

Colocasias xui (Araceae), a new species from Tibet, China

ABSTRACT

Colocasias xui J.T. Yin, a new species from Tibet, China, is described and illustrated. This species is allied with *C. fallax* Schott, *C. kachinensis* S.S. Zhou & J.T. Yin, and *C. menglaensis* J.T. Yin, H. Li & Z.F. Xu, and a comprehensive comparison reveals that *C. xui* differs from these species in a unique combination of distinctive morphological characteristics.

KEY WORDS: aroid, colocasioid, Mêdog, taro, Xizang.

INTRODUCTION

The genus *Colocasia*, a member of the *Pistia* Clade (Haigh et al. 2023, Renner & Zhang 2004), comprising approximately 20 species (Boyce & Croat, 2011 onwards), are distributed widely across subtropical and tropical Asia, extending from the subtropical eastern Himalaya to the tropical western Pacific and eastern Australia (Li & Boyce 2010). While *Colocasia esculenta* Schott (taro) has gained significant popularity as an economically important crop, our understanding of its wild relatives remains limited.

In China, the genus *Colocasia* was previously known to comprise five species in the latest Flora in Li & Boyce (2010): *C. affinis* Schott (1859: 28), *C. antiquorum* Schott & Endlicher (1832: 18), *C. esculenta* (L.) Schott in Schott & Endlicher (1832: 18), *C. fallax* Schott (1859: 28), and *C. menglaensis* J.T. Yin, H. Li & Z.F. Xu (2004: 223). Notably, *Leucocasia gigantea* (Blume) Schott (1854: 34) has been reinstated as a monotypic genus, excluding it from the genus *Colocasia* (Nauheimer et al. 2012). In recent years, a few new species have been discovered and published in the region spanning the Eastern Himalayas to Northern Indochina, indicating a growing interest in exploring the genus's diversity (Li & Long 1999 & 2000, Long & Liu 2001, Cao & Long 2003, Cai et al. 2006, Gogoi, R., & Borah 2013, Zhou et al. 2020, Matthews et al. 2022). However, a comprehensive revision of *Colocasia* is still required to fully comprehend its taxonomic complexity.

During a field expedition to Mêdog County in southeastern Tibet (Xizang), we encountered sets of *Colocasia* individuals that differed significantly from known species. Living specimens were introduced into cultivation at the Xishuangbanna Tropical Botanical Garden (XTBG), Chinese Academy of Sciences in 2003 subsequently. While they flourished between April and June 2005 in the XTBG nursery, unfortunately, all individuals succumbed to root rot after several years of cultivation. Upon consulting herbarium specimens, we confirmed that the plant we encountered represents a novel species of the genus *Colocasia*, allied with *C. fallax*, *C. kachinensis* S.S. Zhou & J.T. Yin in Zhou et al. (2020: 41) and *C. menglaensis*. In this study, we describe and illustrate this newly discovered species, contributing to the ongoing efforts to document and understand the biodiversity of this fascinating genus.

Comment [I1]: colocasia

Comment [I2]: Need to be rephrased

Comment [I3]: Add reference: Mayo et al. 1997
Mayo, J. S., Bogner, J. & Boyce, C. P. (1997). The genera of Araceae. Belgium: Royal Botanic Gardens.

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TAXONOMY

Colocasia xui J.T. Yin, *sp. nov.*, **Figures 1, 2 & 3.**

Type: CHINA. Buqun Lake, Mêdog County, Tibet, elev. 1088 m., along road in dense forest, 22 September 2003, *Yin Jian-Tao* 388 (holotype: HITBC107052).

Diagnosis: *Colocasia xui* is morphologically allied with *C. menglaensis*, but differs in having rhizome without stolons, smaller leaves only with weak villi on the low blade surface, milk-white limb of spathe.

Description: Herb evergreen, small. *Rhizome* up to 15 cm long, 1.6 cm in diam., brown, decumbent, with 1–2 dormant lateral buds. Roots brown c. 20 cm long, 1.5 mm in diam. Leaves 3–6 together. *Petiole* glossy, jade-green (or purple occasionally), 30 cm long, 5 mm diameter in the middle, lower part with sheath 12 cm long. *Leaf blade* peltate, ovate, to 16 cm × 11 cm, primary veins 7 pairs, glossy green above; pale white below, with microvilli on lower surface. Inflorescence 1 or 2. Peduncle 18 cm long, 4 mm in diam., green, glossy. *Spathe* 12 cm long; tube green, ellipsoid, 3 cm long, 1.2 cm in diam., base pruinose; limb erects (during female phase: the throat of spathe opens; the stigmas are receptive and the pollinator can enter the tube of spathe), milk white (female phase), oblong-boat-shaped, distinctly constricted, 8 cm long, 3 cm in diam., having some slightly pronounced longitudinal striations (limb is reflexed and creamy yellow during the male phase when pollen are released and the throat of spathe is closed which can prevent entry by pollinators and pollen). *Spadix* 6.5 cm long, 5 mm in diam. in the middle; *female zone* 2 cm long, 0.5 cm in diam., green, conic, with scattered synandrophores, sessile at base; ovary oblong, 1-locular, ovules many, fusiform, placentae 5, parietal, most stigma trifid, few 2-lobed, 4-lobed; sterile zone present between male and female zone, 1.5 cm long, 3 mm in diam., milk white; *synandrophore* white, oblate; *male zone* 1.4 cm long, 4 mm in diam., milk white, hairless; *synandrium* 4–6-androus; *appendix* subuliform to long conical, 1.5 cm long, 3 mm in diam., milk white, shortly stipitate at base, sterile zone between male zone and appendix absent. Infructescence, jade-green, base pruinose, 3 cm long, 1 cm in diam.

Eponymy: The species epithet is given in honor of Mr. Bin Xu [徐斌] of the China Association for Science and Technology, who greatly assisted the first author (J.-T. Yin) during his stay in Xinjiang from 2017 to 2018.

Phenology: Flowering from April to June.

Distribution and Habitat: *Colocasia xui* is endemic to China, currently known only from its type locality. The plants were found growing alongside a path at an elevation of 1088 m above the sea level in humid dense subtropical monsoon rainforest.

Conservation assessment: Data deficient (DD).

Notes: The species concept within the genus *Colocasia* remains ambiguous. While vegetative traits are frequently relied upon to distinguish species (Matthews et al. 2022), we contend that the spadix architecture offers a far more reliable approach. Specifically, *C. xui* exhibits similarities to the co-distributed species *C. fallax* (Figure 4 A-C), including a questionable synonym *C. tibetensis*. Nevertheless, the two species diverge significantly in reproductive features, and *C. xui* differs from *C. fallax* in having 1) a decumbent rhizome, 2) oblong-boat-shaped spathe, opened and reflex at

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male phase, 3) sessile female zone, with scattered synandrodies, 4) sterile zone between male and female region 1.5 cm, and 5) absent between the male zone and spadix-appendix.

Comment [17]: It is preferable to add a table that shows the difference between *C. xui* & *C. fallax*

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Figures & Legends

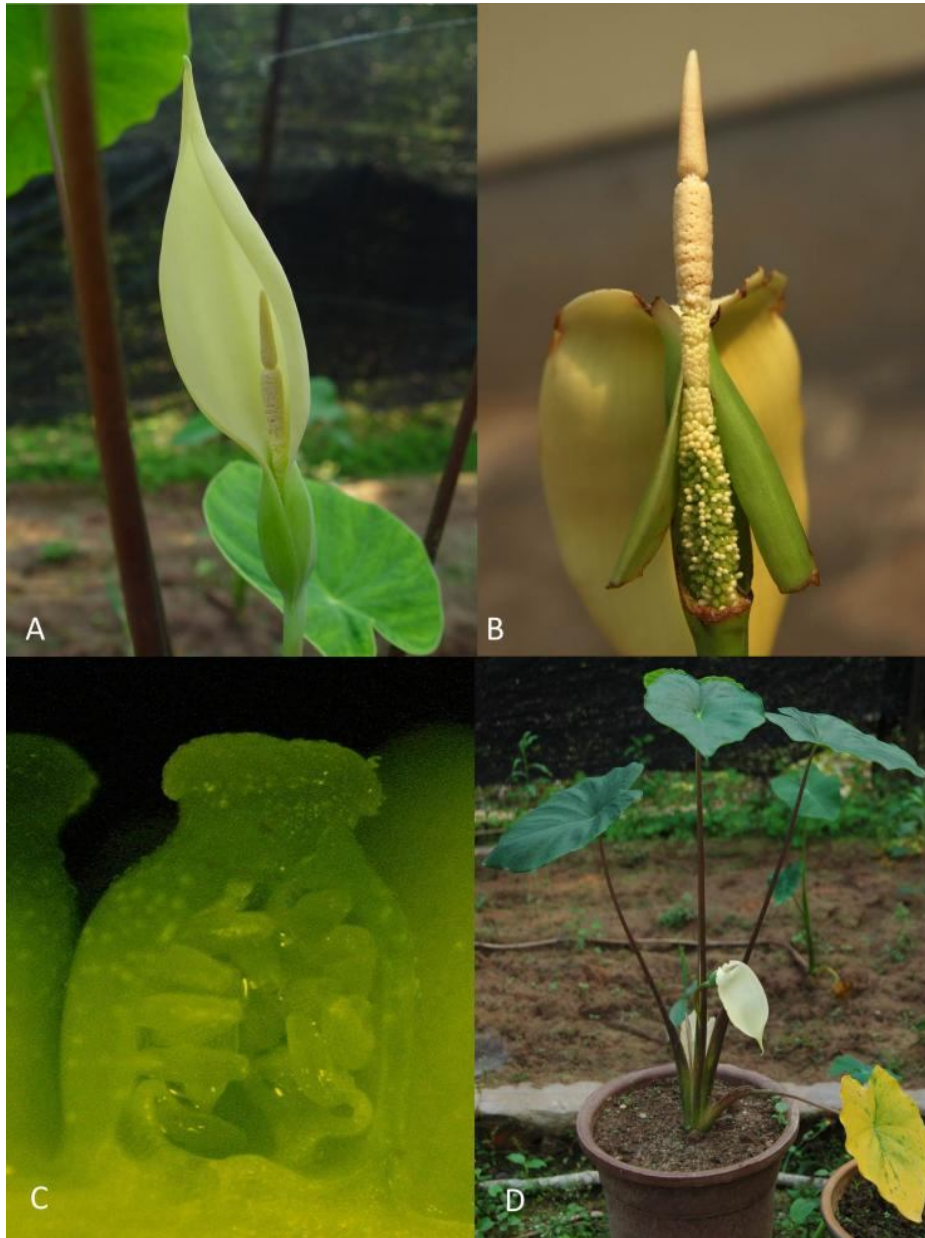


Figure 1. Habit of *Colocasia xui* J.T. Yin. **A.** inflorescence; **B.** spadix exposed; **C.** longitudinal section of ovary; **D.** plant at anthesis.



Figure 2. Habit of *Colocasia xui* J.T. Yin. A. plant with infructescence in field; B. abaxial leaf surface; C. plant with long decumbent rhizome.

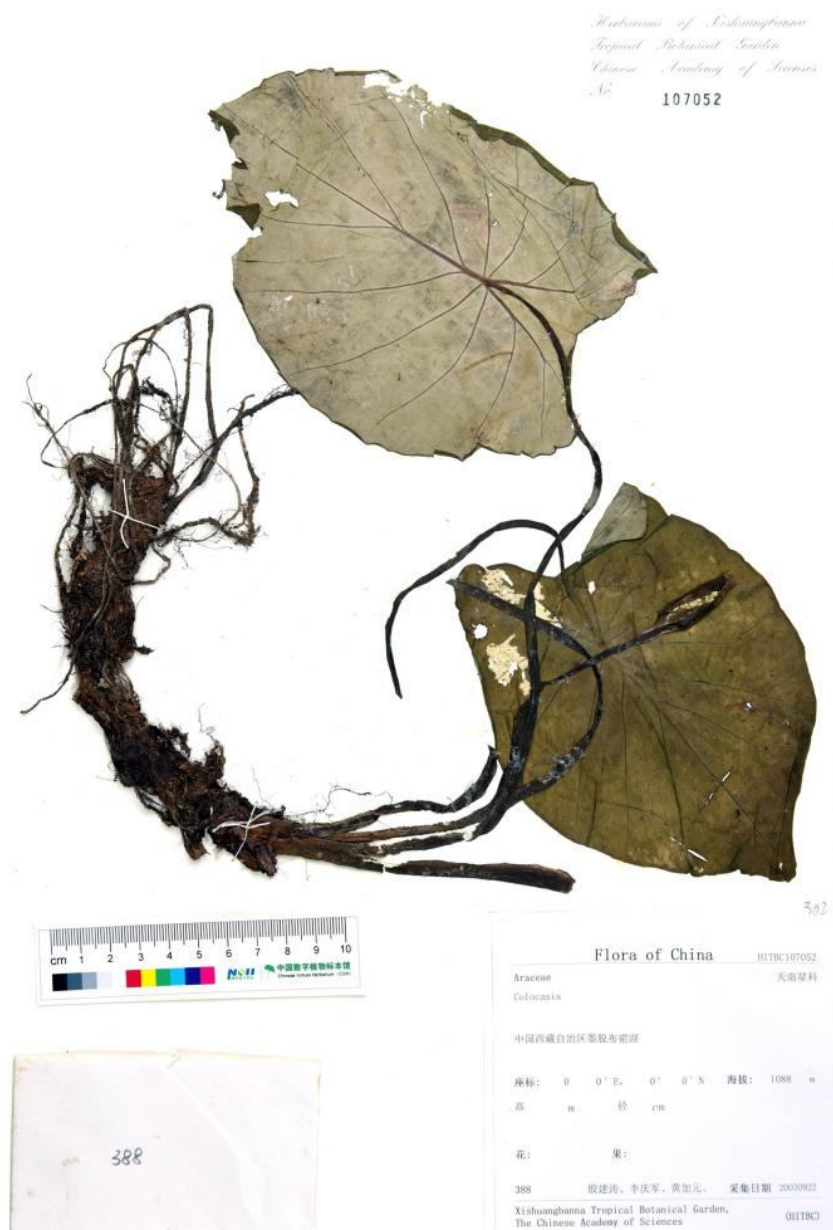


Figure 3. Holotype of *Colocasia xui* J.T. Yin.

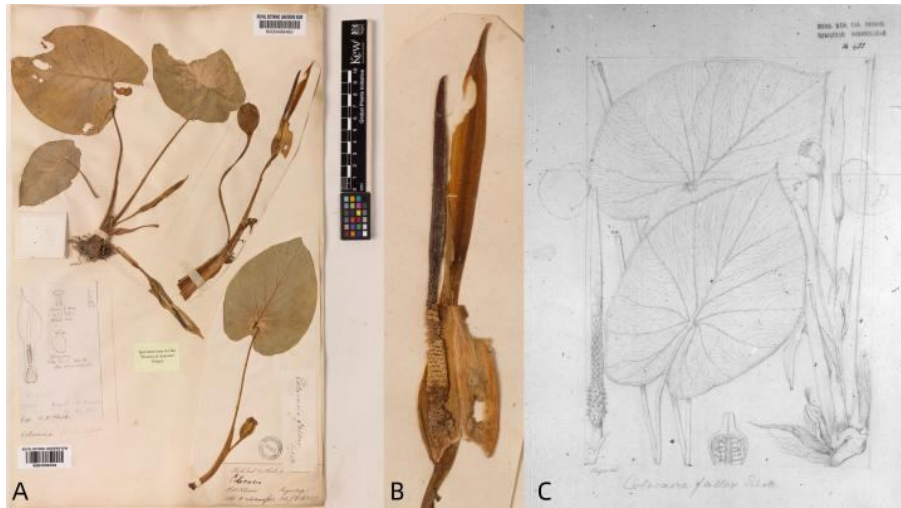


Figure 4. Original material of *Colocasia fallax* Schott. A. Part of the syntype (J.D. Hook. s.n., K[barcode K001056332]!) exhibiting a dissected inflorescence; B. A magnified view of the spadix shown in A, highlighting specific details of its structure; C. Illustration from Schott's manuscript (adopted from Schott 1983), serving as explanatory material to complement the type specimen. A-B © The Board of Trustees of the RBG, Kew.