

Arisaema lushuiense sp. nov. (Araceae) from Gaoligong Mountains in Yunnan, China

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Arisaema lushuiense G. W. Hu & H. Li, a new species of Araceae from Gaoligong Mountains in northwestern Yunnan, China, is described and illustrated. It is similar and closely related to *A. auriculatum* Buchet, but differs by its basically green spathe with semi-rotund to broadly ovate, 6–8 mm long auricles; the appendix of the spadix is 3.5–5.0 cm long and the apex of the appendix depressed with faint longitudinal ridges and grooves, slightly curved forward, with purplish black color, and exerted 1.0–1.5 cm from the spathe throat.

The genus *Arisaema* Martius comprises about 180 species distributed in northeast Africa, Asia, eastern North America and Mexico (Li et al. 2010). China harbors the highest diversity of *Arisaema* in the world, with 78 species (45 endemic) in 12 sections (Li and Long 1998, Li et al. 2010). The Himalaya–Hengduan Mountains is a recently evolved center of speciation for *Arisaema*, with 57 endemic species and four endemic sections (Li 1980).

During an expedition in May 2010 to survey *Arisaema* species in northwest Yunnan, we observed an unusual *Arisaema* population that included flowering male and female plants. The leaves of individuals of this population are similar to *A. auriculatum* but it differs by a distinctly shaped inflorescence as well as by the spathe and appendix color. After detailed morphological examination, literature search (Hara 1971, Gusman and Gusman 2002, Li et al. 2010, Murata 2011) and comparison with herbarium material at KUN, we concluded that these plants represent an undescribed species of *Arisaema*. The description of the new species presented below is based on dried herbarium specimens, living in situ plants, photographic images and material in cultivation at Kunming Botanical Garden (no. HGW-Z-750).

***Arisaema lushuiense* G. W. Hu & H. Li sp. nov. (Fig. 1)**

Haec species Arisaemati auriculato Buchet similis, sed spathae tubo chloroleuco, limbo viridi, auriculis fauci brevibus, semiorbiculatis vel ovatis, 6–8 mm longis, appendice spadici brevi, 3.5–5.0 cm longa, apice purpureo-nigri, compresso leviter procurvo, parti exposita extra faucem spathae non nisi 1.0–1.5 cm longa differt.

Holotype: China. Yunnan Province, Lushui County, Gaoligong Mountains, narrow mountain pass from Liuku to Pianma Township, 25°58'21"N, 98°41'00"E, 3150 m a.s.l., under bamboo shoots, 28 May 2010, Hu, G. W., Zhao, F. W., Zhao, D. K and Wang, Z. HGW-00565 (♂, KUN).

Etymology

The specific epithet *lushuiense* refers to the geographic name 'Lushui', which refers to the county in which we found this new species and collected the type specimen.

Description

Plants dioecious. Tuber depressed globose, 1–3 cm in diameter. Cataphylls 3, white to light yellow, to 14 cm, obtuse at apex. Leaf solitary; petiole greenish yellow, smooth, ca 31 cm long, ca 10 cm sheathing into pseudo-stem; leaf blade pedate; leaflets 7–13, sessile, oblanceolate or oblong, attenuate at base, acuminate at apex, and margin erose or entire; central leaflet usually larger than or equaling lateral ones, ca 5.5 × 2.0 cm; lateral leaflets 2.7–5.5 × 1–2 cm, the outermost ca 2.7 × 1.0 cm. Peduncle shorter than petioles, ca 24 cm. Spathe 8–10 cm; tube cylindrical, 4–5 × ca 0.7 cm, pale green, sometimes flushed with white spots on the outside, throat margins with a pair of semi-rotund to broadly ovate auricles, these 6–8 × ca 8 mm; limb green, adaxially with five white veins, elliptic to ovate, 4–5 × 2.0–2.5 cm, constricted at base, with acute and incurved apex. Spadix unisexual. Male: fertile zone ca 1 cm, slender; male flowers loosely arranged; flowers usually with 2 stamens and 4 fused anthers, proximal flowers shortly stipitate, distal flowers subsessile; anthers purplish black; thecae dehiscent by apical pores; pollen white.



Figure 1. *Arisaema lushuiense* sp. nov. (A)–(B) habit of a female individual, (C) female inflorescence, (D) female inflorescence (spathe tube opened), (E)–(F) tuber of a female individual, (G) female zone of spadix, (H) habit of a male individual, (I) leaf of a male individual, (J) male inflorescence (side view), (K) male inflorescence (front view), (L)–(M) male inflorescence (spathe tube opened), (N) male zone of spadix. (A)–(G) from the paratype, (H)–(N) from the holotype.

Female: fertile zone conic; ovaries densely arranged, yellow, ovoid; stigmas shortly stipitate, capitate, white and pilose. Appendix 3.5–5.0 cm long, sessile, ascending, slightly swollen near the base; proximal half columnar, greenish white flushed with purple longitudinal lines; distal half depressed, curved forward, purplish black, with faint

longitudinal ridges and grooves, exposed from the spathe throat for ca 1.0–1.5 cm. Fruits unknown.

Similar species

Arisaema lushuiense is similar to *A. auriculatum* in its pedate leaf blade with sessile leaflets, and a leaflet margin that is

Table 1. Morphological comparison between *Arisaema lushuiense* sp. nov. and *A. auriculatum* (Fig. 2).

Characters	<i>A. lushuiense</i>	<i>A. auriculatum</i>
Spathe color	Basically green; tube pale green, sometimes flushed with white spots; limb green, adaxially with five white veins	Basically purplish; tube and limb densely flushed with dark purple or dark brown spots; limb with three white veins adaxially
Spathe auricle	Semi-rotund to broadly ovate, 6–8 × ca 8 mm	Oblong or oblanceolate, 20–25 × ca 7 mm
Spadix appendix	3.5–5.0 cm long, distally slightly curved forward; proximal half columnar, greenish white flushed with purple longitudinal lines, distal half depressed with faint longitudinal ridges and grooves, purplish black; exerted ca 1 cm from spathe throat	7–12 cm long, sigmoid; flagelliform to filiform, dark violet; exerted 3–8 cm from spathe throat

consistently arose in smaller individuals and entire in larger ones. It is difficult to separate these two species without inflorescence, which, however, differs considerably between the two species. The major inflorescence differences are summarized in Table 1.

Distribution, habitat and conservation status

Arisaema lushuiense is currently known only from the type locality at a narrow mountain pass in Gaoligong Mountains from Liuku to Pianma Township in Lushui County of northwest Yunnan, China. It grows under short *Fargesia* bamboo shoots in loose, black humus. It was observed flowering in May. During the past decade, many investigations of plant resources have been carried out in the Gaoligong Mountains including the type locality of this new species. It has nonetheless been found only once. The population comprises less than 20 individuals sparsely scattered in an area of ca 500 m². According to the IUCN category and criteria (2001), it should be regarded as ‘Critically Endangered’ (CR).

Additional specimen examined (paratype)

China. Yunnan Province: Lushui County, Gaoligong Mountains, narrow mountain pass from Liuku to Pianma Township, under bamboo grove, 25°58′21″N, 98°41′00″E, 3150 m a.s.l., 28 May 2010, Hu, G. W., Zhao, F. W., Zhao, D. K and Wang, Z. HGW-00857 (♀, KUN).

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Figure 2. *Arisaema auriculatum*. (A) front view of inflorescence, (B) back view of inflorescence, (C) female spadix, (D) leaf.

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