



Aristolochia tongbiguanensis, a new species of Aristolochiaceae from Yunnan, China

Qiang-Bang GONG¹, Sven LANDREIN², Hou-Cheng XI², Xing-Da MA², Zheng-Hua YANG¹, Kuan-Weng HE¹, Jian-Yong SHEN^{2,*}

1. Yunnan Tongbiguan provincial Nature Reserve, Dehong, Yunnan, China.

2. Xishuangbanna Tropical botanical garden, Chinese academy of sciences, Xishuangbanna 666303, Yunnan, China.

*Corresponding author's e-mail: shenjianyong@xtbg.ac.cn, phone number: +86 15393816057, fax: +86 0691-8715464

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ABSTRACT: *Aristolochia tongbiguanensis* (Aristolochiaceae), a new species from Dehong Prefecture, Yunnan, China, is described and illustrated. It is compared with morphologically similar species including *A. faviogonzalezii*, *A. saccata*, *A. balansae*, *A. tonkinensis* and *A. cathcartii*. This new species differs mainly by the shape and colour of its calyx. The perianth of *A. tongbiguanensis* is yellowish-white with dark purple lines, the limb is nearly rectangular and covered with purple warts as well as long papillae and the throat is yellowish-white with dark purple lines and dots. Full description of *A. tongbiguanensis* is provided, together with line drawings, photographs and a conservation assessment for this rare vine species.

KEY WORDS: *Aristolochia tongbiguanensis*, Aristolochiaceae, China, New species, Subgenus *Siphisia*, Yunnan.

INTRODUCTION

Aristolochia (Aristolochiaceae) instated by Linnaeus in 1753 is a family with about 550 species of lianas, shrubs, or tuberous herbs with peculiar zygomorphic flowers that are presumably adapted to fly pollination (Gonzalez, 2012). They grow mainly in tropical and subtropical regions with some species thriving in temperate regions (Kelly *et al.*, 2003). In China, the genus *Aristolochia* has 61 species (Zhu *et al.*, 2016, 2017). *Aristolochia* has three subgenera which are *Siphisia*, *Pararistolochia* and *Aristolochia*. The flowers of *Aristolochia tongbiguanensis* have a horseshoe-shaped calyx tube, 3-lobed limb, 3-lobed gynostemium, and basipetally dehiscent capsules, typical to the subgenus *Siphisia*.

Do *et al.* (2015) provided a useful identification key for the Asian species of *Aristolochia* subgenus *Siphisia* as well as an overview of the terminology for the flower description which was here followed. Zhu *et al.* (2015, 2016, 2017) are working on a revision of the genus in Asia.

During a botanical expedition in Tongbiguan Provincial Nature Reserve, in SW Yunnan, we collected an unknown species of *Aristolochia*. It is similar to *A. tonkinensis*, *A. faviogonzalezii*, *A. balansae*, *A. saccata*, and *A. cathcartii*, but the flower limb is nearly rectangular and covered with purple warts as well as long papillae and the throat is yellowish-white with dark purple lines and dots (see Figs. 1 & 2). After consulting national Floras and other relevant literature (Ma, 1989a, Ma, 1989b, Ma and Cheng, 1989, Do *et al.*, 2015, Zhu *et al.*, 2017) as well as numerous herbarium specimens, we made the conclusion that this is a new species.

TAXONOMIC TREATMENTS

Aristolochia tongbiguanensis J.Y. Shen, Q.B. Gong & S. Landrein, *sp. nov.*

銅壁關馬兜鈴 Figs. 1 & 2; Tab. 1

Diagnosis: *Aristolochia tongbiguanensis* can be distinguished from its closest morphological match *A. faviogonzalezii* by the dark purple lines inside the throat, it differs from *A. saccata* and *A. cathcartii* which have yellow to deep red throats, and *A. tonkinensis* which have white throat, *A. balansae* differs from *A. tongbiguanensis* by the cuneate to rounded leaf base and the golden-brown throat. (see Table 1).

Type: CHINA, Yunnan, Dehong Prefecture, Tongbiguan Provincial Nature Reserve, 23°56'N, 97°33'E, alt. 1,484 m, 8 Sep. 2017, J. Y. Shen & Q. B. Gong 774 (holotype: HITBC; isotype: HIB).

Perennial, woody liana, 8–10 m high. Stem slightly oval in cross section, young branches densely pubescent, becoming glabrescent, bark corky and with irregular longitudinal fissures. Leaf blade ovate to ovate-oblong, base cordate, 16–23 cm long, 12–18 cm wide, subcoriaceous, sinus 1–1.5 cm deep, margin entire, apex acuminate, 1–1.2 cm long, the adaxial surface dark-green and glabrous, basal veins five, palmate, secondary veins four to seven pairs, pinnate; tertiary veins coarsely reticulate, slightly sunken adaxially, prominent abaxially. Inflorescence cymose on old woody stems, cymes in clusters of 4–6, each cyme with two or three flowers, clearly separated from each other. Inflorescence axis 5–9 cm long, pubescent. Pedicel 2–3 cm long, pendulous, densely brown villous. Bracteole clasping the axis, triangular, 2–3 mm long, 2–2.5 mm wide, sessile, both surfaces densely brown pubescent. Perianth horseshoe-

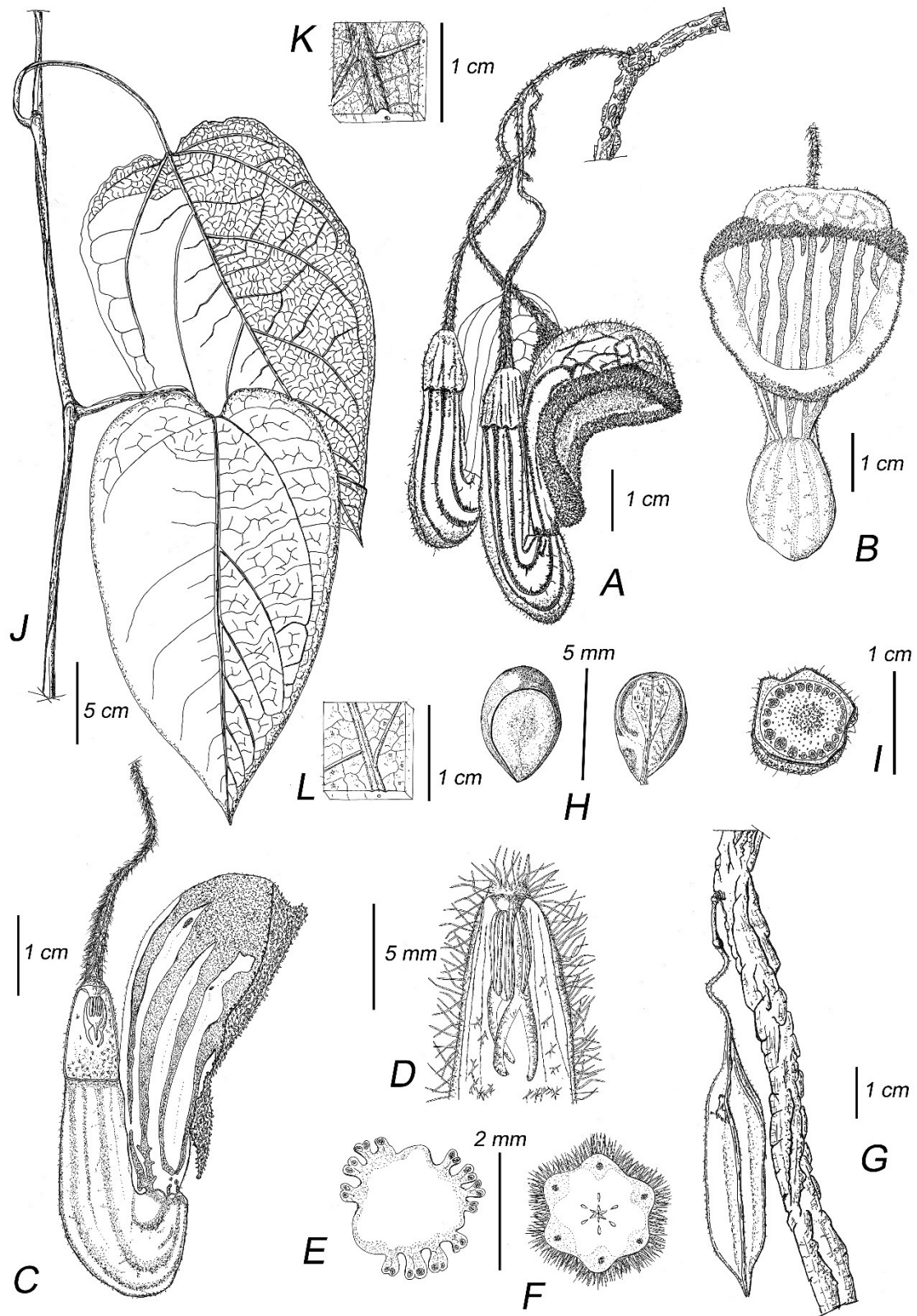


Fig 1. *Aristolochia tongbiguanensis*. A. Lateral view of open flower. B. Front view of open flower. C. Longitudinal section of open flower. D. Gynostemium. E. Gynostemium cross section through the androecium. F. Ovary cross section. G. Capsule. H. Seed. I. Stem cross section showing bark formation. J. Habit. K. abaxial leaf surface. L. Adaxial leaf surface. Drawn by Sven Landrein.

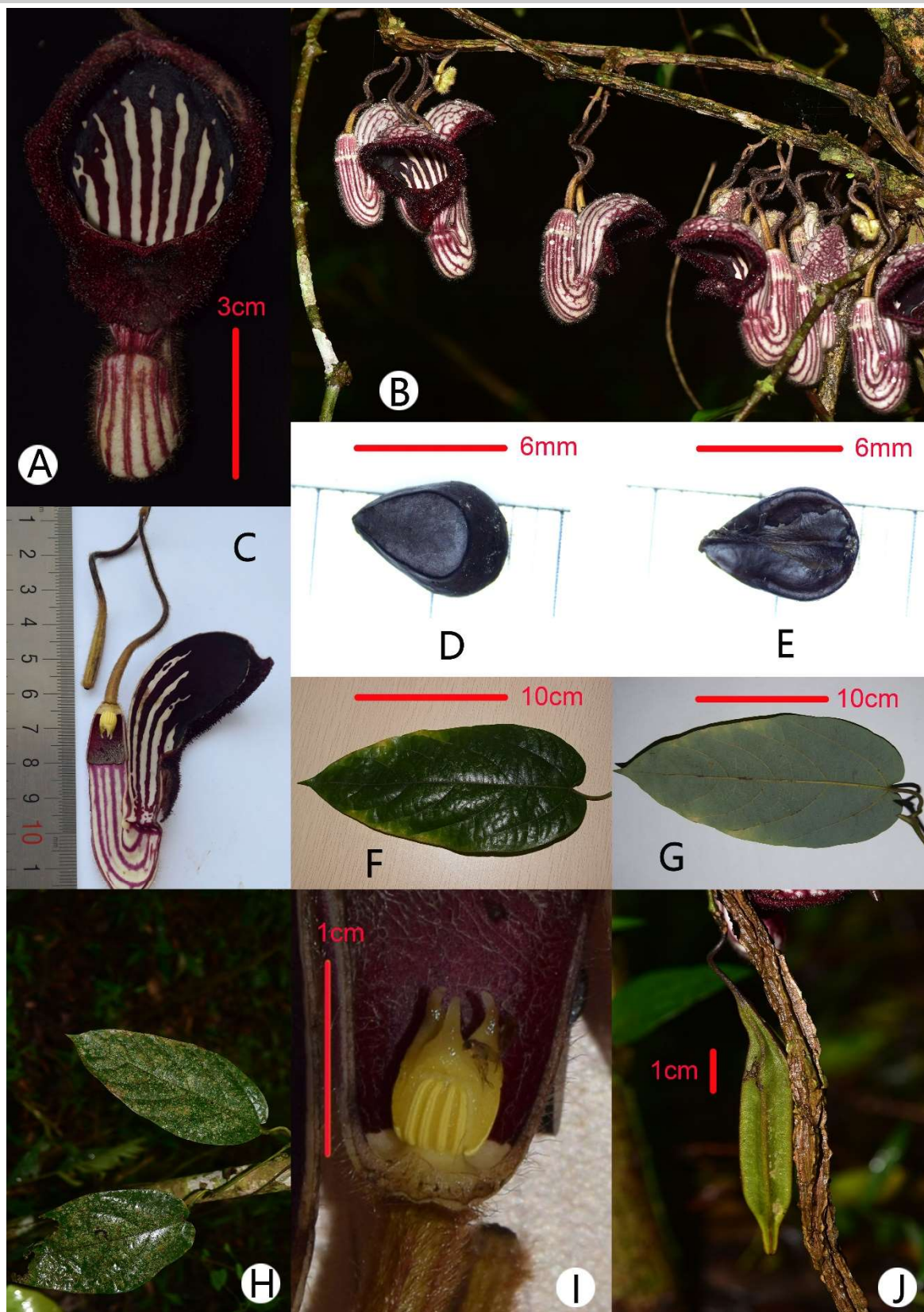


Fig 2. *Aristolochia tongbiguanensis*. **A.** Front view of the open flower. **B.** Flowering stem. **C.** Flower opened showing the inside structure. **D-E.** seed. **F-H.** Adaxial and abaxial leaf surface. **I.** Gynostemium. **J.** Capsule (immature). Photo by J. Y. Shen & Q. B. Gong.

**Table 1.** Morphological comparison of *A. tongbiguanensis*, *A. faviogonzalezii*, *A. saccata*, *A. balansae*, *A. tonkinensis* and *A. cathcartii*.

| Characters | <i>A. tongbiguanensis</i> | <i>A. faviogonzalezii</i> | <i>A. saccata</i> | <i>A. balansae</i> | <i>A. tonkinensis</i> | <i>A. cathcartii</i> |
|---------------------------|---|--|--|--|--|--|
| Leaf blade | ovate or ovate-lanceolate to narrowly ovate | broadly-ovate to cordate | ovate-oblong to lanceolate | ovate-oblong | ovate to broadly ovate, rarely deltoid | narrowly ovate to lanceolate-ovate |
| Inflorescence | cymose on old woody stems, cymes in clusters of 4–6, each cyme with 2–3 flowers | cluster of 6–8(–10) cymes at each node on old woody stem, each cyme with 3–4 flowers | cluster of 2–3 cymes at each node on old woody stems, each cyme with 3–5 flowers | cluster of 2–3 cymes at each node on old woody stems, each cyme with 3–5 flowers | cymose on old woody stems and young branches, solitary, each cyme with 3–4 flowers | cluster of 3–4 cymes at each node on old woody stems, each cyme with 3–5 flowers |
| Inflorescence axis | 5–9 cm | 5–9 cm | 1.8–2.2 cm | ca. 5 cm | 1.5–2.5 cm | 2–4 cm |
| Calyx throat | upper quarter of throat purple, lower three-quarter white with purple lines and dots. | upper half of throat white, with dark purple dots, lower half pinkish, without visible dots. | uniformly yellow, without visible dots. | golden-brown, without visible dots. | white, inside with a dark purple band and densely glandular hairs | uniformly yellow, densely covered with purple dots |

shaped (in lateral view), 6–9 cm high, yellowish white, outside densely brown hirsute with parallel dark purple veins, inside glabrous. Utricle distinct from the tube, bell-shaped, 4–5 cm high, 0.8–1 cm in diam. at base, 1–1.1(–1.3) cm in diam. at apex, inside with a dark purple band and densely distributed trichomes. Tube horseshoe-shaped, 4–5 cm high, lower tube strongly inflated, 1.6–1.8 cm in diam., upper tube funnel-shaped 1.5–1.6(–1.8) cm in diam., gradually constricted at its base 0.6–0.7 cm in diam., with visible purple lines parallel to the utricle, base uniformly dark purple. Limb rectangular in shape with three unequal lobes, valvate at anthesis and later becoming revolute, lateral lobes fused and middle lobe narrow covered with purple warts and long papillae. Upper quarter of throat purple, lower three-quarter throat white with purple lines and dots. Gynostemium with acute apices, 6–7 mm high, 3–4 mm in diam, smooth; anthers 3.5–4 mm long, 1–1.5 mm wide, yellow. Ovary oblong, 1–1.2 cm long, 0.4–0.5 cm in diam. Capsule cylindrical, 9–12 cm long, 1.5–2 cm in diam., distinctly 6-angled, dark-brown, the angles villous, becoming glabrescent, basipetally dehiscent. Seeds ovoid, 6–7(–8) mm long, (3–)4–5 mm in diam., not winged, the abaxial surface convex, and the adaxial surface deeply concave, both surfaces smooth.

Phenology: Flowers and mature fruits were observed in September.

Distribution and Habitat: currently known only from the type locality and found growing in dense forests at ca. 1500 m high elevation.

Etymology: The specific epithet is derived from the type locality, Tongbiguan Provincial Nature Reserve, Dehong Prefecture, Yunnan, China.

Conservation assessment: The Area of Occupancy is 116 km² (2 km square grid) and the Extent of Occurrence 12 km². The Tongbiguan Provincial Natural Reserve was surveyed in September 2017 and three populations were found, each with less than three

individuals. The reserve is covered with well-preserved rainforests and the surrounding area is not suitable for this species. According to the criteria D (IUCN., 2012) the new species should be assessed as Critically endangered (CR) because there were only 9 mature individuals recorded. Because we did not survey areas in Myanmar we prefer to use the criteria B1ab (ii, v) + 2ab (ii, v) and D1+2 (IUCN, 2012) and assess *Aristolochia tongbiguanensis* as Endangered (EN).

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