

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/349023308>

Primulina papillosa (Gesneriaceae), a new species from limestone areas of Guangxi, China

Preprint · February 2021

DOI: 10.3897/arphapreprints.e63933

CITATIONS

0

READS

18

5 authors, including:



Fang Wen

Guangxi Academy of Sciences

134 PUBLICATIONS 667 CITATIONS

SEE PROFILE



Zi-Bing Xin

Guangxi Institute of Botany, Chinese Academy of Sciences

23 PUBLICATIONS 23 CITATIONS

SEE PROFILE



Stephen Maciejewski

20 PUBLICATIONS 30 CITATIONS

SEE PROFILE



Long-Fei Fu

Guangxi Institute of Botany, Guangxi Zhuang Autonomous Region and Chinese Ac...

51 PUBLICATIONS 114 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Taxonomy of the species-rich genus *Pilea* (Urticaceae) [View project](#)



国家自然科学基金项目 (31860047), 中国科学院科技服务网络计划 (KFJ-3W-No1), 广西自然科学基金项目 (2017GXNSFAA198006), 广西科技计划项目 (桂科AB16380053), 广西科学院基本业务费项目 (2017YJJ23022), 广西喀斯特植物保育与恢复生态学重点实验室基金项目 (17-259-23) 和中国科学院植物资源保护与可持续利用重点实验室开放基金项目 [View project](#)

PREPRINT

Posted on 03/02/2021

DOI: <https://doi.org/10.3897/arphapreprints.e63933>

***Primulina papillosa* (Gesneriaceae), a new species from limestone areas of Guangxi, China**

 Fang Wen,  Zi-Bing Xin, Wei-Chuen Chou, Stephen Maciejewski,  Long-Fei Fu

Not peer-reviewed, not copy-edited manuscript.

Disclaimer on biological nomenclature and use of preprints

The preprints are preliminary versions of works accessible electronically in advance of publication of the final version. They are not issued for purposes of botanical, mycological or zoological nomenclature and **are not effectively/validly published in the meaning of the Codes**. Therefore, nomenclatural novelties (new names) or other nomenclatural acts (designations of type, choices of priority between names, choices between orthographic variants, or choices of gender of names) **should NOT be posted in preprints**. The following provisions in the Codes of Nomenclature define their status:

International Code of Nomenclature for algae, fungi, and plants (ICNafp)

Article 30.2: "An electronic publication is not effectively published if there is evidence within or associated with the publication that its content is merely preliminary and was, or is to be, replaced by content that the publisher considers final, in which case only the version with that final content is effectively published." In order to be validly published, a nomenclatural novelty must be effectively published (Art. 32.1(a)); in order to take effect, other nomenclatural acts must be effectively published (Art. 7.10, 11.5, 53.5, 61.3, and 62.3).

International Code of Zoological Nomenclature (ICZN)

Article: 21.8.3: "Some works are accessible online in preliminary versions before the publication date of the final version. Such advance electronic access does not advance the date of publication of a work, as preliminary versions are not published (Article 9.9)".

***Primulina papillosa* (Gesneriaceae), a new species from limestone areas of Guangxi, China**

Zi-Bing Xin^{1,2,3#}, Wei-Chuen Chou^{3#}, Stephen Maciejewski^{3,4}, Long-Fei Fu^{1,2,3} & Fang Wen^{1,2,3*}

1 *Guangxi Key Laboratory of Plant Conservation and Restoration Ecology in Karst Terrain, Guangxi Institute of Botany, Guangxi Zhuang Autonomous Region and Chinese Academy of Sciences, CN-541006 Guilin, China.*

2 *National Gesneriaceae Germplasm Bank, Guangxi Institute of Botany, Guangxi Zhuang Autonomous Region and Chinese Academy of Sciences, CN-541006 Guilin, China.*

3 *Gesneriad Conservation Center of China (GCCC), Guilin Botanical Garden, Guangxi Zhuang Autonomous Region and Chinese Academy of Sciences, CN-541006 Guilin, China.*

4 *The Gesneriad Society, 2030 Fitzwater Street, Philadelphia, PA. 19146-1333 USA.*

These authors contributed equally to this work as co-first authors.

* Corresponding author: Fang Wen (wenfang760608@139.com)

Abstract

Primulina papillosa Z.B. Xin, W.C. Chou & F. Wen, a new species from limestone areas of Guangxi, China, is described and illustrated. It resembles *P. linearifolia* (W.T. Wang) Yin Z. Wang and *P. pseudolinearifolia* W.B. Xu & K.F. Chung, but can be easily distinguished by some combined characters, especially its leaf blades densely papillose-hispid. We found only one population at the type locality with no more than 200 individuals so that this new species is provisionally assessed as Critically Endangered (CR) using IUCN criteria.

Keywords

Cliff-dwelling, flora of Guangxi, limestone flora, new taxon, taxonomy

Introduction

By the end of 2020, the genus *Primulina* Hance (1883) comprises 201 species and 27 varieties (IPNI 2021; Tropicos 2021). It is mainly distributed throughout southern and southwestern China and northern Vietnam (Wang et al. 2011; Weber et al. 2011). China is a center of diversity for *Primulina* as at least 183 species and 27 varieties occur there at present, especially limestone areas (e.g. Wen et al. 2019, 2021; Ge et al. 2020; Liu et al. 2020; Xin et al. 2020a, 2020b, 2020c). An acceleration of species discovery had been seen over the last five years, with an average of over ten new species per year (Wen et al. 2019, 2021). As this trend persists, more new species from China will most likely be discovered, even though a thorough investigation is unlikely in the short term (Möller 2019).

An amateur Gesneriaceae enthusiast from Guangxi found this unknown plant in the wild on 9 April 2020. One of authors, W.C. Chou, went to the type locality and collected the specimens for this unknown species. At the same time, some living plants were introduced and cultivated in the gardens of the Gesneriad Conservation Center of China (GCCC) and National Gesneriaceae Germplasm Bank for further study. A detailed comparison of specimens and living plant materials with the type specimens and protologues of known *Primulina* species revealed that these specimens neither fit the existing protologues nor conform to the type specimens of these species. Nevertheless, its leaf shape and rhizome are most similar to those of *P. linearifolia* (W.T. Wang) Yin Z. Wang (Wang and Pan

1982; Wang et al. 2011) and *P. pseudolinearifolia* W.B. Xu & K.F. Chung (Xu et al. 2011, 2012), it can be easily distinguished from the latter two by the combination of several morphological characters (Table 1), especially its leaf blades densely papillose-hispid. Thus, we confirmed that it represents a new species of *Primulina*, and described it here.

Taxonomic Treatment

Primulina papillosa Z.B. Xin, W.C. Chou & F. Wen, sp. nov.

urn:lsid:ipni.org:names:*****

Fig. 1 and Fig. 2E-F

Diagnosis. The new species resembles *Primulina linearifolia* (Fig. 2A-B) and *P. pseudolinearifolia* (Fig. 2C-D), but can be easily distinguished from the latter two by its leaf blades densely papillose-hispid. It differs from *P. linearifolia* by its 1–2-flowered per cyme (vs. 4–7-flowered); pedicel 20–35 mm long (vs. 5–12 mm); calyx lobes 7.5–9 mm long (vs. 3.2–4 mm); disc ca. 1.2 mm in height, margin entire (vs. ca. 0.5 mm, margin repand); capsule 5–6.5 cm long (vs. 2.2–3.6 cm). It also differs from *P. pseudolinearifolia* by its 1–2-flowered per cyme (vs. 4–12-flowered); pedicel 20–35 mm long (vs. 7–15 mm); central staminodes ca. 0.5 mm long (vs. ca. 3 mm); disc ca. 1.2 mm in height, margin entire (vs. ca. 2.5 mm, margin repand).

Type. CHINA. Guangxi: Nanning City, Longan County, Dingdang Town, 23°07'N, 107°57'E, 9 April 2020, *W.C. Chou 20200409-01* (Holotype, IBK!; Isotypes, IBK!)

Description.

Herbs perennial. **Rhizome** subterete, 10–15 cm long, 1.5–2 cm in diameter, commonly branched at the apex of the rhizome, or no branched. **Leaves** 15–25, congested at the apex of the rhizome, subsessile; **leaf blade** fleshy, linear-lanceolate, 5–15 × 0.9–1.8 cm, densely papillose-hispid on both surfaces, apex obtuse to round, base attenuate, margin entire, lateral veins 2–4 on each side of the midrib, conspicuous on the abaxial surface, inconspicuous on the adaxial surface. **Cymes** 2–5, axillary, 1–2-flowered; peduncle 4–8 cm long, ca. 2 mm in diameter, glandular-pubescent and sparsely pilose; **bracts** 2, opposite, linear-lanceolate, 6–8 × 1–1.5 mm, apex acute, margin entire, pubescent on both surfaces, pedicel 2–3.5 cm long, ca. 2 mm in diameter, glandular-pubescent. **Calyx** 5-parted from the base, segments equal, lanceolate, 7.5–9 × ca. 2 mm, abaxially glandular-pubescent, adaxially sparsely glandular-pubescent to glabrous, apex acute, margin entire. **Corolla** purple, throat with two yellow stripes inside, 3.5–4.5 cm long, outside puberulent with both glandular and eglandular hairs, inside glabrous, tube 2.5–3 cm long, orifice 1–1.5 cm in diameter; limb distinctly 2-lipped, adaxial lip 2-parted to the base, lobes ovate, 6–7 × 8–9 mm, abaxial lip 3-parted to near the middle, lobes ovate, 8–9 × 9–10 mm. **Stamens** 2, adnate ca. 1.2 cm above the corolla base; filaments 1.3–1.5 cm long, sparsely geniculate near middle; anthers reniform, 3.5–4 mm long, bearded; **staminodes** 3, lateral ones linear, glabrous, ca. 9 mm long, apex capitate, sparsely pubescent, adnate to ca. 1 cm above the corolla tube base, the central one ca. 0.5 mm long, apex capitate, adnate to 3.5 mm above the corolla tube base. **Disc** annular, ca. 1.2 mm in height, margin entire, glabrous. **Pistil** 2.5–3 cm long, **ovary** 1.4–1.6 cm long, ca. 2 mm in diameter, densely glandular-pubescent; **style** 0.9–1.2 cm long, 1.5 cm wide, glandular-pubescent; **stigma** obtrapeziform, ca. 2 mm long, apex shallowly 2-lobed. **Capsule** linear, 5–6.5 cm long, 2–3 mm in diameter,

puberulent with both glandular and eglandular hairs.

Phenology. Flowering occurs from September to November, fruiting from October to December.

Etymology. The specific epithet '*papillosa*' is derived from its leaf blades densely papillose-hispid on both surfaces.

Vernacular name. The Chinese name '刺疣报春苣苔' (Cì Yóu Bào Chūn Jù Tái) is newly coined for this species because of its special leaf blades surface full of densely papillose-hispid hairs.

Distribution and habitat. *Primulina papillosa* is only known from the type locality, Dingdang Town, Longan County, Nanning City, Guangxi, China. It only grows in a crevice of the cliff near the top of limestone hills in a subtropical evergreen seasonal rain forest.

Conservation status. *Primulina papillosa* is only found from the type population with less than 200 individuals. The beautiful flowers, fleshy rhizome and spiny leaves have led to its over-harvesting by local people who have sold it as an ornamental plant. Furthermore, the natural habitat is mostly disturbed due to local farmers imposing intense pressure on the remaining patches of primary forest. Thus, following the IUCN Red List Categories and Criteria (IUCN 2019), it is temporarily assessed as Critically Endangered [CR B1+B2ab (iii, v)].

Additional specimens examined. *Primulina linearifolia* CHINA: Guangxi, Nanning City, suburb, 1959, *Inst. Med. Nanning* 66735 (Holotype: GXMI!); Guangxi, Nanning City, Longan County, Natong, 8 April 1971, *X.X. Chen & H.M. Yang* 73117 (Paratype: GXMI!)

Primulina pseudolinearifolia, CHINA: Guangxi, Luocheng County, Huaiqun Town, 25°11'N, 108° 24' E, 350 m, 19 April 2009, *W.B. Xu & Yan Liu* 09383 (Holotype: IBK!).

Acknowledgments

We want to thank Michael LoFurno, Adjunct Professor, Temple University, Philadelphia, the USA, for their editorial assistance. This study was financially supported by the Foundation of Guangxi Key Laboratory of Plant Conservation and Restoration Ecology in Karst Terrain (19-050-6; 19-185-7), the National Natural Science Foundation (31860047), Guilin Science and Technology Foundation (20180107-6), the Key Science and Technology Research and Development Project of Guangxi (GuikeAD20159091), Guangxi Natural Science Foundation (2020GXNSFBA297049), Basal Research Fund of GXIB (Guizhiye20009), 21st Talent project of "Ten-Hundred-Thousand" in Guangxi.

References

Ge YZ, Xin ZB, Fu LF, Chou WC, Huang Y, Huang ZJ, Maciejewski S, Wen F (2020) *Primulina hochiensis* var. *ochroleuca* (Gesneriaceae), a new variety from a limestone area of Guangxi, China, and errata on five new species of *Primulina*. *PhytoKeys* 152: 111–120. <https://doi.org/10.3897/phytokeys.152.50968>

Hance HF (1883) New Chinese Cyrtandreae. Le Journal de Botanique 21: 165–170.

IPNI (2021) The International Plant Names Index. <http://www.ipni.org> (accessed 28 January 2021).

IUCN (2019) Guidelines for Using the IUCN Red List Categories and Criteria. Version 14. Prepared by the Standards and Petitions Subcommittee of the IUCN Species Survival Commission. <http://cmsdocs.s3.amazonaws.com/RedListGuidelines.pdf>

Liu K, Meng DC, Huang ZJ, Maciejewski S, Xin ZB (2020) *Primulina jiuyishanica* (Gesneriaceae), a new species from Hunan, China. PhytoKeys 162: 37–44. <https://doi.org/10.3897/phytokeys.162.53763>

Möller M (2019) Species Discovery in Time: An Example from Gesneriaceae in China. Guangxi Sciences 26(1): 1–16.

Tropicos (2021) Tropicos.org. Missouri Botanical Garden. <http://www.tropicos.org> [28 January 2021]

Wang WT, Pan KY (1982) Notulae de Gesneriaceis Sinensibus III. Bulletin of Botanical Research 2(2): 121–152.

Wang YZ, Mao RB, Liu Y, Li JM, Dong Y, Li ZY, Smith JF (2011) Phylogenetic reconstruction of *Chirita* and allies (Gesneriaceae) with taxonomic treatments. Journal of Systematics and Evolution 49: 50–64.

Weber A, Middleton DJ, Forrest A, Kiew R, Lim CL, Rafidah AR, Sontag S, Triboun P, Wei YG, Yao TL, Möller M (2011) Molecular systematics and remodelling of *Chirita* and associated genera (Gesneriaceae). Taxon 60: 767–790. <https://doi.org/10.1002/tax.603012>

Wen F, Wei YG, Fu LF, Xin ZB, Li S, Huang ZJ, Ge YZ, Meng DC (2021) The Checklist of Gesneriaceae in China. <http://gccg.gxib.cn/about-46.aspx>. [28 January 2021]

Wen F, Li S, Xin ZB, Fu LF, Cai L, Qin JQ, Pan B, Hong X, Pan FZ, Wei YG (2019) The Updated Plant List of Gesneriaceae in China against the Background of Newly Chinese Naming Rules. Guangxi Sciences 26(1): 37–63.

Xin ZB, Fu LF, Huang ZJ, Chou WC, Huang Y, Wen F (2020a) *Primulina titan* sp. nov. (Gesneriaceae) from a Limestone Area in Northern Guangxi, China. Journal of Botanical Research 2(3): 1–4. <https://doi.org/10.30564/jrb.v2i3.1994>

Xin ZB, Huang ZJ, Chou WC, Huang Y, Meng DC, Wen F (2020b) *Primulina qintangensis* (Gesneriaceae), A New Species from Limestone Areas of Guangxi, China. Acta Botanica

Boreali-Occidentalia Sinica 40(8): 1424–1427.

Xin ZB, Huang ZJ, Fu LF, Li S, Wang BM, Wen F (2020c) *Primulina spiradictioides* (Gesneriaceae), a new species from limestone areas in Guangxi, China. *Annales Botanici Fennici* 2020, 57(4-6): 245–248. <https://doi.org/10.5735/085.057.0408>

Xu WB, Huang YS, Wu L, Liu Y (2011) *Chirita luochengensis* (Gesneriaceae), a new species from limestone areas in northern Guangxi, China. *Brittonia* 63: 314–317.

Xu WB, Zhang Q, Wen F, Liao WB, Pan B, Chang H, Chung KF (2012) Nine new combinations and one new name of *Primulina* (Gesneriaceae) from South China. *Phytotaxa* 64: 1–8

Table 1. Detailed comparison of *Primulina papillosa* and its two relatives.

Characters	<i>P. papillosa</i>	<i>P. linearifolia</i>	<i>P. pseudolinearifolia</i>
Leaf blades	densely papillose-hispid	densely appressed pubescent	densely appressed pubescent
Cymes	1–2-flowered	4–7-flowered	4–12-flowered
Pedicel	20–35 mm long	5–12 mm long	7–15 mm long
Calyx lobes	7.5–9 × ca. 2 mm	3.2–4 × 0.6–1.1 mm,	5–6 × ca. 1 mm
Central staminodes	ca. 0.5 mm long	none	ca. 3 mm long
Disc	ca. 1.2 mm in height, margin entire	ca. 0.5 mm in height, margin repand	ca. 2.5 mm in height, margin repand
Flowering time	September to November	April	April to May
Capsule	5–6.5 cm long	2.2–3.6 cm long	3–4.5 cm long

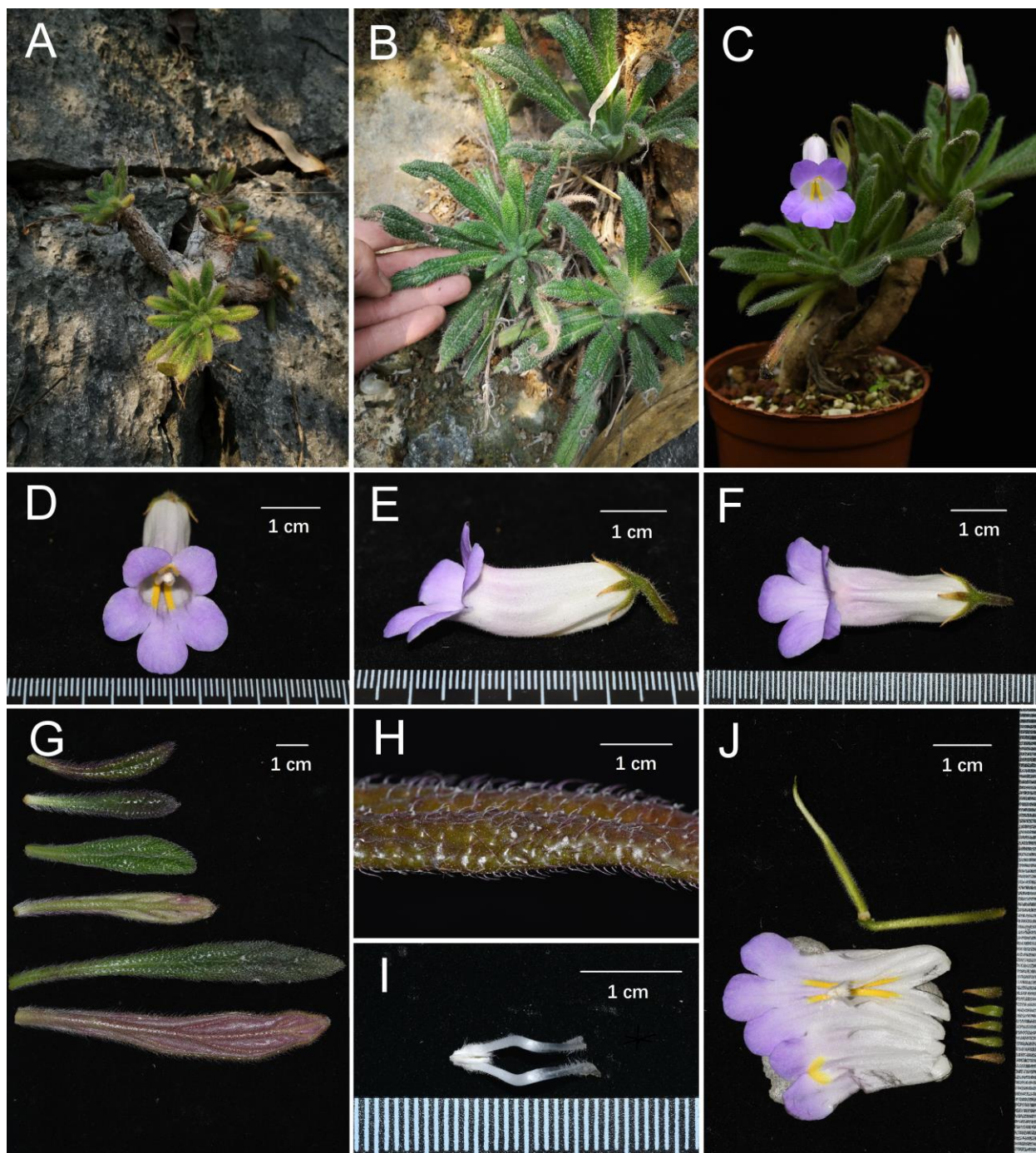


Figure 1. *Primulina papillosa* A-B habitat C habit D front view of the corolla E lateral view of the corolla F top view of the corolla G adaxial and abaxial surface of leaf blades H papillose-hispid hairs on leaf blade surface I stamens J pistil, calyx and opened corolla with stamens and staminodes (A-B: photos by W.C. Chou, C-J: photos by F. Wen; arranged by Z.B. Xin).

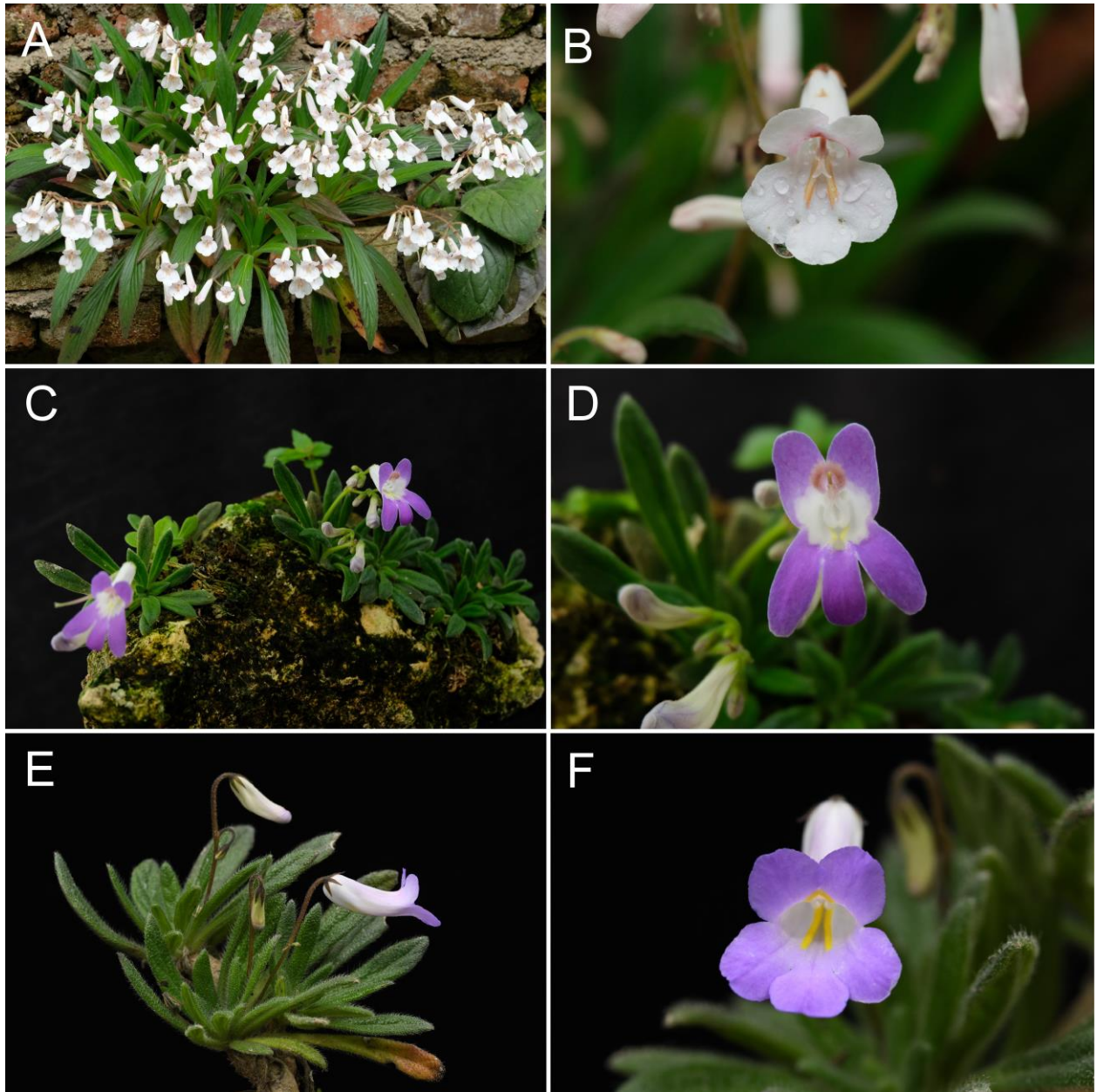


Figure 2. Comparison of three species of *Primulina* **A-B** *P. linearifolia* **C-D** *P. pseudolinearifolia* **E-F** *P. papillosa* (photos by F. Wen; arranged by Z.B. Xin).