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Studies on *Typhonium* Schott (Araceae) of Thailand III: *Typhonium cucullatum*, a new species from Sakon Nakhon Province, Northeastern Thailand

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ABSTRACT: *Typhonium cucullatum*, a new species from Sakon Nakhon Province, Northeastern Thailand, is described and illustrated. A detailed description, color plates, a discussion of similar taxa, phenology, distribution, and a conservation status assessment are provided.

KEY WORDS: Areae, Aroideae, Cretaceous sandstone, Indochina, spathe movement, *Typhonium laoticum*.

INTRODUCTION

Thailand, with 34 genera and over 240 species, harbors the highest diversity of Araceae Juss. in Mainland Southeast Asia (Boyce *et al.*, 2012; Hein *et al.*, 2025, POWO, 2025). A notable characteristic of the Thai aroid flora is the prevalence of geophytes, with more than half of the species possessing a hypogeal storage organ in the form of a tuber or rhizome (Boyce *et al.*, 2012). Remarkably, two geophytic genera—*Amorphophallus* Blume ex Decne. and *Typhonium* Schott—account for nearly half of all Thai aroid taxa (Boyce *et al.*, 2012; POWO, 2025).

The genus *Typhonium sensu stricto* (Cusimano *et al.*, 2010; Hay *et al.*, 2022) is the largest genus within the tribe Areae (*sensu* Mayo *et al.*, 1997; see also Cusimano *et al.*, 2010, 2011; Nauheimer *et al.*, 2012) and is sister to the remaining genera of the tribe (Cusimano *et al.*, 2010). Currently, about 72 species are accepted (POWO, 2025), although Boyce and Croat (2025) estimate that the genus may include as many as 100 species. The genus is distributed across South, Southeast, and East Asia, the Malay Archipelago, and Australia, with its center of diversity in Indochina, particularly in Thailand (Low *et al.*, 2020; Hay and Hein, 2022; Hay *et al.*, 2022). In Thailand, *Typhonium* is the second most species-rich aroid genus, with 40 species currently recorded (Saensouk *et al.*, 2024a,b), although its actual diversity is likely underestimated (Boyce *et al.*, 2012).

Fieldwork in Sakon Nakhon Province, Northeastern Thailand, undertaken in July 2024 as part of an ongoing taxonomic revision of *Typhonium* in Thailand, located a population of an unidentified taxon bearing elliptic to elliptic-lanceolate leaf blades with a cuneate to obtuse base. Although this leaf blade shape has previously only been recorded in *Typhonium glaucum* Hett. & Sookch. (Hetterscheid *et al.*, 2001), *T. laoticum* Gagnep. (Gagnepain, 1942), *T. ramosum* Hett. (Hetterscheid, 2013), *T. tubispathum* Hett. & A.Galloway (Hetterscheid and Galloway, 2006), and *T. vinicolor* P.Saensouk, K.Z.Hein & Saensouk (Saensouk *et al.*, 2024a), the newly encountered material is readily separable from these species by its distinctive spathe and spadix morphology. Detailed comparisons with protologues, relevant literature, and examination of type specimens of *Typhonium* confirmed that it does not correspond to any described species. Accordingly, we consider this material a taxonomic novelty, here described as a species new to science, bringing the total number of *Typhonium* species recorded from Thailand to 41.

MATERIALS AND METHODS

Measurements and morphological descriptions were based on fresh materials and spirit-preserved specimens. The description format follows the recent work of Saensouk *et al.* (2024b), with morphological terminology for Araceae adopted from Mayo *et al.* (1997) and supplemented by Beentje (2016). Spathe morphology terminology follows Hetterscheid and Boyce (2000), wherein the spathe base refers to the basal part formed by the convolute margins, and the spathe limb refers to the upper, expanded part; both are separated by a constriction. Observations of spathe movement were carried out in

September 2024 and April 2025 to confirm the pistillate and staminate stages of anthesis. These observations were based on four inflorescences from living specimens cultivated in the greenhouse of Mahasarakham University, Maha Sarakham, Thailand. Herbarium citations follow the Index Herbariorum (Thiers, 2025). Relevant literature and type specimens of *Typhonium* species were examined from various herbaria, including A, AAU, B, BK, BKF, BM, C, CAL, DACB, E, G, K, KKU, KUN, L, M, MO, P, PE, QBG, SING, and WAG, using high-resolution images accessed through https://plants.jstor.org/ and the Global Biodiversity Information Facility (GBIF) accessed from https://www.gbif.org. The conservation status was assessed following the IUCN (2024) guidelines, applying appropriate categories, criteria, and subcriteria based on current knowledge. Geology in this paper is specified based on the 1:250,000-scale geological map of Sakon Nakhon Province published by the Department of Mineral Resources (2012).

TAXONOMIC TREATMENT

Typhonium cucullatum K.Z.Hein, P.Saensouk & Saensouk, ***sp. nov***. **Figs. 1–2 & S1**

***Type*:** Cultivated in the greenhouse of Mahasarakham University, 15 April 2025, *S. Saensouk & K. Z. Hein 003* (original collection: THAILAND. Northeastern – Sakon Nakhon Province, 26 July 2024, *S. Saensouk et al. s.n.*) (holotype BKF, spirit collection!).

***Diagnosis*:** *Typhonium cucullatum* is unique within the genus in having a spathe limb that curves strongly forward, forming a hood-like shape at the end of pistillate anthesis and remaining intact through post-staminate anthesis despite signs of withering. In overall morphology, *T. cucullatum* is most similar to *T. laoticum* (Gagnepain, 1942), but can be readily distinguished by its spathe limb curving strongly forward (vs. the spathe limb reflexed backward in *T. laoticum*), a shorter staminate zone with 4–6 whorls of stamens (vs. 12–15 whorls of stamens in *T. laoticum*), and a stipitate appendix (vs. a sessile appendix in *T. laoticum*).

Description*:** Small, deciduous herbs, to 30 cm tall. ***Stem hypogeal, subglobose or depressed globose tuber, 2.0–2.5 cm in diameter, externally pale brown, internally white. ***Roots*** filiform, 1.0–1.5 mm in diameter, white. ***Leaves*** 2–3 together; *petioles* 11.2–13.3 cm long, 2.5–3.0 mm in diameter, erect, glabrous, cylindrical, almost entirely terete, except for the dorsally shallowly canaliculate distal end, basal subterranean portion white, upper aerial portion plain green or green with a pale reddish or purplish brown flush; *petiolar sheath* 6.5–7.0 cm long, ca. 1/2 of petiole length; *leaf blade* elliptic, narrowly elliptic, or elliptic-lanceolate, 12.8–15.8 × 3.4–4.8 cm, chartaceous, adaxially medium green, abaxially pale green, glabrous on both sides, margins entire or sinuate, base cuneate or obtuse, apex acute or attenuate; *midrib* adaxially impressed, abaxially raised, rounded, 2.5–3.0 mm wide at the base, 1.0–1.5 mm wide at center, then narrowing towards blade apex; *primary lateral veins* 7–9 per side, adaxially impressed, abaxially raised, diverging from the midrib at 12–20°, anastomosing at 2.0–2.5 mm from margin into a submarginal (intramarginal) collective vein; *interprimary veins* somewhat less conspicuous than primaries; *higher order venation* reticulate. ***Inflorescence*** 1–3 together, appearing either before or simultaneously with the leaves, each subtended by a cataphyll; *cataphyll* up to 2 cm long, lanceolate or triangular-ovate, membranous, white, later withering brown; *peduncle* ca. 1.3 cm long, 2.5–3.0 cm in diameter, almost entirely subterranean, cylindrical, terete, glabrous, white; *spathe* 6.6–8.8 cm long, strongly differentiated into a spathe base and a spathe limb by a constriction; *spathe base* ellipsoid-ovoid, ca. 1.5 cm long, 0.8–0.9 cm in diameter, glabrous, externally pinkish or brownish white with dense dark purple or brownish purple mottling, internally pale brownish or purplish white, margins free, convolute; *spathe limb* narrowly elongate-ovate, 5.1–7.3 cm long, 0.6–0.8 cm wide at widest point, glabrous, externally pinkish or brownish white with dense dark purple or brownish purple mottling or short longitudinal striae, internally pale brownish or purplish white, apex narrowly acute, spathe limb erect, gaping and expanding to reveal the staminate zone at early pistillate anthesis (Fig. 2A&B), then reflexing and curling strongly backward during pistillate anthesis (Fig. 2C&D), then uncurling and gradually becoming erect again at late pistillate anthesis, subsequently, the spathe limb gradually curves forward, with the lower part of the spathe limb margins strongly convolute, closing over the staminate zone while partly leaving an opening for the appendix (Fig. 2E&F), and the remaining upper part of the spathe limb margins convolute except at the distal end; the forward curvature of the spathe limb is most prominent during staminate anthesis (Fig. 2G&H), and the strongly forward-curving position persists into post-staminate anthesis even as it begins to wither. ***Spadix*** sessile, 4.8–6.2 cm long, shorter than spathe; *pistillate zone* ca. 1.5 mm long, ca. 4 mm in diameter at the base, shortly conical or hemispheroid, with 2–3 rows of congested pistils; *ovary* ca. 0.7 mm high, ca. 0.5 mm in diameter, obovoid, white, unilocular with one basal ovule held obliquely on a funicle, on a basal placenta; *stigma* sessile, discoid, ca. 0.3 mm in diameter, red, papillate; *sterile interstice* between pistillate and staminate zones 1.2–1.4 cm long, 0.8–1.1 mm in diameter, upper part naked, terete, glabrous, white, lower part covered with 5–6 spirals of staminodes; *staminodes* subulate, 1.3–2.5 mm long, ca. 0.5 mm in diameter, perpendicular to the spadix axis or slightly curved upwards, glabrous, yellow, apex acute or obtuse, lower ones congested, upper ones slightly distant from each other; *staminate zone* 2.8–3.0 mm long, ca. 2.5 mm in diameter, shortly subcylindrical, with 4–6

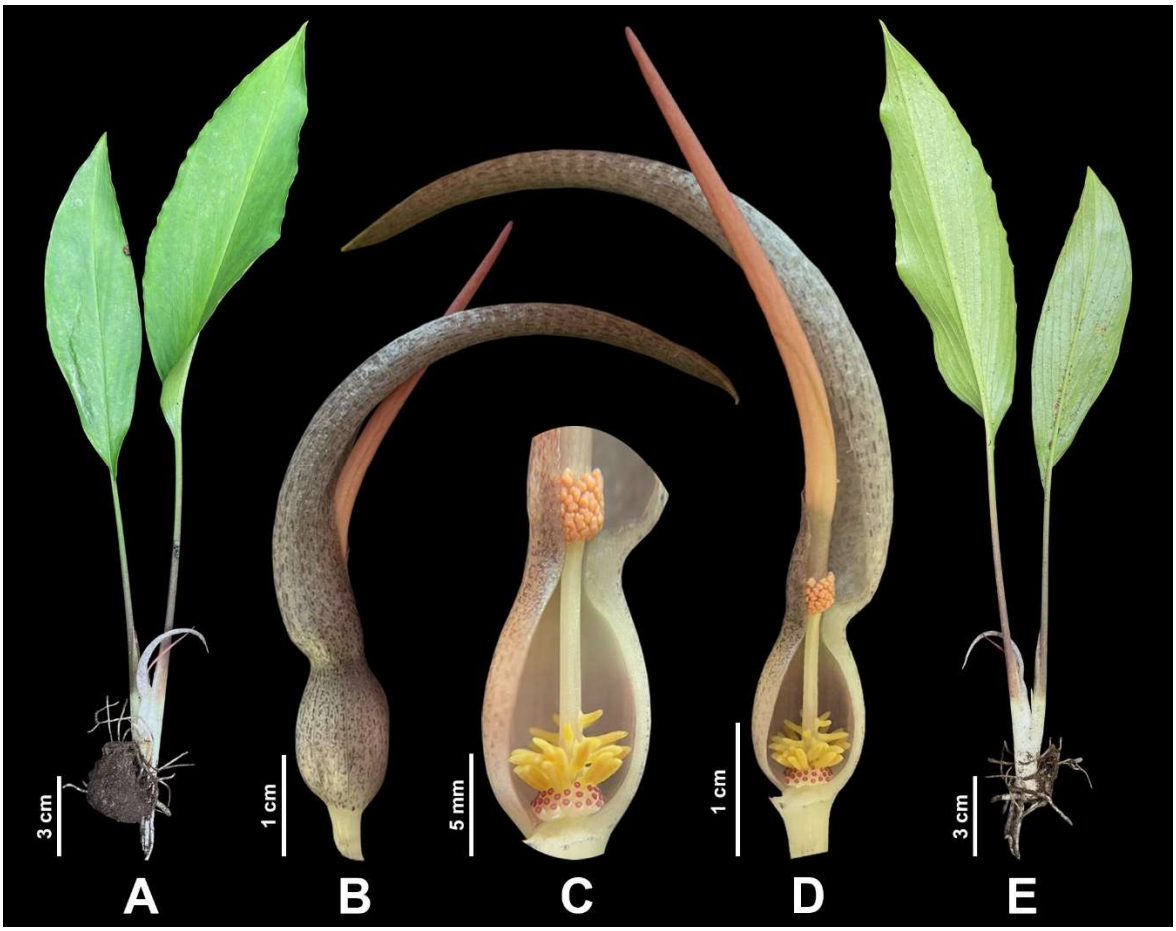

Fig. 1.*Typhonium cucullatum* sp. nov. **A.** Excavated flowering individual showing adaxial surface of leaf blades, **B.** Side view of inflorescence at post-pistillate anthesis, **C.** Detail of spadix showing pistillate zone, sterile interstice, and staminate zone (nearside of spathe artificially removed), **D.** Spadix at post-pistillate anthesis (nearside of spathe artificially removed), **E.** Excavated flowering individual showing abaxial surface of leaf blades. Photos by: Khant Zaw Hein.

Fig. 2. Spathe movement of ***Typhonium cucullatum*** sp. nov. during anthesis. **A. & B.** Inflorescence at early pistillate anthesis, spathe limb erect, gaping and expanding to reveal the staminate zone, **C. & D.** Inflorescence at middle pistillate anthesis, spathe limb reflexing and curling strongly backward, **E. & F.** Inflorescence at post-pistillate anthesis, spathe limb gradually curving forward, with the lower part of the spathe limb margins strongly convolute, closing over the staminate zone, **G. & H.** Inflorescence at staminate anthesis, forward curvature of the spathe limb most prominent. (A., C., E., G. Front view of inflorescence, B., D., F., H. Side view of inflorescence) Photos by: Khant Zaw Hein.

whorls of congested stamens; *stamens* congested, always single, not grouped into multistaminate flowers, 0.6–0.7 mm in diameter, orange; *appendix* stipitate, 2.5–4.0 cm long (excluding the stipe), ca. 2 mm in diameter at base, narrowly elongate conical, tapering towards apex, erect, glabrous, pale orange, apex acute, base attenuate; stipe cylindrical, ca. 0.5 cm long, 1.7 mm in diameter, glabrous, greyish white. ***Infructescence*** not seen.

Distribution and habitat**:** *Typhonium cucullatum* is currently known only from its type locality in Sakon Nakhon Province, Northeastern Thailand. It grows in humus-filled crevices of Cretaceous sandstone under a semi-open canopy of tropical dry deciduous forest at an elevation of approximately 300 m a.s.l.

Phenology**:** Flowering observed in July in the wild, and in September and April under cultivation.

Etymology**:** The specific epithet is derived from the Latin *cucullatus*, meaning 'hooded', referring to the spathe limb becoming forwardly curved and hood-like.

Provisional conservation status**:** This new species is currently known only from the type locality, and further field studies and collections are needed to determine whether it occurs elsewhere. Due to limited data on its distribution, population size, and potential threats, we propose classifying it as 'Data Deficient' (DD) according to the IUCN Red List criteria (IUCN Standards and Petitions Subcommittee, 2024).

Taxonomic notes**:** Based on overall morphology, *Typhonium cucullatum* is also similar to *T. glaucum* Hett. & Sookch. (Hetterscheid et al., 2001); however, *T. glaucum* strikingly differs from *T. cucullatum* by having staminodes that are basally to entirely connate with neighboring staminodes, whereas in *T. cucullatum*, the staminodes are free and slightly spaced apart..

Additional specimen examined (paratype)**:** Cultivated in the greenhouse of Mahasarakham University, 15 September 2024, *S. Saensouk & K. Z. Hein 001* (original collection: THAILAND. Northeastern – Sakon Nakhon Province, 26 July 2024, *S. Saensouk et al. s.n.*) (VMSU, spirit collection!).

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Fig. S1. ***Typhonium cucullatum*** sp. nov. Flowering individual in habitat. Photo by: Khant Zaw Hein.