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Triodanis Raf. (Campanulaceae: Campanuloideae), a new generic record for the flora of Taiwan

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Abstract. *Triodanis biflora* (Ruiz & Pav.) Greene (Campanulaceae), a slender, annual herb, was collected recently from Taiwan. It represents a new record for both the species and the genus on this island. The present study provides a key to the genera of Campanuloideae in Taiwan and gives a taxonomic account for this naturalized plant species.

Keywords: Campanulaceae; Campanuloideae; New record; Taiwan; *Triodanis biflora.*

Triodanis was not reported in treatments of Campanulaceae of Taiwan (Huang, 1979; Kao and DeVol, 1974, 1978; Lammers, 1992). During the course of the botanical inventory of Taiwan, *Triodanis biflora* was collected by the senior author from the lowlands of northwestern Taiwan, apparently as a naturalized weed. Although we have not witnessed its spread since it was discovered, it is appropriate to document the discovery of this species in Taiwan. To make the information available for Volume 4 (sympetalous dicots) of the second edition of the Flora of Taiwan, we hereby provide a taxonomic account of the newly recorded genus and species.

Key to Genera of Campanuloideae in Taiwan

1. Fruit loculicidal, dehiscent above the calyx lobes, or if indehiscent, all or most of the mature berry superior to the calyx lobes.
   2. Stems twining; corolla 15–35 mm long ..... *Codonopsis*
   2. Stems erect or ascending; corolla 5–12 mm long.
      3. Terminal flowers in 3-flowered cymes; calyx lobes pinnatifid, inserted at base of hypanthium; corolla lobes 6; fruit a berry ..... *Cyclocodon*
      3. Terminal flowers solitary; calyx lobes entire, inserted at summit of hypanthium; corolla lobes 5; fruit a capsule ..... *Wahlenbergia*
1. Fruit poricidal, dehiscent below the calyx lobes, or if indehiscent, the berry crowned by the calyx lobes.
   4. Plants with slender creeping stolons; corolla 3–8 mm long; seeds 10–16, relatively large, released through irregular rupture of the thin membranous pericarp . ..... *Peracarpa*
   4. Plants with fibrous or fleshy roots but no stolons; corolla 8–30 mm long; seeds more numerous, small, released via 3 definite pores.
      5. Plants perennial; all flowers chasmogamous; nectar disc large, tubular, surrounding the style . ..... *Adenophora*
      5. Plants annual; only one or a few flowers chasmogamous, the rest cleistogamous; nectar disc absent or flat.
         6. Inflorescence panicle-like, the flowers pedicellate; capsule broadly ellipsoid ..... *Campanula*
         6. Inflorescence spike-like, the flowers sessile; capsule cylindrical ..... *Triodanis*

TRIODANIS Raf., New Fl. N. Amer. 4: 67. 1838.—Lectotype: *T. rupestris* Raf. [= *T. perfoliata* (L.) Nieuwl.]. Designated by: McVaugh, Wrightia 1: 23. 1945.

Dysmicodon (Endl.) Nutt., Trans. Amer. Philos. Soc. (n. s.) 8: 255. 1842. Based on: *Specularia* [no rank indicated] *Dysmicodon* Endl., Gen. P1. 518. 1838. Lectotype: *Campanula flagellaris* Kunth [=*T. perfoliata*]. Here designated!

Campylocera Nutt., Trans. Amer. Philos. Soc. (n. s.) 8: 257. 1842. *Specularia* sect. *Campylocera* (Nutt.) A. Gray, Proc. Amer. Acad. Arts 11: 82. 1876. Type: *Campylocera leptocarpa* Nutt. [*T. leptocarpa* (Nutt.) Nieuwl.]

Annual herbs; stems erect or reclining, unbranched or sparingly branched from lower nodes, 5-angled. Leaves toothed, sessile or short-petiolate, imperceptibly passing into floral bracts above. Flowers sessile, 1–3 (-8) in axils of upper leaves, forming a spike-like inflorescence, lower ones generally smaller and cleistogamous; calyx lobes 3–5; corolla 5-lobed, rotate, lobes narrowly triangular or elliptic, longer than the tube, acuminate at apex; stamens 5,

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distinct, free from corolla; filaments expanded at base; anthers linear, longer than filaments; ovary inferior, 3-loculed with axile placentae (rarely 1-loculed with parietal placenta); stigma 3-lobed. Fruit an erect linear, oblong, ellipsoid, or clavate poricidal capsule with one pore per locule; seeds lenticular, dark brown, small, numerous.

Nearly endemic to North America, from southern Canada to Guatemala, with one species [*T. biflora* (Ruiz & Pav.) Greene] extending south to Argentina and Chile. *Triodanis perfoliata* is found throughout the North American range of the genus, while the remainder of the species [*T. coloradoensis* (Buckley) McVaugh, *T. holzingeri* McVaugh, *T. lamprosperma* McVaug*h, T. lept*ocarpa (Nutt.) Nieuwl., and *T. texana* McVaugh] are endemic to the central and western United States. The solitary species reported from the Old World, *T. falcata* (Ten.) McVaugh, was treated as *Legousia falcata* (Ten.) Fritsch by Tutin (1976).

The genus has been merged by some authors with the Eurasian genus *Legousia* Durande (≡*Specularia* Heist. ex A. DC., nom. illeg.). It is one of only three genera of Campanuloideae (out of 47 total) endemic to the New World.

Triodanis biflora (Ruiz & Pav.) Greene, Man. Bot. San Francisco 230. 1894. §Z,›†§ “Æ Figure 1

Campanula biflora Ruiz & Pav., Fl. Peruv. 2: 55. 1799.

Lobelia humboldtiana Willd. ex Scultes. in Roem. & Schultes, Syst. Veg. 5: 68. 1819.

Campanula montevidensis Spreng., Syst. Veg. 1: 738. 1824.

Specularia biflora (Ruiz & Pav.) Fisch. & C. A. Mey., Index Sem. Hort. Petrop. 2: 22. 1836, nom. illeg.

Dysmicodon ovatum Nutt., Trans. Amer. Philos. Soc (n. s.) 8: 256. 1842.

Dysmicodon californicum Nutt., Trans. Amer. Philos. Soc. (n. s.) 8: 256. 1842.

Specularia ovata (Nutt.) Vatke, Linnaea 38: 173. 1874, nom. illeg.

Specularia californica (Nutt.) Vatke, Linnaea 38: 714. 1874, nom. illeg.

Pentagonia biflora (Ruiz & Pav.) Kuntze, Revis. Gen. P1. 381. 1891, nom. illeg.

Legousia biflora (Ruiz & Pav.) Britt., Mem. Torrey Bot. Club 5: 309. 1894.

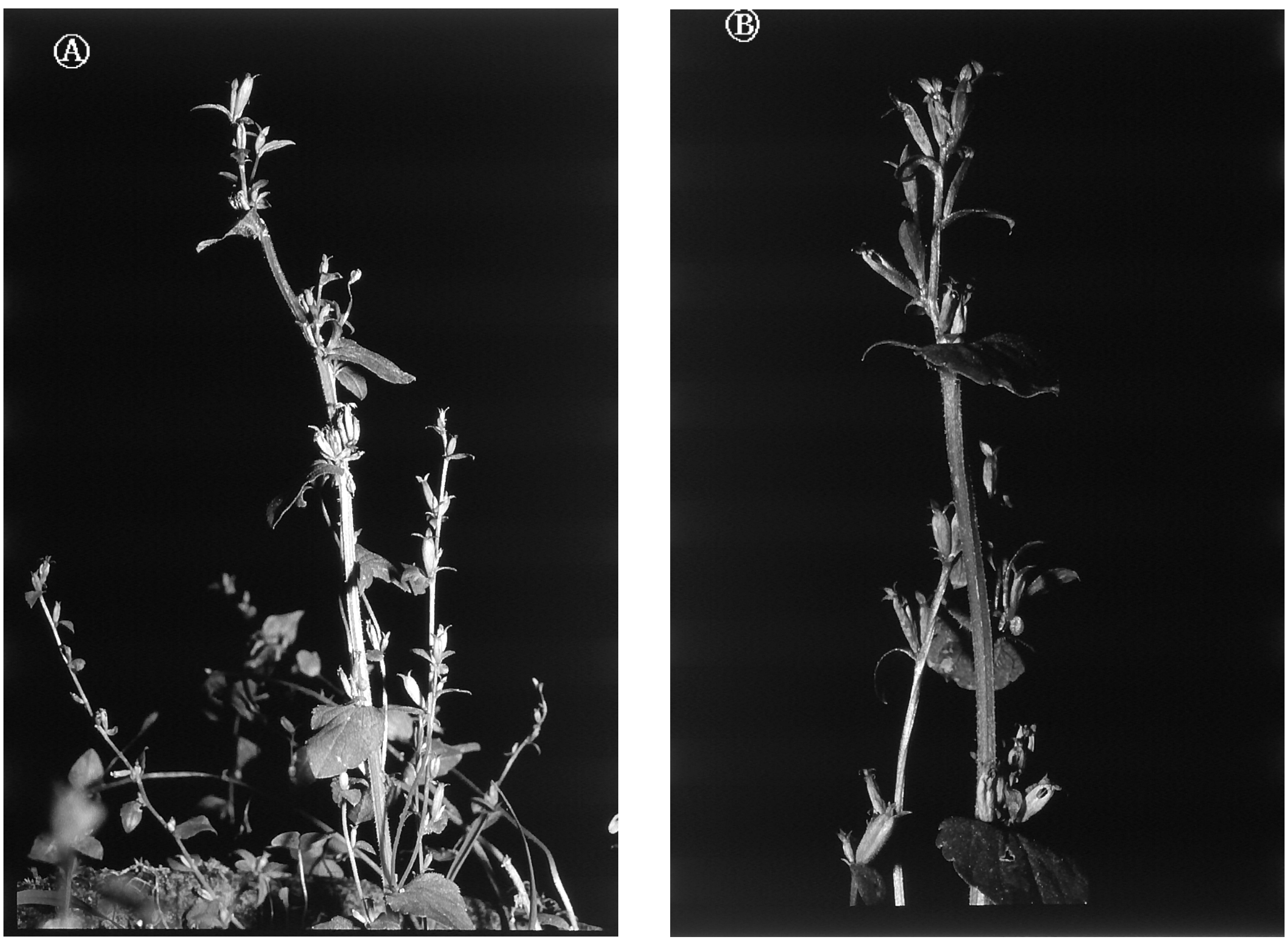

Figure 1. *Triodanis biflora*. A, habit; B, upper portion of a fruiting stem, showing poricidal capsules.

Specularia perfoliata f. *ramosa* Arechav., Anales Mus. Nac. Montevideo 7: 14. 1909, nom. illeg.

Specularia perfoliata f. *rigida* Arechav., Anales Mus. Nac. Montevideo 7: 14. 1909, nom. illeg.

Triodanis perfoliata var. *biflora* (Ruiz & Pav.) T. R. Bradley, Brittonia 27: 114. 1975.

Asyneuma anhuiense B. A. Shen, Acta Phytotax. Sin. 26: 463. 1988.

Stems usually 10–80 cm tall, 1–2 mm diameter. Leaves ovate to broadly elliptic, 0.5–3 cm long, 0.7–1.2 cm wide, rounded, obtuse, or acute at apex, cordate or cuneate at base, margins crenate, sessile. Flowers mostly cleistogamous, only the upper one (rarely few) open; calyx lobes triangular, lanceolate, or ovate, 1–7 mm long, 0.3–3 mm wide; corolla of open flowers lavender-blue (rarely white), 5–11 mm long, lobes 4–9 mm long, 2–4.5 mm wide; ovary (2–)3-loculed. Capsule oblong to clavate, 4–7 mm long, 1.3–2 mm in diameter; seeds elliptic in outline, 0.5–0.6 mm long. Gametic chromosome number, $n = 14, 28$.

Specimens examined. **TAIWAN.** Hsinchu Hsien: Chutung, Wufengli. Cement cracks of an abandoned village house, elev. ca. 110 m. 17 Mar 1991, *Ching-I Peng 13708* (F, HAST).

Notes. Triodanis biflora is native throughout much of the southern United States, from Virginia to Oregon, south into northern Mexico. It is also believed to be native to South America, occurring sporadically in the central Andes and temperate southern portions of that continent. It is sparingly naturalized in the Hawaiian Islands (Lammers, 1990) and on the Chinese mainland, in Anhui, Zhejiang, and Fujian provinces (Chen et al., 1992; Shen, 1988). An illustration of *Triodanis biflora* is available in Shen (1988), as *Asyneuma anhuiense* B. A. Shen.

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