

## ***Newmania bambusifolia* (Zingiberaceae: Zingiberoideae), a new species from Hon Ba Nature Reserve, southern Vietnam**

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**ABSTRACT.** *Newmania bambusifolia* Škorničk., Vuong & Bao (Zingiberaceae: Zingiberoideae), a new ginger species discovered in Hon Ba Nature Reserve, Khanh Hoa Province in southern Vietnam is described and illustrated here with notes on distribution, ecology, phenology, preliminary IUCN assessment, and etymology. It is distinct from all known congeners by the very narrow leaf-blades, resembling those of bamboos. This discovery increases the total number of species in *Newmania* to seven. We include an updated key to the genus accommodating this novelty.

**Keywords.** Eastern Indochina, gingers, Khanh Hoa Province, Vulnerable, Zingibereae

### **Introduction**

*Newmania* N.S.Lý & Škorničk. is a small genus of gingers endemic to Vietnam (Leong-Škorničková et al., 2011). The members of this genus are easy to recognise by the following combination of characters: a *Zingiber*-like habit with a well-developed pseudostem and usually numerous pulvinate leaves, flowers with a white long floral tube and a purple to violet labellum, and anthers, which are mostly ecristate, but if present, the crest does not wrap around the style (as it always does in *Zingiber* Mill.). Only six species have been described to date, namely *Newmania cristata* Luu et al. (Trần et al., 2018), *N. gracilis* Škorničk. et al. (Trần et al., 2018), *N. orthostachys* N.S.Lý & Škorničk. (Leong-Škorničková et al., 2011), *N. serpens* N.S.Lý & Škorničk. (Leong-Škorničková et al., 2011), *N. sessilantha* Luu & Škorničk. (Luu et al., 2015), and *N. sontraensis* H.Đ. Trần et al. (Trần et al., 2018).

A *Newmania* species with very narrow bamboo-like leaf blades and lax inflorescences was discovered in Hon Ba Nature Reserve during fieldwork by the first author in 2019 and recollected again in 2023. The shape of leaf blades is unique in the genus and the species is therefore formally described below as *Newmania bambusifolia*.

## Materials and methods

The description below is mainly based on living flowering plants from the type locality, supplemented with flowers preserved in spirit; the style and level of detail follows previous *Newmania* publications (Leong-Škorničková et al., 2011; Lru et al., 2015; Trần et al., 2018). General plant terminology follows Beentje (2016). As the vegetative parts of *Newmania* may easily be confused with a species of *Zingiber*, all herbarium collections of *Newmania* and *Zingiber* have been checked at E, HN, K, P, SING, VNM and VNMN. The preliminary conservation assessment is based on the guidelines of the IUCN Standards and Petitions Committee (2024), with nomenclature and typifications following the rules of ICN (Turland et al., 2018). A general introduction to the Zingiberaceae and the genera of Cambodia, Laos and Vietnam can be found in Leong-Škorničková & Newman (2015), while an introduction to the phytogeography of the region is outlined by Averyanov et al. (2003). The key to the genus by Trần et al. (2018) is updated below to include the new species.

## Taxonomic treatment

### *Newmania bambusifolia* Škorničk., Vuong & Bao, **sp. nov.**

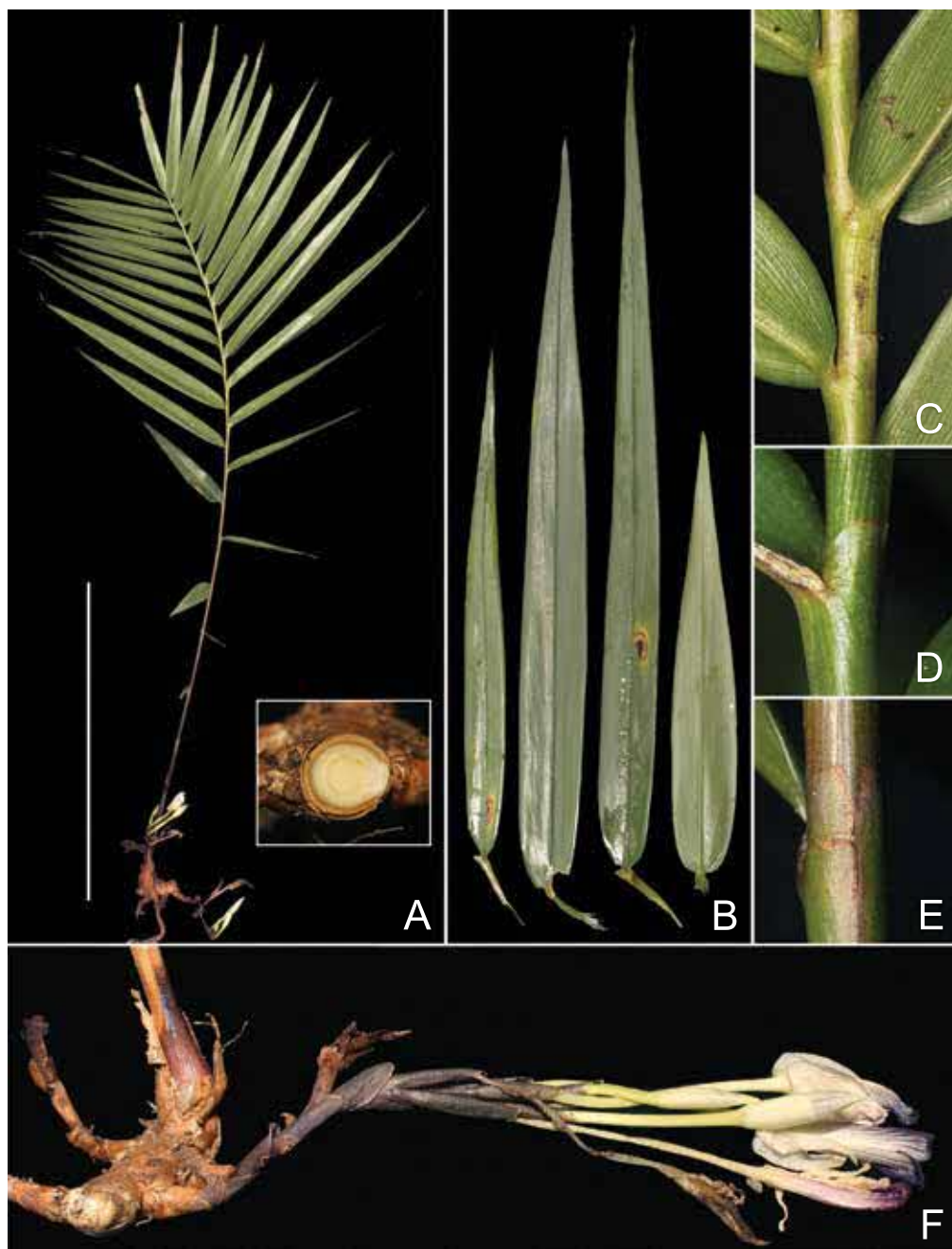
Unique in the genus by its prominently narrow, bamboo-like leaf-blades and dark purple labellum with overlapping lobes. Flowers are most similar to *Newmania cristata* by the yellow to greenish floral tube and filament, but differ by having a small anther crest less than 1 mm long with entire rounded apex (vs anther crest 4.6–5 mm long with a bilobed apex). – TYPE: Vietnam, Khanh Hoa Province, Cam Lam District, Suoi Dau, Hon Ba Nature Reserve, c. 1500 m, 26 June 2023, *Ba Vuong Truong, Quoc Bao Nguyen & Van Lam Mang BV 1774* (holotype VNM [VNM00063956]; isotypes E, SING [SING0403241, SING0403242, incl. flowers preserved in spirit SING0402820], VNM [VNM00063955]). (Figs 1–3)

Terrestrial rhizomatous herb, up to 0.9 m tall, with c. 2 leafy shoots arising from rhizome, 1–2.5 cm apart. **Rhizome** branched, 0.5–1 cm diam., light brown externally, pale yellow internally, usually covered by papery scales; **root tubers** not seen. **Leafy shoot** 25–95 cm long (measured from base to the uppermost ligule), bladeless or with just vestiges of leaves in basal 1/2, with 19–25 leaf blades clustered in distal half; **bladeless sheaths** c. 4, another c. 4 with leaf blade vestiges, basalmost sheaths striate, maroon to purple, turning brown and papery with age, distal sheaths green with maroon to reddish tinge, obscurely striate, glabrous; **leaf sheaths** closed or nearly so, green, sometimes tinged maroon to reddish, obscurely striate, glabrous; **ligule** 2–5 mm long, closed, truncate to obscurely bilobed due to the unilateral small incision or notch opposite the petiole, green to pale green, glabrous; **petiole** 2–3 mm long, pulvinate, green, glabrous; **leaf blade** linear, (13–)17–26 × 1.5–2.2 cm, smooth (not plicate), somewhat leathery, adaxially green, glabrous, abaxially paler green with darker veins, glabrous on both sides, margin entire, straight (not wavy). **Inflorescence** arising from



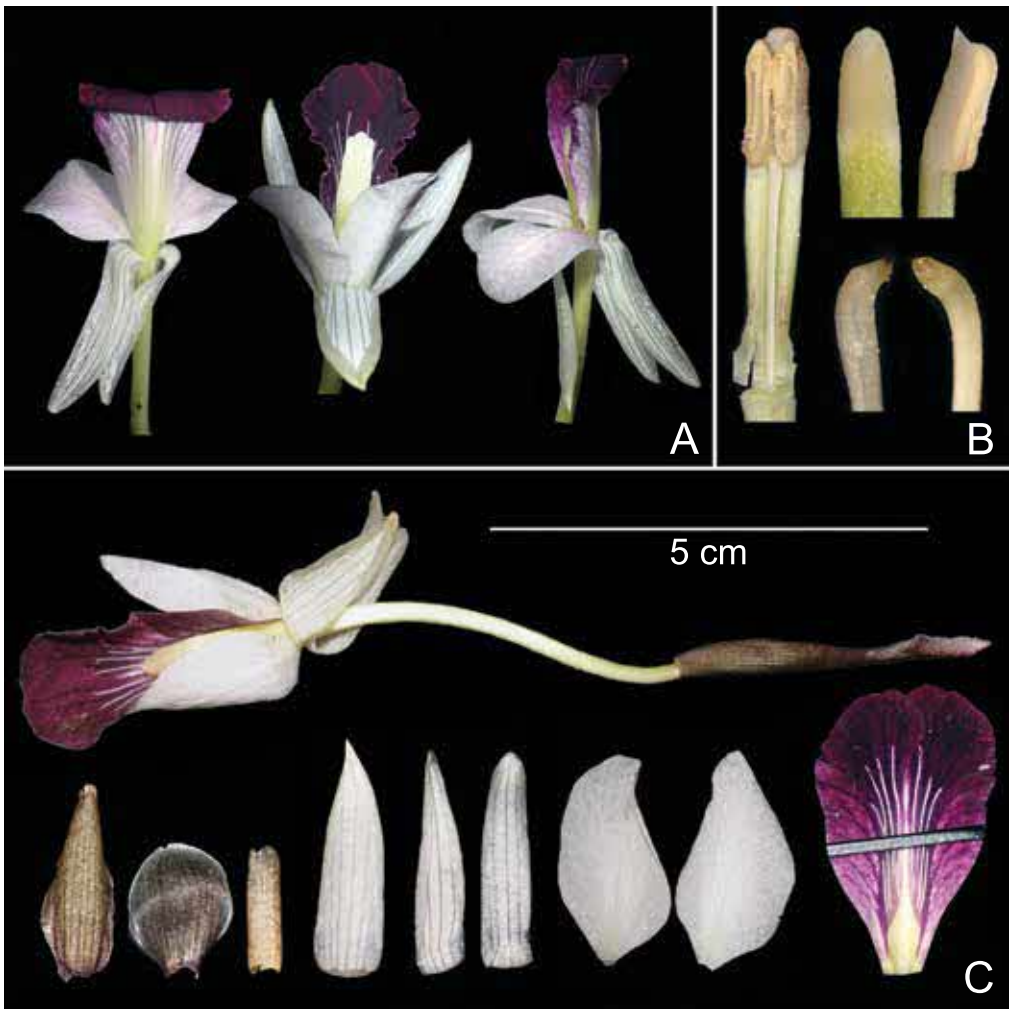
**Fig. 1.** *Newmania bambusifolia* Škorničk., Vuong & Bao in situ at Hon Ba Nature Reserve. From the type, *Truong et al. BV 1774*. (Photo: B.V. Truong)

rhizome at base of leafy shoot, prostrate on the ground or partly embedded in ground or leaf litter with flowers extending well above the ground; *peduncle* 4–6 cm long, covered with 5–8 sheathing bracts; sheathing bracts tubular at base, 2–8 mm long, longer distally (to 2 cm), olive green tinged richly maroon to dark purple, adaxially  $\pm$  matt, abaxially glossy, glabrous on both sides, apex round to somewhat acute, sometimes minutely mucronate or with apical notch; *spike* more or less lax, sometimes somewhat ascending, 4–6 cm long, composed of 4–8 fertile bracts, each supporting a single flower; *fertile bracts* ovate to oblong-ovate,  $15\text{--}21 \times 8\text{--}10$  mm, open to base, margins overlapping (appearing tubular), olive green tinged richly maroon to dark purple, adaxially  $\pm$  matt, abaxially glossy, glabrous on both sides, apex rounded with a few ciliate hairs, margin hyaline; *bracteole* one per flower, broadly obovate,  $9\text{--}16 \times 7\text{--}9$  mm, open to base, olive green tinged maroon to dark purple, adaxially  $\pm$  matt, abaxially glossy, apex rounded, sometimes minutely mucronate or notched, apical margin with a few ciliate hairs, margin hyaline. **Flower** 8–11 cm long; *calyx* tubular, 10–11 mm long, 2.5–3 mm diam., semi-translucent, pale olive green tinged purple, glabrous, apex with no distinct teeth and a somewhat erose ciliate margin; *floral tube* narrowly cylindrical, 5–7 cm long, 2–3 mm diam., pale greenish yellow, glabrous; *dorsal corolla lobe* narrowly triangular-ovate,  $26\text{--}28 \times 8\text{--}10$  mm, usually bent upwards or reflexed, white with translucent veins, glabrous, apex acute, slightly



**Fig. 2.** *Newmania bambusifolia* Škorničk., Vuong & Bao. **A.** Habit (inset: detail of cross-section of rhizome). Scale bar: 30 cm. **B.** Leaf blades from various parts of the leafy shoot (from the left: distal, middle part of pseudostem (two blades), basal). **C.** Pseudostem showing ligules, pulvinate petioles and bases of leaf blades. **D, E.** Detail of leaf sheaths and ligules. **F.** Rhizome with an inflorescence. All from the type, *Truong et al. BV 1774*. (Photos: B.V. Truong)





**Fig. 3.** *Newmania bambusifolia* Škorničk., Vuong & Bao. **A.** Distal part of the flower in different views. **B.** Details of stamen and stigma (left: entire stamen in adaxial view; top right: anther with part of filament in abaxial and lateral views; bottom right: details of stigma). **C.** Flower with bract, pedicel and part of rachis, and dissection below (from left: bract, bracteole, calyx, dorsal corolla lobe in abaxial view, lateral corolla lobes (one in adaxial and one in abaxial view), staminodes (one in abaxial and one in adaxial view), and labellum. Tweezers seen across the labellum were used to flatten it. All from the type, *Truong et al. BV 1774*. (Photos: B.V. Truong)

mucronate; *lateral corolla lobes* narrowly triangular-ovate,  $26\text{--}28 \times 7\text{--}9$  mm, white with translucent veins, glabrous, apex acute; *labellum* obovate,  $30\text{--}32 \times 18\text{--}21$  mm, apex recurved, bilobed (up to  $1/3$  of the length), lobes overlapping, dark purple with a pale green-yellow rhombic patch at the centre of the base, with 3 or 4 white veins on each side radiating from the base to  $2/3$  of the labellum towards apex; *lateral staminodes* elliptic to obovate,  $22\text{--}26 \times 10\text{--}14$  mm, white or with faint purplish shade,

glabrous; *stamen* 18–21 mm long; *filament* 10–12 mm long, 2–3 mm broad at base, c. 4 mm broad at apex, light green; *anther* 8–9 × 3.5–4 mm, connective tissue pale cream, greenish at base, gradually transiting to pale beige or white towards apex; *anther crest* 1–1.5 × c. 2 mm long, apex rounded to obscurely bilobed (emarginate); *thecae* 7–8 mm long, dehiscing longitudinally along their entire lengths, glabrous; *pollen* cream to pale yellow; *ovary* barrel-shaped, 3.5–4 × 2.5–3 mm, cream white with very sparse purple dots; *epigynous glands* absent; *style* white, glabrous; *stigma* 0.5–1 mm long, curved in relation to style, white at base, yellowish towards ostiole, ostiole transverse elliptic, ciliate, cilia rusty brown. **Fruits** not seen.

*Distribution.* Endemic to Vietnam, Khanh Hoa Province.

*Ecology and phenology.* *Newmania bambusifolia* occurs on slopes in primary evergreen broadleaved montane forest, at elevations of c. 1500 m. Flowering was observed in June–July, and fruiting is thought to occur in July–September.

*Etymology.* The specific epithet refers to the unusually narrow, bamboo-like leaf blades.

*Provisional IUCN conservation assessment.* Endemic to Vietnam, and only known from a single location in Hon Ba Nature Reserve. Although the area is under legal protection, this species appears to be very rare. Hon Ba Nature Reserve has been surveyed by us and other botanical teams on multiple occasions since 2011, yet only a single location for this species is known to date. Any localised stochastic event may drive this taxon to extinction. Until further information on the distribution of this species is available, we propose to treat this species as Vulnerable (VU D1, D2), following the guidelines of the IUCN Standards and Petitions Committee (2024). This species may occur also in Bidoup-Nui Ba National Park, which is known to share many species of Zingiberaceae with Hon Ba Nature Reserve. The two places are slightly over 50 km apart (air distance/as the crow flies) and overlap in altitudinal zonation and vegetation types although the highest peak of Hon Ba is lower at an elevation of 1578 m compared to the highest peak in Bidoup-Nui Ba National Park at 2287 m.

*Additional specimen examined.* VIETNAM: **Khanh Hoa Province:** Cam Lam District, Suoi Dau, Hon Ba Nature Reserve, c. 1500 m, 28 Jun. 2019, *Ba Vuong Truong & Van Lam Mang BV 1928* (VNM [VNM00070762, VNM00070767]).

*Notes.* As already pointed out, the narrow, bamboo-like leaf blades are unique in *Newmania*, setting this species apart from all other congeners. In Vietnam, *Zingiber atroporphyreum* Škorničk. & Q.B.Nguyễn and *Z. cardiocheilum* Škorničk. & Q.B.Nguyễn have similarly shaped leaves (Leong-Škorníčková et al. 2015), and sterile herbarium collections could potentially be misidentified. In the field, such a confusion could be easily avoided as both these *Zingiber* species occur only in northern Vietnam whereas *N. bambusifolia* is restricted to southern Vietnam. The lax inflorescences of *Newmania bambusifolia* is another character that is uncommon in the genus. So far,

only *Newmania serpens* (Leong-Škorničková et al. 2011) has been reported to have lax inflorescences, but this species differs from *N. bambusifolia* by the prominently plicate leaf blades, a deep violet labellum with a bright red patch in the centre and the apical lobes not overlapping, the pure white filament and the ecristate anther (vs smooth and more leathery leaf blades, deep purple labellum without a red patch and apical lobes overlapping, filament greenish-yellow and anther with a small round crest in *N. bambusifolia*). As also mentioned in the diagnosis, the flowers are somewhat similar to *Newmania cristata*, due to the yellow to greenish floral tube and filament, both of which are plain white in all other species. No vernacular names or uses have been recorded for *N. bambusifolia*.

**Key to all species of *Newmania***  
**(updated from Trần et al., 2018)**

- 1a. Inflorescence prostrate on the ground, spike more or less lax ..... 2
- 1b. Inflorescence more or less erect, spike condensed ..... 3
  
- 2a. Leaf blades smooth (not plicate), linear; labellum dark purple with white veins, distal lobes overlapping ..... *N. bambusifolia*
- 2b. Leaf blades plicate, narrowly elliptic to elliptic; labellum pale to dark violet with bright red centre and white lines, distal lobes not overlapping ..... *N. serpens*
  
- 3a. Filament absent (anther sessile) ..... *N. sessilantha*
- 3b. Filament well developed (2.5–11 mm long) ..... 4
  
- 4a. Anther crest more than 4 mm long ..... *N. cristata*
- 4b. Anther ecristate or with a short blunt crest not exceeding 2 mm in length ..... 5
  
- 5a. Leaf blades small (6.5–13 × 3–4 cm), more or less plicate with prominently undulate margins ..... *N. gracilis*
- 5b. Leaf blades large (12–22 × 4–8 cm), with more or less smooth surface and straight margins ..... 6
  
- 6a. Pseudostem 60–80 cm tall, composed of 5–8(–11) leaves; leaf blades elliptic to obovate; ligule 5–10 mm long; corolla lobes as long as or marginally exceeding the length of lateral staminodes ..... *N. orthostachys*
- 6b. Pseudostem up to 160 cm tall, composed of 10–27 leaves; leaf blades narrowly elliptic to narrowly obovate; ligule 1.5–3 mm long; corolla lobes exceeding the length of lateral staminodes ..... *N. sontraensis*

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