

Gentiana zhenxiongensis (Gentianaceae), a new species from Yunnan, China

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Gentiana zhenxiongensis L.H. Wu & Z.T. Wang *sp. nova* (Gentianaceae) from Yunnan province, China, is described and illustrated. It resembles *G. praticola*, but differs in having stolons and/or rhizomes, small flowers, calyx lobes with keeled midribs, a campanulate corolla and a tuberculate testa.

Gentianaceae is a large and diverse family widely distributed throughout the tropical, temperate and arctic zones. Recent taxonomic reviews estimate the family to contain 80 genera and 700 species (Ho & Pringle 1995), or 87 genera and over 1600 species (Struwe *et al.* 2002). Ho and Pringle (1995) estimate some 20 genera and 419 species to be native to China.

Gentiana is the largest genus in the family. After Linnaeus formally established the genus, other scientists subsequently delimited *Gentiana* with different viewpoints both *s. lato* and *s. stricto* (Ho & Liu 2001, Struwe *et al.* 2002). *Gentiana* in its current eclectic circumscription comprises about 361 species, with 249 recognized in China (Ho & Pringle 1995, Ho & Liu 2010).

Many *Gentiana* species have economic value especially in the Traditional Chinese Medicine (TCM) in China. Their medicinal use, which spans over a 1000 years, includes the treat-

ment of jaundice, hepatitis, constipation and rheumatoid arthralgia among Chinese Han and minority nationalities (State Administration of TCM 1999). Whilst undertaking recent fieldwork in NE, W and SW China as part of a wider research project about the authentication of *Gentiana* species used in TCM, in August 2008 and August 2010 we collected a previously unknown *Gentiana* species from Zhenxiong county, NE Yunnan province, which we describe here as a new species.

***Gentiana zhenxiongensis* L.H. Wu & Z.T. Wang, *sp. nova* (Figs. 1 and 2)**

Haec species G. praticolae affinis, sed ab caudicibus stolonibus, floribus parvioribus (8–11 mm non 12–15 mm), calycis loborum costis carinatis, corollis campanulatis, testis tuberculatis bene distincta.

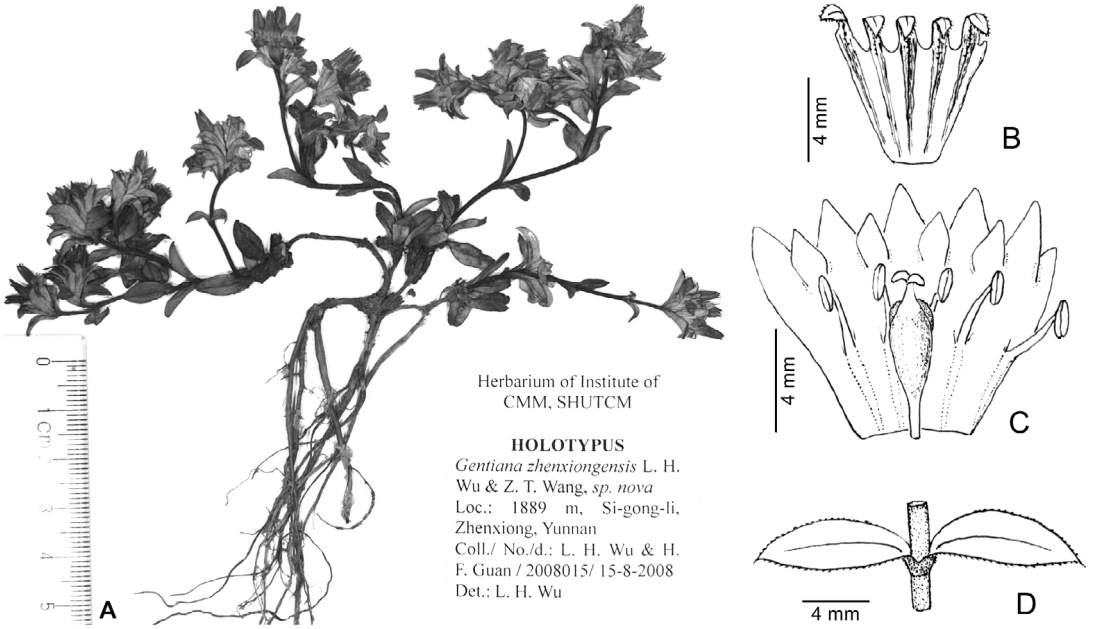


Fig. 1. *Gentiana zhenxiiongensis*. — **A:** Holotype. — **B:** Calyx (opened, dorsal view). — **C:** Corolla (opened) and pistil. — **D:** Opposite leaves with bases connate-sheathing. (**B–D** from the holotype, drawn by Li-Hong Wu)

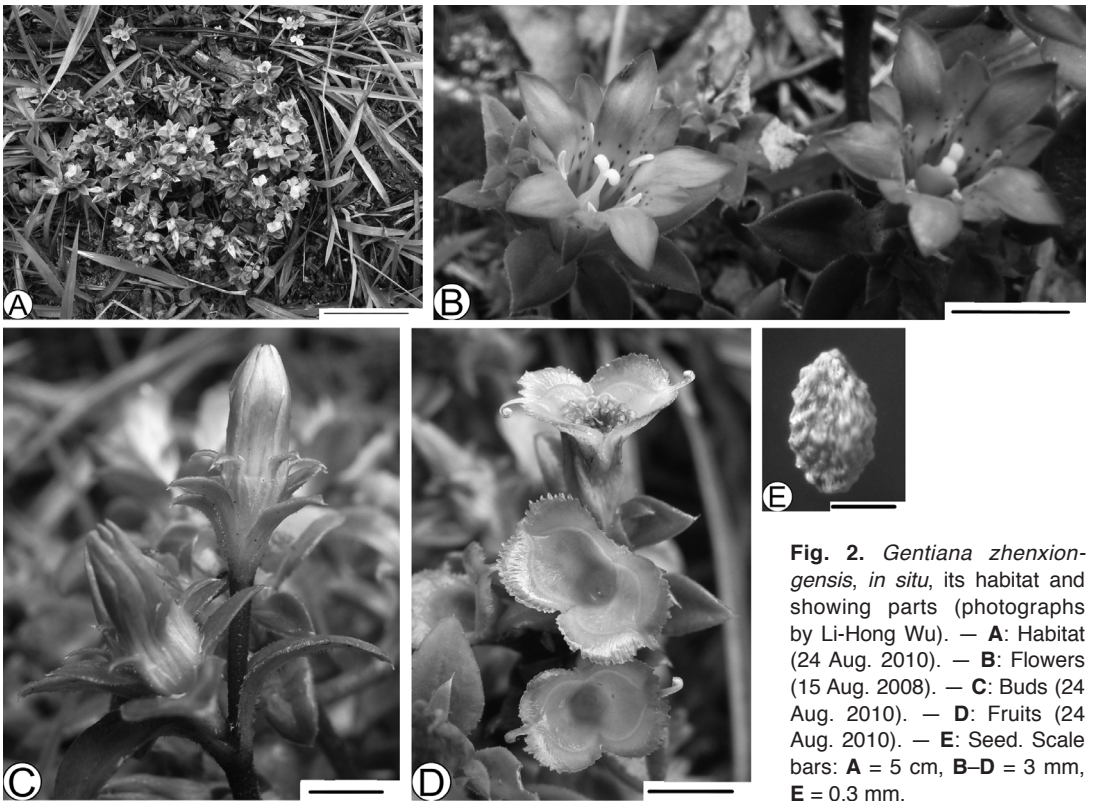


Fig. 2. *Gentiana zhenxiiongensis*, *in situ*, its habitat and showing parts (photographs by Li-Hong Wu). — **A:** Habitat (24 Aug. 2010). — **B:** Flowers (15 Aug. 2008). — **C:** Buds (24 Aug. 2010). — **D:** Fruits (24 Aug. 2010). — **E:** Seed. Scale bars: **A** = 5 cm, **B–D** = 3 mm, **E** = 0.3 mm.

TYPE: China. Yunnan, Zhenxiong county, Si-gong-li, in the clearings of hilltop, alt. 1889 m, flowering and fruiting, 15 Aug. 2008 *L.H. Wu & H.F. Guan 2008015* (holotype SYS; isotype SYS, Herbarium of Institute of Chinese Materia Medica, Shanghai University of TCM). — PARATYPE: China. Yunnan, Zhenxiong, *ibid.*, 1889 m, 24 Aug. 2010 *L.H. Wu 2010036* (SYS, Herbarium of Institute of Chinese Materia Medica, Shanghai University of TCM).

ETYMOLOGY. The epithet is derived from the type locality, Zhenxiong county, in NE Yunnan province, China.

Perennial, 5–10 cm tall; stolons short to 2.5 cm, sometimes producing fleshy adventitious roots. Rhizomes short to 2 cm, producing a few slender, rather fleshy adventitious roots. Stems decumbent to erect, purple, densely papillate, dichotomously branched from base. Basal leaves usually developed, sessile, bases connate-sheathing 1–2 mm, obovate-elliptic to lanceolate, 15–30 × 3–5 mm, abaxially glabrous, adaxially densely and minutely papillate, margin indistinctly cartilaginous and densely ciliolate, apex acute and mucronulate, midrib distinct and sparsely ciliolate. Stem leaves sub-leathery, widely spaced, sessile, bases connate-sheathing ca. 1 mm or less, obovate-elliptic to obovate, 5–12 × 2–4 mm, shorter than internodes, abaxially glabrous, adaxially densely and minutely papillate, margin indistinctly cartilaginous and densely ciliolate, apex acute and mucronulate, midrib slender and sparsely ciliolate. Bracts 1 pair each flower, sessile, bases connate-sheathing ca. 1 mm or less, obovate-lanceolate, 8–9 × 2.5 mm, margin indistinctly cartilaginous and densely ciliolate, apex acute and mucronulate, midrib densely ciliolate. Flowers 1 to 4 crowded into uppermost leaf axils, sessile. Calyx campanulate, 6–8 mm, tube membranous; calyx lobes recurved, green, elliptic-lanceolate, 2.5–3 × 1 mm, leathery, margin indistinctly cartilaginous and densely ciliolate, apex acute and mucronulate, midrib keeled and decurrent into a wing of calyx tube. Corolla campanulate, 8–11 mm, outside purple red, inside blue, usually with brownish stripes and spots in throat; lobes ovate-triangular, ca. 2 mm, margin entire, apex obtuse; plicae ovate-triangular, 1 × 1–1.5 mm, margin entire, apex obtuse. Stamens inserted at middle of corolla tube, equal; filaments 3–3.5 mm; anthers narrowly ellipsoid, 1–1.5 mm. Ovary obovoid, 3–3.5 × 2 mm, gynophore to 1.5 mm at anthesis; style ca. 1 mm; stigma lobes recurved. Capsules obovate-trian-

gular, 4–5 mm, usually inserted inside or slightly exerted from corolla, margin and apex winged along sutures, apex denticulate; gynophore to 7 mm. Seeds 0.6–0.7 mm, ellipsoid or spindle-shaped, brown; testa tuberculate and minutely reticulate. Flowering and fruiting in August.

DISTRIBUTION AND HABITAT. *Gentiana zhenxiongensis* is known only from the type locality, Si-gong-li, Zhenxiong county, NE Yunnan province. It grows at 1890 m in yellow soils on a hilltop clearing; associated species include *Cunninghamia lanceolata*, *Cryptomeria japonica* var. *sinensis*, *Quercus serrata* var. *brevipetiolata*, *Cotoneaster horizontalis*, *Gentiana rigescens*, *Swertia macrosperma* and *Hypericum erectum*.

As the largest genus within the Gentianaceae, *Gentiana* in its current global circumscription includes 15 sections, excluding sect. *Stenogyne* (Ho & Liu 2001), with 12 sections including sect. *Stenogyne* in China (Ho & Pringle 1995). Sect. *Chondrophyllae* is the largest one on a global scale, with 156 species, 117 of which are endemic to China (Ho & Pringle 1995). Based on the perennial plants with stolons and/or fleshy roots together with small flowers, Ho (1985) described a new series within sect. *Chondrophyllae*, viz. ser. *Napuliferae*, comprising four species, *G. napulifera*, *G. sarcorrhiza*, *G. praticola* and *G. loureiroi* (Ho *et al.* 1988). *Gentiana sarcorrhiza* was later recognized to be a synonym of *G. napulifera* (Ho & Pringle 1995, Ho & Liu 2001). In gross morphology *G. zhenxiongensis* most closely resembles *G. praticola*, which occurs in Guizhou, Sichuan and NW Yunnan provinces, but the former is distinguished in having stolons and/or rhizomes, smaller flowers, calyx lobes with keeled midribs, campanulate corolla and tuberculate seed coat. The morphological characters of the two species are compared in Table 1. The taxon described here is a fourth species in *Gentiana* sect. *Chondrophyllae* ser. *Napuliferae* and it may be identified from its allied species by following key.

Key to the species of *Gentiana* sect. *Chondrophyllae* ser. *Napuliferae* in China

1. Roots stout, fusiform; basal leaves linear to linear-lanceolate *G. napulifera*
1. Roots slender, cylindrical; basal leaves elliptic to ovate-lanceolate 2

Table 1. Morphological comparison of *Gentiana zhenxiogensis* and *G. praticola*. Data on the latter based on the descriptions in Franchet (1896), Ho *et al.* (1988), Ho and Pringle (1995), and Ho and Liu (2001).

Characters	<i>G. zhenxiogensis</i>	<i>G. praticola</i>
Stolon	to 2.5 cm	usually absent
Rhizome	short to 2 cm	usually absent
Flower	8–11 mm	12–15 mm
Corolla shape	campanulate	broadly tubular
Plicae	ovate-triangular, 1 × 1–1.5 mm, margin entire, apex obtuse	semiorbicular, 1–1.2 mm, margin denticulate, apex rounded
Calyx lobe midrib	keeled and decurrent into a wing of calyx tube	distinct but not keeled
Testa	tuberculate and minutely reticulate	minutely reticulate

2. Flowers solitary on short to long branches, subsessile to pedicellate; anthers 1.8–2.5 mm *G. loureiroi*
2. Flowers usually clustered, sessile; anthers 1–1.5 mm .. 3
3. Stolons to 2.5 cm; rhizomes usually short to 2 cm; flowers 8–11 mm; calyx lobe midribs keeled; corolla campanulate; testa tuberculate and minutely reticulate
..... *G. zhenxiogensis*
3. Stolons and rhizomes usually absent; flowers 12–15 mm; corolla broadly tubular; testa minutely reticulate ...
..... *G. praticola*

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