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. hermaphroditica, Z. sphaerosperma, endemic to Thailand, and Z. tenutispica (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-theceous anthers (Jeffrey, 1962; Keraudren, 1975). Related genera with simple tendrils like Mukia, Solena, and others not in Thailand are excluded. Zehneria still appears heterogenous systemically 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


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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-thecous; 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 warty.

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**


5. *Z. marginata*

1b. Male inflorescence a sessile 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, unmargined or margin but margin not grooved

2  

2a. Male inflorescences a sessile 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  

2b. 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*

3b. 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*

4b. 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*

5b. Fruit subglobose, ellipsoid or fusiform, green, dark and pale striked, apex rostrate

6  

6a. Flowers hermaphroditic

3. *Z. hermaphroditica*

6b. Flowers unisexual

7a. Plant glabrous; Fruit short ellipsoid, when dry apex shortly narrowly beaked, beak to 0.5 cm long

2. *Z. brevirostris*

7b. Plant sparingly soft-hairy. Fruit fusiform, when dry apex longly beaked, beak 1–2 cm long

8. *Z. wallichii*

Subherbaceous climber, 2–6 m long, subglabrous, generally drying (dark) brownish; monoeocious. 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; Petrmitr 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 (Phengkhla 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.


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 marginated, with square edge, faces shallowly scrobiculate.

Thailand.— NORTHEASTERN: 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. Zehneriae 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.

Figure 1. Zehneria hermaphrodita W. J. de Wilde & Duyfjes: A. habit with fruiting nodes on main branch, flower on lateral branch; B.–D. flowers; E. fruit (from alcohol material). All from De Wilde & Duyfjes 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 (sparingly 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 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, unmargined, 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.

Annual or biennial, (sub)herbaceous, prostrate, sometimes creeping, or climbing, (0.5–)1–4 m long, variously scabrid hairy, stem glabrescent; monocoeous; 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 acute-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 linear, ca. 1 mm long, 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 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 & Duyfjes 12614 (Sumatra); C. from De Wilde & Duyfjes 21794 (Sumatra); D. from Iwatsuki c.s. 1732 (Sumatra); E.–H. from De Wilde & Duyfjes 21756 (Sulawesi); I. from De Wilde & Duyfjes 21699 (Java); J. from De Wilde & Duyfjes 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 cm long, 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; 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 ± 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, ± 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 spathulate, 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 hemi-globose 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 ± 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.
Zehneria (Cucurbitaceae) in Thailand, with a Note on the Indian Zehneria maysorensis


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, ± 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 ± 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 ± 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, ± 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 carnose,
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 & Dayfjes 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 ZEHRNERIA 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 maysorensis (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 & Dujsjes 22/49. Drawn by Jan van Os.


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.


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**

We feel much indebted and grateful to the staff of BKF, facilitating us to collect and study *Zehneria* in the wild. We thank the keepers of the herbaria BM, BK, BKF, BO, E, K, KEP, L, P, SING, LA for permitting the study of their specimens, Jan van Os (Leiden) for preparing the drawings, and J. F. Veldkamp (Leiden) for providing the Latin diagnosis of the new species.

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