

MITREOLA LIUI SP. NOV. (LOGANIACEAE, LOGANIOIDEAE), A NEW SPECIES FROM CHONGQING, CHINA

ZHANGJIAN SHAN^{1,2,3}, XIAOLANG DU¹, TAO DING⁴, ZEJING MU^{1*} AND XIAOYUN WANG^{1*}

¹*Jiangxi university of Traditional Chinese Medicine, Nanchang 330004, China*

²*State Key Laboratory of Systematic and Evolutionary Botany, Institute of Botany, Chinese Academy of Sciences, Beijing 100093, China*

³*College of Life Sciences, University of Chinese Academy of Sciences, Beijing 100049, China*

⁴*Guangxi Institute of Botany, Guangxi Zhuangzu Autonomous Region and Chinese Academy of Sciences, Guilin 541006, Guangxi, China*

*Corresponding author's email: mzj401326@163.com; wxy20052002@aliyun.com

Abstract

Mitreola liui sp. nov., a new species from Chongqing, China, is described and illustrated. This species is close to *M. petiolatoides* in morphological characters. Both of them have terete stem, lateral veins 4–6 pairs, stamens 5, inserted at corolla tube base but are distinguished by perennial, leaves blade long elliptic to oblanceolate, apex acute, the flower with narrow-triangular bracts. The key to the species of *Mitreola* in China is provided.

Key words: *Mitreola*, New species, Taxonomy.

Introduction

Mitreola Linnaeus (1758: 214) (Loganiaceae) consists of approximately 14 species of annual or perennial herbs (Li & Leewenberg, 1996; Wang, 2018) and wide distribution in Asia, America, Africa and Oceania (Fang *et al.*, 1995; Conn, 1996; Li & Leewenberg, 1996; Li, 1979; Ma *et al.*, 2010; Gibbons *et al.*, 2012). About nine *Mitreola* species are currently recorded from China (Fang *et al.*, 1995; Li & Leewenberg, 1996; Ma *et al.*, 2010). Among them, there are six species (*M. petiolatoides* P.T. Li, *M. pingtaoi* D. Fang & D.H. Qin, *M. macrophylla* D. Fang & D.H. Qin, *M. spathulifolia* D. Fang & L.S. Zhou, *M. purpureonervia* D. Fang & X. H. Lu, *M. yangchunensis* Q.X. Ma, H.G. Ye & F.W. Xing) are endemic to China, mainly grow in limestone areas (Chen, 1995; Fang *et al.*, 1995; Ma *et al.*, 2010).

Morphologically, *Mitreola* is characterized by having cymes, 5-merous flowers, cleft styles, capsule, seed coat smooth. The latest phylogenetic relationships in Loganiaceae shows that *Mitreola* is not a monophyletic group, the relationship within the genus needs further study (Gibbons *et al.*, 2012).

During our fieldwork in Chongqing from 2013 to 2017, we found an interesting *Mitreola* species that had not been seen before. We had collected the materials for flowering and fruiting several times. After consulting predecessor's literatures and specimens, we found it is an undescribed species. Consequently, we have described it as a new species here.

Taxonomic treatment

Mitreola liui X.L. Du & Z.J. Mu sp. nov. (Figs. 1-2).

Type: CHINA. Chongqing, Pengshui county, Hanxia town, Ayihe scenic spot, 29°9'N, 108°6'E, 483.6 m alt., 8 May 2013, Du X. L. JXCM20130503012 (holotype JXCM!, isotype PE!).

Diagnosis: *Mitreola liui* is closely related to *M. petiolatoides* but differs from the latter one in perennial herb (vs. annual herb), leaf blade 1.5–10.5 × 0.5–3.8 cm, apex acute, (vs. leaf blade 0.5–2 × 0.3–1 cm, apex obtuse),

dichasium, terminal or axillary, usually more than ten flowers (vs. dichasium, terminal, 1–3 flowers), stipules subulate (vs. stipules linear).

Description: Perennial herb. Stem terete, erect, up to 12 cm, simple or branched at base, small plants unbranched, old stem leaf traces obvious, villous except flowers and fruits; internodes 0.2–0.5 (–1.0) cm. Leaves blade long elliptic to oblanceolate, 1.5–10.5 × 0.5–3.8 cm, papery, apex acute, narrowed at the base, lateral veins 4–6 pairs, impressed above, proliferous beneath, petiole 0.5–1.5 cm; stipules subulate, interpetiolar, ca. 1 mm long with lateral ciliation; petiole with filamentous glands at base, become black when dry. Inflorescence dichasium, terminal or axillary, peduncle to 8 cm long, usually more than 10 flowered; bracts narrow-triangular 3–4 mm long and bracteoles subulate 1–2 mm long. Pedicel 1–2 mm long. Calyx 5, lower 1/2 connate, triangular. Corollas urceolate, white, ca. 4 mm long, lobes 5, broad ovate, with tubes almost isometric, glabrous except have a long hairs ring at throat. Stamens 5, inserted at corolla tube base, filaments ca. 1 mm, anthers broad ovate, ca. 0.3 mm. With two carpels, distinct, style ca. 1 mm, stigma capitate. Ovary ovate, smooth, when mature split to middle. Capsule nearly heart-shaped with erect apical horns.

Phenology: Flowering in April to May and fruiting in May to June.

Distribution and habitat: *Mitreola liui* is currently only found in the type locality. It grew in mainly limestone areas together with such species as *Leptopus chinensis* and *Spiradiclis pengshuiensis*.

Conservation status: Only one population and less than 300 individuals were found during our four years' fieldwork in Chongqing, China. Habitat destruction caused by human activities is the most important factor for population decline. In addition, low water retention capacity and little fertility in limestone districts are also the factors limiting the expansion of population. In consideration all of this, we assessed *M. liui* as Vulnerable (VU D1+D2) (IUCN 2017).

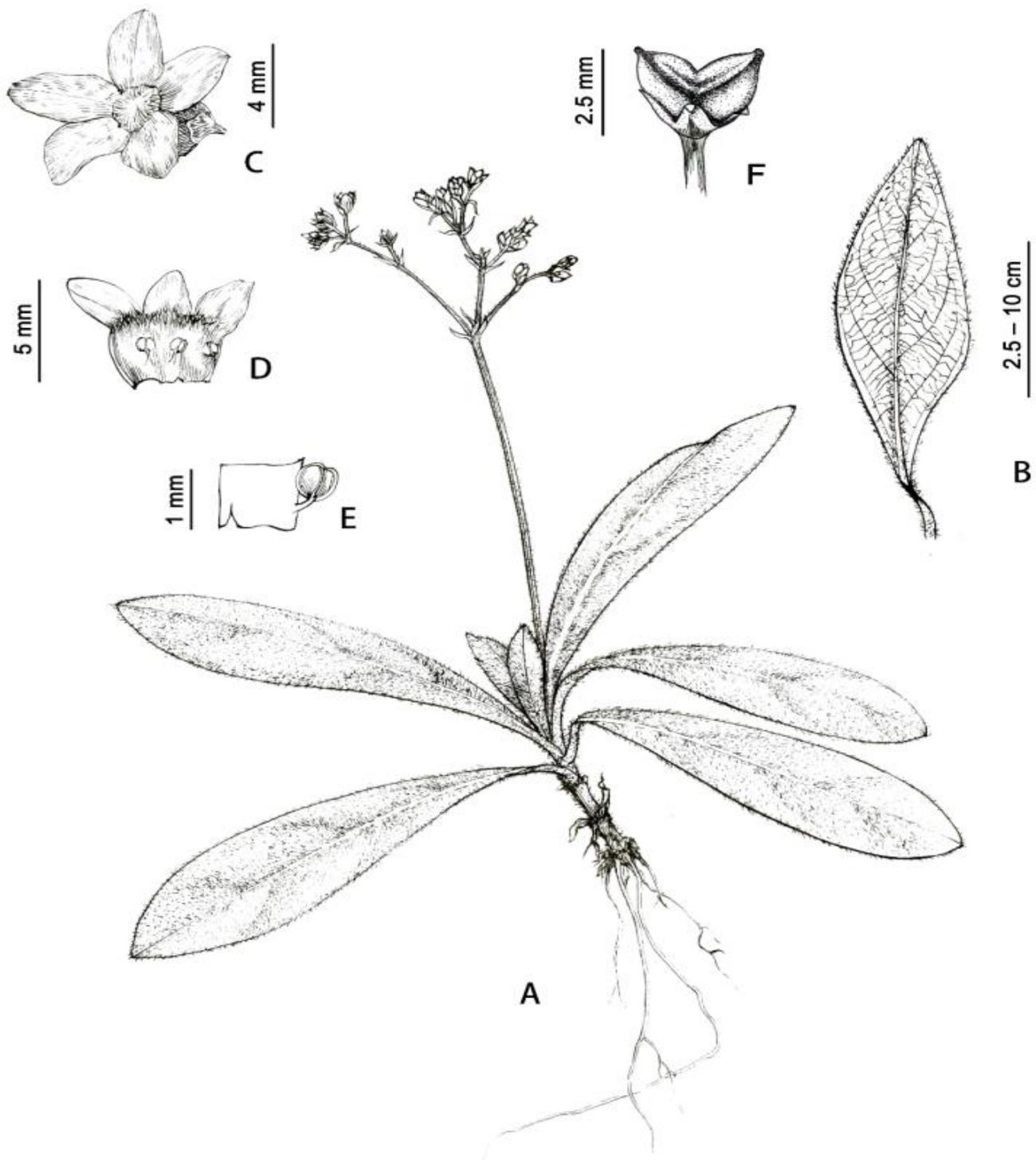


Fig. 1. *Mitreola liui*. A. Habitat. B. Leaf. C. Flower. D. Flower cutaway view. E. Stamen. F. Fruit. Drawn by Yushan Zhu.

Table 1. Morphological comparison between *M. liui* and the related species.

Characters	<i>M. liui</i>	<i>M. petiolatoides</i>	<i>M. pingtaoi</i>	<i>M. spathulifolia</i>
Habit	Perennial	Annual	Perennial	Perennial
Stem	Conspicuous	Conspicuous	Conspicuous	Inconspicuous
Internode	0.2–0.5 (–1.0) cm	0.1–0.3 cm	0.2–0.5 cm	lack
Leaf size	1.5–10.5 × 0.5–3.8 cm	0.5–2 × 0.3–1 cm	2–8 × 0.7–3 cm	7–28 × 1.5–8 cm
Leaf blade	long elliptic to oblanceolate, apex acute	ovate, apex obtuse	obovate to long obovate, apex acute	spathulate to oblanceolate, apex rounded
Petiole	0.2–0.5 (–1.0) cm	0.3–0.5 cm	0.5–1.5 cm	Sessile
Floral bracts	narrow-triangular	lanceolate	linear	narrow-triangular
Inflorescence	terminal or axillary, many flowers	terminal, 1–3 flowers	terminal or axillary, many flowers	terminal, many flowers
Stamen	inserted at corolla tube base	inserted at corolla tube base	inserted at corolla tube middle	inserted at corolla tube middle

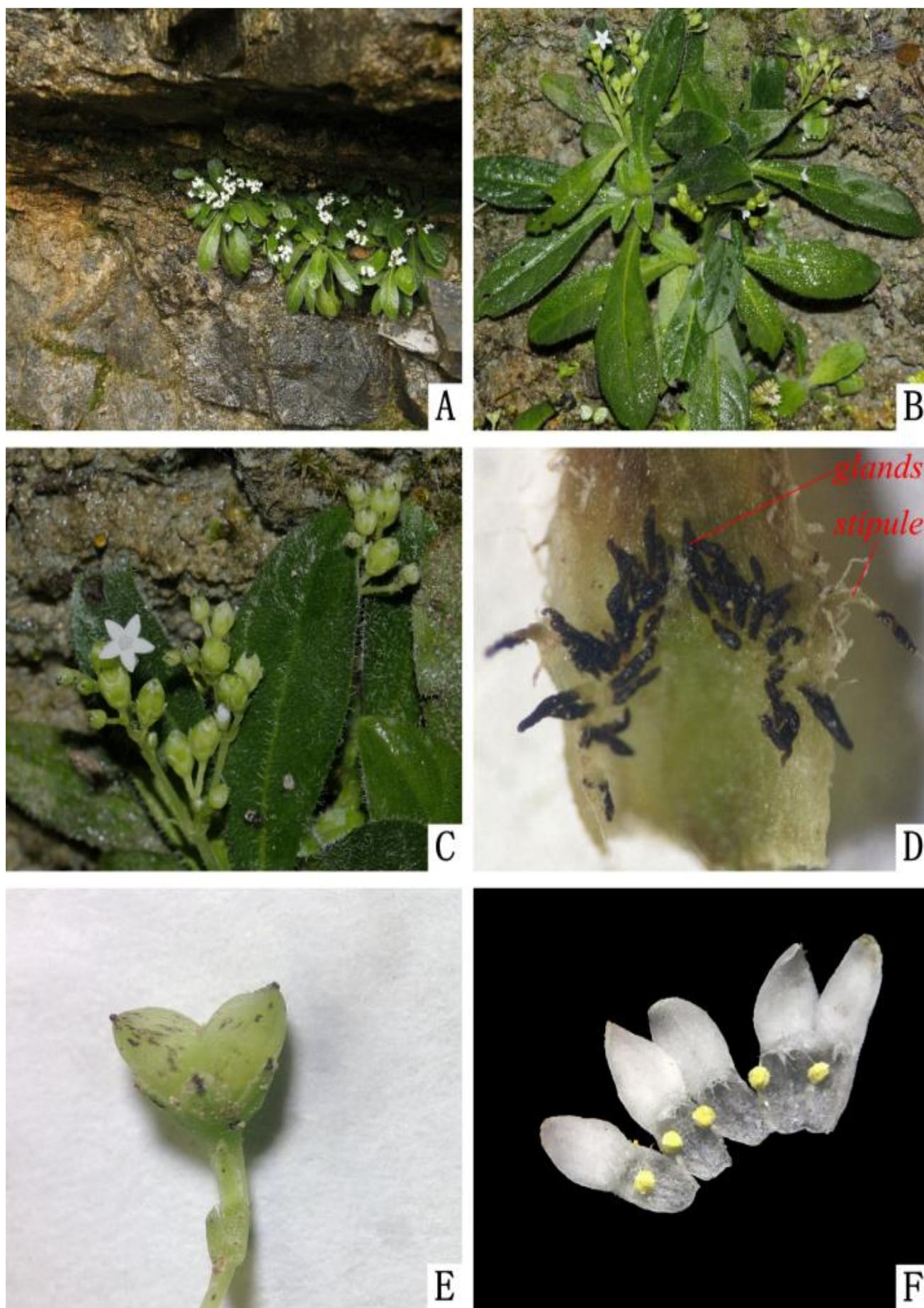


Fig. 2. *Mitreola liui* A. Habitat. B. Plant. C. Inflorescence. D. Glands and stipule E. Fruit. F. Floral anatomy. Photographed by Zejing Mu.

Key to species of *Mitreola* in China

1. Perennials 3
- + Annuals 2
2. Plants 5–10 cm tall; leaf blade 0.5–2 cm long; stems terete *M. petiolatoides*
- + Plants 10–50 cm tall; leaf blade 4–7 cm long; stems 4-angled *M. petiolata*
3. Stem 4-angled or acaulescent; leaf petiolate or sessile; inflorescences terminal 7
- + Stem terete; leaf petiolate; inflorescences terminal or axillary 4
4. Stems erect; stamens inserted at corolla tube base *M. liui*
- + Stems erect or creeping; stamens inserted at or near corolla tube middle 5
5. Plants 9–30 cm tall; leaf blade (1–) 2–8 cm long, lateral vein 4–6 pairs; bracts linear *M. pingtaoi*
- + Plants near 60 cm tall; leaf blade 4–13 cm, lateral veins 7–10 pairs; bracts narrowly elliptic 6
6. Leaf apex acute; stipules triangular; stems erect, nearly terete *M. yangchunensis*
- + Leaf apex acuminate to obtuse; stipules degeneration or reduce to a narrow leaf sheath between petioles; stems creeping branchlets 4-angled when young, becoming terete *M. pedicellata*
7. Stems conspicuous, creeping; leaves occurring along length of stem or clustered at stem apex, petiole 0.3–1.2 cm long *M. reticulate*
- + Stems inconspicuous; leaves in a basal rosette, sessile 8
8. Leaf blade 3.5–7 cm long, apex acute, nerves purple abaxially; capsule horns incurved *M. purpureonervia*
- + Leaf blade 7–30 cm long, apex obtuse to rounded, nerves light green; capsule horns erect 9
9. Leaves long obovate, rarely oblanceolate; 5–7 veins on each side; stamens inserted at corolla tube middle *M. spathulifolia*
- + Leaves spatulate to oblanceolate, 7–10 veins on each side; stamens inserted at corolla tube top *M. macrophylla*

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