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Petrocosmea panzhouensis (Gesneriaceae), a new species from Guizhou, China

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Abstract

The two species with lobed leaves, viz., *Petrocosmea henryi* and *P. weiyigangii* are very distinctive from other species of *Petrocosmea*. Here, the third species with lobed leaves, named *Petrocosmea panzhouensis*, from western Guizhou, China, is described. The new species is most similar to *P. henryi* on shape of leaf blade margin and straight filaments, but it is distinguished from the latter by shape of bracts, and shape and length of anthers. The new taxon is assessed as “Data Deficient” (DD), according to the IUCN standards.

Keywords: Didymocarpoideae, flora of Guizhou, *Petrocosmea henryi*, *P. weiyigangii*

Introduction

Petrocosmea Oliver (1887: pl. 1716) is a medium-size genus now, within the family Gesneriaceae, subfamily Didymocarpoideae (Weber *et al.* 2013). The genus is endemic to Asia, occurring in China, northeastern India, Myanmar, Thailand, and Vietnam (Wang *et al.* 2013, POWO 2022), and currently comprises 69 taxa (Shaw 2021, GRC 2022, IPNI 2022, Wen *et al.* 2022). Guizhou Province, China, is one of the centers of diversity of *Petrocosmea*. To date, 14 accepted taxa of *Petrocosmea* have been recorded in Guizhou.

In January 2020, during field work in Niangniang Mountain, Panzhou County, Guizhou Province, Tao Peng and his students discovered a species of *Petrocosmea* with lobed leaves in a cave. In the same year, Ying Guo found it blooming in May. In May 2022, Sheng-Hu Tang and Jian-Hua Zhang visited the cave to collect specimens with flowers. In September 2022, Jian-Hua Zhang went back to observe the fruits. It was similar to *P. henryi* Craib (1918: 216) and *P. weiyigangii* F.Wen (2019: 176) on the lobed leaves. After thorough comparisons, we concluded that it represented a new species.

Materials & methods

The morphological characteristics of approximately 40 mature individuals were observed, and 20 flowers selected were observed and measured carefully in the field. The microscope (Olympus SZ61, Tokyo, Japan) was used for micro-observation. The plant was described following the terminology used by Wang *et al.* (1998). The checklist of global *Petrocosmea* were prepared carefully. Relevant literature was consulted, including Qiu *et al.* (2011), Qiu & Liu (2015), Shaw (2019), and Jiang *et al.* (2020). The images of *Petrocosmea* type specimens available in virtual herbaria and databases, including E (<https://data.rbge.org.uk/search/herbarium/>), K (<http://apps.kew.org/herbcat/navigator.do>), iPlant (<http://www.iplant.cn/>), Global Plants (<https://plants.jstor.org/>), US (<https://collections.nmnh.si.edu/search/botany/>) and P (<https://science.mnhn.fr/all/search>) were also examined.

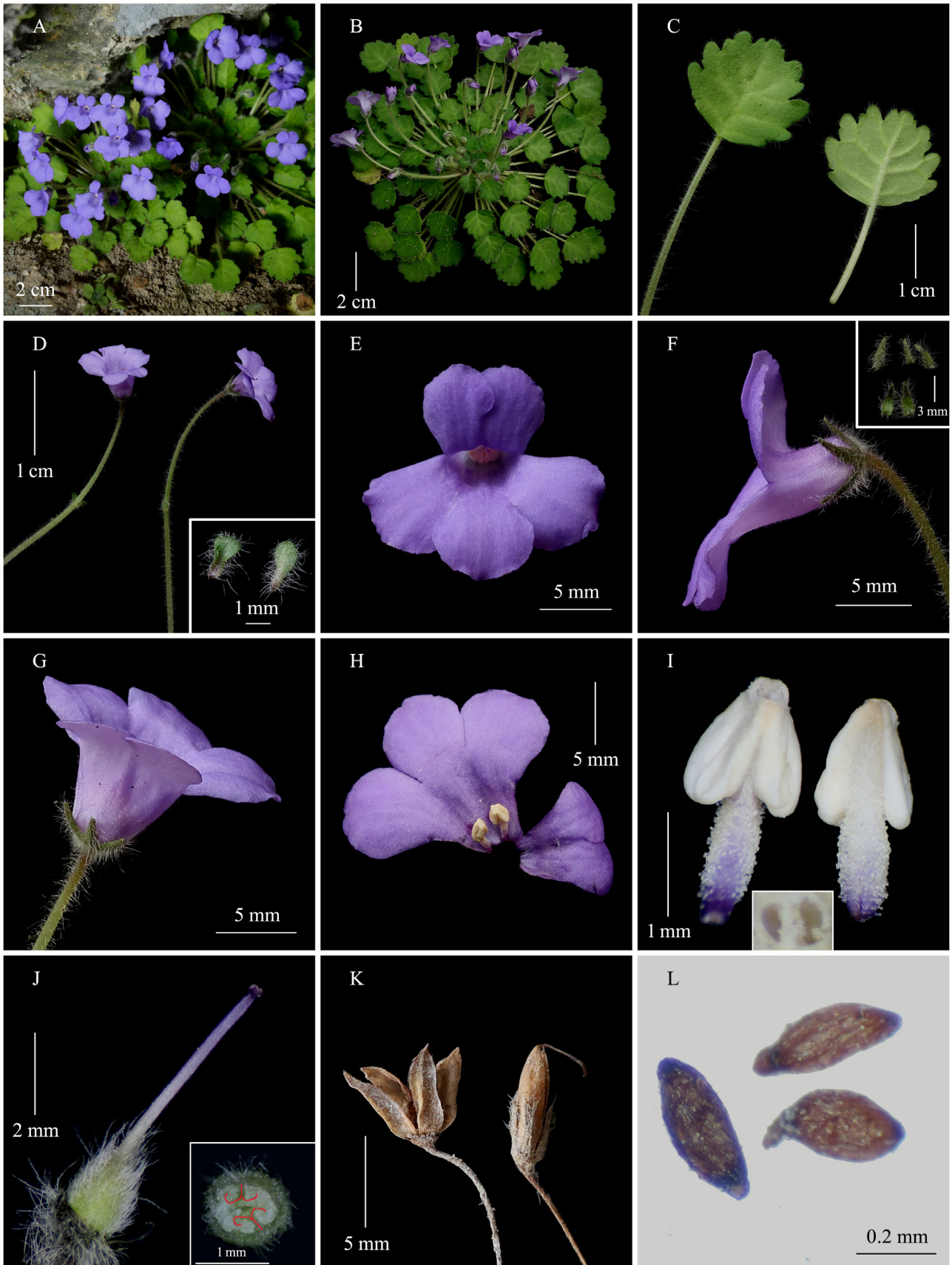


FIGURE 1. *Petrocosmea panzhouensis* Sheng H.Tang & Tao Peng, *sp. nov.* **A, B** flowering plant **C** adaxial and abaxial surfaces of leaf blade **D** cymes, and bracts inside and outside (inset) **E** flower in front view **F** flower in side view, and calyx lobes outside and inside (inset) **G** flower in top view **H** opened corolla with pistil removed, showing stamens, and spots inside the corolla **I** stamens ventral and dorsal, and dehiscing terminal anther pores (inset) **J** pistil, cross section of ovary (inset), and red lines showing the shape of placentas **K** capsules of previous year **L** seeds of previous year. (Photographs by Sheng-Hu Tang).

Taxonomic treatment

Petrocosmea panzhouensis Sheng H. Tang & Tao Peng, *sp. nov.*, Figure 1

Type:—CHINA. Guizhou Province, Panzhou County, Pugu Town, Niangniang Mountain, 26°04'45.56"N, 104°49'14.83"E, approximately 1472 m elev., 9 May 2022, *Sheng-Hu Tang 202205001* (Holotype: CSH [CSH0193338]!, Isotype: CSH!, GZBG!)

Petrocosmea henryi and *P. weiyigangii* are the only other two species of the genus with lobed leaves. *Petrocosmea panzhouensis* can be easily distinguished from the first by bracts spatulate, rarely oblanceolate (*vs.* linear or lanceolate), adaxial corolla lip apex 2-lobed to near middle (*vs.* emarginate or obtuse), anthers triangular, 1.7–1.8 mm long (*vs.* sagittate, 4.5–5 mm long). The new taxon can be easily distinguished from *P. weiyigangii* by adaxial corolla lip apex 2-lobed to near middle (*vs.* emarginate), straight filaments and densely glandular puberulent (*vs.* geniculate near middle and white pilose).

Herbs, perennial, stemless. Rhizome short, cylindrical, 7–10 mm long, 4.7–8.4 mm in diameter. Leaves all basal, 20 to 70; the inner leaves with petioles 5–20 mm long, the outer leaves with petioles 20–84 mm long, 1.1–1.3 mm in diameter, petiole densely pubescent and sparsely villous; leaf blade papery when dry, broadly ovate or suborbicular, 13–21.9 × 15.5–25.2 mm, adaxially densely pilose, abaxially densely pubescent, base broadly cuneate, suborbicular or truncate, sometimes peltate, margin irregularly lobed, apex obtuse or suborbicular; lateral veins 3–4 on either side of the midrib, adaxially inconspicuous or slightly impressed, abaxially prominent. Cymes 1–26, one flower per cyme; peduncle 22.2–48.5 mm long, 1–1.3 mm in diameter, densely pubescent and sparsely pilose; bracts 2, opposite, spatulate, rarely oblanceolate, 1.9–3.3 × 0.6–1.6 mm, margin entire, both outside and inside pilose; pedicel 11.2–32.5 mm long, 0.5–0.8 mm in diameter, densely pubescent and sparsely pilose. Calyx zygomorphic, outside densely pilose, inside glabrous; adaxial calyx lip 3.6–4.3 mm long, 3-parted from near base, segments equal, lanceolate or ovate-lanceolate, 2.6–3.3 × 0.8–1.3 mm, margin entire, apex acuminate; abaxial calyx lip 2-parted from base, segments equal, ovate-lanceolate or lanceolate, 3.8–4.9 × 1.3–1.5 mm, margin entire, apex acuminate. Corolla blue-purple, 14.6–16.2 mm long, outside densely puberulent, inside glabrous; tube 3.6–6.5 mm long, 6–7 mm in diameter at mouth, 3–4 mm in diameter at base, subcampanulate, two dark blue-purple spots inside the tube beneath the anthers; throat blue-purple, without spots or stripes; limb distinctly 2-lipped, adaxial corolla lip erect, 4.9–5.5 × 6–8.9 mm, 2-lobed to near the middle, lobes ovate or broadly ovate, overlapped, 3.7–4.1 × 3.6–5.1 mm; abaxial corolla lip 8.7–10.8 × 14.5–16.9 mm, 3-lobed to near the middle, lobes subequal, ovate or broadly ovate, 5.4–6.7 × 5.1–7.4 mm. Stamens 2, connivent, adnate to the corolla tube near base, included; filaments 1.3–1.8 mm long, 0.5–0.7 mm in diameter, straight, densely glandular puberulent, apex slightly curved; anthers triangular, 1.7–1.8 × 1.6–1.8 mm, basifixed, two anthers connivent, not coherent at apex, thecae two, parallel, not confluent at apex, poricidal at the apex, connective not projecting, sparsely puberulent; staminodes absent. Disc absent. Pistil 7.1–7.7 mm long; ovary 2–2.1 mm long, 1.2–1.4 mm in diameter, ovoid or narrowly ovoid, densely pilose and sparsely glandular puberulent, 1-loculed, placentas 2, sometimes 3, parietal, projecting inward, 2-cleft; style 5.1–5.6 mm long, 0.2–0.3 mm in diameter, sparsely glandular puberulent at base, glabrescent above base; stigma 1, terminal, capitate, apex emarginate. Capsule straight in relation to pedicel, 4.6–6 mm long, 1.4–1.6 mm in diameter, oblong to ovoid, sparsely pilose, dehiscing loculicidally to base; valves 2, straight, not twisted. Seeds 0.3–0.4 mm long, ellipsoid to broadly ellipsoid, unappendaged.

Phenology:—Flowering occurs from late April to June. Fruiting occurs from late August to September.

Etymology:—The new taxon is named after the type locality, Panzhou County, China.

Vernacular name:—The Chinese name is “Pán Zhōu Shí Hú Dié” (盘州石蝴蝶).

Distribution and habitat:—Only two populations have been found in Niangniang Mountain, Pugu Town, Panzhou County, Guizhou Province, China. The plants grow on rocks in limestone caves (Fig. 2). The main companion species was *Adiantum gravesii* Hance (1875: 197).

Conservation status:—Two populations with approximately 500 mature individuals were found at and around the type locality. The habitats are in villages and threatened by human activities. We visited other sites in Niangniang Mountain several times in the last five years and did not find other populations. Before carrying out further investigations, this species should be assessed as “Data Deficient” (DD), according to the IUCN standards (IUCN 2012, 2022).



FIGURE 2. Habitats of *Petrocosmea panzhouensis* Sheng H. Tang & Tao Peng, *sp. nov.* A type locality of *P. panzhouensis*, growing inside the cave B, C landscape of Niangniang Mountain D, E, F *P. panzhouensis* in the cave at the the type locality. (Photographs by Sheng-Hu Tang).



FIGURE 3. Holotype of *Petrocosmea henryi* Craib stored in E (*Henry 9154*, E00396425), and enlarged flowers (inset) from this specimen, showing its anthers.

Morphological affinities:—The new taxon is most similar to *Petrocosmea henryi* (Fig. 3) in having lobed leaf blades, one flower per cyme and straight filaments, but it can be easily distinguished from the latter by the shape and length of the anthers. The new taxon is also similar to *P. weiyigangii* in sharing the lobed leaf blades, but they are different in the shape of adaxial corolla lip apex and filaments. The detailed morphological comparisons among *P. panzhouensis*, *P. henryi* and *P. weiyigangii* are shown in Table 1.

It should be noted that when Hemsley described *Petrocosmea minor* Hemsley (1899: pl. 2600), he cited two collections, viz., *Hancock 428* and *A. Henry 9154*. Craib examining Hancock's specimens realized that the original figure of *P. minor* was drawn from these plants, and not from Henry's collections, so he described *P. henryi* with strongly waved leaf blade margin and elongate and sagittate anthers (Craib 1918). In fact, the collection *A. Henry 9154* contained several taxa, including *P. henryi* and *P. minor* (Global Plants 2022). In 1985, *P. henryi* was designated as synonymy of *P. minor*, based on indumentum on filaments (Wang 1985). In 1996, *A. Henry 9154 (E00396425)* was labeled and verified as Holotype of *P. henryi* and Isosytype of *P. minor* by Skog and Weitzman. In 2021, *P. henryi* was reinstated (Shaw 2021).

TABLE 1. Detailed comparisons among *Petrocosmea panzhouensis*, *P. henryi* and *P. weiyigangii*.

Character/species	<i>P. panzhouensis</i>	<i>P. henryi</i>	<i>P. weiyigangii</i>
Bracts	spathulate, rarely oblanceolate	linear or lanceolate	ensiform
Adaxial corolla lip apex	2-lobed to near the middle	emarginate or obtuse	emarginate
Filaments			
Shape	straight	straight	geniculate near the middle
Indumentum	densely glandular puberulent	unknown	white pilose
Anthers			
Shape	triangular	elongate and sagittate	ovate
Length	1.7–1.8 mm long	4.5–5 mm long	3.6–4.2 mm long
Apex	not coherent	unknown	coherent
Staminodes number	absent	3	3

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