

***Zehneria* (Cucurbitaceae) in Thailand, with a note on
the Indian *Zehneria maysorensis***

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ABSTRACT. A taxonomic revision of the genus *Zehneria* Endl. in Thailand is presented. There are eight species of which four are new: *Z. brevirostris*, *Z. hermaphrodita*, *Z. sphaerosperma*, endemic to Thailand, and *Z. tenuispica* (also Myanmar). The well-known name *Z. maysorensis* for a common Thai species needed to be changed into *Z. bodinieri*; the reason for this name change is discussed.

Keywords: *Zehneria*, Cucurbitaceae, Thailand.

INTRODUCTION

The genus *Zehneria* is at present restricted to those minor cucurbits with small, white or yellow, mostly monoecious flowers, which in the male have all 3 stamens with 2-thecous anthers (Jeffrey, 1962; Keraudren, 1975). Related genera with simple tendrils like *Mukia*, *Solena*, and others not in Thailand are excluded. *Zehneria* still appears heterogenous systematically by this definition, but pending a detailed study over the complete area of all species in Asia the generic name *Zehneria* alone is retained for Thailand.

Recent intensive collecting and study has shown that eight species are present in Thailand, of which four are new endemic ones, most interestingly one with hermaphroditic flowers, and one with very minute flowers and fruit containing only 1 (or 2) globose seeds. Because the names of these species are needed for floristic purposes, a concise treatment is presented.

ZEHNERIA IN THAILAND

ZEHNERIA

Endl., Fl. Norfolk I.: 69. 1833; Miq., Fl. Ind. Bat.: 654. 1856; C.B. Clarke in Hook. f., Fl. Brit. Ind. 2: 624. 1879; Keraudren in Aubrév. & Leroy, Fl. Camb., Laos & Viêt-nam 15: 50. 1975. Type species: *Zehneria baueriana* Endl. (Norfolk I.).— *Melothria* auct. non L.: Benth. & Hook. f., Gen. Pl. 1: 830. 1867; Cogn. in A. & C. DC., Monogr. Phan. 3: 572, p.p. 1881; in Engl., Pflanzenr. 66, 4. 275. 1: 75, p.p. 1916; Gagnep., Fl. Gén. Indoch. 2: 1058. 1921; Craib, Fl. Siam. Enum. 762. 1931; Chakrab., Rec. Bot. Surv. India 17: 138. 1959; Backer in Backer & Bakh. f., Fl. Java 1: 296. 1964; Ohwi, Fl. Jap.: 847. 1965.— *Pilogyne* Eckl. ex Schrad., Ind. Sem. Hort. Goett.: 5. 1835. Type species: *Pilogyne suavis* Schrad. (South Africa).

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Note.— According to modern opinion (Jeffrey, 1962) the genus *Melothria* can best be regarded as confined to America.

Small climbers; stems herbaceous; annual or subperennial. *Leaves* simple, petiolate; blade ovate-cordate, triangular, hastate, or palmately lobed, apex acute-acuminate. *Tendrils* simple. *Probract* absent. *Flowers* small, white or yellow, monoecious or dioecious, rarely hermaphroditic. *Male flowers* solitary or few to many in sessile or pedunculate racemiform or umbelliform clusters, pedicellate; bracts minute or absent; receptacle-tube campanulate; calyx lobes small, dentiform; petals small, free, entire, valvate or imbricate; stamens (2–)3(–4), all 2-theous; anthers on long filaments, inserted in the lower half of the tube, or anthers subsessile with filaments inserted above the middle of the tube; thecae curved or straight, connective produced or not; disc free from tube, distinct. *Female flowers* solitary or in few- to many-flowered sessile or pedunculate shortly (laxly) racemiform or umbelliform clusters, short or long pedicellate, frequently co-axillary with male; ovary subglobose, ellipsoid or fusiform, glabrous or hairy; ovules few to many, horizontal; perianth as in male flower; staminodes 3, usually present; disc prominent, annular, free from receptacle-tube, surrounding base of style; stigma (2–)3-lobed. *Fruit* solitary or clustered, globose, ellipsoid or fusiform, baccate, red, whitish or green, smooth, sometimes finely pitted when dry. *Seeds* small, elliptic to broadly ovate in outline, compressed or flat, rarely subglobose, margin obscure or distinct, faces smooth, scrobiculate or warted.

About 35 species in the Old World tropics, extending from South Africa and Madagascar through tropical Africa and Asia to Japan, Malesia, Australia and Polynesia.

Notes.— 1. A heterogenous genus in which possibly several distinct genera are to be recognised.

2. Nearly all Thai species are monoecious (except one with hermaphroditic flowers).

KEY TO THE SPECIES

- 1a. Male inflorescence a peduncled raceme. Stamens exserted, inserted in the margin of the receptacle-tube. Petals yellow. Fruit red, juicy. Seeds warted-pitted, margin grooved **5. *Z. marginata***
- b. Male inflorescence a subsessile or peduncled raceme, or male flowers single or paired. Stamens included in the receptacle-tube. Petals white or creamy-white. Fruit red, green, or white. Seeds smooth, unmarginated or margined but margin not grooved 2
- 2a. Male inflorescences a subsessile or a peduncled raceme. Stamens inserted below halfway, or near or at the base of the receptacle-tube. Fruit purple or red, globose. Seeds flat, margined 3
- b. Male flowers solitary, 1 or 2, long-pedicelled (sometimes in a short-shoot resembling a raceme). Stamens inserted in the upper half of the receptacle-tube. Fruit red or green, globose or fusiform 4
- 3a. Male raceme short; flowering part up to 1 cm long. Pedicel of female flower 3–10 mm long. Fruit ca. 1 cm diam. **1. *Z. bodinieri***
- b. Male raceme longer; flowering part 2–4 cm long. Pedicel of female flower ca. 15 mm long. Fruit less than 1 cm diam. **7. *Z. tenuispica***
- 4a. Flowers 2 mm diam. Stamens 2. Fruit globose, red. Seed 1 (or 2), globose **6. *Z. sphaerosperma***
- b. Flowers 4–7 mm diam. Stamens 3. Fruit subglobose or ellipsoid, green or whitish. Seeds many, flat 5
- 5a. Fruit (short) ellipsoid, whitish, ± shiny and translucent, apex rounded or acute, but not rostrate **4. *Z. indica***
- b. Fruit subglobose, ellipsoid or fusiform, green, dark and pale striped, apex rostrate 6
- 6a. Flowers hermaphrodite **3. *Z. hermaphrodita***
- b. Flowers unisexual 7
- 7a. Plant glabrous. Fruit short ellipsoid, when dry apex shortly narrowly beaked, beak to 0.5 cm long **2. *Z. brevirostris***
- b. Plant sparingly soft-hairy. Fruit fusiform, when dry apex longly beaked, beak 1–2 cm long **8. *Z. wallichii***

1. *Zehneria bodinieri* (H. Lév.) W. J. de Wilde & Duyfjes, **comb. nov.**— *Melothria bodinieri* H. Lév., Fl. Kouy-Tcheou: 122. 1914. Type: China, Kouy-Yang, *Bodinier* 1957 (lectotype E, here chosen; isotype P). — *Melothria perpusilla* (Blume) Cogn. var. *subtruncata* Cogn. in A. & C. DC., Monogr. Phan. 3: 608. 1881. Type: Sri Lanka, Thwaites 1613 (lectotype K, here chosen; isotype L). — *Zehneria hookeriana* auct. non (Wight & Arn.) Arn.: C.B. Clarke in Hook. f., Fl. Brit. Ind. 2: 624, p.p. 1879.— *Melothria perpusilla* auct. non (Blume) Cogn.: Cogn. in A. & C. DC., Monogr. Phan. 3: 607. 1881; in Engl., Pflanzenr. 66, 4.275, 1: 106, p.p. 1916; Gagnep., Fl. Gén. Indoch. 2: 1061. 1921; Craib, Fl. Siam. Enum. 1: 764 (incl. var. *subtruncata*). 1931; Chakrab., Ind. J. Agric. Sc. 16, 1: 69, p.p. 1946; Rec. Bot. Surv. India 17, 1: 146, p.p. 1959.— *Zehneria maysorensis* auct. non (Wight & Arn.) Arn.: Gandhi, Fl. Hassan Distr. India: 181, 1976; Matthew, Fl. Carnatic 1: 655, p.p. 1983; Keraudren in Aubrév. & Leroy, Fl. Camb., Laos & Viêt-nam 15: 51, pl. 9, 1–4. 1975; A. M. Lu & Zhi Y. Zhang in A. M. Lu & S. K. Chen, Fl. Reip. Pop. Sin. 73, 1: 173, pl. 45, 9–11. 1986; S. K. Chen in C. Y. Wu, C. Chen & S. K. Chen, Fl. Yunn. 6: 317, pl. 82, fig. 1–5. 1995; P. H. Hô, Fl. Vietnam 1,2: 716, fig. 1986. 1991. (For explanation as to why the name *Z. maysorensis* is not used, see II. Note on *Zehneria maysorensis*).— *Bryonia oxyphylla* Wall. List 6697, nom. nud.— *Bryonia cissoides* Wall. List 6698, nom. nud.

Subherbaceous climber, 2–6 m long, subglabrous, generally drying (dark) brownish; monoecious. *Leaves*: petiole 2–5 cm long; blade ovate-triangular, entire, rarely shallowly lobed, 4–12 by 3–10 cm, base subtruncate or broadly shallowly cordate, apex acute-acuminate, margin denticulate. *Inflorescences* consisting of a peduncled 3–10-flowered short or sometimes ± spike-like proliferous male raceme; peduncle 1–5 cm long, usually co-axillary with a previously developing single pedicelled female flower, rarely female flowers few, subumbellate, peduncled, or female flowers solitary. *Male flowers*: pedicel 1–4 mm long, articulate at apex; bracteole absent; receptacle-tube ca. 3 by 2 mm, with long hairs inside, especially at throat; sepals triangular, ca. 0.5 mm long; petals ovate, ca. 2 mm long, subacute, pubescent at apex and adaxially; filaments 1–2 mm long, inserted halfway up the tube or rather lower (but not at base of tube), subglabrous or long-haired about the middle; anthers circular in outline, ca. 1 mm diam., thecae curved, the two nearly forming a ring, connective ± hairy, not produced; disc depressed globose, ca. 1 mm diam. *Female flowers*: pedicel slender, 2–5 mm long; ovary ovoid-globose, ca. 3 by 2.5 mm, glabrous (except minute raised gland-dots), neck ca. 1 mm long; perianth as in male but petals longer, 2.5–3 mm long; disc ca. 0.5 mm high; style ca. 3 mm long, glabrous, stigma 3-lobed, papillose, 1.5–2 mm diam.; staminodes slender, ca. 2 mm long, the basal portion adnate with receptacle-tube. *Fruit* solitary (rarely 2 or 3), globose, 0.8–1.2 cm diam., glabrous, green, at last (purple or) red, finely netted or pitted when dry; fruiting pedicel 0.3–1 cm long. *Seeds* rather many, flat, ovate(-oblong), ca. 5 by 3–3.5 mm, narrowly margined, smooth, pale brownish when dry.

Thailand.— NORTHERN: Mae Hong Son (*Larsen et al.* 46847, 46849); Chiang Mai (*Bunchuai* 1282; *De Wilde & Duyfjes* 22147, 22165, 22171; *Garrett* 360; *Kerr* 6625; *Maxwell* 87-1115, 88-959, 89-1238, 90-1104, 92-35, 92-486, 92-6051, 95-1189, 97-554, 98-1076; *Phengnaren* 676; *Pooma et al.* 3038; *Shimizu & Hutoh* T10570; *Shimizu & Santisuk* T18705; *Sørensen et al.* 6091; *Van Beusekom & Phengklai* 2660); Chiang Rai (*Chayamarit* 1063; *Maxwell* 97-1280); Lampang (*Maxwell* 95-1195; *Petrmir* 364); Tak (*Hansen & Smitinand* 12910); Phitsanulok (*Shimizu et al.* T11660);

NORTH-EASTERN: Loei (*Charoenphol et al.* 4633; *Koyama* T61506, T61607; *Wongprasert* 0011-19); EASTERN: Chaiyaphum (*Van Beusekom et al.* 4468); E Thailand (*Phengkhlai* 675); SOUTH-WESTERN: Phetchaburi (*Koonthunthod et al.* 333); PENINSULAR: Surat Thani (*Kerr* 12599, *Put* 880).

Distribution.— Widespread, in Sri Lanka (?) and S India (?), and from northern India to China, Indo-China, SE to Peninsular Malaysia, Sumatra, and Sabah.

Habitat & Ecology.— Disturbed places, forest edges, and scrub at 500–1,700 m altitude.

2. *Zehneria brevirostris* W. J. de Wilde & Duyfjes, **sp. nov.** *Zehneriae indicae similis*, fructu globoso aurantiaco, rostro gracili 2–3 mm longo differt. Typus: Thailand, Prachuap Khiri Khan, Sam Roi Yot NP, *Newman*, *Boontavikoon*, *Hemrat & Middleton* 1152 (holotypus BKF; isotypi A, AAU, E, K, L).

Herbaceous delicate annual climber, ca. 1 m long; early glabrescent (few gland-hairs); greenish on drying. *Leaves*: petiole 1–2.5 cm long; blade finely scabrid adaxially, (broad-)triangular, rarely sub-hastate, 2–5.5 by 3–6 cm, base truncate-cordate, apex acute-acuminate, margin shortly remotely dentate, sometimes ± wavy, nerves sparingly minute harshly hairy. *Flowers*: perianth (3–)4 mm diam.; male flowers solitary, usually co-axillary with later developing female, on the main nodes, or in somewhat reduced lateral shoots 2–4 cm long. *Male flowers*: pedicel slender, 7–10 cm long, glabrous; receptacle-tube narrowly cup-shaped, ca. 1.5 by 1.5 mm, glabrous inside and outside; sepals ± outcurved, 0.3–0.4 mm; petals ovate-elliptic, 1.5–2 x 0.7–1 mm, subacute (blunt), minutely papillose-hairy at apex, nerves faint; stamens 3, inserted slightly below receptacle-throat; filaments ca. 0.3 mm long, glabrous; anthers subtruncate-obovate, 0.8–1 by 0.4 mm; thecae straight, ca. 0.8 mm long, connective ± broad, slightly produced, glabrous; disc subglobose, ca. 0.5 mm diam. *Female flowers*: pedicel 4–6 mm long; ovary ovoid-fusiform, 2–4 by 1–2 mm, glabrous, neck 1.5–2 mm long; perianth considerably smaller than in male, ca. 2 mm diam.; receptacle ca. 1 by 1 mm, glabrous (except few minute hairs in throat); sepals ca. 0.2 mm long; petals ca. 1 mm long; disc ca. 0.2 mm high; style ca. 1 mm long, glabrous; stigma deeply 3-lobed, ca. 0.5 mm diam., finely papillose. *Fruit* subglobose, 6–8 mm diam., smooth, glabrous, apex slenderly 2–3 mm beaked (beak may be broken off), orange, 5–10-seeded; fruiting pedicel (4–)8–12 mm long. *Seeds* flat, ovate, ca. 5 by 3 mm, paleish, hardly margined, with square edge, faces shallowly scrobiculate.

Thailand.— NORTH-EASTERN: Loei (*Koyama et al.* T31187); SOUTH-WESTERN: Kanchanaburi (*Den Hoed & Kostermans* 680; *Kostermans* 1096; *Put* 1821; *Van Beusekom et al.* 3983); Ratchaburi (*Larsen et al.* 1193); Phetchaburi (*Larsen et al.* 45353); Prachuap Khiri Khan (*Newman et al.* 1152, type); SOUTH-EASTERN: Prachin Buri (*Kerr* 19842).

Distribution.— Endemic to Thailand.

Ecology.— On limestone rock; 50–400 m altitude; flowering and fruiting June–December; ripe fruit orange.

3. *Zehneria hermaphrodita* W. J. de Wilde & Duyfjes, **sp. nov.** *Zehneria* species *Z. wallichii* similis a congeneribus omnibus floribus hermaphroditis differt. Typus: Thailand, Phetchaburi, Kaeng Krachan NP, *W.J. de Wilde & Duyfjes* 22289 (holotypus BKF; isotypus L). Fig. 1.

Slender annual or biennial creeper or climber, 1–2 m long; early glabrescent; green on drying. *Leaves*: petiole 1–3.5 cm long, sparsely short rough-hairy; blade adaxially scabrid by minute cystoliths, broadly triangular-ovate, 2.5–10 by 2–8 cm, base broadly cordate (with wide sinus), apex acute-acuminate, margin straight or faintly undulate, with sparse minute teeth (0.2 mm long). *Flowers* hermaphroditic, solitary on the nodes; perianth ca. 5 mm diam.; pedicel 3–8 mm long, glabrous or with sparse minute hairs 0.2 mm long; ovary fusiform, glabrous, at apex longer tapering than at base, 8–13 by 1.5–3 mm, neck ca. 1 mm long; receptacle-tube cup-shaped, ca. 2 by 2 mm, glabrous except few short hairs (0.1–0.2 mm long) inside at throat; sepals linear, ca. 0.5 mm long, slightly outcurved; petals valvate, ovate-elliptic, 2.5–3 by 1.5–2 mm, short papillose-hairy, apex blunt (subacute); stamens 3; filaments ca. 1 mm long, inserted halfway up the receptacle, glabrous; anthers obovoid-rhomboid, ca. 1 by 1 mm, thecae ca. 1 mm long, connective broad, glabrous, broadest at apex, shortly produced adaxially; disc carnose, ± conical, cup-shaped, ca. 1 by 1 mm; style ca. 1.5 mm long, ca. 0.3 mm thick, glabrous, stigma obconical, ca. 1.5 mm diam., situated partly below and inside the anthers, consisting of 3 largely adnate lobes, narrowed and shallowly notched at apex. *Fruit* pendent, broadly fusiform, strongly beak-like narrowed at base and apex, ca. 2.5 by 1 cm, basal and apical beaks (5–)7–10 mm long, pale green; fruiting pedicel 0.7–2 cm long. *Seeds* 15–25 per fruit, flat, ovoid-oblong, 5–7 by 3–3.5 mm, smooth, hardly margined.

Thailand.— SOUTH-WESTERN: Phetchaburi, Kaeng Krachan NP (*De Wilde & Duyfjes* 22289, type; *Koonthunthod et al.* 330); Prachuap Khiri Khan, Kui Buri NP (*Middleton et al.* 1249).

Distribution.— Locally endemic to SW Thailand.

Ecology.— Roadsides in evergreen (secondary) forest; 100–600 m altitude; flowering and fruiting August–December.

4. *Zehneria indica* (Lour.) Keraudren in Aubrév. & Leroy, *Fl. Camb., Laos & Viêt-nam* 15: 52, pl. 9, fig. 5–8. 1975; C. Jeffrey, *Cucurbitaceae of Eastern Asia*, Kew: 17. 1980; Kew Bull. 34: 795. 1980; A. M. Lu & Zhi Y. Zhang in A. M. Lu & S. K. Chen, *Fl. Reip. Pop. Sin.* 73, 1: 170, p.p., pl. 45, fig. 1–7. 1986.— *Melothria indica* Lour., *Fl. Cochinch.*: 35. 1790; Ser. in DC., *Prodr.* 3: 313. 1828; Naud., *Ann. Sci. Bot.* 4, 16: 169, tab. 2. 1862; C. B. Clarke in Hook. f., *Fl. Brit. Ind.* 2: 626. 1879; Cogn. in A. & C. DC., *Monogr. Phan.* 3: 598. 1881; in Engl., *Pflanzenr.* 66, 4.275.1: 98. 1916; Gagnep., *Fl. Gén. Indoch.* 2: 1064. 1921; Craib, *Fl. Siam. Enum.* 763. 1931; Chakrab., *Rec. Bot. Surv. India* 17, 1: 150. 1959; Backer in Backer & Bakh. f., *Fl. Java* 1: 297. 1964.— *Eachmandra indica* (Lour.) Arn. in Hook., *Journ. Bot.* 3: 274. 1841; Miq., *Fl. Ind. Bat.* 1: 658. 1856. Type: Viêt-nam, Tourane, *Loureiro* s.n. (BM).— *Bryonia geminata* Blume, *Bijdr.*: 924. 1826. Type: not seen.— *Bryonia tenella* Roxb., *Fl. Ind.* 3: 725. 1832. Type: not seen.— *Zehneria japonica* auct. non (Thunb.) H. Y. Liu: C. Jeffrey: S. K. Chen in C. Y. Wu, C. Chen & S. K. Chen, *Fl. Yunn.* 6: 314, p.p., pl. 82, fig. 6–9. 1995.— *Melothria leucocarpa* auct. non (Blume) Cogn.: Craib, *Fl. Siam. Enum.* 763. 1931, p.p. (the other part is *Zehneria brevirostris*).

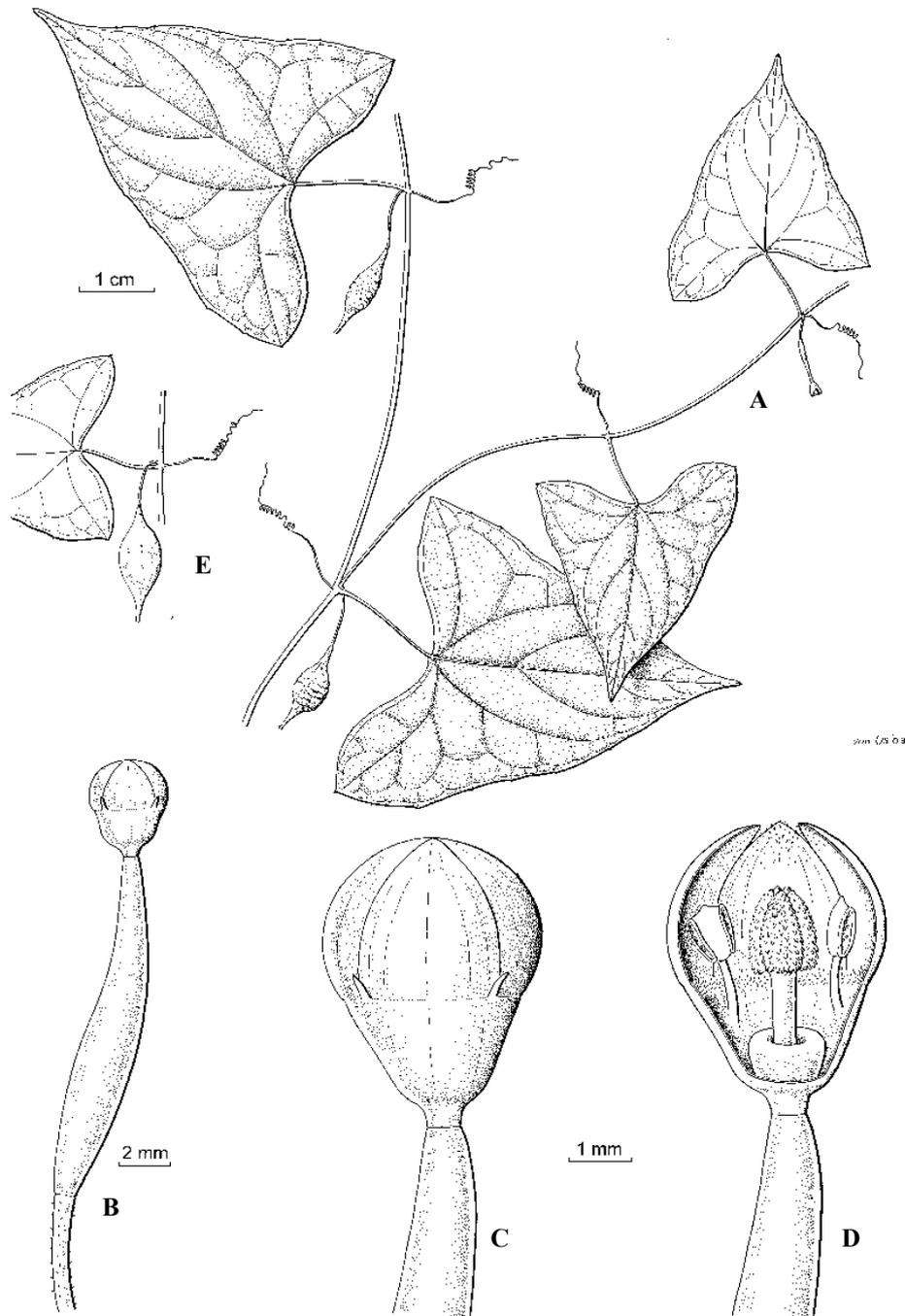


Figure 1. *Zehneria hermaphrodita* W. J. de Wilde & Duyffjes: A. habit with fruiting nodes on main branch, flower on lateral branch; B.-D. flowers; E. fruit (from alcohol material). All from *De Wilde & Duyffjes 22289*. Drawn by Jan van Os.

Slender creeper or climber, 0.5–1.5 m long; monoecious; subannual; largely glabrescent; green on drying. *Leaves*: petiole 1–3 cm long, finely hairy or glabrescent; blade triangular or (deeply) hastately 3(–5)-lobed, 2.5–7(–10) by 3–5.5(–7) cm, base broadly shallowly cordate or subtruncate, apex acute-acuminate, margin faintly dentate. *Flowers*: perianth 4–7 mm diam., male flowers solitary (or paired?), usually co-axillary with 1 or 2 previously developed, longer-pedicelled female flower(s), glabrous (sparsely gland-dotted). *Male flowers*: pedicel slender, 10–15 mm long, articulate at apex; receptacle-tube ± narrowly cup-shaped, 1.5–2 by 1.5–2 mm, glabrous, except for hairy fringe at throat inside; sepals (0.5–)1 mm long, glabrous, recurved; petals ovate-oblong, 2–3.5 by 1.5–2 mm, minutely gland-hairy and papillose ab and adaxially; stamens 3, inserted ca. 0.5(–1) mm below throat of tube, ca. 0.5 mm long, glabrous; anthers obovoid-rhomboid, 1–1.5 mm diam.; thecae straight, ca. 1 mm long, connective broad, broadest at apex, subtruncate with short 0.2 mm projection, (partly) finely hairy; disc elongated, ± obovate-elliptic, ca. 1 mm long. *Female flowers*: pedicel (10–)15–30 mm long; ovary ellipsoid-oblong, 3(–4) by 1.5–2 mm, neck 0.5–1 mm long, glabrous; perianth as in male flowers; staminodes linear, ca. 1 mm long, inserted halfway up the tube; disc thick-carnose, ca. 1 mm high; style 1.5(–2) mm long, stigma ca. 1 mm diam., composed of 3 apically deeply notched lobes, papillose. *Fruit* 1 or 2 per node, subglobose or (short) ellipsoid, not apiculate, 8–12 by 8–10 mm, pericarp thinly leathery or membranous (when dry often leaving the seeds shining through), glabrous; fruiting pedicel 15–30 mm long. *Seeds* 15–25 per fruit, flat, ± obovate, 2–4 by 2.5–3 mm, pale brownish, smooth, unmarginated, with smooth, rounded edge.

Thailand.— NORTH-EASTERN: Khon Kaen (*Na Songkhla et al.* 258); CENTRAL: Bangkok (*Kerr* 4313; *Marcan* 454); PENINSULAR: Nakhon Si Thammarat (*Damsri* 34).

Distribution.— Northern India (where distinction with *Zehneria odorata* C. B. Clarke not sharp), east to Southern China (where distinction with *Zehneria japonica* (Thunberg ex Murray) C. Jeffrey not sharp), through Indo-China, Myanmar? (no material seen), into Malesia south to Java.

Ecology.— Waste ground, gardens, forest edges, shaded roadsides; 0–500 m altitude; flowering and fruiting mainly July to December; flowers white. The fruit colour is rarely recorded as whitish; apparently the fruit is short-lived or frequently early picked by animals. The species is not very showy and apparently not common in Thailand, as only few collections are known.

5. *Zehneria marginata* (Blume) Keraudren in Aubrév. & Leroy, Fl. Camb., Laos & Viêt-nam 15: 55, pl. 9, fig. 4. 1975; A. M. Lu & Zhi Y. Zhang in A. M. Lu & S. K. Chen, Fl. Reip. Pop. Sin. 73, 1: 172. 1986; S. K. Chen in C. Y. Wu, C. Chen & S. K. Chen, Fl. Yunn. 6: 316. 1995.— *Bryonia marginata* Blume, Bijdr.: 924. 1826; Ser. in DC., Prodr. 3: 305. 1828; M. Roem., Syn. Monogr. 2: 36. 1846; Miq., Fl. Ind. Bat., 1: 660. 1856.— *Melothria marginata* (Blume) Cogn. in A. & C. DC., Monogr. Phan. 3: 593. 1881; in Engl., Pflanzenr. 66, 4.275.1: 93. 1916; Backer in Backer & Bakh. f., Fl. Java 1: 296. 1964. Type: Java, *Blume* 920 (L).— *Bryonia epigaea* (possibly sphalm. of the herbarium label name *exigua*) Blume, Bijdr.: 925. 1826, non Rottl. Type: *Blume* s.n. (L, HLB 901.288-359).— *Melothria marginata* (Blume) Cogn. var. *heterophylla* (Blume) Cogn. in A. & C. DC., Monogr. Phan. 3: 594, p.p. (excl. type, incl. *Zollinger*

1136 in herb. Franqueville, P). 1881; in Engl., Pflanzenr. 66, 4.275.1: 93, p.p. 1916.— *Bryonia heterophylla* Blume, Bijdr.: 925. 1826, non Steud. Type: Java, Blume s.n. (L).— *Aechmandra blumeana* M. Roem., Syn. Monogr. 2: 33, p.p. 1846; Miq., Fl. Ind. Bat., 1: 657, p.p. 1856 [a new name for *Bryonia epigaea* Blume (sphalm. *exigua*)].— ? *Cerasiocarpum maingayi* C. B. Clarke in Hook. f., Fl. Brit. Ind. 2: 629. 1879. Type: Peninsular Malaysia, Maingay 1268 (K).— ? *Cerasiocarpum penangense* C. B. Clarke in Hook. f., Fl. Br. Ind. 2: 629. 1879. Type: Peninsular Malaysia, Penang, Wallich 6704 (K–W).— *Melothria affinis* King, Journ. Asiat. Soc. Beng. 67: 38. 1898; Mat. Fl. Mal. Penins., Calycifl.: 382. 1902; Cogn. in Engl., Pflanzenr. 66, 4.275.1: 94. 1916; Craib, Fl. Siam. Enum. 762. 1931. Lectotype: Peninsular Malaysia, Perak, King's Collector 1068 (K, selected here).— *Melothria gracilipes* Merr., Papers Mich. Acad. Sci. 19: 199. 1934. Type: Bartlett 7228 (holotype NY; isotype MICH).— *Bryonia filicaulis* Wall. List 6713, nom. nud. [mentioned under *Kedrostis rostrata* (Rottl.) Cogn. by Cogniaux (1881) 636; (1916) 142; under *Rhynchocharpa rostrata* (Rottl.) by Kurz (1877) 105; under *Rhynchocharpa foetida* Schrad. by C. B. Clarke in Hook. f. (1879) 627; and under *Kedrostis foetidissima* (Jacq.) Cogn. by Jeffrey (1980) 805]. Wall. 6713 (photo seen) is the only collection from Myanmar known to us. Fig. 2.

Annual or biennial, (sub)herbaceous, prostrate, sometimes creeping, or climbing, (0.5–)1–4 m long, variously scabrid hairy, stem glabrescent; monoecious; green on drying. *Leaves*: petiole 1–5 cm long; blade very variable in shape, (long) triangular, ovate, cordiform, entire or (hastately) 3-lobed, 4–16 by 3–10 cm, base truncate, rounded, or (deeply) cordate, apex acute-acuminate, margin straight with minute teeth or (coarsely) dentate, upper surface rough-hairy (strigose) and/or scabrous by (coarse) cystoliths, lower surface coarsely hairy mostly only on the nerves. *Inflorescences* glabrescent in male 1(–3) slender peduncled, short (or long) densely flowered raceme(s), usually co-axillary with 1 (or 2) previously developed long-pedicelled female flower(s); peduncle 1.5–6 cm long, ca. 0.5 mm thick; flower-bearing part 0.3–1(–2) cm long, (3–)5–10(–25)-flowered; pedicels slender, half-patent, bracts absent; peduncle and pedicels persisting after flowering. *Male flowers*: pedicel 2–7 mm long, at apex articulate; receptacle-tube cup-shaped, 1.5–2 mm diam., sparsely coarsely hairy outside, throat pubescent; sepals linear, ± out-curved, ca. 0.5 mm long, with sparse hairs; petals imbricate, pale or bright yellow, ovate-oblong, apex rounded or (sub)obtuse-acuminate, (2–)3–4 by 2.5–3 mm, (papillose) hairy; stamens inserted in the throat of the receptacle, erect, protruding; filaments 1–1.5 mm long, glabrous; anthers ca. 1 mm diam., thecae straight, ca. 1 mm long, connective ± narrow, not produced; disc depressed globose, ca. 1 mm diam. *Female flowers*: pedicel 0.5–3 cm long; ovary ellipsoid, with sparse hairs, subglabrescent; perianth as in male but petals larger, 4–5 mm long; staminodes linear, ca. 1 mm long, inserted at base of receptacle; disc less than 1 mm high; style ca. 2 mm long; stigma consisting of 3 feather-like arms, shallowly forked at apex, each ca. 2 mm long. *Fruit* a berry, remarkably variable in shape and texture (see note), globose, 1–1.5 cm diam., or ellipsoid(-oblong) with base and apex rounded, or fruit narrowly oblong, tapering at base and apex, 1.5–2(–3) by ca. 0.5 cm, glabrescent from few sparse hairs; pericarp on drying membranous or ± leathery, leaving the seeds visible or not; ripe fruit red, juicy or pulpy; fruiting pedicel short or long, (0.5–)1–5 cm long. *Seeds* (few or) many, (1–)5–35 per fruit, whitish, flattened, ovate-oblong, (3–)4–5 by (1.5–)3.5 by ca. 1.5 mm, distinctly ± square-margined, faces (deeply) coarsely scrobiculate.

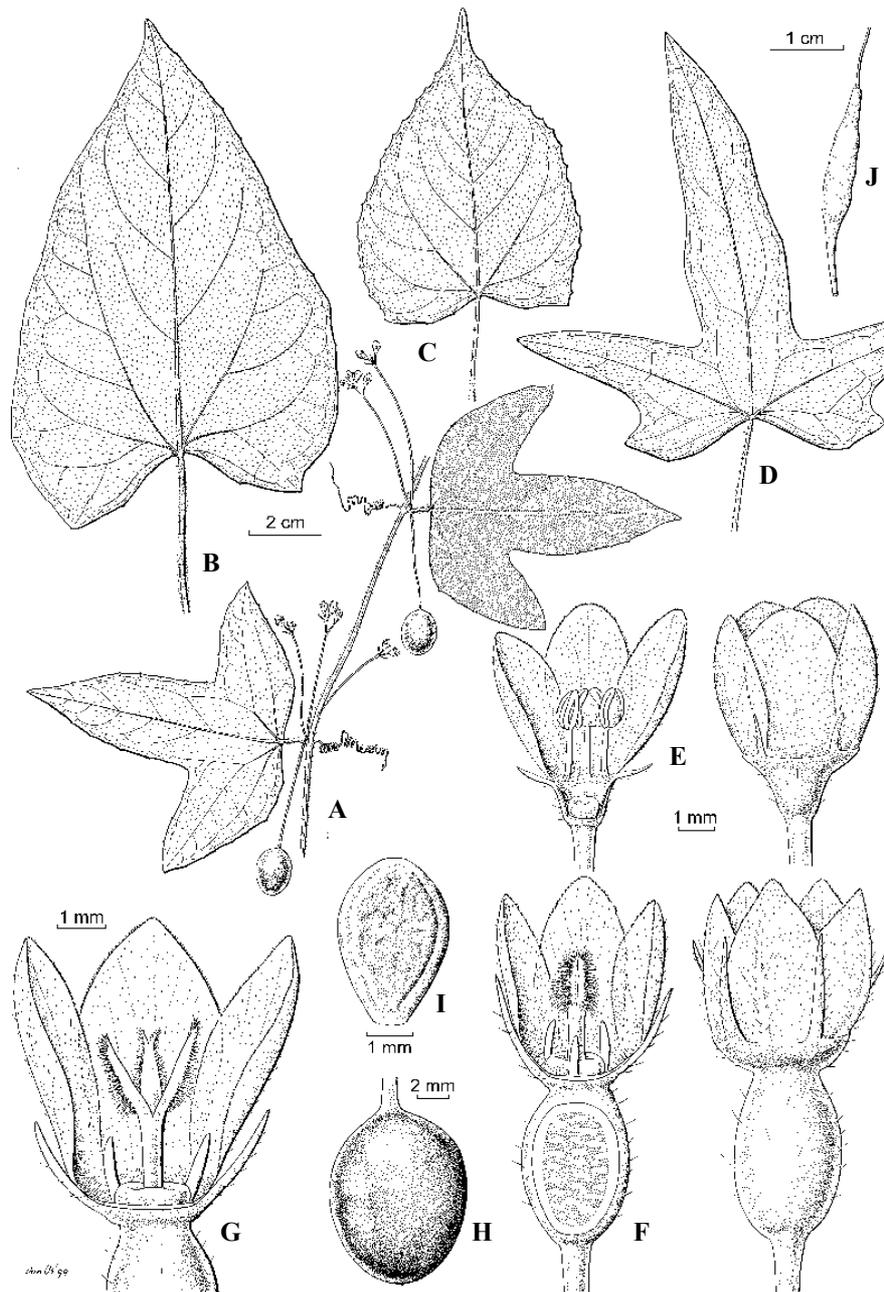


Figure 2. *Zehneria marginata* (Blume) Keraudren: A. habit; B.–D. leaves; E. male flowers; F., G. female flowers; H. fruit (informal form '*marginata*'); I. seed; J. fruit (informal form '*affinis*'). A. from *Awong Kaya* s.n. (Barcode: L 0130026) (Brunei); B. from *De Wilde & Duyffjes* 12614 (Sumatra); C. from *De Wilde & Duyffjes* 21794 (Sumatra); D. from *Iwatsuki c.s.* 1732 (Sumatra); E.–H. from *De Wilde & Duyffjes* 21756 (Sulawesi); I. from *De Wilde & Duyffjes* 21699 (Java); J. from *De Wilde & Duyffjes* 22182 (Thailand). Drawn by Jan van Os.

Distribution.— East Myanmar (*Wallich* 6713, photo seen), China (Yunnan, no material seen), through Thailand, Laos, Cambodia, Vietnam and SE to Sumatra, Peninsular Malaysia, West Java, Borneo (mainly Sabah), Philippines, and Central Sulawesi.

Ecology.— Open and shaded places, mostly along forest edges, roadsides, at 0–1,500 m altitude; flowering and fruiting mostly June to December.

Notes.— 1. Both Cogniaux (1881) and King (1898) described the fruit as velvety, but this aspect is obviously caused by drying; in fact the fruit is early glabrescent.

2. King (l.c.) described the tendril, erroneously, as bifid, a condition which never occurs in *Zehneria*.

3. Apart from the very variable habit of the plant, mainly due to variation in leaf-shape and indumentum, this species exhibits a remarkable and unlikely variation in fruit-shape and length of fruiting pedicel (fruit globose with long pedicels or fruit oblong-fusiform with short pedicels), a variation unknown in any other Asian cucurbit. Although most herbarium specimens have a constant fruit form, there are several collections indicating that both forms occur in one plant, and sometimes they can be found connected on one herbarium sheet. The difference in this aspect has led to the description or recognition of this species under several names even by single authors. Because of the striking differences in fruit shape one could, for convenience, recognise two poorly segregated informal forms. The form with elongate, fusiform fruit may be related to poor soils and be precociously flowering, because most specimens are relatively small plants, but this idea needs further study.

The informal form '*marginata*' (Fig. 2, A–I) represents the type (*Blume* 920, in L) of the oldest available name. It has *fruit* narrow, ellipsoid-oblong, ± fusiform, 1.5–3 by ca. 0.5 cm, base (sub)acute, apex narrowly obtuse, acute-acuminate, or rostrate, juicy when ripe; fruiting pedicel shorter than the fruit, ca. 0.5 cm long; *seeds* (1–)5–12 per fruit. It has distribution the same as the species. Specimens seen: NORTHERN: Lamphun (*Maxwell* 93-1283); SOUTH-WESTERN: Kanchanaburi (*De Wilde & Duyfjes* 22182).

The informal form '*affinis*' (Fig. 2, J) has *fruit* globose or (short) ellipsoid, 0.8–1.5 cm diam., base and apex obtuse or (broadly) rounded, pulpy or juicy when ripe; fruiting pedicel longer than the fruit, 1–5 cm long; *seeds* 20–30 per fruit. Its distribution is, like the form '*marginata*', the same as the species; it is the commonest form, and common all over Thailand. Selection of specimens seen: NORTHERN: Chiang Mai (*De Wilde & Duyfjes* 22176); Lampang (*Maxwell* 97-410); EASTERN: (*Larsen et al.* 31538); SOUTH-WESTERN: Phetchaburi (*Newman et al.* 1032); PENINSULAR: Chumphon (*Khantchai* 1113); Phangnga (*Niyomdham & Puudjaa* 3320); Yala (*Maxwell* 86-1050).

6. *Zehneria sphaerosperma* W. J. de Wilde & Duyfjes, sp. nov. a congeneribus omnibus cognitis in fructu 1 (vel 2) seminibus subglobosis differt.— Differs from all other known *Zehnerias* by fruit 1 (or 2) seeded, seed subglobose. — Typus: Thailand, Saraburi, *Pooma*, *De Wilde, Duyfjes, Chamchumroon & Phattarahirankanok* 3043 (holotypus BKF; isotypus L). Fig. 3.

Tiny slender climber, ca. 1 m long, young parts with fine glandular hairs, early glabrescent; annual. *Leaves*: petiole 1–3 cm long, sparsely hairy, blade triangular, 3.5–5 cm long and broad, base subtruncate, shallowly retuse, apex acute-acuminate, margin

shallowly repand-dentate, adaxially with small cystoliths, nerves sparsely scabrous-hairy. *Flowers* minute, petals 4 or 5, (sub)valvate-imbricate. *Male flowers*: single, co-axillary with single female flower; pedicel 2–4 mm long, the portion below the articulation sparsely with glandular hairs; open perianth 2–2.5 mm diam.; receptacle-tube cup-shaped, ca. 1 by 1.5 mm, finely hairy at throat inside; sepals oblong-linear, 0.5–0.7 mm long, slightly out-curved; petals \pm elliptic, 1–1.2 mm long, subobtuse, with a few hairs on the margin and adaxially papillose, nerves (3–)5; stamens (2 or) 3, inserted about level with the apex of the disc; filaments slender, slightly shorter than anthers, 0.4–0.6 mm long; anthers ca. 0.8 by 0.6 mm, connective at apex truncate or slightly produced; disc comparatively large, \pm obovoid-globose, 0.5–0.7 mm diam. *Female flowers*: solitary or co-axillary with male; pedicel ca. 3 mm long, receptacle-tube ca. 0.8 by 0.8 mm; sepals ca. 0.3 mm long; petals ca. 1.2 by 0.7 mm; disc conspicuous, ca. 0.3 by 0.6–0.7 mm, faintly 3-lobed; style ca. 0.8 mm long, stigma ca. 0.5 mm across, consisting of 3 subsessile lobes, papillose hairy; staminodes oblong or narrowly spatulate, 0.3–0.4 by ca. 0.2 mm, inserted towards the base of the receptacle-tube; ovary subglobose-ellipsoid, ca. 2.5 by (1.5–)1.7 mm, glabrous, very finely papillose, neck ca. 0.5 mm long; ovules 3, enclosed in watery pulp. *Fruit* solitary, depressed globose, 5–7 mm diam., not or narrowly very shortly beaked, glabrous, exocarp membranous, smooth, red; fruiting pedicel 3–4 mm long. *Seeds* 1 or 2, creamy, enclosed in scant watery pulp, (sub)globose, 3.5–4 mm diam., smooth, with distinct equatorial ridge, faces hemiglobose swollen, at base sagged.

Thailand.— CENTRAL: Lop Buri (*Mitsuta et al.* T 38223); Saraburi (*Smitinand & Sleumer* 1339, *Pooma et al.* 2990; 3043).

Distribution.— Locally endemic to Thailand, ca. 100 km N of Bangkok.

Ecology.— Trailing in light shade over eroded limestone rock; 100–350 m altitude. Fruits bright red when ripe and \pm juicy with big creamy-white seeds, which are carried away into crevices by dark-brown ants, obviously facilitating local dispersal; flowering and fruiting in August and October.

Note.— *Zehneria sphaerosperma* is distinct from all other species in its glandular hairs, very small 4- or 5-merous flowers, only 2 (or 3) stamens, a reduced number of ovules and seeds, and comparatively large seeds with conspicuously swollen faces rendering these large and globose. The aestivation is difficult to ascertain due to the very small dimensions of the corolla lobes.

7. *Zehneria tenuispica* W. J. de Wilde & Duyfjes, sp. nov. *Zehneriae bodinieri* affinis, gracillima, racemis masculis gracilibus spiciformibus, floribus ca. 3 mm diam. notata. Typus: Thailand, Kanchanaburi, *Maxwell* 93-1209 (holotypus L).

Delicate annual climber, 50–100 cm long, subglabrous; monoecious; green on drying. *Leaves*: petiole 1.5–3.5 cm long; blade thinly membranous, subovate, (3–)5-angular or shallowly lobed, scabrid by minute cystoliths adaxially, 3–9 by 2.5–8 cm; base shallowly or deeply cordate, apex acute-(long)acuminate, margin sparsely shallowly dentate. *Inflorescences* in male a solitary slender peduncled spike-like raceme; peduncle 1.5–4 cm long, flower-bearing portion 2–4.5 cm long, with 5–15 patently short-pedicelled, spaced flowers, the basal ones usually paired; flowers 2.5–3 mm diam., whitish; bracts absent. *Male flowers*: pedicel 2.5–4 mm long, at apex articulate,

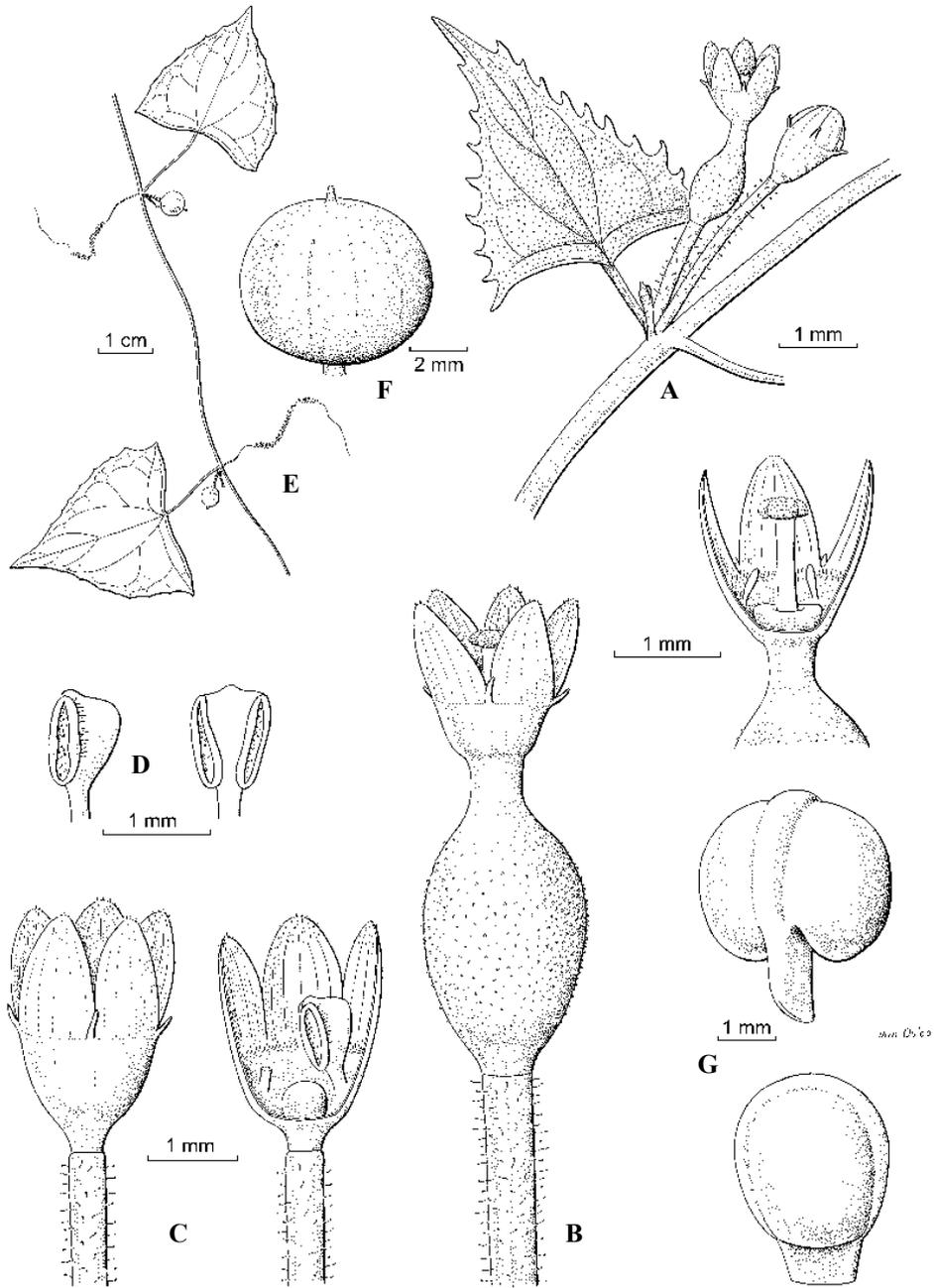


Figure 3. *Zehneria sphaerosperma* W. J. de Wilde & Duyfjes: A. habit of flowering node; B. female flowers; C., D. male flowers and separate stamens; E. portion of stem with fruits; F. fruit; G. seeds. All from *Pooma et al.* 3043. Drawn by Jan van Os.

glabrous; receptacle tube (broad) cup-shaped, 1.5–2 by 2–3 mm, glabrous except for a few slender hairs inside; sepals ca. 0.2 mm long; petals ovate-elliptic, 0.8–1 by 0.8–1 mm, subobtusate, minutely papillose towards apex; stamens 3; filaments 1.5–1.8 mm long, glabrous, inserted near the base of receptacle; anthers ca. 0.3 mm diam.; thecae vertical, somewhat curved, 0.2–0.3 mm long, connective slightly swollen, with few stiff hairs; disc depressed globose, ca. 0.5 by 1 mm. *Female flowers*: solitary on the node or co-axillary with male raceme; pedicel filiform, 12–15 mm long; ovary fusiform-ellipsoid, ca. 1.5 by 1.2 mm, glabrous, neck nearly 1 mm long; perianth like male; disc conspicuous, a \pm 3-lobed ring, ca. 0.5 mm high, at base partly connate with receptacle; staminodes not seen; style 1–1.2 mm long; stigma 0.7 mm diam., consisting of 3 sessile subglobose papillose free lobes. *Fruit* immature, globose; fruiting pedicel at least 2.5 cm long. *Seeds* not seen.

Thailand.— NORTHERN: Chiang Rai, Doi Tung, (*Iwatsuki et al.* T10980); SOUTHWESTERN: Kanchanaburi, Thung Yai Naresuan Wildlife Sanctuary (*Maxwell* 93-1209, type).

Distribution.— Myanmar.

Ecology.— Grass field in open places, rugged limestone terrain; at 400–500 m altitude; flowering in September and October.

8. *Zehneria wallichii* (C. B. Clarke) C. Jeffrey, *Kew Bull.* 34: 802. 1980; Cucurbitaceae of eastern Asia, *Kew*: 18. 1980; A. M. Lu & Zhi Y. Zhang in A. M. Lu & S. K. Chen, *Fl. Reip. Pop. Sin.* 73, 1: 172. 1986; S. K. Chen in C. Y. Wu, C. Chen & S. K. Chen, *Fl. Yunn.* 6: 317. 1995.— *Melothria wallichii* C. B. Clarke in Hook. f., *Fl. Brit. Ind.* 2: 626. 1879; Cogn. in A. & C. DC., *Monogr. Phan.* 3: 592; 1881; in Engl., *Pflanzenr.* 66, 4.275.1: 91. 1916; Craib, *Fl. Siam. Enum.* 765. 1931; Chakrab., *Ind. J. Agric. Sc.* 16, 1: 72. 1946; *Rec. Bot. Surv. India* 17, 1: 156, fig. 71. 1959. Type: Myanmar, Prome, *Wallich*, 6706D (K-W). Fig. 4.

Slender annual climber, 1–4 m, finely soft pale glandular-hairy and with hairs 1–2 mm long, tardily glabrescent; greenish on drying. *Leaves*: petiole 1–6 cm long, \pm harshly whitish hairy; blade (sub)triangular, 4–11 by 3.5–10 cm, base truncate or very shallowly retuse, apex acute-acuminate, margin straight or faintly undulating, dents (?) minute; older leaves adaxially with dense cystoliths; nerves \pm patently hairy. *Flowers* ca. 7 mm diam. *Male flowers*: long-pedicelled, solitary or co-axillary with a solitary slightly later developing female flower, on the nodes of the leafy stem, or male flowers slightly shorter pedicelled and arranged in loose short-shoots to 5 cm long from the nodes; pedicel 10–20 mm long, filiform, sparsely pale hairy; receptacle-tube \pm narrowly cup-shaped, ca. 2.5 by 2 mm, glabrous but inside densely finely long-haired (ca. 0.5 mm) at throat; sepals linear, ca. 1 by 0.2 mm, recurved; petals 3–5 by 2–2.5 mm, ovate-elliptic, apex obtuse or subacute, abaxially and at apex papillose and glandular-hairy; stamens 3, inserted slightly below the apex of the tube; filaments 0.8–1 mm long, glabrous; anthers ca. 1.2 by 0.7 mm, \pm obtriangular; thecae straight, ca. 1 mm long, connective broad, widening towards apex, slightly produced; disc obovoid, 1–1.2 by 0.6–0.7 mm. *Female flowers*: pedicel 5–8 mm long; ovary narrowly fusiform, (10–)20–30 by (1–)2–3 mm, long-tapering towards apex into a narrow neck ca. 1 mm long, glabrous (except very fine sparse papillae), ovules many; perianth as in male; staminodes 3, linear, ca. 1 mm long, inserted halfway up the receptacle-tube; disc carnos,

nearly 1 mm high; style ca. 3 mm long; stigma consisting of 3 deeply notched papillose lobes, together ca. 1.5 mm diam. *Fruit* pendent, oblong-fusiform, 4–6 by ca. 1 cm (on drying narrowed into slender beaks ca. 1.5 cm long, at base and apex, leaving the middle portion with seeds thick), pale green and dark green striped; fruiting pedicel 1–2 cm long. *Seeds* many, flat, whitish, ± ovate, ca. 5 by 3 mm, smooth, margin faint.

Thailand.— NORTHERN: Mae Hong Son (*Iwatsuki & Fukuoka* T10339; *Larsen et al.* 2249); Chiang Mai (*De Wilde & Duyffjes* 22149, 22153, 22157, 22168, 22177; *Kerr* 1942; *Koyama* T61152; *Maxwell* 87-919, 88-844, 90-799, 90-824; *Palee* 314; *Petrmitr* 90; *Tagawa et al.* T9793, T10619); Chiang Rai (*Palee* 428); Nan (*Larsen et al.* 43664); Lampang (*Maxwell* 95-539, 96-1151); Tak (*Shimizu et al.* T10792); Nakhon Sawan (*Kerr* 4619); SOUTH-WESTERN: Prachuap Khiri Khan (*Shimizu* 7749); CENTRAL: Saraburi (*Maxwell* 74-618).

Distribution.— E Myanmar; also reported from China (Yunnan) but no material seen.

Ecology.— Open deciduous forest; gullies, damp shaded sites; on granitic, shale, or limestone bedrock; 200–1,500 m altitude; flowering and fruiting (June) July–October.

A NOTE ON *ZEHNERIA MAYSORENSIS*

The species here named *Zehneria bodinieri* is one of several closely related species, part of which can be united into one extremely variable species with a very wide distribution in Africa and Asia, and of which the oldest name is *Bryonia scabra* Linn. f., typified by a specimen of Thunberg from the Cape, South Africa, and placed in *Zehneria* by Sonder (1862). Here, however, we regard the African taxa as distinct from those of Asia. Members of this group, at least in Asia, are generally (dark) brown on drying, in contrast to greenish in other species.

The present species, *Zehneria bodinieri*, has, in recent decades, been known as *Zehneria maysorensis* (Wight & Arn.) Arn., with which we do not agree. This latter species was originally described as *Bryonia maysorensis* Wight & Arn. (Wight & Arnott, 1834) together with the related *B. hookeriana* Wight & Arn., both from peninsular India. The essential difference between the two peninsular Indian species is in the shape of the ovaries and fruit: ellipsoid in *B. maysorensis* and globose in *B. hookeriana*. Both names were combined under *Zehneria* by Arnott (1841), and both names were placed in the synonymy of older Asian epithets of Blume by Cogniaux (1881, 1916) and Chakrabarty (1959). In the explanation to the plates Wight (1844) united both species under one species *Bryonia mysorensis* (sphalm. for *maysorensis*). This was followed by many recent authors, including Jeffrey (1962) who accepted for Asia three species, viz. *Z. scabra* L. (also in Africa), *Z. mucronata* (Blume) Miq., and *Z. maysorensis* (incl. *Z. hookeriana*).

As regards the unifying of *Z. maysorensis* and *Z. hookeriana*, we think that this is not warranted; following Cogniaux (1881, 1916) we maintain that both species are distinct. In fact, contrary to recent belief, for (southern) peninsular India we accept three distinct species in this alliance, viz.

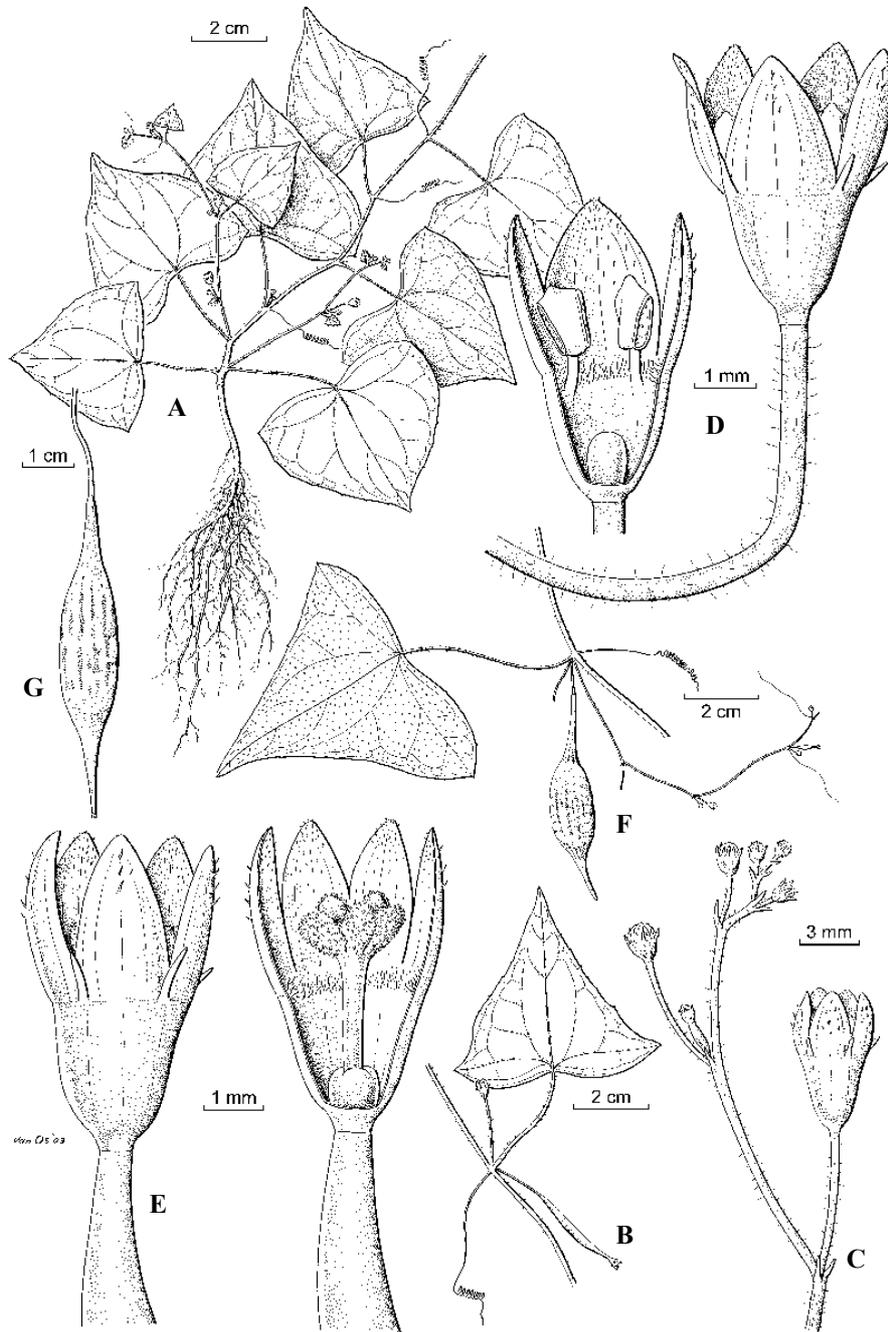


Figure 4. *Zehneria wallichii* (C. B. Clarke) C. Jeffrey: A. habit of base of plant; B. node of older plant with male and female flower; C. tip of flowering lateral twig; D. male flowers; E. female flowers; F. node with fruit and flowering lateral twig; G. fruit (from alcohol material). A. from Maxwell 90-799; B.-G. from De Wilde & Duyffes 22149. Drawn by Jan van Os.

1. *Zehneria maysorensis* (Wight & Arn.) Arn. Type: S India, *Wallich* 6702 A–D, *Wight* 1116.— *Zehneria maysorensis* (Wight & Arn.) Arn. var. *oblonga* V. P. Prasad & M. Prasad, J. Econ. Taxon. Bot. 17 (2): 471. 1993. Type: S India, *Vivekananthan* 45710 (MH, not seen).— Monoecious or dioecious. Ovary and fruit ellipsoid, longer than broad. Distribution: confined to southern peninsular India, at low altitudes.

2. *Zehneria bodinieri* (Lévl.) W. J. de Wilde & Duyfjes. Lectotype: China, *Bodinier* 1957 (E).— Monoecious. Ovary and fruit globose. Distribution: widespread, in Sri Lanka and southern peninsular India, and from N India to S China, Indochina and Malesia, at low and medium altitudes

3. *Zehneria hookeriana* (Wight & Arn.) Arn. Type: S India, *Wight* 1117.— Monoecious. Ovary and fruit globose. Distribution: endemic to southern India, in montane area.

For the whole SE Asian region we recognise further (see Simmons, 2000):

4. *Zehneria mucronata* (Blume) Miq. Type: Java, *Blume* s.n.— Monoecious or dioecious. Ovary and fruit ellipsoid. Distribution: widespread in SE Asia and Malesia, at low and medium altitudes. *Zehneria maysorensis* is very similar to the older *Zehneria mucronata*, and is possibly only a synonym of it.

5. *Zehneria repanda* (Blume) Simmons. Type: Java, *Blume* s.n.— Dioecious (always?). Ovary and fruit globose. Distribution: a mountainous species in Malesia.

6. In mountainous New Guinea there is still an undescribed species, belonging to the group of the above mentioned ones. In the Pacific one or possibly more species could be recognised, including *Z. baueriana* Endl., the type species of the genus, from Norfolk Island.

ACKNOWLEDGEMENTS

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