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Primulina minor sp. nov. (Gesneriaceae) from a limestone cave in Hunan, China

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Primulina minor from the Daoxian county, Hunan province in China is described. This new species is similar to *Primulina jingxiensis* (Yan Liu, W. B. Xu & H. S. Gao) W. B. Xu & K. F. Chung and *P. longzhouensis* (B. Pan & W. H. Wu) W. B. Xu & K. F. Chung, but differs by its number of leaves (4–6), broadly ovate, orbicular-ovate or orbicular leaf blade, 2–4 cymes, short peduncle (1.8–2.0 cm long), white (or white with light purple tinge) corolla, small corolla (8–10 mm long), 3 staminoides of which the lateral ones are short (0.75–0.90 mm long) and adnate to 1.6–1.7 mm above the corolla base.

Recently, based on molecular and morphological data, *Primulina* Hance s.l. (Gesneriaceae) has been recircumscribed as a large genus with at least 145 species and 9 varieties (Wang et al. 2011, Weber et al. 2011, Xu et al. 2012). All species previously referred to *Chirita* sect. *Gibbosaccus* and most species previously placed in the two allied genera *Chiritopsis* and *Wentsaiboea* (excluding *W. tiandengensis*), were merged with the previously monotypic genera *Primulina* (Wang et al. 1990, 1998, Li et al. 2004, Wei et al. 2010). Two newly published species, previously placed in *Chiritopsis*, i.e. *C. jingxiensis* Yan Liu, W. B. Xu & H. S. Gao (Xu et al. 2009) and *C. longzhouensis* B. Pan & W. H. Wu (Pan et al. 2010) were rapidly transferred to *Primulina* s.l., and recombined as *P. jingxiensis* (Yan Liu, W. B. Xu & H. S. Gao) W. B. Xu & K. F. Chung and *P. longzhouensis* (B. Pan & W. H. Wu) W. B. Xu & K. F. Chung.

During a botanical exploration in the Hunan province several novel specimens were collected by a team from the herbarium at Guangxi Inst. of Botany. Subsequent studies lead to the identification of a new species, which is described and illustrated here.

Primulina minor Fang Wen & Y. G. Wei sp. nov. (Fig. 1–2)

Similar to *P. jingxiensis* and *P. longzhouensis*, but differs from the former by its fewer leaves (only 4–6), larger leaf blade (2.5–3.0 × 1.75–2.50 cm), and 3 (not 2) staminoides. It differs from the latter by a lower number of cymes per rosette (only 2–4), fewer flowers per cyme (only (1–)2–4), glabrous filaments, chartaceous (not carnose) leaf blades, shorter peduncle (only 1.8–2.0 cm long), white or purple tinged (not purple) corolla and smaller corolla (only 8–10 mm long).

Type: China. Hunan province, Daoxian (county), Kingtuang Zhen (township), in a limestone cave, 111°24′N, 25°29′E, 289–295 m a.s.l., 13 May 2011, Fang Wen, 2011051301 (holotype: IBK, isotype: ANU).

Etymology

The specific epithet '*minor*' refers to the small habit and flowers of the new species. It is the smallest species known in this genus.

Description

Perennial, stemless herb. Leaves 4–6, basal, thin-chartaceous; petioles flattened, 3.9–7.8 × 1.7–2.2 mm, villous; blades broadly ovate, orbicular-ovate or orbicular, 25–30 × 17.5–25.0 mm, villous and pubescent, shallowly cordate or broadly cuneate at base, with entiremargin and obtuse to suborbicular apex; lateral nerves 2–3, inconspicuous. Cymes lax, 2–4 per rosette, axillary, simple, each (1–) 2–4-flowered; peduncle 18–20 mm long, densely villous with hairs 1.0–1.5 mm long; bracts 2, opposite, linear-lanceolate, 2.0–7.5 × 1.5–2.0 mm, with entire margin and acuminate apex, with outer hairs same as peduncle and inner hairs sparsely appressed puberulous. Calyx 5-lobed, dissected to the base, with segments narrowly linear-lanceolate, 4.5–5.0 mm long, 0.8–1.0 mm wide at base, acute at apex, densely villous externally, glabrous internally, with entire margin. Corolla white or white with purple tinge, 8–10 mm

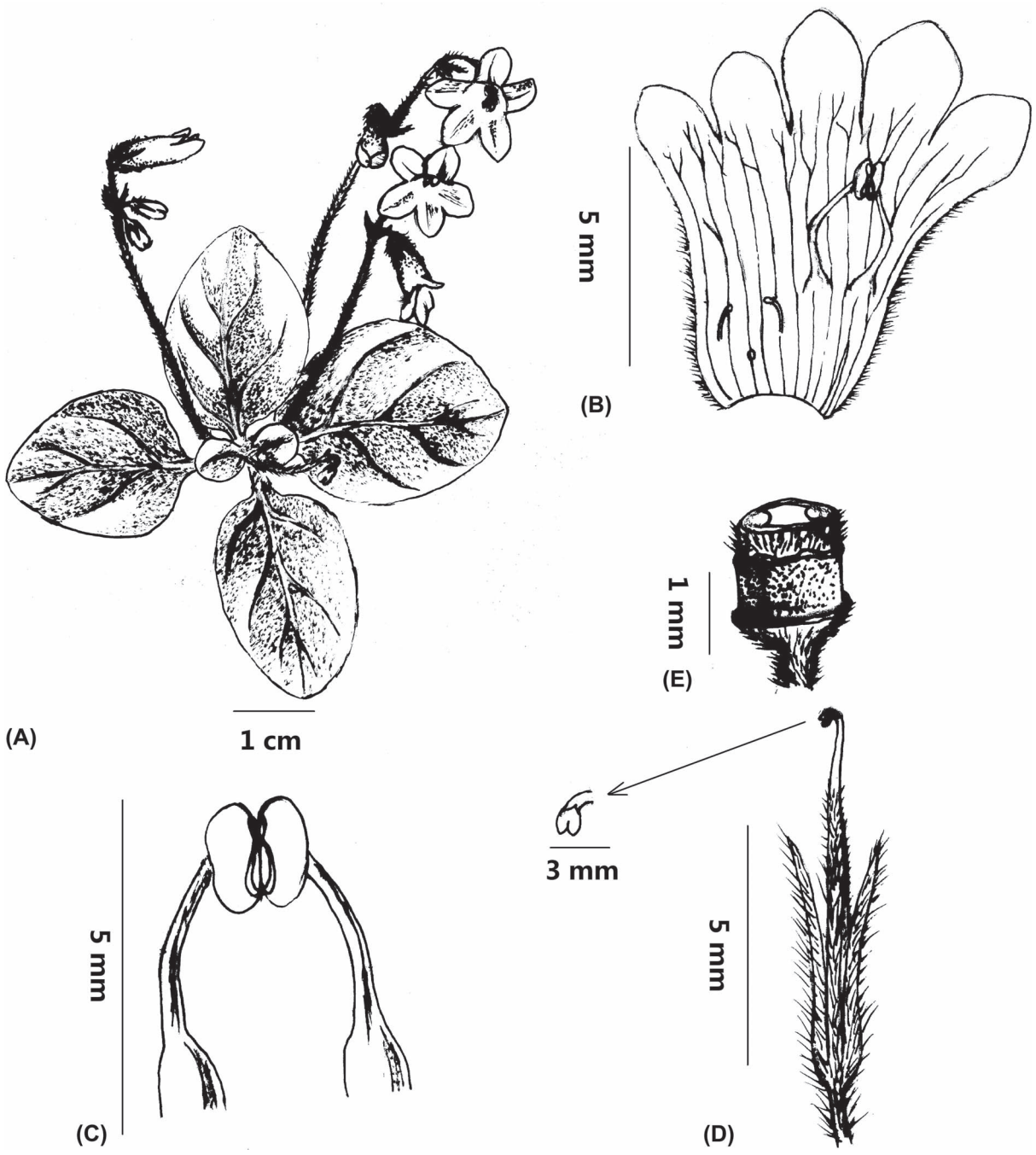

Figure 1. *Primulina minor* sp. nov. (A) habit, with flowering branches, (B) corolla, opened with stamens and staminodes exposed, (C) anthers and filaments, (D) calyx and pistil, (E) disc and cross section of ovary. Drawn by Qi Wei based on the holotype, Fang Wen, 2011051301.

long; orifice ca 3 mm in diameter; base 1.5–1.8 mm in diameter, externally pubescent, internally glabrous; corolla tube 3.5–5.8 mm long; limb distinctly 2-lipped, light purple; adaxial lip 2-parted to base with lobes oblong to rectangular-oblong and acute apex, 2.2–2.5 × 1.50–1.85 mm; abaxial lip 3-parted to near middle, with lobes rounded-ovate or oblong and orbicular apex, 2.7–2.9 × 1.8–2.2 mm. Stamens 2, adnate to 2.4–2.6 mm above the corolla base; filaments linear, 2.7–2.8 mm, geniculate near the middle, glabrous; anthers reniform, united at apex, pale yellow. Staminodes 3; the lateral ones 0.75–0.80 mm long, glabrous, with apex inconspicuously capitate and slightly curved, adnate to 1.6–1.7 mm above the corolla base; central staminode small capitate, adnate to 0.9–1.0 mm above the corolla base. Disc annular, ca 0.8 mm high, glabrous, its margin inconspicuously repand; pistil 7.0–7.5 mm long; ovary narrowly oblong-ovoid, 3.7–4.6 mm long, glabrous; style 2.4–3.8 mm long, puberulent; stigma obtrapeziform, 0.35–0.45 mm long, 2-lobed. Capsule unknown. Flowering occurs in May.

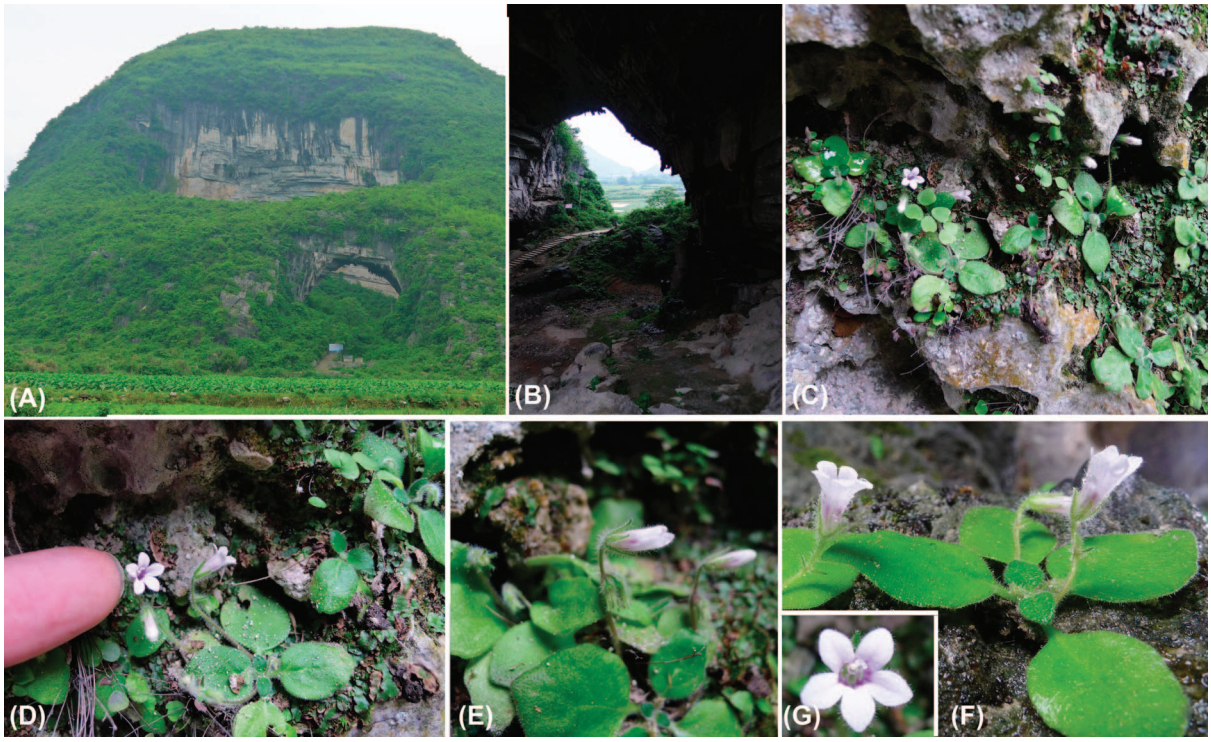

Figure 2. *Primulina minor* sp. nov. (A) limestone hill (type locality), (B) limestone cave, habitat of this new species, (C) adult plants in flowering time, (D) opened flower and a finger for size comparison, (E) lateral view of the bud, (F) top view of the opened flower, (G) frontal view of the opened flower.

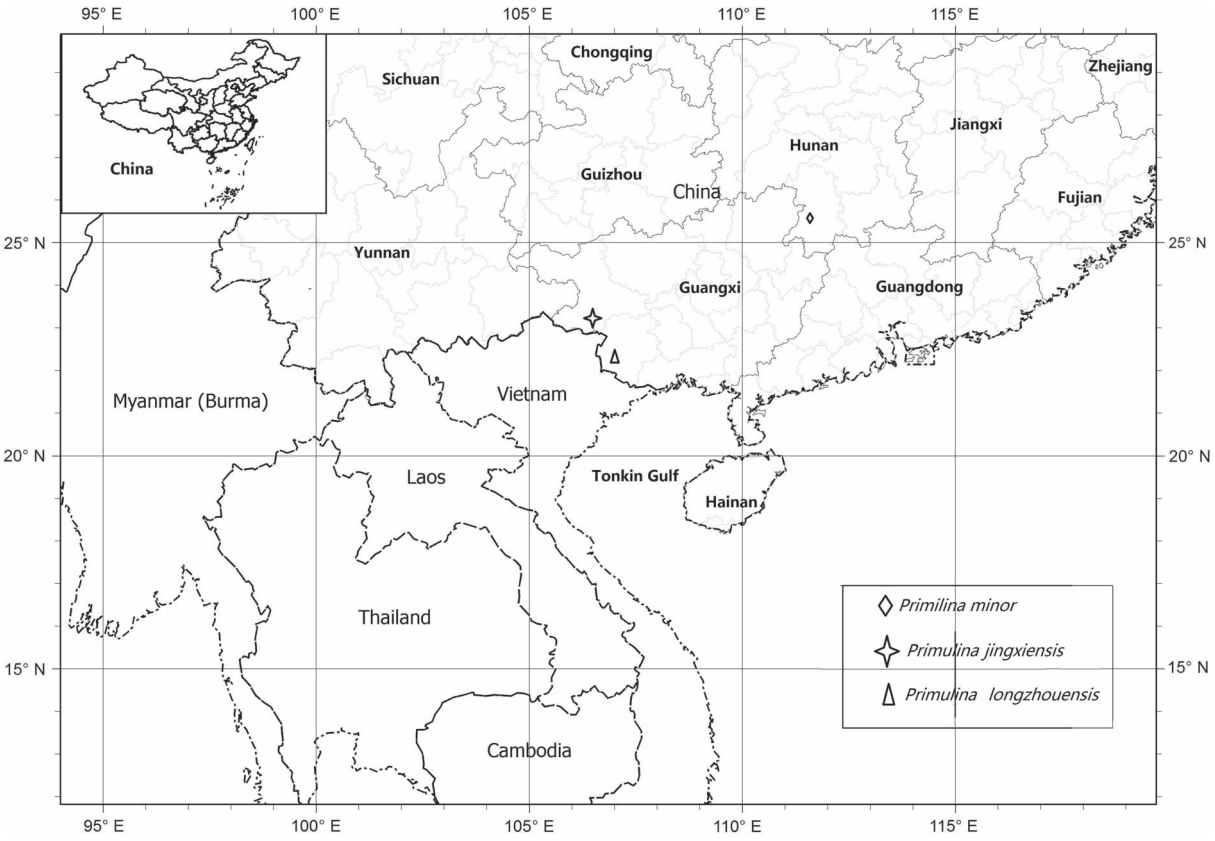

Figure 3. Distribution of *Primulina minor* sp. nov. and related species in China.

Figure 4. (A)–(C) *Primulina jingxiensis*: (A) habitat, (B) plant, (C) flowers. (D)–(F) *P. longzhouensis*: (D) plant, (E) cymes, (F) flowers.

Table 1. Morphological comparison of *Primulina minor* sp. nov., *P. jingxiensis* and *P. longzhouensis*.

Characteristics	*P. minor*	*P. jingxiensis*	*P. longzhouensis*
Leaves (no.)	4–6	7–17	5–25
Leaf blade texture	chartaceous	carnose	carnose
Leaf blade size (cm)	2.50–3.00 × 1.75–2.50	1.0–2.0 × 0.5–1.0	2.0–4.0 × 1.3–2.5
Number of cymes per rosette	2–4	2–5	5–10
Number of flowers per cyme	(1–)2–4	1–3	5–25
Peduncle length (cm)	1.8–2.0	3–6	4–8
Bract size (mm)	2.0–7.5 × 1.5–2.0	10–20 × 3–5	4.0–9.0 × 1.5–3.5
Corolla color	white or white with purple tinge	purplish	purplish
Corolla length (mm)	8–10	10–14	10–13
Length of filaments (mm)	2.7–2.8	3–4	ca 4
Indumentum of filaments	glabrous	glabrous	sparsely glandular-puberulent
Staminoides	3, lateral ones 0.75–0.90 mm long	2, ca 1.5 mm	3, lateral ones 1–3 mm long

Distribution and ecology

Primulina minor is only known from the type locality in Daoxian, Hunan Province, China (Fig. 3). It grows on moist limestone rock surfaces in a karst cave.

Conservation status

Current information shows that the new species is known only from one population with less than 300 mature individuals. We therefore assess that *P. minor* should be provisionally considered as 'Critically Endangered' (CR), CR A1acd, using the IUCN categories and criteria (IUCN 2001).

Similar species

Primulina minor resembles *P. jingxiensis* and *P. longzhouensis* (Xu et al. 2009, 2012, Pan et al. 2010). Shared characters mainly include flowers with similar shape and posture (Fig. 4). Table 1 summarizes the morphological differences between *P. minor* and the two similar species.

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