

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

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**ABSTRACT.** A taxonomic study of the genus *Gynura* Cass. in Thailand is presented. Ten taxa were enumerated, namely *Gynura procumbens* (Lour.) Merr., *G. calciphila* var. *calciphila* Kerr, *G. calciphila* var. *dissecta* F.G. Davies, *G. integrifolia* Gagnep., *G. pseudochina* (L.) DC., *G. nepalensis* DC., *G. hmopaengensis* H. Koyama, *G. cusimbua* (D. Don) S. Moore, *G. bicolor* (Roxb. ex Willd.) DC. and *G. sp.*

**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

Cass. in F. Cuvier, Dict. Sci. Nat. 34: 391.1825, *nom. cons.* Lectotype (designated by Davies 1978: 335): *Gynura divaricata* (L.) DC. = *Gynura auriculata* Cass. — *Gynaecura* Hassk., Cat. Hort.

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Bogor. Alt.: 103. 1844. — *Senecio* sect. *Gynura* (Cass.) Baill., *Histoire des Plantes*. 8: 260. 1882.

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 apiculate 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; involucre cylindrical or narrowly campanulate, calyculate, calycular 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, exerted, gradually tapered, with prominent apical tuft of papillae, sometimes coloured. *Cypselas* oblong to cylindrical, usually brown, ribbed, pilose to glabrous; carpodium annular, cylindrical to hemispherical, usually yellowish, slightly larger in diam. than cypselas 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. hmopaensis***  
 8a. Leaves obovate or ovate, glabrous ..... **3. *G. cusimbua***  
 b. Leaves lanceolate to elliptic, sparsely or densely pubescent ..... **1. *G. bicolor***

**1. *Gynura bicolor*** (Roxb. ex Willd.) DC., Prodr. 6: 299. 1838. — *Cacalia bicolor* Roxb. ex Wild., Sp. Pl. 4: 1731. 1804. Type: Calcutta, cult., *Roxburgh* (holo BM!). — *Gynura angulosa* var. *petiolata* Hook. loc. cit., non Cooke (1904). Syntype: India, Sikkim, *J.D. Hooker* (K!). — *Gynura longifolia* Kerr., Bull. Misc. Inform. Kew. 1935: 331. 1935. Type: Thailand, Chiang Mai, Doi Suthep, *Kerr 3195* (holo BM!; iso E, K!). Fig. 1A.

*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. *Petioles* 0.5–6 cm long, auricles 1 mm or absent, pubescent or glabrescent. *Capitula* 4–15 in lax or dense corymbs; peduncles 1–8 cm long, pubescent; bracts 4–8, 2–5 mm long; involucre 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. *Cypselas* 4–4.5 mm long, brown, glabrous or pilose; carpodium 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).

**2. *Gynura calciphila*** Kerr, Bull. Misc. Inform. Kew. 1935: 330. Type: Thailand, Chumphon, Siepzuan, *Put 953* (holo K!; iso BM!).

## KEY TO THE VARIETIES

- 1a. Plants 20–60 cm high; leaves simple..... **1. var. calciphila**  
 b. Plants usually 60–120 cm high; leaves usually pinnatifid ..... **2. var. dissecta**

**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; carpodium 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); *Shimuzu 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 & Phengkklai* 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;

carpodium 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 South-western Thailand (Kanchanaburi).

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

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

**3. *Gynura cusimbua*** (D. Don) S. Moore, J. Bot. 50: 212. 1912. — *Porophyllum cusimbua* (D. Don) DC., Prodr. 5: 650. 1836. — *Kleinia cusimbua* (D. Don) Less., Linnaea 6: 133. 1831. — *Cacalia cusimbua* D. Don, Prodr. Nep.: 179. 1825. Type: Nepal, *Hamilton s.n.* (holo E). — *Gynura angulosa* DC., Prodr. 6: 298. 1838. Syntype: Nepal, *Wall. cat. no. 3152* (K-W!). Figs. 1B & 2C.

*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; involucre 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; carpodium 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 & Phengkklai* 2406 (KYO); *Garrett* 918 (L); *Kerr* 6567 (BM, E, K); *Konta et al.* T-29792 (A, KYO); *Koyama & Phengkklai* 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* oblanceolate, 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; involucre 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, exerted 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).

**5. *Gynura integrifolia*** Gagnep., Bull. Soc. Bot. France 78:120. 1921. Type: Cambodia, Kampot, *Geoffray* 427 (Lectotype P!, designated by Davies 1980). — *Gynura annamensis* S. Moore, J. Nat. Hist. Soc. Siam 4: 147 1921. Type: Vietnam, Langbian, *Kloss s.n.* (holo BM!). Fig. 1B.

*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; involucre 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, exerted 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 (ดาวเรืองโคก), Wan chaeng (วานแจจ) (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).

**6. *Gynura nepalensis*** DC., Prodr. 6: 300. 1838. Type: Nepal, Noakote, *Wall. cat. no. 3146* (holo K-W!; iso BM!, K!). — *Gynura foetens* Wall. ex DC., Prodr. 6: 300. 1838. Type: Nepal, *Wall. cat. no. 3156* (holo K-W!). — *Gynura nepalensis* DC. var. *thomsoni* C.B. Clarke, Comp. Ind.: 171. 1876. Syn-type: India, Kumaon, *Thomson s.n.* (K!). — *Gynura nudibasis* (H. Lév. & Van.) Lauener & D.K. Ferguson, Notes Roy. Bot. Gard. Edinburgh. 34: 359. 1976. — *Gynura dielsii* H. Lév., Bull. Acad. Géog. Bot. 24: 284. 1914, *nom. illegit., superfl.* — *Senecio nudibasis* H. Lév. & Van. in Fedde, Rep. Sp. Nov. 6: 331. 1909. Type: China, Kweichow, *Cavalerie 3312* (holo E!). Fig. 1C.

*Plants* 2–5 m high or more, stems erect, densely white- or tawny-tomentose, roots fibrous. *Blades* elliptic, narrowly elliptic, rhomboid or lyrate, 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; calycular bracts 3–8, 3–7 mm long, densely tomentose; involucre 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, exerted 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; carpodium 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).

**7. *Gynura procumbens*** (Lour.) Merr. Enum. Philipp. Fl. Pl. 3: 618. 1923. — *Cacalia procumbens* Lour., Fl. Cochin. 485. 1790. Type: Cochinchina, *Loureiro s.n.* (holo P!). — *Gynura sarmentosa* (Blume) DC., Prodr. 6: 298. 1838. — *Cacalia reclinata* Wall. Numer. list no. 3151: 1830, *nom. nud.* — *Cacalia sarmentosa* Blume, Bijdr. 907. 1826. Type: Indonesia, Java, *Blume 1041* (holo & iso L!). — *Cacalia cylindriflora* Wall. Numer. list no. 3150: 1830, *nom. nud.* — *Cacalia finlaysonianana* Wall. Numer. list no. 3162: 1830, *nom. nud.* — *Cacalia sarracenia* Blanco, Fl. Filip. 1: 618. 1837, *non L.* — *Senecio cacaliaster* Blanco, Fl. Filip. 2: 441. 1845. Type: not found. — *Gynura affinis* Turcz., Bull. Soc. Imp. Naturalistes Moscou. 24: 201. 1851. Type: Philippines, Luzon, Albay, *Cumming 926* (holo & iso K!). — *Gynura lobbiana* Turcz., Bull. Soc. Imp. Naturalistes Moscou. 24: 202. 1851. Type: Indoneisa, Java, *Lobb 239* (holo K!, iso BM!, L!). — *Gynura scabra* Turcz., Bull. Soc. Imp. Naturalistes Moscou. 24: 201. 1851. Type: Philippines, Panay, *Cumming 1638* (holo K!). — *Gynura latifolia* (S. Moore) Elmer., Leafl. Philipp. Bot. 1: 145. 1906. —

*Crassocephalum latifolium* S. Moore., J. Bot. 43: 141. 1905. Type: Philippines, Negros, *Whitehead s.n.* (holo BM!). — *Gynura clementis* Merr., Philipp. J. Sci. 1 (Suppl. 3): 244. 1906. Type: Philippines, Mindanao, Lake Lanao, Camp Keithy, *Clemens* 49 (holo PNH). — *Gynura piperi* Merr., Philipp. J. Sci., 7: 355. 1912. Type: Philippines, Siquijor, *Piper* 384 (holo K!). — *Gynura cavaleriei* H.Lév., Bull. Geogr. Bot. 24: 284. 1914. Type: China, *Esquirol* 3572 (holo E!) — *Gynura agusanensis* Elmer, Leaflets Philipps. Bot. 7 (1915) 2585. Type: Philippines, Mindanao, Mt. Urdaneta, Agusan, *Elmer* 13864 (holo K!). — *Gynura pubigera* Bold., Zakfl. Java: 58. 1916, *non rite publ.* — *Gynura buntingii* S. Moore, J. Bot. 54 (1916) 287. Type: Liberi, *Bunting* 110 (Lectotype BM!, designated by Davies (1977)). — *Gynura emeiensis* Z. Y. Zhu, Bull. Bot. Res. 26: 645. 2006. Type: China, Sichuan, Emeishan, *Z. Y. Zhu s.n.* (holo EMA photo). Fig. 1C.

*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; involucre 12–20 mm long, 3–7 mm in diam.; calycular bracts 7–8, 3–6 mm long, sparsely pubescent to glabrescent; phyllaries 8–12, 1–2 mm broad, glabrous. *Florets* 20–35, yellow or orange-red or purple, 9–20 mm long, exerted 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 (ประจำตีควาย), Ma kham di khwai (มะคำตีควาย), Mu maeng sang (มุแมงสัง) (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).

**8. *Gynura pseudochina* (L.) DC., Prodr. 6: 299. 1838. — *Senecio pseudochina* L., Sp. Pl. 1: 867. 1753. Syntype: India, *Royen* 164 (L!). — *Gynura biflora* (Burm. f.) Merr., Philip. J. Sci. 19: 386. 1921. — *Senecio biflora* Burm. f., Fl. Ind. 181. 1768. Type: India (not found). — *Gynura bulbosa* (Lour.) Hook. & Arn., Bot. Beech. Voy.: 194. 1836. — *Cacalia bulbosa* Lour., Fl. Cochinch. 485. 1790. Type: not found. — *Gynura nudicaulis* Arn., Nov. Act. Cur. 18: 351. 1836. Type:**



South India, *Wight 2333* (holo E!; iso K). — *Gynura purpurascens* Wall. ex DC., Prodr. 6: 299. 1838. Type: Cult. Calcutta., *Wall. cat. no. 3157* (holo K-W!). — *Gynura sagittaria* Wall. ex DC., Prodr. 6: 301. 1838. Type: India, *Wall. cat. no. 3159* (holo K-W!). — *Gynura sinuata* DC., Prodr. 6: 301. 1838. Type: *Hamilton* (holo E!; iso BM!). — *Gynura miniata* Welw., Apont. (1859) 586. Type: Angola, Pungo Andongo, Caghuy, *Welwitsch 3595* (holo BM!). — *Gynura miniata* Welw. var. *orientalis* O.Hoffm. in H.G.A. Engl., Pflanzenw. Ost-Afr. 416. 1895. Type: Tanzania, Uzaramo, *Stuhlmann 7776* (holo K). — *Senecio crassipes* H. Lév. & Van., in Fedde, Rep. Sp. Nov. 6: 331. 1909. Type: China, Kweichow, *Cavalerie 3305* (holo E!). — *Gynura rusisiensis* R.E.Fr., Wiss. Ergebn. Schwed. Rhod.-Kongo Exped. 1: 342. 1911. Type: Tanzania, Mpanda, Rusisi Valley between Mpanda and Mecherenge, *Fries 1435* (holo UPS). — *Gynura somalensis* (Chiov.) Cuf., Nuovo. Giorn. Bot. Ital. 50: 112. 1943. — *Senecio somalensis* Chiov., Result. Sc. Miss. Stef.-Paoli Somal. Ita. 1: 106. 1916. Type: Somalia, Baidoa, *Paoli 1110* (holo FT photo). — *Gynura bodinieri* H.Lév., Bull. Géogr. Bot. 24: 283. 1914. Type: China, Kouy-Tcheou, *Esquirol 3563* (holo E!). — *Gynura eximia* S. Moore, J. Bot. 56: 225. 1918. Type: Angola, Kaconda, *Gossweiler 3638* (iso K!). — *Gynura variifolia* De Wild., Pl. Bequaert. 5: 93. 1929. Type: Congo (Kinshasa), Rutshuru, *Bequaert 5627* (holo BR!). — *Gynura truncata* Kerr., Bull. Misc. Inform. Kew. 1935: 331. 1935. Type: Thailand, Nakhon Ratchasima. *Kerr 20484* (holo K; iso E!). Figs. 1D & 2D.

*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. *Petioles* 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; involucre *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-tinged, 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; carpodium 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 (ว่านมหากาน), Phakkat kop (ผักกาดกบ), Phakkat din (ผักกาดดิน), Phakkat nok khao (ผักกาดนกเขา), Nat haeng (หนาดแห้ง) (Bangkok Forest Department, 2001)

*Thailand.*— NORTHERN: Chiang Mai (Doi Suthep); Chiang Rai (Doi Luang); Lamphun (Doi Khun Tan); Lampang.

EASTERN: Chaiphaphum (Thung Kra Mang); Nakhon Ratchasima (Khao Yai). NORTH-EASTERN: Loei (Pha Nok En, Phu Kradung); Khon Kaen (Pu Wieng). CENTRAL: Bangkok. SOUTH-WESTERN: Uthai Thani; Phetchaburi; Phachuap Khiri Khan (Hua Hin). PENINSULAR: Surat Thani (Khao Tao).

Specimens examined.— *Kerr* 1802 (BM, K), 8687 (BM, K), 12734 (BM, K), 13494 (BM, K), 19457 (BM), 20659 (BM, K), *s.n.* (BM); *Koyama et al.* T-30113 (KYO), T-61503 (A, KYO); *Koyama & Phengkhai* T-39004 (KYO); *Lakshnakara* 1380 (BM); *Larsen et al.* 31616 (AAU); *Maxwell* 92-236 (L), 93-532 (A, L), 98-580 (A, L); *Put* 2849 (BM); *Shimizu et al.* T-22376 (KYO).

### 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; involucre 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, exerted 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; carpodium 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.

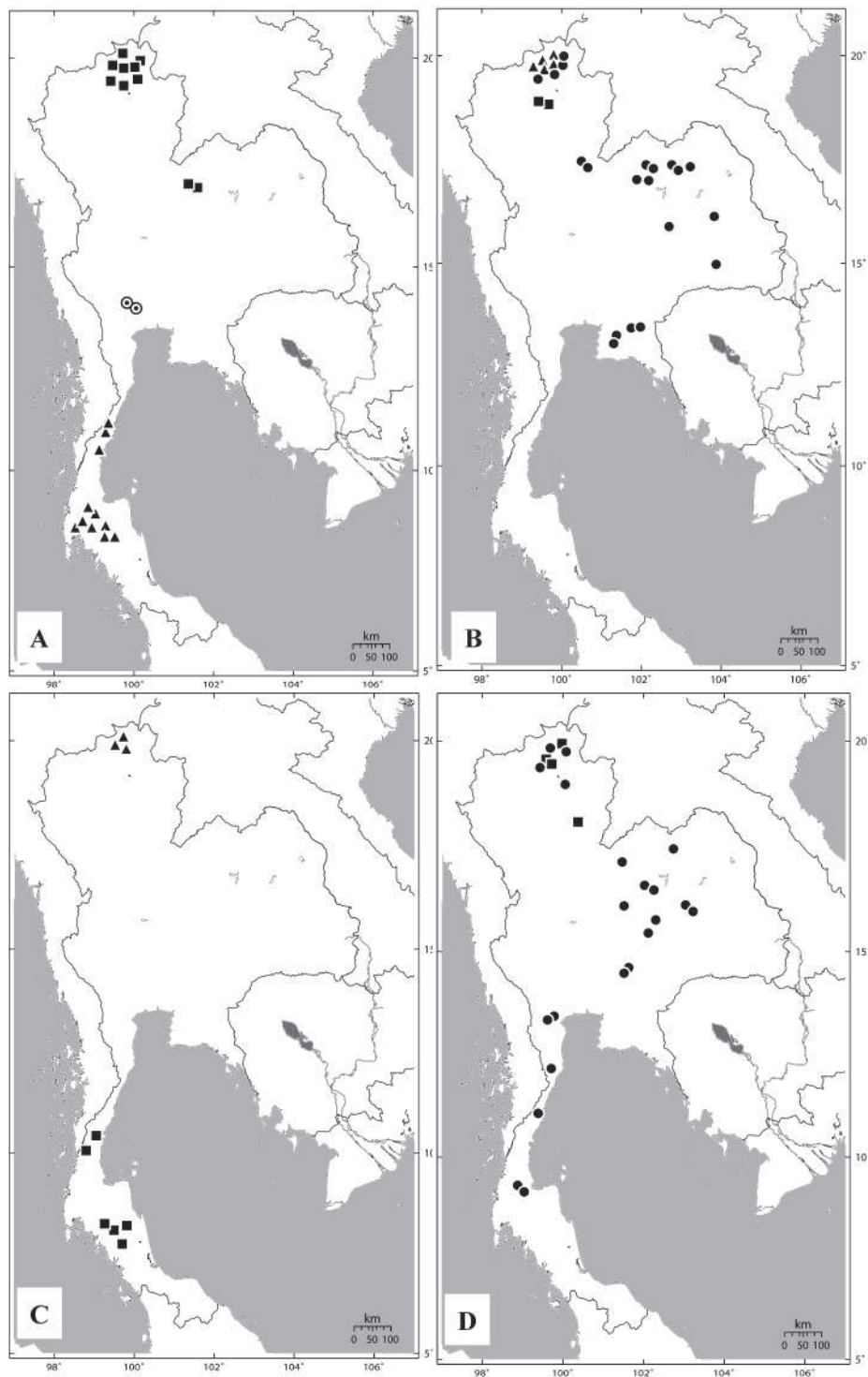
Thailand.— NORTHERN: Chiang Mai, Chiang Rai, Phitsanulok (Thung Salaeng Luang).

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 & Nimanong* 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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