Primulina yangshuoensis, a New Species of Gesneriaceae from Guangxi, China

Fang Wen[(1)], Feng Wang[(2)] and Yi-Gang Wei[(1*)]

1. Guangxi Institute of Botany, Guangxi Zhuang Autonomous Region and Chinese Academy of Sciences, Guilin 541006, China.
2. Station of Forest Pest and Disease Management and Quarantine of Huairou District, Beijing 101400, China.
** Corresponding author. Email: weiyigang@yahoo.com.cn*

(Manuscript received 23 June 2011; accepted 22 November 2011)

ABSRACT: A new species of *Primulina*, *P. yangshuoensis* Y.G. Wei & Fang Wen (Gesneriaceae) from NE Guangxi, China, is described and illustrated in this report. This new species is similar to *P. villosissima* (W.T. Wang) Mich. Möller & A. Weber and *P. fangii* (W.T. Wang) Mich. Möller & A. Weber,, and is easily distinguished from other species in *Primulina* by its morphology of leaves and flowers. *P. yangshuoensis* has more leaves (12-14) with long petioles (2-5 cm long), smaller carnosulus or carnosus leaf blades (3.5-6.5 × 2-4.5 cm), broadly ovate-round, subround or round in shape, broadly cuneate or sub-rotund base and densely papillose-hispid hairs on both surfaces, and it possesses more cymes (8-10), fewer flowers (1-4 per cyme), lanceolate bracts, glabrous anthers, and two staminodes per flower. It flowers from second half of October to November.

KEY WORDS: Gesneriaceae, Guangxi, new species, *Primulina yangshuoensis.*

INTRODUCTION

The genus, *Chirita* Buch.-Ham. ex D. Don once comprised more than 140 species, mainly distributed in Asia from the Western Himalayas and Southwest China to South India, Sri-Lanka and West Malaysia. Three sections, *Gibbosaccus*, *Microchirita* and *Chirita*, can be found in China (Wood, 1974; Wang, 1985; Wang et al., 1990; Wang et al., 1998; Nguyen and Kiew, 2000; Burtt, 2002; Li and Wang, 2004; Wei et al., 2010). *Chirita* now has rapidly swelled because more and more new species were discovered, described and illustrated in Guangxi and Yunnan of South and Southwest China, especially in section *Gibbosaccus*. A small number of new species belong to section *Chirita*, for example *C. auriculata* J.M. Li and S.X. Zhu (Li and Zhu, 2010). However based on the analysis result of ITS and *trn*L-F sequences, Weber et al. (2011) found that all species of original *Chirita* section *Gibbosaccus* in a well-supported clade but with the species of *Chiritopsis* W.T. Wang, *Wentsaiboea renifolia* D. Fang & D.H. Qin, *W. luochengensis* Y. Liu & W.B. Xu and *Primulina* Hance nested within. In this group, the genus name *Primulina*, previously monotypic (Hance, 1883; Wang, 1990; Wang et al., 1998; Li and Wang, 2004; Wei et al., 2010) but very recently expanded to include these groups by Wang et al. (2011), has priority, and Weber et al (2011). *Primulina* is the first effective scientific genus name which was published in the late nineteenth century (Hance, 1883); it should be the only legal name to this group.

During a botanical survey in 2006 for endemic plants of Guangxi, a new species of *Primulina*, or an undescribed species rediscovered after it disappeared for more than thirty years, was found in Yangshuo County from Guangxi, China, again. The vernacular name of this rediscovered and undescribed species is "Ba Shan Hu" (= "Tiger lying on the hill", Chinese name in Yangshuo County), and is used in traditional Chinese medicine. The species was common on limestone hills in Yangshuo County in the 1970s. Unfortunately, it was believed to effectively treat some illnesses so that a large amount of plants were collected uncontrolledly. Nowadays the surviving living plants are very rare. By chance, we found a specimen which was collected in the 1970s and kept in GXMI, the Herbarium of the Guangxi Institute of Chinese Medicine & Pharmaceutical Science. According to the locality information of the specimen, we searched for three years in this area. Recently the specimens of this rare species were collected again.

Because of its compact rosette leaves and erect hairs on the leaf blades, the vegetative morphology of the new species looks like some species in *Petrocosmea* Oliv. However, its flowers and fruits clearly indicate that it belongs to *Primulina* after we carefully studied on the specimens and living plants. After comparing with all described species of *Primulia* (mostly original *Chirita* section *Gibbosaccus*) (Li and Wang, 2008; Xu et al., 2008; Li and Möller, 2009; Wei et al., 2009; Wen et al., 2009; Huang et al., 2010; Wei et al., 2010; Xu et al., 2010; Huang et al., 2011; Tang and Wen, 2011; Huang et al., 2011), we found it is different from all the known species of *Primulina*, so we confirmed it is a new species of *Primulina*. The new species is described, illustrated and compared with *P. villosissima* (W.T. Wang) Mich. Möller & A. Weber and *P. fangii* (W.T. Wang) Mich. Möller & A. Weber as below.

臺灣大學學術期刊資料庫

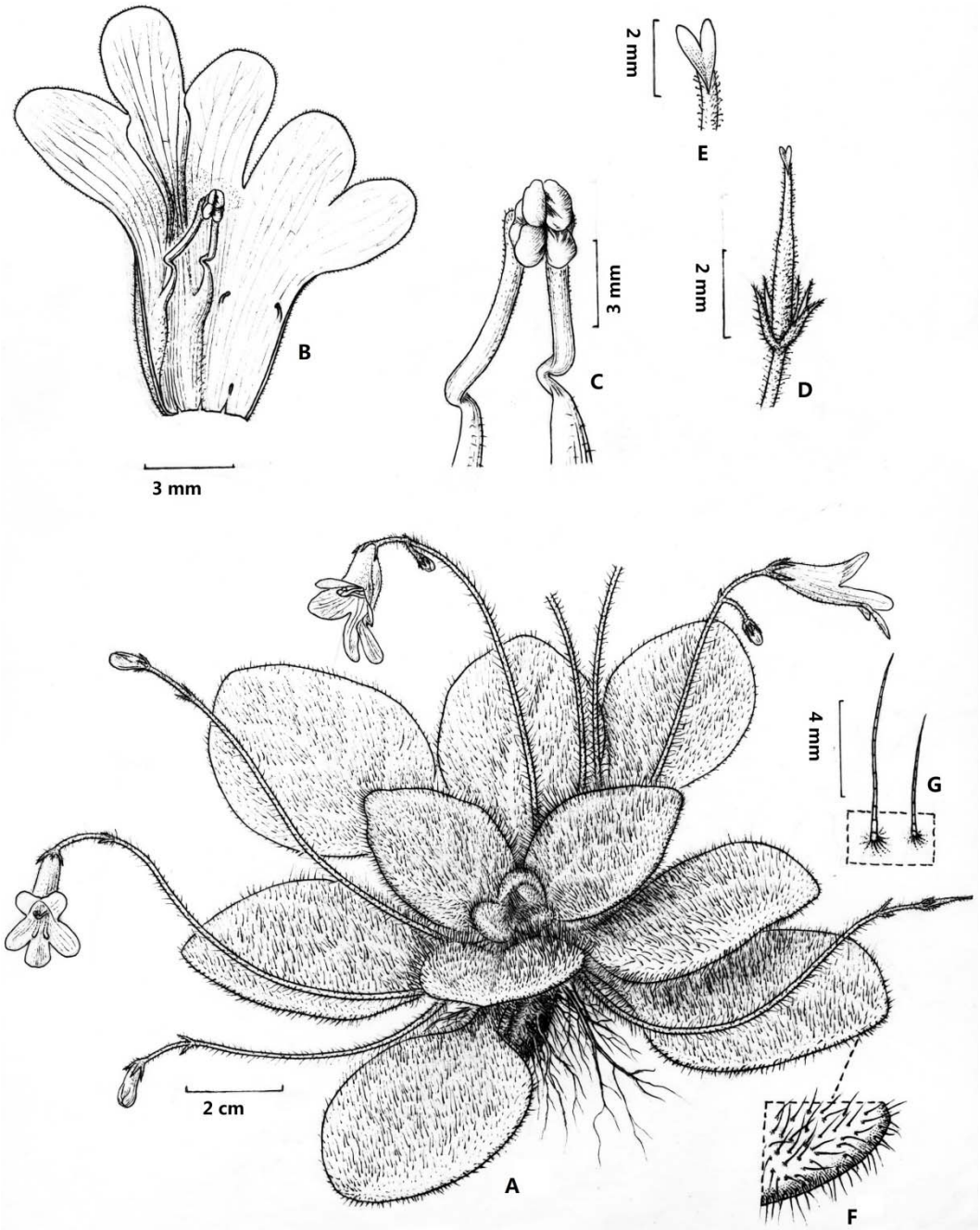


Fig. 1. ***Primulina yangshuoensis*****. A: Habit. B: Corolla opened with stamens and staminodes. C: Stamens. D: Calyx and pistil. E: Stigma. F: Magnified leaf surface, showing hairs. G: Multicellular hairs. A-E from holotype, F, G from living mature plants. Drawn by Y. X. Zhu.**

TAXONOMIC TREATMENT

Primulina yangshuoensis Y.G. Wei & Fang Wen, *sp. nov.* Figs. 1 & 2A

Affinis Primulina villosissimae (W.T. Wang) Mich. Möller & A. Weber *et P. fangii* (W.T. Wang) Mich. Möller & A. Weber, *a quo plus foliis (12-14), petiolis longis (2-5 cm), laminis parvis (3.5-6.5 × 2-4.5 cm), carnosulis vel carnosis, late ovatis-rotundis, subrotundis vel rotundis, basi late cuneatis vel subrotundis, superficiebis ambabis foliis dense papillis-hispidis, plus cymis (8-10), cyma praeditis 1-4 floribusi, bractis lanceolatis, antheris glabris, staminodiis 2.*

臺灣大學學術期刊資料庫



Fig. 2. Photographs of *Primulina yangshuoensis* (A), *P. villosissima* (B) and *P. fangii* (C). 1: Habit. 2: Top view of plant for showing different hairs. 3: Side view of cymes. 4: Front view of flower.

Type: China. Guangxi, Guilin City, Yangshuo County, Gaotian Town, on shaded stones under shrubs in limestone hill, Centre of Yangshuo, 24°42′N, 110°27′E, alt. 105 m, Flowering. 27 Oct. 2006. *Y.G. Wei* 06478 (holo-: here designated, IBK; iso-: IBK).

Herbs, perennial, acaulescent. Rhizome subterete, 2-3 cm long, 5-6 mm in diameter. Leaves 10-14, all basal, petiolate; petiole oblate, with papillose-hispid, 2-5 cm long, 2-5 mm in diameter, 1-2 × 0.4-0.6 cm; leaf blade carnosulus or carnosus, broadly ovate-round,

臺灣大學學術期刊資料庫

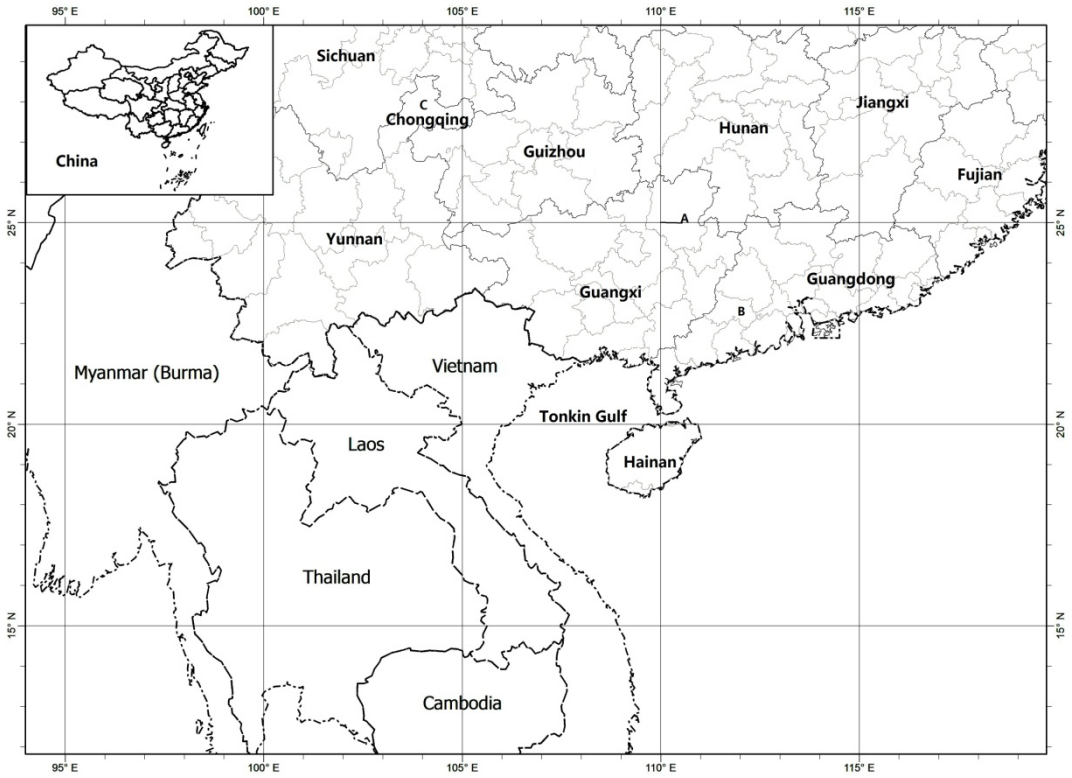


Fig. 3. Distribution of *Primulina yangshuoensis*, *P. villosissima* and *P. fangii*. A = *P. yangshuoensis*; B = *P. villosissima*; C = *P. fangii*.

subround or round, 3.5-6.5 × 2-4.5 cm, apex obtuse or round, base broadly cuneate or sub-rotund, equilateral or slightly inequilateral in each side of the main vein, margin entire, densely erect semitransparent or white multicellular papillose-hispid on both surfaces, 0.8-1 cm long and consisting of 10-15 cells on the adaxial surface, 0.4-0.5 cm long on the abaxial surface and consisting of 6-8 cells, at the base of a hair with a small nipple-like enation consisting of 9-13 cells, lateral veins 2-3 on each side, impressed adaxially and prominent abaxially. Cymes 8-10, 1-4-flowered; peduncle 8-9 cm long, 2.0-2.5 mm in diameter, pilose; bracts 2, opposite, lanceolate or subulate, 1-2 × 0.3-0.5 mm, margin entire, apex acute, pilose abaxially; pedicel pilose, 0.8-1 (-1.5) cm long. Calyx 5-parted to the base, lobes narrowly lanceolate or lanceolate-linear, 4-5(-8) × 0.8-1(-1.5) mm, outside densely pilose, inside glabrous. Corolla blue to purplish blue, 2-3 cm long, outside puberulent, inside glabrous; corolla tube broadly infundibuliform, 1-1.5 (-2) cm long, 1-1.2 cm in diameter at throat; limb distinctly 2-lipped, adaxial lip 2-lobed to over half-length, lobes oblong or round, apex round, 5 (-10) × 5 (-10) mm, abaxial lip 3-lobed to over half-length, lobes oblong, apex round, 7 (-15) × 5 (-9) mm. Stamens 2, adnate to 5-7 mm above corolla tube base, glabrous, the upside of filaments close to anthers, c. 1.9 mm long, sparsely puberulous; filaments 0.9-10 mm long, anthers reniform, glabrous, 1-2 mm long, constricted in the middle; staminodes 3, lateral ones c. 1 mm long, adnate to 3.5-4 mm above corolla tube base, glabrous; middle one 0.35 mm long, adnate to 0.6-0.7 mm above corolla tube base. Disc annular, c. 1 mm in height. Pistil short, c. 4.5-4.9 mm long; ovary linear, c. 2.3-2.6 mm long, pubescent; style puberulent, stigmas obtrapeziform, 2.2-2.3 mm long, apex shallowlly 2-lobed. Fruit linear. Flowering from second half of October to November.

Habitat and ecology: All plants of *Pimulina yangshuoensis* grow on a piece of limestone cliff in subtropical evergreen broadleaf bushes on a hill in Yangshuo County, Guangxi, in limestone crevices at 104-107 m. The rainfall at the type locality, ranged from 1,500 to 1,600 mm/year, and averaged 1,560 mm/year (1981-2000).

Distribution: Known only from the one plot closely near the County seat of Yangshuo in the Northern part of Guangxi, China (Fig. 3). *P. yangshuoensis* belongs to stenochoric species, which it is only known from one site

Phenology: Flowering in from second half of October to November. Capsules were not be observed by us at present. We estimate the fruiting time is from November to December.

臺灣大學學術期刊資料庫

Table 1. Comparison of diagnostic characters of three relative species.

Character	***P. yangshuoensis***	***P. villosissima***	***P. fangii***
Number of leaves	10-14	6-10	*c.* 5
Leaf blade shape	Orbicular	narrowly to broadly elliptic or ovate	elliptic to ovate
Base of leaf blade	broadly cuneate or sub-rotund	cuneate to broadly cuneate	cuneate to rounded
Margin of leaf blade	entire	repand to entire	denticulate
Petiole	2-5 cm long	0.4-2.2 cm long, short	1.2-3.8 cm long
Hairs on the surface of leaf blade	densely erect semitransparent or white multicellular papillose--hispid on both surfaces, 0.8-1 cm long and consisting of 10-15 cells on the adaxial surface, 0.4-0.5 cm long on the abaxial surface and consisting of 6-8 cells, at the base of a hair with a small nipple-like enation consisting of 9-13 cells	adaxially densely villous (hairs 3-8.2 mm long) and puberulent, eglandular, abaxially densely pubescent	puberulent, eglandular
Cymes number	8-10	c. 3	c. 6
Flowers number on one cyme	1-4	6-10 or more	2-3
Bracts	lanceolate, 1-2 × 0.3-0.5 mm	triangular to narrowly triangular, 1.2-2.2 × 0.6-1.2 mm	linear to lanceolate, 2-5 × 0.5-1 mm
Anthers	glabrous, constricted in the middle	villous	puberulent
Staminodes	2, c. 1 mm long	3, central c. 2 mm long, laterals c. 5 mm long	3, central ca. 0.2 mm, laterals 0.3-0.4 mm
Flowering time	from second half of Oct. to Nov.	in May	in Jul.

Conservation Status: At present only one known population with less than survived seventy individuals (including the mature and young ones) was found in Guangxi. Based on IUCN red list categories (Pullin, 2004; IUCN, 2001), this new species is assessed here as "Critically Endangered, CR A1abcd+C2a (i, ii)" because the number of mature individuals known is less than fifty. We had cultivated about ten young plants from leaf cuttings for *ex situ* conservation so that we can preserve the germ plasma resources of this rare species.

Etymology: The specific epithet commemorates the type locality for new species, Yangshuo County, notwithstanding it only can be found in a small limited locality.

Additional specimen examined (Paratype): China. Guangxi, Guilin City, Yangshuo County, Gaotian town, on shaded stones under shrubs in limestone hill, Centre of Yangshuo, 24°42′N, 110°27′E, 106 m, Flowering 20. Oct. 2008. *Y.G. Wei 07601* (Paratype, IBK).

Notes: The hairs of two species, *Primulina yangshuoensis* Y.G. Wei & Fang Wen and *P. villosissima* (W.T. Wang) Mich. Möller & A. Weber, look alike. However, they are different type of hairs, papillose-hispid and villous. *P. yangshuoensis* is also similar to *P. fangii* (W.T. Wang) Mich. Möller & A. Weber in its leaf shape and staminodes. Three species can be easily distinguished by *P. yangshuoensis*' carnosulus or carnosus, broadly ovate-round, subround or round leaf blades (3.5-6.5 × 2-4.5 cm), with papillose-hispid on both surfaces; the flowering time in Oct. Table 1 summarizes the morphological differences between *P. yangshuoensis* and two similar species. When we referred to the Flora of China, it shows that *P. villosissima* (W.T. Wang) Mich. Möller & A. Weber (as *Chirita villosissima* W.T. Wang) bears one or two flowers on one cyme (Wang et al., 1990; Wang et al., 1998). However, we investigated the mature plants in flowering season in the field, it is hard to find any plant with only one or two flowers on one cyme except some plants grow abnormally. The flowers number of this species on one cyme is usually more than eight. The detailed see Table 1.

ACKNOWLEDGEMENTS

We are grateful to Prof. Wang Wen-Tsai, Academician of Chinese Academy of Sciences for correcting the description and to Mr. Zhu Yun-Xi for preparation of the handsome drawing. This work was supported by the Guangxi Natural Science Foundation (2011GXNSFB018050), fund of Guangxi Institute of Botany (Guizhiye11001), Science and Technology Innovation Program of Guangxi Academy of Sciences and West Light Foundation of The Chinese Academy of Sciences.

LITERATURE CITED

Burtt B. L. 2002. New Gesneriaceae: a *Chirita* from Vietnam and a *Monophyllaea* from Sulawesi. Gard. Bul. Singap. **54**: 239-242.

臺灣大學學術期刊資料庫

Hance H. F. 1883. *Primulina tabacum* Hance. J. Bot. London **21**: 169.

Huang, Y.-S., W.-B. Xu and Y. Liu. 2011. *Chirita rongshuiensis*, a New Species of Gesneriaceae from Northern Guangxi, China. Taiwania **56**: 54-57.

Huang, S.-X., Y.-G. Wei and W.-H. Luo. 2010. *Chirita nadanensis* (Gesneriaceae), a new species from Guangxi, China. Ann. Bot. Fenn. **47**: 139-140.

Li, J.-M and S.-X. Zhu. 2010. *Chirita auriculata* (Gesneriaceae), a new species from China, placed in sect. *Chirita* based on molecular data. Ann. Bot. Fenn. **47**: 221-225.

Li, J.-M. and M. Möller. 2009. *Chirita grandibracteata* (Gesneriaceae), a new species from Yunnan, China. Ann. Bot. Fenn. **46**: 125-129.

Li, J.-M. and Y.-Z. Wang. 2008. *Chirita longicalyx* (Gesneriaceae), a new species from Guangxi, China. Ann. Bot. Fenn. **45**: 212-214.

Li, Z.-Y. and Y.-Z. Wang. 2004. Plants of Gesneriaceae in China. Henan Science and Technology Publishing House. Zhengzhou. pp. 171-261.

Möller, M., A. Forrest, Y.-G. Wei and A. Weber. 2011. A molecular phylogenetic assessment of the advanced Asiatic and Malesian didymocarpoid Gesneriaceae with focus on non-monophyletic and monotypic genera. Plant Systematics and Evolution doi: 10.1007/s00606-010-0413-z.

Nguyen, T. H. and R. Kiew. 2000. New and interesting plants from Ha Long Bay, Vietnam. Gard. Bull. Singap. **52**: 185-202.

Wang, W.-T. 1985. Notulae de Gesneriaceae Sinensibus (II). Bull. Bot. Res. 1: 35-75.

Wang, W.-T, K.-Y Pan and Z.-Y. Li. 1990. Gesneriaceae. In: Wang W.T., (eds). Flora Reipublicae Popularis Sinicae 69. Science Press, Beijing.

Wang, W.-T., K.-Y. Pan and Z.-Y. Li. 1998. Gesneriaceae. In: Wu, Z.-Y. and P.-H. Raven (eds), Flora of China **18**: 328-333. Science Press, Beijing and Botanical Garden Press, St. Louis, Missouri.

Wang, Y.-Z., R.-B. Mao, Y. Liu, J.-M. Li, Y. Dong, Z.-Y. Li and J. F. Smith. 2011. Phylogenetic reconstruction of *Chirita* and allies (Gesneriaceae) with taxonomic treatments. J. Syst. Evol. **49**: 50-64.

Wei Y.-G., B. Pan and W.-X. Tang. 2007. *Chirita guihaiensis* sp. nov. (Gesneriaceae) from Guangxi, China. Nord. J. Bot. **25**: 296-298.

Wei Y.-G., F. Wen, M. Möller, Monro, A., Q. Zhang, Q. Gao,H.-F. Mou, S.-H. Zhong and C. Cui. 2010. *Chirita*. In: Gesneriaceae of South China: 457-490. Guangxi Science and Technology Publishing House, Nanning, pp 278-490.

Tang, H. and F. Wen. 2011. *Chirita tiandengensis* (Gesneriaceae) sp. nov. from Guangxi, China. Nord. J. Bot. **29**: 233-237.

Weber, A., D. J. Middleton, A. Forrest, R. Kiew, C.-L. Lim, A. R. Rafidah, S. Sontag, P. Triboun, Y.-G. Wei, T.-L. Yao and M. Möller. 2011. Molecular systematics and remodelling of *Chirita* and associated genera (Gesneriaceae). Taxon **60**: 1-24.

Wen, F., Y. Wang, W.-F. Fan, L.-F. Guo and Q.-X. Zhang. 2009. *Chirita leeii* (Gesneriaceae), a new species from Guangxi, China. Guihaia **29**: 719-723.

Wood, D. 1974. A revision of *Chirita* (Gesneriaceae). Not. Roy. Bot. Gard. Edinb. **33**: 123-205.

Xu, W.-B., B. Pan, Y.-S. Huang and Y. Liu. 2010. *Chirita leprosa* sp. nov. (Gesneriaceae) from limestone areas in Guangxi, China. Nord. J. Bot. **28**: 705-708.

Xu H., Z.-Y. Li and H. Jiang. 2008. A new species of *Chirita* (Gesneriaceae) from Yunnan, China. Bot. J. Linn. Soci. **158**: 269-273.

Yan Z.-J. and Z.-Y. Li. 2003. Pollen morphology of genus *Chirita* (Gesneriaceae) in China and its systematic significance. Guizhou Science **21**: 1-8.

臺灣大學學術期刊資料庫

中國廣西苦苣苔科（Gesneriaceae）植物一新種 – 陽朔報春苣苔

溫放[(1)]、王峰[(2)]、韋毅剛[(1*)]

1. 廣西壯族自治區，中國科學院廣西植物研究所，桂林 541006，中國。
2. 北京市懷柔區林業病蟲害防治檢疫站，北京 101400，中國。
* 通信作者。*Email: weiyigang@yahoo.com.cn*

(收稿日期：2011 年 6 月 23 日；接受日期：2011 年 11 月 22 日)

摘要：本文報導了中國廣西苦苣苔科（Gesneriaceae）一個新種 – 陽朔報春苣苔（*Primulina yangshuoensis* Fang Wen & Y.G. Wei）。該種近緣於長毛報春苣苔（*P. villosissima* (W.T. Wang) Mich. Möller & A. Weber）與方氏報春苣苔（*P. fangii* (W.T. Wang) Mich. Möller & A. Weber），且易於與報春苣苔屬內其他種區分。陽朔報春苣苔具多數葉（12-14 枚）；葉片小型（3.5-6.5 × 2-4.5 cm），具長葉柄（2-5 cm），闊倒卵狀圓形、近圓形或圓形，且肉質化，葉兩面均具乳頭狀凸起基部的硬毛；它有較多的花序（8-10）；每一花序上具較少的花（1-4）；苞片披針形；花藥無毛；退化雄蕊 2 枚；其花期於 10 月後半期到 11 月。

關鍵詞：苦苣苔科、廣西、新種、陽朔報春苣苔。

臺灣大學學術期刊資料庫