

Synopsis of *Canthiumera* and *Pyrostria* (Rubiaceae, Vanguerieae) in Thailand

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ABSTRACT

Canthiumera and *Pyrostria* comprise two species each in Thailand; three lectotypes are designated.

KEYWORDS: *Canthium*, distribution, inflorescence, keys, *Psydrax*, pyrene, taxonomy.

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INTRODUCTION

Since Craib's enumerations (Craib 1932a, 1932b) of *Canthium* Lam. with 27 species in Thailand, three genera comprising species not belonging to *Canthium* in Craib's sense have been split off, viz. *Canthiumera* K.M.Wong & Mahyuni with two species in Thailand (Wong *et al.*, 2018), *Pyrostria* Roxb. with two species in Thailand (Utteridge & Davis, 2009), and *Psydrax* Gaertn. with about 10 species in Thailand (Mahyuni *et al.*, 2018; Wong & Mahyuni, 2018) resulting in true *Canthium* currently comprising 16 species for Thailand (de Wilde & Duyfjes, 2022). Here we present a treatment of the genera *Canthiumera* and *Pyrostria* in Thailand in preparation for the forthcoming Flora of Thailand treatment. In addition, a key to the genera *Canthium*, *Canthiumera*, *Psydrax* and *Pyrostria* is provided.

The architecture of the inflorescence.—

Normally an inflorescence is axillary to a foliage leaf; hence, usually there are an opposite pair of inflorescences at a flowering node. They show up, in a wide sense, as either umbellate or paniculate. The inflorescence comprises the following parts: one primary peduncle, none or one to several secondary axes (or primary inflorescence branches), each subtended by small or larger persistent or caducous bracts. At the top of the secondary peduncles, the flowers are either dichasially (showing up umbel-like) or monochasially (showing up spike-like) arranged, with minute bracts mostly present at the base of the pedicels. For names of flower parts see de Wilde & Duyfjes (2022, figs 1a, 1b).

KEY TO FOUR CANTHIUM GROUP GENERA IN THAILAND

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|--|-----------------------|
| 1. Shrub with spines | Canthium |
| 1. Tree or treelet without spines | |
| 2. Foliage brittle when dry. Corolla tube more-or-less constricted at the throat, with a ring of straight downwards directed hairs and with moniliform hairs (see fig. 4d) protruding in 5 bundles. Style short-hairy or densely scabrid. Pyrene smooth or rugose, with a distinct or faint dorsal crest all over the pyrene | 1. Canthiumera |
| 2. Foliage not brittle when dry. Corolla tube not constricted at the throat, without downward directed hairs, with or without protruding moniliform or non-moniliform hairs. Style glabrous. Pyrene rugose, without a crest or with an apical crest | |
| 3. Flowers bisexual, 5-merous. Corolla throat with non-moniliform hairs. Style much longer than the corolla tube, stigmatic knob longer than wide, at base deeply recessed, i.e. mitriform. Pyrene without a crest | Psydrax |
| 3. Flowers (functionally) unisexual, 4-merous. Corolla throat with a continuous band of protruding moniliform hairs (see fig. 3d). Style about as long as the corolla tube, stigmatic knob about as long as wide, solid. Pyrene with an apical crest | 2. Pyrostria |

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TAXONOMY

1. CANTHIUMERA

K.M.Wong & Mahyuni in K.M.Wong *et al.*, Reinwardtia 17: 107. 2018; K.M.Wong & X.Y.Ng in K.M.Wong *et al.*, Fl. Singapore 13: 36. 2019. Type: *Canthiumera glabra* (Blume) K.M.Wong & Mahyuni (= *Canthium glabrum* Blume).

Trees to 20 m tall (to 25 m in Singapore), without spines, young twigs at apex 1–2 mm diam. whole plant drying dark (blackish). *Stipules* keeled, cuspidate. *Leaves* opposite; lamina with or without domatia, drying brittle, dull on both surfaces, membranous or subchartaceous, mostly glabrous. *Inflorescence* axillary, cyme-like, peduncle short or long, branching essentially dichasial, the ultimate branches often becoming monochasial. *Flowers* bisexual, 5-merous, green; pedicel short, bracts and bracteoles minute, falling early; calyx limb and calyx lobes short; corolla tube constricted at the throat below the lobes, inside with one ring of downwards directed straight hairs just below the lobes, corolla

lobes valvate, spreading, each at the throat flanked by tufts of moniliform hairs; stamens inserted at the corolla throat between the corolla lobes, spreading or slightly reflexed, filaments very short; disk glabrous; style short-hairy or densely scabrid, about as long as the corolla tube; stigma (stigmatic knob) globular, slightly recessed at base, ovary small, 2-locular, ovules 1 per locule, inserted towards the apex of the locule. *Fruit* a drupe, 1 to several, ripening dark green to purplish black, fleshy, fruit ellipsoid or globose and often bilobed, pyrenes 2–3 (outside Thailand to 4), shouldered or not, smooth or rugose, each with 1 seed.

Distribution.— A genus of three species in India (Andamans), Myanmar, Laos, Cambodia, Vietnam, Malesia (Sumatra, Peninsular Malaysia, Singapore, Borneo, Java, Bali, Sumbawa, Sulawesi). In Thailand two species.

Notes.— Dried specimens are easy to distinguish by their thin, brittle, blackish (brown) leaf blades with 6–9(–10) lateral veins on each side.

KEY TO THE SPECIES

1. Fruit (dry) ellipsoid, 2–4 cm long; pyrene shouldered; corolla tube hidden by the calyx limb for two-thirds or more **1. C. robusta**
1. Fruit (dry) (sub)globose, 1–1.8 cm long; pyrene not shouldered; corolla tube visible, not or only slightly hidden by the calyx limb **2. C. siamensis**

1. *Canthiumera robusta* K.M.Wong & X.Y.Ng in K.M.Wong *et al.*, Reinwardtia 17: 109, fig. 1C, 4, 9, 10. 2018; K.M.Wong & X.Y.Ng in K.M.Wong *et al.*, Fl. Singapore 13: 37. 2019. Type: Singapore, Mandai Road Track 7, 11 June 2018, Ng *et al.* SING 2018-409 (holotype SING [SING 0243434] photo seen; isotype L [L.4421173!]).

— *Canthium carinatum* Pierre ex Pit. in Lecomte, Fl. Indo-Chine 3: 291, in syn. 1924. Type: Vietnam, Bung, Thu-dau-mot, Sept. 1877, Pierre 3240 (lectotype P [P03937306!]) designated here; isoelectotypes L [L.2901149!, L.2902216!]).

Trees to 20 m tall; twigs at apex 1–2 mm diam. *Stipules* ca 8 mm long, including a ca 5 mm long cusp. *Leaves*: petioles 1–1.5 cm long; lamina with domatia, glabrous, chartaceous, elliptic, 9–14 × 3.5–5.5 cm, base cuneate, apex acute; midrib flat above, raised beneath; lateral veins 6–9(–10) on each side. *Inflorescence* glabrous, 5–20-flowered; peduncle 1–5 mm long, at apex with one (or two)

branch(es), ca 2 mm long. *Flowers* green; bud ca 6 mm long; pedicel 2–3 mm long; ovary ca 2 mm long, calyx limb ca 2 mm long, calyx lobes less than 0.5 mm long; corolla tube 2.5–3 mm long, hidden by the calyx limb for two-thirds or more, corolla lobes 2.5–3.5 mm long; filaments ca 0.5 mm long, anthers ca 1.5 mm long; style ca 4 mm long, rough short-hairy and somewhat thickened below the middle; stigma ca 1.4 × 1.4 mm. *Infructescence* with 1–4 fruits; fruit dark green or blackish green, ellipsoid, 2–4 × 1.5–2.5 cm, pyrene smooth, 1.5–2 cm long, with horizontal shoulders, and with a conspicuous dorsal crest; fruiting pedicel ca 5 mm long.— Fig. 1.

Thailand.— PENINSULAR: Ranong [Ranong, 13 Nov. 1973, Santisuk 576 (BKF, L)]; Nakhon Si Thammarat [Yong Waterfall, 3 Dec. 1972, Santisuk 285 (BKF)]; Trang [Khao Chong, Jan. 2001, Davies & Sinbumroong 2001-016 (BKF)]; Yala [Betong, 19 Dec. 1972, Santisuk & Nimanong 444 (BKF)]; Than To, Ban Chulaphon Phatthana 7 area, 13 Feb. 2004, Middleton *et al.* 3019 (BKF, L)]; Narathiwat

[Hala-Bala WS, 21 Feb. 2003, *Niyomdham & Puudjaa* 7079 (**BKF, L**); Nikhom Waeng, 28 Feb. 1974, *Larsen & Larsen* 32754 (**BKF, L**); Narathiwat, 23 Nov. 1971, *Promdej et al.* 284 (**BKF, L**)].

Distribution.— Southern Vietnam, Peninsular Malaysia, Singapore (type), Sumatra, Borneo.

Ecology.— Evergreen rainforest, from sea level to 540 m altitude; fruiting: November to December, and February.

Notes.— Due to the lack of flowering material of *Canthiumera robusta* from Thailand, the collections *Whitmore KEP FRI 0675* [L.2902147!] from Peninsular Malaysia (Perak) and *Maxwell 82-255* [L.2901167!] from Singapore were studied for details of the flower.

2. *Canthiumera siamensis* (K.Schum.) K.M.Wong in K.M.Wong *et al.*, *Reinwardtia* 17: 113. 2018.— *Plectronia siamensis* K.Schum., *Bot. Tidsskr.* 24: 335. 1902.— *Canthium siamense* (K.Schum.) Pit.

in Lecomte, *Fl. Indo-Chine* 3: 300. 1924; Craib, *Fl. Siam.* 2: 139, in syn. 1932a.— Type: Thailand, South-Eastern, Trat, Koh Chang, Lem Dan, 25 Feb. 1900, *Schmidt* 622 (lectotype **C** [C10018081] photo seen, designated here; isolectotype **K** [K000763638!]). — *Canthium glabrum* auct. non Blume: Craib, *Fl. Siam.* 2: 139, p.p. 1932a; S. Gardner *et al.*, *Forest Trees Northern Thailand*: 224, fig. 491. 2000; Sangratt., *Stud. Canthium*: 10. 2013; Gardner *et al.*, *Forest Trees Southern Thailand* 3: 1946, fig. 2457. 2018.— *Canthium glabrum* Blume var. *pedunculatum* Pit. in Lecomte, *Fl. Indo-Chine* 3: 292. 1924. Type: Laos, Sam-neua, 25 Sept. 1920, *Poilane* 1969 (lectotype **P** [P03937320] photo seen, designated by Wong *et al.*, 2018; isolectotypes **P** [P03937321] photo seen, **P** [P03937322] photo seen).

Trees 6–14 m tall, bark thin, finely roughened; twigs ca 2 mm diam. *Stipules* 6–7 mm long, including a ca 2 mm long cusp. *Leaves*: petioles 0.5–1 cm long; lamina without or with domatia, glabrous

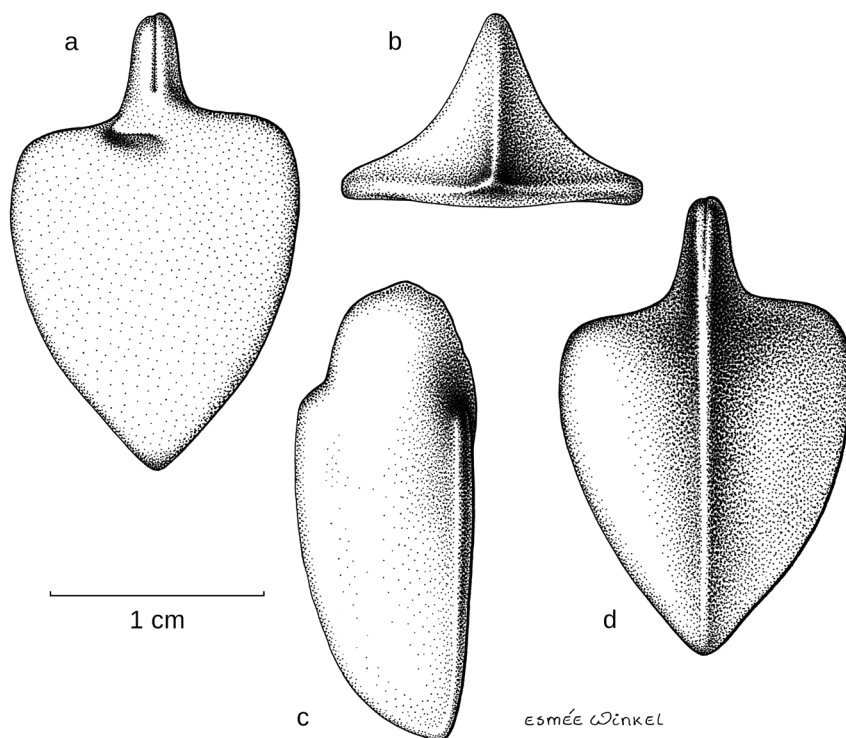


Figure 1. *Canthiumera robusta* K.M.Wong. Pyrene; a. ventral, b. apical, c. lateral, and d. dorsal view (a–d: *Santisuk* 576 (**L**)). Drawn by Esmée Winkel (**L**).

above, glabrous or hairy especially on veins beneath, chartaceous, ovate-elliptic, 8–18(–21) × 4–8 cm, base cuneate, apex acute; midrib flat above, raised beneath; lateral veins 6–8(–9) on each side. *Inflorescence* glabrous or slightly hairy, ca 30-flowered; peduncle 5–25 mm long, at apex dichotomously branched. *Flowers* pale green; bud ca 5 mm long; pedicel ca 2 mm long; ovary ca 1 mm

long, calyx limb ca 0.5 mm long, calyx lobes ca 0.5 mm long; corolla tube visible, not or only slightly hidden by the calyx limb, 1.5–2–3 mm long, corolla lobes ca 2.5–3.5 mm long; filaments ca 0.5 mm long, almost sessile, anthers ca 1.5 mm long; style ca 1.5–3.5 mm long, densely scabrid below the middle; stigma ca 1.5 × 1.5 mm. *Infructescence* with up to 12 fruits. *Fruit* green or dark green, (sub)globose,

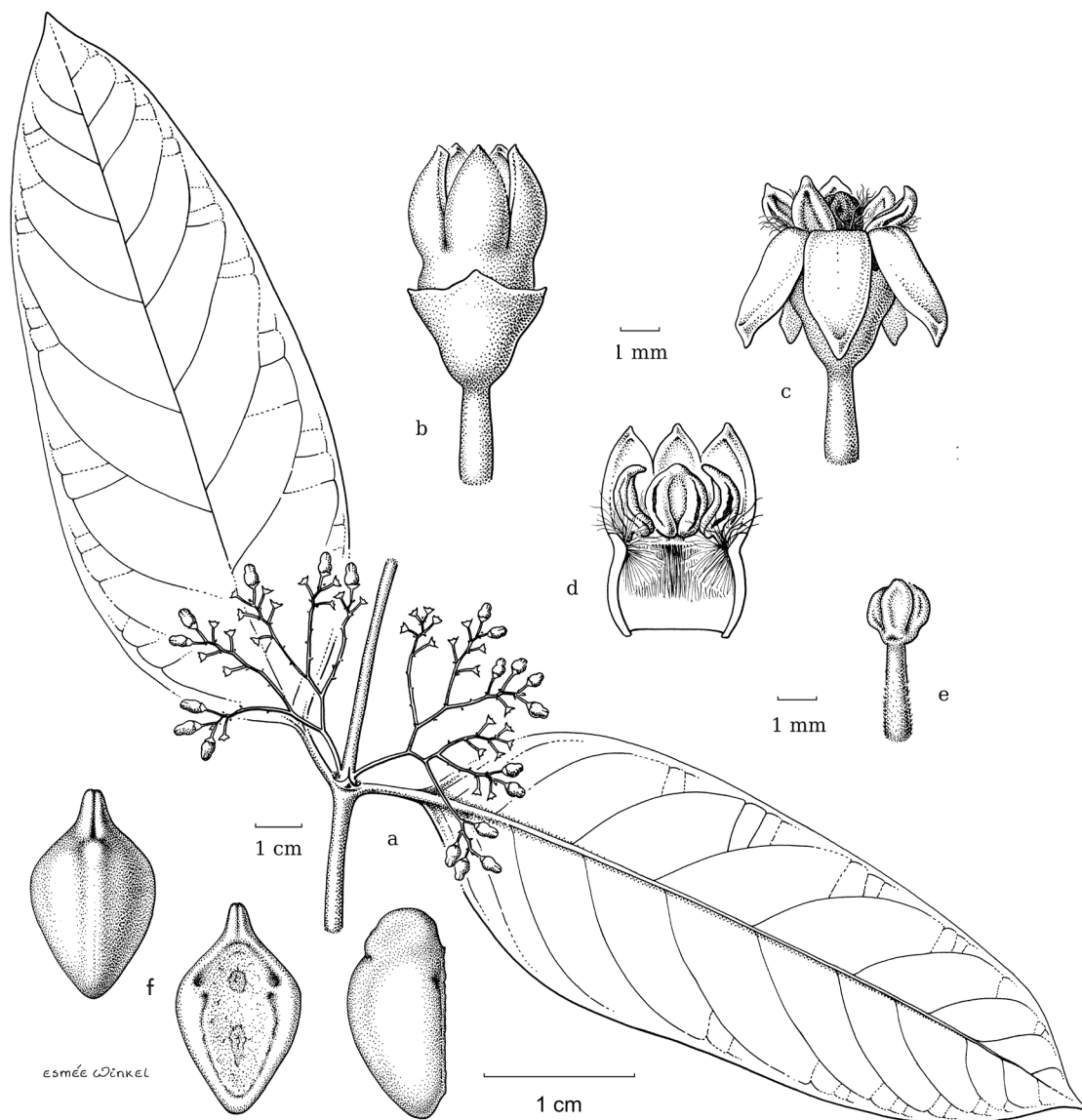


Figure 2. *Canthiumera siamensis* (K.Schum.) K.M.Wong. a. Part of flowering twig; b. bud; c. open flower, note stigma in the centre; d. opened flower bud, two petals removed, note downward directed hairs; e. stigma and style, note style densely scabrid below the middle; f. pyrene, dorsal, ventral and lateral views (a–e: *Tagane et al.* T-439 (BKF), f: *Pooma et al.* 6532 (L)). Drawn by Esmée Winkler (L).

often bilobed, $1-1.5 \times 1.3-1.5$ cm, pyrene slightly rugose, (fusiform) obovoid, $1.1-1.5 \times 1-1.5$ cm, not shouldered with a (faint) dorsal crest; fruiting pedicel 5–10 mm long.— Figs. 2, 3.

Thailand.— NORTHERN: Chiang Mai [Pang Tong, 29 Apr. 1931, *Put* 3807 (**L**); Doi Suthep-Pui, 19 Sept. 1958, *Sørensen et al.* 5133 (**L**); Doi Suthep Pui NP, 20 Feb. 1991, *Maxwell* 91-185 (**L**); *ibid.*,

24 Feb. 1995, *Maxwell* 95-159 (**BKF**, **L**); Doi Chiang Dao, 22 July 1989, *Maxwell* 89-934 (**L**); Nan [Doi Phu Kha NP, 24 Nov. 1997, *Wongprasert s.n.* (**BKF** [BKF112175, BKF112176])]; Lampang [Chae Son NP, 1 Dec. 1995, *Maxwell* 95-1217 (**BKF**, **L**)]; EASTERN: Chaiyaphum [Phu Khiao WS, 22 Jan. 2004, *Wongprasert & Khaoiam* 041-14 (**BKF**)]; Nakhon Ratchasima [Khao Yai NP, 20 Oct. 1969,



Figure 3. *Canthiumera siamensis* (K.Schum.) K.M.Wong. a. flowering, b. fruiting. Photos by Phongsak Phonsena.

van Beusekom & Charoenpol 1773 (BKF, L); *ibid.*, 17 Aug. 2002, *Chomchin 4 (BKF, L)*; SOUTH-WESTERN: Kanchanaburi [Thung Yai Naresuan WS, 11 Oct. 1993, *Maxwell 93-1210 (BKF, L)*; Lieuw Long Hill, 3 Apr. 1968, *van Beusekom & Phengkklai 312 (BKF, L)*; Phetchaburi [Kaeng Krachan NP, 8 Oct. 2012, *Tagane et al. T-439 (BKF)*]; SOUTH-EASTERN: Chon Buri [Khao Khiao, 23 Oct. 1976, *Maxwell 76-694 (L)*; Trat [Ko Chin ang, Lem Dan, 25 Feb. 1900, *Schmidt 622*, type (C, K)]; PENINSULAR: Ranong [Kapoe, 23 Aug. 1977, *Santisuk 171 (BKF)*]; Nakhon Si Thammarat [Walailak University, 22 Dec. 2006, *Pooma et al. 6532 (BKF, L)*; *ibid.*, 20 Aug. 2010, *Tunjai 23 (L)*]; Phatthalung [Riang Thong Falls, 25 Sept. 1986, *Maxwell 86-743 (BKF, L, PSU)*].

Distribution.— Myanmar, Cambodia, Laos, southern Vietnam.

Ecology.— Open places in primary evergreen forest and in mixed evergreen and deciduous forest, along streams, also with much bamboo; on sandstone, over granite bedrock, shale-granite bedrock and in rugged limestone terrain; 20–1,300 m altitude; flowering: April to June, August to October; fruiting: April, July, October to February.

Vernacular.— Khon mi (ขนหมี) (proposed here).

Notes.— Schmidt (1921: 3) mentioned in the introduction to the Flora of Koh Chang that his botanical collections had been placed in the Botanical Museum of the University of Copenhagen;

consequently we have chosen [C10018081] as lectotype, being the original material.

2. PYROSTRIA

Comm. ex Juss., Gen. Pl. [Jussieu] 2: 206. 1789; Bridson, Kew Bull. 42: 611. 1987; Gardner *et al.*, Forest Trees Southern Thailand 3: 1947. 2018.— Type: *Pyrostria commersonii* J.F.Gmel.

Shrubs or trees 1.5–16 m tall, without spines, young twigs at apex 2–3 mm diam. *Leaves* opposite; lamina with domatia, (sub)coriaceous. *Stipules* ca 5 mm long, including a ca 3 mm long cusp. *Inflorescence* axillary to a foliage leaf, in bud enclosed by two spathe-like persistent bracts. *Bracteoles* inconspicuous. *Flowers* [functionally] unisexual, 4-merous, pale yellow or light green; calyx at base grown together with the ovary, calyx limb (calyx tube) free, mostly short, calyx lobes inconspicuous, corolla throat densely set with moniliform hairs, corolla lobes valvate, at last reflexed; stamens inserted at or near the throat, between the corolla lobes, filaments short, anthers reflexed; disk glabrous, style glabrous, about as long as the tube, stigma (stigmatic knob) globular, ovary small, 2-locular, ovules 1 per locule, inserted towards the apex of the locule. *Fruit* a drupe, green, ripening yellowish, fleshy, flattened, heart-shaped, pyrenes (1 or) 2, each with one seed, rugose, with an apical dorsal crest.

Distribution.— Asia and Africa, 10 or more species, with two species in Thailand.

KEY TO THE SPECIES

1. Lamina 10–17 cm long with 4–6 lateral veins on each side; leaf apex acute-acuminate

1. Lamina 4–8 cm long with 2–3 lateral veins on each side; leaf apex rounded and not or slightly acute

1. *P. brunnescens*

2. *P. cochinchinensis*

1. *Pyrostria brunnescens* (Craib) Utteridge & A.P.Davis, Kew Bull. 64: 751. 2009; Gardner *et al.*, Forest Trees Southern Thailand 3: 1947, fig. 2460. 2018.— *Canthium brunnescens* Craib, Fl. Siam. 2: 135. 1932a; Craib, Bull. Misc. Inform. Kew: 1932(7): 330. 1932b; Sangratt., Stud. Canthium: 10. 2013.— Type: Thailand, North-Eastern, Nakhon Ratchasima, Kao Lem, 9 Jan. 1924, *Kerr 9890* (lectotype **BM** n.v., designated by Utteridge & Davis (2009); isoelectotypes **K** [K000763607] photo seen, **BK** [BK220049!]).

Trees 6–16 m tall; twigs ca 2 mm diam. *Stipules* 5–6 mm long including 2–3 mm long cusp. *Leaves* glabrous; petiole ca 0.8 cm long; lamina with domatia, drying brown, subcoriaceous, broadly elliptic or ovate, 10–17 × 3–7 cm, base cuneate, apex acute-acuminate; midvein and lateral veins impressed above, raised beneath; lateral veins 4–6 on each side. *Inflorescence* an umbel, composed of ca 15 flowers, glabrous, when in bud enclosed in two persistent ca 4 mm long spathe-like bracts; peduncle ca 2 mm long. *Flowers*: bud rounded, slightly acute at apex,

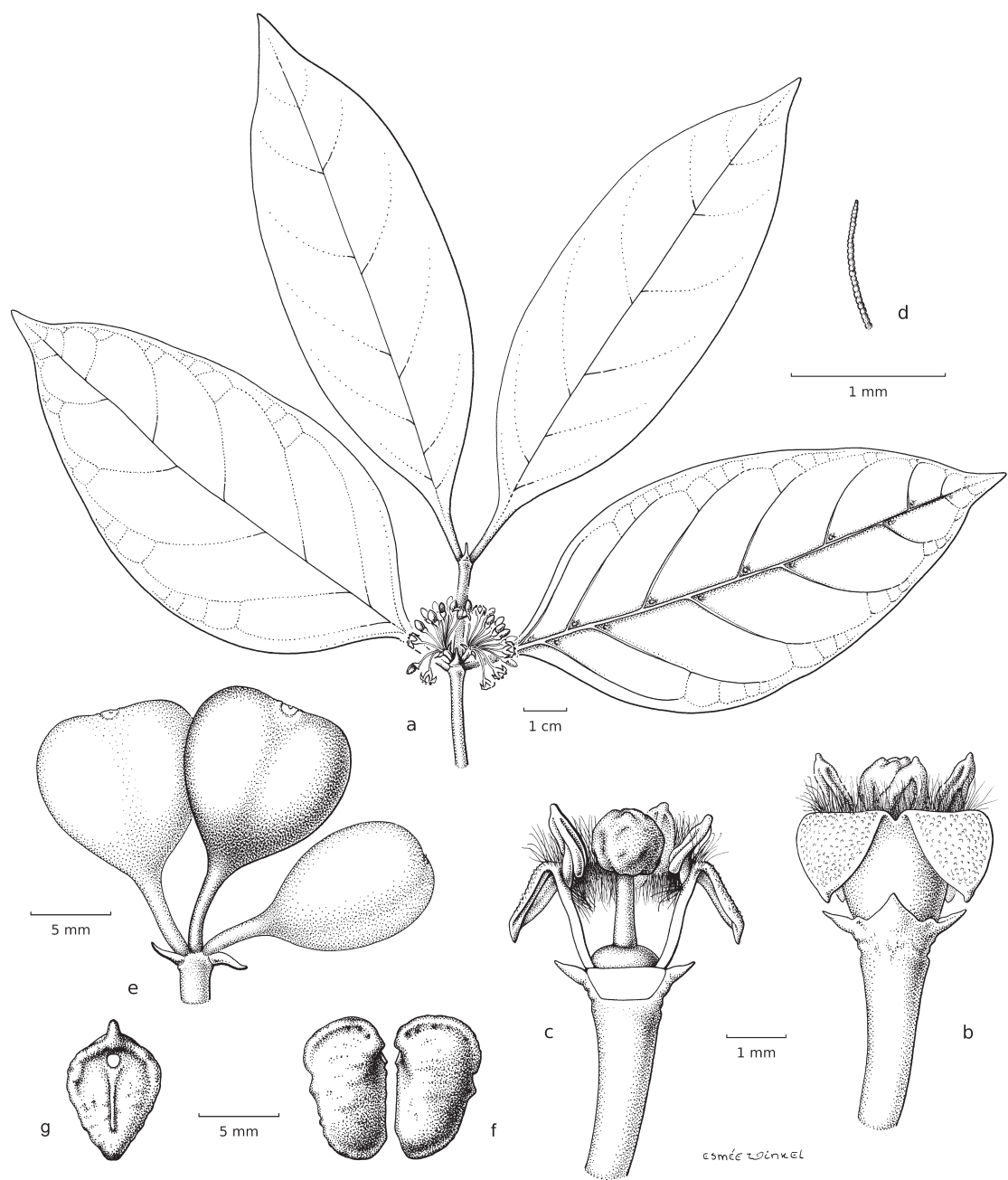


Figure 4. *Pyrostria brunnescens* (Craib) Utteridge & A.P.Davis. a. Part of flowering twig; b. flower, note stigma in the centre; c. opened flower, note style as long as corolla tube; d. moniliform hair; e. infructescence, note fruits heart-shaped; f. 2 pyrenes, note apical crest; g. pyrene, ventral view (a–d: CharoENCHAI 773 (L), e–g: van Beusekom & Charoenpol 1725 (L)). Drawn by Esmée Winkel (L).

3–3.5 mm long; pedicel 5–7 mm long; ovary ca 0.5 mm long, calyx limb ca 0.3 mm long, calyx lobes wavy, minute, corolla tube ca 2 mm long, at throat densely hairy, hairs 0.5–0.8 mm long, moniliform, upright and turned downwards into the tube, corolla tube ca 2 mm long, corolla lobes 2–2.5 mm long; filaments ca 0.5 mm long, slightly hairy, anthers ca 1.5 mm long; style ca 1.2 mm long, stigma globose, solid, ca 1.5 mm diam. *Fruit* light green, ripening orange, heart-shaped, bilobed, ca 1 × 0.9–1 cm; pyrene somewhat rugose, obovoid, ca 0.9 cm long, with an apical dorsal crest; fruiting pedicel 6–9 mm long.— Fig. 4.

Thailand.— EASTERN: Nakhon Ratchasima [Khao Laem, 9 Jan. 1924, *Kerr* 9890, type (**BK**, **BM**, **K**); *ibid.*, Dec. 1930, *Put* 3581 (**BM**, **TCD**); Khao Khiao, 20 Jan. 1968, cf. *Phengnaren* 240 (**BKF**); *ibid.*, 18 Oct. 1969, *van Beusekom & Charoenphol* 1725 (**BKF**, **L**); *ibid.*, 19 Nov. 1982, *Koyama et al.* T-30035 (**BKF**, **L**); CENTRAL: Nakhon Nayok [Khao Yai NP, 19 Nov. 1962, *Smitinand* 7915 (**BKF**, **L**); *ibid.*, 10 Nov. 1999, *Charoenchai* 731 (**BKF**, **L**); *ibid.*, 15 Sept. 1999, *Charoenchai* 773 (**BKF**, **L**); *ibid.* 11 July 2002, *Petrmitr* 528 (**BKF**); *ibid.*, 12 Jan. 2004, *Maxwell* 04-21 (**BKF**, **L**); *ibid.*, 29 Jan. 2008, *Maxwell* 08-18 (**L**); PENINSULAR: Krabi [Khao Phanom Bencha NP, 29 March 2005, *Gardner & Tippayasri* ST 1756 (**BKF**); *ibid.*, 8 Jan. 2006, *Gardner* ST 2181 (**BKF**)].

Distribution.— Vietnam (*Poilane* 10145 [P05458389]).

Ecology.— Moist hill evergreen forest; over sandstone bedrock; 800–1,300 m altitude; flowering: July, September, November, January; fruiting: October to November, January, March.

Vernacular.— Ta thip khi nok (ต่าธิบขี้nok) (Nakhon Ratchasima).

Notes.— *Pyrostria brunnescens* and *Canthiumera siamensis* look deceptively similar, especially in fruit, but there are several differences between the two taxa, for example the inflorescences and infructescences of *P. brunnescens* are umbellate while those of *C. siamensis* are cyme-like.

2. *Pyrostria cochinchinensis* (Pierre ex Pit.) Utteridge & A.P.Davis, *Kew Bull.* 64: 751. 2009 (as *P. cochinchinense*); *Gardner et al.*, *Forest Trees Southern Thailand* 3: 1947. 2018.— *Canthium*

cochinchinense Pierre ex Pit. in Lecomte, *Fl. Indo-Chine* 3: 295. 1924; Craib, *Fl. Siam.* 2: 136. 1932a; Sangratt., *Stud. Canthium*: 11, fig. 2.2: A, B. 2013.— *Plectronia cochinchinensis* Pierre ex Pit. in Lecomte, *Fl. Indo-Chine* 3: 295. 1924.— Type: Vietnam, Condor Isl., Sept. 1876, *Harmand* ?766 **P**, first step designated by Utteridge & A.P.Davis, 2009); second step designated here: *Harmand* 766 (lectotype **P** [P03843730] photo seen; isolectotypes **K** [K000763605] photo seen, **K** [K000763606] photo seen, **P** [P03843729] photo seen, **P** [P03843736] photo seen; see Notes).

Shrubs or small trees 1.5–8 m tall; twigs ca 2.5 mm diam. *Stipules* ca 4 mm long including ca 3 mm long needle-like cusp. *Leaves* glabrous; petiole 0.3–0.7 cm long; lamina with domatia, drying brown, coriaceous, broadly elliptic, 4–8 × 2–4 cm, base cuneate, apex rounded, sometimes slightly acute; midvein and lateral veins impressed above, raised beneath; lateral veins 2–3 on each side. *Inflorescence* an umbel, composed of ca 8 flowers, glabrous, when in bud enclosed in two persistent ca 3 mm long bracts. *Flowers*: bud acute at apex, ca 3 mm long; pedicel 4–7 mm long; ovary ca 0.5 mm long, calyx limb ca 0.2 mm long, calyx lobes ca 0.5 mm long, corolla tube ca 2 mm long, at throat densely hairy, hairs ca 0.5 mm long, moniliform, corolla lobes ca 2 mm long, acute; filaments ca 0.5 mm long, anthers ca 1 mm long; style ca 1.5 mm long, stigma globose, solid, ca 1.5 mm diam. *Mature fruit* bilobed, ca 1 × 1–2 cm; pyrene rugose, ellipsoid, ca 6 mm long, with an apical dorsal crest; fruiting pedicel 4–6 mm long.

Thailand.— PENINSULAR: Chumphon [Pak Nam, 10 June 1969, *Jaray* 158 (**BK**); Surat Thani [Ko Tao, 15 Apr. 1927, *Kerr* 12759 (**BK**); *ibid.*, 21 July 1927, *Kerr* 12981 (**BK**); *ibid.*, 23 July 1927, *Kerr* 13381 (**BK**); Ko Pha-ngan, 16 Jan. 1928, *Kerr* 14128 (**BK**); *ibid.*, June 1927 *Put* 794 (**L**, **TCD**); *ibid.*, 5 June 1927, *Put* 794A (**BK**); *ibid.*, 8 June 1927, *Put* 828 (**BK**, **TCD**); Satun [Butong, 13 Jan. 1928, *Kerr* 14049 (**BK**)].

Distribution.— Peninsular Malaysia (Terengganu), Vietnam (type).

Ecology.— Evergreen forest by streams, on rocky ground, rocky ridges, and rocky ground near the sea; 0–700 m altitude. Flowering: January; fruiting: January, April, June to July.

Notes.— 1. Due to the lack of flowering and fruiting material of *Pyrostria cochinchinensis* from Thailand, the collection *Jutta & Hamidi KEP FRI 54170* [L.4189273!], Peninsular Malaysia (Terengganu, Bukit Bauk FR), has been studied for details of the flower; the description of the pyrene is taken from *d'Alleizette s.n.* [L.2900946!], Vietnam.

2. Although the flowers and fruits of *Pyrostria brunnescens* and *P. cochinchinensis* do not differ, the leaves do. In *P. brunnescens*, the petiole is ca 0.8 cm long, the lamina is 10–17 cm long with an acute to acuminate apex, and there are 4–6 lateral veins on each side. In *P. cochinchinensis*, the petiole is 0.3–0.7 cm long, the lamina is up to 8 cm long with a rounded apex, and there are 2–3 lateral veins on each side.

3. Notes on the typification.— In the protologue of *Canthium cochinchinense* Pierre ex Pit. (Pitard in Lecomte 1924: 295) the locality and collector are noted as “Cochinchine: Condor (Harmand)”, so Pitard did not designate one specimen as the type. Then Utteridge & Davis (2009: 751) designated the following type: “Cochinchine [southern Vietnam], Condor, *Harmand* number not cited [?766] (holotype **P** n.v.; isotype **K!**)”, however, [?766] does not refer to one specimen and cannot be the holotype. The Paris herbarium harbours three *Harmand* collections from Condor, numbered 766, from Sept. 1876, namely P03843729, P03843730, and P03843736, all with Pitard’s identification “*Canthium cochinchinense* Pierre” on a separate label. These collections are syntypes, from which the lectotype [P03843730] has been chosen.

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REFERENCES

- Craib, W.G. (1932a). *Florae Siamensis Enumeratio* 2: 135–144. Siam Society, Bangkok.
- Craib, W.G. (1932b). Contributions to the flora of Siam. Additamentum 35. Bulletin of Miscellaneous Information, Kew 1932(7): 330–338.
- De Wilde, W.J.J.O. & Duyfjes, B.E.E. (2022). The genus *Canthium* (Rubiaceae, Vanguerieae) in Thailand, with a note on the typification of the genus. *Thai Forest Bulletin (Botany)* 50(2): 161–180.
- Mahyuni, R., Chikmawati, T., Ariyanti, N.S. & Wong, K.M. (2018). The *Psydrax dicoccos* complex (Rubiaceae) in Malesia, with three new species. *Floribunda* 5(8): 322–331.
- Schmidt, J. (1901). Flora of Koh Chang. Contributions to the knowledge of the vegetation in the Gulf of Siam. *Bot. Tidsskr.* 24(1): 1–13.
- Utteridge, T.M.A. & Davis, A.P. (2009). Two new combinations in *Pyrostria* (Rubiaceae, Vanguerieae) from Thailand. *Kew Bulletin* 64: 751–752.
- Wong, K.M., Mahyuni, R. (2018). Flora of Singapore precursors, 2. A new species and two new combinations in *Psydrax* (Rubiaceae: Vanguerieae) for West Malesia. *Reinwardtia* 17(1): 77–84.
- Wong, K.M., Mahyuni, R., Ng, X.Y. & Neo, L. (2018). Flora of Singapore precursors, 8. Systematy of the new Southeast Asian genera *Canthiumera* and *Dibridsonia* (Rubiaceae: Vanguerieae), with notes on plant architecture and reproductive ecology. *Reinwardtia* 17(2): 101–124.