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Primulina diffusa (Gesneriaceae), a new species endemic to the karst limestone area in southwestern Guangxi, China

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Primulina diffusa Xin Hong, Fang Wen & S.B. Zhou (Gesneriaceae), a new species growing in rocky crevices at the foot of a limestone hill near the Sino-Vietnamese border in southwestern Guangxi, China, is described and illustrated. It is morphologically similar to *P. hochiensis* and *P. hochiensis* var. *rosulata*, but can be distinguished by having single-flowered cymes; short peduncle (1–1.5 cm long); narrowly elliptical to subulate bracts, 2–2.5 × ca. 0.6 mm; 1–2 cm long pedicel; calyx lobes that are densely puberulent on both sides; and filaments that are geniculate near the middle.

The genus *Chirita* once had at least 140 species, making it a large genus in Gesneriaceae (Weber 2004). However, its sectional division was found to be artificial and unnatural, and therefore the genus was recently revised based on molecular data (Möller *et al.* 2011, Wang *et al.* 2011, Weber *et al.* 2011). All species of the sections *Gibbosaccus* and *Chiritopsis*, and two species of the section *Wentsaiboea*, were incorporated into a previously monotypic genus, *Primulina*. Most species of that newly defined genus have a narrow distribution and many new species were discovered in recent years, especially in the Guangxi Zhuang Autonomous Region, the main

distribution center of the genus (Wei *et al.* 2010).

During an excursion across the karst limestone hills near the Sino-Vietnamese border in 2010, a plant of Gesneriaceae was collected by Mr. Hua Wang, but it lacked flowers, which were found only in 2013. After carefully consulting the relevant literature (e. g. Wang *et al.* 1990, Wang *et al.* 1998, Li & Wang 2004, Wei *et al.* 2010, Hong *et al.* 2012, Wen *et al.* 2012a, 2012b, Wen *et al.* 2013, Xu *et al.* 2013, Zhao *et al.* 2013) and many specimens from Chinese and Vietnamese herbaria (e.g. NU, BJFU, CDBI, HN, IBK, IBSC, KUN, PE, VMN, CTC, MO, CDBI) we concluded that it was an undescribed species.

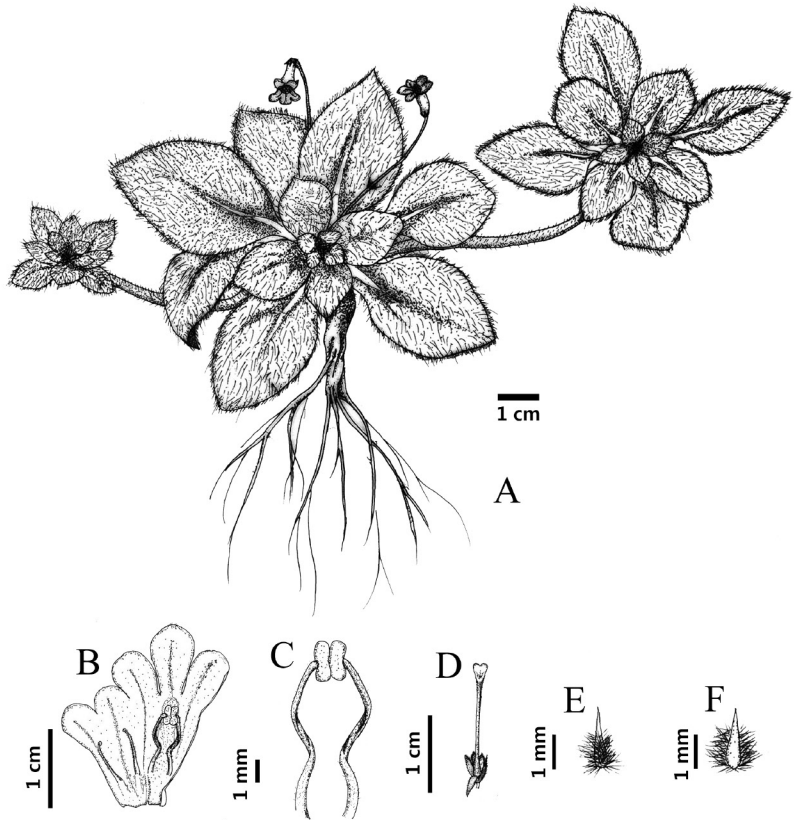


Fig. 1. *Primulina diffusa* (from the holotype). — **A:** Habit in flowering. — **B:** Cut-open flower showing stamens and staminodes. — **C:** Anthers. — **D:** Calyx and pistil. — **E:** Bract lobe, dorsal view showing dense pubescence. — **F:** Bract lobes, ventral view.

Primulina diffusa Xin Hong, Fang Wen, & S.B. Zhou, *sp. nova* (Figs. 1, 2A–K, 3)

TYPE: China. Guangxi Zhuangzu Autonomous Region: Chongzuo city, Daxin County, Leiping Town, growing in rocky crevices at the foot of a limestone hill, 200 m a.s.l., 27 Nov. 2011 (fl.), *Fang Wen 0173* (holotype IBK; isotype ANU). — PARATYPES: Same locality, 4 Aug. 2010 *Wang-062* (IBK); 200 m a.s.l., 27 Nov. 2012 *Hong 20121116* (ANU).

ETYMOLOGY: The specific epithet is derived from its diffuse habit, resulting from the many stolons growing from leaf axils.

Perennial, acaulescent, stoloniferous herb. Rhizome cylindrical, 2–4 cm long or longer, ca. 1.3 cm in diameter, glabrous; leaves 8–16 or more, fasciculate and rosulate; 4-verticillate, petiole cylindrical, densely villous, 1.0–1.6(–2.8) × 0.2–0.4 cm; leaf blade slightly ovate-elliptic or nearly rounded, 1.8–4.0 × 1.5–2.0 cm, thick papery, densely villous on both sides, broadly cuneate, or cuneate-attenuate to oblique at base, margin entire, apex nearly rounded to obtuse; lateral veins 3–4 on each side of midrib, con-

spicuous abaxially. Inflorescences axillary, 2–4 or more, unbranched cymes, single-flowered; peduncle short, 1–1.5 cm long, ca. 0.1 cm in diameter, densely erect-puberulent with both glandular and eglandular hairs; bracts 2, opposite, narrowly elliptical to subulate, 2–2.5 mm long, 0.5–0.8 mm in diameter, margin entire, apex acute, outside densely pilose. Pedicel 1–2 cm long, ca. 1 mm in diameter, glandular pubescent. Calyx green, 5-parted from base; segments equal, elliptical, 2–2.5 mm long, 1–1.2 mm in diameter, margin entire, apex acute, outside densely puberulent. Corolla purple or pale pink, throat with two distinctly elliptic yellow spots, 1.7–2 cm long, orifice 0.5–0.8 cm in diameter, outside puberulent with both glandular and eglandular hairs, inside glabrous; tube infundibuliform, ca. 1 cm long; limb distinctly 2-lipped, adaxial lip 2-parted to the middle, lobes ovate, ca. 4 × 4 mm; abaxial lip 3-parted to the base, lobes obliquely ovate to oblong, lateral ones ca. 5 × 4 mm, the central one ca. 7 × 5 mm. Stamens 2, anterior position,

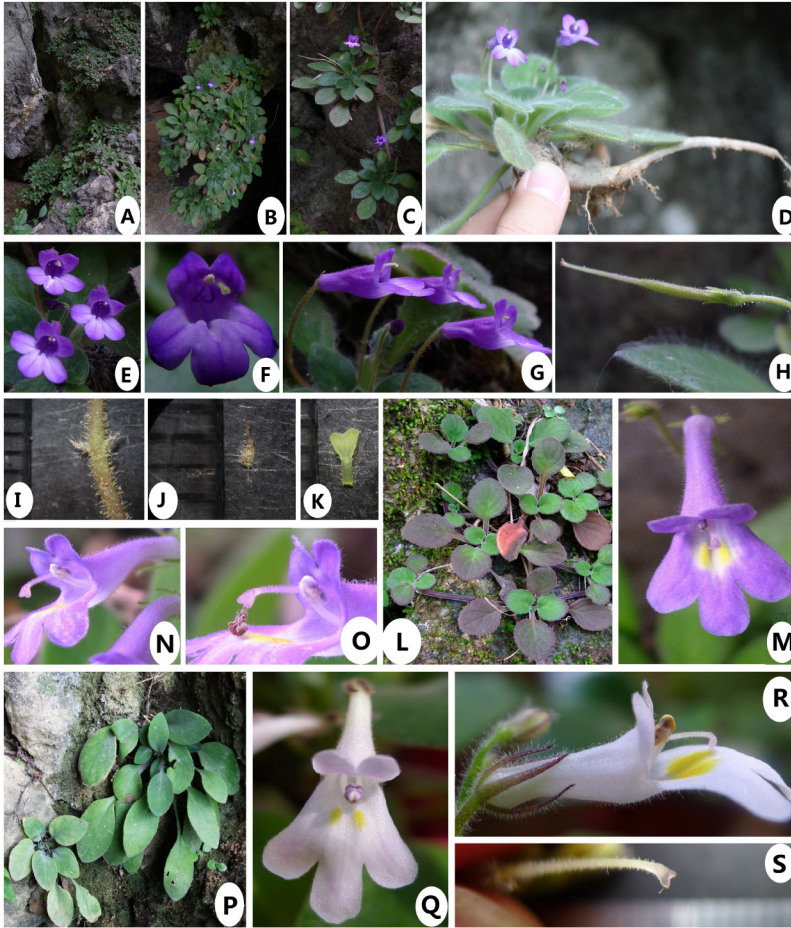


Fig. 2. A–K: *Primulina diffusa*. — A: Habitat. — B: Habit. — C: Rosette plants showing stolons. — D: Plant and rhizome. — E: Frontal view of flowers. — F: Flower throat. — G: Lateral view of flowers. — H: Calyx and pistil. — I: Bracts. — J: Abaxial surface of bract. — K: Stigma. — L–O: *P. hochiensis*. — L: Plants and stolons. — M: Front view of flower. — N: Lateral view of flower. — O: Stigma. — P–S: *P. hochiensis* var. *rosulata*. — P: Habit. — Q: Lateral view of flower. — R: Frontal view of flower. — S: Stigma.



Fig. 3. *Primulina diffusa*. — A: Habit. — B: Stolons and flowers. — C: Close-up of plant with stolon.

adnate to ca 4 mm above the corolla base; anthers fused across entire adaxial surfaces, yellow, reniform, ca. 3×1.2 mm, slightly constricted at the middle, glabrous; filaments purple, geniculate near the middle, ca. 8 mm long, sparsely glandular pilose; staminodes 2, linear, glabrous, ca. 5 mm long, adnate to 5–6 mm above the corolla base. Disc annular, margin entire or sometimes slightly erose, 0.3–0.4 mm high. Pistil ca. 15 mm long; ovary linear, 6–8 mm long, ca. 1.2 mm in diameter, densely puberulent with both glandular and eglandular hairs; style 9–10 mm long, ca. 0.5 mm in diameter, densely glandular-puberulent. Stigmas greenish, obtuse, emarginate at apex, 0.5–0.7 mm long. Capsule linear, 1.8–2.2 cm long, ca. 2 mm in diameter, puberulent. Flowering from November to December.

DISTRIBUTION. China, narrow endemic and only known from the type locality, i.e. Leiping

Town, Daxin County, Chongzuo City, southeastern Guangxi Zhuang Autonomous Region, China.

HABITAT. *Primulina diffusa* is locally abundant. It is growing in rocky crevices at the foot of a limestone hill in a subtropical evergreen broad-leaved forest near the Sino-Vietnamese border in southwestern Guangxi, China, at an elevation of 200 m a.s.l. The average temperature of Zhongzuo County is 21.3 °C and the average annual precipitation over 1000 mm.

Primulina diffusa is morphologically, based on leaf and flower shape, close to *P. hochiensis* (Fig. 2K–N; cf. Weber *et al.* 2011) and *P. hochiensis* var. *rosulata* (Fig. 2P–S; cf. Huang & Chen 1992, Wen & Wei 2012a), both found in southwestern Guangxi, but there are numerous differences (Table 1).

Table 1. Morphological comparison of *Primulina diffusa*, *P. hochiensis* and *P. hochiensis* var. *rosulata*.

Characters	<i>P. diffusa</i>	<i>P. hochiensis</i>	<i>P. hochiensis</i> var. <i>rosulata</i>
Stolons	present	present	absent
Rhizome length (cm)	2–4	1.5–2	1.6–2
Petiole length (cm)	1.0–1.6(–2.8)	1–3.5	3.5–6.0
Indumentum of petiole	densely villous	pubescent	very short pubescence
Leaf blade size (cm)	1.8–4.0 × 1.5–2.0	2–5.5 × 1.3–3.5	3.5–6.0 × 2.5–4.0
Texture of leaf blade	thick papery	papery	chartaceous
Indumentum of leaf blade	densely villous on both sides	densely appressed puberulent	densely appressed puberulent
Inflorescence	single-flowered	1–4-flowered	2–4-flowered
Peduncle length (cm)	1–1.5	4–7	3.0–9.5
Bract shape	narrowly elliptical to subulate	linear-lanceolate	linear
Bract size (mm)	2–2.5 × 0.6	3–4 × 1.2	4–5 × 1
Pedicle length (cm)	1–2	0.7–2.3	≤ 0.7
Indumentum of pedicle	glandular pubescent	glandular puberulent	puberulent
Calyx shape	elliptical	lanceolate-linear to subulate	lanceolate-linear
Calyx size (mm)	2–2.5 × 1–1.2	4–7 × 0.5–0.8	7–7.5 × 1.5–2.3
Calyx color	green	purple	purple
Indumentum of calyx	densely puberulent on both sides	outside densely pubescent, inside glabrous	outside densely pubescent, inside glabrous
Corolla length (cm)	1.7–2	2–3	2.6–3.6
Adaxial lip	2-parted to middle	2-parted to base	2-parted to base
Abaxial lip	3-parted to base	3-parted to middle	3-parted to middle
Anthers	glabrous	abaxially villous	glabrous
Filaments	geniculate near middle	straight	geniculate near base
Staminodes	2	2	3
Stigmas	obtrapeziform, emarginate at apex	ligulate, emarginate at apex	obtrapeziform, apex 2-lobed up to middle
Flowering time	Nov.–Dec.	Oct.	Aug.

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