



## *Lysimachia sedoides* (Primulaceae), a rare new species from limestone area in northern Guangxi, China

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**ABSTRACT:** *Lysimachia sedoides*, a rare new species of Primulaceae from a karst cave in northern Guangxi, China, is described and illustrated. It is similar to *L. rupestris* F.H.Chen & C.M.Hu in having rosette leaves and copiously glandular dots on young parts of shoot apex, but differs markedly in the smaller plant size, fleshy leaf blade, with a size of 10–30 × 3–8 mm, and the length of offsets never exceeding 5 cm.

**KEY WORDS:** karst cave, limestone flora, *Lysimachia rupestris*, *Lysimachia* subgen. *Idiophyton*, plant taxonomy.

### INTRODUCTION

The genus *Lysimachia* Linnaeus (1753: 146) is one of the largest genera in the family Primulaceae, includes more than 260 species worldwide based on online data (POWO 2022). The species of *Lysimachia* from China were divided into five subgenera, viz. subgen. *Idiophyton* Hand.-Mazz., subgen. *Lysimachia*, subgen. *Palladia* (Moench) Hand.-Mazz., subgen. *Heterostylandra* (Hand.-Mazz.) F.H.Chen & C.M.Hu and subgen. *Naumburgia* (Moench) Klatt. (Chen and Hu, 1979; Chen *et al.*, 1989; Hao *et al.*, 2004). *Lysimachia* subgen. *Idiophyton* Hand.-Mazz. (1928: 69) was delimited by anthers being longer than filaments, distinctly basifixed and usually opening by apical pores, occasionally by lateral slits, plants being not colored glandular punctate or striate (Hu and Kelso, 1996). The species of *L.* subgen. *Idiophyton* are mainly distributed in southern China to northern Vietnam, especially Guangxi, Guizhou and southern Yunnan (Chen and Hu, 1979; Loc and Hu, 2011; Tong *et al.*, 2017a; Yan *et al.*, 2018). *L.* subgen. *Idiophyton* in China was revised for the last time by Hu & Kelso (1996), and 38 species and five varieties were recorded. In recent years, a growing number of new taxa in *L.* subgen. *Idiophyton* are being described (Zhang *et al.*, 2006; Tong *et al.*, 2017b; Yan *et al.*, 2017; Huang *et al.*, 2019; Lu *et al.*, 2021).

During the field work in 2020, a very different species of *Lysimachia* with smaller plants size and fleshy leaves was collected. After carefully checking morphological characters, consulting relevant literature (Chen and Hu 1979; Hu, 1985; 1992; Chen *et al.*, 1989; Hu and Kelso, 1996; Zhang *et al.*, 2006; Julius *et al.*, 2016; Tong *et al.*, 2017b; Yan *et al.*, 2017; Huang *et al.*, 2019; Huang *et al.*, 2020; Lu *et al.*, 2021), and checking relevant specimens from IBK, IBSC, KUN and PE, we confirmed that this species is an undescribed species. Here we name it as *Lysimachia sedoides*.

### MATERIALS AND METHODS

The fresh materials and type specimens of *L. sedoides* were collected from the type locality in Minglun Town, Huanjiang Country, northern Guangxi. The measurements, color, shape and other details in the description of *L. sedoides* are based on observations of fresh materials, photos from the field and specimens. Comparisons with *Lysimachia rupestris* F.H.Chen & C.M.Hu were based on photos taken in the field, as well as specimens studied in herbaria (IBK and IBSC).

### TAXONOMIC TREATMENT

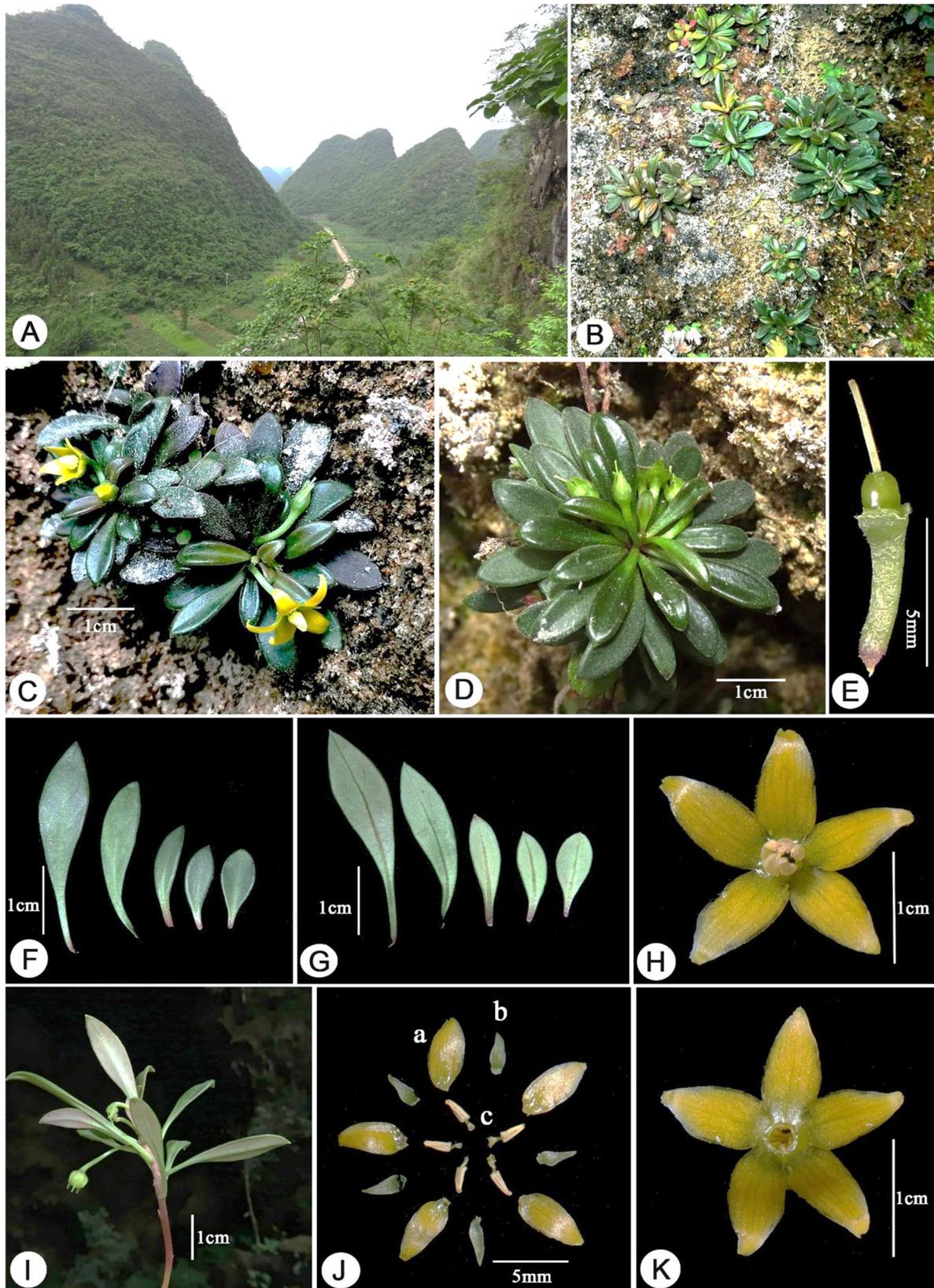
*Lysimachia sedoides* W.B.Xu, C.Y.Zou & B.Pan, *sp. nov.*

**Figs. 1 & 2A**

**Type:** CHINA. Guangxi: Huanjiang County, Minglun Town, 25°5'27"N, 108°24'5"E, at the entrance of a karst cave, 490 m elev., 30 May 2020, C. Y. Zou, W. B. Xu & B. Pan, ZCY1746 (holotype IBK!; isotype IBK!).

**Diagnosis:** *Lysimachia sedoides* is similar to *L. rupestris* F.H.Chen & C.M.Hu (1979: 40) (Figs. 2B & S1) in having rosette leaves, but is distinct in the smaller plants size, leaf blade 10–30 × 3–8 mm (vs. 3–6.5 × 1.2–2.2 cm), offsets shorter than 5 cm (vs. stolons up to 17 cm long), fleshy leaves and slightly fleshy corolla (vs. herbaceous).

**Description:** Perennial herbs, 1–3 cm tall, glabrous throughout. Offsets 1–5 cm long, ascending from the rhizome, with minutely reddish-brown glandular dots when young. Leaves fleshy, spirally arranged, congested at the apex of the rhizome or offset, ± forming a rosette, obovate to oblanceolate, 10–30 × 3–8 mm, with minutely glandular dots on both sides, apex mucronate, acute to obtuse, base attenuate, veins invisible on both sides, petioles 2–15 mm long. Flowers solitary and axillary. Pedicels 4–15 mm long, with minutely reddish-brown glandular dots. Calyx lobes lanceolate, 2.5–3 × ca. 1 mm,



**Fig. 1.** *Lysimachia sedoides*. **A:** Habitat. **B:** Habit. **C:** Plant with flowers. **D:** Plant with young fruits. **E:** Fruit stalk and young capsule. **F:** Leaves, adaxial view. **G:** Leaves, abaxial view. **H:** Flower, front view. **I:** Fruiting branch. **J:** Dissection of a flower: a. Petals, b. Calyx lobes, c. Stamens. **K:** Flower, back view.

**Table 1.** Comparison of characters between *Lysimachia sedoides* and *L. rupestris*.

Characters	<i>L. sedoides</i>	<i>L. rupestris</i>
Stem	1–3 cm tall, offsets 1–5 cm long	2–5 cm tall, stolons 6–17 cm long
Leaf blade	fleshy, obovate to oblanceolate, 10–30 × 3–8 mm	herbaceous, elliptic-oblanceolate, 3–6.5 × 1.2–2.2 cm
Petiole	0.2–1.5 cm long	1.0–4.0 cm long
Pedicel	0.4–1.5 cm long	2.5–5.5 cm long
Calyx lobe	2.5–3 × ca. 1 mm	ca. 10 × 2.5 mm
Corolla lobe	lanceolate to elliptic, 4–6 × ca. 3 mm, apex acute, yellow-green at base	obovate-elliptic, 5–7 × ca. 10 mm, apex acuminate, yellow at base
Anthers	1.5–2 mm long	2.5–3 mm long
Style	ca. 3 mm long	ca. 6 mm long

**Fig. 2.** Type sheets of *Lysimachia sedoides* (A) and *L. rupestris* (B).

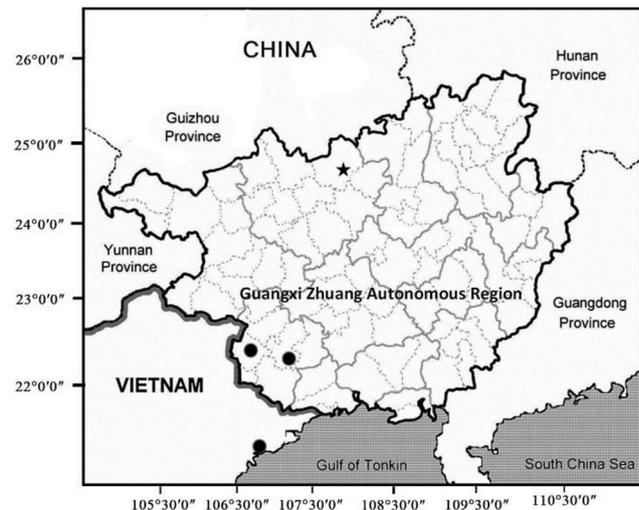
with minutely reddish-brown glandular dots, apex acute. Corolla yellow, slightly fleshy, connate basally into a ring; lobes lanceolate to elliptic, 4–6 × ca. 3 mm, apex acute. Filaments ca. 1 mm long, connate basally into a ring; anthers 1.5–2 mm long, dorsifixed, opening by apical pores. Ovary globose, ca. 1 mm in diameter; style ca. 3 mm long. Capsule globose, ca. 3 mm in diameter. Calyx and style persistent in fruit.

**Etymology:** The species epithet refers to the habit of this new species resembling that species of *Sedum* Linnaeus (1753: 430).

**Phenology:** Based on the wild observation, Flowering from April to May, and fruiting from May to July.

**Distribution and habitat:** *Lysimachia sedoides* was known only from the type locality in Minglun Town, Huanjiang Country, northern Guangxi (Fig. 3). The plants grow on moist limestone rock surfaces at the entrance of a karst cave.

**Conservation status:** *Lysimachia sedoides* was known only one population in a karst cave at present. We assessed the total area of occupancy as less than 0.1 km<sup>2</sup>, and less than 50 individuals have been recorded in the population. Since no special surveys were carried out to confirm its distribution, and the information about threat is unclear, it should be classified in the category of ‘Data Deficient’ (DD) based on the IUCN red list criteria (IUCN, 2022).

**Fig. 3.** Map showing the distribution of *Lysimachia sedoides* (★) and *L. rupestris* (●).

**Discussion:** Based on aggregating basal leaves forming a rosette, flowers 5-merous, filaments shorter than anthers, and anthers opened by apical pores, *Lysimachia sedoides* should be assigned to *L.* subgen. *Idiophyton*. *Lysimachia sedoides* is morphologically similar to *L. rupestris* (Figs. 2B & S1) in dwarf plant and fleshy leaves. Their distribution areas are also allopatric (Fig. 3). *Lysimachia rupestris* was published by Chen and Hu (1979) without floral description, and was assigned to *L.* subgen. *Lysimachia* firstly. Tong *et al.* (2017a) reconsidered its taxonomical position and transferred it to *L.* subgen. *Idiophyton* based on the basifixed anthers opening by apical pores, anthers longer than filaments, and give a detailed description for it, especially the flower. Here, we compare the taxonomic traits between *Lysimachia sedoides* and *L. rupestris* based on photos and specimens, a detailed comparison of the morphological characters among two species was listed in Table 1.

*Lysimachia* subgen. *Idiophyton* has high diversity in limestone areas, and also splendid endemism in limestone areas of Yunnan-Guizhou-Guangxi. For example, among the 23 species and two varieties of *L.* subgen. *Idiophyton* recorded in Guangxi, 18 species and two varieties are



endemic to limestone areas of Guangxi (Hu and Dong, 2017; Huang *et al.*, 2019; Lu *et al.*, 2021). In order to adapt to the special limestone habitat, *L.* subgen. *Idiophyton* evolved some adaptive characters, e.g. woody stem, coriaceous to fleshy and small leaf blade (Chen and Hu, 1979). *Lysimachia* subgen. *Idiophyton* also has very important medicinal values for local people in underdeveloped areas (Chen and Hu, 1979). Because of the medicinal value and narrow distribution, we should pay more attention to the conservation of the species of *L.* subgen. *Idiophyton* in limestone areas.

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Supplementary materials are available from Journal Website.