

***Oreocharis tsaii*, a new species of Gesneriaceae from southern Yunnan, China**

YUN-HONG TAN, JIAN-WU LI* & JIAN-TAO YIN

Key Laboratory of Tropical Plant Resource and Sustainable Use, Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, Menglun, Mengla, Yunnan 666303, China;

* Authors for correspondence. E-mail: ljw@xtbg.org.cn

Abstract

Oreocharis tsaii, a new species of Gesneriaceae from southern Yunnan, China, is here described and illustrated. It is morphologically similar to *O. hirsuta* and *O. aurea*, but can be easily distinguished from the latter by its smaller cordate to ovate leaves; cymes with 1–5 flowers, corolla tube narrowing gradually from base to throat, constricted at the throat, corolla lobes mostly more than half as long as the tube; filaments sparsely glandular-pubescent and pilose, style sparsely glandular-pubescent.

Keywords: China, morphology, *Oreocharis*, taxonomy

Introduction

Oreocharis Benth. (1876: 1021) comprises about 80 species of Gesneriaceae distributed in the Old World tropics and subtropics. Based on molecular phylogenetics and morphological analyses, Möller *et al.* (2011) proposed to include ten small and monospecific Chinese genera within *Oreocharis* in order to form a monophyletic group.

During floristic surveys of southern Yunnan between 2010 and 2013, a few new species were discovered and described (Tan *et al.* 2012, 2013). We also collected an unknown plant of *Oreocharis* that morphologically did not match the description of any of the known species. This specimen differed in its relatively smaller cordate to ovate leaves; cymes with 1–5 flowers, corolla tube narrowing gradually from base to throat, constricted at the throat, corolla lobes mostly more than half as long as the tube; filaments sparsely glandular-pubescent and pilose, style sparsely glandular-pubescent. Based on a detailed examination of the morphological and anatomical characters of this plant and possible relatives (Pellegrin 1930, Barnett 1961, Li 1983, Pan 1987, Wang *et al.* 1990, 1998, Li & Wang 2004, Liu *et al.* 2012, Chen *et al.* 2013, Tan *et al.* 2014), we concluded that it is a new species, which we hereby describe and illustrate.

Taxonomic treatment

***Oreocharis tsaii* Y. H. Tan & J. W. Li, *sp. nov.* (Figs. 1–2).**

Diagnosis: *Oreocharis tsaii* is similar to *O. hirsuta* Barnett, differing from the later by its smaller cordate to ovate leaves; cymes with 1–5 flowers, corolla tube narrowing gradually from base to throat, constricted at the throat, corolla lobes mostly more than half as long as the tube; filaments sparsely glandular-pubescent and pilose, style sparsely glandular-pubescent.

Type:—CHINA. Yunnan: Menglian, Mengma, Lafu, growing on rocks or cliffs in valleys under evergreen broad-leaved forests, 1500 m, 31 Oct. 2010, Yun-Hong Tan 3308 (holotype HITBC!, isotype HITBC!).

Perennial, rosette herbs. Stemless. Leaves basal, spirally arranged, 5–20, petiolate; petioles terete, 0.5–5.0 cm long, 1.5–3 mm in diameter, densely reddish brown villous and glandular hairy, 2–4 mm long; leaf blades papery when dry, cordate to ovate, 1.3 × 1.2–5.5 × 4.0 cm, bases subcordate to cordate, slightly unequal, margins crenate, apices obtuse to acute, adaxially densely reddish brown villous hairy, abaxially densely villous along veins, hairs 4–5 mm long; midrib

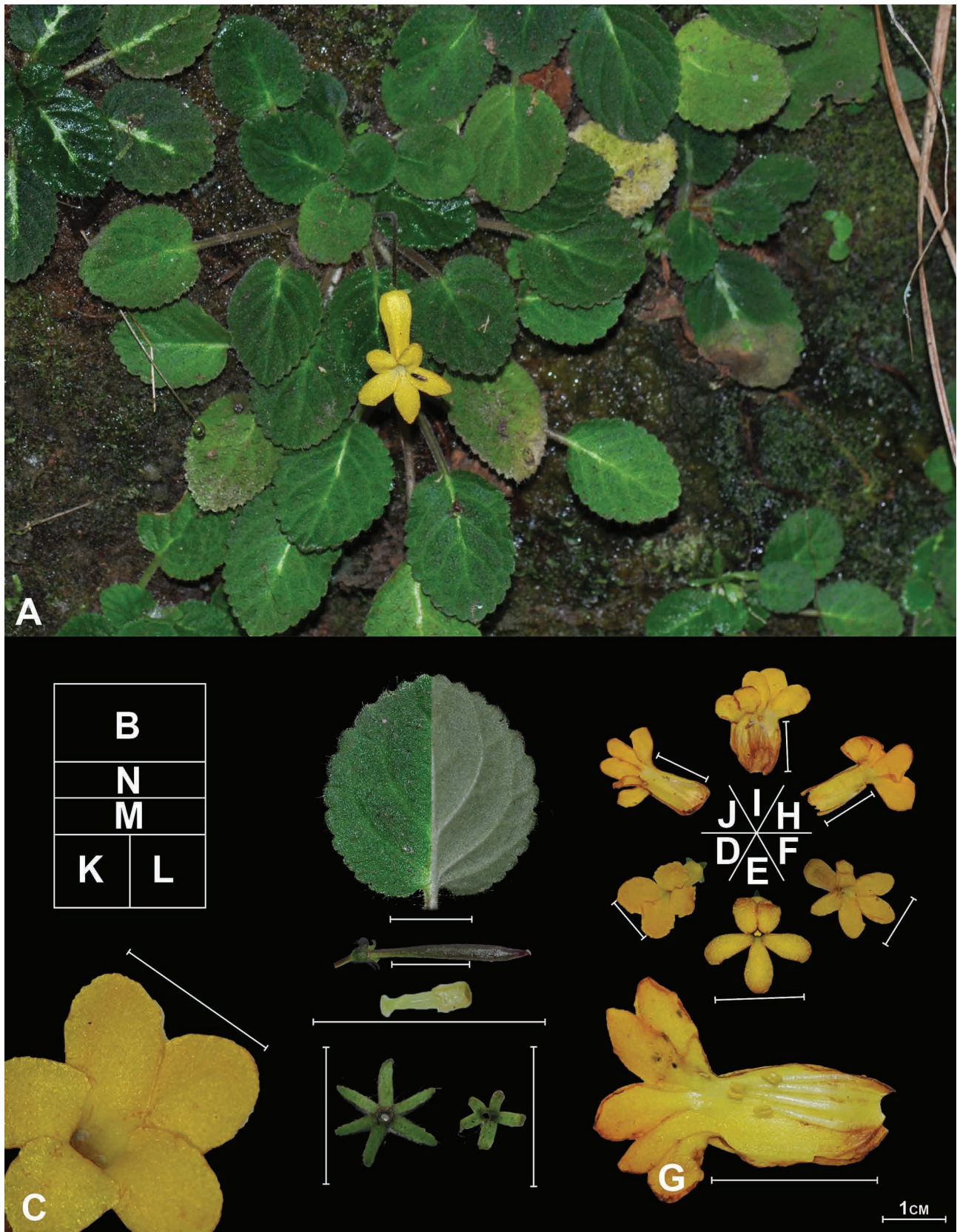


FIGURE 1. *Oreocharis tsaii*. **A.** Habit. **B.** Leaf. **C–F.** Corolla shapes. **G–J.** Opened corolla showing stamens and staminode. **K–L.** Calyx. **M.** Pistil. **N.** Capsule. Photographed by Yun-Hong Tan.

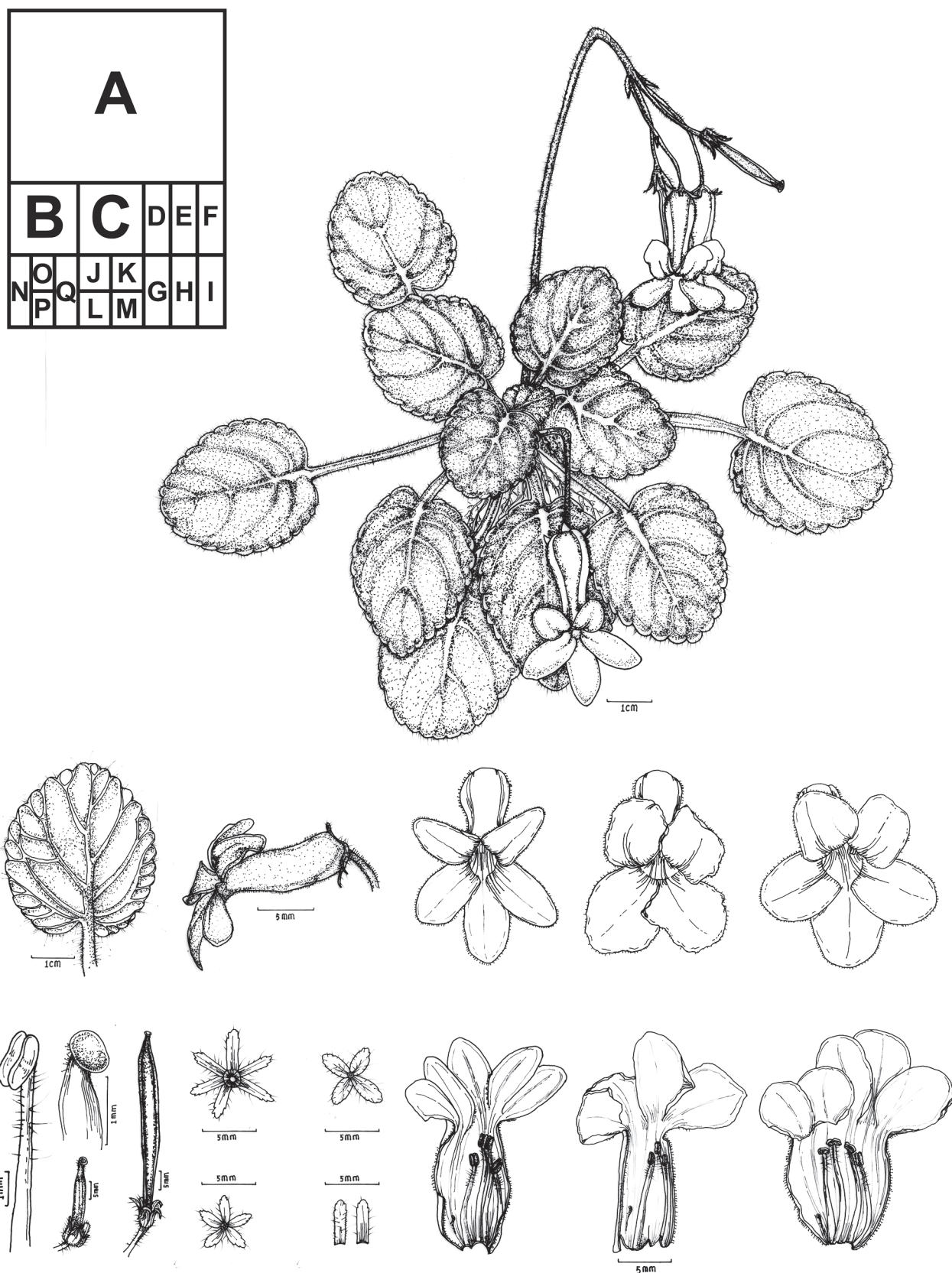


FIGURE 2. *Oreocharis tsaii*. **A.** Habit. **B.** Leaf (abaxial). **C.** Flower, lateral view. **D–F.** Corolla shapes. **G–I.** Opened corolla showing stamens and staminode. **J–M.** Calyx. **N.** Stamen. **O–P.** Pistil. **Q.** Capsule. Illustration by Bi-Dan Lai based on the holotype *Yun-Hong Tan* 3308.

usually emerald when fresh, lateral veins 4–5 on each side of midrib, distinct, concave adaxially, prominent abaxially. Inflorescences cymes, axillary, 1–2-branched, 1–5-flowered; peduncles 3.0–11.0 cm long, ca. 1 mm in diameter, pilose and sparsely glandular hairy; bracts 2, 3.5×0.8 – 5.5×1.0 mm, lanceolate to linear-lanceolate, margins entire or 2–3-denticulate, pilose and sparsely glandular hairy outside, hairs 2–3 mm long; bracteoles similar but smaller, 2.5×0.5 – 3.0×0.7 mm; pedicels 0.6–2.1 cm long, 0.6–0.8 mm in diameter, with 2–2.5 mm long dense and glandular pubes. Calyx actinomorphic, 3.0×0.8 – 4.0×1.0 mm, (4–)5(–6)-parted to base, slightly unequal, lobes elliptic to linear-lanceolate, pilose and with glandular hairy outside and glabrous inside, margins entire or 1–3-denticulate. Corolla yellow 1.7–2.0 cm long, outside densely glandular-pubescent, inside glabrous; tube cylindrical, narrowing gradually from base to throat, constricted at the throat, 10–13 mm long, 4.5–5.0 mm in diameter at base and 2.0–3.0 mm in diameter at the throat; limb distinctly two-lipped, adaxial lip 2-lobed to base, lobes obovate to elliptic, 4.0×2.5 – 7.0×7.0 mm; abaxial lip (2–)3-lobed to base, lobes obovate to elliptic, 6.0×2.5 – 9.0×7.8 mm. Stamens (3–)4, adnate to corolla 4.0–5.0 mm above base, included; filaments 6.0–7.0 mm long, slender, sparsely glandular-pubescent and pilose, free; anthers oblong, 0.8×0.5 – 1.0×0.7 mm, 2-loculed, dehiscing longitudinally, connective glabrous; staminode 1, glabrous, 1.5–2.0 mm long, adnate to 5 mm above corolla tube base. Disc ring-like, 1.0–1.5 mm high, glabrous, entire or subentire. Pistil 6.0–10.0 mm; ovary 4.0–8.0 mm long, ca. 1 mm in diameter, style 1.0–2.0 mm long, sparsely glandular-pubescent; stigma peltate, orbicular, 1.0–1.5 mm in diameter. Capsules 4-angled or subterete, 1.5–2.1 cm long and ca. 2 mm in diameter, glabrous. Flowering from October to November and fruiting from November to December.

Distribution, habitat and ecology:—*Oreocharis tsaii* is only known from southern Yunnan and grows on rocks or cliffs in valleys, at an elevation of ca. 1400–1500 m. The main herbaceous companion species are: *Begonia menglianensis* Y. Y. Qian, *Henckelia speciosa* (Kurz) D.J.Middleton & Mich.Möller, *Petrocosmea parryorum* C. E.C.Fisch., *Asplenium normale* Don, *Cornopteris decurrenti-alata* (Hook.) Nakai, *Selaginella siamensis* Hieron., and *Carex cruciata* Wahlenb.

Relationships:—*Oreocharis tsaii* is morphologically most similar to *O. aurea* and *O. hirsuta* Barnett from Thailand (Barnett 1961). After comparison with the specimens and literature of *O. hirsuta* and *O. aurea*, we found that *O. tsaii* can be clearly differentiated from both by several characters, as described in the diagnostics above and summarized in Table 1.

TABLE 1. Morphological comparisons between *Oreocharis tsaii* and *O. hirsuta*.

	<i>O. tsaii</i>	<i>O. hirsuta</i>	<i>O. aurea</i>
Leaves	cordate to ovate, obtuse, subcordate to cordate, margins crenate, 1.3–5.5 cm long, 1.2–4.0 cm wide.	elliptic or ovate, acute, base cuneate to subrounded, margins biserrate, 5.0–8.5 cm long, 2.7–4.6 cm wide.	lanceolate to ovate, base sometimes slightly oblique, broadly cuneate to cordate, margins biserrate, 5–15.5 cm long, 3.4–8 cm wide.
PetiolesPeduncles	0.5–5.0 cm long. 3.0–11.0 cm long.	1.2–6.5 cm long. 13.5–18 cm long.	3–12 cm long. 12–40 cm long.
Inflorescences	cymes with 1–5 flowers.	cymes with 6–7 flowers or more.	cymes 3–10-flowers
Corolla	ca. 1.7–2.0 cm long; tube narrowing gradually from base to throat, contracted at throat. Corolla lobes mostly longer than tube.	ca. 2.0 cm long; tube almost equal from base to throat, sometimes slightly curved. Corolla lobes mostly shorter than tube.	ca. 1.2–2.2 cm long; tube strongly contracted at throat. Corolla lobes mostly shorter than tube.
Calyx	(4–)5(–6) part to base, margins entire or 2–3 denticulate.	5 part to base, margins entire.	margins 2–3 denticulate
Filaments	6.0–7.0 mm long, sparsely glandular-pubescent and pilose.	7–8.5 mm long, hirsute	ca. 4–5 mm long, sparsely pubescent near apex or white villous
Style	sparsely glandular-pubescent.	glabrous	glabrous to sparsely glandular puberulent

Proposed IUCN conservation assessment.—Endangered (EN B1ab(iii)). This species is only known from two nearby sites. The currently known Extent of Occurrence is less than 200 km² and the population size is less 1000 individuals. The known populations are all in disturbed and fragmented habitats.

Etymology:—The specific epithet commemorates the late Prof. Cai Xitao (Tsai Hse-Tao), who devoted all his life to the study of Chinese plants and Xishuangbanna Tropical Botanical Garden (XTBG).

Additional specimens examined (paratypes):—CHINA. Yunnan: Menglian County, Mengma, Lafu, 31 Oct. 2010, *Jian-Wu Li cx00019* (HITBC). 20 Nov. 2013, *Yun-Hong Tan 10059* (HITBC).

Acknowledgements

We are grateful to Dr. Prof. Richard Corlett for providing valuable comments and suggestions on the manuscript. We thank Bi-Dan Lai for the illustration. We are also grateful to Yi-Wen Cui for editing the illustration and the photographs. This work was financially supported by the National Science and Technology Infrastructure Program (08ZK121B02, 08ZK111B02) and CAS 135 program (XTBG-F03).

References

- Barnett, E.C. (1961) Contributions to the Flora of Thailand: LV. *Kew Bulletin* 15: 249–259.
<http://dx.doi.org/10.2307/4109363>
- Bentham, G. & Hooker, J.D. (1876) *Genera Plantarum ad exemplaria imprimis in herbariis Kewensibus*. vol. 2. London, Reeve & Co.
- Chen, W.H., Wang, H., Shui, Y.M., Möller, M., & Yu, Z.Y. (2013) *Oreocharis jinpingensis* (Gesneriaceae), a new species from Yunnan, China. *Annales Botanici Fennici* 50: 312–316.
<http://dx.doi.org/10.5735/086.050.0504>
- Li, H.W. (1983) Notulae de Gesneraceis Yunnanensibus. *Bulletin of Botanical Research* 3(2): 1–55.
- Li, Z.Y. & Wang, Y. Z. (2004) *Plants of Gesneriaceae in China*. Henan Science and Technology Publishing House, Zhengzhou, pp. 14–47.
- Liu, Y., Xu, W.B., Huang, Y.S., Peng, C.I., & Chung, K.F. (2012) *Oreocharis dayaoshanioides*, a rare new species of Gesneriaceae from eastern Guangxi, China. *Botanical Studies* 53: 393–399.
- Möller, M., Middleton, D., Nishii, K., Wei, Y.G., Sontag, S. & Weber, A. (2011) A new delineation for *Oreocharis* incorporating an additional ten genera of Chinese Gesneriaceae. *Phytotaxa* 23: 1–36.
- Pellegrin, F. (1930) Gesneriaceae. In: Lecomte, M.H. (Ed.) *Flore. Générale de l'Indo-Chine* 4: 487–565.
- Pan, K.Y. (1987) Taxonomy of the genus *Oreocharis* (Gesneriaceae). *Acta Phytotaxonomica Sinica* 25: 264–293.
- Tan, Y.H., Hsu, T.C., Pan, B., Li, J.W., & Liu, Q. (2012) *Gastrodia albidoides* (Orchidaceae: Epidendroideae), a new species from Yunnan, China. *Phytotaxa* 66: 38–42.
- Tan, Y.H., Li, J.W., Pan, B., Wen, B., Yin, J.T. & Liu, Q. (2013) *Oreocharis glandulosa*, a new species of Gesneriaceae from southern Yunnan, China. *Phytotaxa* 131: 29–34.
<http://dx.doi.org/10.11646/phytotaxa.131.1.5>
- Tan, Y.H., Li, J.W., Chen, W.H., Wen, B., & Möller, M. (2014) Additional notes on *Oreocharis yunnanensis*, a species of Gesneriaceae from southern Yunnan, China, including morphological and molecular data. *Phytotaxa* 167(3), 283–288.
<http://dx.doi.org/10.11646/phytotaxa.167.3.7>
- Wang, W.T., Pan, K.Y., Zhang, Z.Y., & Li, Z.Y. (1990) Gesneriaceae. In: Wang, W.T., (Ed.) *Flora Reipublicae Popularis Sinicae* 69. Science Press, Beijing, pp. 141–171.
- Wang, W.T., Pan, K.Y., Li, Z.Y., Weitzman, A.L. & Skog, L.E. (1998) Gesneriaceae. In: Wu, Z.Y. & Raven, P.H. (Eds.) *Flora of China*. Vol. 18. Science Press and Missouri Botanical Garden Press, Beijing and St. Louis, pp. 244–401.