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Primulina wuae (Gesneriaceae), a new species from southern China

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ABSTRACT. A new species, *Primulina wuae* F.Wen & L.F.Fu (Gesneriaceae), is described from the southern part of China. This new species is most similar to *Primulina pseudoroseoalba* Jian Li et al., *P. roseoalba* (W.T.Wang) Mich.Möller & A.Weber, *P. subrhomboidea* (W.T.Wang) Yin Z.Wang and *P. beiliuensis* B.Pan & S.X.Huang var. *fimbribracteata* F.Wen & B.D.Lai, but differs from these in characters such as the size and indumentum of the bracts, the indumentum of the pedicels and anthers, the length of the pistils etc. A provisional conservation assessment is also provided.

Keywords. Critically endangered, IUCN conservation assessment, limestone flora, new taxon, *Primulina pseudoroseoalba*

Introduction

Until recently *Primulina* Hance was a monotypic genus in the family Gesneriaceae. Based on molecular phylogenetic and morphological studies, all species of *Chiritopsis* W.T.Wang, two species of *Wentsaiboea* D.Fang & D.H.Qin, and almost all species of *Chirita* sect. *Gibbosaccus* C.B.Clarke have since been incorporated into a dramatically expanded *Primulina* (Wang et al., 2011; Weber et al., 2011). Now the genus comprises more than 176 species, including many recently described species (Möller et al., 2016; IPNI, 2017).

While conducting field investigations of the limestone flora of northern Guangxi (China), we found an unknown species of *Primulina* that required further study. As well as herbarium specimens, live plants and seeds were collected and grown at the nursery of Guilin Botanical Garden and the Gesneriad Conservation Center of China. After comparison to other *Primulina* species in local Floras and monographs (e.g. Wang et al., 1990, 1998; Li & Wang, 2004; Wei et al. 2010), comparison to the many new larger-flowered species described in recent years, especially those from Guangxi (e.g. Zhu et al., 2014; Huang et al., 2015; Ning et al., 2015; Liu et al., 2016; Luo et al.,

2016; Wen et al., 2016), and comparison to specimens of *Primulina* in herbaria (e.g. IBK, IBSC, KUN, PE), we have confirmed that it is indeed a new species of *Primulina* that is here described and illustrated. A provisional IUCN conservation assessment following the guidelines in IUCN Standards and Petitions Subcommittee (2016) is also provided.

Taxonomy

Primulina wuae F.Wen & L.F.Fu **sp. nov.**
This new taxon is morphologically similar to *Primulina pseudoroseoalba* Jian Li et al., *P. roseoalba* (W.T.Wang) Mich.Möller & A.Weber, *P. subrhomboidea* (W.T.Wang) Yin Z.Wang and *P. beiliuensis* B.Pan & S.X.Huang var. *fimbribracteata* F.Wen & B.D.Lai, but differs from these in the following characters (taxa listed in same order in each comparison to avoid repetition): bract size (2.1–2.5 × 0.85–1.1 cm in *P. wuae* vs 1.5–2 × 0.8–1.2 cm in *P. pseudoroseoalba*, vs 1.1–1.3 × 0.25–0.3 cm in *P. roseoalba*, vs 0.4–0.6 × 0.2–0.3 cm in *P. subrhomboidea*, and vs 2.8–4 × 2.5–3 cm in *P. beiliuensis* var. *fimbribracteata*); bract indumentum (outside sparsely erect pubescent and densely puberulent, inside puberulent vs outside densely puberulent, inside glabrous, vs outside strigose, inside glabrous, vs outside puberulent and pilose, inside glabrous, and vs outside sparsely purple-pubescent, inside glabrous); pedicel indumentum (pubescent vs puberulent and glandular puberulent, vs puberulent and glandular puberulent, vs densely pubescent and pilose, and vs densely glandular-pubescent); anther indumentum (glabrous vs bearded, vs sparsely puberulent, vs villous, and vs densely white lanate), and pistil length (3–3.5 cm long vs 2.2–2.5 cm long, vs c. 2.8 cm long, vs c. 3.3 cm long, and vs 8–4 cm long). – TYPE: China, Guangxi Zhuangzu Autonomous Region, Quanzhou County, Shitang town, alt. 900 m, 18 July 2014, flowering, *Wu Xiang-Hong & Wen Fang WF140718-01* (holotype IBK; isotype IBK). (Fig. 1)

Perennial herb. ***Stem*** axis extremely short with indistinct internodes. ***Leaves*** 4–8, all basal, opposite, petioles 1.5–2.5 × 0.35–0.5 cm; leaf blade ovate to ovate-oblong, left-right slightly asymmetric, but not falcate, 6.5–9.5 × 4.8–8 cm, chartaceous when dried, adaxially and abaxially appressed eglandular-puberulent, base cuneate to broadly cuneate, margin entire, repand to undulate, apex acute, obtuse to nearly rounded; lateral veins 3–4 on each side of midrib, adaxially impressed, abaxially conspicuously prominent. ***Inflorescence*** axillary, a dichasium, 1 or 2 inflorescences on each plant, (1–)2–4-flowered or more; ***peduncle*** 5.5–7 cm long, eglandular-puberulent and eglandular-pubescent; ***bracts*** 2, free and opposite, narrowly cordate to rhombic, 2.1–2.5 × 0.85–1.1 cm, outside sparsely erect pubescent and densely puberulent, inside puberulent, margin entire and usually revolute, apex acute; pedicels 1.1–1.6 cm long, pubescent. ***Calyx*** 5-sect from base; segments equal, narrowly lanceolate to lanceolate, 9–10 × c. 3.5 mm, outside puberulent and glandular puberulent, inside nearly glabrous, margin entire, apex acute. ***Corolla*** 35–40 mm long, dark pink to purple, the throat pale purple, the upper part of the interior of the corolla tube with

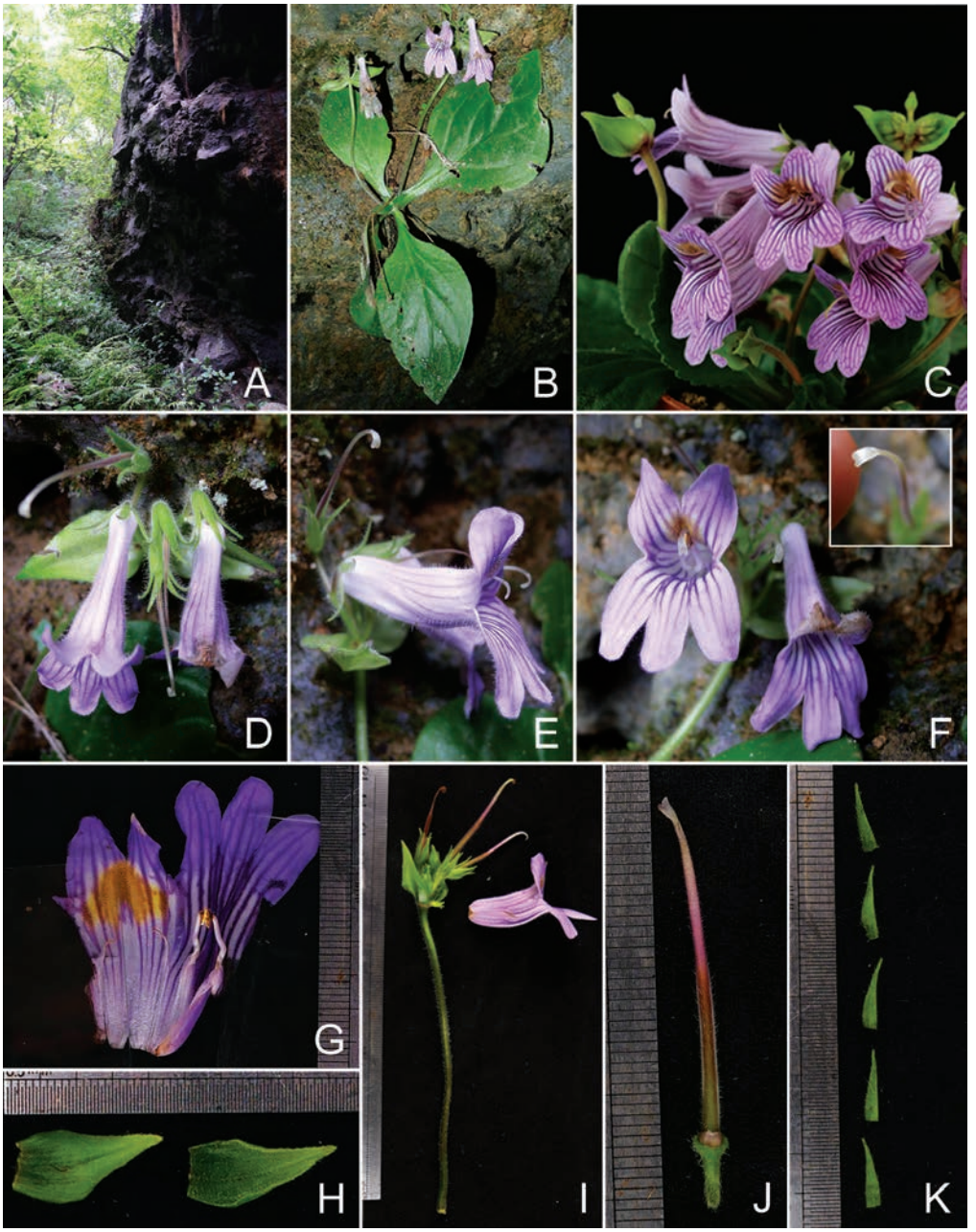

Fig. 1. *Primulina wuae* F.Wen & L.F.Fu. **A.** Habitat. **B.** Habit in flower. **C.** The plant in flower in cultivation. **D.** Top view of corolla and calyx. **E.** Lateral view of corolla, calyx and cyme. **F.** Frontal view of corolla with the detail of stigma in inset. **G.** Opened corolla showing stamens and staminodes. **H.** Bracts adaxial surface on the left, abaxial surface on the right. **I.** Inflorescence. **J.** Pistil without calyx. **K.** Adaxial surface of sepals. A–B, D–K from the type collection, C from cultivation. (Photos: F. Wen)

two dark brown flaps, the surface of the flaps glandular-puberulent, outside glandular-pubescent, inside glandular-puberulent; tube tubular, 24–26 mm long, orifice c. 18 mm in diameter; limb distinctly 2-lipped, adaxial lip 2-partite for more than half of length, lobes slightly oblique to obviously oblique, triangular to ovate, adaxial lobes 7–8 × 8–8.5 mm; abaxial lip 3-partite to half or slightly more than half of length, lateral lobes obliquely ovate to oblong, 12–14 × 6–8 mm, the central one oblong, c. 12 × 6 mm, all five lobes with 4–5 dark purple stripes which sometimes connect and become somewhat reticulate. ***Stamens*** 2, adnate to corolla tube c. 12 mm above the base; filaments white to pale purple, geniculate near the base, c. 11 mm long, glabrous; anthers fused by their entire adaxial surfaces, oblong, c. 3 × 1 mm, glabrous dorsally; ***staminodes*** 2, translucent to white, linear, apex capitate, glabrous, c. 7 mm long, adnate to corolla 10–12 mm above base. ***Disc*** purplish brown, annular, glabrous, 1.3–1.5 mm high. ***Pistil*** 30–35 mm long; ovary cylindrical, 16–18 mm long, 1.8–2 mm in diameter, densely puberulent and glandular puberulent; ***style*** 15–17 mm long, c. 1 mm in diameter, densely glandular puberulent. ***Stigma*** translucent to white and pale purple, cuneate, chiritoid, 2-lobed, 2.2–2.5 mm long. ***Capsule*** linear, slightly upward-curved, 5–6 cm long, surface densely puberulent when young.

Distribution. Only known from the type locality, near Shijiaopen Village, Shitang Town, Quanzhou County, Guangxi Zhuangzu Autonomous Region, China.

Habitat. Primary forest on shaded slopes and vertical cliffs in limestone valleys and hills, rare, at low altitude, c. 177 m. It occurs in crevices in limestone rocks under evergreen forest and is rather prone to human disturbance.

Etymology. The new species is named after Ms Xiang-Hong Wu, who first discovered and collected this rare species and who accompanied us on a number of subsequent field expeditions in Quanzhou, Guangxi.

Provisional IUCN Conservation Assessment. Critically Endangered CR B2ab(iii,v) according to the IUCN red list criteria (IUCN Standards and Petitions Subcommittee 2016). We have visited the type locality of this new species many times and have found not more than 400 individuals which are scattered in a fairly narrow area at the top of a cliff. They grow in a popular scenic spot near the village of Shitang town, but most of the plants are protected from tourists by their elevated location.

Vernacular name. 吴氏报春苣苔. The Chinese pronunciation of *Primulina wuae* is 'Wú Shì Bào Chūn Jǜ Tái'.

Notes. Primulina wuae has a pair of relatively large bracts. Large bracts also occur in *Primulina beiliuensis* B.Pan & S.X.Huang (Pan et al., 2013), *P. eburnea* (Hance) Yin Z.Wang (Hance, 1883; Wang et al., 2011), *P. lutea* (Yan Liu & Y.G.Wei) Mich.Möller & A.Weber (Liu & Wei, 2004; Weber et al., 2011), *P. lunglinensis* (W.T.Wang) Mich. Möller & A.Weber (Wang, 1981; Weber et al., 2011), *P. lungzhouensis* (W.T.Wang)

Table 1. *Primulina wuae* F.Wen & L.F.Fu compared to closely related species.

Characters	*P. wuae*	*P. pseudoroseoalba*	*P. roseoalba*	*P. subrhomboidea*	*P. beiliuensis* var. *fimbribracteata*
Petiole	1.5–2.5 × 0.35–0.5 cm	2.5–4.5 × 0.7–1 cm	2.5–5 × 0.7–1.5 cm	0.4–2.5 × c. 0.5 cm	3–6 × 0.7–1.0 cm
Leaf blade	Slightly oblique, ovate to ovate-oblong, adaxially and abaxially appressed eglandular-puberulent	Broadly ovate to elliptic, slightly oblique but not falcate, adaxially eglandular-puberulent and abaxially glabrous	Slightly oblique, ovate, adaxially and abaxially sparsely strigose, eglandular	Rhomboid-ovate to elliptic, broadly ovate, or spatulate, adaxially sparsely strigose, eglandular, abaxially sparsely pubescent	Broadly ovate, adaxially and abaxially appressed pubescent
Peduncle	5.5–7 cm long, eglandular-puberulent and eglandular-pubescent	3.3–4.2 cm long, glandular-puberulent	9–13 cm long, eglandular-puberulent	5.5–8 cm long, densely purple puberulent and pilose	15–20 cm long, pubescent
Bracts	Narrowly cordate to rhombic, 2.1–2.5 × 0.85–1.1 cm, outside sparsely erect pubescent and densely puberulent, inside puberulent	Ovate to orbicular-ovate, 1.5–2 × 0.8–1.2 cm, outside densely puberulent, inside glabrous	Linear-lanceolate, 1.1–1.3 × 0.25–0.3 cm, outside strigose, inside glabrous	Narrowly ovate to triangular, 0.4–0.6 × 0.2–0.3 cm, outside puberulent and pilose, inside glabrous	Ovate-cordate or cordate, 2.8–4 × 2.5–3 cm, outside sparsely purple-pubescent, inside glabrous
Pedicel	1.1–1.6 cm long, pubescent	c. 3.8 cm long, puberulent and glandular puberulent	1–2.5 cm long, puberulent and glandular puberulent	0.8–1.4 cm long, densely pubescent and pilose	1.5–2 cm long, densely glandular-pubescent
Calyx lobes	9–10 × c. 3.5 mm, outside puberulent and glandular puberulent, inside nearly glabrous	10–13 ×1–1.5 mm, outside puberulent and glandular puberulent, inside sparsely puberulent	4–6 × 0.8–1 mm, outside puberulent and glandular puberulent, inside glabrous	6–7 × 1–1.2 mm, outside puberulent and pilose, inside nearly glabrous	7.5–8.5 × 2–2.5 mm, outside purple-pubescent, inside pubescent
Corolla indumentum	Outside glandular-pubescent, inside glandular-puberulent	Outside sparsely puberulent, inside puberulent on adaxial lip	Outside sparsely puberulent, inside puberulent on adaxial lip	Outside puberulent, inside puberulent below adaxial lip	Outside pubescent, inside pubescent
Filament indumentum	Glabrous	Glabrous	Base sparsely pubescent, apex sparsely glandular puberulent	Apically sparsely puberulent	Sparsely short glandular puberulent
Anther indumentum	Glabrous on the back	Bearded on the back	Sparsely puberulent	Villous	Back densely white lanate
Staminode indumentum	Glabrous	Densely glandular puberulent	Glabrous	Glabrous	Glabrous
Pistil length	3–3.5 cm long	2.2–2.5 cm long	c. 2.8 cm long	c. 3.3 cm long	3.8–4 cm long

Mich.Möller & A.Weber (Wang, 1981; Weber et al., 2011), *P. maguanensis* (Z.Yu Li et al.) Mich.Möller & A.Weber (Xu et al., 2008; Weber et al., 2011), and others. Although *Primulina wuae* shares this very striking large bract character with these species, overall it more closely resembles *P. beiliuensis* var. *fimbribracteata* F.Wen & B.D.Lai (Lai & Wen, 2015). The corolla of many *Primulina* species is generally rather featureless except for a few distinct features such as yellow ridges ventrally in the corolla tube (also present in other Gesneriaceae genera) and coloured 'flaps' dorsally in the tube that hold the style in place (Weber, 2004), as in *P. wuae*. The new species also looks rather similar to *Primulina pseudoroseoalba* (Li et al., 2014) which has the same leaf shape but differs in corolla characters. *Primulina wuae* lacks corolla ridges but has 'flaps', whereas both ridges and flaps are lacking in *P. pseudoroseoalba*. However, flaps and a similar corolla colouration are present in other species such as *Primulina subrhomboidea* and *P. roseoalba*. *Primulina wuae* is compared to the morphologically similar taxa *P. pseudoroseoalba*, *P. roseoalba*, *P. subrhomboidea* and *P. beiliuensis* var. *fimbribracteata* in Table 1.

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