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A NEW SPECIES OF sect. *Alpinia* subsect. *Alpinia* (Zingiberaceae) FROM NORTHERN VIETNAM

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ABSTRACT

Alpinia tamdaoensis was discovered on the southwestern slope of the Tam Dao mountain range. This area is mainly tropical moist evergreen forest, which covers most of Tam Dao at an altitude below 800 m, subtropical moist evergreen low mountain forest covers the areas over 800 m. Because the survey route of many previous research teams often ignored this area, a survey on the mountain peaks and northeastern slopes of the Tam Dao mountain range. On the other hand, February to April each year is the flowering season of this species, this is the time when a few research teams survey. When the fruit is present, it is often confused with some other species of genus *Alpinia* in the same area and is therefore not collected. This find has increased the number of species of the genus *Alpinia* in Vietnam to 42 species. The new taxon is described and illustrated with field photographs of detailed botanical characteristics.

Keywords: Tam Dao National Park, Phu Tho, *Alpinia tamdaoensis.*

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INTRODUCTION

Alpinia (Roxb.) is a genus in the ginger family (Zingiberaceae), comprising about 250 accepted species, making it one of the most species-rich genera in the family (Powo, 2025). Most members are distributed across the subtropical and tropical forests of Asia, Australia, and the Pacific Islands (Wu & Larsen, 2000). In Vietnam, *Alpinia* currently includes 42 recognized species, a significant increase from previous records: Pham Hoang Ho (1993, 2000) introduced 20 species, the names of 27 species were mentioned by Nguyen Quoc Binh (2005), and 31 species were described in 2017 (in Flora Vietnam). This remarkable increase over the past 25 years is due to numerous newly described and newly recorded species.

Regarding genus *Alpinia*, R. M. Smith (1990) had proposed a new infrageneric classification, which divided species in the genus *Alpinia* into 2 Subgenera: Subgen. *Alpinia* (including 7 Sections, 10 Subsections) and Subgen. *Dieramalpinia* (4 Sections and 2 Subsections). The Vietnamese galangal species are concentrated in the Subgen. *Alpinia*. The characteristics of the new species show that it belongs to the Subgen. *Alpinia* Sect. *Alpinia*. Characteristics of this taxon are an inflorescence erect or pendulous, branched or unbranched. Bracts often soon deciduous, rarely persistent, sometimes absent; flowers single or in cincinni.

During botanical surveys in Tam Dao Mountain (Phu Tho province, Northern Vietnam), we encountered an unknown species of *Alpinia* Sect. *Alpinia* Subsect. *Alpinia*. The Subsection is characterized by an erect inflorescence, bracts small and soon deciduous, bracteoles that open to the base, cincinni with two to many flowers, a flat or concave shortly bilobed labellum, and an anther with a crested apex.Prior to this discovery, 13 species of subsect. *Alpinia* have been recorded in Vietnam, namely *Alpinia breviligulata, Alpinia coriandriodora, Alpinia galanga, Alpinia globosa, Alpinia oblongifolia, Alpinia maclurei, Alpinia pinnanensis, Alpiniapolyantha, Alpinia stachyodes, Alpinia strobiliformis, Alpinia tonkinensis, Alpinia intermedia* and *Alpinia velutina*.

MATERIALS AND METHODS

The studied material was collected from Tam Dao National Park, Phu Tho province, Vietnam, at an altitude of 500–950 m. Specimens were processed following the guidelines of the Royal Botanic Gardens, Kew (Bridson & Forman, 1999). Field photographs were taken using a digital camera, and detailed descriptions of taxonomically significant characters were recorded from fresh materials in situ. Taxonomic identification was based on morphological characters, including both vegetative and reproductive traits. Comparative analysis was conducted using *Alpinia* specimens housed in major Vietnamese herbaria, including the Vietnam National Museum of Nature (VNMN), Institute of Biology (HN), VNU University of Science (HNU), Hanoi University of Pharmacy (HUP), Institute of Advanced Technology (SGN) and other relevant collections.

Alpinia tamdaoensis **Q. B. Nguyen & Luu, sp. nov. (Fig. 1)** urn:lsid:ipni.org:names:77377828-1

Most morphologically similar to *Alpinia coriandriodora* D.Fang in having small cincinni of 2–4 flowers each, bilobed ligule, and overall labellum shape, but differs in the following: pedicel (flower sessile vs. pedicel 1–1.5 mm long in *A. coriandriodora*); floral tube10–12 mm long, white (vs.5–7 mm long, light red-brown); labellum 9–11 × 6–8 mm, yellow with purple-brown stripes (vs.5–6 × 3–3.5 mm, light yellow with red-brown stripes); filament 6–8 mm, pale green (vs.5–6 mm, red-brown); anther5–6 mm (vs.3–4 mm); crest bilobed (vs. entire); lateral staminodes2–3 mm (vs.3–6 mm).

Type: VIETNAM, Phu Thoprovince, Tam Dao National Park, 21°26’48”N, 105°37’29”E, 580 m elevation, 10 Mar. 2019, *Nguyen Quoc Binh & Nguyen Phuong Hanh SH 728* (holotype: VNMN!, isotypes: HN!, SGN!).

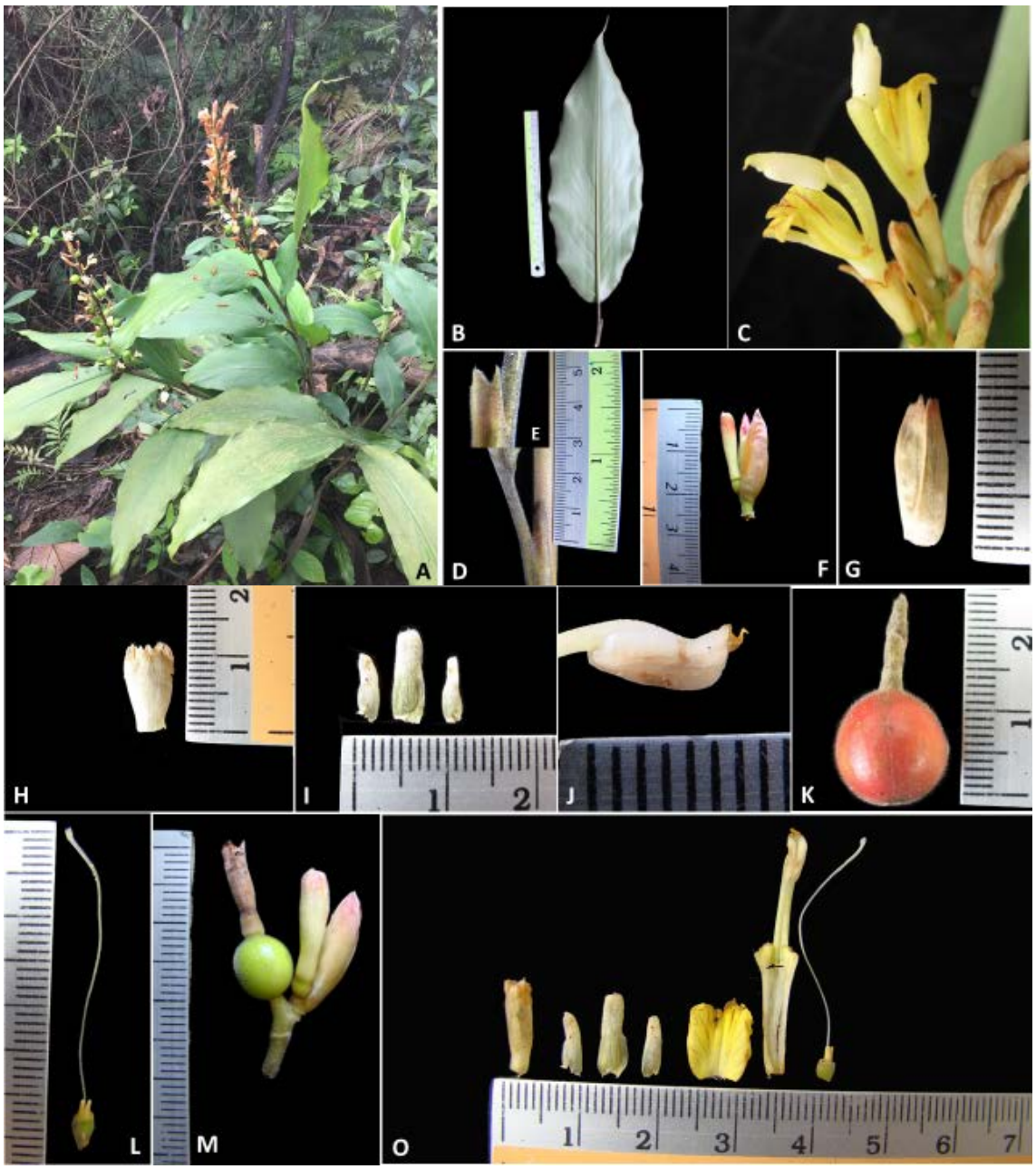

Figure 1. *Alpinia tamdaoensis*sp. nov.: A. habit; B. leaf; C. flowers; D. petiole (left) and ligule (right); E. ligule (inside); F. cincinni; G. bracteoles; H. calyx; I. corolla lobes; J. anther and crest; K. ripe fruit; L. ovary and epigynous glands, style, stigma; M. green fruit and young flower; O. flower dissection (from left): calyx,three corolla lobes, labellum, corolla-filament-anther, ovary-epigynous glands-style-stigma [*Photos by* Nguyen Quoc Binh]

Etymology: The species is named after Tam Dao Mountain, a rocky mountain range in the Northern of Vietnam, located in Phu Tho province, where the type specimens were collected.

Figure 2. Inflorescence: A. *Alpinia tamdaoensis*sp. nov.; B. *Alpinia coriandriodora*; C. *Alpinia maclurei*; D. *Alpinia intermedia* [*Photos by* Nguyen Quoc Binh]

Common and vernacular names: Tam Dao galangal (Vietnamese name: Riềng Tam Đảo).

Descriptions: Terrestrial herb, 1–1.3 m high, with 7–11 leaves; blade 30–40 × 11–13 cm, leathery, base rounded, apex tapering to a subulate tip 2–3 cm long, adaxially green and glabrous, abaxially light green with a smooth surface. *Petiole* 1.5–2.5 cm long, densely black-gray pubescent externally; ligule 0.7–1.0 cm long, apex shallowly bilobed (2–3 mm deep), externally densely pubescent; leaf sheaths hispid. *Inflorescence* is a terminal raceme, 15–20 cm, erect, with a white, soft hairy axis. *Peduncle* 3–7 cm. *Pedicel* of

cincinni 4–6 mm long, with white soft fur, flowers 2–3 per cincinni, sessile. *Outer bract* enclosing flowers, narrowly ovoid, 14–16×7–8 mm, light yellow-brown, easily deciduous during anthesis, apex pale-pink, short tomentose; bracteoles narrowly ovoid, open to the base, pale brown-green, 12–15 × 6–7 mm, glabrous with short hairs at the apex. *Flower* small, sessile. *Calyx* tubular, pale yellow, 10–12 mm long, abaxially silky with small white pubescence, unilaterally split 3–4 mm, apex with 3 teeth, teeth 1–1.5 mm high, margins short white ciliate. *Floral tube* equal in length to the calyx (10–12 mm), white, thin villous, sparse; *Dorsal corolla lobe* oblong, 9–11 × 4–5 mm, concave, white, abaxially covered with white soft hairs; *Lateral corolla lobes* oblong, 6–7 x 3–4 mm, concave, white, abaxially covered with white soft hairs. *Labellum* broadly obovate, 9–11 × 6–8 mm, flat with the upper half slightly recurved, yellow with purple-brown stripes, soft white pubescent at the throat, apex short-bilobed. *Lateral staminodes* 2, subulate, 2–3 mm long, pale yellow, base with a pale red-brown cavity, apexstraight or slightly outward-curved. *Filament* 6–8 mm × 1.5–2 mm, pale green. *Anther* 2-locular, 5–6 mm long, parallel, white, dorsally sparsely villous; connective extends upward into a 1–2 mm long translucent white crest, forming an obtuse angle with the anther, apex emarginate and bilobed, top lobe rounded. *Ovary* broadly ovoid, trilocular, 2–2.5 ×1.5–2 mm, green, externally shortly white hirsute. *Style* filiform, white, 22–24 mm long, stigma funnel-shaped, white, margin shortly white ciliate. *Epigynous glands* 2, subulate, 1.5–2 mm, pale yellow, attached atop the ovary. *Capsule* globose, pubescent, 1.1–1.3 cm in diameter, green, turning red-brown at maturity. *Seeds* irregularly polygonal, green, with a thin white aril.

Similar species

Morphologically, *A. tamdaoensis*sp. nov. shares similarities with *A. coriandriodora, A. maclurei*, and *A. intermedia*, particularly in having 2–3 flowers per cincinni, bilobed ligules, and a calyx split on one side. However, it differs in several key characteristics, including the shape and color of its inflorescence and labellum (Fig. 2). Unlike the other three species, *A. tamdaoensis* has sessile flowers, while *A. coriandriodora*, *A. maclurei*, and *A. intermedia* bear pedicellate flowers. Additionally, its bracteoles are notably longer, measuring 12–15 mm (compared to a maximum of 10 mm in the other species), and its anthers are also larger, reaching 6–8 mm (whereas the longest anther in the other species measures 4–5 mm). Further distinctions in floral size, shape, and coloration are detailed in Table 1.

Distribution, ecology and conservation status:*A. tamdaoensis* is currently known only from Tam Dao National Park, where it grows under the canopy of broad-leaved evergreen forest alongside *Pinus massoniana* Lamb. The species thrives in shaded, humid conditions at elevations ranging from 500 to 950 m. Flowering occurs from January to April, with fruiting following from April to July. Observations indicate that the new species is limited to a few small populations, each consisting of approximately 30–50 individuals. It has not been recorded in other nearby mountain ranges of similar elevation and ecological conditions. Due to the lack of comprehensive field surveys assessing population size and distribution, *A. tamdaoensis* should be classified as Data Deficient (DD) under the current IUCN Red List criteria (IUCN Standards and Petitions Subcommittee, 2024). Further studies are necessary to determine its conservation status and potential threats to its survival.

Additional specimens examined (paratypes): VIETNAM. Phu Tho province: Tam Dao National Park, 950 elevation, 10 Jan. 2015, *Nguyen Quoc Binh VNMN 2183* (VNMN!, HN!, SGN!); 880 m elevation, 14 April 2016, *Nguyen Quoc Binh SH 86* (VNMN!, HN!, SGN!).

Table 1. Comparison of morphological characters between Alpinia tamdaoensis and closest congeners. *Alpinia coriandriodora* (data from Vu Xuan Duong et al., 2019 and from our study of the specimen Q. B. Nguyen & X. D. Vu SH 83 (VNMN), Q. B. Nguyen & X. D. Vu SH 84 (VNMN); *Alpinia maclurei* (data from Nguyen Quoc Binh, 2017 and from our study of the specimen VMN-B0000793 (VNMN); *Alpinia intermedia* (data from Nguyen Quoc Binh, 2017 and from our study of the specimen QB 581 (VNMN)

Characters	*Alpiniatamdaoensis* sp. nov.	*Alpiniacoriandriodora*	*Alpinia maclurei*	*Alpiniaintermedia*
Leaf blade	30–40×11–13 cm, abaxially smooth fur	13–16×2.5–3.3 cm, glabrous	30–50×8–10 cm, 1.5–2 cm,white pubescent	20–50×6–12 cm, glabrous
Pedicel	Sessile	1–1.5 mm	0.5–1 mm	1–2 mm
Bracteoles	12–15 mm, narrow ovoid, open to the base, pale brown-green	5–9 mm, elliptic, flat, open to the base, light green, puberulent	7–8 mm, oblong-ovate, open to the base, light reddish brown	7–10 mm, open to the base
Calyx	10–12 mm, pale yellow, split down to 3–4 mm on one side	7–9 mm, yellow-white on lower half, pale pink on upper half, split down to 1.5–2 mm on one side	6–10 mm, white, puberulent, split down to 1-2 mm on one side	3.5–4.5 mm, white, split down to 1–1.5 mm
Floral tube	10–12 mm, white	5–7 mm, light red-brown	11–12 mm, white	8–10 mm, white
Labellum	9–11×6–8 mm, broadly obovate, yellow with purple-brown stripes	5–6×3–3.5 mm, light yellow with red-brown stripes	16–18×12–14 cm, broad ovoid, white with2 red bands along the mid-vein andyellow upper half of the mid-vein	14–18 mm long, obovate, white, with 2 red stripes along lower half of the mid-vein
Filament	6–8 mm, pale green	5–6 mm, red-brown	1.2–1.4 cm, white	18–22 mm, white
Anther	5–6 mm, white	3–4 mm, white	4–5 mm, white, adaxially with light pink spots	2–3 mm, yellow-white light
Crest	1–2 mm, bilobed	1 mm, entire	1.5–2 mm, bilobed	1 mm, entire
Lateral staminodes	2–3 mm, subulate, pale yellow, basally with pale red-brown cavity	3–6 mm, linear, reddish brown	4–5 mm, band-form, flat, reddish brown	1–2 mm, subulate

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REFERENCES

Bridson D., Forman L., 1999. Herbarium Handbook - 3rd Edition. Lubrecht & Cramer Ltd, Kew, pp. 346.

IUCN Standards and Petitions Subcommittee, 2024. Guidelines for using IUCN Red List Categories and Criteria. Version 16. Prepared by the Standards and Petitions Subcommittee.IUCN. Available from: http://www.iucnredlist.org/documents/RedListGuidelines.pdf (accessed 5 September 2025).

Ngoc-Sam Ly, 2017. *Alpinia newmanii* sp. nov. (Zingiberaceae) from central Vietnam. *Nordic Journal of Botany*, 35(2): 176–181: 1–6. https://doi.org/10.1111/njb.01429

Nguyen Quoc Binh, 2005. In Ban N. T. (Editor). Zingiberaceae Lindl. 1835 - Họ Gừng. *Checklist of Plant Species of Vietnam*. Vol. III: 487–492. Agricultural Publishing House.

Nguyen Quoc Binh, 2017. Họ Gừng - Zingiberaceae Lindl. *Flora of Vietnam*, Vol. 21: 41–109. Publishing House for Science and Technology, Ha Noi.

Pham Hoang Ho, 1993. Zingiberaceae: - Zingiberaceae. *An Illustrated Flora of Vietnam*, 3(1): 534–572. Mekong Printing, Santa Ana, California. USA.

Pham Hoang Ho, 2000.Zingiberaceae: - Zingiberaceae. *An Illustrated Flora of Vietnam*, III: 432–461. Young Publishing House.

Powo, 2025. Plants of the World Online. Facilitated by the Royal Botanic Gardens. Published on the Internet. Available from: https://powo.science.kew.org/taxon/328388-2 (accessed 1 July 2025)

Shuichiro Tagane, Nguyen Van Ngoc, Hoang Thi Binh, Ai Nagahama, Meng Zhang, Truong Quang Cuong, Le Van Son, Van-Son Dang, Hironori Toyama, Natsuki Komada, Hidetoshi Nagamasu and Tetsukazu Yayama, 2020. Fifteen New Species of Angiospermum from Bioup-Nui Ba National Park, Southern Highlands of Vietnam. *Acta Phytotax. Geobot.*, 71(3): 201–229. doi: 10.18942/apg.202002

Smith R.M., 1990. *Alpinia* (Zingiberaceae): A proposed new infrageneric classification. *Edinburgh Journal of Botany*, 47(1): 1–75.

Vu Xuan Duong, Nguyen Quoc Binh, Dang Trong Luong, Nghiem Duc Trong, Cao Phi Bang, Vu Tien Chinh, Ye Xing-er, Xia Nian-he, 2019. *Alpinia coriandriodora* D. Fang, A New Record for Flora of Vietnam. *Journal of Tropical and Subtropical Botany*, 27(1): 99–101.

Wu D. & Larsen K., 2000. *Alpinia*, Zingiberaceae. pp. 333–346 in Z. Y. Wu & P. H. Raven (editors), Flora of China, Vol. 24. Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis.