Primulina argentea (Gesneriaceae), a new species endemic to a karst cave in N Guangdong, S China

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Source: Willdenowia, 44(3) : 377-383
Published By: Botanic Garden and Botanical Museum Berlin (BGBM)
URL: https://doi.org/10.3372/wi.44.44307
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Abstract


DOI: http://dx.doi.org/10.3372/wi.44.44307

Primulina argentea Xin Hong, F. Wen & S. B. Zhou, sp. nov. (Gesneriaceae) is described and illustrated from N Guangdong Province, S China. It is morphologically close to P. fengshanensis F. Wen & Yue Wang and P. orthandra (W. T. Wang) Mich. Möller & A. Weber, but is differentiated from its congeners by several characters of the shape, texture and indumentum of the leaf blade and bracts, length of pedicels, size of calyx lobes, colour of corolla, indumentum of staminodes, etc. A description of P. argentea together with illustrations, distribution map, habitat description and a diagnostic comparative table with P. fengshanensis and P. orthandra are presented.

Additional key words: limestone flora, taxonomy, Primulina fengshanensis, Primulina orthandra

Introduction

Primulina Hance consists of more than 150 species and has become the biggest genus in the Chinese Gesneriaceae, thanks to the recent discovery of many new species with narrowly restricted distributions and the new combinations that followed the inclusion of the genus Chirita Buch.-Ham. ex D. Don (Wei & al. 2010; Weber & al. 2011; Chung & al. 2013; Li & Wang 2004; Wei & al. 2012; Hong & al. 2012; Wen & al. 2012a, b) and after examining many specimens from Chinese and Vietnamese herbaria (e.g. BJFC, CDBI, CTC, HN, IBK, IBSC, KUN, PE, VNMN) as well as MO, we concluded that the unidentified plant was a new species.

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Results and Discussion

*Primulina argentea* Xin Hong, F. Wen & S. B. Zhou, sp. nov. – Fig. 2 & 3.

Holotype: China, Guangdong Province: Lianzhou city, Liannan Yao Autonomous county, Damaishan town, c. 200 m, in the entrance of a limestone cave, 19 Sep 2012 (fl.), F. Wen 20120930-1 (IBK!; isotype: ANU!).

Diagnosis — *Primulina argentea* Xin Hong, F. Wen & S. B. Zhou is similar to *P. fengshanensis* F. Wen & Yue Wang in vegetative appearance, but differs in having leaves opposite, leaf blade thick, chartaceous, densely appressed sericeous-villos on both surfaces, apex attenuate or with a curved beak; cymes 1- or 2-branched; bracts 2, densely appressed sericeous-villos on both surfaces; bracteoles oblong-lanceolate, c. 2 mm long; pedicels 1.3–1.5 cm long; calyx 9–11 × 1–1.5 mm; corolla brownish purple; staminodes densely glandular pubescent; pistil 2–2.5 cm long; and stigma 2.5–3 mm long (Table 1).

Description — *Herbs* perennial. *Rhizome* subterete, 6–9 cm long, 1–1.3 cm in diam.; *internodes* inconspicuous. *Leaves* 6–10(–21), opposite, clustered at apex of rhizome; *petiole* 3–6(–13) × 2–3 cm, densely pilosulous; *leaf blade* elliptic to obovate-lanceolate, 2–6 cm, thick, chartaceous, both surfaces densely appressed sericeous-villos, hairs on both surfaces and on other parts of plant simple, multicellular, base cuneate-attenuate, margin entire, apex attenuate or with a curved beak; *leaf veins* 3–5 on each side, abaxially slightly prominent, adaxially unapparent. *Inflorescence* cymose, each plant bearing 7–10 flowers borne in 3–8 cymes; *peduncle* 10–14 cm long, c. 0.3 mm in diam., sparingly appressed pubescent with both glandular and eglandular hairs, hairs simple, multicellular; *cymes* 1- or 2-branched, branches (1 or)2–6-flowered; *bracts* 2, opposite, oblong, 3.5–3.7 × c. 1 cm, both surfaces densely appressed sericeous-villos, hairs on both surfaces and on other parts of plant simple, multicellular, base cuneate-attenuate, margin entire, apex acute; *leaf blades* opposite, clustered at apex of rhizome; *petiole* c. 1.3 cm long, sparsely glandular pubescent, inside sparsely shortly pubescent; *tube* cylindric, 2.5–3 cm long, 0.4–0.5 cm in diam. at base, c. 0.8 cm in diam. in throat; *limb* distinctly 2-lipped; *upper lip* 2-lobed to base, lobes with dark purple lines inside, narrowly ovate, c. 0.7 × 0.6 cm, apex obtuse; *lower lip* 3-lobed to or slightly below middle, lobes ovate-oblong, 0.9–1.2 × 0.7–0.8 cm, apex obtuse; *throat* with a yellow spot between lobes of upper lip and 2 dark purple narrowly elliptic zones between lobes of lower lip. *Stamens* 2, adnate to corolla tube 1.1–1.2 cm above base; *anthers* fused throughout adaxial surface, c. 0.3 cm long, glabrous; *filaments* purple, geniculate near middle, 1–1.1 cm long, glabrous; *staminodes* 3; *lateral staminodes* arising c. 1.3 cm above corolla base, purple, 0.6–0.8 cm long, densely extremely small glandular pubescent, hairs simple, multicellular, apex curved, turgid; *middle staminode* arising c. 1.2 cm above corolla base, c. 0.4 mm long, glabrous, apex capitulate. *Disk* annular, c. 0.1 cm high, margin entire. *Pistil* 2–2.5 cm long; *ovary* linear, 1–1.1 cm long, 0.8–0.9 mm in diam., densely shortly glandular pubescent, hairs simple, multicellular; *style* 1.4–1.5 cm long; *stigma* 2.5–3 mm long, bipartite to half its length, lobes subulate, 1–1.5 mm long, apex acute or acuminate. *Capsule* linear, straight, 4–6 cm long or longer, 3–5 mm in diam., pubescent when young, with style persistent. *Seed* long ellipsoid; *testa* favelulata.

Phenology — Flowering from September to October.

Distribution — S China. Narrowly endemic and known only from the type locality: Damaishan town, Liannan Yao Autonomous County, c. 13 km SW of Lianzhou City in N Guangdong Province (Fig. 1).

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Fig. 1. Known distributions of *Primulina argentea* (A) and *P. fengshanensis* (B).
Fig. 2. *Primulina argentea* – A: habit, in flower; B: cut-open corolla showing stamens and staminodes; C: calyx, pistil and disk; D: stigma; E: anthers; F: cross-section of ovary; G: capsule. – All drawn from the holotype by Xiao-Mei Xiao.
Conservation status — At present, Primulina argentea is known only from one site. It is estimated that the number of mature individuals of this new species does not exceed 2000. All the individuals depend on the particular cave.

Ecology — Locally abundant in rock crevices on moist shady cliffs at the entrance of a limestone cave at an altitude of 200 m. The annual average temperature of Liannan is 19.5 °C; the average annual precipitation is 1570 mm.

Fig. 3. Primulina argentea – A & B: habitat at type locality; C: plants of P. argentea (1) and P. orthandra (2) growing side by side; D: habit; E: leaves, showing dense, appressed, sericeous-villos indumentum; F: cyme; G: frontal view of flower; H: lateral view of flower; I: calyx lobes; J: opened corolla; K: young capsule; L: mature capsule. – Photographs by Fang Wen, type locality of P. argentea, 19 Sep 2012.
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If the cave is disturbed or destroyed, the population of this new species might rapidly decline or even disappear. Therefore, we propose that Primulina argentea should be considered Critically Endangered: CR B1ab(iii)+2ab(iii) according to the IUCN Red List categories and criteria (IUCN 2012).

Etymology — The specific epithet refers to the dense silvery hairs on both leaf blade surfaces (Latin, argenteus, silvery).

Vernacular name — Chinese: 银叶报春苣苔 (yin ye bao chun ju tai). The first two characters mean “silver leaf”, the last four are the Chinese name for Primulina.

Remarks — Primulina argentea is morphologically close to P. fengshanensis (Wen & al. 2012b), which is endemic to Guangxi Zhuang Autonomous Region, adjacent to and W of Guangdong Province (Fig. 1), where it is at present known only from the type locality, which happens to be another limestone cave (Fengshan County, Hungkun

Fig. 4. Primulina fengshanensis – A: habitat; B: habit; C: leaves; D: cyme; E: frontal view of flower; F: lateral view of flower; G: dehisced capsules. – Photographs by Fang Wen, type locality of P. fengshanensis (see Remarks), 1 Oct 2010.
These two species together with *P. orthandra*, which is sympatric with *P. argentea*, can easily be distinguished by the characteristics compared in Table 1 and Fig. 3–5.

**Additional specimens seen (paratypes) — China:**

Guangdong Province: Lianzhou city, Liannan Yao Autonomous county, Damaishan town, c. 200 m, 2 Apr 2014, ZSB029 (ANU!, IBK!, KUN!).

**Acknowledgements**

The authors are grateful to Prof. Yi-Gang Wei for checking the specimens and reviewing the description of this new species. The authors would also like to thank Ms. Xiao-Mei Xiao for drawing the botanical illustration. This study was supported by Key Foundation of Education Department of Anhui Province (KJ2011A129), Provincial Key Laboratory of Biotic Environment and Eco-

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**Table 1. Diagnostic character differences among Primulina argentea and its morphologically close congeners, *P. fengshanensis* and *P. orthandra*.**

<table>
<thead>
<tr>
<th>Characters</th>
<th>Primulina argentea</th>
<th>Primulina fengshanensis</th>
<th>Primulina orthandra</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves arrangement</td>
<td>opposite</td>
<td>in whorls of 3</td>
<td>opposite</td>
</tr>
<tr>
<td>Leaf blade texture</td>
<td>thick, chartaceous</td>
<td>fleshy</td>
<td>herbaceous</td>
</tr>
<tr>
<td>Leaf blade indumentum</td>
<td>densely appressed</td>
<td>densely appressed</td>
<td>densely puberulent</td>
</tr>
<tr>
<td></td>
<td>sericeous-villous</td>
<td>pubescent on both surfaces</td>
<td>on both surfaces</td>
</tr>
<tr>
<td>Leaf blade apex</td>
<td>attenuate or with</td>
<td>obtuse or rounded</td>
<td>acute to rounded</td>
</tr>
<tr>
<td></td>
<td>a curved beak</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cymes</td>
<td>1- or 2-branched</td>
<td>2-5-branched</td>
<td>1- or 2-branched</td>
</tr>
<tr>
<td>Bracts number</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Bracts indumentum</td>
<td>densely appressed</td>
<td>densely appressed</td>
<td>puberulent</td>
</tr>
<tr>
<td></td>
<td>sericeous-villous</td>
<td>pubescent abaxially</td>
<td></td>
</tr>
<tr>
<td></td>
<td>on both surfaces</td>
<td>nearly glabrous adaxially</td>
<td></td>
</tr>
<tr>
<td>Bracteoles shape</td>
<td>oblong-lanceolate</td>
<td>linear</td>
<td>ovate</td>
</tr>
<tr>
<td>Bracteoles length [mm]</td>
<td>2</td>
<td>4–5</td>
<td>c. 3</td>
</tr>
<tr>
<td>Pedicels length [cm]</td>
<td>1.3–1.5</td>
<td>1.5–3</td>
<td>0.4–1.3</td>
</tr>
<tr>
<td>Calyx dimensions [mm]</td>
<td>9–11 × 1–1.5</td>
<td>2.5–3.2 × 0.35–0.52</td>
<td>3–3.5 × c. 1.2</td>
</tr>
<tr>
<td>Corolla colour</td>
<td>brownish purple</td>
<td>purple</td>
<td>purple-blue</td>
</tr>
<tr>
<td>Staminodes number</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Staminodes indumentum</td>
<td>densely glandular</td>
<td>glabrous</td>
<td>glabrous</td>
</tr>
<tr>
<td></td>
<td>pubescent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pistil length [cm]</td>
<td>2–2.5</td>
<td>1.5–1.9</td>
<td>c. 2.1</td>
</tr>
<tr>
<td>Stigma length [mm]</td>
<td>2.5–3</td>
<td>1.2–1.5</td>
<td>c. 2</td>
</tr>
</tbody>
</table>
logical Safety in Anhui (2004sys003), Guangxi Natural Science Foundation (2013GXNSFA019071), Science Research Foundation of Guangxi Academy of Sciences (no. 12YJ25ZW013), West Light Foundation of The Chinese Academy of Sciences, International S & T Cooperation Projects of Guangxi (Guikehe 1347004-4) and Guilin (Shike [2013]79), and Project of Graduate Students Innovation and Entrepreneurship of Anhui Normal University. Two anonymous reviewers are thanked for their comments on an earlier draft of this paper.

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