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*Deianthera* (Gesneriaceae) from Yunnan, China**

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# *Petrocosmea melanophthalma*, a New Species in Section *Deianthera* (Gesneriaceae) from Yunnan, China

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**ABSTRACT.** *Petrocosmea melanophthalma* Huan C. Wang, Z. R. He & Li Bing Zhang, an attractive new species (Gesneriaceae, *Petrocosmea* sect. *Deianthera* W. T. Wang) from Yunnan, China, is described and illustrated. It is similar to *P. kerrii* Craib in the zygomorphic calyx and brevirostrate anther. The new species differs from the latter by its peltate leaves and the blue corolla with two striking black spots on the tube, as well as the geniculate filaments of the stamens that thicken above the middle. *Petrocosmea melanophthalma* was found on basalt cliffs in evergreen broad-leaved forest on Mopan Shan.

**Key words:** China, Gesneriaceae, IUCN Red List, *Petrocosmea*, Yunnan.

*Petrocosmea* Oliv. is a small genus of Gesneriaceae established by Oliver with the single species *P. sinensis* Oliv. (Oliver, 1887). Plants in this genus are perennial, acaulescent herbs with entirely basal leaves. The inflorescences are cymose, axillary, 1- to 4- (to 7-) flowered; the corolla can be blue to purple or white and is zygomorphic and bilabiate. There are two stamens with basifixed anthers and parallel thecae; there are three staminodes, but these can be only one or absent. There is no disc; the ovary is 1-loculed with two placentas in parietal orientation; the single stigma is terminal, capitate, and undivided (Li & Wang, 2004). Taxonomic revision of the genus *Petrocosmea* was first provided by Craib (1919) and later by Wang (1985). Twenty-seven species and four varieties were recognized by W. T. Wang, classified into three sections: *Petrocosmea* sect. *Petrocosmea*, *Petrocosmea*

sect. *Anisochilus* Hemsl., and *Petrocosmea* sect. *Deianthera* W. T. Wang (Wang, 1985). New reports and taxonomic novelties of this genus have been consistently reported (e.g., Wang et al., 1990, 1998; Li & Wang, 2004; Wei & Wen, 2009; Guo et al., 2010; Middleton & Triboun, 2010; Zhao & Shui, 2010) such that *Petrocosmea* currently comprises 32 species and four varieties. The genus is native to Asia, occurring in China, northeastern India, Myanmar, Thailand, and southern Vietnam. Approximately 24 species are concentrated on the Yunnan-Guizhou Plateau and most species restrict to relatively small geographical areas in distributions. Herein we describe a new species of *Petrocosmea*, in section *Deianthera* sensu W. T. Wang (1985), from basalt cliffs in south-central Yunnan.

***Petrocosmea melanophthalma*** Huan C. Wang, Z. R. He & Li Bing Zhang, sp. nov. TYPE: China. Yunnan: Xiping Co., Mopan Shan, 23°56.60'N, 101°58.49'E, on basalt cliffs in evergreen broad-leaved forest, 2200–2300 m, 26 May 2005, H. C. Wang 20050321 (holotype, YUKU; isotypes, CDBI, KUN, MO, YUKU). Figures 1, 2.

Species nova *P. kerrii* Craib affinis, sed ab ea foliis peltatis, corolla caerulea tubo intus basi maculis nigris ellipticis duabus ornata atque filamentis supra medium incrassatis geniculatisque quam antheris longioribus differt.

Perennial, small herbs; rhizomes short, ca. 5 mm. Leaves 10 to 25, basal, crowded, the inner leaves

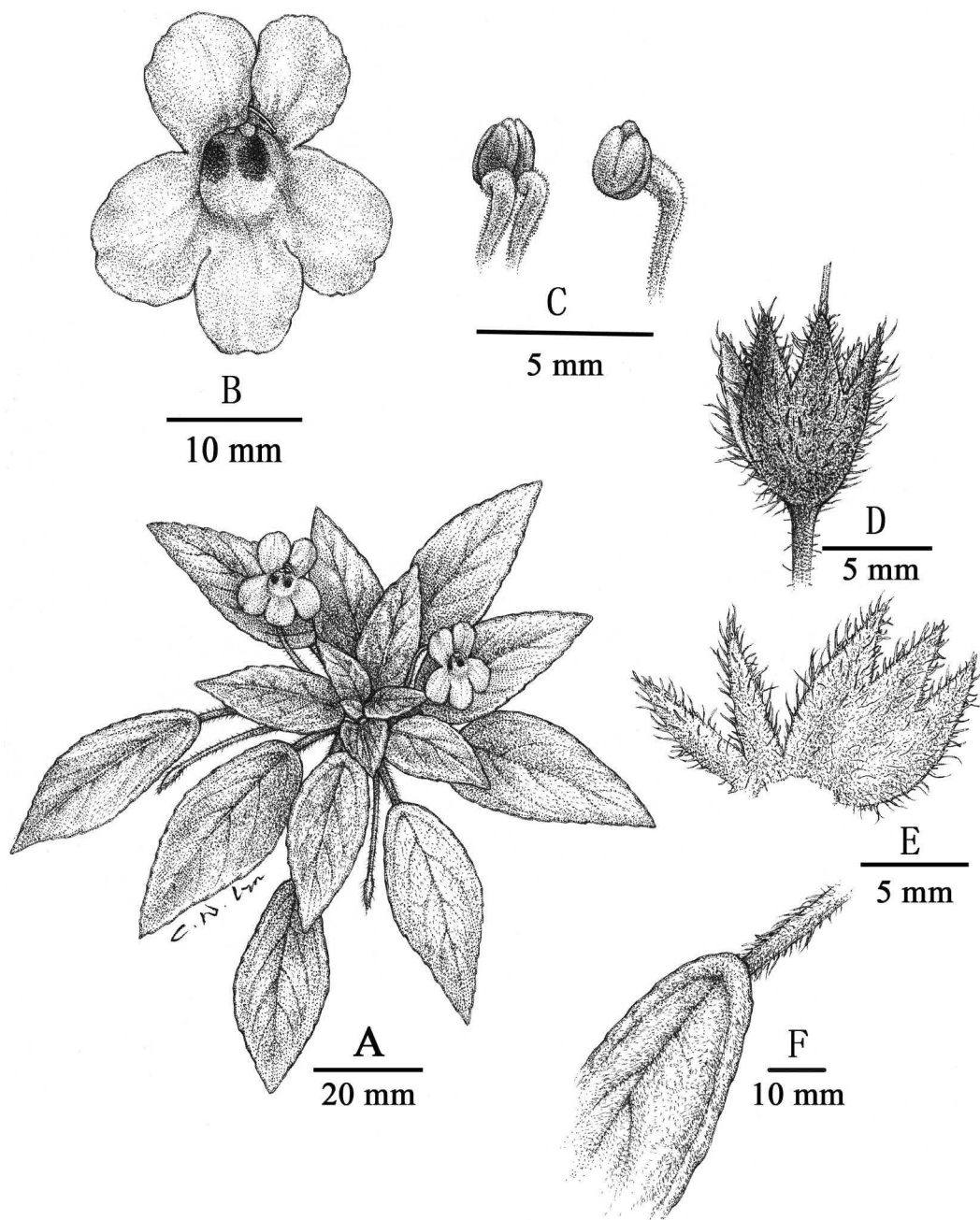


Figure 1. *Petrocosmea melanophthalma* Huan C. Wang, Z. R. He & Li Bing Zhang. —A. Fertile plant habit. —B. Flower. —C. Anther. —D. Calyx and style. —E. Calyx, flattened. —F. Leaf base. Drawn by Che-Wei Lin from the holotype, *H. C. Wang 20050321* (YUKU).

with petioles short or absent, the outer leaves with long petioles to 7 cm; leaf blades flaccid, slightly papery when dry, the outer blades narrowly elliptic, oblong or ovate-oblong, rarely lanceolate, 4–7(–10) × 1–2.5(–4) cm, the inner blades ovate or suborbicular,

1–3.5 × 0.6–2 cm, the blade apex acute, the base peltate, margin repand, adaxial blade surface densely pubescent, abaxial surface purple, short glandular, densely adpressed villous, lateral veins 4 to 8 on either side of midrib; petioles densely adpressed,

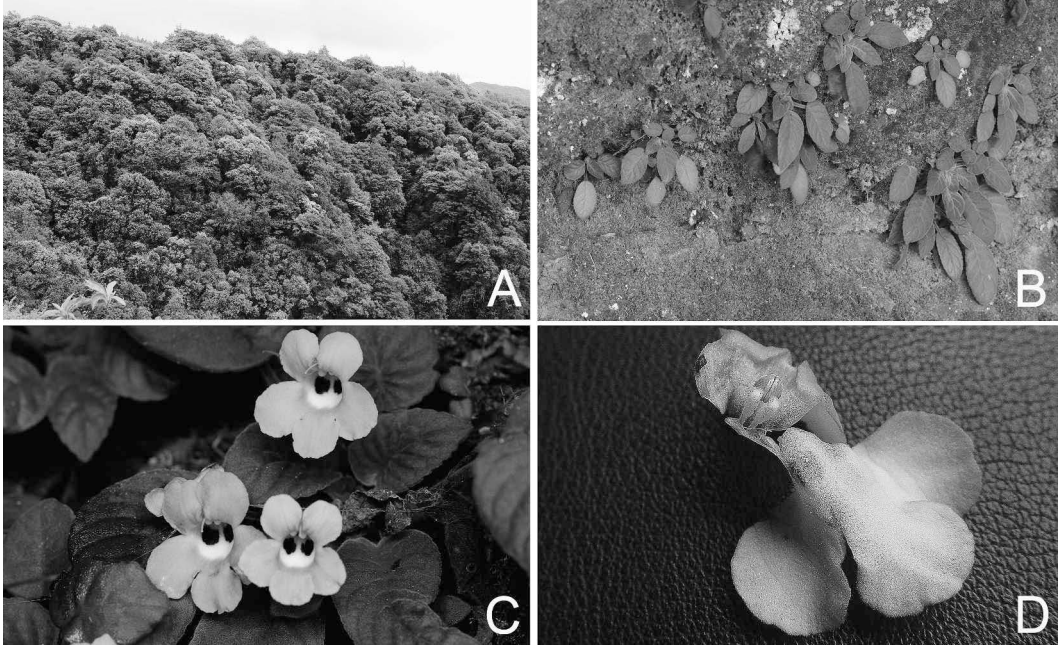


Figure 2. *Petrocosmea melanophthalma* Huan C. Wang, Z. R. He & Li Bing Zhang. —A. Habitat at the type locality, evergreen forest on Mopan Shan in Xiping county. —B. Plant habit on cliff surfaces at the type locality. —C. Close-up of fertile plants. —D. Corolla dissected to show the androecium inserted at the base of the corolla tube.

villous, base usually ferruginous, 1–7 cm. Scapes 1 to 5 (to 10), 3–5 cm tall, densely appressed villous; bracts 2, opposite, linear, ca. 3.5 mm; cymes usually 1-flowered; pedicels 1–1.5 cm. Calyx zygomorphic, 6–7 mm, unequally divided into 3 lobes from base, outer surface densely villous, inner surface glabrous, the adaxial calyx lobe larger, 3-dentate almost to middle, 4–6 mm broad, the abaxial calyx lobes 2, smaller, entire, narrowly triangular to lanceolate, ca. 1–1.8 mm broad. Corolla blue, bilabiate, 1.2–1.6 cm, externally puberulent, internally glabrous or somewhat puberulent, the adaxial corolla lip usually shorter than abaxial lip, corolla tube 6–8 mm, with 2 large black maculae evident on the abaxial tube surface internally; adaxial corolla lip ca. 0.5–0.7 mm  $\times$  1.5–2 cm, 2-lobed, lobes with rounded apex, abaxial lip ca. 0.6–0.8  $\times$  2–2.8 cm, 3-lobed, lobes with rounded apex; stamens 2, filaments inserted on base of corolla, puberulent, ca. 3.5 mm, geniculate and thickened above the middle, anthers ovate, cordate at apex, ca. 2  $\times$  1 mm, apex brevirostrate; staminodes 2, linear, puberulent; pistil ca. 1.3 mm; ovary ca. 3 mm, narrowly ovate, the style sparsely puberulent near base. Capsule ellipsoid, 3–4 mm.

*Distribution and habitat.* *Petrocosmea melanophthalma* is known only from the type locality in Xiping Co., in south-central Yunnan Province, in

southwestern China. It was observed to grow on basalt cliffs in evergreen broad-leaved forest, predominated by species of *Lithocarpus* Blume, at altitudes of 2100–2300 m.

*IUCN Red List category.* *Petrocosmea melanophthalma* is known only from Mopan Shan, Xiping Co., Yunnan, where its distribution area is less than 5 km<sup>2</sup> and the total number of individuals is approximately 500–800 (D1, D2). Following the IUCN criteria (IUCN, 2008), this species should be categorized as Vulnerable (VU).

*Phenology.* According to field observations and experiments in cultivation, *Petrocosmea melanophthalma* flowers from May to June when the dry season comes to an end on the Yunnan Plateau. Although we have carried out field surveys several times in the type locality and in adjacent areas, fruits were largely lacking and have been rarely collected.

*Etymology.* The specific epithet *melanophthalma* is derived from the Greek prefix “melan-” or black and the Greek “ophthalmos” or eye, referring to the two black eye-like spots on the corolla tube.

*Relationships.* *Petrocosmea melanophthalma* differs from previously known species in the genus. It is

Table 1. Morphological comparison of *Petrocosmea melanophthalma* Huan C. Wang, Z. R. He & Li Bing Zhang and similar species in southeastern Asia.

	<i>P. melanophthalma</i>	<i>P. kerrii</i> Craib	<i>P. pubescens</i> D. J. Middleton & Triboun	<i>P. coerulea</i> C. Y. Wu ex W. T. Wang
Leaf blade	outer leaves narrowly elliptic, oblong, ovate-oblong, rarely lanceolate, 4–7 × 1–2.5 cm; the inner ovate or suborbicular; apices acute; bases peltate	all leaves similar, elliptic to rhombic-elliptic or ovate, 1.8–13.5 × 1.2–8.5 cm; apices widely acute to obtuse; bases oblique, not peltate	all leaves similar, suborbicular to very broadly obovate, 4–9.3 × 3.8–9 cm; apices rounded; bases peltate	all leaves similar, oblong to elliptic or elliptic-ovate, 1–6.6 × 0.7–2.2 cm; apices slightly obtuse; bases peltate
Cyme	usually 1-flowered	1- to 7-flowered	1- to 2-flowered	usually 1-flowered
Calyx symmetry	zygomorphic	zygomorphic	zygomorphic	actinomorphic
Calyx	tripartite, larger adaxial lobe trilobed	tripartite from base, larger adaxial lobe trilobed	tripartite, larger adaxial lobe trilobed	5-partite from base
Flower color and maculation	corolla blue, with two black maculae internally on abaxial tube	corolla white, not maculate	corolla blue, not maculate	corolla blue, not maculate
Anthers	ovoid, ca. 2 mm long, apices brevirostrate	ellipsoid, ca. 3 mm long, apices brevirostrate	ovoid, ca. 4 mm long, apices brevirostrate	cordate-ovoid, ca. 2.2 mm long, apices not brevirostrate
Stamen filaments	geniculate, thickened above middle, ca. 3.5 mm	straight, ca. 1.2 mm	straight, ca. 2.4 mm	straight, ca. 1.2 mm
Capsule length	3–4 mm	5–6.5 mm	10–12 mm	not known
Distribution	south-central Yunnan (Xinping Co.), China	southern Yunnan, China, northern Myanmar, and Thailand	Chiang Rai, Thailand	southeastern Yunnan (Jinping Co.), China

characterized by the peltate leaves, the zygomorphic calyx, and the blue corolla with two striking black spots evident within the abaxial corolla tube. The filaments of the two stamens are geniculate and thickened above the middle, and the anthers are apically constricted to form a short beak.

Following Wang's (1985) taxonomic treatment of this genus, this new species should be assigned to *Petrocosmea* sect. *Deinantha* ser. *Kerrianae* W. T. Wang, as the calyx is zygomorphic and 3-lobed, and the anther is apically constricted to form a short beak. This series is currently composed of one species with two varieties, *P. kerrii* var. *kerrii* and *P. kerrii* var. *crinita* W. T. Wang. *Petrocosmea melanophthalma* differs from *P. kerrii* by its peltate (vs. nonpeltate) leaves, blue (vs. white and not maculate) corolla with two striking black maculae within the abaxial tube, and filaments that are longer than anthers (vs. being shorter than anthers), ca. 3.5 mm long (vs. ca. 1.2 mm long), geniculate and thickened above middle (vs. straight and not thickened). Both species occur in Yunnan, but *P. kerrii* extends to the south into northern Myanmar and Thailand. *Petrocosmea melanophthalma* shares some similar characters with *P.*

*pubescens* D. J. Middleton & Triboun, such as the peltate leaves, zygomorphic calyx, and blue corolla, but differs from the latter in that its outer leaves are narrowly elliptic, oblong or ovate-oblong, and 4–7(–10) × 1–2.5(–4) cm in size, and its flower has two black spots on the corolla. *Petrocosmea melanophthalma* shares similar characters with *P. coerulea* C. Y. Wu ex W. T. Wang as well, a species also described from Yunnan, such as the peltate leaves and blue corolla, but differs from the latter in its zygomorphic (vs. actinomorphic) calyx and brevirostrate anthers. *Petrocosmea melanophthalma* is somewhat morphologically similar to *Metapetrocosmea peltata* (Merr. & Chun) W. T. Wang, which was originally placed in the genus *Petrocosmea*, but as Wang indicated (1981), the latter is characterized by an elongated rhizome, a white or reddish corolla, with the lip shorter than tube, the villous anthers, and divergent thecae. *Metapetrocosmea peltata* is known from Hainan Island in China and is not sympatric to the new species. A morphological comparison of *Petrocosmea melanophthalma* and related species is given in Table 1.

*Paratype.* CHINA. **Yunnan:** Xiping Co., Mopan Shan, 23°56.60'N, 101°58.49'E, on basalt cliffs in evergreen broad-leaved forest, 2200–2300 m, 30 May 2007, *H. C. Wang et al.* 20070055 (YUKU).

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