**Zingiber magang and Z. tamii (Zingiberaceae), two new species from central Vietnam**

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**ABSTRACT:** *Zingiber magang* and *Z. tamii*, two new species of *Zingiber* sect. *Cryptanthium* (Zingiberaceae) from central Vietnam are described and illustrated. Information on their distribution, ecology, phonology, uses and vernacular names are provided. A preliminary IUCN conservation assessment of each of these species is proposed. A key to species of *Zingiber* sect. *Cryptanthium* in Vietnam is also given.

**KEY WORDS:** Annamite range, endemic species, monocots, taxonomy, *Zingiber* sect. *Cryptanthium*.

**INTRODUCTION**

*Zingiber* Mill. (Zingiberaceae; Zingiber) is one of the largest genera in the family with about 188 species (ZRC 2021), distributed throughout tropical and subtropical Asia (Wu and Larsen, 2000; Leong-Škorničková and Newman, 2015). The members of this genus are easily recognised by the horn-shaped anther crest embracing the upper part of the style and the existence of a swollen part of the petiole, known as a pulvinus (Bai et al., 2015). Traditionally, four sections are recognized, based on the position of the inflorescence, i.e., the nominal *Z*. sect. *Zingiber* (spike on an erect and, usually, long peduncle), *Zingiber* sect. *Cryptanthium* Horan. (radical inflorescences composed of a spike appearing at ground level, usually with a short procumbent peduncle), *Z*. sect. *Dymczewicza* Benth. (terminal inflorescences), and *Z*. sect. *Pleuranthesis* (spikes breaking though the leaf sheaths laterally). The general outline of *Zingiber* in Vietnam has been given in the recent publications (Leong-Škorničková et al., 2015b; Lý, 2016; Le et al., 2019a, b) and is therefore not repeated here. Currently, more than 37 *Zingiber* species representing all four sections, are known from Vietnam with many species described or newly reported for the flora of Vietnam only recently (Leong-Škorničková et al., 2015b; Lý, 2016; Lý et al., 2016; Nguyễn, 2017; Le et al., 2019a, b).

During our floristic surveys in central Vietnam many interesting species and genera were discovered and described from mountainous areas in Quảng Ngãi Province (e.g. Lý, 2017c,d; Lý and Tillich, 2016; Lý et al., 2017; Lý et al., 2021), including four ginger species, namely *Alpinia newmani* N.S.Lý (Lý, 2017a), *Anomom cristatissimum* N.S.Lý & Škorník. (Lý and Leong-Škorník, 2018; recently transferred to *Meistera* by Šída et al., 2019), *Boesenbergia quangngaiensis* N.S.Lý (Lý, 2017b), *Curcuma sahuynhensis* N.S.Lý & Škorník. (Leong-Škorník et al., 2015a), and *Zingiber skornickovae* N.S.Lý (Lý, 2016). In the present paper, we describe and illustrate another two *Zingiber* species from this area, namely *Z. magang* and *Z. tamii*. As both new species exhibit inflorescences appearing at the ground level, with peduncles being partly or fully embedded in the ground, we place them in the section *Cryptanthium*.

**MATERIALS AND METHODS**

Herbarium specimens of the morphologically related species from the sect. *Cryptanthium* were examined from the following herbaria: E, P, K, SING, and VNM, as well as digitized specimen images available from the Chinese Virtual Herbarium (http://www.cvh.org.cn/), Jstor Global Plant (https://plants.jstor.org/), Muséum National d’Histoire Naturelle (https://science.mnhn.fr/). Relevant references (e.g. Gagnepain, 1908; Pham, 2000; Wu and Larsen, 2000; Tribou et al., 2014; Leong-Škorníková et al., 2015b; Le et al., 2019a, b) were also scrutinised. The description and all measurements were made from mature individuals of living flowering plants in the field, supplemented with herbarium specimens and flower material preserved in alcohol. The general terminology used follows Beentje (2012) and the standard work of Bai et al. (2015). Conservation status was assessed using the
IUCN Red List Categories and Criteria version 3.1 (IUCN 2019). The extent of occurrence (EOO) and the area of occupancy (AOO) were estimated using the web Geospatial Conservation Assessment Tool or GeoCAT (http://geocat.kew.org/editor) with an auto-value cell width of 2 km (Bachman et al., 2011).

TAXONOMIC TREATMENT

Zingiber magan N.S.Lý & Škorník, sp. nov.

Figs. 1 & 2

Zingiber magan is rather distinct from its congeners by combination of leafy shoots composed of only 3–5 prominently petiolate leaves with weakly plicate and somewhat shiny leafy laminae, and inflorescences with basal part of basal bracts convex and slightly inflated giving it somewhat bullate appearance.

Type: VIETNAM. Quảng Ngãi Province: Ba Tơ District, Ba Nam Commune, Tây Ba Tơ protection forest, subzone 451, Cao stream, 14°37’49.08”N, 108°37’10.20”E, 962 m, 7 August 2019, Lý Ngọc Sâm, Trương Bá Vương, Cao Ngọc Giang, Lý-1327 (holotype VNM; isotypes: P, SING).

Description: Rhizomatous herbs 15–40 cm tall forming small loose clumps each with 2–7 leafy shoots. Rhizome loosely branched, 0.8–1.1 cm in diam., externally light brown, internally yellowish, slightly aromatic, covered with triangular, light brown, glabrous scales 2–3 cm long, soon decaying; root tubers formed at the end of roots, subglobose to ellipsoid, 1.4–2 × 0.5–1.2 cm, pale brown externally, cream-white internally. Leafy shoots 2–6 cm apart, swollen at base ca. 2 cm in diam., each shoot comprising of 3–5 leaves at maturity, positioned at apical part of the pseudostem; bladeless sheaths 3–4, 2.5–18 cm long, inconspicuously longitudinally striate, light green, outer ones with reddish tinge at base, glabrous; leaf sheaths inconspicuously longitudinally striate, light green, glabrous; ligule bilobed, 2–5 mm long, light green, glabrous or sparsely puberulous, apex acute, margins rusty brown; petiole 3–7.7(–10.5) cm long, light green, pulvinus inconspicuous, positioned at the base of petiole, green, slightly pubescent to glabrescent; lamina broadly elliptic, (12.5–)19.5–26.5(–31.4) × (6.5–)8.5–13(–16) cm, leathery, weakly plicate, adaxially dark green, shiny, glabrous, abaxially light green, semi-matt, glabrous, apex attenuate to acuminate, base obtuse with narrow wing-like leaf margins gradually extending along the petiole/pulvinus. Inflorescences 1–2 per clump, arising near the base of the pseudostem, 15–26 cm long, with 1–2 flowers open at a time; peduncle partly or fully embedded in ground, 5–11 cm long, 0.4–0.5 cm in diam., covered by 5–10 sheathing bracts, broadly triangular-ovate at base, ovate distally, white with red tinge, externally sparsely pubescent; spike narrowly ovoid to oblong, 7–14 × 1.8–2.5 cm, consisting of up to 15 strongly imbricate fertile bracts, each subtending a single flower; bracts narrowly ovate, 3.5–4.5 × 1–1.9 cm (gradually narrower towards apical part of the inflorescence), basal bracts greenish at base rest with rich red to purple tinge, apices in upper bracts greenish, externally densely pubescent, internally glabrous, margins straight (not undulated), pubescent, apex narrowly acute; bracteoles narrowly ovate, 26–32 × 15–20 mm, greenish, sometimes with purple tinge at apex, externally sparsely pubescent, internally glabrous, apex acute. Flowers exserted from bracts, 6.2–7.5 cm long; calyx tubular, clasping the floral tube at base, 10–10.5 mm long, white, externally puberulous, with unilateral incision 4.5–5.5 mm long, apex with three blunt teeth (ca. 2 × 2 mm); floral tube 33–37 mm long, narrowly cylindrical, slightly widening distally (to ca. 3.5 mm in diam.), white, externally glabrous, internally with few hair near the throat; dorsal corolla lobe triangular-ovate, 22–24 × 7.5–8 mm, cream-white with semi-translucent veins, glabrous, apex narrowly acute with a short microca. 1.5 mm long; lateral corolla lobes narrowly triangular-ovate, 21–22 × 4–5.5 mm, cream white with semi-translucent veins, glabrous, apex narrowly acute; labellum obovate, 23–25 mm long, 15–16 mm at widest point near the middle of labellum (18.5–21 mm broad inclusive of lateral staminodes), cream-white at basal 1/3, distally dark purple to purple-violet in the centre, gradually changing to pale purple or almost white slightly deflexed margins, glabrous, apex bifid, with incision of 5–6 mm long; lateral staminodes obovate, 15–15.7 × 3–4.5 mm, cream-white to very pale yellow with semi-translucent veins, connate to labellum 1/2–1/3, glabrous, apex rounded to obtuse; stamen 19–19.5 mm long (unmanipulated); filament ca. 1 mm long, 2–2.5 mm wide, cream-white, glabrous; anther 11.5–12 mm long (crest not straightened), 3.5–4 mm broad, connective tissue cream-white to pale yellow, glabrous, anther thecae 10.5–11 mm long, dehiscing along the entire length, pollen cream white, elliptic; anther crest 9.5–11 mm (straightened), cream with pink to red-purple tinge towards apex, glabrous. Epigynous glands two, subulate, 5–5.5 mm long, ca. 0.5 mm in diam. at base, cream sometimes with slight purple tinge. Ovary cylindrical, 4.5–2 × 3–3.5 mm, pale greenish to cream white with purple tinge, pubescent, trilocular with axile placentation; style white, glabrous; stigma slightly thicker than style, white, ostiole ciliate. Fruit (immature) ovoid, bluntly trigonous septifragal capsule, 22–26 × 8–11 mm, cream-white with longitudinal reddish lines along the valves, glabrous, apex with persistent calyx. Seeds (immature) 4–6 per locule, oblong, 8–9.5 × 3.5–4 mm long, white; aril sac-like, irregularly edged/laciniate at apex, white, nearly fully covering the seeds.

Distribution: The species only occurs in two provinces in central Vietnam, Quảng Ngãi and Kon Tum.

Habitat and phenology: Stream sides and moist and shady areas of primary and secondary tropical broadleaved
Fig. 1. *Zingiber magang* N.S. Lý & Škorničk. A. Habit. B. Basal part of the plant with an inflorescence. C. Inflorescence with a flower (side view). Photos Ngọc-Sâm Lý from the type Lý-1327.
Fig. 2. Zingiber magang N.S.Lý & Škorničk. A. Habit. B. Detail of pseudostem. C. Basal part of the plant with an inflorescence. D. Inflorescence with flowers (top view). E. Fertile bract (basal part of the inflorescence), flower enclosed in fertile bract (middle part of the inflorescence), bract, bracteole. F. corolla lobes, labellum, ovary with floral tube and stamen (calyx removed), calyx. G. Stamen from side and front view, ovary with epigynous glands. H. Young fruit from outside and when open with young seed in between. Photos Ngoc-Sâm Lý from the type Lý-1327.
forests between 850–1,230 m elevation. Flowering was observed from June to August, fruiting was observed in August and September, but presumably extends till October.

**Vernacular names and uses:** This species is locally known as magang (Kinh minority), Pagieng or Pagang (Co, Ca Dong and Hre minorities). Rhizomes of these species are harvested, crushed and applied for healing wounds and bone fractures.

**Etymology:** The specific epithet “magang” is derived from the common name applied to this species by local people from Kinh tribe in Quang Ngai province.

**Preliminary IUCN assessment:** At present, three relatively-large populations consisting of about 2000 mature individuals/mature clumps have been observed. Of these about 1800 mature clumps occur in Quang Ngai province and about 200 mature clumps Kon Tum province. The extent of occurrence (EOO) and the area of occupancy (AOO) were calculated to be 361.7 km² and 12 km², respectively. Although the known habitat of the new species is within forests protected by the provincial authorities of Quang Ngai and Kon Tum, these populations are still vulnerable because of the continuing decline in area, extent and quality of habitat due to various human activities, such as harvesting of non-timber forest products (medicinal plants, rattans, etc.), forest fires, and especially clearing of forest land for Acacia plantations. Based on the IUCN Red List Criteria (IUCN 2019), we therefore provisionally assess this species as Endangered (EN B2ab(iii), C).

**Additional specimens examined (Paratypes):**

VIETNAM. Quảng Ngãi Province: Ba Tơ District, Ba Nam Commune, Tây Ba Tơ protection forest, subzone 451, N inaccessible to ground, 5–10 cm long, with 1–2 flowers forming small loose clumps each with 2–4 loose leafy shoots. **Rhizome** branched, 0.5–1 cm in diam., externally reddish when young, turning pale brown with age, internally cream-white, slightly aromatic, covered with pale reddish triangular scales, 2–3 cm long, glabrous, soon decaying. **Leafy shoots** 1.5–5 cm apart, slightly arching, with up to 9 leaves, approximately basal 1/3 of pseudostem leafless; **bladeless sheaths** 1–2 per clump, arising near the base of the pseudostem, 1.5–5 cm long, base of the pseudostem, 10–13 cm long, with 1–2 flowers forming small loose clumps each with 2–4 loose leafy shoots. **Rhizome** branched, 0.5–1 cm in diam., externally reddish when young, turning pale brown with age, internally cream-white, slightly aromatic, covered with pale reddish triangular scales, 2–3 cm long, glabrous, soon decaying. **Leafy shoots** 1.5–5 cm apart, slightly arching, with up to 9 leaves, approximately basal 1/3 of pseudostem leafless; **bladeless sheaths** 1–2 per clump, arising near the base of the pseudostem, 10–13 cm long, with 1–2 flowers opening at a time; **peduncle** fully embedded in ground, 5–7.5 cm long, covered by 8–10 sheathing bracts; sheathing bracts broadly triangular-ovate, densely tinged bright to dark red, externally sparsely pubescent, hairs white; **spike** ovoid, 4.5–6.5 × 2.5–3 cm, consisting of up to 35 strongly imbriicate fertile bracts, each subtending a single flower; **bracts** narrowly ovate, 4.5–4.8 × 1.6–1.8 cm (smaller towards apical part of the inflorescence), bright red to purplish-red, sometimes with cream or greenish at base, upper bracts with greenish apices, externally pubescent, internally glabrous, margins sparsely pubescent, slightly incurved, apex narrowly acute; **bracteoles** ovate, 31–34 × 16–17 mm, pale yellow with red to purple tinge apically, externally sparsely pubescent, internally glabrous, apex acute. **Flowers** exerted from bracts, 5.5–6.2 cm long; **calyx** tubular, 10–12 mm long, clasping the floral tube at

**Zingiber tamii** N.S.Lý & Škorničk. *sp. nov.* Figs. 3 & 4

Similar to *Z. vuquangense* N.S.Lý *et al.* by overall similarity in leafy shoots consisting of prominently petiolate, broadly elliptic and prominently plicate laminae, but differs by overall smaller size 0.5–0.7 mm, shorter ligules 3–5 mm long, smaller abaxially glabrous laminae 15.8–21.5 × 7.5–9.5 cm, narrowly ovate bracts, shorter calyx 10–12 mm long, pale yellow and externally sparsely puberulous corolla lobes, pale yellow lateral staminodes and ovate to elliptic ovate very dark purple labellum with small yellow blotches and yellow margin (compared to larger size 1.2–1.8 mm, ligules 12–30 mm long, larger laminae abaxially densely pubescent along midrib 26–50.8 × 9–14.7 cm, oblong to club-shaped bracts, longer calyx 17–18 mm long, bright yellow and glabrous corolla lobes, lateral staminodes yellow with pink purple apex and obovate pink-purple labellum with pale yellow spots in *Z. vuquangense*).

**Type:** VIETNAM. Quảng Ngãi Province: Ba Tơ District, Ba Nam Commune, Tây Ba Tơ protection forest, subzone 451, N inaccessible to ground, 5–10 cm long, with 1–2 flowers forming small loose clumps each with 2–4 loose leafy shoots. **Rhizome** branched, 0.5–1 cm in diam., externally reddish when young, turning pale brown with age, internally cream-white, slightly aromatic, covered with pale reddish triangular scales, 2–3 cm long, glabrous, soon decaying. **Leafy shoots** 1.5–5 cm apart, slightly arching, with up to 9 leaves, approximately basal 1/3 of pseudostem leafless; **bladeless sheaths** 1–2 per clump, arising near the base of the pseudostem, 10–13 cm long, inconspicuously longitudinaly striate, pale reddish green, basally richer red to maroon, sparsely pubescent towards margins (white scattered hairs); **leaf sheaths** inconspicuously longitudinaly striate, light green sometimes with reddish-green tinge, sparsely pubescent towards margins (white scattered hairs). **Ligule** bilobed, 3–5 mm long, greenish, membranous, pubescent, apex rounded with short ciliae, dry and soon decaying; **petiole** 3–6 cm long, pulvinus purplish, glabrous; **lamina** broadly elliptic to obovate-elliptic, 15.8–21.5 × 7.5–9.5 cm, adaxially mid green, prominently plicate, glabrous, abaxially paler, glabrous, apex acuminate, base obtuse to rounded. **Inflorescences** 1–2 per clump, arising near the base of the pseudostem, 10–13 cm long, with 1–2 flowers opening at a time; **peduncle** fully embedded in ground, 5–7.5 cm long, covered by 8–10 sheathing bracts; sheathing bracts broadly triangular-ovate, densely tinged bright to dark red, externally sparsely pubescent, hairs white; **spike** ovoid, 4.5–6.5 × 2.5–3 cm, consisting of up to 35 strongly imbriicate fertile bracts, each subtending a single flower; **bracts** narrowly ovate, 4.5–4.8 × 1.6–1.8 cm (smaller towards apical part of the inflorescence), bright red to purplish-red, sometimes with cream or greenish at base, upper bracts with greenish apices, externally pubescent, internally glabrous, margins sparsely pubescent, slightly incurved, apex narrowly acute; **bracteoles** ovate, 31–34 × 16–17 mm, pale yellow with red to purple tinge apically, externally sparsely pubescent, internally glabrous, apex acute. **Flowers** exerted from bracts, 5.5–6.2 cm long; **calyx** tubular, 10–12 mm long, clasping the floral tube at
Fig. 3. *Zingiber tamii* N.S. Lý & Škorničk. A. Plant habit. B. Leaves and petioles. C. Inflorescence with a flower (side view). D. Inflorescence with a flower (semi-top view). Photos Ngọc-Sâm Lý from the type Lý-1323.

base, semi-translucent white, externally puberulous, with unilateral incision ca. 9.5 mm long, apex with three inconspicuous blunt teeth; **floral tube** narrowly cylindrical, slightly widening distally, 30–33 mm long, externally and internally cream-white at base, white apically, externally sparsely pubescent, internally glabrous at base, sparsely pubescent apically near the throat; **dorsal corolla lobe** triangular-ovate, 23–25 × 9–10 mm, pale yellow with semi-translucent veins, glabrous, apex acute, shortly mucronate, mucro ca. 0.5 mm long; **lateral corolla lobes** narrowly triangular-ovate, 21–23 × 6.4–7.5 mm, pale yellow with semi-translucent veins, glabrous, apex narrowly acute; **labellum** elliptic to slightly elliptic-ovate with obtuse apex, 20–24 mm long, 11–12 mm at widest point near the middle of labellum (28–32 mm broad inclusive of lateral staminodes), cream-white at base, the rest very dark purple with small yellow patches along central line, margin bright yellow, slightly deflexed, undulate to crisped, glabrous; **lateral staminodes** elliptic-ovate with obtuse apex, 17–8 × 8.5–10 mm, pale yellow with semi-translucent veins, connate to labellum by basal 1/2, margin slightly deflexed, slightly undulate, glabrous; **stamen** 16–16.5 mm long (unmanipulated); **filament** ca. 2 × 2 mm, cream, with sparse short glandular hairs; **anther** 12–13 mm long (crest not straightened), 3–3.5 mm broad, connective tissue cream white at base, pale yellow apically, glabrous; anther thecae 10–11 mm long, dehiscing along the entire length; **anther crest** 11–12 mm (straightened), bright yellow at base, rest purple-black,
Fig. 4. Zingiber tamii N.S. Lý & Škorničk. A. Basal portion of flowering plant showing rhizome, inflorescence and leafless sheaths. B. Fertile bracts (external and internal view), bracteole, flower in side view with bracteole attached. C. Flower in side view with calyx removed. D. Flower dissection (from left): floral tube with ovary and stamen attached (calyx removed), ovary with epigynous glands, calyx, dorsal corolla lobe, two lateral corolla lobes, labellum with basally connate lateral staminodes. Photos Ngoc-Sâm Lý from the type Lý-1323.

glabrous. **Epigynous glands** two, subulate, 2–2.5 mm long, ca. 0.5 mm in diam. at base, cream-white. **Ovary** cylindrical, 4.5–6.5 × 3.5–4 mm, cream white, pubescent (rusty coloured hair), trilocular with axile placentation; **style** white, glabrous; **stigma** slightly thicker than style, white, ostiole ciliate. **Fruit** not seen.

**Distribution and habitat:** Near streams and in the moist and shady understorey of primary and secondary tropical broadleaved forests between 520–930 m elevation.

**Phenology:** Flowering was observed in August to September. Fruiting was not observed, but is presumed to occur in October and November.

**Eponymy:** This species is named in honour of Mr. Trương Quang Tâm, a forestry engineer at Institute of Tropical Biology.

**IUCN preliminary assessment:** Only two small subpopulations, with a total of about 10 mature individuals were found in an area of less than 5 km² in Tây Ba Tơ protection forest, Ba Tơ District, Quảng Ngãi Province. Although the type locality is part of protection forest, its habitat is frequently disturbed by logging and clearing of the forest for *Acacia* plantations. To propose an accurate conservation status, further exploration of adjacent areas is needed to understand the extent and population sizes of this species better. Until more information becomes available, we propose to treat this species as data deficient (DD).

**Additional specimens examined (Paratypes):** VIETNAM. Quảng Ngãi Province: Ba Tơ District, Ba Nam Commune, Tây Ba Tơ protection forest, Trảng Sim, 14°38′1.59″N, 108°37′22.24″E, 523 m elev., 7 August 2017, Lý Ngọc Sâm, Lý-921 (VNM).

**Taxonomic notes:** As elaborated in the diagnosis, *Zingiber tamii* most resembles *Z. vuquangense* (Le et al., 2019b) recently described from the North-Central Vietnam (Nghệ An province) by its petiolar leaves with strongly corrugate/pleate laminae. The inflorescence and
flower shape of Z. tamii also resembles Z. lecongkietii, recently described from the Central Highlands, Vietnam (Kon Tum Province) (Leong-Škorničková et al. 2015), but it can be readily distinguished by the leafy shoot composed of 8–9 leaves, each with prominent 3–6 cm long petiole, and broadly elliptic to obovate-elliptic, prominently plicate laminae compared to leafy shoot composed of up to 20 leaves, each with short petiole up to 1.2 cm, and narrowly ovate and smooth leaf blades.

A key to Zingiber sect. Cryptanthium in Vietnam

1a. Leaves with laminae sessile ............................................. 2
1b. Leaves with prominent petioles ........................................... 5
2a. Ligule > 22 mm long ...................................................... Z. mekongense
2b. Ligule to 11 mm long .................................................... 3
3a. Ligule 8–11 mm long, densely pubescent ...................... Z. recurvatum
3b. Ligule to 5 mm long, glabrous ......................................... 4
4a. Spike broadly ovoid, 5–6 × 2.5–4 cm, corolla lobes bright red .......... Z. rubens
4b. Spike narrowly ovoid to ovoid, 9–13 × 3–4.5 cm, corolla lobes cream white to pale yellow ............ Z. skornickovae
5a. Plant > 50 cm tall, leafy shoots with more than 5 leaves ........ Z. thorelii
5b. Plant >1.5 m tall, petiole 2–2.5 mm long, lamina 44–47 × 11–18 cm .............................................. Z. stipitatum
6a. Labellum plain yellow or very pale purple blotches .............. Z. tamii
6b. Labellum pink purple, dark purple or violet with yellow or white spots or blotches ...................... Z. thorelii
7a. Ligule 20–40 mm long, lamina obovate to elliptic obovate 28–50 × 10–15 cm .............................................. Z. thorelii
7b. Ligule 3–12 mm, lamina ovate to oblong-ovate 20–37 × 4–6 cm .................................................. Z. minga
8a. Ligule 10–20 mm long .................................................. Z. vuquangense
8b. Ligule to 5 mm long .................................................... Z. lecongkietii
9a. Petiole to 12 mm long, lamina narrowly ovate .......... Z. lecongkietii
9b. Petiole to 20–60 mm long, lamina ovate to broadly elliptic 10–20 cm .................................................. Z. tamii
10a. Plant to 0.7 m tall, petiole 3–6 cm long, lamina 15.8–21.5 × 7.5–9.5 cm .............................................. Z. tamii
10b. Plant >1.5 m tall, petiole 2–2.5 mm long, lamina 44–47 × 11–18 cm .............................................. Z. cornubracteatum

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LITERATURE CITED


