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Primulina titan sp. nov. (Gesneriaceae) from a Limestone Area in Northern Guangxi, China

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ABSTRACT

A new species of Gesneriaceae, *Primulina titan*, is described and photographed from northern Guangxi, China. It resembles *P. hunanensis*, but can be distinguished by combined morphological characters of leaf, bract, corolla, stamen and pistil. We found only one population with approx. 800 mature individuals at the type locality. This species is provisionally assessed as vulnerable [VU D1] using IUCN criteria.

1. Introduction

The circumscription of *Primulina* has been revised and expanded based on molecular evidence^[1-2]. Currently the genus *Primulina s.l.* represents the species richest genus in Chinese Gesneriaceae. By the end of May 2020, the genus *Primulina s.l.*, comprises more than 220 species (infraspecific taxa included)^[3-5]. More than 50 new species of *Primulina* have been reported since last 5 years^[6-10]. As this trend seemed to persist to date, it might suggest that there would be many new

species to be discovered in the near future, as it is unlikely that the entirety of China can be surveyed any time soon^[4].

During a botanical survey on limestone karst areas in Guangxi in early April 2018, an unknown plant of *Primulina* was discovered by the members of GCCC. The population was not in flowering at that time, only the white buds that about to bloom. Thus we visited the original locality again in early May 2020, when this unknown taxon is in flowering. After detailed comparison of this unknown plant with all reported *Primulina* species from Guangxi and adjacent areas^[11-14], it neither fits

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the existing protologues nor conforms with the type specimens of these species. Nevertheless its inflorescence are most similar to those of *P. hunanensis* K.M. Liu & X.Z. Cai [15], it can be distinguished from the latter by combined of several morphological characters of leaf, bract, corolla, stamen and pistil. We confirmed that it represents a new *Primulina* species, which is described and photographed here.

2. Taxonomic Treatment

Primulina titan Z.B. Xin, W.C. Chou & F. Wen, *sp. nov.* (Figure 1)



Figure 1. *Primulina titan*. A: Habitat. B: Habit with flowers. C: Leaf and the axillary cyme. D: Cyme. E: Bracts. F: Lateral view of the corolla. G: Top view of the corolla. H: Front view of the corolla. I: Pistil and Calyx. J: Calyx lobes. K: Opened corolla (Photographed by Z.B. Xin)

Diagnosis *Primulina titan* differs from *P. hunanensis* by its leaf blade glabrous (*vs.* covered with straight, pointed, white trichomes), petiole 1.2-2.5 cm in diam. (*vs.* 0.4-1.0 cm); bract pale green inside, margin obviously numerous serrate, sparsely pubescent outside, glabrous inside (*vs.* pink or purple-red inside, margin entire or repand, densely trichomes and pubescent outside, sparsely trichomes and pubescent inside); corolla white outside, with red-purple and brown stripes and spots inside (*vs.* purple, with white stripes at corolla mouth); filament yellow, 1.5-1.7 cm long (*vs.* white, 0.8-1.2 cm); anther 7-8 mm long (*vs.* 3.5-4.5 mm); pistil pale green, 4.2-5.0 cm long (*vs.* pale pink, 2.6-3.8 cm).

Type. China. Guangxi Zhuangzu Autonomous Region: Guilin City, Yongfu County, Sanhuang, growing on moist and shaded rock surface on the limestone cliff, 25°3'52" N,

109°41'20"E, alt. 345m, 09 May 2020, flowering, Z.B. Xin *et al.*, XZB20200509-01 (Holotype: IBK; Isotype: IBK).

Description. Herbs perennial, acaulescent, lithophytic. Leaves 4-10, basal, opposite; petiole 5-15 × 1.2-2.5 cm, glabrous; leaf blades broadly ovate, 15-35 × 12-30 cm, apex obtuse, base cuneate or cordate, margin repand, adaxial and abaxial surfaces glabrous; lateral veins 3-4, inconspicuous adaxially; apparently raised abaxially. Cymes 2-4, axillary, 5-10-flowered; peduncles stout, brown, 20-25 cm long, 5-8 mm wide, densely whitish pubescent; bracts 2, opposite, pale green, ovate or broadly ovate, 4.0-5.0 × 3.5-4.5 cm, obtuse at apex, margin obviously numerous serrate, sparsely pubescent outside, glabrous inside; pedicels pale green, 1.1-1.3 cm long, whitish pubescent. Calyx 5-parted, near to the base; lobes pale green, narrowly lanceolate, 9-13 × 3.0-4.0 mm, densely pubescent abaxially, nearly glabrous adaxially, apex acute, margin obviously serrate from middle to apex. Corolla white outside, with red-purple and brown stripes and spots inside, 5-6 cm long, densely pubescent outside, sparsely pubescent or glandular-pubescent inside; corolla tube narrowly funnel-shaped, almost straight, 3.6-4.0 × 1.0-1.4 cm; limb distinctly 2-lipped, adaxial lips short, bilobed, lobes ovate or broadly ovate, ca. 7 mm long, 8 mm wide; abaxial lips trilobed, lobes near equal, ovate, ca. 1 cm long, 8 mm wide. Stamens 2, adnate to 1.5-1.7 cm from corolla tube base, filaments 1.5-1.7 cm long, yellow, linear, geniculate strongly near middle, glandular-pubescent or trichomes; anthers glabrous, dorsi-fixed, reniform to elliptic, 7-8 mm long, 2 mm wide, coherent in pairs, thecae confluent at middle; staminodes 3, the middle one adnate to 8-10 mm from corolla tube base, 2-3 mm long, the lateral two adnate to 1.2-1.4 cm from corolla tube base, 1.0-1.1 cm long. Disc ca. 2 mm high, annular, margin repand. Pistil pale green, 4.2-5.0 cm long, densely glandular-pubescent; ovary linear, 2.0-2.5 × ca. 3 mm, densely glandular-pubescent; style ca. 1.2 × 1.5 mm, densely glandular-pubescent; stigma bilobed, lobe ca. 5.0 × 1.2 mm wide, puberulent. Fruit 5.5-6.5 cm long, apex obtuse, capsule cylindrical, densely glandular-pubescent.

Phenology. Flowers from the middle of April to June, fruits from the middle of June to August.

Distribution and habitat. The plant is known only from its type locality, near Sanhuang, Yongfu County, Guilin City, Guangxi Zhuangzu Autonomous Region, China, growing on moist and shaded rock surface on the limestone cliff, which is located in subtropical broad-leaved evergreen forest.

Etymology. Its specific epithet, "titan" comes from its quite big leaves.

Vernacular name. Tài Tăn Bào Chūn Jù Tái (Chinese

pronunciation).

Conservation status. The type population consists of approx. 800 mature individuals, growing on shaded and moist rock surface on the cliff. This species is provisionally assessed as vulnerable [VU D1] using IUCN criteria^[16].

Notes. *Primulina titan* is morphologically close to *P. hunanensis*, but can be identified by combined characters (Table 1; Figure 2).

Table 1. Comparison between *Primulina titan* and *P. hunanensis*

Characters	<i>P. titan</i>	<i>P. hunanensis</i>
Leaf	glabrous	straight, pointed, white trichomes
Petiole	1.2-2.5 cm in diam.	0.4-1.0 cm in diam.
Bract	pale green inside, margin obviously numerous serrate, sparsely pubescent outside, glabrous inside	pink or purple-red inside, margin entire or repand, densely trichomes and pubescent outside, sparsely trichomes and pubescent inside
Corolla	white outside, with red-purple and brown stripes and spots inside	purple, with conspicuous white stripes at the corolla mouth
Corolla tube	2.4-2.9 cm long,	2.8-3.5 cm long
Filament	yellow, 1.5-1.7 cm long	white, 0.8-1.2 cm long
Anther	7-8 mm long	3.5-4.5 mm long
Staminode	3	2, rarely 3
Pistil	pale green, 4.2-4.8 cm long	pale pink, 2.6-3.8 cm long
Disc	ca. 2 mm high	1.2-1.8 mm



Figure 2. Comparison between *Primulina titan* (1) and *P. hunanensis* (2). A: Adaxial surfaces of the leaf blade. B: Cymes. C: Lateral view of the corolla. D: Front view of the corolla. E: Pistil. F: Stamens. (Photographed by Z.B. Xin)

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References

- [1] Wang Y.Z., Mao R.B., Liu Y., Li J.M., Dong Y., Li Z.Y. & Smith J.F. Phylogenetic reconstruction of *Chirita* and allies (Gesneriaceae) with taxonomic treatments[J]. Journal of Systematics and Evolution, 2011, 49: 50-64. <https://doi.org/10.1111/j.1759-6831.2010.00113.x>
- [2] Weber A., Middleton D.J., Forrest A., Kiew R., Lim C.L., Rafidah A.R., Sontag S., Triboun P., Wei Y.G., Yao T.L. & Möller M. Molecular systematics and remodeling of *Chirita* and associated genera (Gesneriaceae)[J]. Taxon, 2011, 60: 767-790. <https://doi.org/10.1002/tax.603012>
- [3] IPNI. The International Plant Names Index. 2020. Available from: <http://www.ipni.org>
- [4] Möller M. 2019: Species discovery in time: An example from Gesneriaceae in China[J]. Guangxi Sciences, 2019, 26(1): 1-16. <https://doi.org/10.13656/j.cnki.gxkx.20190307.002>
- [5] Wen F., Wei Y.G., Fu L.F., Xin Z.B., Li S., Huang Z.J. & Meng D.C. The Checklist of Gesneriaceae in China. 2020. Available from: <http://gccx.gxib.cn/about-46.aspx>.
- [6] Ning Z.L., Pan B., Wen F., Kang M. & Zhuang X.Y. *Primulina yingdeensis*, a new species from Guangdong, China, and *P. rosulata*, a new combination (Gesneriaceae), based on morphological and molecular evidence[J]. Willdenowia, 2016, 46: 399-409. <http://dx.doi.org/10.3372/wi.46.46308>
- [7] Wu H.T., Zhou S.B., Ma W., Wang O.W. & Wen F. *Primulina dichroantha* (Gesneriaceae), a New Species from a Karst Cave from Guangxi, China[J]. Annales Botanici Fennici, 2017, 54(1-3): 95-98. <https://doi.org/10.5735/085.054.0314>
- [8] Hong, X., Li, Z., Liu, J., Zhou, S., Qin, W. & Wen, F. Two new species of *Primulina* (Gesneriaceae) from limestone karsts of China[J]. PeerJ, 2018, 6: e4946.

- <https://doi.org/10.7717/peerj.4946>
- [9] Li, S., Xin, Z.B., Chou, W.C., Huang, Y., Pan, B., Maciejewski, S. & Wen, F. Five New Species of the genus *Primulina* (Gesneriaceae) from Limestone Areas of Guangxi Zhuangzu Autonomous Region, China[J]. *PhytoKeys*, 2019, 127: 77-91.
<https://doi.org/10.3897/phytokeys.127.35445>
- [10] Xin Z.B., Huang Z.J., Fu L.F., Li S., Wang B.M. & Wen F. *Primulina spiradiclioides* (Gesneriaceae), a new species from limestone areas in Guangxi, China[J]. *Annales Botanici Fennici*, 2020, 57: 245-248.
- [11] Wang W.T., Pan K.Y., Li Z.Y., Weitzman A.L. & Skog L.E. Gesneriaceae. In: Wu, Z.Y. & Raven, P.H. (Eds.) *Flora of China*[M]. Science Press, Beijing & Missouri Botanical Garden Press, St. Louis, 1998: 244-401.
- [12] Li Z.Y., Wang Y.Z. *Plants of Gesneriaceae in China*[M]. Henan Sci. Technol. Publ. House, Zhengzhou, 2005: 171-261.
- [13] Wei Y.G., Wen F., Möller M., Monro A., Zhang Q., Gao Q., Mou H.F., Zhong S.H., Cui C. *Gesneriaceae of South China*[M]. Guangxi Science and Technology Publishing House, Nanning, 2010: 274-526.
- [14] Vu P.X. Gesneriaceae. In: Tran, T.H. (Ed.) *Flora of Vietnam*[M]. Technology & Science Publishing House, Hanoi, 2018: 77-125.
- [15] Cai, X.Z., Tian, J., Xiao S.Y., Peng L., Liu K.M. *Primulina hunanensis* sp. nov. (Gesneriaceae) from a limestone area in southern Hunan, China[J]. *Nordic Journal of Botany*, 2015, 33: 576-581.
<https://doi.org/10.1111/njb.00757>
- [16] *Guidelines for Using the IUCN Red List Categories and Criteria*[S]. version 14. Prepared by the Standards and Petitions Subcommittee of the IUCN Species Survival Commission, 2019.
<http://cmsdocs.s3.amazonaws.com/RedListGuidelines.pdf>