

Arisaema tsangpoense (Araceae), a new species from southeast Tibet, China

Jian-Tao Yin¹ & Guy Gusman²

¹) Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, Menglun, Mengla 666303, Xishuangbanna, Yunnan, People's Republic of China

²) Université Libre de Bruxelles, 1050 Bruxelles, Belgium (e-mail: ggusman@ulb.ac.be)

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Arisaema tsangpoense J.T. Yin & G. Gusman is described and illustrated as a new species from southeast Tibet, China. The morphological characters of *A. tsangpoense* and other morphologically close species, such as the Sino-Vietnamese *A. victoriae*, the Indian *A. setosum*, the Chinese *A. lihenganum* and the Thai *A. smitinandii* are discussed.

Key words: Araceae, *Arisaema* sect. *Anomala*, new species, taxonomy

During a recent expedition to Medog County, in southeast Tibet, an *Arisaema* species was collected and was later introduced into cultivation at Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences. Today, it appears that these plants have to be recognised as a new species in sect. *Anomala* (Hettterscheid & Gusman 2003) as it comes out from the study of publications by Hu (1968), Rao and Verma (1969), Nguyen (2000), Gusman (2002), and Murata and Wu (2003).

***Arisaema tsangpoense* J.T. Yin & G. Gusman, sp. nova (Fig. 1)**

Affinis A. setosi et A. smitinandii, sed ab A. setoso differt spadice appendice e tubo exserta, quam parte sterili longiore, floribus sterilibus carnosis sparsisque, ad 7 cm longis tecta, et ab A. smitinandii differt magnitudine brevior pedunculo brevissimo et floribus sterilibus brevioribus. A.

tsangpoense ab aliis Arisaema speciebus differt excretionibus in axillas florum sterilium ad summum spadice appendicis.

TYPE: China. Tibet, Medog County, along Yalu Tsangpo River, alt. 900 m, in forest, along path, 6.XII.2004 Yin Jian-Tao 821 (holotype HITBC 108686, female inflorescence; isotypes HITBC 108685 & 108687, male inflorescences).

ADDITIONAL SPECIMENS EXAMINED (paratypes). — **China.** Tibet, Maniwong, Beiben, under forest, 850 m, 6.XI.1992 H. Sun, Z.K. Zhou & H.Y. Yu ETM 1090 (KUN 0029321, 0029322 & 0029323; H. Li identified them first, in 1993, as *A. speciosum* and, later, in 1995, as *A. smitinandii*).

Terrestrial and perennial evergreen herb. Rhizome 5 cm long and 2.5 cm in diam., with numerous branches; roots whitish, 6–8 cm long, 2 mm in diam. Pseudostem absent, petioles and peduncles wrapped in separate cataphylls. Leaves 1 to 4 present simultaneously. Petiole cylindrical, ca. 25 cm long and 0.5–1 cm in diam., dull dark brown to violet, with light brown transverse markings. Leaf blade pedate with 3–5 segments;



Fig. 1. *Arisaema tsangpoense* (drawn by Wen Huang from living plants). — **a**: Flowering plant with rhizome. — **b**: Female spadix. — **c**: Transverse section of an ovary. — **d**: Close-up of ovules. — **e**: Synandria. — **f**: Male spadix.

leaflets greenish, membranaceous and petiolulate, lanceolate, apex acute ending in a short arista; central leaflet ca. 15×5 cm, numerous lateral veins, base cuneate, petiolule to 3 cm long; lateral leaflets, $12\text{--}15 \times 3\text{--}4$ cm, base obliquely cuneate; petiolules to 5 mm long. Peduncle cylindrical, whitish, ca. 2×0.5 cm, much shorter than petiole, surrounded by 3 cataphylls, oblong, light brown, 2, 4 and 6 cm long respectively. Inflorescence unisexual. Spathe-tube cylindrical, white-green, ca. 3×1.5 cm, with numerous green longitudinal stripes, throat margin widely recurved. Spathe-limb ovate-lanceolate, arched over tube,

ca. 7×4 cm, green, with darker, longitudinal veins; apex acuminate ending in a 1 cm long tail. Spadix either male or female; pistillate spadices sometimes topped by a few stamens (Fig. 2). Male fertile part cylindrical, ca. 2×0.5 cm; stamens loosely arranged, each consisting of 3–6 anthers, stipitate, thecae yellowish, subglobose, dehiscing by oblong pores. Female fertile part conical, ca. 1.5 cm long and 1 cm in diam., at base; ovaries congested, green, fusiform, unilocular, each containing 3 basal ovules, fusiform and slightly curved, stigma discoid borne on a short style. Spadix-appendix sessile, narrowly conical,



Fig. 2. *Arisaema tsangpoense*. Pistillate spadix overtopped by a few staminate flowers.

protruding from spathe-tube but not exceeding spathe, 4 cm long, 3 mm in diam. above fertile part and 1 mm across at apex, purple; about 20 fleshy, dusty brown filament-like projections, 1–2 mm in diam., scattered from base to top. Projections ca. 1–1.5 cm long in lower portion but much longer, up to 7 cm long, towards apex of appendix, with bud-like excrescences in axiles of upper projections in both staminate and pistillate spadices (Fig. 3).

ETYMOLOGY. The new species is named after its type locality.

This evergreen and rhizomatous new species is a member of sect. *Anomala*. Main characters are found in an absence of pseudostem, a peduncle so short that the inflorescence is held just above ground level and a spadix appendage sparsely covered with long fleshy bristles protruding from the spathe-tube. The most peculiar character of *A. tsangpoense* is found in the presence of bud-like structures in the axils of the projections in the



Fig. 3. *Arisaema tsangpoense*. Close-up of bud-like excrescences on the spadix appendage.

upper part of the spadix appendage, a character never observed before in the genus *Arisaema*. Whether these buds will eventually develop into bulbils and show a new vegetative mode of reproduction is still to be checked. Spadices are either staminate or carpellate, even if a few staminate flowers may be borne above the ovaries, a condition often observed in this genus (Lovett Doust & Cavers 1982, Fukai 2004).

These characters relate *A. tsangpoense* to four other species of sect. *Anomala*, all of them reported from tropical areas extending from NE India and S China to the neighbouring countries Thailand, Laos and Vietnam. The five species flower from November to March, have petiolulate leaflets and a spadix appendage whose extremity is covered with long bristles. It appears that *A. tsangpoense* and *A. setosum* have many characters in common: a small size, an absence of pseudostem, a five-foliolate blade, an auriculate inflorescence produced at ground level and a spadix covered with long bristles. Moreover, both species also have neighbouring distributions on both sides of the Himalayan Range: *A. tsangpoense* on the Chinese side, *A. setosum* on the Indian side. A main difference, however, is found in the disposition and the texture of the bristles: a tassel of numerous filaments in *A. setosum* while they are fleshy and scattered along the whole appendage in *A. tsangpoense*, recalling the appendage of *A. smitinandii*, but in the latter species the inflorescence is borne on a long peduncle and overtops the foliage. Information on *A. setosum* is very scarce; no living plants seem to be in cultivation.

Table 1. Comparison between *Arisaema tsangpoense* and its four closest species; morphological characters and respective distributions.

	<i>A. tsangpoense</i>	<i>A. setosum</i>	<i>A. smitinandii</i>	<i>A. lihenganum</i>	<i>A. victoriae</i>
Height	30 cm	40 cm	70 cm	50 cm	50 cm
Pseudostem	absent	absent	absent	absent	25 cm
Maximum number of leaflets per blade	no	no	no	yes	yes
Peduncle height	3 cm	7 cm	60 cm	20 cm	25 cm
Appendage longer than the spathe	no	no	no	yes	yes
Bristles on spadix appendage	fleshy sparse	capillary bunch-like	fleshy sparse	capillary sparse	capillary sparse
Bud-like excrescences on spadix appendage	present	not mentioned	absent	absent	absent
Distribution	SW China, S Tibet 900 m a.s.l.	India, Arunachal, Siang alt. unknown	S Thailand, Nakhon Si Thammarat 1000 m a.s.l.	S China, border Yunnan–Guangxi 1000 m a.s.l.	along border Vietnam–China 500 m a.s.l.

Moreover, neither the protologue nor the illustrations of *A. setosum* show structures in the axiles of the projections along the spadix–appendix.

The two other species, *A. victoriae* and *A. lihenganum* have long spadices protruding from the spathe-tube, and covered with capillary bristles. Both species are trifoliolate and, moreover, in *A. victoriae* the peduncle and petioles are sheathing, forming a conspicuous pseudostem.

We summarized reliable morphological characters that separate these five species in Table 1.

DISTRIBUTION AND HABITAT. China, Tibet, Medog County. *Arisaema tsangpoense* grows at forest edges, in humid conditions, at 900 m altitude. Living plants of *Arisaema tsangpoense* were introduced in Xishuangbanna Tropical Botanical Garden (500–600 m alt.) two years ago. They are cultivated successfully and are flowering from November to February.

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