A new species of Primulina (Gesneriaceae) from Danxia landform in Jiangxi, China

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ABSTRACT: Based on morphological observations and comparisons, a new species of Primulina (Gesneriaceae), P. inflata Li.H. Yang & M.Z. Xu, is described and illustrated. This new species resembles P. xiuningensis in leaf blade shape and indumentum, and differs from the latter by the white corolla with longitudinally purple-red stripes (vs. yellowish without stripes), inflated tubular corolla tube (vs. tubular) and straight filament (vs. geniculate). The descriptions, illustrations and photographs of this new species are provided here.

KEY WORDS: China, Gesneriaceae, Primulina, Primulina inflata, P. xiuningensis, Taxonomy.

INTRODUCTION

The newly defined genus, Primulina (Gesneriaceae), comprises a monophyletic group of perennial herbs (Wang et al., 2011; Weber et al., 2011), and shows a great species diversity with about 200 species (Möller, 2019; Wen et al., 2019). In contrast, it displays a high conservation of edaphic habitat specialization, with the majority of species occurring in calcareous soil originated from karst limestone bedrock (i.e. calciphiles, Hao et al., 2015). In contrast to its general association with karst soil habitats, there are a few species confined to Danxia soil, which is a red or purple soil derived from the red terrigenous sediment beds found in the Danxia landforms. These species include P. xiuningensis (X.L. Liu & X.H. Guo) Mich. Möller & A. Weber (Liu and Guo, 1989; Weber et al., 2011), P. dantianensis (W.B. Liao, S.S. Lin & R.J. Shen) W.B. Liao & K.F. Chung (Shen et al., 2010; Xu et al., 2012), P. langshanica (W.T. Wang) Yin Z. Wang (Wang, 1992; Wang et al., 2011), P. bobaensis Q.K. Li, Q. Zhang & W.L. Li (Li et al., 2015), P. suichuanensis X.L. Yu & J.J. Zhou (Zhou et al., 2016) and P. hengshuensis L.H. Liu & K.M. Liu (Tian et al., 2018). Similar to the karst landform, the unique physical and chemical characteristics of Danxia soil generate a range of microclimatic and edaphic habitats, which possibly play an important role in the diversification and evolution of the genus Primulina (Hao et al., 2015).

During field investigations of Gesneriaceae in southeastern China in August, 2016, we found a population of Gesneriaceae with small plant size in Xingguo County, Jiangxi Province. We reconciled the results of morphological comparison with its congeners from descriptions in the literature and comparison with herbarium specimens in IBSC, IBK and PE (Wang, 1981a, b; Liu and Guo 1989; Wang et al., 1998; Fang and Qin 2004; Li and Wang 2004; Wei et al., 2010). We concluded that the characters including the small plant size, slightly fleshy leaves, and chiritoid stigma place it in the hitherto genus Chiritopsis W.T. Wang (1981a), which had been incorporated into the redefined genus Primulina based on molecular phylogenetical analyses (Wang et al., 2011; Weber et al., 2011). We further observed that the small white flowers with the distinct stripes are reminiscent of those of P. renifolia (D. Fang & D.H. Qin) J.M. Li & Yin Z. Wang (Fang and Qin 2004; Wang et al., 2011), although here, the leaf blade is reniform or sub-cordate and glandular puberulent (vs. ovate to broadly ovate, puberulent), the corolla tube is much shorter, abaxially swollen and slightly narrowed at base (vs. inflated in the middle at both abaxial and adaxial directions, strongly narrowed at base), and the stigma is subhypsocrepiform and undivided (vs. obtrapeziform, divide). The overall plant habit of the newly collected material is morphologically most similar to P. xiuningensis despite that this species lacks the stripes in its yellowish corolla. We decided that the new material represented a new species in Primulina which is described and illustrated below.

TAXONOMIC TREATMENT

Primulina inflata Li.H. Yang & M.Z. Xu, sp. nov.

粗筒小花苣苔 Figs. 1 & 2; Tab. 1

Type: China. Guangdong Province, Guangzhou City, voucher from cultivated plants at South China Botanical Garden, 13 April 2019 (flowering), Li-Hua Yang, YLH1024 (holotype: SCB10849964, isotypes: SCB10849965, IBK), originally corrected in Jiangxi
**Fig. 1.** *Primulina inflata* sp. nov. **A.** habit, **B1.** abaxial leaf surface, **B2.** adaxial leaf surface, **C.** pistil, **D.** flower in front view, **E.** flower in side view, **F.** opened corolla, showing stamens and staminodes, **G.** calyx lobes, **H.** coherent anthers. Scale bars: **A, B**=20 mm, **C, E, F**=10 mm, **D**=5 mm, **G**=3 mm, **H**=2 mm. Drawn by Yun-Xiao Liu based on cultivated individual collected from type locality.

Province, Xingguo County, Changgang Town, Bingxindong scenic area, growing on moist rock surface of Danxia landform, elevation ca. 200 m a.s.l., 26°21′47.26″N, 115°25′40.85″E, 8 August 2016, Mei-Zhen Xu et al., JXXG01.

**Diagnosis:** *Primulina inflata* differs from *P. xiuningensis* by the white corolla with longitudinally purple-red stripes (vs. yellowish without stripes), inflated corolla tube (vs. tubular) and straight filaments (vs. geniculate).

Perennial herb. Rhizomatous stem subterete, 5–10 mm long, 2–5 mm in diameter. Leaves 8–12, basal, more or less opposite at young stage, spiral in mature plants; petiole 15–25 × ca. 1.5 mm, puberulent; leaf blade slightly fleshy when fresh, thinly chartaceous when dried, ovate to broadly ovate, 20–25 × 18–22 mm, with adaxial surfaces densely puberulent and abaxial surfaces slightly puberulent, obtuse or subacute at apex, subcordate to broadly cuneate at base, with repand-denticulate to nearly entire margin; lateral veins 3 on each side, abaxially prominent, adaxially impressed. Cymes 3–6, axillary, one per axil, 4–8-flowered; peduncles 30–50 mm long, densely puberulent; bracts 2, opposite, lanceolate-linear, 2–3 × ca. 1 mm, outside densely puberulent, inside glabrescent, margin entire. Pedicel 8–12 mm long, ca. 1 mm in diameter, densely puberulent. Calyx 5-parted to near base, lobes lanceolate-linear, 2–3 × ca. 1 mm, outside densely puberulent, inside glabrescent, margin entire. Corolla 12–15 mm long, white, outside puberulent, inside glabrescent and with three longitudinally purple-red stripes per lobe, and the stripes are more prominent on the adaxial side; corolla...
tube inflated in the middle, 8–10 mm long, 2–3 mm in diameter at the mouth, 4–5 mm in diameter in the middle; limb distinctly 2-lipped; adaxial lip 2-parted, with lobes oblong, ca. 3 × ca. 2 mm, rounded at apex; abaxial 3-lobed, with lobes oblong, ca. 3 × ca. 2 mm, rounded at apex. Stamens 2, adnate to ca. 2 mm above the corolla tube base; filaments linear, ca. 3 mm long, white, straight, glabrous; anthers reniform, fused by entire adaxial surfaces, ca. 1.5 mm long, glabrous; staminodes 3, adnate to ca. 2 mm above the corolla tube base, lateral ones ca. 2 mm long, middle one ca. 1 mm long. Disc annular, ca. 0.3 mm in height. Pistil ca. 10 mm long; ovary narrowly ovoid, ca. 2 mm long, ca. 1 mm in diameter, densely puberulent; style ca. 8 mm long, densely puberulent; stigma chiritoid, lower lobe obtrapeziform and ca. 1 mm long, lobes ca. 0.3 mm long. Capsule narrowly ovoid, straight, ca. 5 mm long.

**Distribution and habitat:** As most other *Primulina* species, *P. inflata* is a species endemic to Xingguo County, Jiangxi Province. Based on our field investigations, this new species is only found at its type locality at Bingxindong scenic area in a Danxia Geopark. Plants of this new species grow on the moist rock surface of a cave entrance. We observed about 200 mature individuals of this new species at the type locality in 2016, but no more than 50 mature individuals in 2018. The serious reduction of the population size mostly resulted from human disturbance. Based on this information, *P. inflata* is considered as Critically Endangered (CR): B2a,b(iii,v); C2a(i), following the IUCN categories and criteria (IUCN 2016). However, our field investigations on this species are insufficient, and more fieldwork is required to comprehensively understand its geographical distribution.

**Phenology:** Flowering time is April, fruiting time is May.

**Etymology:** The specific epithet is derived from the inflated corolla tube of this new species.

**Notes:** We describe a new species, *Primulina inflata*, which is morphologically similar to *P. xiuningensis* (Fig. 2). Both of these two species occurring in the Danxia landform in southeastern China (Wang et al., 1998; Li and
Wang 2004; Wei et al., 2010), but without overlapping distributions. We provide the detailed morphological comparison between the new species and P. xiuningensis in Table 1. Primulina inflata is most characterized by a small habit and small white corolla with distinct stripes. Such gross morphology, particularly in flower characteristics is reminiscent of other species among Chinese Gesneriaceae such as Metapetrocosmea peltata (Merr. & Chun) W.T. Wang (Wang, 1981b). However, the capitate stigma and nearly globose capsule of the latter (Wang et al., 1998) readily differentiates it from P. inflata with its chiritoid stigma and narrowly ovoid capsule. These characteristics are typical for species in the enlarged genus Primulina (Weber et al., 2011). A small striped corolla occurs also in other Primulina species, such as P. renifolia (Wang et al., 1998), but there are other differences in corolla and leaf characteristics that distinguishes it from the new species. The inflated corolla tube of the new species is an unusual feature in Primulina and thus provided the species epithet for the new species, P. inflata.

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**LITERATURE CITED**


