



Isotrema leyeense, a new species of Aristolochiaceae from Guangxi, China

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ABSTRACT: *Isotrema leyeense* Hai L. Chen, Yan Liu & Y.S. Huang, a new species from Leye County, Baise City of Guangxi, China, is formally described and illustrated. It is morphologically similar to *I. liangshanense*, but is readily distinguished by leaf blade which are often trullate-lanceolate, and sometimes ovate-lanceolate or lanceolate, base auriculate, abaxially densely hook-haired and pedicel ca. 3 cm long, gynostemium 3-lobed, apex obtuse, nondivergent and not curved inward. In addition to a diagnosis and detailed description, information on the morphological characters and a provisional conservation status assessment are also provided for this species.

KEY WORDS: *Aristolochia*, Flora of Guangxi, *Isotrema liangshanense*, new species, taxonomy.

INTRODUCTION

Isotrema Rafinesque (1819) previously treated as a subgenus of *Aristolochia* (Aristolochiaceae), was reinstated to be an separate genus by Zhu *et al.* (2019a), based on morphological and phylogenetic studies. The key characters of *Isotrema* species are calyx strongly curved, gynostemium 3-lobed, anthers paired on the outer surface of each gynostemium segment, and capsule dehiscing basipetally (Do *et al.*, 2015; Zhu *et al.*, 2019a,b; Huang *et al.*, 2022). In recent years, many new species have been described in China, especially in Guangxi as one of the most biodiverse regions of China (Zhou *et al.*, 2019; Luo *et al.*, 2020; Huang *et al.*, 2022; Lu *et al.*, 2022; Ma *et al.*, 2022, 2023).

During a fieldwork in Yachang Orchid National Nature Reserve of north-western Guangxi, China on 2 June 2024, we discovered a unique flowering plant with young capsules of Aristolochiaceae and speculated that it might be a new species of *Isotrema*, based on its leaf blade which are often trullate-lanceolate, abaxially densely hook-haired and calyx limb with dark purple spots forming stripes. Subsequently, after several field surveys in Yachang Orchid National Nature Reserve we found another subpopulation with about 200 individuals was found. According to the literature review as well as morphological examination, we confirm that it represents a new species and report it below.

TAXONOMIC TREATMENT

Isotrema leyeense Hai L. Chen, Yan Liu & Y.S. Huang, *sp. nov.* **Figs. 1-2**

Type: CHINA. Guangxi, Baise City, Leye County, Yachang Township, Yigou (Yachang Orchid National Nature Reserve), 24°47' N, 106°14' E, 849 m a.s.l., 4 June

2024, *Hailing Chen YC5547* (holotype: IBK00461957; isotypes: IBK00461958–00461960).

Diagnosis: *Isotrema leyeense* is morphologically similar to *I. liangshanense* (Z. L. Yang) X. X. Zhu, S. Liao & J. S. Ma, but easily distinguished from the latter by leaf blade which are often trullate-lanceolate, and sometimes ovate-lanceolate or lanceolate (vs. only cordate-long-ovate, oblong-lanceolate), densely hook-haired abaxially (vs. non hooked hairs), pedicel ca. 3 cm long (vs. 5–7 cm long), gynostemium 3-lobed, apex obtuse, nondivergent and not curved inward (vs. 3-lobed, apex acuminate, divergent and slightly curved inward).

Description: Perennial, twining herbaceous liana. Root cylindrical, 3–5 mm in diam, brownish yellow. Stems terete, 2–3 mm in diam., up to 4 m long, densely yellowish pubescent when young, glabrescent later. Leaves alternate, leaf blade papery, trullate-lanceolate, sometimes ovate-lanceolate or lanceolate, 5–11 cm long, 1.5–3.7 cm wide in the middle, 2.5–6.0 cm wide in the lower, apex acuminate or obtuse, base auriculate, occasionally cordate, lobes round or oblong, sinus 0.5–1.0 cm deep, margin entire, adaxially green, densely pubescent, abaxially pale green, densely hooked-hairy except the midnerve and lateral veins, the midnerve and lateral veins densely pubescent; basal veins 5–7, lateral veins 3–5 pairs, making curved arches meeting up to the margin, tertiary veins coarsely reticulate, adaxially inconspicuous, abaxially prominent; petiole 1.5–2.7 cm long, densely yellowish pubescent. Flowers in the axils of leafy shoots, solitary; pedicel pendulous, ca. 3 cm long, densely yellowish pubescent; bracteoles lanceolate to ovate-lanceolate, 0.8–1.5 × 0.3–0.6 mm, inserted on basal 1/3 of pedicel, densely yellowish pubescent; perianth tube horseshoe-shaped, outside pale green or yellowish-green, densely yellowish pubescent, basal portion of tube ca. 1.5 cm long, ca. 0.5 cm in diam.; inside dark purple, densely

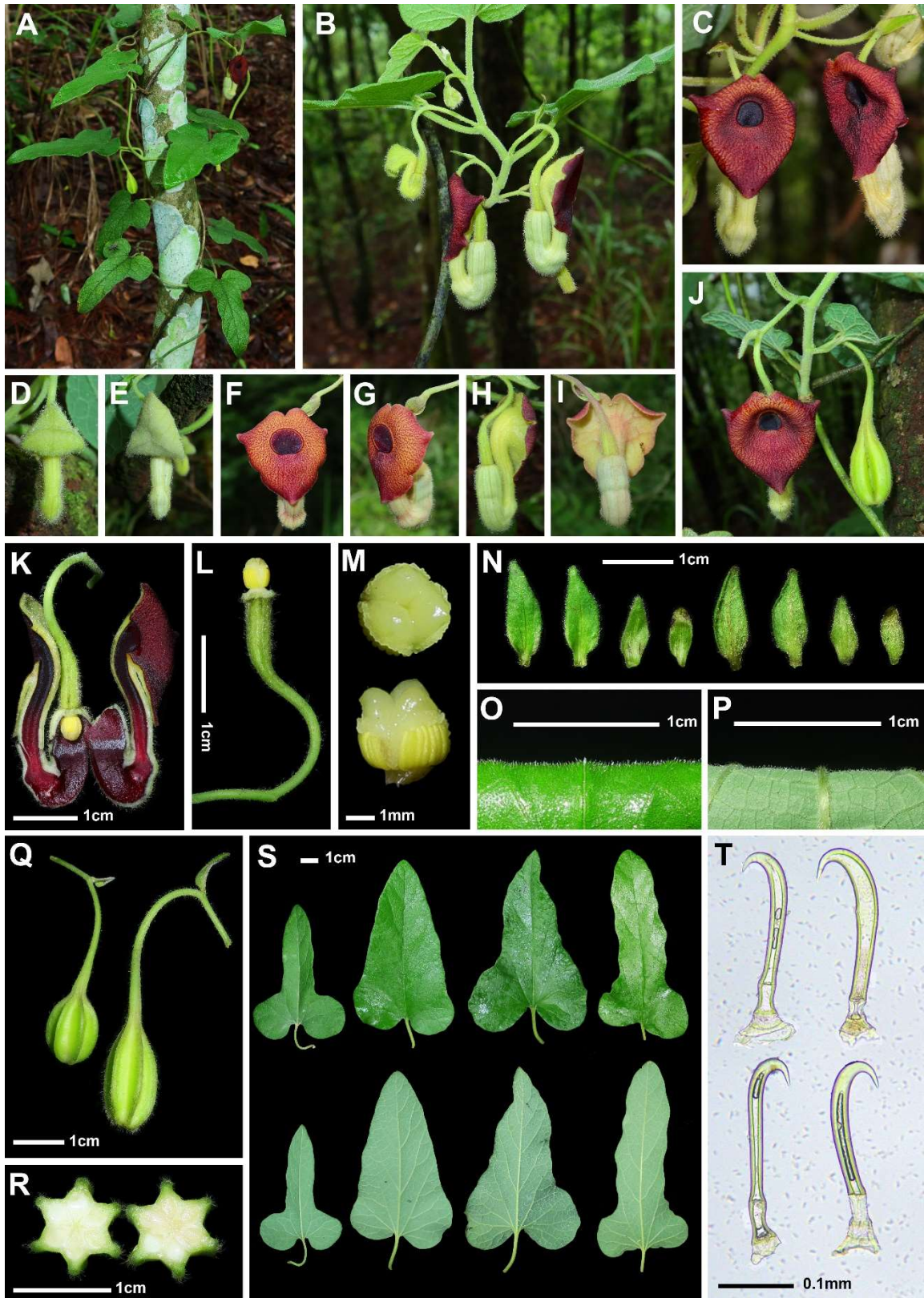


Fig. 1. *Isotrema leyeense* Hai L. Chen, Yan Liu & Y.S. Huang, *sp. nov.* **A:** Habit. **B-C:** Flowering branch. **D-E:** Flower bud. **F-I:** Flower (front view, lateral view and dorsal view). **J:** Flowering and fruiting branch. **K:** Longitudinally dissected flower (showing the inside characters). **L:** Ovary. **M:** Gynostemium. **N:** Bracteoles (adaxially and abaxially view). **O:** Adaxial leaf surface enlarged. **P:** Abaxial leaf surface enlarged. **Q:** Young capsules. **R:** Cross section of young fruit. **S:** Leaf blades (adaxially and abaxially view). **T:** Hook-haired.

**Table 1.** Comparison of key morphological characters between *Isotrema leyeense* and *I. liangshanense*.

Characters	<i>I. leyeense</i>	<i>I. liangshanense</i>
Roots	3–5 mm in diam	up to 15 mm in diam
Leaf blade	trullate lanceolate, ovate-lanceolate or lanceolate	cordate-long-ovate, oblong-lanceolate
Abaxially of leaves	pale green, densely hook-haired and pubescent	gray-white, pubescent and non hooked hairs
Base of leaves	auriculate, occasionally cordate	cordate
Pedicel	ca. 3 cm long	5–7 cm long
Perianth tube	densely yellowish pubescent outside. basal portion of tube ca. 0.5 cm in diam., upper portion of tube ca. 0.3 cm in diam.	densely rusty pubescent outside, basal portion of tube up to 1 cm in diam., upper portion of tube ca. 0.5 cm in diam.
Throat	suborbicular, 0.4–0.5 cm in diam., densely dark purple spots	orbicular, 0.4–0.7 cm in diam., densely purple-red spots
Gynostemium	3-lobed, apex obtuse, nondivergent and not curved inward	3-lobed, apex acuminate, divergent and slightly curved inward
Ovary	densely yellowish pubescent	densely rusty pubescent
Capsule	1.2–2 cm long	ca. 4 × 2 cm long

**Fig. 2.** Holotype of *Isotrema leyeense* Hai L. Chen, Yan Liu & Y.S. Huang, *sp. nov.* *Hailing Chen*, YC5547 (IBK!).

pubescent at the base, upper portion of tube ca. 1.5 cm long, ca. 0.3 cm in diam.; calyx limb ovate triangular, ca. 2 cm in diam., orange-yellow, densely dark purple spots, sometimes forming stripes, margin shallowly 3-lobed; throat suborbicular, 0.4–0.5 cm in diam., densely dark purple spots forming stripes; stamens 6, filament absent, anthers oblong, yellow, 1–2 mm long, adnate to the gynostemium base, paired on the outer surface of each gynostemium segment; gynostemium 3-lobed, apex of lobes obtuse, margin glabrous; ovary terete, ca. 1 cm long, ca. 3 mm wide, 6-angled, densely yellowish pubescent. Capsule ellipsoid, yellowish-green, 1.2–2.0 cm long, ca.

1 cm in diam., 6-angled and with densely yellowish pubescent.

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

Distribution and habitat: *I. leyeense* is currently known only from Dianzishang Village, Huaping Town, and Yachang Township of Leye County, Guangxi, China. It grows on hillside in evergreen forests at altitudes of 800–1000 m. Its associated species include *Quercus variabilis* Blume (Fagaceae), *Pinus massoniana* Lamb. (Pinaceae), *Ficus auriculata* Lour. (Moraceae), *Cipadessa baccifera* (Roth) Miq. (Meliaceae), *Eurya groffii* Merr. (Pentaphylacaceae), *Craibiodendron stellatum* (Pierre) W. W. Sm. (Ericaceae), *Nephrolepis cordifolia* (L.) C. Presl (Nephrolepidaceae), *Tetrastigma hemsleyanum* Diels & Gilg (Vitaceae), *Miscanthus floridulus* (Labill.) Warburg ex K. Schumann (Poaceae).

Conservation assessment: Field investigations have been conducted in Yachang Orchid National Nature Reserve for ten years, and only two subpopulations of *I. leyeense* were found. The subpopulation in Dianzishang Village, only has one mature plant. The other subpopulation in type locality (Yachang Township), has ca. 200 individuals, including sixty mature ones. More subpopulations could be found in similar habitats of evergreen forests of north-western Guangxi and southern Guizhou in the future, the Extent of Occurrence (EOO) is less than 10 km² and the Area of Occupancy (AOO) is less than 8 km². Although this species is found in protected areas, the quality of habitat and the number of mature individuals continue to decline. According to the guidelines of the IUCN Red List Categories and Criteria (IUCN Standards and Petitions Committee, 2024), *I. leyeense* should be assessed as Endangered (EN) based on criteria B1B2ab (iii, v) (IUCN, 2012).

Etymology: The species epithet is derived from the name of the type locality, Leye County, Baise City, Guangxi, China. The Chinese name is given 乐业关木通 (lè yè guān mù tōng).

Note: Morphologically, *Isotrema leyeense* is similar to *I. liangshanense* (Table 1). Moreover, *I. leyeense* is also similar to *I. cucurbitoides* (C. F. Liang) X. X. Zhu, S.



Liao & J. S. Ma, *I. wardianum* (J. S. Ma) X. X. Zhu, S. Liao & J. S. Ma and *I. heterophyllum* (Hemsl.) Stapf in leaf blade shape. But the limb cylindrical of *I. cucurbitoides* and *I. wardianum* can be distinguished from *I. leyeense* (vs. limb ovate triangular). *I. leyeense* differs from *I. heterophyllum* by its perianth outside pale green or yellowish-green (vs. yellow), calyx limb densely dark purple spots (vs. orange-yellow spots at base), and throat dark purple (vs. yellow) (Fig. S1).

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