

## THE SUBTRIBE THLADIANTHINAE (CUCURBITACEAE) IN INDOCHINA AND MALESIA

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### SUMMARY

Of the seven genera which constitute the subtribe *Thladianthinae* five occur in our area. Full descriptions are given of the genera and species not treated previously by us. Two new species have been described: *Sinobaijania smitinandii* W.J. de Wilde & Duyfjes and *Thladiantha angustisepala* W.J. de Wilde & Duyfjes.

**Key words:** Thladianthinae, Cucurbitaceae, SE Asia, taxonomy.

### INTRODUCTION

Since the reassessment by Jeffrey & De Wilde (2006) of the 7 genera in the subtribe *Thladianthinae* Pax (1889), it appears that 5 genera of the subtribe occur in the area under consideration: *Baijania*, *Momordica*, *Sinobaijania*, *Siraita* and *Thladiantha*. The other two genera are *Indofevillea* (India, Bhutan, China) and *Microlagenaria* (Africa). The subtribe is characterized by the presence of basal ventral scales on the petals. It can be divided into a group of genera having the tendrils unbranched or branched and then spiralling both above and below the point of branching and a group of genera having the tendrils unbranched or branched and then spiralling only above the point of branching. In the present account two recently treated genera, *Baijania* (a monotypic genus, endemic to Borneo; see De Wilde & Duyfjes, 2003) and *Momordica* (widespread, c. 50 species, of which 6 in Malesia and 3 in Thailand; see De Wilde & Duyfjes, 2002) are left out; the remaining ones are described here. A classification of the genera with an enumeration and short discussion of the species in each genus can be found in Jeffrey & De Wilde (2006).

### KEY TO THE GENERA

- 1a. Tendrils distally 2-branched, spiralling both above and below the point of branching (tendrils rarely simple but then spiralling almost throughout their length) . . . . . 2
- b. Tendrils medianly or proximally 2-branched, spiralling only above the point of branching, or tendrils unbranched and then spiralling only in the upper part or sometimes spiralling almost throughout their length (*T. cordifolia*, p.p.) . . . . . 4
- 2a. Basal adaxial petal scales (at least in male flowers) absent. Receptacle-tube deep. Stamens inserted towards the apex in the tube. — Borneo . . . . . ***Baijania***

- b. Basal adaxial petal scales present. Receptacle-tube shallow. Stamens inserted towards the base of the tube ..... 3
- 3a. Hairs of leaves and stem blackish glandular. Anther thecae sigmoid. Disc absent. Seeds with (broad) wing-like double or triplicate margin. — Widespread in SE Asia, also in West Malesia. .... **2. *Siraitia***
- b. Hairs of leaves and stem not glandular. Anther thecae straight or  $\pm$  curved, not sigmoid. Disc in receptacle-tube merely the thickened basal part. Seeds unwinged. — China, Thailand ..... **1. *Sinobaijania***
- 4a. Stamens 2 or 3. Anther thecae strongly folded or sigmoid. Disc absent or inconspicuous. — Widespread in Africa and Asia ..... ***Momordica***
- b. Stamens 5 (rarely 3). Anther thecae straight or curved. Disc obvious, half-globose and  $\pm$  asymmetrically inserted. — E & SE Asia, 1 species extending into West Malesia ..... **3. *Thladiantha***

### 1. SINOBAIJANIA

*Sinobaijania* C. Jeffrey & W.J. de Wilde (2006) 769. — Type: *Sinobaijania yunnanensis* (A.M. Lu & Zhi Y. Zhang) C. Jeffrey & W.J. de Wilde.

*Siraitia* Merr. subg. *Microlagenaria* auct. non (C. Jeffrey) A.M. Lu & Zhi Y. Zhang: A.M. Lu & Zhi Y. Zhang (1984) 30, p.p., excluding the type.

*Siraitia* auct. non Merr.: H.Y. Liu (1993) 865, p.p., excluding the type.

*Baijania* auct. non A.M. Lu & J.Q. Li: A.M. Lu & J.Q. Li in Li (1993) 45–55, p.p., excluding the type.

Herbaceous climbers with small or large spherical (totally or partly subterranean) tuber; dioecious; plant more or less stiff-hairy to glabrescent, without glandular hairs. *Probract* absent on sterile nodes, not obvious in inflorescences. *Tendrils* distally 2-branched, spiralling both above and below point of branching or simple. *Leaf-blades* ovate to narrowly elliptic, simple, not lobed to shallowly 3–5-lobed, green on drying. *Flowers* yellow. *Male flowers* few in simple or branched racemes; pedicels articulate towards apex; receptacle-tube very shallow, saucer- or cup-shaped, without obvious basal disc, although wall of receptacle-tube thickened basally; sepals ovate to narrowly triangular, acute; petals longer than sepals, (narrowly) ovate to (narrowly) elliptic, each or some with an incurved basal adaxial scale; stamens 5, inserted near rim of receptacle-tube, all solitary or two in pairs and one solitary, filaments long, thecae straight or curved. *Female flowers* solitary or up to 3, pedunculate, similar to male flowers; stigmas reniform; staminodes 5. *Fruits* fleshy, indehiscent, narrowly ellipsoid to globose, 2.5–8.5 cm long, smooth; pulp not sweet. *Seeds* numerous, ovoid, apex obtuse or truncate, smooth, not ornamented, not margined.

Taxonomy — *Sinobaijania* was described after it appeared that the type of the genus *Baijania* A.M. Lu & J.Q. Li in Li (1993), *Baijania borneensis* (Merr.) A.M. Lu & J.Q. Li, represents a monotypic genus confined to Borneo (De Wilde & Duyfjes, 2003). The remaining species which were placed in *Baijania* by A.M. Lu & J.Q. Li in Li (1993) have been combined in *Sinobaijania* by Jeffrey & De Wilde (2006). The genus *Sinobaijania* now comprises one species in Thailand, *S. smitinandii*, here newly described, and three species in China, of which *S. yunnanensis* also occurs in Laos:

1. *Sinobaijania yunnanensis* (A.M. Lu & Zhi Y. Zhang) C. Jeffrey & W.J. de Wilde, 2006. — *Siraitia borneensis* (Merr.) A.M. Lu & Zhi Y. Zhang var. *yunnanensis* A.M.

Lu & Zhi Y. Zhang (1984) 31. — *Baijiania yunnanensis* (A.M. Lu & Zhi Y. Zhang) A.M. Lu & J.Q. Li in Li (1993) 51. — Type: *S.G. Wu* 307 (KUN), China, Yunnan.

*Thladiantha sessilifolia* Hand.-Maz. var. *longipes* A.M. Lu & Zhi Y. Zhang (1981) 77. — Type: *Y.H. Li* 11954 (PE, not seen).

*Sinobaijiania yunnanensis* is here considered to occur in northern Laos on the evidence of a sterile specimen: *Poilane* 2 (P). On the label the very large, half-subterranean tuber, typical for this species, is discussed.

2. *Sinobaijiania decipiens* C. Jeffrey & W.J. de Wilde (2006) 769. — Type: *S.K. Lau* 27136 (PE, not seen), China, Yunnan.

3. *Sinobaijiania taiwaniana* (Hayata) C. Jeffrey & W.J. de Wilde (2006) 770. — *Thladiantha taiwaniana* Hayata (1911) 119. — *Siraitia taiwaniana* (Hayata) A.M. Lu & Zhi Y. Zhang (1984) 31. — *Baijiania taiwaniana* (Hayata) A.M. Lu & J.Q. Li in Li (1993) 52. — Type: *Nakahara* 340 (TI, not seen), Taiwan.

**1. *Sinobaijiania smitinandii* W.J. de Wilde & Duyfjes, *spec. nov.* — Fig. 1–3; Plate 2b–d**

A congeneribus omnibus foliis breviter petiolatis, fructibus fusiformibus 6–8.5 cm longis distinguenda. — Typus: *Phonsena, De Wilde & Duyfjes* 3910 (holo BKF; iso L), Thailand (male flowers).

Climber, 2–10 m long, with one annual shoot from a subterraneous perennial tuber c. 10 cm diam.; stem 5-angular, 2–3 mm thick. *Tendrils* finely hairy. *Leaves*: blade narrowly ovate, 7–20 by 4–8 cm, base narrowly cordate, apex acute, margin entire with sparse minute teeth, short hairy, cystoliths not obvious; petiole 1–3(–4) cm long, both surfaces soft hairy. *Inflorescences* in male a peduncled bracteate raceme, 1–5 cm long, peduncle 0.5–1 cm long, with 5–15 closely set flowers; bracts imbricate, narrowly wedge-shaped, 5–10 by 2–5 mm, at apex incised; female flowers solitary on the nodes. *Male flowers*: wholly finely soft hairy, hairs 0.1 mm long; pedicel slender, c. 5 mm long; receptacle-tube saucer-shaped, c. 2.5 by 5 mm, the basal half thickened, slightly 3-lobed in the centre, c. 1 by 2 mm, and towards the margin lowly 10-ribbed; sepals valvate, ovate to narrowly elliptic, c. 6 by 2.5 mm, apex acute-acuminate; petals imbricate in bud, narrowly elliptic, c. 10 by 5 mm, apex broadly obtuse, inside with minute papillose gland-hairs, mouth of the receptacle-tube closed by 4 (or 5) carnose scales of unequal size, 1–2 mm long; stamens: two in pairs and one solitary, filaments c. 3 mm long, erect but at apex somewhat curved, minutely hairy, anthers dorsifixed,  $\pm$  extrorse, ellipsoid, c. 1.5 by 1 mm, not or hardly curved. *Female flowers*: pedicel 10–20 mm long; ovary narrowly ellipsoid, c. 12 by 4 mm, densely patently hairy, hairs 1–2 mm long; sepals somewhat carnose, c. 6 by 3–4 mm; petals ovate to narrowly elliptic, 6–7 by c. 3.5 mm, acute, inside densely minutely gland-hairy; petal scales 5, minute (less than 0.5 mm long); style column c. 3 mm long, style-arms c. 0.5 mm long, stigmas broadly horseshoe-shaped, almost smooth, c. 1.5 mm diam.; staminodes prominent, erect, all solitary, c. 1.5 mm long, hairy, at apex with anther-like appendage (always?). *Fruits* broadly-fusiform, 6–8.5 by 2.5–3.5 cm, with sparse hairs 1–2 mm long; fruit pulp creamy-white; fruiting pedicel 1–2 cm long. *Seeds* (broadly) ovoid, c. 6 by 4–5 by 2.5–4 mm, little or moderately compressed, pale brown.

Field-notes — Rare plant. Tuber ellipsoid or depressed globose, brown. Male bracts persistent.

Distribution — Endemic to Thailand (NE, SW, C, SE).

Habitat & Ecology — Edges of mixed deciduous forest, evergreen forest, and open forest; often near streams, on good soil; 100–370 m altitude. Flowering: May to October; fruiting: June to August.

Vernacular — Buap khon.

Etymology — Named after Tem Smitinand (1920–1995), Thai forest botanist, who made one of the first collections of this species.



Fig. 1. *Sinobaijania smitinandii* W.J. de Wilde & Duyfjes. a. Portion of male flowering twig; b. node with male inflorescence; c. apex of shoot with one solitary female flower (a, b: Phonsena et al. 3820; c. Phonsena et al. 4588).

Notes — 1. Several collections of *Sinobaijiania* from the Kunming Herbarium were sequenced by Hanno Schäfer (Munich). He found (pers. comm.) that the isotype of *Siraitia borneensis* (Merr.) A.M. Lu & Zhi Y. Zhang var. *lobophylla* A.M. Lu & Zhi Y. Zhang, which was placed in the synonymy of *Sinobaijiania yunnanensis* by Jeffrey & De Wilde (2006), comes very close to *Sinobaijiania smitinandii* and most likely is not *Sinobaijiania yunnanensis*. The findings need further study.

2. The collection *Put 18* (E, K), from Kanburi, is deviating in its more slender male inflorescences.

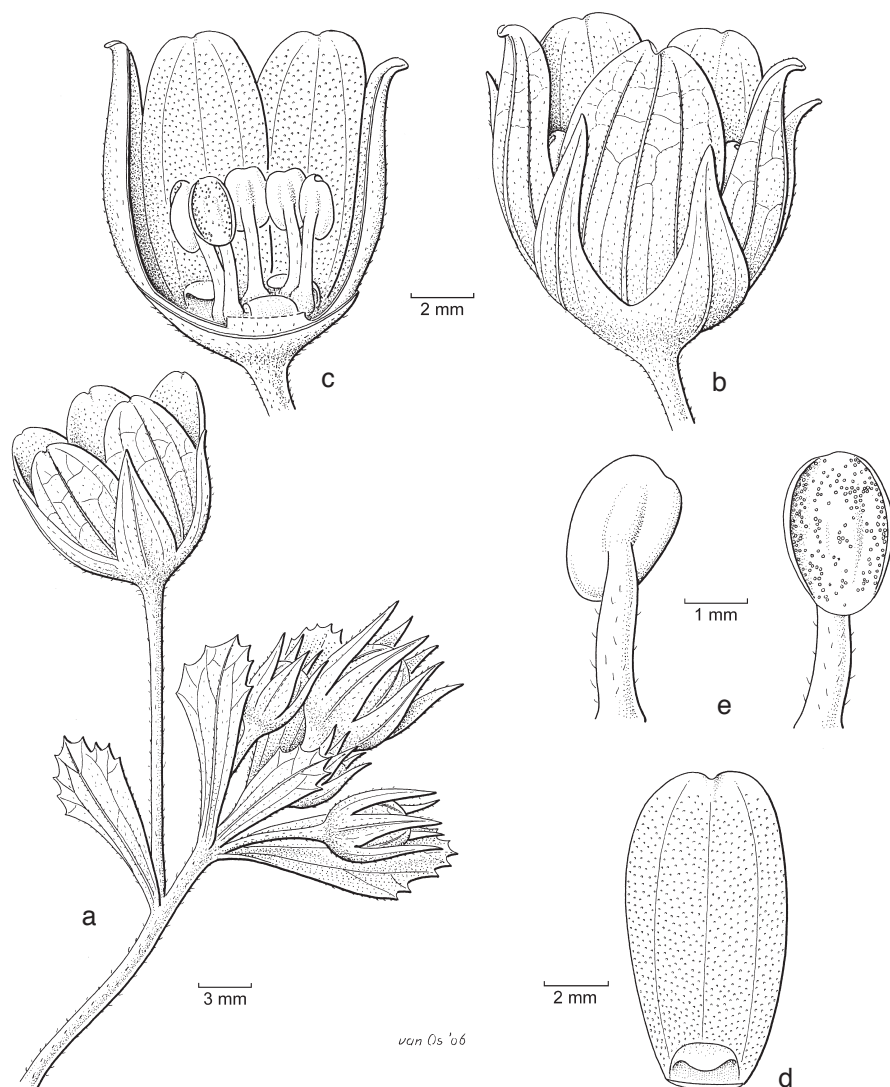


Fig. 2. *Sinobaijiania smitinandii* W.J. de Wilde & Duyfjes. a. Apex of male inflorescence; b, c. male flower, from outside and opened, respectively; d. male petal with basal scale; e. stamens (all: *De Wilde & Duyfjes* 22298).

## Specimens examined:

*De Wilde et al.* 22127, 22132, 22298 (male); *Koonthunthod* 538 (male); *Panyarat s.n.* (fruit), 131; *Phonsena* 3747, 3802 (male), 3819 (male), 3820 (male), 4588 (female), 4610 (fruit); *Phonsena et al.* 3903, 3910, 4629 (male); *Pooma et al.* 2689; *Put* 18; *Smitinand* 8136 (type).

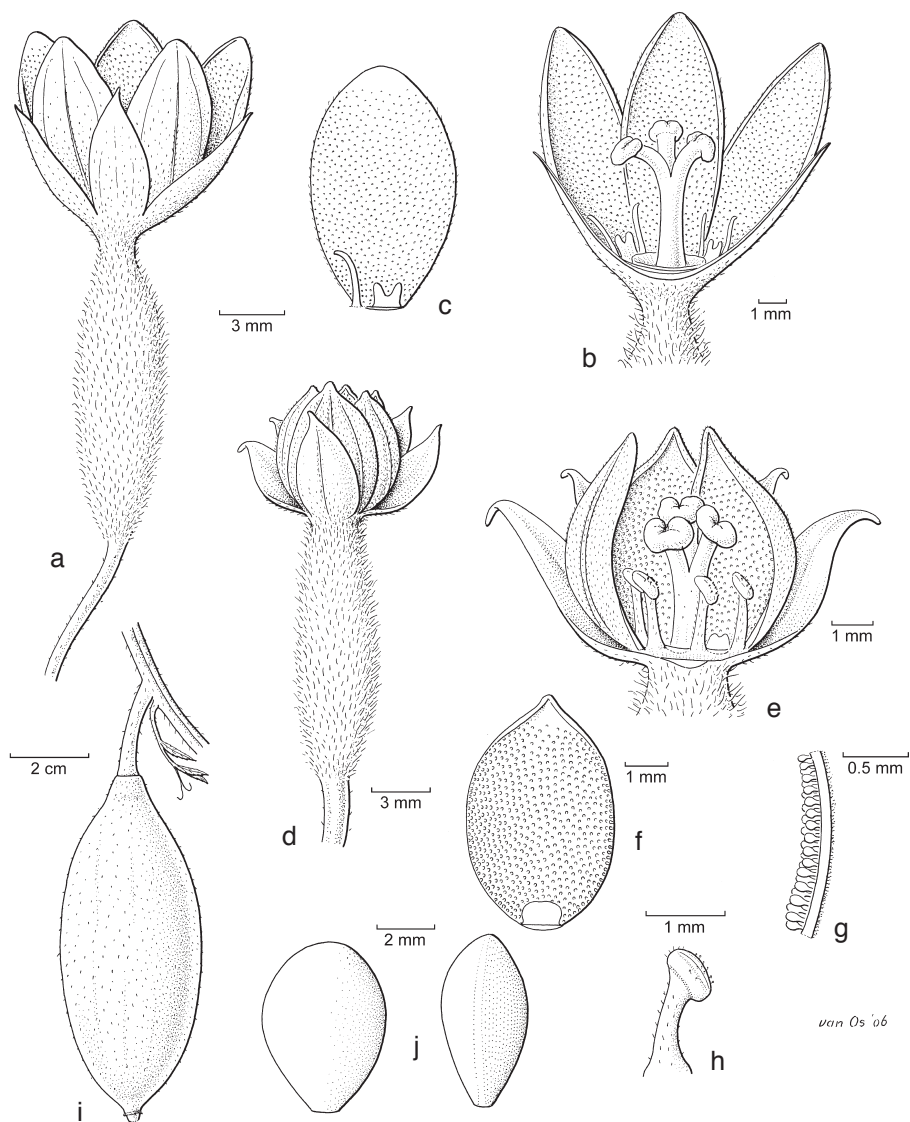


Fig. 3. *Sinobaijania smitinandii* W.J. de Wilde & Duyfjes. a, b. Female flower, from outside and opened, respectively; c. female petal with basal scale and staminode; d, e. female flower, from outside and opened, showing style and staminodes, respectively; f. female petal with basal scale; g. detail of adaxial surface of petal with papillose gland-like hairs; h. staminode; i. fruit; j. seeds (a–c: *Phonsena et al.* 4588; d–h: *Panyarat s.n.* (21-07-2004); i, j: *Phonsena s.n.* (17-06-2003)).



## 2. SIRAITIA

*Siraitia* Merr. (1934) 200; C. Jeffrey (1980a) 25; (1982) 737; A.M. Lu & Zhi Y. Zhang (1984) 29, p.p., for subgenus *Siraitia*; A.M. Lu & J.Q. Li in Li (1993) 45–55; S.K. Chen (1995a) 310–314.

— Type: *Siraitia silomaradjae* Merr.

*Neoluffa* Chakrav. (1952) 895; (1959) 70. — Type: *Neoluffa sikkimensis* Chakrav. [type: *King s.n.*, 12 May 1876 (CAL, not seen), Sikkim].

*Thladiantha* Bunge subg. *Microlagenaria* C. Jeffrey (1962) 363, p.p., excluding the type (which is the genus *Microlagenaria* (C. Jeffrey) A.M. Lu & J.Q. Li, from Africa).

Herbaceous climbers with sub- or supra-terraneous tuber (always?); dioecious; leaves and stems with obvious blackish glandular hairs. *Probract* absent or not obvious. *Tendrils* distally 2-branched, spiralling both below and above point of branching, although basal portion straight. *Leaf-blades* ovate, simple, not lobed, green on drying. *Flowers* yellow. *Male flowers* in racemes or panicles; receptacle-tube rather shallow, conspicuously coarsely anastomosing-veined externally; without obvious disc, although receptacle-tube with thickened bottom; pedicels articulate towards apex; sepals  $\pm$  triangular; petals longer than sepals, (narrowly) elliptic or (narrowly) ovate, two or all with an incurved basal adaxial scale; stamens 5, inserted in or near the throat of receptacle-tube, in two pairs and one solitary, filaments long, thecae sigmoid, the connective frequently with conspicuous papillae. *Female flowers* solitary or rarely few in a short raceme; style-arms largely free, stigmas  $\pm$  2-lobed or reniform; staminodes 5, glandular. *Fruits*  $\pm$  fleshy, indehiscent, subglobose to cylindric, rather large (5–11 cm long), smooth; pulp sweet (always?). *Seeds* numerous, broadly ovate or subcircular in outline, compressed, with broad finely radiatingly ribbed, corky, double or 3-ridged margin.

A genus of three or four species distributed in NE India, S & C China, Indochina and West Malesia (Sumatra, Peninsular Malaysia, Java, Borneo); 1 species in Thailand, 1 species in Malesia.

### KEY TO THE SPECIES OF SIRAITIA IN THAILAND AND MALAYSIA

- 1a. Calyx lobes  $\pm$  narrowly triangular, with (long-)acute-acuminate apex. Seed-margin 2-ridged. Fruit-pulp sweet. — Fruits introduced from China . . . **1. *S. grosvenorii***
- b. Calyx lobes broadly triangular with (sub)acute apex. Seed-margin 3-ridged. Fruit-pulp not sweet (?). — Plant growing wild . . . . . **2. *S. siamensis***

### 1. *Siraitia grosvenorii* (Swingle) A.M. Lu & Zhi Y. Zhang — Fig. 4c–e

*Siraitia grosvenorii* (Swingle) A.M. Lu & Zhi Y. Zhang (1984) 29. — *Momordica grosvenorii* Swingle (1941) 198, plate 1, 2, as '*grosvenori*'. — *Thladiantha grosvenorii* (Swingle) C. Jeffrey (1979) 393. — Type: *Taam Ying-wah 1* (iso A), China, Kwangsi.

Note — Although *Siraitia grosvenorii* does not occur in our region it is mentioned here because its sweet, medicinally used fruits can be found in Chinese shops and local markets in Thailand.

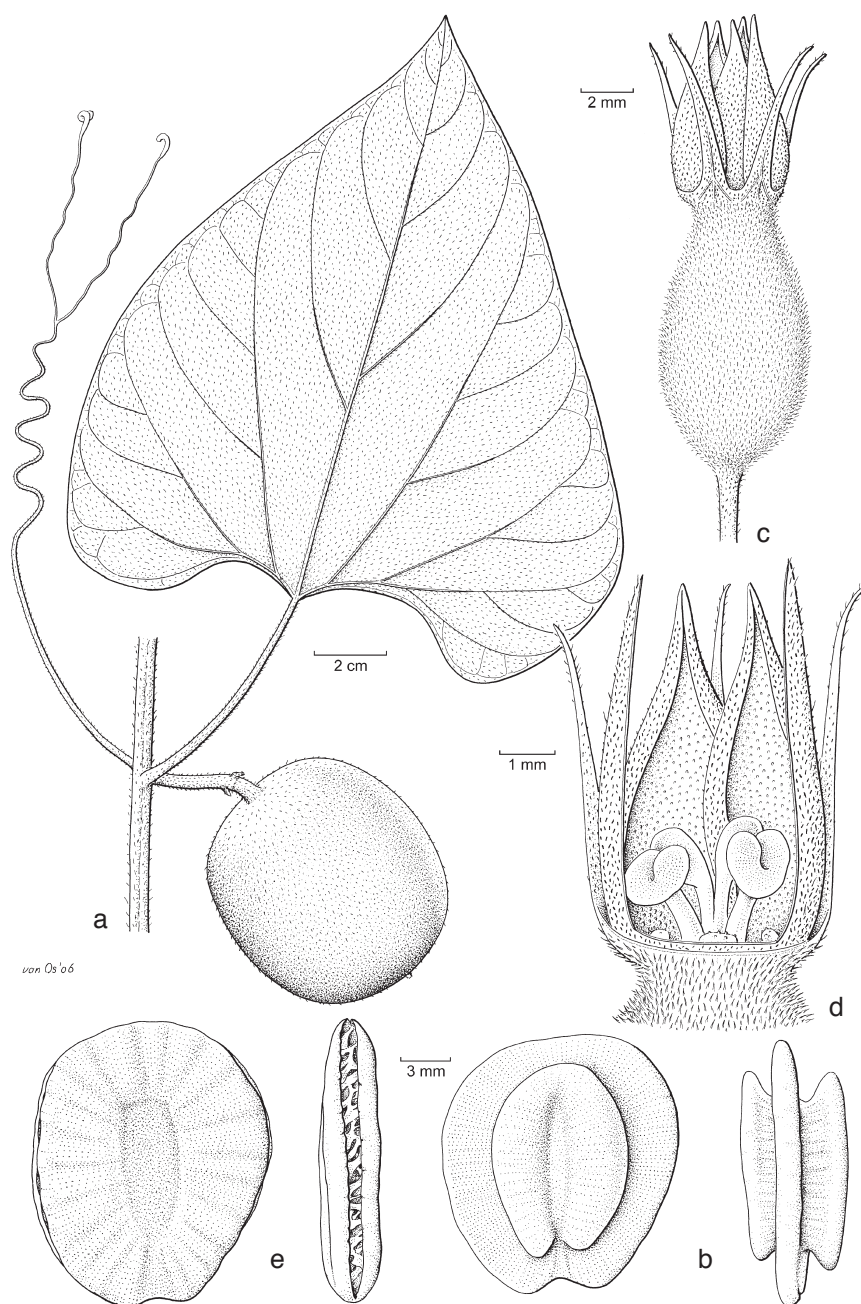


Fig. 4. a, b: *Siraitia siamensis* (Craib) S.Q. Zhong & D. Fang var. *siamensis*. a. Portion of branch with fruit; b. seed, seen from above and laterally. — c–e: *Siraitia grosvenorii* (Swingle) A.M. Lu & Zhi Y. Zhang. c. Immature female flower; d. ditto, opened; e. seed, seen from above and laterally (a: K. Larsen, S. Larsen, Nielsen & Santisuk 32487; b: Van Beusekom & Phengklai 918; c, d: Zhang Guicai 445; e: De Wilde, Duyfjes & Pruesapan 22306).



## 2. *Siraitia siamensis* (Craib) S.Q. Zhong & D. Fang

*Siraitia siamensis* (Craib) S.Q. Zhong & D. Fang (1984) 23; C. Jeffrey (1980a) 26, comb. nov. provis.; A.M. Lu & Zhi Y. Zhang (1986a) 164, f. 43: 8–12; S.K. Chen (1995a) 311, f. 81: 1–9. — *Thladiantha siamensis* Craib (1914) 7; (1931) 759; Cogn. (1916) 51; Keraudren (1975) 34, f. 10: 5–7. — Type: *Kerr 1171* (holo K; iso E), Thailand, Doi Suthep.  
*Momordica tonkinensis* Gagnep. (1918b) 376; (1921) 1072. — Type: *Eberhardt 4273* (holo P; iso P), North Vietnam.

Climber with one (or few) shoots to 5(–10) m long from a supra-terrestrial club-shaped or ovoid tuber to 25 cm diam.; leafy stem subterete or  $\pm$  angular, 3(–6) mm thick, with long or short hairs. *Tendrils* finely pubescent. *Leaves*: blade ovate, 9–30 by 8–22 cm, base deeply cordate, apex acute-acuminate, margin sparsely minutely dentate, upper surface sparsely appressed-hairy (cystoliths not obvious), lower surface variously pubescent and with many black glandular hairs; petiole 4–10 cm long, long-hairy. *Male inflorescences* a peduncled raceme or loose panicle 2 (or 3) times branched, (10–)20–25 cm long, the flowers  $\pm$  crowded at the apex of inflorescence branches; bracts minute, 1(–2) mm long or mostly absent; peduncle 5–13 cm long; all parts finely pubescent; *female flowers* solitary (or 2) in a reduced raceme to 1 cm long. *Male flowers*: finely pubescent; pedicel 15–30 mm long; receptacle-tube bowl-shaped, shallow, c. 10 by 5 mm; disc not obvious, but bottom of receptacle-tube  $\pm$  thickened; sepals triangular, c. 5 by 5 mm, apex blunt, acute or acute-acuminate, receptacle and sepals outside with conspicuous anastomosing-netted veins; petals elliptic to narrowly elliptic or long-triangular, (10–)15 mm long, 4–8 mm wide at base, apex obtuse, obtuse or (long-) acute, inner surface finely papillose, at base with 2 large and 2 or 3 smaller scales, these together with the thickened bases of the filaments concealing the hollow of the receptacle-tube; stamens erect or  $\pm$  curved, filaments 5–7 mm long, anthers sigmoid one arm shorter, c. 4 mm long, the connective slightly enlarged and set with minute swollen appendages (oil glands?). *Female flowers*: pedicel 10(–20) mm long; ovary ovoid-ellipsoid, c. 10 mm long, hairy; perianth as in male flowers; style (China) 4–5 mm long, 3-lobed. *Fruit* solitary, subglobose, 5–8 cm diam., hairy, partly glabrescent; pericarp thin, c. 1 mm thick, woody; fruit pulp whitish, enclosing numerous densely packed seeds. *Seeds* c. 15 mm diam., pale brown, corky, with broad triplicate rim, the middle rim largest, seed without rim narrowly ellipsoid, c. 8 mm long.

Field-notes — Young leaves and twig apices purplish reddish.

Distribution — Widespread, from S China through Indochina (Thailand, type) into West Malesia (Peninsular Malaysia, Sumatra, Borneo, Java).

### KEY TO THE VARIETIES

- 1a. Male inflorescences 2 (or 3) times branched, c. 20 cm long. Sepals of male flowers acute-acuminate, rather open in bud. Petals narrowly triangular, c. 4 mm wide at base. — N Sumatra . . . . . **b. var. *silomaradjae***
- b. Male inflorescences simple or once branched, 10–20 cm long. Sepals of male flowers obtuse or sub-acute, connivent and closing the bud before anthesis. Petals elliptic, 4–8 mm wide at base with rounded or blunt apex. — Widespread . . . . . **a. var. *siamensis***

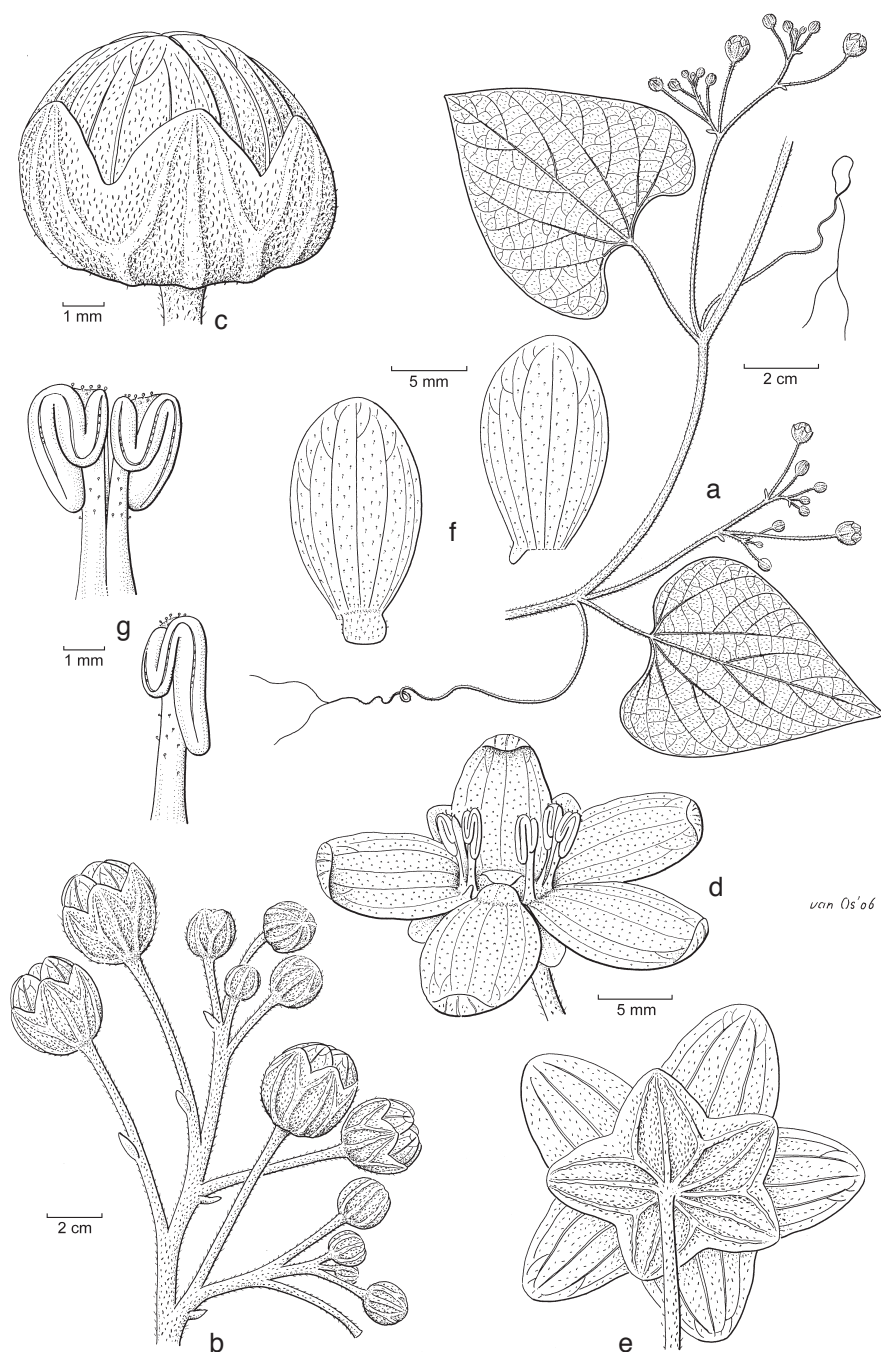


Fig. 5. *Siraitia siamensis* (Craib) S.Q. Zhong & D. Fang var. *siamensis*. a. Male flowering branch; b. apex of male inflorescence; c. male flower bud; d, e. open male flower, seen from above and below, respectively; f. inner petals with petal-scale at base; g. stamens (all: *Phonsena* 4225).

**a. var. *siamensis*** — Fig. 4a, b, 5

Male inflorescences simple, or once-branched, 10–20 cm long. Sepals of male flowers obtuse (rounded) or sub-acute at apex; petals broadly elliptic, apex rounded.

Field-notes — Mature fruits green. *Lörzing* 5595 gives the following observations (translated): “Climbing herb 8 m, profusely branched; rare; male flowers: calyx bright red-brown, with bright green veins, when in flower the red colour vanishes for the greater part; corolla deeply 5-lobed, yellow, with pale yellow-green veins; anthers two with each 2 free thecae, and one with 1 theca and with two scale-like staminodia; always 1 stamen or staminodia basally adnate to a petal; stamens bright yellow or green-yellow, at the base yolk-yellow; 5 petals, all the same size, broadly obovoid, dorsally somewhat rounded; upper surface of leaves green, somewhat glossy, lower surface dull pale green; lower surface of young leaves chocolate with grey-green nerves.”

Distribution — Possibly as the species, but see the note under var. *silomaradjae*.

Habitat & Ecology — Open or disturbed places in evergreen forest, hill Dipterocarp forest on acid rock, forest edges, scrub; 0–1500 m altitude. Flowering: April; fruiting: May, September, November.

Note — The hairiness can be very different. Strongly long-haired is, e.g., *Eberhardt* 4273 (type of *Momordica tonkinensis*); almost glabrous is, e.g., *Pételot* 8414.

**b. var. *silomaradjae*** (Merr.) W.J. de Wilde & Duyfjes, *stat. nov.*

*Siraitia silomaradjae* Merr. (1934) 200; A.M. Lu & J.Q. Li in Li (1993) 54, f. 2. — Type: *Bartlett* 8702a (holo US; iso L), male flowers in June 1927, Sumatra.

Male inflorescences long-peduncled, 15–25 cm long, (1 or) 2 (or 3) times branched panicles. Sepals of male flowers long-acute-acuminate, the apices in bud free and slightly out-curved; petals narrow, long-triangular, at base c. 4 mm wide, apex long-acute (see Lu & Li, 1993: f. 2).

Distribution — Only known from the type, Asahan area, northern Sumatra.

Notes — 1. The only other flowering collection of the species known from the Malesian area is *Lörzing* 5595 (BO, L) from Sibolangit, not far from Asahan. Although the flowers of *Lörzing* 5595 are in a bad state of conservation, they are more similar to those of var. *siamensis* than to those of var. *silomaradjae*.

2. We cannot decide on the distribution of var. *silomaradjae* beyond the type-locality as all other collections from Malesia (Sumatra, Peninsular Malaysia, Java, Borneo) are sterile, except one collection from Java in fruit.

**3. THLADIANTHA**

*Thladiantha* Bunge (1833) 29; Cogn. (1881) 421; (1916) 40; Gagnep. (1921) 1075; Craib (1931) 759; Chakrav. (1959) 125; Backer (1964) 296; Keraudren (1975) 29; C. Jeffrey (1980a) 27; A.M. Lu & Zhi Y. Zhang (1981) 61; (1986b) 132; S.K. Chen (1995b) 297; J.Q. Li (1997) 103–127. — Type: *Thladiantha dubia* Bunge (China, near Beijing).

Herbaceous climbers, usually with tuberous rootstock; dioecious; stem and leaves without glandular hairs. *Probract* absent in sterile shoots, in inflorescences present or absent. *Tendrils* unbranched (all material from Thailand and Malesia) or 2-branched

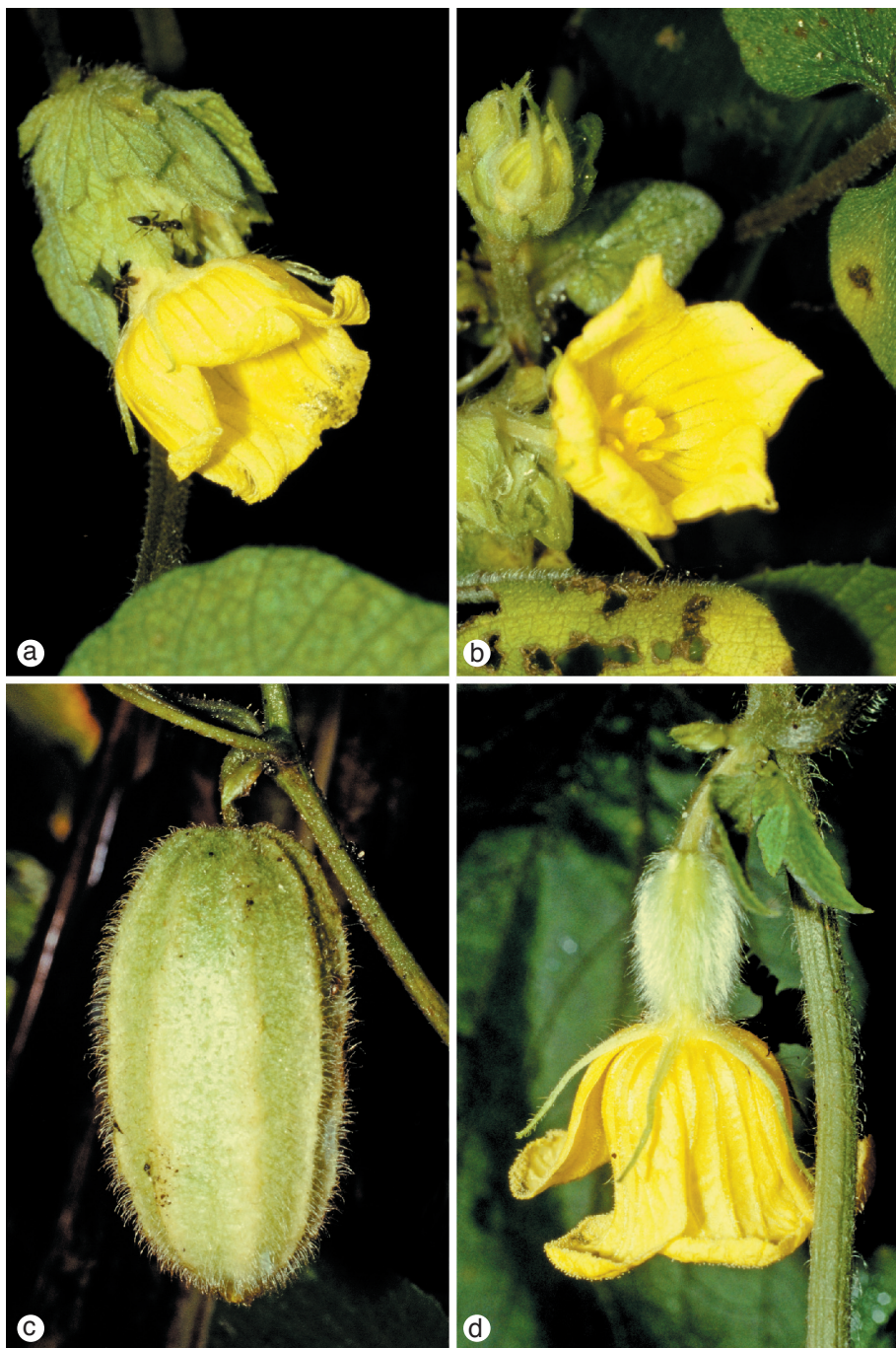


Plate 1. *Thladiantha angustisepala* W.J. de Wilde & Duyfjes (a, b: Phonsena et al. 4637 (type); c: Phonsena et al. 5238; d: Phonsena et al. 5204). Photos De Wilde.



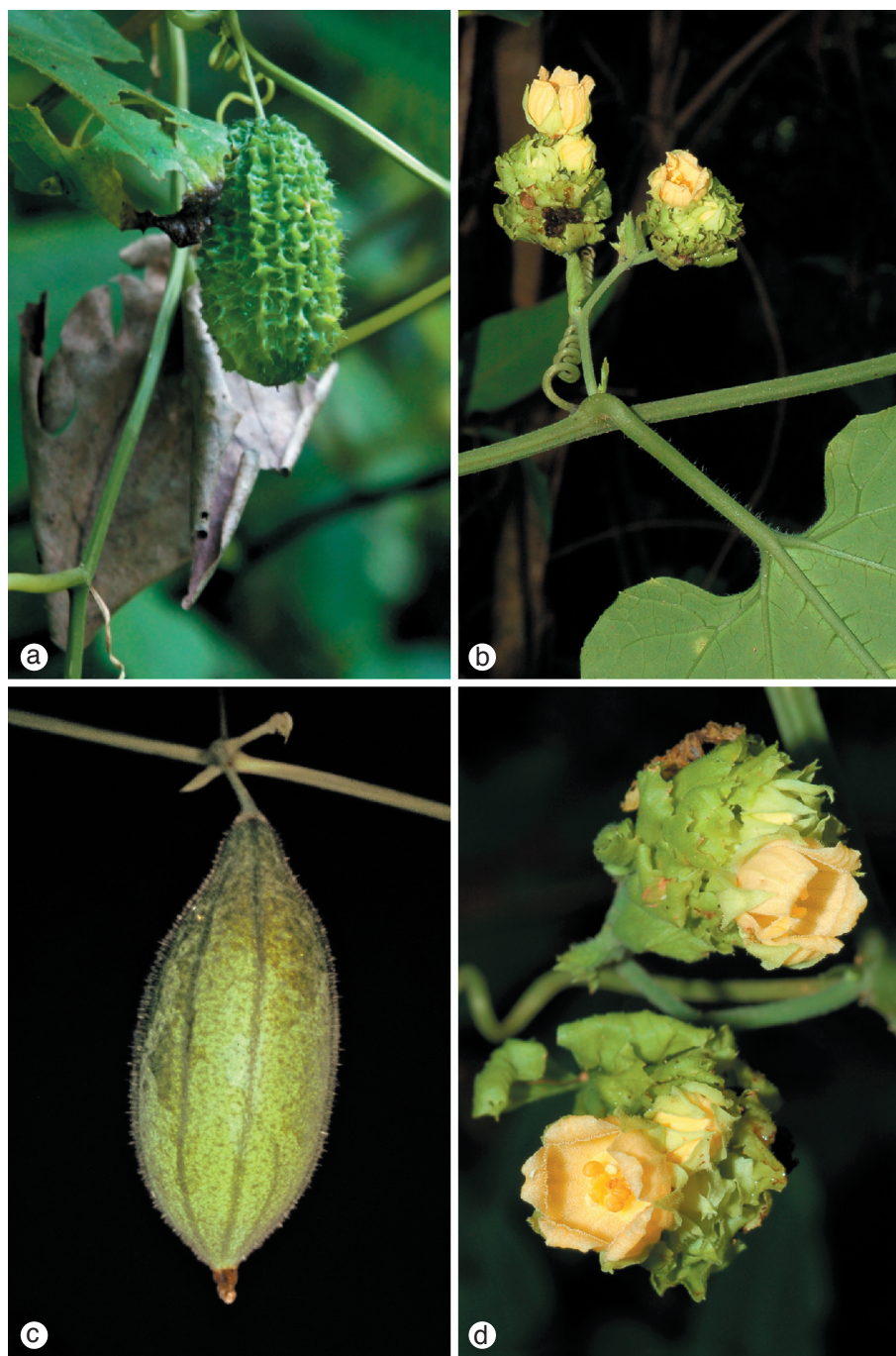


Plate 2. a. *Thladiantha cordifolia* (Blume) Cogn.; b–d. *Sinobaijania smitinandii* W.J. de Wilde & Duyfjes (a: photographed in Sumatra; b, d: Phonsena *et al.* (29-09-2006); c: Panyrat 131). Photos a: Haruo Katakura; b, d: Thamarat Putthai; c: Phornpithak Panyarat.

and spiralling only above the point of branching. *Leaf-blades* ovate, usually simple, not lobed or palmately lobed, rarely 3–9-foliolate, green or brown on drying. *Flowers* yellow. *Male flowers* in racemes or panicles, rarely flowers solitary; receptacle-tube shallow, with eccentric half-globose basal disc; pedicels articulate towards apex; sepals linear to (narrowly) ovate; petals longer than sepals, (narrowly) ovate, obtuse, 1–3 with an adaxial basal scale; stamens (3–)5, inserted on or near throat of receptacle-tube, often in two pairs and one solitary, filaments long, thecae short, more or less straight, erect. *Female flowers* solitary or few in short racemes or panicles, similar to male flowers; stigmas subglobose; staminodes 5. *Fruits* (narrowly) ellipsoid, 2–6 cm long, fleshy, indehiscent, ribbed or verrucose, not sweet. *Seeds* numerous, ovoid or ellipsoid, finely sculptured, with or without narrow margin.

A genus of about 25 species distributed in SE Asia, extending SW to West Malesia (Sumatra, Java); 5 species in Thailand.

#### KEY TO THE SPECIES OF THLADIANTHA IN THAILAND AND MALESIA

- 1a. Leaf blade simple. Male bracts conspicuous, (0.5–)1–2 cm long. (Ovary and fruits  $\pm$  fenestrate, ribbed or verrucose: sect. *Fidobractea* A.M. Lu & Zhi Y. Zhang (1981)) ..... 2
- b. Leaf blade simple, not lobed or (deeply) lobed, or foliolate. Male bracts absent. (Ovary and fruits smooth, though hairy: sect. *Thladiantha*) ..... 4
- 2a. Probract at base of male peduncle absent. Petiole and peduncle long-pilose. Plant rather stout ..... **5. *T. tonkinensis***
- b. Probract absent or (its scar) present at base of male peduncle. Petiole and peduncle short-hairy or glabrous. Plant more slender ..... 3
- 3a. Sepals linear, thread-like, less than 1 mm wide, 1-veined. Fruit ribbed ..... **1. *T. angustisepala***
- b. Sepals narrowly elliptic, 2–3 mm wide, 3-veined. Fruit fenestrate ..... **2. *T. cordifolia***
- 4a. Plant (sub)glabrous. Leaves simple, lobed or not lobed, or foliolate **3. *T. hookeri***
- b. Plant long-hairy. Leaves simple, not lobed ..... **4. *T. indochinensis***

#### **1. *Thladiantha angustisepala*** W.J. de Wilde & Duyfjes, *spec. nov.* — Fig. 6e, f; Plate 1

*Thladianthae cordifolia* similis, sepalis angustis minus quam 1 mm latis, fructu laevi (non fenestrato) distinguenda. — Typus: *Phonsena*, De Wilde & Duyfjes 4637, male (holo BKF; iso L), Thailand, Kaeng Krachan NP.

?*Thladiantha cordifolia* (Blume) Cogn. var. *tomentosa* A.M. Lu & Zhi Y. Zhang (1981) 70. — Type: *S.Q. Chen 12174* (PE, not seen).

Subligneous or herbaceous climber 4–10 m tall, putatively from a tuberous root; stem (leafy shoots) 2–3 mm diam., variously grey or yellowish brown soft long-hairy, hairs 1.5–4 mm long. *Probract* absent or rarely present at base of male peduncle, c. 10 mm long, basal part narrow, apex incised. *Tendrils* unbranched, spiralling over almost all their length, but basal part at least for 1 cm straight. *Leaves*: blade simple, (narrowly) ovate, 6–12(–15) by 4–9(–12) cm, base deeply cordate, apex acute-acuminate, margin



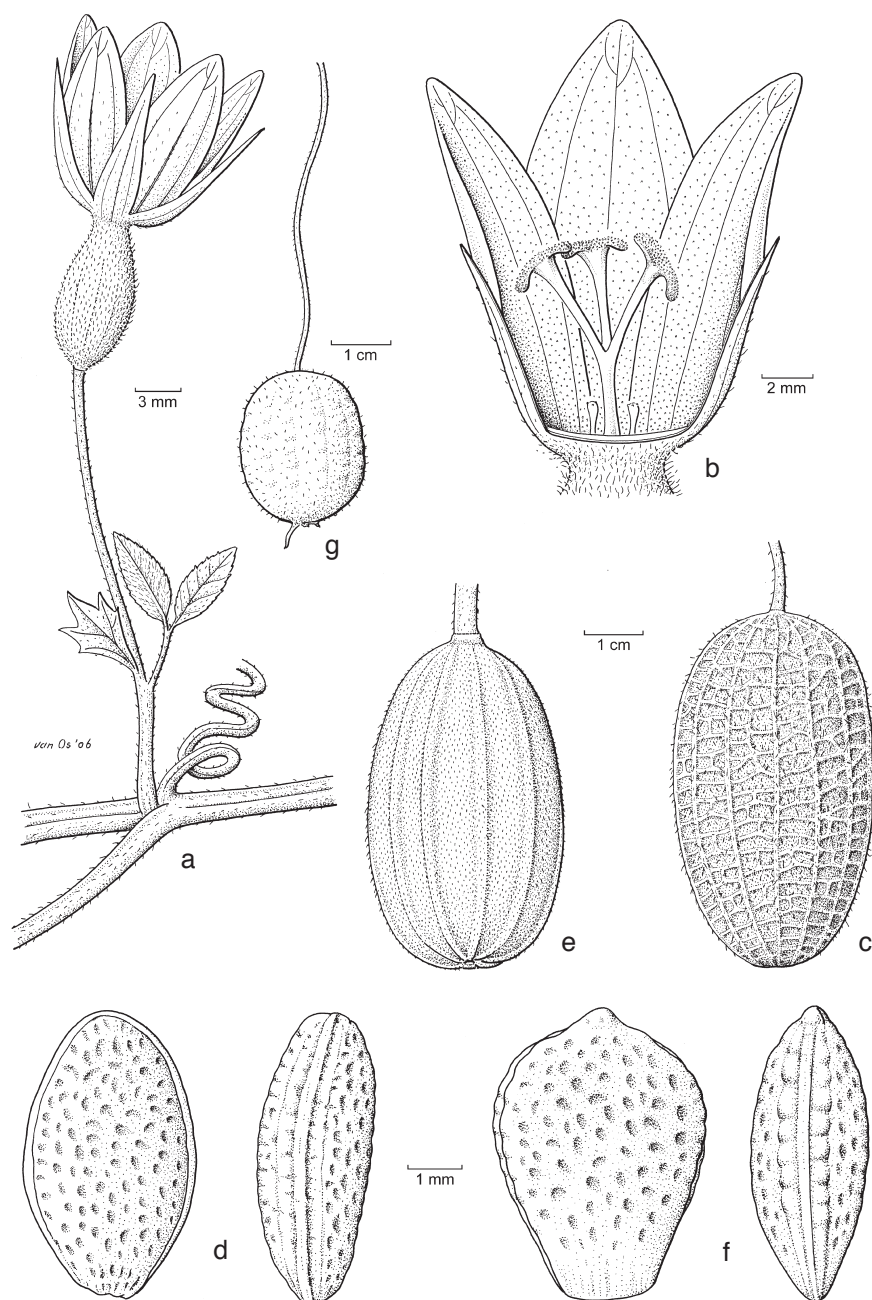


Fig. 6. a–d: *Thladiantha cordifolia* (Blume) Cogn. a. Node with 1-flowered female inflorescence; b. female flower, perianth partly removed, disc absent; c. fruit, note fenestrately pitted outer surface; d. seeds. — e, f: *Thladiantha angustisepala* W.J. de Wilde & Duyfjes. e. Fruit; f. seeds. — g: *Thladiantha tonkinensis* Gagnep. Fruit (a: Docters van Leeuwen s.n. (28-09-1910); b: Wongprasert s.n. (SN 120885); c, d: Maxwell 99-96; e, f: Phonsena 3960; g: Balansa 4549).

finely (coarsely) dentate, upper surface rather densely appressed scabrid-hairy, later on leaving cystoliths, lower surface densely softer hairy, especially on veins; petiole 2–9 cm long, (sparsely) soft-hairy. *Male inflorescences*: one (or rarely 2) peduncled raceme(s), sometimes with the persistent pedicel of a previously developed flower at base; peduncle 2–10 cm long; flowers few, bracteate, crowded, all pubescent with short or long hairs, hairs up to 2(–4) mm long; bracts elliptic to narrowly elliptic or  $\pm$  wedge-shaped, 1–1.5 by 0.4–1 cm, shallowly or up to halfway incised, apices of lobes long-acute. *Male flowers*: pedicel 5–10 mm long, longer in basal solitary male flower; receptacle-tube cup-shaped, c. 5 by 6 mm, throat minutely papillose; sepals linear, 6–10 mm long, c. 1 mm wide or less, 1-veined; petals (10–)15 by 8–10 mm, obtuse, inside papillose; filaments c. 4 mm long, anthers (2–)2.5 by c. 1.5 mm; petal basal scales papillose, largest c. 3 by 2 mm, and 3 (or 4) much smaller ones; disc subglobose, c. 2 mm diameter. *Female flower*: solitary (or 2 or 3 in a short bracteate raceme); pedicel 5(–10) mm long; perianth as in male flowers but somewhat larger; ovary ellipsoid, c. 12 by 7 mm, faintly 10-ribbed, densely (appressed) hairy, hairs c. 2 mm long; receptacle-tube narrow; sepals (10–)15 mm long, linear; petals 20–22 by 15 mm; style-column c. 0.5 mm long, arms 4(–5) mm long, stigmas irregularly broadly reniform, papillose, each 3–4 mm wide; petal basal scales 3, c. 1 mm long; staminodes 3(–5), erect, 1–1.5 mm long, papillose. *Fruit* solitary (or 2), ellipsoid, 4–5 by 2.5–3 cm, 10-ribbed, hairy, smooth, not fenestrately ornamented between the ribs; fruiting pedicel 1–1.5 cm long. *Seeds* ovoid, c. 4 by 3 by 2 mm, pale brown, finely rugose.

Field-note — Male corollas falling off in late morning.

Distribution — Thailand (N, SW), Laos.

Habitat & Ecology — Scrub and seasonal forest edges; 300–1500 m altitude. Flowering: February to September; fruiting: September, October.

Note — The collections *Kerr 2449* and *Maxwell 05-138*, both from Chiang Mai Province, are aberrantly densely long-haired in all parts.

Specimens examined:

THAILAND. *Kerr 2449* (male); *Larsen et al. 46169* (male); *Maxwell 05-138* (male, specimen very hairy); *Parnell et al. 95-516* (male); *Phonsena et al. 3960* (female, fruit, spirit); *3961* (male); *3964* (male); *4636* (female, fruit); *4637* (type, male); *4680* (male); *4681* (female); *Pooma 1253* (male); *Van Beusekom et al. 4652* (male); *Wongprasert 997-34* (male?).

LAOS. *D'Alleizette s.n.* (male, possible same as *Poilane 26355*); *Poilane 26355* (male); *Poilane s.n.* (male).

## 2. *Thladiantha cordifolia* (Blume) Cogn. — Fig. 6a–d, 7; Plate 2a

*Thladiantha cordifolia* (Blume) Cogn. (1881) 424; (1916) 51; C. Jeffrey & Kashyapa (1960) 461–463; Backer (1964) 296; Keraudren (1975) 30, p.p.; C. Jeffrey (1980a) 30; A.M. Lu & Zhi Y. Zhang (1986b) 135, f. 37: 13, 14, p.p.; S.K. Chen (1995b) 300, p.p. — *Luffa cordifolia* Blume (1826) 929; Ser. (1828) 302; M. Roem. (1846) 63; Miq. (1856) 666. — Lectotype (here chosen): *Blume 1464*, fruit, barcode L0001624 (holo L; iso L), Java.

*Thladiantha cordifolia* (Blume) Cogn. forma *glabrescens* Hochr. (1934) 287. — Type: *Hochreutiner 1255* (iso L), Java.

*Thladiantha calcarata* Cogn. (1880) Errata, without page; (1881) 423; (1916) 50; Gagnep. (1921) 1076, p.p.; Craib (1931) 759; Chakrav. (1959) 125. — Lectotype (Jeffrey, 1980b: 790): *Wallich Cat. 6740A* (K-W) ('*Momordica calcarata*'), collection Gomez, Sylhet.

*Trichosanthes javanica* Miq. (1856) 678. — Type: *Junghuhn 875* (iso L), Java.

*Gymnopetalum piperifolium* Miq. (1856) 680. — Type: *Horsfield s.n.* (K, not seen), Java.

*Gymnopetalum horsfieldii* Miq. (1856) 680. — Type: *Horsfield s.n.* (K, not seen), Java.

*Thladiantha calcarata* Cogn. var. *subglabra* Cogn. (1881) 424. — Type: *Hooker & Thomson 2057* (iso K), Khasia, India.

*Thladiantha dubia* auct. non Bunge: Hook. (1864) t. 5469, p.p., for the female flower and fruit; C.B. Clarke (1879) 631 (see Cogniaux, Errata (1880) under *Thladiantha calcarata*).

Perennial much-branched climber to 8 m long; subglabrous or hairy; stem of leafy shoots 2(–3) mm diameter. *Probract* usually present. *Tendrils* unbranched, spiralling either throughout their length or only in the upper part. *Leaves*: blade simple, ovate, 6–10 by 4–9 cm, deeply cordate, apex acute-acuminate, margin coarsely or finely dentate, upper surface appressed-hairy, scabrous by cystoliths, lower surface hairy or subglabrous; petiole 3–6 cm long, finely hairy or subglabrous. *Male inflorescences*: a peduncled bracteate raceme (sometimes with a previously developed solitary flower at base), 5–10 cm long, sparsely minutely pubescent; peduncle 2–5 cm long, at or close to the base with a rhombiform or sub-elliptic (5–)10 mm long irregularly incised probract; flowers few or several, bracts conspicuous, close together, or in older inflorescences the scars of the fallen flowers and bracts more spaced, forming an up to 3 cm long spike, with few bracteate flowers and buds at apex; bracts obovate or obtriangular, 10–15 mm long, the margin in the apical half (irregularly) dentate or incised to c. 1/4 deep. *Male flowers*: pedicel c. 10 mm long; receptacle-tube obliquely cup-shaped, tapering, 3–4 mm diam., throat short-hairy; sepals long-triangular, or narrowly elliptic, 8–12 by 3–5 mm, acute, 3(–5-)veined, sometimes reflexed; petals in bud erect and much shorter than sepals, expanded petals obovate-elliptic, 15–20 by c. 15 mm, apex rounded and faintly dentate; filaments short, 3–5 mm long,  $\pm$  curved,  $\pm$  dilated towards the base, anthers 3–5 mm long, slightly curved, median(?) petal with conspicuous curved scale, c. 4 mm long, concealing the disc in the receptacle-tube; disc inserted slightly laterally, large, ellipsoid, c. 4 mm long. *Female flowers*: solitary; pedicel 10–40 mm long, with probract at or near base; perianth as in male flowers; ovary ovoid-ellipsoid, densely woolly grey-hairy, c. 10 mm long; style-column c. 2 mm long, arms 4–5 mm long, stigmas 2-lobed, lobes broadly reniform, each c. 3 mm diam.; staminodes c. 1.5 mm long, erect. *Fruit* solitary; narrowly ellipsoid, (2–)3–6 by 2–2.5 cm, broadly rounded at both ends, sparsely or densely bristly hairy, outer surface fenestrately pitted in c. 15 rows; fruiting pedicel 1.5–4 cm long. *Seeds* ovoid, 5–6 mm long, somewhat flattened, rugose, margin shallowly 2-grooved.

Field-note — The seeds are embedded in whitish pulp. Fruits are edible (*Maxwell 99-96*).

Distribution — [Eastern?] E India, Myanmar, Thailand (N, SW) to S China, extending to Sumatra and Java (type). Not recorded from Peninsular Thailand and Peninsular Malaysia.

Habitat & Ecology — Seasonal rainforest, disturbed hill Dipterocarp forest along trail, also open areas and degraded forest with much bamboo, often along stream; sandy soil, shale bedrock, and limestone; 200–800 m altitude. Flowering: April, May, August; fruiting: August.

Note — *Thladiantha cordifolia* belongs with two other here treated species, *T. tonkinensis* and *T. angustisepala* to the section *Fidobracea* A.M. Lu & Zhi Y. Zhang (1981) of which the type species is *Thladiantha cordifolia*. The section is characterized by the male flowers arranged in a bracteate raceme, and by the imbricately arranged, large, flabellate bracts with an incised-dentate margin. In the section belong furthermore three

Chinese species: 1) *T. globicarpa* A.M. Lu & Zhi Y. Zhang (1981) (C China), similar to *T. angustisepala*, also with narrow sepals but differing in a more slender habit, and smaller fruit; 2) *T. grandisepala* A.M. Lu & Zhi Y. Zhang (1981) (Yunnan); and 3) *T. medogensis* A.M. Lu & J.Q. Li in Li et al. (1992) (Xizang), the latter two species have much broader sepals.

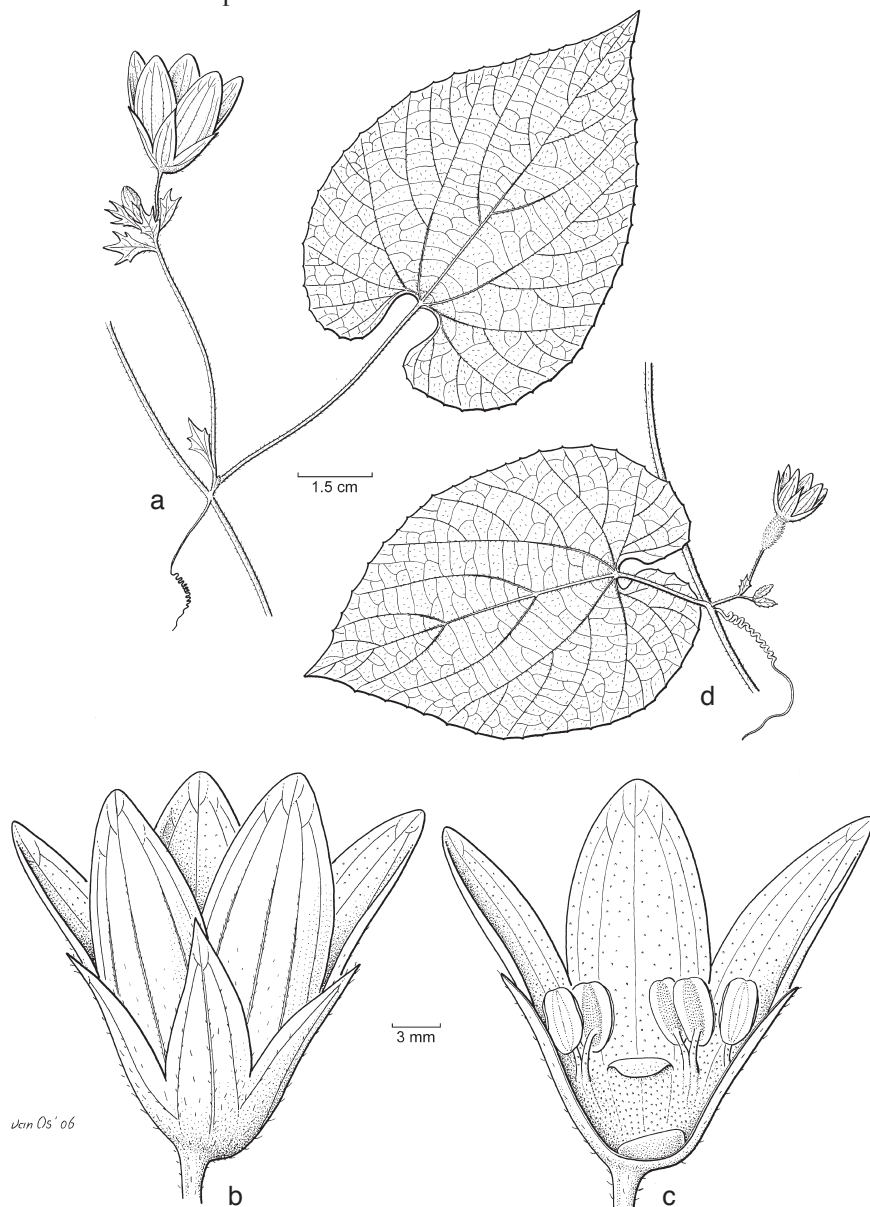


Fig. 7. *Thladiantha cordifolia* (Blume) Cogn. a. Node with male inflorescence; b. male flower; c. idem, laid open, partly schematic, note eccentrically situated disc-gland; d. node with 1-flowered female inflorescence (a–c: Wieringa & Janzen 3417; d: Docters van Leeuwen s.n. (28-09-1910)).

**3. *Thladiantha hookeri* C.B. Clarke — Fig. 8**

*Thladiantha hookeri* C.B. Clarke (1879) 631; Cogn. (1881) 425; (1916) 52; Gagnep. (1921) 1078; Craib (1931) 759; Chakrav. (1946) 64 (not seen); (1959) 127, incl. variety and forms; Keraudren (1975) 32, f. 6: 7–9; C. Jeffrey (1980a) 35; A.M. Lu & Zhi Y. Zhang (1986b) 149; S.K. Chen (1995b) 305. — Lectotype (here chosen): *Hooker & Thomson 1703* (K), Khasia.

*Hemsleya ? tonkinensis* Cogn. (1893) 613. — Type: *Balansa 4011* (G, not seen), Tonkin.

*Hemsleya trifoliolata* Cogn. (1909) 304. — *Thladiantha trifoliolata* (Cogn.) Merr. (1937) 261. — Type: *Henry 12295D* (Z, not seen), Yunnan.

*Thladiantha pentadactyla* Cogn. (1916) 52. — *Thladiantha hookeri* C.B. Clarke var. *pentadactyla* (Cogn.) A.M. Lu & Zhi Y. Zhang (1981) 80. — Type: *Henry 12295D* (B†, not seen), Yunnan.

*Thladiantha heptadactyla* Cogn. (1916) 52; Gagnep. (1918a) 290. — *Thladiantha hookeri* C.B. Clarke var. *heptadactyla* (Cogn.) A.M. Lu & Zhi Y. Zhang (1981) 81. — Type: *Delavay s.n.* (P), Yunnan, Lou Kong.

*Thladiantha digitata* H. Lév. (1916) 65. — Type: *Maire (E.E.M.) s.n.* (E), Yunnan.

*Hemsleya yunnanensis* Cogn. (1916) 27. — Type: *Henry 9057* (B†, not seen), Yunnan.

Herbaceous few-branched climber 1.5–4 m long, from a tuberous root; young parts finely hairy, largely glabrescent; stem 2(–4) mm diameter. *Probract* absent, except in connection with inflorescences, in male small, up to 5 mm long, at or towards base of inflorescences, in female not obvious. *Tendrils* unbranched, not spiralling basally. *Leaves*: blade simple, not lobed or lobed, or 3- or 5-foliolate, (broadly) ovate in outline, 7–20(–25) by 4–15(–20) cm, base deeply cordate, apex acute-acuminate, margin finely (coarsely) dentate; upper surface with sparse (minute) coarse hairs, later on leaving sparse cystoliths, lower surface glabrous, except for few hairs on veins; petiolules to 10 mm long; petiole 1.5–7 cm long. *Male inflorescences*: usually a peduncled raceme (rarely few-branched, see note 1), 2–12 cm long, including 1.5–5 cm long peduncle, early glabrescent, at base usually with a scar of fallen small probract, and a solitary pedicel 20–30 mm long of previously developed flower; flowers in raceme (few to) numerous; lower portion of pedicels persistent; bracts absent. *Male flowers*: buds with open calyx, imitating small flowers; pedicels 5–15 mm long; receptacle-tube shallowly cup-shaped, 2–3 by 5–7 mm, slightly oblique at base because of eccentric disc, inside minutely gland-hairy, throat minutely gland-hairy; sepals narrowly elliptic, 4–6 by 2–2.5 mm, 3- or 5-veined,  $\pm$  out-curved, apex greenish (often black on drying), (sub)acute; petals ovate to narrowly ovate, 10–15 by 8–10 mm, obtuse, 5(–7)-veined, at apex of midvein with a minute gland; filaments short, 3–4 mm long, anthers c. 2.5 mm long; median? petal at base with a large curved scale, c. 2.5 mm long, concealing the disc; disc globose-ellipsoid, c. 2.5 mm diameter. *Female flowers*: solitary or 2 or 3 in up to 2 cm long raceme; pedicel (10–)20 mm long (but see note 2); sepals and petals similar to those of male flowers, but narrower; ovary subfusiform, c. 15 by 3 mm, at apex long-tapering, brownish short-woolly hairy; style c. 2.5 mm long, stigma-arms 0.5(–1) mm long, stigmas reniform, c. 1.5 mm diam.; staminodes in two pairs and 1 solitary, c. 0.5 mm long, glandular-papillose; basal petal scale not obvious. *Fruit* (according to Lu & Zhang, 1986b): (narrowly) ellipsoid, 4–6 by 2–3 cm, rounded at both ends, smooth. *Seeds* broadly ovoid, 6–7 by 5 mm, base obtuse-rounded, smooth.

Field-note — The leaves are variable in shape, simple or trifoliolate, often on the same twig. The inner side of the corolla is darker yellow than the outer side.

Distribution — NE India (type), Bhutan, S China (Yunnan, Guizhou), Myanmar, Thailand (N, SW), N Vietnam; (from Laos no collections seen).



Habitat & Ecology — Edges and scrub of evergreen forest, deciduous hardwood forest; on granite and shale as well as on limestone outcrop and rugged limestone terrain; 200–1400 m altitude. Flowering: May to November; no fruiting specimens known from Thailand.

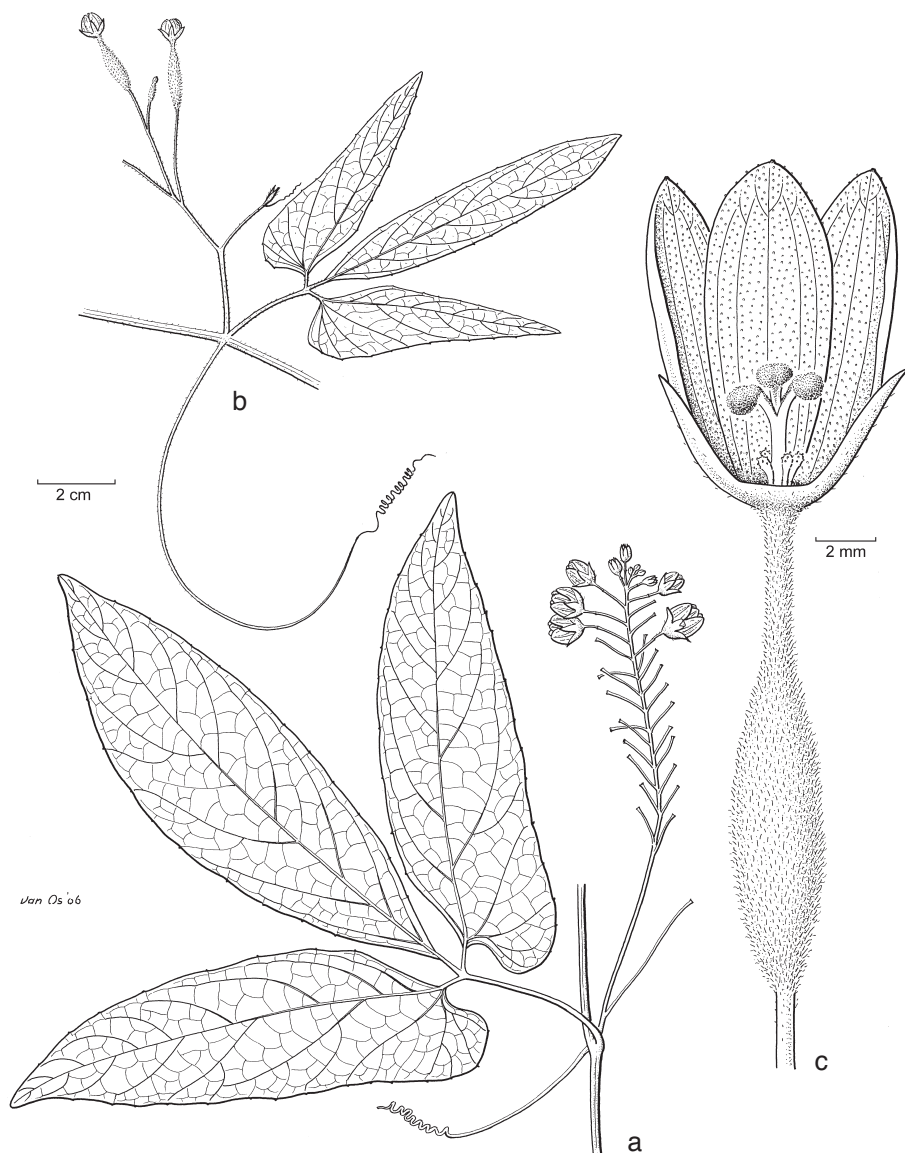


Fig. 8. *Thladiantha hookeri* C.B. Clarke. a. Leafy node with male inflorescence, note persistent pedicels; b. leafy node with female inflorescence; c. female flower, opened (a: Maxwell 90-860; b, c: Sai Jai 21).



Notes — 1. Branched male inflorescences can be interpreted as a short lateral branch without leaves and tendrils; the solitary flower is lacking at the base of such compound inflorescence.

2. Material in P indicate that the status of *T. pentadactyla* Cogn. and *T. heptadactyla* Cogn., both from China, with foliolate leaves and petioluled leaflets and long-pedicelled female flowers, as ordinary synonyms of *T. hookeri* need further study. Solitary female flowers in *T. heptadactyla* have up to 10 cm long pedicels.

#### 4. *Thladiantha indochinensis* Merr.

*Thladiantha indochinensis* Merr. (1940) 386; Keraudren (1975) 33. — Lectotype (Jeffrey, 1980a): *Pételot 2194* (GH), N Vietnam, Chapa.

Climber a few meters long, putatively with a tuberous rootstock; leafy shoot 2–3 mm thick, soft grey-hairy, hairs 1–2 mm long, glandular or not. *Probract* not obvious. *Tendrils* unbranched, not spiralling in the basal third. *Leaves*: blade simple, ovate or narrowly ovate, 9–17 by 5–10 cm, base deeply cordate, apex acute-acuminate, margin finely dentate, upper surface sparsely hairy, cystoliths not obvious, lower surface more densely hairy, especially on veins; petiole 2.5–6 cm long, soft-hairy. *Male inflorescences*: flowers solitary or in an up to 12-flowered peduncled raceme to 10 cm long; bracts absent (possibly minute and early caducous); peduncle to 5 cm long, hairy. *Male flowers*: pedicel 15–25 mm long, hairy; receptacle-tube broadly campanulate, c. 3 by 4–5 mm, outside with long, stiff, whitish hairs, throat finely papillose-hairy; sepals narrowly ovate, c. 5 mm long, at base 1.5(–2) mm wide, acute, hairy; petals ovate to narrowly ovate, 15–20 by 7–10 mm, obtuse, 5–7-veined, inside and margin papillose; filaments 3.5–4 mm long, papillose, anthers 3–3.5 mm long; petal basal scales: 1 large, c. 3 mm long, with 2 or 3 smaller ones forming a finely hairy diaphragm-like ring, c. 0.5 mm high; disc 1–1.5 mm across. *Female flowers*: solitary; pedicel (5–)10 mm long; perianth smaller than in male flowers, petals narrower; ovary short-fusiform, c. 4 by 2.5–3 mm, subglabrous or sparsely hairy; sepals c. 4 mm long; petals c. 13 mm long; style-column c. 2.5 mm long, style-arms (1.5–)2 mm long, stigmas c. 1 mm diam.; staminodes in two pairs and 1 solitary, erect, c. 0.5 mm long, papillose; petal basal scale small. *Fruit* not known.

Distribution — Thailand (N), Vietnam (type).

Habitat & Ecology — Open forest; 1500–1800 m altitude. Flowering: August, September.

Note — Jeffrey (1980a: 29) identified the specimens (*Pételot 2185, 2194*) on which *Thladiantha indochinensis* Merr. was based as *T. nudiflora* Forbes & Hemsl., a species from China, this identification was confirmed by Zhi Y. Zhang in 1990 on an identification slip (A). In our opinion the Thai collection *Vidal 5175* (male and female), of which the male flowers are solitary or few together, is similar to the type of *T. indochinensis* and these specimens are sufficiently different to keep the species separate. *Thladiantha nudiflora* has 2-branched tendrils and its ovary is described as narrowly oblong, 12–15 by 4–5 mm (in *T. indochinensis* the ovary is short-fusiform, c. 4 by 2.5–3 mm).

Specimens examined:

*Pételot 2185, 2194*, both N Vietnam, Chapa; *Vidal 5175*, Doi Chiang Dao (P, male; BKF, female; AAU?).

### 5. *Thladiantha tonkinensis* Gagnep. — Fig. 6g

*Thladiantha tonkinensis* Gagnep (1918a) 292; (1921) 1078. — Type: *Balansa* 4003 (holo P; iso P), North Vietnam, Tonkin, Vallée de Langkok, Mt Bavi.

*Thladiantha calcarata* Cogn. var. *tonkinensis* Cogn. (1916) 50. — Lectotype (here chosen): *Balansa* 4004 (holo P; iso E, P).

*Thladiantha calcarata* auct. non C.B. Clarke: Gagnep. (1918a) 293, in clavis; (1921) 1076, f. 122.

*Thladiantha cordifolia* auct. non (Blume) Cogn.: Keraudren (1975) 30, f. 6: 1–6; S.K. Chen (1995b) 300.

Climber to 10 m tall, possibly with tuberous root; stem of leafy shoots (2–)3(–4) mm thick, rather densely soft-patently hairy, hairs pale brown, (1–)2–3 mm long. *Probract* usually absent, occasionally present (when male inflorescence with solitary flower at base of peduncle present),  $\pm$  rhomboid-elliptic, c. 1.5 cm long, dentate or incised in apical half. *Tendrils* unbranched, not spiralling in lower third, hairy. *Leaves*: blade simple, ovate (or narrowly ovate), 7–17 by 4.5–12 cm, base deeply cordate, apex acute-acuminate, margin (densely) finely dentate, upper surface  $\pm$  sparsely mixed-hairy, the shorter hairs finally leaving small cystoliths, lower surface more densely hairy especially on veins; petiole 4–12 cm long, soft-hairy. *Male inflorescences*: a peduncled raceme, 6–15 cm long, with up to 20 bracteate flowers crowded in a head 2.5–4 cm diam. at apex; peduncle 5–10 cm long, soft-hairy, hairs (1–)2–3 mm long; bracts  $\pm$  rhomboid-obovate or wedge-shaped, 1.5(–2) by 1.5 cm, the apical part  $\pm$  rounded, shallowly or deeply (1/4 to 1/2) incised, the lobes acute to long-acuminate, base narrow, subglabrous to (sparsely) long-hairy, hairs 0.5–2 mm long; bracts persistent after flowering. *Male flowers*: sparsely hairy, frequently up to 3 open flowers in one raceme; pedicel short, 2(–3) mm long, articulate towards base; receptacle-tube broadly cup-shaped, c. 3 by 5 mm, finely papillose in the throat; sepals (narrowly ovate-)linear, 8–12 by 1–1.5 mm, 3(–5)-nerved, sparsely hairy; petals narrowly ovate, obtuse, 15–20 by 7–10 mm, 7-nerved, inside finely papillose; basal petal scales: one or two large, 2–2.5 mm long, up to 3 smaller ones present or absent; filaments 3–4 mm long (one shorter than the others), glandular-hairy, anthers 3–4 mm long; disc c. 2.5 mm diameter. *Female flowers*: not known. *Fruit* solitary, subglobose, c. 3 by 2.5 cm, irregularly striate-verrucose, (sparsely) hairy; fruiting pedicel c. 6 cm long. *Seeds* pear-shaped (or ovoid), somewhat narrowed at base, rather flattened, c. 5 by 3.5 by 1.5 mm, finely verrucose, margin  $\pm$  square.

Field note — Fruit fleshy, dirty white.

Distribution — S Yunnan, N Thailand, N Vietnam (type), Laos.

Habitat & Ecology — Hill evergreen forest, scrub edges by streams; 300–1500 m altitude. Flowering: all year round; fruiting: July.

Note — *Thladiantha calcarata* C.B. Clarke var. *tonkinensis* Cogn. (1916: 50) was based on *Balansa* 4004 & 4549 and described as a rather glabrescent plant. We have examined *Balansa* 4004 in P and E and *Balansa* 4549 in L. The latter is rather hairy, the former quite glabrous. Therefore, we have chosen *Balansa* 4004 as lectotype.

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## IDENTIFICATION LIST

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|---|--------------------------------------|
| 1 = <i>Sinobaijiana smitinandii</i>                     | 4 = <i>Thladiantha angustisepala</i> |
| 2 = <i>Siraitia grosvenorii</i>                         | 5 = <i>Thladiantha cordifolia</i>    |
| 3a = <i>Siraitia siamensis</i> var. <i>siamensis</i>    | 6 = <i>Thladiantha hookeri</i>       |
| 3b = <i>Siraitia siamensis</i> var. <i>silomaradjae</i> | 7 = <i>Thladiantha indochinensis</i> |
|   | 8 = <i>Thladiantha tonkinensis</i>   |

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