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Didymocarpus anningensis (Gesneriaceae), a new species from Yunnan, China

LEI CAI^{1,3}, JIE CAI² & YU-MIN SHUI^{1,3*}

¹ Key Laboratory for Plant Diversity and Biogeography of East Asia, Kunming Institute of Botany, Chinese Academy of Sciences, Kunming 650201, Yunnan, China.

² Germplasm Bank of Wild Species, Kunming Institute of Botany, Chinese Academy of Sciences, Kunming 650201, Yunnan, China.

³ Karst Conservation Initiative of Yunnan, Kunming 650201, Yunnan, China.

*Author for corresponding: ymshui@mail.kib.ac.cn

A new species of Gesneriaceae, *Didymocarpus anningensis*, is described and illustrated from Anning, Central Yunnan, China. The new species resembles *D. purpureobracteatus* and *D. yunnanensis*, but it can be easily distinguished by a combination of stem, leaf blade and leaf petiole indumentum characters, bract and calyx shape and number of staminodes.

Key words: China, *Didymocarpus*, Gesneriaceae, Yunnan

Introduction

The genus *Didymocarpus* Wallich (1819: 378) traditionally comprised ca. 180 species, and most species distributed in tropical Asia with a few scattered in Africa and Australia (Wang *et al.* 1998, Li & Wang 2004). Recent results of molecular phylogenetic studies and morphological revision of *Didymocarpus* has reduced this number to 60–80 species, with some species being placed in other genera (Weber & Burt 1998, Weber *et al.* 2000, Weber *et al.* 2011, Möller *et al.* 2011, Möller & Clark 2013). For example, several Chinese species of *Didymocarpus* have been transferred into *Petrocodon* Hance (Weber *et al.* 2011), and the genus *Gyrocheilos* W.T. Wang was merged into *Didymocarpus* based on pollen and other morphological characters (Li *et al.* 2015). According to the treatment of *Didymocarpus* in Flora of China (Wang *et al.* 1998), including two new species and one variety discovered and added into the list of *Didymocarpus* recently, this genus now consists of 33 species and four varieties in China, mainly distributed in the south and southwest of the country (Li & Wang 2004, Wen *et al.* 2013, Li & Li 2014, Li & Wang 2015).

In 2013, an unknown species of Gesneriaceae was collected during field investigations of the limestone areas in Yunnan, China. We confirmed its membership of the genus *Didymocarpus* based on its disc-like stigma (Wang *et al.* 1998). But, the examination of the specimens and the related literature of the genus reveals that its morphological characters do not fit any known species from China or adjacent regions (Pellegrin 1930, Wang *et al.* 1990, Wang *et al.* 1998, Li & Wang 2004). We recollected this uncertain species of *Didymocarpus* for detailed inspection in 2015, and concluded that this plant is new to science. Here, the new species *D. anningensis* is described and illustrated, its morphological characters are compared with the closely related species *D. purpureobracteatus* W.W. Smith (1912: 153) and *D. yunnanensis* (Franchet 1899: 250) W. W. Smith (1924: 337).

Taxonomy treatment

Didymocarpus anningensis Y.M. Shui, Lei Cai & J. Cai, *sp. nov.* (Figs. 1 & 2)

Diagnosis:—The new species resembles *D. purpureobracteatus* and *D. yunnanensis* in leaves opposite, calyx slightly 5-lobed, corolla purple with darker stripes, pubescent anthers. But it clearly differs from the latter in its stems densely pilose and glandular puberulent (puberulent above, sparsely puberulent to glabrescent below in *D. purpureobracteatus*, densely puberulent to glabrescent in *D. yunnanensis*), bracts connate at base (sometimes connate at base, covering calyx when flowering in *D. purpureobracteatus*, free at base in *D. yunnanensis*), calyx 6–10 mm long (10–12 mm long in *D. purpureobracteatus*, 3–6 mm long in *D. yunnanensis*), corolla glabrous (glabrous in *D. purpureobracteatus*, outside sparsely pubescent in *D. yunnanensis*) and three staminodes (two in *D. purpureobracteatus* and *D. yunnanensis*).

Type:—CHINA. Yunnan: Kunming, Anning, Qinglong Community, Zongshuyuan Village, elev. ca. 1840 m, forest margin and roadside, in flowering, 29 August 2013, Jie Cai *et al.* 13CS7155 (holotype KUN!; isotype KUN!).

Perennial herbs, stems 5–10 cm high, densely pilose and glandular puberulent. Leaves opposite, 3–5 pairs; leaf petiole 0.2–4.5 cm long, densely pilose and glandular puberulent, leaf blade rounded or oblong, 1–3.6 × 0.8–3.5 cm, herbaceous,

adaxially densely appressed pubescent and glandular puberulent, abaxially densely pubescent and glandular, puberulent, densely pilose along veins on both sides, lateral veins 3–6 on each side of midrib, apex obtuse to rounded, base broadly cuneate to rounded, symmetric but occasionally oblique, margin crenate to crenulate. Cymes axillary towards the top of the stem, inflorescence 2–10-flowered; peduncle 3–10 cm long, sparsely glandular puberulent; bracts 2, green or purple, opposite, connate at base, ovate, 3–6 mm long, glabrous, margin entire; pedicel 0.4–1.8 cm long, glabrous. Calyx slightly zygomorphic, 6–10 mm long, funnelform-campanulate, glabrous; limb indistinctly 2-lipped; tube 4–7 mm long; adaxial lip 3-lobed to middle or slightly over central, lobes triangular, ca. 1.8 mm long; abaxial lip 2-lobed, lobes triangular, ca. 3 mm long. Corolla purple to pinkish purple with darker stripes on both sides, 3.8–4.2 cm long, glabrous; corolla tube funnelform, ca. 2.8 cm long, 2–9 mm in diameter; limb 5-lobed, adaxial lip 2-lobed to middle, lobes oval to rounded, 4–6 mm long, ca. 5 cm in diameter for the base of lobes, abaxial lip 3-lobed to middle, lobes oval to rounded, 5–8 mm long, ca. 6 cm in diameter for the base of lobes. Stamens 2, adnate to corolla 1.6–2 cm from base; filaments linear, 6–8 mm long, glabrous; anthers ca. 2 mm long, pubescent; staminodes 3, 3–5 mm long, adnate to corolla 1.5–1.8 cm from base (the central one thinner and shorter, closer to the base). Disc cupulate, ca. 1.2 mm high. Pistil glabrous, 2.8–3.5 cm long; ovary narrowly linear, 2.4–3 cm long; style ca. 0.4 cm long; stigma 1, disc-like. Capsule linear, 3.5–4.5 cm long, ca. 2 mm in diameter.

Distribution and Ecology:—*Didymocarpus anningensis* is currently known only from the type locality where it is represented by one population along the road with ca. 60–80 individuals. Its habitat corresponds to broad-leaved evergreen forests dominated by *Cyclobalanopsis glaucoides* Schottky (Fagaceae), *Craspedolobium unijugum* (Gagnep.) Z. Wei & Pedley (Fabaceae) and *Ilex* sp. (Aquifoliaceae). It occurs together with *Begonia labordei* Lévl. (Begoniaceae) and *Athyrium* sp. (Athyriaceae). The species grows on limestone rocks with shallow surface soil, in places with sufficient seasonal run-off water.

Phenology:—Flowering from mid-August to mid-september; fruiting from mid-september to October.

Taxonomic affinities:—The new species morphologically resembles *Didymocarpus purpureobracteatus* W. W. Smith (1912: 153) and *D. yunnanensis* (Franchet 1899: 250) W. W. Smith (1924: 337), however, *D. anningensis* can be clearly differentiated from both by several characters, such as combination of stem indumentum characters, leaf blade, bract and calyx shape, leaf indumentum and number of staminodes. The detailed characters among the three related species are provided in Table 1.

Etymology:—The specific epithet ‘anningensis’ refers to the type locality where the new species occurs, Anning, Kunming, Yunnan Province.

Additional specimens examined (paratypes):—CHINA. Yunnan: Kunming, Anning, Qinglong Community, Zongshuyuan Village, elev. ca. 1895 m, on moist rocks roadside, flowering, 13 September 2015, *Lei Cai et al. B2015-026* (KUN!).

TABLE 1. Diagnostic characters for *Didymocarpus anningensis* and its relatives

| Characters | <i>D. anningensis</i> | <i>D. purpureobracteatus</i> | <i>D. yunnanensis</i> |
|---------------------|--|---|---|
| Stem | 5–10 cm, densely pilose and glandular puberulent | 11–62 cm, puberulent above, sparsely puberulent to glabrescent below | 3–26(–48) cm, densely puberulent to glabrescent |
| Shape of leaf blade | rounded or oblong, apex obtuse to rounded | ovate to elliptic or obovate, apex acute to acuminate | narrowly ovate to ovate, oblong, or obovate, apex acute to rounded |
| Leaf indumentum | densely appressed pubescent and glandular puberulent, densely pilose along veins | adaxially sparsely appressed puberulent to nearly glabrous along veins | appressed puberulent, eglandular, puberulent along veins, eglandular |
| Leaf petiole | densely pilose and glandular puberulent | puberulent | with very short puberulent |
| Bract | connate at base, ovate, glabrous | sometimes connate at base, galeate, covering calyx when flowering, glabrous | free at base, ovate to orbicular, glabrous to puberulent, yellow glandular |
| Calyx | 6–10 mm long, funnelform-campanulate, glabrous, lobes triangular | 10–12 mm long, tubular-campanulate, glabrous, lobes semiorbicular | 3–6 mm long, campanulate, outside sparsely puberulent, inside glabrous, lobes triangular, reflexed when flowering |
| Corolla | glabrous, corolla tube funnelform | glabrous, corolla tube funnelform | outside sparsely pubescent, inside glabrous, tube narrowly funnelform |
| Staminode | three, 3–5 mm long | two, 1.5–3 mm long | two, 1.2–5 mm long |

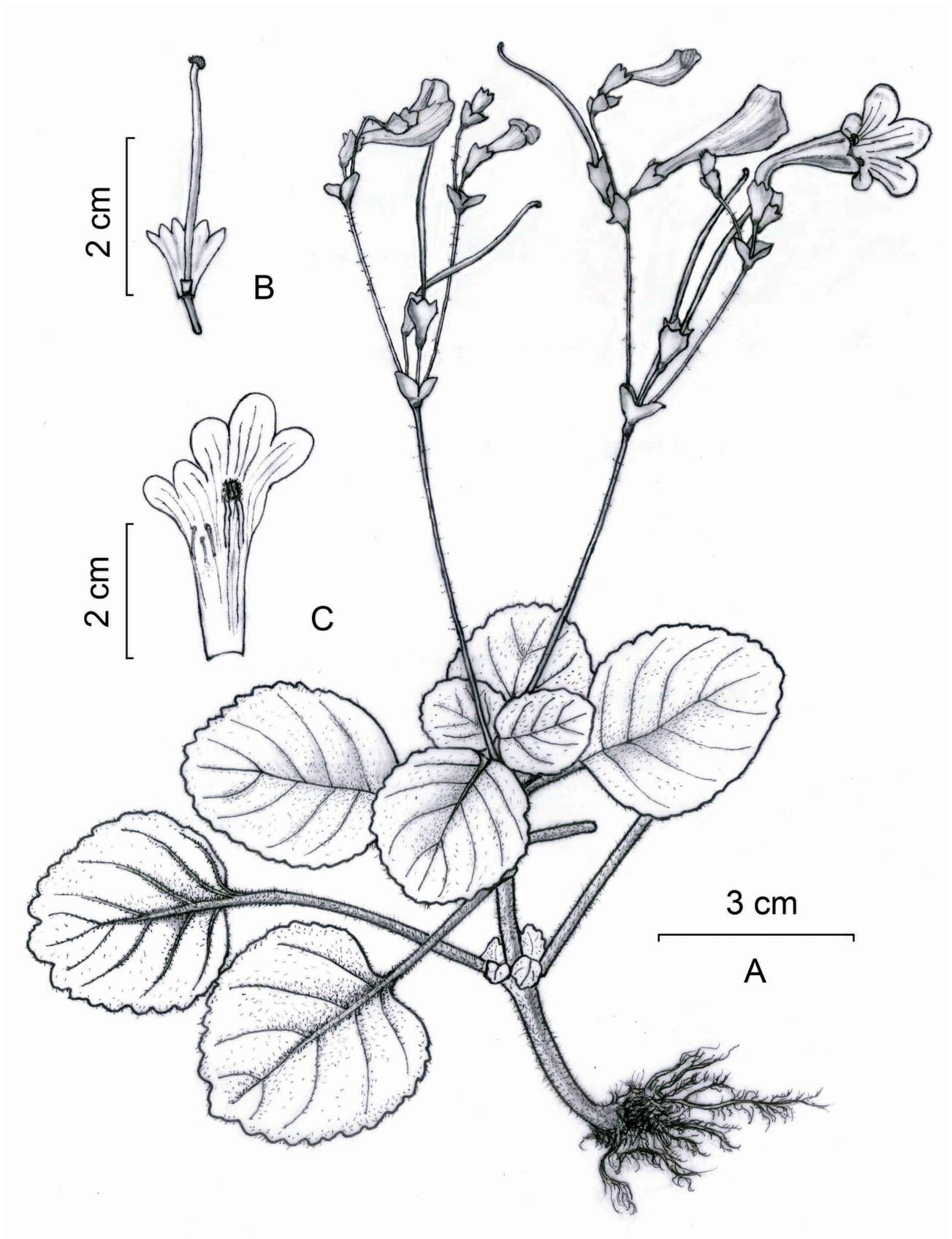


FIGURE 1. *Didymocarpus anningensis* Y.M. Shui, Lei Cai & J. Cai. (from the paratype) A. Plant with flowers and young fruits; B. Pistil with calyx; C. Opened corolla showing stamens and staminodes.

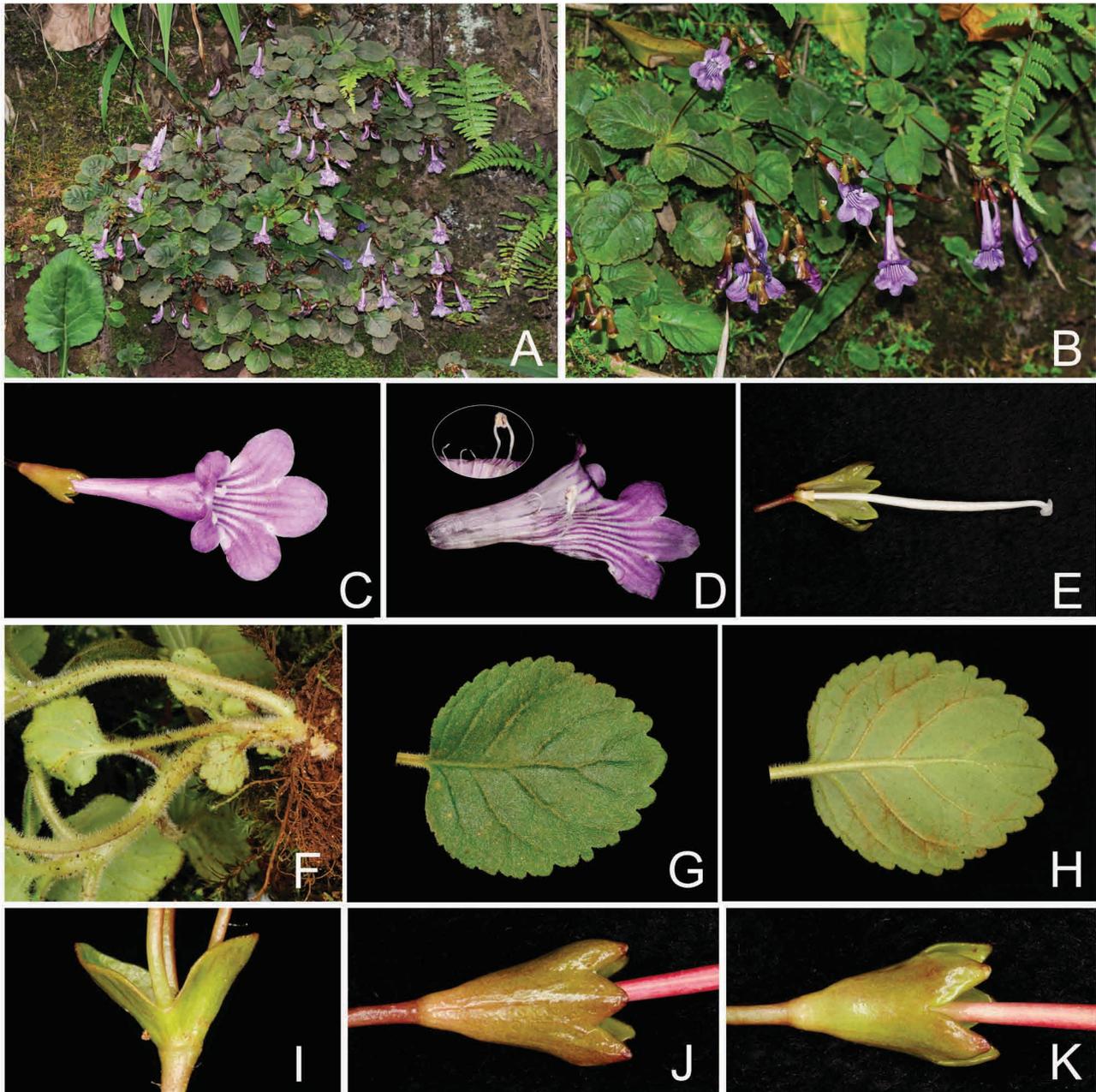


FIGURE 2. *Didymocarpus anningensis* Y.M. Shui, Lei Cai & J. Cai. A. Habitat; B. Plant with flowers; C. Flower; D. Opened corolla showing stamens and staminodes; E. Pistil with calyx; F. Stem, leaf petiole and roots; G. Adaxial leaf surface; H. Abaxial leaf surface; I. Bracts; J. Adaxial lip of calyx; K. Abaxial lip of calyx. Notes: A–B photographed by Jie Cai, C–K photographed by Lei Cai.

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References

Li, J.M., Sun, W.J., Chang, Y. & Yang, W.G. (2015) Systematic position of *Gyrocheilos* and some odd species of *Didymocarpus* (Gesneriaceae) inferred from molecular data, with reference to pollen and other morphological characters. *Journal of Systematics*

- and Evolution* 54 (2): 113–122.
<http://dx.doi.org/10.1111/jse.12169>
- Li, J.M. & Li, S.L. (2014) *Didymocarpus heucherifolius* var. *yinzhengii* (Gesneriaceae), a new taxon from Hunan, China. *Phytotaxa* 156 (3): 187–190.
<http://dx.doi.org/10.11646/phytotaxa.156.3.10>
- Li, J.M. & Wang, F.S. (2015) *Didymocarpus tonghaiensis* sp. nov. (Gesneriaceae) from Yunnan, China. *Nordic Journal of Botany* 33: 68–70.
<http://dx.doi.org/10.1111/njb.00465>
- Li, Z.Y. & Wang, Y.Z. (2004) *Didymocarpus* Wall. In: Li, Z.Y. & Wang, Y.Z. (Eds.) *Plants of Gesneriaceae in China*. Henan Science & technology Publish House, Zhengzhou, pp. 283–299.
- Möller, M. & Clark, J.L. (2013) The state of molecular studies in the family Gesneriaceae: A review. *Selbyana* 31 (2): 95–125.
- Möller, M., Forrest, A., Wei, Y.G. & Weber, A. (2011) A molecular phylogenetic assessment of the advanced Asiatic and Malesian didymocarpoid Gesneriaceae with focus on non-monophyletic and monotypic genera. *Plant Systematics and Evolution* 292: 223–248.
<http://dx.doi.org/10.1007/s00606-010-0413-z>
- Pellegrin, F. (1930) Gesneriaceae. In: Lecomte, H. & Humbert, H. (Eds.) *Flore Générale de L'Indo-Chine*. Tome 4. Masson, Paris, pp. 487–565.
- Wallich, N. (1819) Notice of the progress of botanical science in Bengal, being the substance of a letter from Dr. Wallich to Francis Hamilton. *Edinburgh Philosophical Journal* 1: 376–378.
- Wang, W.T., Pan, K.Y. & Li, Z.Y. (1990) Gesneriaceae. In: Wang, W.T. (Ed.) *Flora Reipublicae Popularis Sinicae* Vol. 69. Science Press, Beijing, pp. 420–451.
- Wang, W.T., Pan, K.Y. & Li, Z.Y. (1998) Gesneriaceae. In: Wu, Z.Y. & Raven, P.H. (Eds.) *Flora of China*. Vol. 18. Science Press, Beijing & Missouri Botanical Garden Press, St. Louis, pp. 349–358.
- Weber, A., Burt, B.L. & Vitek, E. (2000) Materials for a revision of *Didymocarpus* (Gesneriaceae). *Annalen des Naturhistorischen Museums in Wien*. Serie B, 102: 441–475.
- Weber, A., Wei, Y.G., Puglisi, C., Wen, F., Mayer, V. & Möller, M. (2011) A new definition of the genus *Petrocodon* (Gesneriaceae). *Phytotaxa* 23 (1): 49–67.
<http://dx.doi.org/10.11646/phytotaxa.23.1.3>
- Weber, A. & Burt, B.L. (1998) Remodelling of *Didymocarpus* and associated genera (Gesneriaceae). *Beiträge zur Biologie der Pflanzen* 70: 293–363.
- Wen, F., Qiu, Y.L., Huang, J., Zhao, B. & Wei, Y.G. (2013) *Didymocarpus dissectus* sp. nov. (Gesneriaceae) from Fujian, eastern China. *Nordic Journal of Botany* 31: 316–320.
<http://dx.doi.org/10.1111/j.1756-1051.2012.00057.x>