted at point of constriction of the corolla tube, included; anthers 2-celled, subglobose. *Staminodes* absent. *Disc* inconspicuous. *Ovary* cone-shaped, with 8 ovules per cell; stigma 2-lobed, unequal. *Capsule* cone-shaped, 2-celled.

Seeds 14–18, small, seated on minute papillae, not on hard retinacula (retinacula absent), flat, surface smooth.

One native species has been found throughout Thailand.

Nelsonia canescens (Lam.) Spreng., Syst. Veg. (ed. 16) 1: 42. 1825; Nees in A.DC., Prodr. 11: 67. 1847; Bremek., Reinwardtia 3: 248. 1955; C.C.Hu *et al.* in C.Y.Wu *et al.*, Fl. China 19: 371. 2011.— *Justicia canescens* Lam., Tabl. Encycl. 1: 41. 1791.; Vahl, Enum. Pl. 1: 122. 1804.

— *Justicia organoides* Vahl, Enum. Pl. 1: 122. 1804.— *Nelsonia organoides* (Vahl) Roem. & Schult., Syst. Veg., ed. 15 bis 1: 173. 1817.

— *Nelsonia campestris* R.Br., Prodr. Fl. Nov. Holland. 1: 481. 1810; Roem. & Schult., Syst. Veg., ed. 15 bis 1: 173. 1817; C.B.Clarke in Hook.f., Fl. Brit. India 4: 394. 1885; Burkill & C.B.Clarke in Oliver *et al.*, Fl. Trop. Afr. 5: 28. 1899; C.B.Clarke, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 74(3): 633. 1908; Ridl., J. Straits Branch Roy. Asiat. Soc. 59: 147. 1911; Ridl., Fl. Malay Penin. 2: 558. 1923; Benoist in Lecomte, Fl. Indo-Chine 4: 621. 1935; Suvatti, Fl. Thailand 2: 1117. 1978; P.H.Hô, Càyco Viêt-nam. 3(1): 34. 1993.

— *Nelsonia tomentosa* A.Dietr., Sp. Pl., ed. 6: 419. 1831; Nees in Wall., Pl. Asiat. Rar. 3: 79. 1832; Nees in A.DC., Prodr. 11: 65. 1847a; Miq., Fl. Ned. Ind. 2: 770. 1856; T.Anderson, J. Linn. Soc. Bot. 9: 450. 1867.

Thailand.—NORTHERN: Mae Hong Son [Khun Yuam, 3 Mar. 1989, *Maxwell* 89-303 (AAU, BKF, E); Salawin NP, 25 Mar. 2011, *Choopan* 2011-199 (BKF); Pang Mapha, 26 Feb. 1968, *Hansen & Smitinand* 12739 (AAU, C)]; Chiang Mai [Doi Khum, 23 Jan. 1911, *Kerr* 1657 (BM, K 2 sheets, L); Doi Suthep, 28 May 1906, *Hosseus* 443 (BM, K), *Hosseus* 490 (BM, K); 19 Feb. 1989, *Maxwell* 89-232 (BKF, L); 20 Feb. 1990, *Maxwell* 90-219 (E); 8 Mar. 1950, *Suvatabandha* 313 (BK); Doi Chiang Dao, 15 Mar. 1956, *Garrett* 1479 (K); 9 Feb. 1983, *Koyama et al.* 33249 (BKF, L); 8 Mar. 1965, *Chermsirivathana* 314 (BK); 14 Jan. 1973, *Sutheesorn* 2274 (BK); 15 Feb. 1958, *Sørensen et al.* 1128 (C 2 sheets, E); 18 Feb. 1958, *Sørensen et al.* 1325 (C 2 sheets); 5 Jan. 1989, *Maxwell* 89-4 (L); 19 Jan. 1991, *Maxwell* 91-78 (AAU); Doi Phahompok NP, 22 Mar. 2011, *Choopan* 2011-188 (BKF); Fang, 21 Feb. 1958, *Sørensen et al.* 7943 (C); 22 Feb. 1958, *Sørensen et al.* 1446 (C), *Sørensen et al.* 1479 (C, E); 10 Feb. 1983, *Koyama et al.* 33302 (C, L); Mae Rim, 14 Mar. 1991, *Maxwell* 35 (E); Mae Taeng, 20 Jan. 1992, *Maxwell* 92-41 (E); Doi Saket, 26 Feb. 1993, *Maxwell* 93-199 (BKF)]; Chiang Rai [Ban Miya, Thoeng, 12 Feb. 1970, *Sutheesorn* 1638 (BK); Khun Chae NP, 16 Mar. 2005, *Pooma et al.* 4852 (BKF); Doi Glah, 10 Apr. 2006, *Maxwell* 06-293 (BK)]; Nan [Doi Phukha NP, 13 Jan. 2011, *Choopan* 2011-138 (BKF)]; Lampang [Doi Khun Tan NP, 18 Feb. 1995, *Maxwell* 95-134 (BKF, L)]; Phrae [near Pang Poog, 17 Feb. 1910, *Kerr* 982 (BM, K)]; Tak [Mae Tak, 3 Mar. 1958, *Sørensen et al.* 1874 (C 2 sheets, K); Khun Pha Wor NP, 25 Mar. 2011, *Choopan* 2011-202 (BKF); Umphang WS, 27 Mar. 2011, *Choopan* 2011-209 (BKF)]; NORTH-EASTERN: Loei [Phu Luang WS, 11 Apr. 1968, *Chermsirivathana* 813 (BK)]; Nong Khai [Mekong river bank, 16 Dec. 1982, *Koyama et al.* 31119 (BKF, C, L)]; Phu Wua WS, 24 Dec. 2010, *Choopan* 2010-100 (BKF)]; Sakon Nakhon [Phu Phan NP, 25 Feb. 1993, *Chantaranothai et al.* 961 (K)]; SOUTH-WESTERN: Kanchanaburi [Phomphee, Sangkhlaburi, 25 Mar. 1968, *Beusekom & Phengklai* 107 (AAU, C, E, K, L); 4 Mar. 1978, *Phengklai* 3095 (E, K); I-Tong, 21 Feb. 1967, *Chermsirivathana* 670 (BK); Thong Pha Phum, 6 Feb. 1962, *Larsen* 9609 (C, K); Sai Yok NP, 3 Jan. 1962, *Larsen* 9126 (C); 5 Jan. 1962, *Larsen* 9153 (C); 13 May 2011, *Choopan* 2011-228 (BKF)]; CENTRAL: Ang Thong [Klang Temple, Mueang, 7 Mar. 1976, *Maxwell*

76-134 (AAU, BK, L)]; Nakhon Nayok [no date, *Banyorosh s.n.* (BK)]; Nonthaburi [18 Jan. 1955, *Varikul* 20 (BK)]; Bangkok [25 Jan. 1920, *Kerr* 3950 (BK, BM, K); 8 Feb. 1920, *Marcan* 53 (BM); 19 Feb. 1922, *Marcan* 683 (BM); 20 Jan. 1924, *Marcan* 1615 (BM)]; SOUTH-EASTERN: Prachin Buri [Thaplan NP, 22 Feb. 2009, *Choopan* 2009-002 (BKF)]; PENINSULAR: Ranong [30 Jan. 1958, *Sørensen et al.* 837 (C 2 sheets); Khlong Nakha WS, 12 Mar. 1987, *Niyomdham & Kubat* 1396 (AAU, C, E, K, L); 15 May 2011, *Choopan* 2011-245 (BKF)]; Chang, 13 Feb. 1912, *Kerr* 2337 (BM, K 2 sheets); Rong Kwaung, 14 Feb. 1912, *Kerr* 2337A (BM); Khao Phota Luangkaeo, Kaper, 27 Feb. 1983, *Koyama et al.* 33818 (BKF, C, L); Namtok Ngao NP, 15 May 2011, *Choopan* 2011-238 (BKF)]; Thung Raya-Nasak WS, 25 May 2011, *Choopan* 2011-315 (BKF)]; Surat Thani [Ban Ha, 19 Feb. 1930, *Kerr* 18126 (BK, BM, K); Khao Sok NP, 2 Mar. 1983, *Koyama et al.* 33944 (C, L); 16 May 2011, *Choopan* 2011-252 (BKF)]; Phangnga [Thap Put, 24 Feb. 1971, *Sadakorn* 222 (BK); Song Phi Nong waterfall, Khuraburi, 4 Feb. 1979, *Koyama et al.* 15248 (AAU, BKF)]; Krabi [Than Bok Khorani NP, 19 Jan. 1987, *Maxwell* 87-99 (AAU, BKF, L); 18 May 2011, *Choopan* 2011-266 (BKF)]; Nakhon Si Thammarat [Wang Hin, 26 Feb. 1987, *Maxwell* 87-235 (AAU, BKF, L); Chawang, no date, *Thawon* 40 (BKF, C)]; Namtok Yong NP, 22 May 2011, *Choopan* 2011-293 (BKF)]; Trang [Khao Chong, 4 July 1969, *Sangkhachand* 1958 (BK); 12 July 1969, *Sangkhachand* 1982 (BK)]; Satun [Taphan Lek, 9 Mar. 1928, *Kerr* 14403 (BK, BM, C, K, L)].

Distribution.—Congo, Tanzania, Ethiopia, Senegal (type), Cameroon, Zambia, Nigeria, Ghana, Pakistan, India, Sri Lanka, Bangladesh, Nepal, Bhutan, Myanmar, China, Laos, Cambodia, Vietnam, Malaysia, Singapore, Indonesia, Philippines, Australia, Panama, Brazil (native in the warmer regions of Africa, Asia, and Australia, and as an introduced weed in tropical America).

Ecology.—In open areas in mixed deciduous forest with bamboos, evergreen forest, sandy soil, 100–1,000 m alt.

Phenology.—Flowering from January to May.

Vernacular.—Salet phang phon (เสลดพังพอน), ya khon (หญ้าขน).

STAUROGYNE

Wall., Pl. Asiat. Rar. 2: 80, t. 86. 1831; Endl., Gen. Pl. 708. 1839; Kuntze, Rev. Gen. Pl. 2: 497. 1891; Ridl., Fl. Malay Penin. 2: 558. 1923; Benoist in Lecomte, Fl. Indo-Chine. 4: 622. 1935; Bremek., Reinwardtia 3: 163. 1955; Leonard, Contr. U.S. Natl. Herb. 31: 5. 1951; Scotland & Vollesen, Kew Bull. 55(3): 588. 2000; Y.F.Deng *et al.*, Fl. Hong Kong 3: 163. 2009; C.C.Hu *et al.* in C.Y.Wu *et al.*, Fl. China 19: 372. 2011; T.F.Daniel & McDade, Aliso 32(1): 31. 2014.

— *Ebermaiera* Nees in Wall., Pl. Asiat. Rar. 3: 75, 79. 1832; Benth. & Hook.f., Gen. Pl. 2: 1074. 1876; C.B.Clarke in Hook.f., Fl. Brit. India 4: 395. 1885; Champl., Bull. Jard. Bot. Natl. Belg. 61(1/2): 98. 1991; Scotland & Vollesen, Kew Bull. 55(3): 584, 588. 2000.— *Ebermeyera* Nees in Endl., Gen. Pl. 698. 1839.— *Ebermayera* Nees in Miq., Fl. Ned. Ind. 2: 772. 1856.

— *Erythracanthus* Nees in Wall., Pl. Asiat. Rar. 3: 75, 80. 1832; Endl., Gen. Pl. 698. 1839; Champl., Bull. Jard. Bot. Natl. Belg. 61(1/2): 98. 1991; Scotland & Vollesen, Kew Bull. 55(3): 584, 588. 2000.

— *Stiftia* Pohl ex Nees in A.DC. Prodr. 11: 70. 1847, **nom. nud.**; Champl., Bull. Jard. Bot. Natl. Belg. 61(1/2): 98. 1991.

— *Ophiorrhizophyllum* Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 40: 76. 1871; Benth. & Hook.f., Gen. Pl. 2: 1074. 1876; C.B.Clarke in Hook.f., Fl. Brit. India 4: 403. 1885; Benoist in Lecomte, Fl. Indo-Chine. 4: 636. 1935; Scotland & Vollesen, Kew Bull. 55(3): 586. 2000; C.C.Hu *et al.* in C.Y.Wu *et al.*, Fl. China 19: 376. 2011.

— *Zenkerina* Engl., Bot. Jahrb. Syst. 23(4): 497. 1897; Champl., Bull. Jard. Bot. Natl. Belg. 61(1/2): 98. 1991; Scotland & Vollesen, Kew Bull. 55(3): 588, 589. 2000.

— *Phyllophiorhiza* Kuntze, Lex. Gen. Phan. 435. 1902.

— *Neozenkerina* Mildbr., Notizbl. Bot. Gart. Berlin-Dahlem 7: 491. 1921; Champl., Bull. Jard. Bot. Natl.

Belg. 61(1/2): 98. 1991; Scotland & Vollesen, Kew Bull. 55(3): 586, 588. 2000.

— *Staurogynopsis* G.Mangenot & Aké Assi, Bull. Jard. Bot. État Bruxelles 29: 27. 1959; Champl., Bull. Jard. Bot. Natl. Belg. 61(1/2): 98. 1991; Scotland & Vollesen, Kew Bull. 55(3): 588. 2000.

— *Ancistrostylis* T.Yamaz., J. Jap. Bot. 55(1): 1. 1980; Scotland & Vollesen, Kew Bull. 55(3): 582, 588. 2000.

Annual or perennial herbs, or rarely subshrubs. *Stem* usually single, decumbent from base or procumbent, ascending from roots, sometimes nearly erect or erect, shrubby at base. *Leaves* opposite or nearly opposite at shoot apex, usually petiolate; leaf blade elliptic, ovate or lanceolate, pinnately veined, margin usually entire. *Inflorescences* racemose or capitate, terminal or axillary, simple or compound, dense or lax, pubescent or glandular hairy; bracts at base of pedicel spirally arranged, leaflike and overtopping flowers or small and inconspicuous; bracteoles 2, near the base of calyx, similar to calyx segments or smaller and narrower than bracts, 1-veined. *Calyx* deeply 5-partite; segments subequal or unequal, occasionally adaxial one larger and broader, pubescent or glandular hairy. *Corolla* tube cylindrical, sometimes with hairs at base of tube, throat narrow, nearly campanulate; lobes of limb equal, sometimes 2-lipped, curved; abaxial lip 3-lobed; adaxial lip 2-lobed. *Stamens* 2 or 4 (didynamous), exerted or included; filaments hairy, hirsute towards apex or rarely glabrous; anthers elliptic, oblong, globose or nearly so, base with an appendage, connective short, enlarged and abaxially hirsute. *Staminodes* unequal, filamentous, sometimes absent. *Disc* inconspicuous. *Ovary* ovate, 2-celled, with 12–60 ovules in 2 (or 4) columns; style glabrous; stigma 2- or 3-lobed, lobes equal or not. *Capsule* oblong, 2-valved; valves compressed, apex acute to slightly obtuse, no retinacula. *Seeds* 12–60, globose, ultimately nearly smooth or with obscure shallow pits.

Twenty-eight species have been found throughout the country and all of them are native to Thailand.

KEY TO THE SPECIES

1. Inflorescence capitate

2. Flower \leq 1 cm long; corolla white with red patch at lobe base; stem \leq 10 cm tall

2. Flower $>$ 1 cm long; corolla white without red patch at lobe base; stem $>$ 10 cm tall

3. Corolla tube glabrous on abaxial; staminode absent

3. Corolla tube puberulous on abaxial; staminode 1

23. *S. setigera*

1. *S. argentea*

2. *S. aristata*

1. Inflorescences racemose or paniculate
 4. Inflorescence a dense raceme
 5. Bracts > 0.3 cm wide
 6. Leaves oblanceolate
 7. Bracts 0.3–0.5 cm wide; filaments ≤ 0.7 cm long, with eglandular hairs; staminode 1 **5. S. densifolia**
 7. Bracts > 0.5 cm wide; filaments > 0.7 cm long, with glandular hairs; staminode absent **10. S. helferi**
 6. Leaves elliptic or lanceolate
 8. Calyx and corolla puberulous; filaments glabrous; staminode 1 **9. S. griffithiana**
 8. Calyx and corolla glabrous; filaments with glandular hairs; staminode absent
 9. Bract puberulous; calyx unequal > 0.3 cm long; corolla white **6. S. dispar**
 9. Bract glabrous; calyx subequal ≤ 0.3 cm long; corolla pink or pale red **4. S. cuneata**
 5. Bracts ≤ 0.3 cm wide
 10. Leaves lanceolate; stem unbranched or rarely branched
 11. Staminode 1; inflorescence, bract, calyx and corolla with glandular hairs **20. S. parvicaulis**
 11. Staminode absent; inflorescence, bract, calyx and corolla with eglandular hairs **13. S. lanceolata**
 10. Leaves elliptic or spatulate; stem always branched
 12. Calyx puberulous; stem decumbent, ≤ 10 cm tall **11. S. incana**
 12. Calyx with glandular hairs; stem erect, > 10 cm tall
 13. Bracts and filaments puberulous **15. S. longeciliata**
 13. Bracts and filaments with glandular hairs
 14. Inflorescence > 3 cm long; corolla lobes straight; calyx unequal; leaves densely puberulous **25. S. spatulata**
 14. Inflorescence ≤ 3 cm long; corolla lobes curved; calyx subequal; leaves glabrous **8. S. glauca**
 4. Inflorescence a lax racemose or paniculate
 15. Stem ≤ 10 cm tall, decumbent, ascending
 16. Leaves lanceolate or oblanceolate, ≤ 2.5 cm wide
 17. Inflorescence ≤ 5 cm long; corolla white with pink lobes **24. S. singularis**
 17. Inflorescence > 5 cm long; corolla purple **3. S. concinnula**
 16. Leaves broadly elliptic or oblong, > 2.5 cm wide
 18. Calyx subequal; leaves membranous with upper surface puberulous **19. S. obtusa**
 18. Calyx unequal; leaves coriaceous with upper surface glabrous
 19. Calyx, corolla and filament puberulous **18. S. merguensis**
 19. Calyx, corolla and filament with glandular hairs **27. S. tenuispica**
 15. Stem > 10 cm tall, erect
 20. Stem and leaves puberulous **7. S. filipes**
 20. Stem and leaves glabrous
 21. Bract and calyx > 1 cm long **12. S. kingiana**
 21. Bract and calyx ≤ 1 cm long
 22. Corolla white; calyx glabrous
 23. Calyx ≤ 0.5 cm long; filament with glandular hairs; staminode 1; leaves ≤ 2 cm wide **21. S. punctata**
 23. Calyx > 0.5 cm long; filament puberulous; staminode absent; leaves > 2 cm wide **26. S. subglabra**
 22. Corolla never white; calyx hairy
 24. One anterior lobe of corolla with white tip; staminodes absent; leaves with white areas along veins **14. S. lasiobotrys**
 24. Corolla lobes without white tips; staminodes 1–2; leaves never white along veins
 25. Flower ≤ 1 cm long; bracts with glandular hairs or puberulous
 26. Fertile stamens 2, exserted, anthers oblong, filaments glabrous **16. S. macrobotrya**
 26. Fertile stamens 4, included, anthers globose, filaments puberulous **28. S. kaengkrahanense**
 25. Flower > 1 cm long; bract puberulous
 27. Filaments puberulous; calyx > 0.5 cm long **17. S. major**
 27. Filaments with glandular hairs; calyx ≤ 0.5 cm long **22. S. racemosa**

1. Staurogyne argentea Wall., Pl. Asiat. Rar. 2: 80, t. 86. 1831.

— *Staurogyne argentea* Wall. var. *brevi-aristata* J.B. Imlay, Bull. Misc. Inform. Kew 1939(3): 109. 1939.

Thailand.— PENINSULAR: Chumphon [Tasae, 22 Dec. 1928, *Kerr 16280* (**BK, BM, K**); Pha To, Langsuan, 1 Mar. 1927, *Kerr 12171* (type of

S. argentea var. *brevi-aristata*, **ABD**); 3 Mar. 1927, *Kerr 12187* (**BK, BM, C, L**); Thung Maphrao, 19 July 1972, *Larsen et al. 31155* (**AAU, BKF, C, K**); Ranong [20 Jan. 1929, *Kerr 17523* (**K**); 2 May 1974, *Larsen & Larsen 33574* (**AAU**); Khao Phota Luangkaeo, 29 Nov. 1974, *Beusekom et al. 7702* (**L**); Surat Thani [Khao Sok NP, 15 Sept. 1994, *Boyce 972* (**K**); 25 Oct. 1990, *Larsen et al. 40902*

(AAU, C), *Larsen et al. 40908* (AAU); 17 May 2011, *Choopan 2011-258* (BKF); Phangnga [Nang Manora waterfall, 1990, *Sirirugsa 1207* (C)]; Khao Phra Mi, 6 July 1972, *Larsen et al. 30690* (E); Khao Lum Phee, 22 June 2006, *Williams et al. 2057* (BKF); Krabi [Nai Chong, 24 May 1960, *Chermsirivathana 62* (BK)]; Nakhon Si Thammarat [Thung Song, 24 July 1929, *Rabil 184* (BK, BM, K)]; Ronphibun, Feb. 1922, *Smith 433* (BK, BM)]; Phatthalung [Khao Den, 19 Apr. 1928, *Kerr 15313* (BK, BM, K)]; Khao Soi Dao, 29 Apr. 1930, *Kerr 19225* (BK 2 sheets, BM, K)]; Trang [Chong, 12 Jan. 1958, *Sørensen et al. 605* (C)]; 24 Jan. 1958, *Sørensen et al. 583a* (C)]; Khao Chong, 13 Nov. 1990, *Larsen et al. 41309* (AAU); 14 Apr. 1928, *Kerr 15180* (BM, BK, K)]; 9 Oct. 1970, *Charoenphol et al. 3512* (AAU, K)]; 11 Aug. 1975, *Maxwell 75-758* (AAU, BK, L)]; 17 Dec. 1979, *Shimizu et al. 27471* (BKF 2 sheets); 5 Aug. 1975, *Sutheesorn 3360* (BK)]; 8 Mar. 1976, *Chermsirivathana 2200* (BK)]; 15 July 2003, *Chantaranothai s.n.* (KKU)]; 16 Nov. 1969, *Sangkachand 2152* (BK)]; 2 Dec. 1969, *Phusomsaeng & Pinnin 322* (BKF, L)]; Pattani [Betong, 13 Aug. 1923, *Kerr 7618* (BK)]; Narathiwat [Janae, 17 Mar. 1985, *Niyomdham 865* (K)].

Distribution.— India, Myanmar, Malaysia.

Ecology.— In shaded moist evergreen forest, 100–500 m alt.

Phenology.— Flowering from March to May.

Vernacular.— Krap (กราบ).

2. *Staurogyne aristata* E.Hossain, Notes Roy. Bot. Gard. Edinburgh 31(3): 383. 1972.

Thailand.— PENINSULAR: Trang [Ton Ngam Plio, 22 Aug. 1955, *Suvarnakoses 872* (BKF, E)]; 14 Nov. 1959, *Smitinand & Abbe 6139* (type, BKF, K)].

Distribution.— Endemic.

Ecology.— In shaded moist evergreen forest along stream, 100–200 m alt.

Vernacular.— Krap khon (กราบขอน).

3. *Staurogyne concinnula* (Hance) Kuntze, Rev. Gen. Pl. 2: 497. 1891; Y.F.Deng *et al.*, Fl. Hong Kong 3: 163. 2009; C.C.Hu *et al.* in C.Y.Wu *et al.*, Fl. China 19: 375. 2011.— *Ebermaiera concinnula*

Hance in Seem., J. Bot. 6(70): 300. 1868.— *Staurogyne concinnula* (Hance) Matsum., Index Pl. Jap. 2: 581. 1912.

— *Staurogyne rosulata* Bremek., Dansk Bot. Ark. 23: 198. 1965.

— *Staurogyne subrosulata* E.Hossain, Notes Roy. Bot. Gard. Edinburgh 31(3): 385. 1972.

Thailand.— EASTERN: Nakhon Ratchasima [Khao Yai NP, 11 Dec. 1962, *Phengklai 446* (BKF)]; 6 Jan. 1963, *Phengklai 696* (BKF, K, L)]; 22 Oct. 1969, *Beusekom & Charoenphol 1828* (AAU, BKF, C, E, K, L)]; 2 Dec. 1983, *Fukuoka & Ito 34984* (BKF)]; 7 July 1966, *Anonymous 54* (BKF)]; 4 May 1964, *Harnlananda 179* (BKF)]; 6 Oct. 1962, *Smitinand 7456* (BKF)]; 7 Oct. 1962, *Smitinand 7514* (BKF, L)]; 18 July 1973, *Murata et al. 16249* (BKF, L)]; 19 July 1973, *Murata et al. 16313* (AAU, BKF, L), *Murata et al. 16331* (L), *Murata et al. s.n.* (BKF)]; 6 May 2011, *Choopan 2011-217* (BKF)]; 18 Aug. 1964, *Sutheesorn 1* (BK)]; Kong Kaeo waterfall, 12 Aug. 1974, *Maxwell 74-793* (AAU, BK, L)]; Orchid waterfall, 31 Oct. 1970, *Charoenphol et al. 4386* (AAU, BKF, L)]; Pak Chong, 20 Nov. 1982, *Koyama et al. 30126* (BKF, C, L)]; 18 Nov. 1982, *Shimizu et al. 30014* (BKF, C, L)]; CENTRAL: Nakhon Nayok [Khao Yai NP, 8 Oct. 1979, *Shimizu et al. 19554* (BKF 2 sheets, L), *Shimizu et al. 19578* (BKF, C, L)]; 9 Oct. 1979, *Shimizu et al. 19726* (BKF 2 sheets, C, L)]; 10 Oct. 1979, *Shimizu et al. 18127* (BKF 2 sheets, L)]; Pha Tabaek, 14 Oct. 1984, *Murata et al. 52385* (BKF)]; Pha Deo Dai, 14 Aug. 2000, *Maxwell 00-402* (L)]; Sarika waterfall, 14 Aug. 1968, *Larsen et al. 3398* (type of *S. subrosulata*, AAU)]; SOUTH-EASTERN: Prachin Buri [Khao Khiao, 20 July 1963, *Larsen 10656* (type of *S. rosulata*, AAU, C, E, K, L)]; 8 Mar. 1964, *Hansen et al. 11380* (BKF, C)]; 7 July 1966, *Larsen et al. 22* (AAU), *Larsen et al. 54* (AAU)]; 8 July 1966, *Larsen et al. 103* (AAU)]; 9 July 1966, *Larsen et al. 165* (AAU, BKF)]; 7 Sept. 2002, *Maxwell 02-311* (BKF, L)].

Distribution.— China, Vietnam, Taiwan, Hong Kong, Japan.

Ecology.— In shaded evergreen forest, 500–1,100 m alt.

Phenology.— Flowering from July to September.

Vernacular.— Busaba ngam (บุษบางาม).

4. *Staurogyne cuneata* J.B. Imlay, Bull. Misc. Inform. Kew 1939: 110. 1939.

Thailand.— SOUTH-WESTERN: Prachuap Khiri Khan [Khao Luang, 4 July 1926, *Kerr 10811* (**ABD**, **BK**, **BM**, **K** 2 sheets)]; PENINSULAR: Chumphon [Khao Tong, 18 Jan. 1927, *Kerr 11534* (type, **ABD**, **K**)]; Ranong [Khao Phota Luangkaeo, 11 Dec. 1979, *Shimizu et al. 26943* (**BKF** 2 sheets, **L**); 22 June 1974, *Geesink et al. 7419* (**AAU**, **BKF**, **L**)].

Distribution.— Endemic.

Ecology.— In shaded evergreen forest, 700–900 m alt.

Phenology.— Flowering from January to May.

Vernacular.— Krap bai pradap tai (กราบใบประดับใต้).

5. *Staurogyne densifolia* Bremek., Dansk Bot. Ark. 27(1): 75. 1969.

Thailand.— NORTHERN: Phitsanulok [Thung Salaeng Luang, 25 July 1966, *Larsen et al. 897* (type, **AAU**, **C** image, **U** image)].

Distribution.— Endemic.

Ecology.— In shaded evergreen forest, 600 m alt.

Vernacular.— Krap thung salaeng luang (กราบทุ่งแสงหลวง).

6. *Staurogyne dispar* J.B. Imlay, Bull. Misc. Inform. Kew 1939: 110. 1939.

Thailand.— NORTHERN: Mae Hong Son [Doi Pepo, 29 June 1922, *Kerr 6178* (type, **BK**, **BM**, **K** 2 sheets)]; Tak [Doi Musor, 9 Dec. 1961, *Smitinand 7070* (**BKF**); 31 Aug. 1967, *Tagawa et al. 8642* (**BKF**, **C**, **L**); 23 Aug. 1961, *Chermisrivathana 52* (**BK**); 25 July 1959, *Floto 7718* (**C**)].

Distribution.— Endemic.

Ecology.— In shaded evergreen forest, 400–1,100 m alt.

Phenology.— Flowering from September to December.

Vernacular.— Krap musoe (กราบมูเซอ), krap bai pradap nua (กราบใบประดับเหนือ).

7. *Staurogyne filipes* E. Hossian, Notes Roy. Bot. Gard. Edinburgh 31(3): 383. 1972.

Thailand.— PENINSULAR: Pattani [Betong, 1 Aug. 1923, *Kerr 7442* (**BK**, **BM**, **K**); 26 Aug. 1923, *Kerr 7920* (**BK**, **BM**, **K**)]; Yala [Tan To, 9 Feb. 2004, *Middleton et al. 2834* (**BKF**); Betong, 3 Mar. 1941, *Premrasmi 136* (**BKF**)].

Distribution.— Laos.

Ecology.— In shaded evergreen forest, 50–400 m alt.

Phenology.— Flowering from July to September.

Vernacular.— Krap pattani (กราบปัตตานี).

8. *Staurogyne glauca* (Nees) Kuntze, Rev. Gen. Pl. 2: 497. 1891; Benoist in Lecomte, Fl. Indo-Chine 4: 624. 1935.— *Ebermaiera glauca* Nees in A.D.C., Prodr. 11: 73. 1847; C.B. Clarke in Hook.f., Fl. Brit. India 4: 395. 1885; T. Anderson, J. Linn. Soc. Bot. 9: 450. 1867; P.H. Hô, Càyco Vietnam. 3(1): 76. 1993.

— *Staurogyne polybotrya* (Nees) Kuntze, Rev. Gen. Pl. 2: 497. 1891.— *Ebermaiera polybotrya* Nees in A.D.C., Prodr. 11: 74. 1847; C.B. Clarke in Hook.f., Fl. Brit. India 4: 396. 1885;

— *Staurogyne rivularis* Merr., Philippine J. Sci. 7: 248. 1912; Merr., Fl. Manila 441. 1912; Bremek., Reinwardtia 3: 173. 1955.

— *Staurogyne siamensis* C.B. Clarke in E. Lindhard, Bull. Herb. Boissier ser. 2, 5: 716. 1905.— *S. glauca* var. *siamensis* Benoist, Bull. Soc. Bot. France 60: 267. 1913.

Thailand.— NORTHERN: Chiang Mai [Doi Suthep, 27 Dec. 1910, *Kerr 1631* (**BM**); 4 Dec. 1911, *Kerr 2270* (**BM**, **L**); Fang, 22 Feb. 1958, *Smitinand 4305* (**BKF**), *Smitinand 4313* (**BKF**); 12 Jan. 1988, *Paisooksantivatana et al. 2230-88* (**BK**); Thep Phanom hot spring, 21 Dec. 1989, *Maxwell 89-1578* (**E**, **L**); Fang, hot spring park, 10 Feb. 1983, *Koyama et al. 33308* (**BKF**); Doi Chiang Dao WS, 10 Mar. 1990, *Maxwell 90-307* (**E**)]; Phayao [Chiang Kam, 29 Feb. 1912, *Kerr 2468* (**E**, **K**)]; Lampang [Chae Son NP, 8 Jan. 1996, *Maxwell 96-39* (**BKF**); 15 Jan. 2011, *Choopan 2011-165* (**BKF**)]; Tak [Raheng, 8 Jan. 1904, *Lindhard s.n.* (type of *S. siamensis*, **C**, **K**, **P**)]; NORTH-EASTERN: Phetchabun [Nam Nao NP, 26 Dec. 1982, *Koyama et al. 31733* (**BKF**), *Koyama et al. 31764* (**BKF**)]; Sakon Nakhon [Phu Phan NP, 23 Jan. 1999, *Chaikong 30/42* (**KKU**); 14 Dec. 1982, *Koyama et al. 31041* (**BKF**, **C**, **L**); 13 Nov. 1984,

Murata et al. 50610 (BKF); Sangklokao, 27 Dec. 1962, *Adisai 256 (BK)*; EASTERN: Chaiyaphum [Phak Pang, 1 Feb. 1931, *Kerr 19980 (BK, BM, K)*]; Nakhon Ratchasima [Pak Thong Chai, 24 Dec. 1923, *Kerr 8118 (BK, BM, C, L)*]; Yasothon [Kheung Nai, 23 Jan. 1984, *Sadakorn & Paisooksantivatana 1411-84 (BK)*]; SOUTH-WESTERN: Kanchanaburi [Sai Yok, 25 Nov. 1971, *Beusekom et al. 3967 (BKF, L)*]; 25 Dec. 1961, *Larsen 8960 (C, K)*; 1 Jan. 1962, *Larsen 9067 (C, K)*; Ban Kao, Ta Khien, 27 Nov. 1961, *Larsen 8396 (C 2 sheets)*; Had Palom, no date, *Larsen 8854 (C)*; CENTRAL: Ang Thong [30 Dec. 1928, *Put 2604 (BM)*]; Saraburi [Sam Lan, 20 Nov. 1973, *Maxwell 73-676 (AAU, BK)*]; Nakhon Nayok [Khao Yai NP, Feb. 1966, *Chermsirivathana 613 (BK)*]; SOUTH-EASTERN: Prachin Buri [Krabinburi, 4 Jan. 1925, *Kerr 9838 (BK, BM 2 sheets, C)*]; Chon Buri [Sriracha, 5 Mar. 1920, *Kerr 4039 (BM)*]; Khao Khiao, 6 Dec. 1975, *Maxwell 75-1106 (AAU, BK, L)*; PENINSULAR: Chumphon [Thasae, 16 Jan. 1967, *Maxwell 87-63 (AAU, BKF, L 2 sheets)*]; Surat Thani [Khian Sa, 19 Feb. 1930, *Kerr 18130 (BK, BM)*].

Distribution.— Pakistan, India, Myanmar, Cambodia, Vietnam, Malaysia, Philippines, Australia.

Ecology.— In shaded mixed deciduous forest along stream, 400–600 m alt.

Phenology.— Flowering from October to December.

Vernacular.— Ya krap hiao (หญ้ากราบเขียว).

9. *Staurogyne griffithiana* (Nees) Kuntze, Rev. Gen. Pl. 2: 497. 1891; C.B. Clarke, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 74(30): 640. 1908; Ridl., Fl. Malay Penin. 2: 561. 1923; Bremek., Reinwardtia 3: 181. 1955.— *Erythracanthus griffithianus* Nees in A.DC., Prodr. 11: 78. 1847.— *Ebermaiera griffithiana* (Nees) T. Anderson, J. Linn. Soc. Bot. 9: 452. 1867; C.B. Clarke in Hook.f., Fl. Brit. India 4: 400. 1885.

Thailand.— PENINSULAR: Chumphon [Lang Suan, 6 Feb. 1927, *Kerr 11846 (BK, BM, K)*]; Surat Thani [25 Oct. 1990, *Larsen et al. 40909 (AAU)*]; Phangnga [Khao Lumpee, 14 Sept. 1994, *Boyce 949 (K)*]; Satun [11 Mar. 1928, *Kerr 14467 (BK, BM)*]; Pattani [Betong, 9 Aug. 1923, *Kerr 7897 (K)*]; 26 Aug. 1923, *Kerr 7674 (BK, BM, K)*]; Narathiwat

[Nikom Waeng, 14 Sept. 1966, *Sangkhachand & Nimanong 1364 (BKF, C, L)*]; 7 Oct. 1966, *Sangkhachand 497 (BK, L)*; 24 Apr. 1968, *Prayad 1319 (BK)*; Chatwarin waterfall, 18 Oct. 1970, *Charoenphol et al. 3988 (AAU)*; 15 Aug. 1995, *Larsen et al. 45581 (AAU)*; Ban Bala, 16 Aug. 1995, *Larsen et al. 45658 (AAU)*].

Distribution.— Malaysia, Singapore, Indonesia.

Ecology.— In shaded moist evergreen forest, 50–500 m alt.

Phenology.— Flowering from February to April.

Vernacular.— Krap nara (กราบนรา).

10. *Staurogyne helferi* (T. Anderson) Kuntze, Rev. Gen. Pl. 2: 497. 1891.— *Ebermaiera helferi* T. Anderson, J. Linn. Soc. Bot. 9: 452. 1867; C.B. Clarke in Hook.f., Fl. Brit. India 4: 399. 1885.— *Staurogyne latifolia* Bremek., Dansk Bot. Ark. 27: 76. 1969.

Thailand.— PENINSULAR: Ranong [Khlong Nakha WS, 24 Nov. 1974, *Geesink et al. 7522 (BKF, C, L)*]; 11 Sept. 1982, *Shimizu et al. 29286 (BKF)*; 16 May 2011, *Choopan 2011-249a (BKF)*; Khao Phota Luangkaeo, Kaper, 20 Nov. 1973, *Santisuk 634 (BKF 2 sheets)*; 11 Dec. 1979, *Shimizu et al. 27007 (BKF)*, *Shimizu et al. 27022 (BKF 2 sheets)*; 27 Feb. 1983, *Koyama et al. 33802 (BKF)*; Surat Thani [25 Oct. 1990, *Larsen et al. 40866 (AAU)*, *Larsen et al. 40901 (C)*]; Phangnga [Klong Saeng WS, 11 Sept. 1984, *Fukuoka & Nanakhon 36104 (BKF, L)*]; 11 Sept. 1984, *Anonymous 722 (BKF)*; Khao Phra Mi, 7 Jan. 1966, *Hansen & Smitinand 11828* (type of *S. latifolia*, **BKF, C**)].

Distribution.— Myanmar.

Ecology.— In shaded moist evergreen forest, 100–500 m alt.

Phenology.— Flowering from January to March.

Vernacular.— Krap khlong nakha (กราบคลองนาคา).

11. *Staurogyne incana* (Blume) Kuntze, Rev. Gen. Pl. 2: 497. 1891; Bremek., Reinwardtia 3: 191. 1955.— *Adenosma incanum* Blume, Bijdr. Fl. Ned. Ind. 756. 1826.— *Ebermaiera incana* Hassk. in

Teijsm. & Bin., Cat. Hort. Bot. Bogor. 149. 1866; Nees in A.DC., Prodr. 11: 76. 1847; C.B. Clarke in Hook.f., Fl. Brit. India 4: 397. 1885.

— *Staurogyne multiflora* Bremek., Dansk Bot. Ark. 27: 76. 1969.

Thailand.— PENINSULAR: Chumphon [Tasae, 5 Nov. 1919, *Kloss 6911* (K); 23 Dec. 1928, *Kerr 16303* (BK, BM, K)]; Ranong [Khao Phota Luangkaeo, 11 Dec. 1979, *Shimizu et al. 27010* (BKF 2 sheets), *Shimizu et al. 27053* (BKF)]; Khlong Nakha WS, 28 Jan. 2003, *Chamchumroon et al. 1843* (BKF); 16 Nov. 1973, *Santisuk 576* (BKF 2 sheets); 8 Dec. 1979, *Shimizu et al. 26468* (BKF 2 sheets, L); 24 Nov. 1974, *Geesink et al. 7568* (BKF, C, K, L); Thung Raya Na Sak WS, 30 Jan. 2004, *Middleton et al. 2673* (BKF); 25 May 2011, *Choopan 2011-310* (BKF); Kaper, 20 Nov. 1965, *Sangkhachand 1149* (BKF, C, K 2 sheets); Pak Chan, 28 Jan. 1927, *Kerr 11678* (BK, BM, K)]; Surat Thani [Nasan, 8 Oct. 1955, *Thavorn 486* (BKF, K)]; Phangnga [foothills of Khao Phra Mi, 7 Jan. 1966, *Hansen & Smitinand 11825* (type of *S. multiflora*, BKF, C, K, L, U image); Bangwan stream, Kuraburi, 27 Sept. 2006, *Muadsub 124* (BKF)]; Trang [Khao Chong, 31 July 1975, *Suthisorn 3372* (BK)].

Distribution.— Myanmar, Indonesia.

Ecology.— In shaded moist evergreen forest, 50–200 m alt.

Phenology.— Flowering from March to May.

Vernacular.— Krap thung raya (กราบทุ่งระยษ).

12. *Staurogyne kingiana* C.B. Clarke, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 74(3): 637. 1908.

Thailand.— PENINSULAR: Pattani [Betong, 9 Aug. 1923, *Kerr s.n.* (BM)]; 13 Aug. 1923, *Kerr 7618* (BM)]; Narathiwat [Janae, 17 Mar. 1985, *Niyomdham 865* (AAU, BKF, C, K)]; Waeng, 20 Nov. 1962, *Sangkhachand 863* (BKF); 29 June 1972, *Nitrasirirak 114* (BKF, L); Hala-Bala WS, 21 July 2004, *Pooma et al. 4512* (BKF)].

Distribution.— Malaysia, Singapore, Indonesia.

Ecology.— In shaded evergreen forest, 100–800 m alt.

Phenology.— Flowering from March to May.

Vernacular.— Krap hala-bala (กราบฮาลา-บาลา).

13. *Staurogyne lanceolata* (Blume) Kuntze, Rev. Gen. Pl. 2: 497. 1891; Benoist in Lecomte, Fl. Indo-Chine 4: 627. 1935; Bremek., Reinwardtia 3: 207. 1955.— *Adenosma lanceolatum* Blume, Bijdr. Fl. Ned. Ind. 757, 1826.— *Ebermaiera lanceolata* (Blume) Hassk., Cat. Hort. Bot. Bogor. 147. 1844; Miq., Fl. Ned. Ind. 2: 774. 1856; C.B. Clarke in Hook.f., Fl. Brit. India 4: 397. 1885.— *E. lanceolata* (Hassk.) Nees in A.DC., Prodr. 11: 76. 1847.

Thailand.— NORTH-EASTERN: Sakon Nakhon [Phu Phan NP, 13 Oct. 1999, *Chaikong 31/42* (KKU); 23 Dec. 2010, *Choopan 2010-099* (BKF)]; EASTERN: Nakhon Ratchasima [Khao Yai NP, 7 Oct. 1962, *Smitinand 7549* (BKF); 21 Nov. 1982, *Shimizu et al. 30215* (BKF, L); 22 Oct. 1969, *Beusekom et al. 1820* (AAU, BKF, C, E); 19 Oct. 2001, *Maxwell 01-534* (L); Ban Rai, 29 Nov. 1924, *Kerr 9493* (BK)]; Surin [2 Dec. 1976, *Phengklai et al. 3548* (BKF)]; Si Sa Ket [Khao Phra Vihan NP, 21 Dec. 2005, *Pooma et al. 6043* (BKF)]; Ubon Ratchathani [Phu Chong Na Yoy NP, 21 Dec. 2010, *Choopan 2010-084* (BKF)]; SOUTH-WESTERN: Kanchanaburi [Sai Yok, 16 Dec. 1961, *Larsen 8747* (K)]; CENTRAL: Nakhon Nayok [Khao Yai NP, 16 Oct. 1999, *Chongko 35* (BKF)]; SOUTH-EASTERN: Prachin Buri [Krabinburi, 8 Nov. 1930, *Marcan 2549* (BM)]; Sa Kaeo [Pang Sida NP, 13 Nov. 2010, *Choopan 2010-006* (BKF)]; Chon Buri [Khao Khiao, 28 Aug. 1976, *Maxwell 76-621* (L); Hoop Bon, Siracha, 25 Oct. 1927, *Collins 1672* (BK)]; Chanthaburi [1936, *Vesterdal 14D* (C)]; Khao Chamao Khao Wong NP, 24 Nov. 1979, *Shimizu et al. 23468* (BKF); Khao Khitchakut NP, 15 Nov. 2010, *Choopan 2010-023* (BKF); Khao Sabap, 18 Jan. 1958, *Sørensen et al. 515* (C); Krathing waterfall, 21 Oct. 1972, *Maxwell 72-481* (AAU)]; Trat [Chang Island, 26 Sept. 1924, *Kerr 9178* (BK, BM, K); 29 Sept. 1924, *Kerr 9493* (K); Kut Island, 20 Oct. 2000, *Phengklai 13099* (BKF 2 sheets); 20 Nov. 1970, *Charoenphol et al. 5071* (AAU); Pong Song Salung, 5 Nov. 1964, *Suvarnakoses 2202* (BKF, L); Namtok Phlio NP, 17 Oct. 1971, *Maxwell 71-589* (AAU); 16 Nov. 2010, *Choopan 2010-026* (BKF); Ban Saphan Hin, 8 Nov. 1993, *Larsen et al. 44305* (AAU)]; PENINSULAR: Ranong [Lam Liang, 2 Feb. 1927, *Kerr 11775* (BK, BM, K)]; Muang Len, 2 Jan. 1966, *Hansen & Smitinand 11874* (BKF, C, E, K, L); Khlong Nakha WS, 8 Dec. 1979, *Shimizu et al. 26471* (BKF 2 sheets); Klong Bang Bon, 24 Nov. 1974, *Indrapong 47*

(**BKF**); Kraburi, no date, *Kerr 16357 (BK)*; Surat Thani [Soa Um-Krut, 8 Jan. 1935, *Seidenfaden 2244 (C)*]; Ban Rai-Krut, 29 Nov. 1924, *Kerr 9493 (BK, BM)*; Phangnga [Khao Nangting, 8 May 1967, *Sutheesorn 2553 (BK)*]; Krabi [8 Nov. 1930, *Marcan 2549 (K)*]; Nai Chong, 17 Dec. 1965, Umpai 216 (**BK**); Nakhon Si Thammarat [Kiriwong, 28 Apr. 1928, *Kerr 15422 (BK, BM, K)*]; Namtok Yong NP, 3 Dec. 1972, *Anonymous s.n. (BKF)*; 22 May 2011, *Choopan 2011-289 (BKF)*; Khao Luang NP, 25 Oct. 1991, *Larsen et al. 42570 (AAU, C)*; 23 May 2011, *Choopan 2011-296 (BKF)*; Phatthalung [Plai Wan waterfall, 19 Nov. 1990, *Larsen et al. 41602 (AAU)*]; Trang [Khao Chong, 17 Dec. 1979, *Shimizu et al. 27458 (BKF 2 sheets)*, *Shimizu et al. 27465 (BKF 2 sheets)*]; Ton The waterfall, 14 Nov. 1990, *Larsen et al. 41370 (AAU, C)*; Thalae Song Hong, 27 Jan. 1958, *Sørensen et al. 745 (C)*; South Peninsular BG, 20 May 2011, *Choopan 2011-277 (BKF)*; Satun [Ton Plio, 28 Oct. 1993, *Larsen et al. 44087 (AAU, BKF)*]; Kuan Kalong, 15 Oct. 1970, *Charoenphol et al. 3845 (AAU, BKF, K, L)*; Ya Roy waterfall, 6 Nov. 1990, *Larsen et al. 41171 (AAU)*; Songkhla [21 Dec. 1978, *Hamilton & Congdon 105 (BKF)*]; Ko Hong Hill, 15 Dec. 1984, *Maxwell 84-523 (BKF)*; 9 Nov. 1988, *Sirirugsa 1183 (C)*; Ton Nga Chang WS, 21 May 2011, *Choopan 2011-288 (BKF)*; Narathiwat [Nikom Waeng, 1 Mar. 1974, *Larsen & Larsen 32775 (BKF)*]; Chatwarin waterfall, 22 Dec. 1993, *Fukuoka & Koyama 61988 (BKF)*.

Distribution.— Myanmar, Laos, Malaysia, Singapore, Indonesia.

Ecology.— In shaded mixed deciduous forest and evergreen forest with sandy soil, 50–400 m alt.

Phenology.— Flowering from November to January.

Vernacular.— Ya sam chan (หญ้าสามชั้น).

14. *Staurogyne lasiobotrys* (Nees) Kuntze, Rev. Gen. Pl. 2: 497. 1891; C.B. Clarke, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 74(30): 639. 1908; Ridl., J. Straits Branch Roy. Asiat. Soc. 59: 147. 1911; Ridl., Fl. Malay Penin. 2: 561. 1923; Bremek., Reinwardtia 3: 195. 1955.— *Ebermaiera lasiobotrys* Nees in A.D.C., Prodr. 11: 721. 1847; T. Anderson, J. Linn. Soc. Bot. 9: 452. 1867; C.B. Clarke in Hook.f., Fl. Brit. India 4: 400. 1885.

— *Staurogyne expansa* Bremek., Dansk Bot. Ark. 20: 57. 1961.

Thailand.— PENINSULAR: Chumphon [Tha Ngam, 16 Jan. 1927, *Kerr 11481 (BK, BM, K)*]; Langsuan, 14 Feb. 1927, *Kerr 11946 (BK, BM, C, K, L)*; Ranong [La-Un, 1 Jan. 1929, *Kerr 16474 (BK, BM, K)*]; Ban Hin Song, Kraburi, 17 Jan. 1987, *Maxwell 87-82 (AAU, BKF, E, L)*; Khlong Nakha WS, 1 Mar. 1983, *Koyama et al. 33907 (BKF)*; Phato, 2 May 1974, *Larsen & Larsen 33583 (AAU)*; Surat Thani [Khlong Saeng WS, 15 Feb. 1994, *Maxwell 94-193 (BKF)*]; Khao Sok NP, 20 Feb 2001, *Chayamarit et al. 2584 (BKF)*, *Chayamarit et al. 2585 (BKF)*; Phangnga [Thapput, 4 Mar. 1930, *Kerr 18357 (BK, BM, K)*; 5 Mar. 1930, *Kerr 18385 (BK, BM, C, K)*]; Laemson NP, 22 Feb. 1994, *Barford et al. 45240 (AAU, BKF, C)*; Ko Ra, Khura Buri, 30 Jan. 2009, *Watthana 2969 (BKF, QBG)*; Khao Dan, 19 Apr. 1928, *Kerr 15314 (L)*; Phuket [Kamala, 10 Mar. 1929, *Kerr 17427 (BK, BM, C, K, L)*]; Khao Phathaeo NHA, 14 Dec. 1979, *Shimizu et al. 27186 (BKF)*, *Shimizu et al. 27325 (BKF)*; 3 Feb. 2003, *Chamchumroon et al. 1897 (BKF)*; 17 May 2011, *Choopan 2011-261 (BKF)*; Khao Phara, 25 Jan. 1966, *Hennipman 3728 (BKF, L)*; Sirinath NP, 18 May 2011, *Choopan 2011-264 (BKF)*; Mueang, 12 Dec. 1978, *Hamilton & Congdon 74 (AAU, BKF)*; Krabi [Nai Chong, 18 Jan. 1966, *Hansen & Smitinand 11982 (BKF, C, K, L)*; 17 Dec. 1965, *Umpai 214 (BK)*; 25 Feb. 1969, *Umpai s.n. (BK)*]; Nakhon Si Thammarat [Lang Suan, 14 Feb. 1927, *Kerr 11946 (K)*]; Phatthalung [Khao Den, 19 Apr. 1928, *Kerr 15314 (BK, BM, C, K, L)*]; Trang [28 Jan. 1958, *Sørensen et al. 770 (type of S. expansa, C)*]; Khao Chong, 26 Jan. 1966, *Tagawa et al. 6741 (BKF, L)*; Satun [Kuan Don, 10 Mar. 1928, *Kerr 14434 (BK, BM, K)*]; Khao Khiao Range, 12 Mar. 1928, *Kerr 14511 (BK, BM, C, K)*; Tarutao Island, 18 Jan. 1928, *Kerr 14159 (BK, BM, C, K)*; 8 Feb. 1981, *Congdon 1168 (AAU)*; Kuan Ka Long, 7 Jan. 1985, *Maxwell 85-53 (BKF)*; Pattani [Betong, 1 Aug. 1928, *Kerr 7442 (K)*]; Narathiwat [Nikom Waeng, Su-ngai Kolok, 3 Mar. 1974, *Larsen & Larsen 32885 (AAU, BKF, K, L)*]; Waeng, Apr. 1968, *Phusomsaeng 434 (BKF, K, L)*; 25 Apr. 1968, *Sangkhachand 1322 (BK)*; Sirindhorn waterfall, 29 Mar. 1987, *Maxwell 87-276 (L)*; 11 Feb. 1997, *Puudjaa 343 (BKF)*; Hala-Bala WS, 10 Feb. 1996, *Niyomdham 4572 (BKF)*.

Distribution.— India, Myanmar, Malaysia, Singapore.

Ecology.— In shaded evergreen forest, 50–200 m alt.

Phenology.— Flowering from February to May.

Vernacular.— Krap phuket (กราบภูเก็ต).

15. *Staurogyne longeciliata* Bremek., Dansk Bot. Ark. 20: 60. 1961.

Thailand.— PENINSULAR: Phuket [Khao Phataew WS, 14 Dec. 1979, *Shimizu et al.* 27216 (**BKF** 2 sheets, **C** 2 sheets, **K**, **L**)]; Nakhon Si Thammarat [Khao Island, 26 Jan. 1958, *Sørensen et al.* 699 (type, **BKF**, **C**)]; Satun [Kuan Don, 30 Dec. 1927, *Kerr* 13752 (**BK**, **BM**)]; Yala [Nikom Kue Long, 11 Dec. 1972, *Santisuk* 371 (**BKF**, **K**, **L**)].

Distribution.— Endemic.

Ecology.— In shaded moist evergreen forest with sandy soil, 50–400 m alt.

Phenology.— Flowering from November to January.

Vernacular.— Krap pha tao (กราบพะท้าว).

16. *Staurogyne macrobotrya* (Kurz) T.F. Daniel & McDade, Aliso 32(1): 38. 2014.— *Ophiorrhizophyllum macrobotryum* Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 40: 76. 1871; C.B. Clarke in Hook. f., Fl. Brit. India 4: 403. 1885; Benoist in Lecomte, Fl. Indo-Chine 4: 636. 1935; C.C. Hu *et al.* in C.Y. Wu *et al.*, Fl. China 19: 376. 2011.

— *Ophiorrhizophyllum poilanei* Benoist in Lecomte, Fl. Indo-Chine 4: 637. 1935; Benoist, Notul. Syst. 5: 107. 1936.

Thailand.— NORTHERN: Mae Hong Son [Mae Sariang, 2 Mar. 1991, *Maxwell* 91-213 (**E**, **L**)]; Chiang Mai [Doi Suthep, 19 Feb. 1911, *Kerr* 1678 (**BM**, **C**, **K**, **L**); 28 Feb. 1915, *Kerr* 3536 (**BM**, **E**, **K** 2 sheets); 28 Oct. 1949, *Suvarnakoses* 97 (**BKF**, **K**); 10 Mar. 1966, *Sukkri* 75 (**BKF**, **L**); 16 Feb. 1989, *Maxwell* 89-206 (**BKF**, **L**); 13 Mar. 2000, *Maxwell* 00-125 (**BKF**, **L**); 12 Feb. 1958, *Sørensen et al.* 6898 (**BKF**, **C**); 10 Mar. 1966, *Chermisrivathana* 481 (**BK**); Pangboh, 9 Mar. 1965, *Smitinand* 8675 (**BK**, **BKF**, **K**); Doi Angka, 2 Mar. 1931, *Garrett* 654 (**BKF**, **C**, **K** 2 sheets, **L**); Doi Inthanon NP, 11 Dec.

1984, *Koyama et al.* 48860 (**BKF**); 26 Feb. 1979, *Koyama et al.* 15555 (**AAU**, **BKF**); 4 Feb. 1998, *Konta & Phengklai* 3958 (**BKF**); 7 Jan. 1998, *Srisanga et al.* 98 (**BKF**, **QBG**); 30 Jan 1996, *Nanakorn et al.* 5900 (**QBG**), *Nanakorn et al.* 5933 (**QBG**); 18 Feb. 1999, *Suksathan* 1576 (**QBG**); 12 Feb. 2001, *Chayamarit* 2380 (**BKF** 2 sheets); 3 Feb. 1978, *Lojtnant & Niyomdham* 131 (**AAU**); Doi Phahompok, 12 Feb. 1983, *Koyama et al.* 33414 (**BKF**, **C**, **K**, **L**), *Koyama et al.* 33455 (**BKF**); Mae Sao, Fang, 11 Feb. 1983, *Koyama et al.* 33357 (**BKF**, **L**); Thung Jo, 8 Mar. 1978, *Niyomdham* 63 (**AAU**, **BKF** 2 sheets, **K**); Doi Chong, 18 Feb. 1968, *Hansen & Smitinand* 12648 (**C**); Doi Khun Huai Pong, 4 Mar. 1968, *Hansen & Smitinand* 12817 (**BKF**, **C**, **E** 2 sheets); Mon Tha Thong waterfall, Mar. 1997, *Chayamarit & Phathanacharoen* 662 (**BKF**); Doi Lohn, 2 Mar. 1997, *Maxwell* 97-170 (**BKF**); Doi Chiang Dao, 4 Mar. 1995, *Maxwell* 95-211 (**BKF**, **L**); 15 Feb. 1990, *Maxwell* 90-210 (**L**); Chom Thong, 9 Mar. 1991, *Maxwell* 91-252 (**E**, **L**); Chiang Rai [Doi Tung, 16 Feb. 2005, *Maxwell* 05-129 (**BKF**)]; Nan [Doi Wao, 25 Feb. 1912, *Kerr* 2453 (**BM**, **E**, **K**); Doi Phukha, 25 Feb. 1921, *Kerr* 4910 (**AAU**, **BK**, **BM**, **K**); 20 Feb. 1989, *Santisuk* 6928 (**BKF**); 11 Feb. 1999, *Srisanga* 476 (**BKF**, **QBG**); 12 Jan. 2000, *Srisanga* 1270 (**QBG**); 15 Jan. 2002, *Srisanga* 2345 (**BKF**, **QBG**); 13 Jan. 2011, *Choopan* 2011-135 (**BKF**); Pab Dalm waterfall, Mae Wang, 18 Mar. 2004, *Maxwell* 04-154 (**BKF**); Kamphaeng Phet [Mae Wong NP, 15 Dec. 1998, *Bult* 194 (**BKF**)].

Distribution.— Myanmar, China, Laos, Vietnam.

Ecology.— In shaded hill evergreen forest with moisture, 800–1,400 m alt.

Phenology.— Flowering from January to March.

Vernacular.— Busaba doi phukha (บุษบาตอยภูคา).

17. *Staurogyne major* Benoist, Bull. Mus. Natl. Hist. Nat. 5: 171. 1933.

— *Staurogyne atropurpurea* E. Hossain, Notes Roy. Bot. Gard. Edinburgh 31(3): 382. 1972.

Thailand.— NORTHERN: Tak [Khun Pha Wo, 25 Mar. 2011, *Choopan* 2011-203 (**BKF**)]; SOUTH-WESTERN: Kanchanaburi [Bo Noi, 18 Jan. 1926, *Kerr* 10264 (**BK**, **BM**, **C**, **K**, **L**); I-Tong, 21 Feb.

1967, *Chermsirivathana* 671 (**BK** 2 sheets); Pilok, Thong Pha Phum, 11 Dec. 1969, *Chermsirivathana* 1592 (**BK**); Song Khaw, 1 Feb. 1962, *Larsen* 9457 (type of *S. atropurpurea*, **C**).

Distribution.— Myanmar, Vietnam.

Ecology.— In shaded evergreen forest along stream, 400–800 m alt.

Phenology.— Flowering from December to February.

Vernacular.— Krap khun pha wo (กราบขุนพะวอ).

18. *Staurogyne merguensis* (T.Anderson) Kuntze, Rev. Gen. Pl. 2: 497. 1891; C.B.Clarke, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 74(3): 641. 1908; Ridl., J. Straits Branch Roy. Asiat. Soc. 59: 148. 1911; Ridl., Fl. Malay Penin. 2: 562. 1923; Bremek., Reinwardtia 3: 226. 1955.— *Ebermaiera merguensis* T.Anderson, J. Linn. Soc. Bot. 9: 452. 1867; C.B.Clarke in Hook.f., Fl. Brit. India 4: 402. 1885.

Thailand.— SOUTH-EASTERN: Trat [Khlung Kaeo NP, 7 Jan. 2009, Middleton *et al.* 4635 (**E**); Khao Ban Tad, Khao Saming, 20 Sept. 1946, *Bunpheng* 143 (**BKF**)]; PENINSULAR: Chumphon [Phato, Pah Island, 8 Dec. 1897, *Anonymous* 2068 (**K**); Phato, 2 May 1974, *Larsen & Larsen* 33573 (**AAU**); Ranong [18 Sept. 1968, *Phengkklai* 1304 (**BKF**); Bei, 23 Mar. 1971, *Bogner* 421 (**K**); Hot spring park, Mueang, 5 July 1992, *Larsen et al.* 43120 (**AAU**, **C**); 6 Dec. 1979, *Shimizu et al.* 26196 (**BKF** 2 sheets), *Shimizu et al.* 26218 (**BKF** 2 sheets); Khao Pho Ta Luangkaeo, 11 Dec. 1979, *Shimizu et al.* 26948 (**BKF** 2 sheets), *Shimizu et al.* 26996 (**BKF** 2 sheets, **C**, **L**), *Shimizu et al.* 27013 (**BKF** 2 sheets), *Shimizu et al.* 27019 (**BKF** 2 sheets, **C**, **L**), *Shimizu et al.* 27052 (**BKF**); Khlung Nakha WS, 17 Nov. 1973, *Santisuk* 587 (**BKF** 2 sheets); 24 Dec. 1983, *Fukuoka & Ito* 35455 (**BKF**); 7 Sept. 1984, *Anonymous* 652 (**BKF**); 8 Dec. 1979, *Shimizu et al.* 26151 (**BKF**), *Shimizu et al.* 26411 (**BKF**), *Shimizu et al.* 26425 (**BKF**), *Shimizu et al.* 26487 (**BKF**); 11 Sept. 1982, *Shimizu et al.* 29298 (**C**); Ngao waterfall NP, 15 May 2011, *Choopan* 2011-239 (**BKF**); Thung Raya Na Sak WS, 30 Jan. 2004, *Middleton et al.* 2678 (**BKF**); 17 Jan. 1987, *Maxwell* 87-76 (**AAU**, **L**), *Maxwell* 87-86 (**BKF**); 25 May 2011, *Choopan* 2011-317 (**BKF**); Surat Thani [Baw Rai-Krut, 28 Nov. 1924, *Kerr* 9457 (**BK**, **BM**, **C**, **K**, **L**); Khao Sok NP, 25 Oct. 1991, *Larsen et al.* 40867 (**AAU**),

Larsen et al. 40907 (**AAU**); Phangnga [6 Dec. 1928, *Anonymous* 3861 (**K**); Khao Lam Phi, 13 Sept. 1994, *Boyce* 924 (**K**); Kuraburi, 28 Dec. 2006, *Muadsub* 186 (**BKF**); Krabi [Khao Pra Bangkram WS, 14 Feb. 1991, *Niyomdham* 2091 (**BKF**); 2 Oct. 2005, *Maxwell* 05-522 (**BKF**); 6 Mar. 2006, *Middleton et al.* 4076 (**BKF**, **E**); Nai Chong, 17 Dec. 1965, *Umpai* 215 (**BK**); Nakhon Si Thammarat [Namtok Yong NP, 22 May 2011, *Choopan* 2011-294 (**BKF**); Khao Luang, 12 Feb. 2005, *Williams et al.* 1412 (**BKF**, **E**); Phatthalung [Tha Mot, 5 Oct. 1986, *Sirirugsa* 1028 (**BKF**); 5 Oct. 1991, *Larsen et al.* 42153 (**AAU**, **BKF**); 24 Oct. 1993, *Larsen et al.* 43949 (**AAU**); Klong Hin Khao, 18 Apr. 1928, *Kerr* 15287 (**K**); Trang [Chawng, 14 Apr. 1928, *Kerr s.n.* (**BK**); 24 Jan. 1958, *Sørensen et al.* 5836 (**C**); Khao Chong, 9 Oct. 1970, *Charoenphol et al.* 3486 (**AAU**, **BKF**, **K**, **L**); 24 Jan. 1958, *Smitinand* 4091 (**BKF**); 26 Jan. 1966, *Tagawa et al.* 6739 (**BKF**, **L**); 30 Oct. 1984, *Maxwell* 84-377 (**BKF**); 13 Nov. 1990, *Larsen et al.* 41303 (**AAU**, **C**); 2 Dec. 1969, *Phusomsaeng & Pinnin* 323 (**BKF**, **C**, **L** 2 sheets); Chong waterfall, 14 Sept. 1933, *Collins* 2370 (**BM**); Talibong Island, 10 Feb. 1966, *Hansen & Smitinand* 12208 (**C**); Satun [Thung Wa, 4 Jan. 1928, *Kerr* 13873 (**BM**); Kuan Kalong, 7 Jan. 1985, *Maxwell* 85-52 (**BKF**); Pattani [Bannang Sta, 31 July 1923, *Kerr* 7421 (**BK**, **BM**, **C**, **K**); Yala [3 Mar. 1941, *Premrasmi s.n.* (**BKF**)].

Distribution.— Myanmar, Malaysia, Singapore.

Ecology.— In shaded moist evergreen forest, 50–200 m alt.

Phenology.— Flowering from March to May.

Vernacular.— Tan oi (ตานอ้อย), mai wan (ไม้หวาน).

19. *Staurogyne obtusa* (Nees) Kuntze, Rev. Gen. Pl. 2: 497. 1891.— *Erythracanthus obtusus* Nees in A.DC., Prodr. 11: 78. 1847.— *Ebermaiera obtusa* (Nees) T.Anderson, J. Linn. Soc. Bot. 9: 453. 1867; C.B.Clarke in Hook.f., Fl. Brit. India 4: 401. 1885.

Thailand.— NORTHERN: Chiang Mai [Doi Chiang Dao, 8 Mar. 1910, *Kerr* 1054 (**BM**, **K**); 30 Jan. 1913, *Kerr s.n.* (**BK**, **BM**); 12 Oct. 1926, *Put* 295 (**BK**, **BM**, **C**, **K**, **L**); 19 Dec. 1931, *Put* 4406 (**BK**, **BM**, **C**, **L**), *Put* 4409 (**K**); 28 May 1906, *Hosseus* 464 (**K**); 1 Dec. 1961, *Bunpan* 32 (**BKF**); 5 Nov. 1989, *Maxwell* 89-1360 (**E**, **L**); 8 Feb. 1999, *Larsen & Larsen* 47304 (**AAU**); Fang, 12 Feb. 1959, *Smitinand* 3758 (**BKF**); Doi Suthep, 14 Jan. 1989,

Maxwell 89-37 (AAU, BKF, L); 26 Mar. 1990, *Maxwell 90-362* (E, L); Doi Wao, 23 Feb. 1912, *Kerr 2436* (BM, E, K); Chiang Rai [Chiang Saen, 27 Mar. 1921, *Kerr 5149* (BK, BM, K)]; Nan [Ban Huai Dong, 20 Nov. 1993, *Larsen et al. 44640* (AAU)]; Phitsanulok [Thung Salaeng Luang, 18 Feb. 1964, *Hansen et al. 11192* (BKF, C, K)]; NORTH-EASTERN: Phetchabun [5 Jan. 1960, *Smitinand 6296* (BKF, K)]; Loei [Phu Suan Sai NP, 17 Jan. 2008, *Maknoi 1953* (BKF, QBG)]; SOUTH-WESTERN: Phetchaburi [Kaeng Krachan NP, 26 Dec. 2007, *Phonsena et al. 5767* (BKF)]; CENTRAL: Nakhon Nayok [Salika waterfall, 24 Nov. 1953, *Suvatabandha 491* (BK)]; PENINSULAR: Chumphon [Pha To, 26 Jan. 2002, *Wongprasert 021-2* (BKF)]; Ranong [1 Feb. 1927, *Kerr 11740* (BK, BM, K)]; Kaper, 17 Jan. 1929, *Kerr 16694* (BK, BM, C, K, L)]; Surat Thani [5 Dec. 1975, *Prapat 107* (BKF, K)]; Khao Sok, 25 Oct. 1991, *Larsen et al. 40863* (AAU 2 sheets, C)]; 26 Feb. 2006, *Middleton et al. 4016* (BKF, E)]; Klong Saeng WS, 18 Feb. 1994, *Maxwell 94-254* (BKF)]; Phangnga [Kho Khao Island, 7 Dec. 1965, *Sangkachand 1191* (BKF, C, E, K, L)].

Distribution.— Myanmar, Vietnam.

Ecology.— In shaded evergreen forest, 50–200 m alt.

Phenology.— Flowering from September to December.

Vernacular.— Krap cho khanaeng (กราบช่อแขนง).

20. *Staurogyne parvicaulis* B.Hansen, Nordic J. Bot. 15: 585. 1995.

Thailand.— NORTH-EASTERN: Nong Khai [Si Chiang Mai, 15 Dec. 1982, *Koyama et al. 31078* (type, BKF, C)]; EASTERN: Nakhon Ratchasima [Pi Mai, 16 Mar. 1958, *Sørensen et al 2154* (C 2 sheets)].

Distribution.— Endemic.

Ecology.— Open grassy fields, 100–400 m alt.

Vernacular.— Krap si Chiang mai (กราบศรีเชียงใหม่).

21. *Staurogyne punctata* J.B.Imlay, Bull. Misc. Inform. Kew 1939: 109. 1939.

— *Staurogyne kradengensis* Bremek., Dansk Bot. Ark. 20: 59. 1961.

Thailand.— NORTH-EASTERN: Loei [Phu Kradueng, 11 Feb. 1931, *Kerr 20094* (type of *S. punctata*, BK, BM, K)]; 19 Mar. 1958, *Sørensen et al. 2271* (C); 7 July 1959, *Sørensen et al. 7412* (type of *S. kradengensis*, BKF, C, E); 31 Oct. 1984, *Mitsuta et al. 42262* (BKF), *Mitsuta et al. 42343* (BKF); 15 Nov. 1979, *Shimizu et al. 22735* (BKF), *Shimizu et al. 22819* (BKF 2 sheets); 16 Nov. 1979, *Shimizu et al. 23084* (BKF 2 sheets, C, L), *Shimizu et al. 23131* (BKF), *Shimizu et al. 23184* (BKF 2 sheets, L); 2 Sept. 1988, *Tamura 60504* (BKF); 1 Nov. 1984, *Murata et al. 42505* (BKF, L), *Murata et al. 42542* (BKF, L); 28 Nov. 1965, *Tagawa et al. 466* (AAU, BKF, K, L); 14 Dec. 1963, *Umpai 90* (BK); 29 Mar. 1948, *Suvatabandha 191* (BK, K); 18 Dec. 1982, *Koyama et al. 31221* (BKF, C, L); 19 Dec. 1982, *Koyama et al. 31302* (BKF); 31 Aug. 1988, *Takahashi & Tamura 63293* (BKF); 13 Sept. 1990, *Chantaranothai et al. 90/173* (K); 14 Sept. 1990, *Chantaranothai et al. 90/210* (K); 29 Dec. 1971, *Beusekom et al. 4539* (BKF, L); 26 Dec. 2010, *Choopan 2010-113* (BKF); Phu Luang, 4 Dec. 1965, *Tagawa et al. 1220* (BKF, C, L); 16 June 2004, *Bunwong 291* (KKU); 25 Nov. 2010, *Choopan 2010-065* (BKF); Wang Saphung, 19 Jan. 1948, *Din 10* (BKF); 12 July 1948, *Bunpheng 84* (BKF)].

Distribution.— Endemic.

Ecology.— In shaded hill evergreen forest with *Pinus* along stream, 1,100–1,300 m alt.

Phenology.— Flowering from September to December.

Vernacular.— Kok khai (กกไค), mai phuai nam (ไม้เฟื้องย่น้ำ).

22. *Staurogyne racemosa* (Roxb.) Kuntze, Rev. Gen. Pl. 2: 497. 1891; C.B. Clarke, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 74(3): 641. 1908; Ridl., Fl. Malay Penin. 2: 562. 1923; Benoist in Lecomte, Fl. Indo-Chine 4: 633. 1935; Bremek., Reinwardtia 3: 232. 1955.— *Ruellia racemosa* Roxb., Fl. Ind. 3: 472. 1832.— *Erythracanthus racemosus* (Roxb.) Nees in Wall., Pl. Asiat. Rar. 3: 80. 1832; Nees in A.D.C., Prodr. 11: 78. 1847.— *Ebermaiera racemosa* (Roxb.) Miq., Fl. Ned. Ind. 2: 775. 1856; C.B. Clarke in Hook.f., Fl. Brit. India 4: 401. 1885.— *Ebermaiera racemosa* (Roxb.) T. Anderson, J. Linn. Soc. Bot. 9: 452. 1867.

Thailand.— SOUTH-WESTERN: Phetchaburi [Kaeng Krachan NP, 14 Dec. 2002, *Middleton et al. 1663 (BKF)*; 25 Aug. 2004, *Nielsen et al. 1919 (BKF)*]; PENINSULAR: Surat Thani [Khao Kuap, Krut, 23 May 1930, *Put 2966 (BK, C, K)*].

Distribution.— Myanmar, Malaysia, Singapore, Indonesia.

Ecology.— In shaded evergreen forest, 900–1,000 m alt.

Phenology.— Flowering from September to December.

Vernacular.— Krap klip muang (กราบกลีบม่วง).

23. *Staurogyne setigera* (Nees) Kuntze, Rev. Gen. Pl. 2: 497. 1891; C.B. Clarke, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 74(3): 635. 1908; Ridl., Fl. Malay Penins. 2: 559. 1923; Benoist in Lecomte, Fl. Indo-Chine 4: 626. 1935; Bremek., Reinwardtia 3: 187. 1955.— *Ebermaiera setigera* Nees in A.D.C., Prodr. 11: 76. 1847; Miq., Fl. Ned. Ind. 2: 774. 1856; T. Anderson, J. Linn. Soc. Bot. 9: 451. 1867; C.B. Clarke in Hook.f., Fl. Brit. India 4: 398. 1885.— *Ebermaiera subcapitata* C.B. Clarke in Rosenv., Bot. Tidsskr. 24: 348. 1902; C.B. Clarke in E. Schmidt, Fl. Koh Chang 6: 198. 1902.

— *Staurogyne malaccensis* C.B. Clarke, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 74(3): 636. 1908; Ridl., J. Straits Branch Roy. Asiat. Soc. 59: 147. 1911; Ridl., Fl. Malay Penins. 2: 559. 1923.

Thailand.— SOUTH-EASTERN: Trat [Chang Island, 9 Jan. 1900, *Schmidt 122* (type of *S. subcapitata*, **C**); 18 Jan. 1900, *Schmidt 271 (C, K)*]; PENINSULAR: [5 Nov. 1919, *Kloss 6920 (K)*, 30 Mar. 1911, *Schmidt 271 (K)*]; Ranong [Kraburi, 25 Dec. 1928, *Kerr 16357 (BM)*]; Muang Len, 11 Jan. 1966, *Hansen & Smitinand 11874 (K)*]; Phangnga [6 Dec. 1928, *Anonymous 3860 (K)*]; Phatthalung [Khao Pu-Khao Ya NP, 19 May 2011, *Choopan 2011-272 (BKF)*]; Trang [Khao Chong, 13 Oct. 1985, *Maxwell 85-971 (AAU, BKF, E, L)*]; Songkhla [Ton Nga Chang WS, 17 Aug. 1995, *Larsen et al. 45735 (BKF)*]; Narathiwat [Hala-Bala WS, 26 Dec. 1999, *Phengkhai et al. 14837 (BKF)*]; Sungai Kolok, Nikom Waeng, 1 Mar. 1974, *Larsen & Larsen 32775 (AAU, L)*].

Distribution.— Vietnam, Malaysia, Singapore, Indonesia.

Ecology.— In shaded moist evergreen forest, 100–400 m alt.

Phenology.— Flowering from March to May.

Vernacular.— Krap pu ya (กราบปู่ย่า).

24. *Staurogyne singularis* Bremek., Dansk Bot. Ark. 27: 77. 1969.

— *Staurogyne bella* Bremek. var. *longipedicellata* Bremek., Dansk Bot. Ark. 27: 74. 1969.— *S. singularis* Bremek. var. *longipedicellata* (Bremek.) E. Hossain, Notes Roy. Bot. Gard. Edinburgh 31(3): 387. 1972.

— *Staurogyne inaequalis* E. Hossain, Notes Roy. Bot. Gard. Edinburgh 31(3): 381. 1972.

Thailand.— NORTHERN: Nan [Doi Phukha NP, 6 July 2001, *Srisanga 1948 (QBG)*; 14 Nov. 2001, *Srisanga 2261 (BKF, QBG)*]; Phitsanulok [Phu Miang, 27 July 1966, *Larsen et al. 929* (type of *S. inaequalis*, **AAU, BKF**), *Larsen et al. 933* (type of *S. bella* var. *longipedicellata*, **AAU, BKF**), *Larsen et al. 935* (type of *S. singularis*, **AAU, BKF**); 5 Oct. 1967, *Shimizu et al. 11756 (AAU)*]; NORTH-EASTERN: Loei [Phu Suan Sai NP, Nahaeo, 21 June 1995, *Nanakorn 3858 (QBG)*; 20 Oct. 2012, *Choopan 2012-331 (BKF)*].

Distribution.— Endemic.

Ecology.— In shaded hill evergreen forest, 600–1,300 m alt.

Phenology.— Flowering from July to September.

Vernacular.— Krap phu miang (กราบภูเมี่ยง).

25. *Staurogyne spatulata* (Blume) Koord., Exkursionsfl. Java 147. 1914; Bremek., Reinwardtia 3: 170. 1955.— *Adenosma spatulatum* Blume, Bijdr. Fl. Ned. Ind. 757. 1826.— *Ebermaiera spatulata* (Blume) Hassk. in Teijsm. & Bin., Cat. Hort. Bot. Bogor. 149. 1866; Nees in A.D.C., Prodr. 11: 74. 1847; Miq., Fl. Ned. Ind. 2: 772. 1856.

— *Ebermaiera glauca* Nees var. *spatulata* (Blume) C.B. Clarke in Hook.f., Fl. Brit. India 4: 396. 1885.

— *Staurogyne flexicaulis* Bremek., Dansk Bot. Ark. 20: 58. 1961.

— *Staurogyne polycaulis* Bremek., Dansk Bot. Ark. 20: 60. 1961.

Thailand.— NORTHERN: Chiang Mai [Jan. 1981, *Chermsirivathana s.n.* (**BK**); Doi Suthep, 4 Dec. 1911, *Kerr 2270* (**K**); Chiang Dao, 8 Mar. 1965, *Chermsirivathana 307* (**BK, BKF**); Omkoi, 10 Jan. 1983, *Koyama et al. 32219* (**BKF**); Mae Taeng, 20 Jan. 1992, *Maxwell 92-43* (**E, L**); Nan [Doi Phukha NP, 13 Jan. 2011, *Choopan 2011-141* (**BKF**)]; Lampang [Doi Khun Tan NP, 16 Feb. 1995, *Maxwell 95-112* (**BKF, L**); Chae Son NP, 15 Jan. 2011, *Choopan 2011-164* (**BKF**)]; Phrae [Huai Khamin, 10 Feb. 1912, *Kerr 2350* (**BM, E, K**); Tak [Maetak, 2 Mar. 1958, *Sørensen et al. 1813* (**BKF, E**); Sukhothai [Ramkhamhaeng NP, 28 Jan. 1995, *Maxwell 95-37* (**BKF, L**); Phitsanulok [Thung Salaeng Luang NP, 1 Mar. 1974, *Sutheesorn 2968* (**BK**)]; NORTH-EASTERN: Phetchabun [Mueang, 27 Mar. 1922, *Kerr 5692* (**BK, BM, K**); Loei [Phu Ruea NP, 26 Nov. 2010, *Choopan 2010-069* (**BKF**)]; Sakon Nakhon [17 Feb. 1924, *Kerr 8478* (**BM, K**); Phu Phan NP, 14 Dec. 1982, *Koyama et al. 31025* (**BKF**); 10 Nov. 2001, *Chaikong 53/44* (**KKU**)]; EASTERN: Chaiyaphum [Thung Kamung, 15 Dec. 1971, *Beusekom et al. 4296* (**BKF**)]; Nakhon Ratchasima [Huai Thalaeng, 25 Dec. 1928, *Put 2245* (**BK, BM, K**); Pak Thong Chai, 26 Dec. 1923, *Kerr 8118* (**K**); Pak Chong, 29 Dec. 1923, *Marcan 1574* (**BK, BM, K**); Ubon Ratchathani [24 Feb. 1961, *Chirayupin 176* (**BK**); Phu Phralan, 18 Dec. 2008, *Puudjaa & Hemrat 1503* (**BKF**)]; SOUTH-WESTERN: Kanchanaburi [Sai Yok, 7 Dec. 1961, *Larsen 8577* (**C**); 14 Dec. 1961, *Larsen 8725* (**C**); 16 Dec. 1961, *Larsen 8747* (**C**); 25 Dec. 1961, *Larsen 8960* (**K**); Thung Yai Naresuan WS, 16 Jan. 1994, *Maxwell 94-76* (**BKF, L 2 sheets**); Sangklaburi, 10 Feb. 1960, *Bunpan 26* (**BKF**); Song Thaw, 2 Feb. 1962, *Larsen 9496* (**C**); Greung Gavia, 5 Feb. 1962, *Larsen 9575* (**C**); Ratchaburi [Ban Rai, 1 Mar. 1965, *Suthisorn 430* (**BK**)]; CENTRAL: Ang Thong [30 Dec. 1929, *Put 2604* (**BK, K**); 7 Mar. 1971, *Maxwell 71-133* (**AAU, BK**); 11 Dec. 1971, *Maxwell 71-783* (**AAU, BK**)]; Saraburi [Sam Lan, 5 Jan. 1974, *Maxwell 74-3* (**AAU, BK, BKF**); 25 Jan. 1976, *Maxwell 76-38* (**AAU, BK, L 2 sheets**); Nakhon Nayok [Khao Daeng, 23 Dec. 1966, *S & J 1934* (**BK**); Sarika waterfall, 22 Nov. 1982, *Shimizu et al. 30241* (**BKF**)]; SOUTH-EASTERN: Chachoengsao [Khao Ang Rue Nai WS, 14 Nov. 2010, *Choopan 2010-011* (**BKF**)]; Chon Buri [Sriracha, 5 Mar. 1920, *Kerr 4039* (**K**); Khao Khiao, 16 Jan. 1976, *Maxwell 76-7* (**AAU, BK, L**); Chanthaburi [Khao Chamao Khao

Wong NP, 23 Nov. 1979, *Shimizu et al. 23406* (**BKF** 2 sheets); Soi Dao, 14 Jan. 1958, *Sørensen et al. 7259* (**C**); 15 Jan. 1958, *Sørensen et al. 351* (type of *S. flexicaulis*, **C**); PENINSULAR: Chumphon [Ta Sae, 22 Dec. 1928, *Kerr 17498* (**K**); Surat Thani [19 Feb. 1930, *Kerr 18130* (**K**); Phangnga [Thap Put, 24 Feb. 1971, *Sadakorn 223* (**BK**)]; Nakhon Si Thammarat [Kao Island, 29 Jan. 1958, *Sørensen et al. 811* (type of *S. polycaulis*, **C**); Nabon, 19 Jan. 1971, *Umpai 420* (**BK 2 sheets**)].

Distribution.— Pakistan, India, Nepal, Myanmar, Vietnam, Indonesia.

Ecology.— In shaded mixed deciduous forest and evergreen forest, 100–1,000 m alt.

Phenology.— Flowering from September to December.

Vernacular.— Krap bai khon (กราบไบขน).

26. *Staurogyne subglabra* C.B. Clarke, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 74: 640. 1908.

— *Staurogyne bella* Bremek., Dansk Bot. Ark. 27: 74. 1969.

Thailand.— NORTHERN: Phitsanulok [Phu Mieng, 27 July 1966, *Larsen et al. 929* (**BKF**), *Larsen et al. 931* (type of *S. bella*, **AAU, BKF**); Phu Hin Rong Kla NP, 30 Oct. 2001, *Watthana & Suksathan 1632* (**QBG**); 10 Jan. 2011, *Choopan 2011-117* (**BKF**); Phu Soi Dao, 10 May 1999, *Suksathan 1692* (**QBG**), *Suksathan 2704* (**QBG**)]; NORTH-EASTERN: Loei [Phu Suan Sai NP, 23 Aug. 2006, *Maknoi 1039* (**QBG**); 5 Nov. 1995, *Nanakorn et al. 5129* (**QBG**); 17 Feb. 2010, *Choopan 2010-010* (**BKF**)].

Distribution.— Vietnam, Malaysia, Singapore.

Ecology.— In shaded hill evergreen forest, 1,000–1,300 m alt.

Phenology.— Flowering from September to December.

Vernacular.— Krap phu (กราบฝู).

27. *Staurogyne tenuispica* Bremek., Reinwardtia 3: 227. 1955.

— *Staurogyne kerrii* E. Hossain, Notes Roy. Bot. Gard. Edinburgh 31(3): 386. 1972.

Thailand.— PENINSULAR: Chumphon [Tasae, 5 Nov. 1919, *Kloss 6974* (type, **K**), *Kloss 6984* (**K**); 28 Jan. 1927, *Kerr 11667* (**BK, BM, K**); 22 Dec. 1928, *Kerr 16279* (**BK, BM, K**), *Kerr 17500* (**K**); 23 Dec. 1928, *Kerr 16307* (type of *S. kerrii*, **BK, BM, C, K, L**); Hot spring forest park, 26 Feb. 1983, *Koyama et al. 33742* (**BKF, C 2 sheets, K 2 sheets, L**); Ranong [Hot spring park, Mueang, 6 Dec. 1979, *Shimizu et al. 26210* (**BKF, C, L**); Mueang Len, 12 Jan. 1966, *Hansen & Smitinand 11922* (**BKF, C, K**); Boonyaparn waterfall, 6 Dec. 1999, *Wongprasert s.n.* (**BKF 2 sheets**)]; Phangnga [Khao Phra Mai, 7 Jan. 1966, *Hansen & Smitinand 11824* (**BKF, C, E, K**)]; Phatthalung [Klong Hai Khao, 18 Apr. 1928, *Kerr 15287* (**BK, BM**); Lanmoonjui, 23 Aug. 1996, *Nanakorn et al. 7292* (**QBG**)]; Trang [15 Nov. 1969, *Sangkhachand 2151* (**BK**); Khao Chong, 12 Aug. 1975, *Maxwell 75-799* (**AAU, BK, L**)]; Satun [Thung Wa, 4 Jan. 1928, *Kerr 13873* (**BK, K**)].

Distribution.— Endemic.

Ecology.— In shaded moist evergreen forest, 50–200 m alt.

Phenology.— Flowering from December to February.

Vernacular.— Krap nam phu ron (กราบน้ำพุร้อน).

28. *Staurogyne kaengkrachanense* T.Choopan, sp. nov. Type: Thailand, Phetchaburi, Kaeng Krachan NP, 13 Dec. 2002, *Middleton, Suddee & Hemrat 1610* (holotype **BKF!**). Figs. 1–2.

Herbs up to 50 cm tall, erect, branched, glabrous. *Leaves* opposite-decussate; petioles 2–3 cm long, glabrous; blade elliptic or lanceolate, 5–11 by 3–4.5 cm, acute or attenuate at apex, acute at base, glabrous, lateral veins 9–11 pairs, opposite or alternate. *Inflorescence* terminal or axillary racemes, up to 15 cm long; bracts 2, linear, 1–1.5 mm long, with glandular hairs; pedicels 1–2 mm long, with glandular hairs; bracteoles 2, linear, 1–1.5 cm long, with glandular hairs. Flowers up to 1 by 0.5 cm, actinomorphic. *Calyx* lobes 5, subequal, linear, 1–2 mm long, with glandular hairs. *Corolla* tubular, lobes 5, purple, elliptic, 4–5 by 1–2 mm, obtuse at apex, with glandular hairs. *Stamens* 4, didynamous, included, anthers globose, ca 1 mm in diameter, filaments 5–7 mm long, puberulous; staminode 1. *Ovary* oblong, glabrous; style 6–8 mm long, glabrous; stigma 2-lobed. Fruit capsular, brown, 4–5 by 1.5–2 mm.

Seeds 8–10 per capsule, brown, orbicular, ca 0.5 mm in diameter.

Thailand.— SOUTH-WESTERN: Phetchaburi [Kaeng Krachan NP, 13 Dec. 2002, *Middleton et al. 1610* (**BKF**); 24 Jan. 2005, *Williams et al. 1061* (**BKF**)]

Distribution.— Known only from Thailand.

Ecology.— In shaded hill evergreen forest, 900–1,200 m alt.

Phenology.— Flowering from October to December.

Vernacular.— Krap kaeng krachan (กราบแก่งกระจาน).

Etymology.— Named in honour of the location, Kaeng Krachan National Park.

Note.— This species is distinguished from *Staurogyne racemosa* by the glabrous rachis (instead of puberulous), glandular hairs on pedicels (instead of nonglandular hairs), longer pedicels (1–2 mm long instead of 1 mm), and by narrower bracts (1–1.5 mm wide instead of 2 mm). In addition, it can be separated from *S. lasiobotrys* by an inflorescence with panicle (instead of raceme), floral parts covered with shorter glandular hairs, and the glabrous rachis (instead of distinct, long glandular hairs on the floral parts and rachis in *S. lasiobotrys*).

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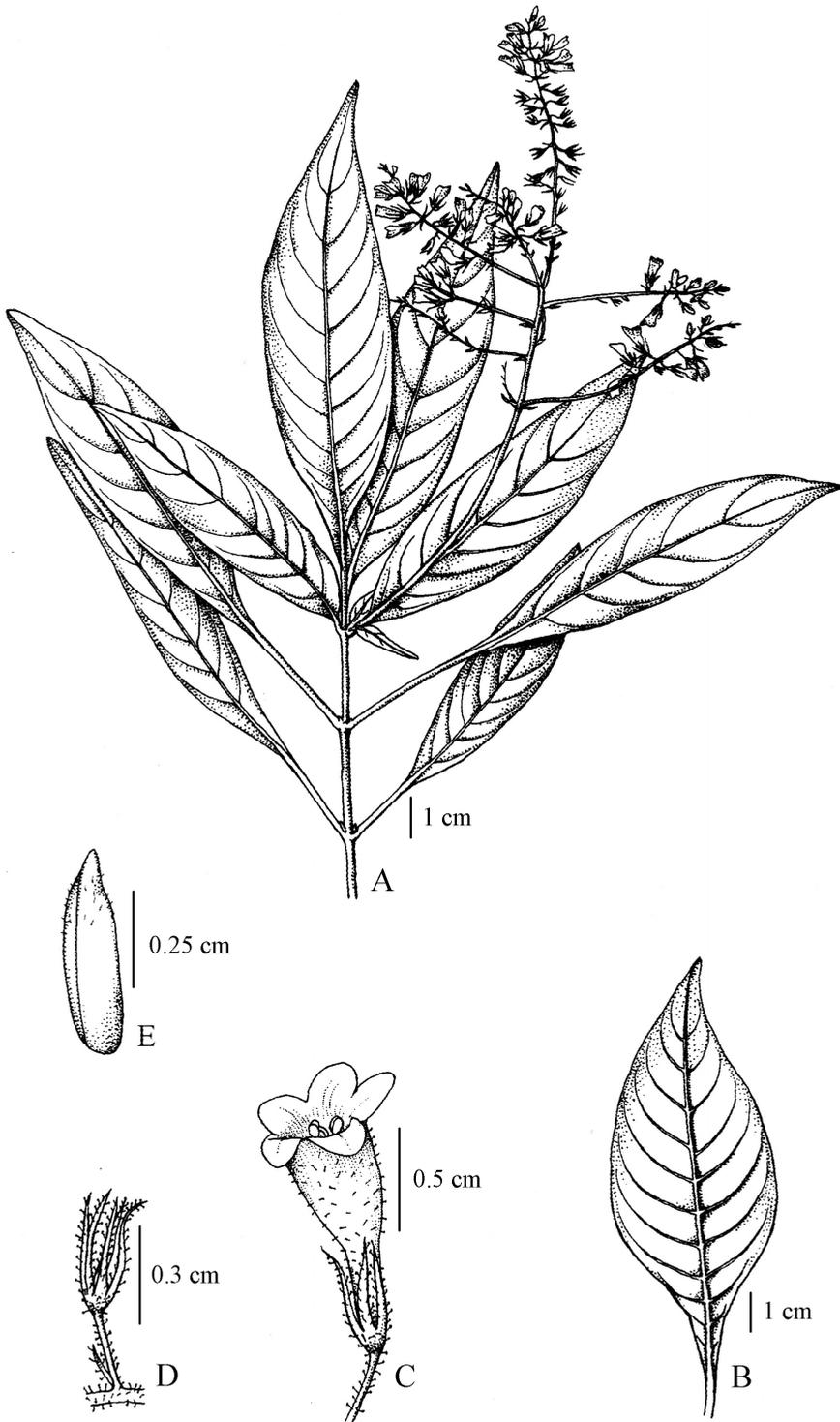


Figure 1. *Staurogyne kaengkrachanense* T.Choopan: A. habit; B. abaxial leaf surface; C. flower; D. Calyx; E. fruit. Drawn by Sunitsorn Pimpasalee.



Figure 2. *Staurogyne kaengkrachanense* T.Choopan: A. holotype; B. abaxial leaf surface; C. dried flower; D. fruit.

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