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Primulina pingguoensis, a new species of Gesneriaceae from Guangxi, China

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Abstract: *Primulina pingguoensis* H. S. Ma & B. Pan, a new species of *Primulina* Hance, Gesneriaceae from Guangxi Zhuang Autonomous Region, China, is illustrated and described here. The new species morphologically resembles *P. carinata* Y. G. Wei, F. Wen & H. Z. Lü, but it differs from the latter by lobes narrowly lanceolate-linear, length-width ratio more than 2 (rounded-ovate, length-width ratio less than 1.5), 8-10 purple stripes from corolla throat to the bottom of corolla tube, the same color with corolla, without honey guides (vs. brown stripes, different color with corolla, 2 yellow honey guides inside), leaf blade elliptic to broadly ovate, (6.5-9.5) cm × (4.5-6.5) cm [(vs. broadly elliptic to ovate, (4.0-5.0) cm × (3.0-4.0) cm], leaf blade base slightly cuneate (vs. rounded), corolla tube tubular, ventrally carinate, (vs. narrowly funnelform, strongly carinate, forming a clear keel), etc. The conservation status of *P. pingguoensis* is considered as 'Critically Endangered' (CR) according to the IUCN red list categories and criteria.

Key words: limestone area, flora, *Primulina*, *Primulina carinata*, taxonomy

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广西苦苣苔科植物一新种——平果报春苣苔

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摘 要: 该文报道了广西苦苣苔科报春苣苔属(*Primulina* Hance)一新种——平果报春苣苔(*Primulina pingguoensis* H. S. Ma & B. Pan),该新种在形态学上与囊筒报春苣苔(*P. carinata* Y. G. Wei, F. Wen & H. Z. Lü)相似,但两者能明显区别,平果报春苣苔花冠裂片狭披针形至线型,长宽比大于2(vs.圆形至卵圆形,长宽比小于1.5),花冠内部具8~10条紫色条纹,与花冠同色,无明显导蜜线(vs.棕色条纹,与花冠不同

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色,具两条黄色导蜜线),花冠筒管状,腹面隆状,(vs.狭漏斗状,明显隆起,形成一清晰的龙骨),叶片椭圆形到宽卵形,(6.5~9.5) cm × (4.5~6.5) cm [vs.宽椭圆形到卵形,(4.0~5.0) cm × (3.0~4.0) cm],叶基部稍楔形(vs. 圆形)。该新种目前只在模式产地一个较大的石灰岩溶洞及周边发现有分布,目前该溶洞内开始发展畜牧养殖,对该物种的生存空间带来压力。该文对该新种的分布区(EOO)和占有面积(AOO) 分别进行了评估,认为根据现已知的居群和所受威胁情况,根据 IUCN 红色名录标准,可暂定为"极危(CR)"级别。该种作为传统中药,被当地居民用于新生儿去胎毒等,有一定的保护和利用价值,今后可进一步开展此物种的民族植物学和药用植物学研究。该种面临生境破坏和野外采挖的风险,因此很有必要开展迁地保护和野外回归等相关工作。与该种同一乡镇分布的物种紫麟报春苣苔(*P. purpureokylin* F. Wen, Yi Huang & W. C. Chou),后者花冠筒漏斗状,叶片深绿至紫色,叶两面具紫红色粗伏毛而明显区别;距离该种 5 km 内分布有小白花报春苣苔(*P. alba* R.F.Li & B.Pan),后者花明显小型,花冠筒状,纯白色,与该种相区别。通过比较该种与报春苣苔属其他物种,发现也有一些物种花筒或多或少有膨大,如浅黄报春苣苔(*P. lutescens* B. Pan & H. S. Ma)、粉花报春苣苔 [*P. roseoalba* (W. T. Wang) Mich. Möller & A. Weber]、中华报春苣苔 [*P. dryas* (Dunn) Mich. Möller & A. Weber]、多莛报春苣苔 [*P. polycephala* (Chun) Mich. Möller & A. Weber]以及崀山报春苣苔 [*P. langshanica* (W. T. Wang) Yin Z. Wang]等,初步推断报春苣苔属植物的花筒膨大可能与特定传粉者有关,然而这一假设需进一步的野外调查和实验论证。

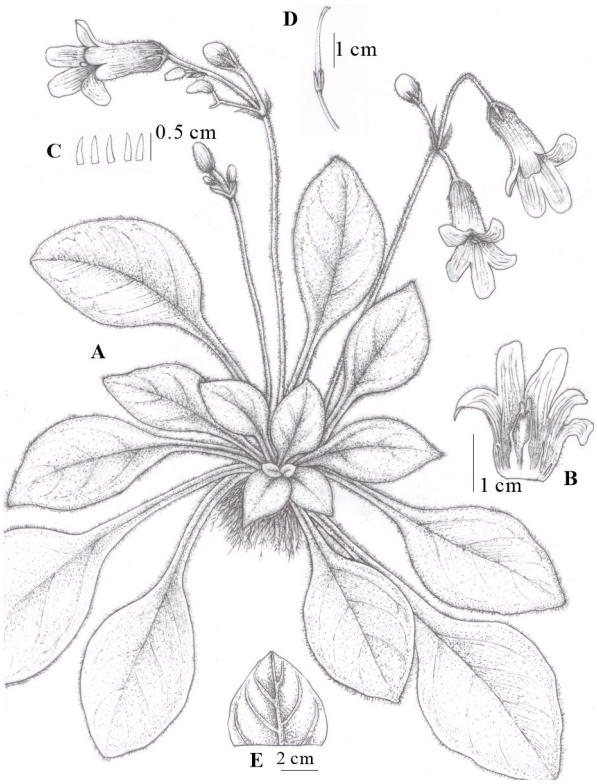
关键词: 石灰岩地区, 植物区系, 报春苣苔属, 囊筒报春苣苔, 分类学

The genus *Primulina* Hance (Hance, 1883) has become the largest genus of Gesneriaceae in China, following generic recircumscriptions based on recent molecular phylogenetic analyses (Wang et al., 2011; Weber et al., 2011; Xu et al., 2019). The newly revised *Primulina* consists of 230 species (excluding infraspecific taxa) primarily distributed from South and Southwest China to North Vietnam (GRC, 2023; Wen et al., 2019, 2021). Up to date, there are 213 accepted species (excluding infraspecific taxa) of *Primulina* recorded from China (GRC, 2023; Wen et al., 2021). The tropical and subtropical limestone mountainous areas of Guangxi, China, are the centers of species diversity and diversification of this genus (Li et al., 2019). Many new taxa of *Primulina* from South and Southwest China have been discovering and publishing since two decades (Guo et al., 2015; Möller, 2019; Wen et al., 2021). In the past decade, the number of new species in *Primulina* has averagely increased by about 10 per year (Xu et al., 2017). In the course of a floristic survey of limestone areas in July 2020, we discovered a rare plant of Gesneriaceae from Pingguo City, Guangxi, China. The species is recognized as *Primulina* by the following characters: the single chiritoid stigma, where the upper lobe of the stigma is not developed (Wang et al., 2011; Weber et al., 2011). After consulting the relevant literature (Xu et al., 2012; Wen et al., 2014; Guo et al., 2015; Möller et al., 2016; Ma et al., 2017; Li et al., 2019; Zhang et al., 2021), as well as detailed comparison with relevant specimens and taxonomic publications (Wang et al., 1998; Li & Wang, 2005; Wei et al., 2010; Wang et al., 2017), a new species of *Primulina* is identified, which is described and illustrated below.

Primulina pingguoensis H. S. Ma & B. Pan, sp. nov. (Fig. 1, Fig. 2)

The new species is similar to *Primulina carinata* Y. G. Wei, F. Wen & H. Z. Lü in floral characteristics, but it differs from the latter by lobes narrowly lanceolate-linear, length-width ratio more than 2 (rounded-ovate, length-width ratio less than 1.5), 8–10 purple stripes from corolla throat to the bottom of corolla tube, without honey guides (vs. brown stripes, 2 yellow honey guides inside, leaf blade elliptic to broadly ovate, (6.5–9.5) cm × (4.5–6.5) cm [vs. broadly elliptic to ovate, (4.0–5.0) cm × (3.0–4.0) cm], leaf blade base slightly cuneate (vs. rounded), corolla tube tubular, ventrally carinate, (vs. narrowly funnelform, strongly carinate, forming a clear keel), etc.

Type: CHINA, Guangxi, Pingguo City, Guohua Town, Longyang Village, elevation 220 m, 23°16′ N, 107°29′ E, 20 July 2020, Hu-Sheng Ma & Bo



A. Habit with flowers; **B**. Corolla opened with stamens and staminodes; **C**. Calyx anatomy; **D**. Calyx and pistil; **E**. Enlarged abaxial veins.

Fig. 1　Line drawings of *Primulina pingguoensis*

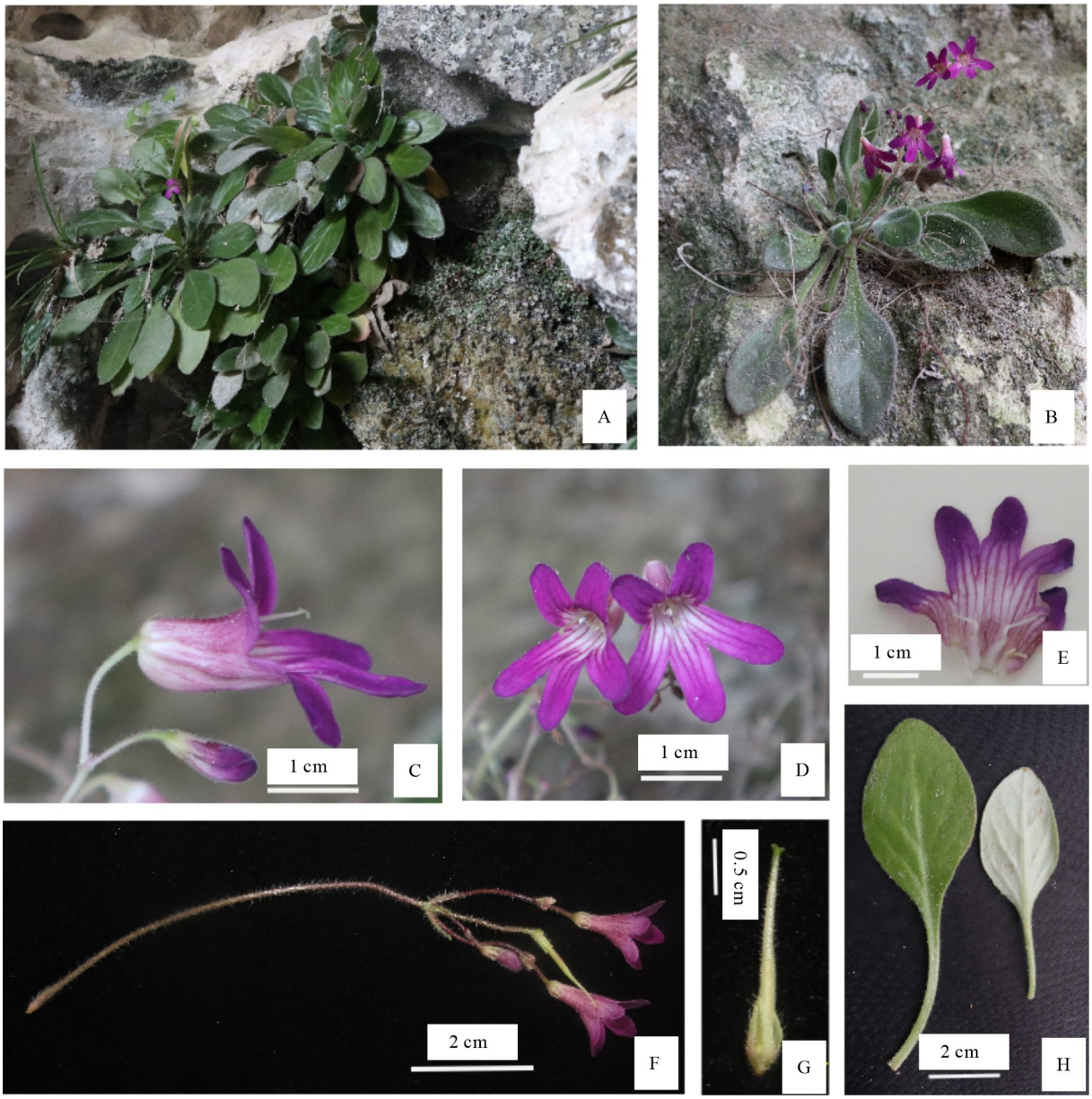
Pan MHS2020072001 (Holotype: IBK!, Isotypes: PE! and IBK!).

1　Description

Perennial herbs. Rhizomatous stem subterete, 1–4 cm long, ca. 9 mm in diameter. Leaves 8–17, basal; petiole subterete, 4.5–8 cm long, 4–6 mm wide; leaf blade elliptic,to broadly ovate, (6.5–9.5) cm × (4.5–6.5) cm, apex obtuse to round, base slightly oblique, cuneate, margin entire, rarely repand, puberulent on both sides, lateral veins 3–5 on each side, prominent abaxially. Cymes axillary, 4–6, 1–4-branched, 3–8-flowered per cyme, peduncle 8.0–16.5 cm long, 2–3 mm in diam., with erectly white glandular pubescent; bracts opposite, pale green, linear or linear-lanceolate, ca. 8.0 mm × 1.8 mm, pubescent outside, glabrous inside, margin entire to sparsely dentate; bracteoles 2, opposite, the shape, indumentum characteristics and color same as bracts but obviously smaller, ca. 4.0 mm × 0.8 mm; pedicel 1.1–3.5 cm long, densely pubescent, 0.9 – 1.2 mm in diam. Calyx 5-parted nearly to the base, lobes linear-lanceolate, (4.0 – 5.0) mm × (0.8 – 1.0) mm, pale green, apex acuminate, sparsely white pubescent outside, inside nearly glabrous, margins entire. Corolla pinkish purple, with 8 – 10 longitudinal dark purple stripes from the throat to the bottom of the corolla tube, 16 – 20 mm long, externally glandular pubescent, internally sparsely puberulent; tube tubular, ventrally carinate, purplish purple to pink, 10 – 11 mm long, ca. 6 mm in diam. at the base, 8–10 mm in diameter in medium. Limb distinctly 2-lipped, purplish adaxial lip 2-parted to the middle, lobes oblong, ca. 6 mm × 3 mm, three purplish vertical lines on each corolla lip; abaxial lip 3-parted to over the middle, lobes broadly oblong, ca. 9 mm × 4 mm, rounded at apex. Stamens 2, adnate to ca. 6 mm above the corolla tube base, filaments linear, white to translucent, ca. 6.5 mm long, geniculate over middle, glabrous; anthers elliptic to reniform, connate at adaxial surface, dorsifixed, ca. 2 mm long, glabrous. Staminodes 3, translucent, ca. 1 mm long, glabrous, slightly swollen at apex, adnate to ca. 6 mm above the corolla tube base. Disk ringlike, ca. 0.8 mm high, margin repand. Pistil 11 – 15 mm long, linear, densely puberulent, ovary yellowish brown, 6 – 8 mm long, ca. 1 mm in diameter, style densely puberulent, white to translucent, 6–8 mm long, nearly glabrous; stigma obtrapeziform, ca. 1 mm long, apex 2-lobed. Capsule linear, outside pubescent, 18 – 24 mm long, ca. 2.5 mm in diam., valvate dehiscence when mature.

2　Distribution and Habitat

Up to date, the new species has been only found in Pingguo City, Guangxi, on the surface of wet crevices of rocks surrounding a big karst cave, elevation 220 m, 107°29′ E, 23°16′ N. It grows on the shady surface of limestone rocks. The main associated species are *Adiantum flabellulatum* L., *Alchornea trewioides* (Benth.) Müll. Arg., *Arachniodes chinensis* (Rosenst.) Ching,



A. Habitat; **B**. Habit; **C**. Lateral view of corolla; **D**. Frontal view of corolla; **E**. Corolla opened with stamens and staminodes; **F**. Cyme and flowers; **G**. Calyx and pistil; **H**. Adaxial and abaxial leaves.

Fig. 2 *Primulina pingguoensis*

Asplenium sampsoni Hance, *Selaginella moellendorffii* Hieron and so on.

2.1 Phenology

Flowering occurs from July to August, and fruiting occurs from August to September.

2.2 Etymology

The specific epithet 'pingguoensis' refers to the type locality of this new species.

2.3 Conservation status

Primulina pingguoensis is currently known only from the type locality. The total population size of this new species is small. The mature individuals of the new species are 187. Besides, there is a continuing decline in quality of habitat slightly prominent as local villagers have developed animal husbandry in the karst cave and used *P. pingguoensis* as traditional Chinese medicine by

local inhabitant according to our observations and interviews. The extent of occurrence (EOO) is 4 km^2 and the area of occupancy (AOO) is 0.64 km^2. Thus, based on currently available information, we propose that *P. pingguoensis* should be considered as 'Critically Endangered' [(CR): B1+ B2a], C2b, according to the Guidelines for Using (IUCN) Red List Categories and Criteria (IUCN, 2022). This species is confronted with habitat destruction and wild extraction, therefore, it is necessary to carry out conservation actions, such as: *ex situ* conservation and field return, etc.

2.4 Similar species

This new species is morphologically similar to *Primulina carinata* Y. G. Wei, F. Wen & H. Z. Lü in floral characteristics, but the two species show several diagnostic differences (Table 1). By comparing the new species with other spicies in *Prumulina* not only *P. carinata*, we have found that there are other species with carianate corolla more or less, eg, *P. dryas*, *P. polycephala*, *P. langshanica*, and *P. roseo-alba*, etc. The tube is transitional from funnelform to tubular, all these transitional characters are relation to pollination biology through experimental observation in greenhouse as well as in wild.

Acknowledgements　We thank Miss. WEN Zunrong for the handsome drawing.

Table 1　Morphological comparison of *Primulina pingguoensis and P. carinata*

Characters	*P. pingguoensis*	*P. carinata*
Corolla lobes	Narrowly lanceolate-linear,	Rounded-ovate,
Adaxial	length-width ratio more than 2	length-width ratio less than 1.5,
Abaxial	ca. 6 mm wide	8–9 mm wide
	ca. 9 mm wide	7.2–7.8 mm wide
Stripes	8–10 purple stripes from corolla throat to the bottom of corolla tube, without honey guides	Brown stripes, 2 yellow honey guides inside
Leaf	Elliptic, ovate or broadly ovate,	Broadly elliptic to ovate,
Blade	(6.5–9.5) cm × (4.5–6.5) cm	(4.0–5.0) cm × (3.0–4.0) cm
Base	Slightly oblique, cuneate	Rounded
Texture	Carnose	Subcoriaceous
Corolla color	Pinkish purple to pink	Purple or purplish red
Corolla tube	Tubular,	Narrowly funnelform,
	ventrally carinate	strongly carinate
		forming aclear keel
Flowering	July to August	August to September

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