The genus *Gynura* (Asteraceae: Senecioneae) in Thailand

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**KEYWORDS:** *Gynura*, Compositae, revision, taxonomy, Thailand.

**INTRODUCTION**

The genus *Gynura* Cass. (Asteraceae-Senecioneae) comprises 44 species and is distributed from tropical Africa to South and East Asia and Australasia with one species in tropical Australia (Vanijajiva & Kadereit, submitted). The highest specific diversity is found in Southeast Asia (Davies, 1981), but the genus is least well understood particular in Thailand (Davies, 1978; Koyama, 1988). In the absence of extensive fieldwork, the account presented here for Thailand can at best be regarded as provisional.

**MATERIALS AND METHODS**

This study is based mainly on herbarium materials from AAU, BK, BKF, BM, CMU, E, G, K, KEP, KKU, KYO, KUN, L, MJG, P, PSU, QBG, S, SING and TEX (abbreviations according to Holmgren & Holmgren, 1998). Field observations in continental Southeast Asia, mostly Thailand, were made from September to December 2004, January to February 2005 and March to April 2006.

**TAXONOMIC TREATMENT**

**GYNURA**


Perennial herbs or subshrubs or scandent, roots fibrous or tuberous. *Stems* erect, decumbent or scrambling to climbing, fleshy to subsucculent, somewhat woody when old, variously pubescent to glabrous. *Leaves* simple, alternate, cauline or in basal rosette, sessile or petiolate, with or without auricles, papyraceous, fleshy to succulent, pale to dark green, sometimes purplish beneath, variously densely to sparsely pubescent to glabrous; blade linear-lanceolate, oblong, ovate to deltoid, margins entire, crenate, minutely denticulate to coarsely dentate or lyrate to pinnatifidly lobed, apex aciculate to acuminate, base cuneate, truncate or obtusely rounded, rarely unequal. *Capitula* solitary to numerous in lax to dense terminal and/or axillary corymbose panicles; capitula homogamous, discoid, pedunculate; involucres cylindrical or narrowly campanulate, calyculate, calyceal bracts linear-subulate, pubescent to almost glabrous; phyllaries 8–18, free, arranged in a single row, herbaceous with broad to narrow scarious margins, almost glabrous or sparsely to densely pubescent; receptacle flat, glabrous, epaleate. *Florets* numerous, hermaphrodite, orange to yellow, sometimes red or purple, 5-lobed, lobes oblong-lanceolate, acute. *Stamens* 5, anther linear or linear-oblong; anther collar subcylindrical or somewhat balusterform, short to elongate, slightly dilated towards the base; apical anther appendages usually oblong-lanceolate. *Styles* 2-branched, style arms long, exserted, gradually tapered, with prominent apical tuft of papillae, sometimes coloured. *Cypselas* oblong to cylindrical, usually brown, ribbed, pilose to glabrous; carpodion annular, cylindrical to hemispherical, usually yellowish, slightly larger in diam. than cypsela base; pappus of numerous capillary bristles, bristles barbellate, uniform, white, dirty-white or yellowish.

The genus is distributed from tropical Africa to South Asia eastward through southern China, Japan, Southeast Asia and New Guinea into northern Australia, and flowering throughout the year, commonly from December to May. There are 10 taxa in Thailand.

**KEY TO THE SPECIES**

1a. Plants climbing or scrambling ............................................................. 7. *G. procumbens*
   b. Plants erect or decumbent ................................................................................. 2

2a. Basal tuber present ......................................................................................... 3
   b. Basal tuber absent ............................................................................................. 6

3a. Roots forming tapering tubers, diam. 1–2 cm ........................................... 2. *G. calciphila*
   b. Roots forming rounded tubers, diam. 1–9 cm ................................................. 4
4a. Leaves narrowly linear-lanceolate ........................................... 5. *G. integrifolia*
b. Leaves rhomboid to linear, cordate, elliptic, ovate or lyrate .............................. 5
5a. Plants 10–50 cm high, leaves in basal rosette ................................. 8. *G. pseudochina*
b. Plants 1–2 m high or more, stems usually with leaves .................... 9. *G. sp.*
6a. Leaves exauriculate; stems usually erect ........................................ 7
b. Leaves auriculate; stems erect, decumbent or procumbent ...................... 8
7a. Plants densely tomentose; cypselas 4–6 mm long .......................... 6. *G. nepalensis*
b. Plants densely pilose; cypselas 2–3 mm long .......................... 4. *G. hmopaengensis*
8a. Leaves obovate or ovate, glabrous ........................................... 3. *G. cusimbua*
b. Leaves lanceolate to elliptic, sparsely or densely pubescent ............... 1. *G. bicolor*


Plants 1–4 m high, roots fibrous, stems erect, fleshy to subsucculent, sparsely pubescent. Blades lanceolate to elliptic, 4–40 x 2–15 cm, usually dark green or purple beneath, densely to sparsely pubescent, base cuneate, apex acute, margins serrate-dentate. *Petoioles* 0.5–6 cm long, auricles 1 mm or absent, pubescent or glabrescent. *Capitula* 4–15 in lax or dense corymb; peduncles 1–8 cm long, pubescent; bracts 4–8, 2–5 mm long; involucres 10–15 mm long, 4–7 mm in diam.; calycular bracts 8–15, 1–3 mm long, pubescent; phyllaries 12–16, 1–2 mm broad, glabrescent. *Florets* ca. 50, dark red to orange-yellow, 11–15 mm long, exserted part 3–4 mm long. *Anthers* 2 mm long, anther collars elongate. *Style arms* ca. 3.5 mm long. *Cypselae* 4–4.5 mm long, brown, glabrous or pilose; carpododium cylindrical, yellowish; pappus 10–13 mm long, white.

Phenology.— Flowering and fruiting throughout the year.

Ecology.— Growing at the edge of forests, widely cultivated in botanic gardens, 0–2,500 m alt.

Distribution.— China, Myanmar and Thailand.

Thailand.— NORTHERN: Chiang Mai (Doi Suthep, Doi Chiang Dao, Maetaeng, Doi Pha Hom Pok, Doi Chang, Jom Tong). NORTH-EASTERN: Loei (Phu Luang). Specimens examined.— *Hennipman* 3517 (L); *Koyama et al.* T-32690 (KYO), T-32781 (KYO), T-33456 (KYO), T-33697 (KYO); *Maxwell* 88-253 (L), 91-108 (A), 91-246 (A), 96-157 (A, L).

KEY TO THE VARIETIES

1a. Plants 20–60 cm high; leaves simple ........................................... 1. var. calciphila

1. var. calciphila Figs. 1A & 2A.

Plants 20–60 cm high, stems decumbent or erect from small tapering tubers of 1–2 cm diam., subsucculent, sparsely pubescent. Blades cordate, ovate or elliptic, 5–11 x 1.5–6 cm, sparsely pubescent, base cordate, apex acute, margins sinuate-dentate. Petioles 3–7 cm long, with small auricles, 0.5–1 x 0.5–2 cm, or absent, sparsely pubescent. Capitula 1–5 in lax corymbs; peduncles 4–10 cm long, sparsely pubescent; bracts 3–7, 2–4 mm long; involucre 7–10 mm long, 3–8 mm in diam.; calycular bracts 4–7, 3–5 mm long, pubescent; phyllaries 14, 1–2 mm broad, sparsely pubescent. Florets 15–25, orange to yellow, 10–13 mm long, exserted part 2–3 mm long. Anthers 2 mm long, anther collars elongate. Style arms 3 mm long. Cypselas 4 mm long, brown, glabrous; carpodipodium cylindrical, yellowish; pappus 7–10 mm long, white.

Phenology. — Flowering and fruiting throughout the year.

Ecology. — Growing in open rocky places of limestone hills, 0–500 m alt.

Distribution.— Endemic to peninsular Thailand.

Thailand.— PENINSULAR: Chumphon, (Siepzuan); Sura Thani (Khao Phra Rahu, Khao Sak, Khao Lak); Phangnga (Khao Ping Kan); Krabi (Khao Tham Sua, Had Nopharatara); Phatthalung (Koh Si Koh Ha, Khao Olatalu); Trang (Lamphura); Songkhla (Khao Changlon).

Specimens examined.— Charoenphol et al. 3635 (AAU); Kerr 15144 (BM, E, L, K), 15898 (BM, K); Larsen et al. 41457 (AAU), 42548 (AAU), Put 953 (K, BM); Shimizu et al. T-28941 (KYO), T-29096 (KYO), T-29200 (KYO); Smitinand & Sleumer 1158 (K, L), 1194 (L); Vanijajiva 050 (MJG).

2. var. dissecta F. G. Davies. Type: Thailand, Kanchanaburi, between Kritee and Huay Ban Kao, Geesink & Phengklai 6235 (holo K!; iso AAU!, E!, KYO!). Figs. 1A & 2B.

Plants 60–120 cm high, stems fleshy, erect or somewhat decumbent, from small tapering tubers, 1–2 cm diam., sparsely pubescent. Blades ovate in outline, usually pinnatifid, 5–11 x 1–6 cm, sparsely pubescent, base cuneate, apex acute, margins dentate. Petioles 2–4 cm long, with prominent auricles 5–8 x 4–9 mm, sparsely pubescent. Capitula 2–5 per corymb; peduncles 1–6 cm long, sparsely pubescent; bracts 5–10, 2–7 mm long; involucre 5–8 mm long, 4–9 mm in diam.; calycular bracts 4–7, 3–5 mm long, pubescent; phyllaries 12–14, 1–2 mm broad, sparsely pubescent. Florets 20–30, yellow, 10–13 mm long, exserted part 2–4 mm long. Anthers 2 mm long, anther collars elongate. Style arms 2.5–3 mm long. Cypselas 4 mm long, brown, glabrous;
carpopodium cylindrical, yellowish; pappus 7–10 mm long, white.

Phenology.— Flowering and fruiting from July to August.

Ecology.— Growing in open places of bamboo forests and on limestone cliffs, 500—800 m alt.

Distribution.— Endemic to Southwestern Thailand (Kanchanaburi).

Thailand.— SOUTH-WESTERN: Kanchanaburi (between Kritee and Huay Ban Kao, Khao Obuing, Ban Tha Kradan).

Specimens examined.— Geesink & Phengklai 6235 (K, AAU, E, KYO); Phengklai et al. 2989 (K, KYO, L); Shimizu et al. T-28487 (KYO).


Plants 1–4 m high, stems erect to procumbent, sparsely pubescent to glabrescent, roots fibrous. Leaves sessile, auriculate, auricles 1–4 x 1–3 mm or absent, pubescent or glabrescent; blades obovate or ovate, 4–40 x 2–15 cm, glabrous, base cuneate, apex acute, margins serrate-dentate. Capitula 4–15 in dense corymbs; peduncles 1–8 cm long, pubescent; bracts 4–8, 2–5 mm long; involucres 10–15 mm long, 5–8 mm in diam.; calycular bracts 8–15, 1–3 mm long, pubescent; phyllaries 12–16, 1–2 mm broad, glabrescent. Florets 30–45, orange-yellow, 11–15 mm long, exserted part 3–4 mm long. Anthers 2 mm long, anther collar elongate. Style arms ca. 3.5 mm long. Cypselas 4–4.5 mm long, brown, glabrous or pilose; carpopodium cylindrical, yellowish; pappus 10–13 mm long, white.

Phenology.— Flowering and fruiting throughout the year.

Ecology.— Growing in open places near streams and on wet ground along the edge of mixed forests and mossy evergreen forests, 1,800–2,500 m alt.

Distribution.— India, Bangladesh, Nepal, Bhutan, China, Myanmar and Thailand.

Thailand.— NORTHERN: Chiang Mai, (Doi Chiang Dao, Doi Inthanon, Angka).

Specimens examined.— Beusekom & Phengklai 2406 (KYO); Garrett 918 (L); Kerr 6567 (BM, E, K); Konta et al. T-29792 (A, KYO); Koyama & Phengklai T-40002 (A, KYO); Koyama et al. T-32094 (KYO); Niyomdham 5267 (K).

4. Gynura hmopaengensis H. Koyama, Acta Phylotax. Geobot. 39: 152. 1988. Type: Thailand, Mae Hong Son, Pai Hmo Paeng waterfall. Koyama et al. T32536 (holo KYO!; iso BKF!). Fig. 1B.

Plants 1–2 m high, stems erect, densely pilose, roots fibrous. Blades oblancoleate, 10–17 x 3–6 cm, densely pilose, base cuneate, apex acuminate, margins serrate. Petioles 2–5 cm long, exauriculate, pilose. Capitula 2–5 in lax corymbs; peduncles 3–6 cm long,
pilose; bracts 4–6, 6–10 mm long; involucres 10–13 mm long, 4–6 mm in diam.; calycular bracts 5–8, 3–5 mm long, pilose; phyllaries 13–14, 1–2 mm broad, densely pilose. Florets 30–40, orange to yellow, 9–12 mm long, exserted part 2–4 mm long. Anthers 2 mm long, anther collars elongate. Style arms 3 mm long. Cypselas 2–3 mm long, brown, pilose; carpopodium cylindrical, yellowish; pappus 9–10 mm long, white.

Phenology.— Flowering from January to March.

Ecology.— Growing in disturbed parts of deciduous forest. 700–1,000 m alt.

Distribution.— Endemic to Thailand.

Thailand.— NORTHERN: Mae Hong Son (Hmo Paeng waterfall); Chiang Mai (Doi Mah Geu).

Specimens examined.— Koyama et al. T-32536 (KYO, BKF); Maxwell 97-214 (A).


Plants 10–40 cm high, stems erect, arising from small subglobose tubers of 1–2 cm diam. Leaves in basal rosette, sparsely pubescent to glabrescent; blades narrowly linear-lanceolate, 4–12 x 0.3–1.5 cm, sparsely pubescent to glabrescent, apex obtuse to acute, base cuneate, margins entire or rarely denticulate. Petioles 0.5–2 cm long, exauriculate, sparsely pubescent to glabrescent. Capitula 1–3 per corymb; peduncles slender, 4–10 cm long, sparsely pubescent; bracts 2–6, 1–5 mm long; involucres 8–11 mm long, 2.5–6 mm in diam.; calycular bracts 5–8, 3–5 mm long, pubescent; phyllaries ca. 14, 1–2 mm broad, sparsely pubescent. Florets 20–30; orange to yellow, 8–12 mm long, exserted part 2–3 mm long. Anthers 2–2.5 mm long, anther collars elongate. Style arms 3–3.5 mm long. Cypselas 2–3 mm long, brown, pilose; carpopodium annular to cylindrical, yellowish; pappus 8–10 mm long, dirty-white.

Phenology.— Flowering and fruiting throughout the year.

Ecology.— Growing in open grassy places in evergreen and mixed deciduous forests, 500–1,500 m alt.

Distribution.— Myanmar, Thailand, Laos, Vietnam and Cambodia.

Vernacular.— Dao rueng khok ( Dao rueng khok), Wan chaeng ( Wan chaeng) (Bangkok Forest Department, 2001)

Thailand— NORTHERN: Chiang Mai, (Doi Suthep, Doi Pha Dam); Nakhon Sawan (Hna Wai). NORTH-EASTERN: Phetchabun (Nam Nao); Loei (Phu Kradung). EASTERN: Chaiyaphum (Thung Kra Mang). SOUTH-EASTERN: Chon Buri, Khao Khiew); Chanthaburi (Khao Phra Bat).

Specimens examined.— Bunchuai 133 (L); Floto 7452 (K); Geesink et al. 7061 (AAU, L); Koyama T-31272 (KYO), T-61478 (KYO); Larsen et al. 2157 (AAU), 31622 (AAU), 32121 (AAU); Maxwell 75-986 (AAU, L), 76-363 (AAU, L), 87-630 (AAU, E, L), 88-790 (AAU, E, L); Native 102 (S); Put 4059 (BM, K, L); Shimizu et al.
T-18304 (KYO); Sørensen et al. 2289 (K), 4026 (K).


Plants 2–5 m high or more, stems erect, densely white- or tawny-tomentose, roots fibrous. Blades elliptic, narrowly elliptic, rhomboid or lyrated, 2–20 x 1–6 cm, densely tomentose, base cuneate, apex acute, margins entire to denticulate. Petioles 0.5–5 cm, exauriculate, tomentose. Capitula 3–7 per corymb, peduncles stout, 2–10 cm long; calycural bracts 3–8, 3–7 mm long, densely tomentose; involucres 8–12 mm long, 7–12 mm in diam.; phyllaries 13–14, 8–10 mm long, 1–2 mm broad, densely tomentose or sometimes glandular. Florets 25–40, orange to yellow, 9–15 mm long, exserted part 2.5–4 mm long. Anthers 2.5 mm long, anther collars elongate. Style arms 3.5 mm long. Cypselas 4–6 mm long, brown, pilose; carpodum cylindrical, yellowish; pappus 10–12 mm long, white or dirty-white.

Phenology.— Flowering and fruiting throughout the year.

Ecology.— Growing at the edge and in open places of mountain forests, 700–4,500 m alt.

Distribution.— India, Nepal, Bhutan, China, Myanmar and Thailand.

Thailand.— NORTHERN: Chiang Mai (Doi Suthep, Ban Pong Yang).

Specimens examined.— Kerr 2899 (E); Sørensen et al. 6928 (AAU, K).


Plants scrambling to climbing, with robust stem, sparsely pubescent to glabrescent, roots fibrous. Blades elliptic to rhomboid, 1–11 x 0.5–6 cm, sparsely pubescent or glabrous, base cuneate or narrowed into petiole, apex acute, margins subentire to denticulate. Petioles 1–10 cm, usually exauriculate, glabrescent. Capitula 3–10 (-20) per corymb; peduncles stout, 2–7 cm long, subglabrous; bracts 1–4, 1–3 mm long; involucres 12–20 mm long, 3–7 mm in diam.; calycural bracts 7–8, 3–6 mm long, sparsely pubescent to glabrescent; phyllaries 8–12, 1–2 mm broad, glabrous. Flores 20–35, yellow or orange-red or purple, 9–20 mm long, exserted part 2–3.5 mm long. Anthers 2.5–3 mm long, anther collars elongate. Style arms 2–3.5 mm long. Cypselas 4–6 mm, brown, pilose to glabrous; carpodium annular or cylindrical, yellowish; pappus 10–20 mm long, white or dirty-white.

Phenology.—Flowering and fruiting throughout the year.

Ecology.—Climbing on trees in wooded ravines, at the edge of mixed to moist forests, along open areas on limestone, in oil palm plantations, 0–4,000 m alt.

Distribution.—Tropical West Africa and tropical Asia from India, China, Myanmar, Thailand, Malaysia, Philippines, Indonesia to Papua New Guinea.

Vernacular.—Pra kham di khwai (มาเข้าดึกน้ำ), Ma kham di khwai (มาเข้าดึกน้ำ), Mu maeng sang (เพลงดัง) (Bangkok Forest Department, 2001)

Thailand.—PENINSULAR: Chumphon (Ban Mak Amarit); Ranong (Khao Panta Chong Dong); Surat Thani (Samui, Ban Kanth Kep); Pattani (Ban Sai Kao, Banang Sta).

Specimens examined.—Kerr 7367 (BM), 11429 (BM), 13364 (BM), 14859 (BM), 15713 (BM), 16764 (BM).

South India, Wight 2333 (holo E!; iso K).

Plants 10–50 cm high, stems erect, arising from subglobose tubers of 1–9 cm diam. Leaves usually in basal rosette, sparsely pubescent to glabrescent; blades elliptic, ovate or lyrate, (1–) 7–40 by 1–12 cm, sparsely pubescent, base truncate or cuneate, apex acute to obtuse, margins sinuate or coarsely dentate. *Pentole* 0.3–3 (–8) cm long, exauriculate, sparsely pubescent. *Capitula* 1–3 (–6) in lax corymbs; peduncles 0.5–10 cm long, sparsely pubescent; bracts 3–6, 1–3 mm long; involucres ca. 13 mm long, 7.5–10 mm in diam.; calycular bracts 3–5, 2–6 mm long, pubescent; phyllaries 10–14 (–16), 1.5–2 mm broad, somewhat purple-tinted, sparsely pubescent. *Florets* 20–30, red, orange to yellow, 10 – 13 mm long, exerted part 2.5–4 mm long. *Anthers* 2–2.5 mm long, anther collars elongate. *Style arms* 3 mm long. *Cypselas* 3–4 mm long, brown, sparsely pubescent; carpododium round, whitish or yellowish; pappus 10–14 mm long, white to dirty-white.

Phenology.— Flowering and fruiting throughout the year.

Ecology.— Growing on dry steep slopes, sandy soil, meadows, 0–2,600 m alt.

Distribution.— Tropical Africa eastward to Sri Lanka, India, Nepal, Bhutan, Myanmar, China, Thailand and Indonesia.

Vernacular.— *Wan mahakan* (ว่านมากาน), *Phakkat kop* (ภักษาโพก), *Phakkat din* (ภักษาดิน), *Phakkat nok khao* (ภักษาหนอง), *Nat haeng* (น้ำแห้ง) (Bangkok Forest Department, 2001)

Thailand.— NORTHERN: Chiang Mai (Doi Suthep); Chiang Rai (Doi Luang); Lamphun (Doi Khun Tan); Lampang.
9. **Gynura sp.** Fig. 1D.

*Plants* 1–2 m high or more, stems erect, arising from irregularly subglobose tubers of 1–6 cm diam., brownish pubescent. *Leaves* sessile, exauriculate, pubescent; blades ovate to elliptic, 2–9 x 3–5 cm, sparsely pubescent, base amplexicaulous, apex obtuse, margins sinuate-dentate to pinnatifid. **Capitula** 2–4 per corymb; peduncles 2–5 cm long, pubescent; bracts 3–6, 2–4 mm long; involucres 9–11 mm long, 3–6 mm in diam.; calycular bracts 5–8, 3–6 mm long, pubescent; phyllaries *ca.* 14, 1–2 mm broad, sparsely pubescent. **Florets** 30–60, yellow, 12–15 mm long, exserted part 2.5–4 mm long. **Anthers** 2–3 mm long, anther collars elongate. **Style arms** 3 mm long. **Cypselas** 3–4 mm long, brown, pilose; carpopodium round, whitish or yellowish; pappus 10–14 mm long, white.

**Phenology.—** Flowering in July.

**Ecology.—** Growing in open places in deciduous dipterocarp forest, 500–1,000 m alt.

**Distribution.—** Only known from Thailand.

**Thailand.—** NORTHERN: Chiang Mai, Chiang Rai, Phitsanulok (Thung Salaeng Luang).

**Note.—** *Gynura* sp. is a distinct species on account of its mostly subshrubby or shrubby habit, its irregularly subglobose tubers and its sessile leaves. Most of the material of this species has been treated as *Gynura pseudochina*. *Gynura* sp. is mostly found in deciduous dipterocarp forests in northern Thailand.

**Specimens examined.—** Maxwell 91-643 (A, AAU, E, L); Bunchuai & Nimmonang 1423 (K); Murata et al. T-17056 (KYO).

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Figure 1. Distribution of Gynura spp. in Thailand: A. ■ G. bicolor, ▲ G. calciphila var. calciphila, ◊ G. calciphila var. dissecta; B. ▲ G. cusimbua, ■ G. hmopaengensis, ● G. integrifolia; C. ▲ G. nepalensis, ■ G. procumbens; D. ● G. pseudochina, ■ G. sp.
Figure 2. A. Gynura calciphila var. calciphila; B. G. calciphila var. dissecta; C. G. cusimbua; D. G. pseudochina

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