



## Nine new *Zingiber* species (Zingiberaceae) from Vietnam

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### Abstract

Nine new *Zingiber* species from Vietnam are reported here. Of these, *Z. leongkietii* belongs to the sect. *Cryptanthium*, five species, *Z. atroporphyreus*, *Z. cardiocheilum*, *Z. castaneum*, *Z. mellis* and *Z. plicatum*, are terminally flowering species belonging to the sect. *Dymczewiczia*, and three species, *Z. discolor*, *Z. microcheilum* and *Z. yersinii*, belong to sect. *Zingiber*. Detailed descriptions, colour plates and preliminary IUCN assessments are given for all species. As the five terminally flowering novelties more than double the previously known number of species in the *Z.* sect. *Dymczewiczia* in Vietnam, a key to this section is provided.

**Key words:** *Zingiber atroporphyreus*, *Z. cardiocheilum*, *Z. castaneum*, *Z. discolor*, *Z. leongkietii*, *Z. mellis*, *Z. microcheilum*, *Z. plicatum*, *Z. yersinii*

### Introduction

*Zingiber* Miller (1754; Zingiberaceae, Zingibereae) is distributed in tropical to warm-temperate Asia with the highest diversity in the monsoonal parts of Asia. It is considered the largest genus in subfamily Zingiberoideae with more than 200 names corresponding to approximately 100–150 species (Wu & Larsen 2000, Kishor & Leong-Škorničková 2013). The genus is traditionally divided into four sections based on the position of the inflorescence. These are *Zingiber* sect. *Zingiber*, sect. *Dymczewiczia* (Horaninow 1862: 26) Bentham & Hooker (1883: 646), *Zingiber* sect. *Pleuranthesis* Bentham & Hooker (1883: 646) and *Zingiber* sect. *Cryptanthium* Horaninow 1862: 27), although a recent molecular study based on a single marker and limited material indicated that *Zingiber* sect. *Dymczewiczia* and *Zingiber* sect. *Pleuranthesis* are not well segregated from *Zingiber* sect. *Zingiber* (Theerakulpisut *et al.* 2012). As more studies, involving broader sampling and multiple DNA markers, are certainly needed until a new classification can be formally proposed, the traditional sectional treatment is upheld in this work.

Gagnepain (1908) was the first, and to date also the last, to provide a comprehensive account of Zingiberaceae for Indochina, in which he listed 13 species. Eleven species of *Zingiber* were reported for Vietnam by Phạm (2003) and to this list one new species, *Z. collinsii* Mood & Theilade (Theilade & Mood 1999: 525), has been added. Such a low number of species of the genus known to be diverse in the monsoonal tropics compares poorly to Thailand with 49 species reported by Larsen & Larsen (2006) and further increased with numerous novelties recently reported by Triboun *et al.* (2014), or to China with 42 species (Wu & Larsen 2000). This number, however, reflects the lack of recent explorations, rather than the lack of biodiversity in Vietnam. Since our extensive work on Zingiberales in Vietnam since 2008 (Leong-Škorničková *et al.* 2010, 2011, 2012, 2013, 2014, Leong-Škorničková & Lý 2010, Leong-Škorničková & Luru 2013, Leong-Škorničková & Trần 2013, Lý *et al.* 2010, Nguyễn & Leong-Škorničková 2012) we have so far confirmed presence of at least 30 *Zingiber* species from all four sections to be present, of which nine belonging to three sections we describe here as new to science. It is likely that the number will still continue to grow as we are progressing to verify the identities of numerous yet unidentified materials.

So far six terminally flowering species (sect. *Dymczewiczia*) were described, of which only two, *Z. pellitum* Gagnepain (1906: 150) and *Z. rufopilosum* Gagnepain (1903: 249) were known to occur in Vietnam. While we have collected numerous terminally flowering species in recent years, we currently have material complete enough to describe five terminally flowering species here: *Zingiber atroporphyreum* Škorničk. & N.B.Nguyễn, *Z. cardiocheilum* Škorničk. & Q.B.Nguyễn, *Z. castaneum* Škorničk. & Q.B.Nguyễn, *Z. mellis* Škorničk., H. Đ.Trần & Šída f. and *Zingiber plicatum* Škorničk. & N.B.Nguyễn.

Section *Zingiber* is currently characterised by inflorescences arising from the rhizome and consisting of spikes on upright peduncles. So far seven species from this section were reported for Vietnam, although application of some names requires further scrutiny. Here we describe three novelties named as *Z. microcheilum* Škorničk., H.Đ.Trần & Šída f., *Z. discolor* Škorničk., H.Đ.Trần & Rybková and *Z. yersinni* Škorničk., H.Đ.Trần & Rybková.

Section *Cryptanthium*, characterised by inflorescences arising from the rhizome on procumbent peduncles is with no doubt the most complicated section of the genus with high diversity of species particularly in Thailand and China. While most of our recent collections from this section fall into more complicated and widespread complexes necessitating further study, the species described below as *Z. lecongkietii* Škorničk. & H.Đ.Trần is rather distinct from all other Vietnamese species of this section, as well as from the closest taxa reported from China.

Species are listed here alphabetically by sections and species. All descriptions are based on living material, unless explicitly stated. The terminology follows Beentje (2012) and our recent works cited above. The recognition of labellum and lateral staminodes as separate structures and the methodology of their measurements follow the recent work of Bai *et al.* (2015).

## Taxonomy

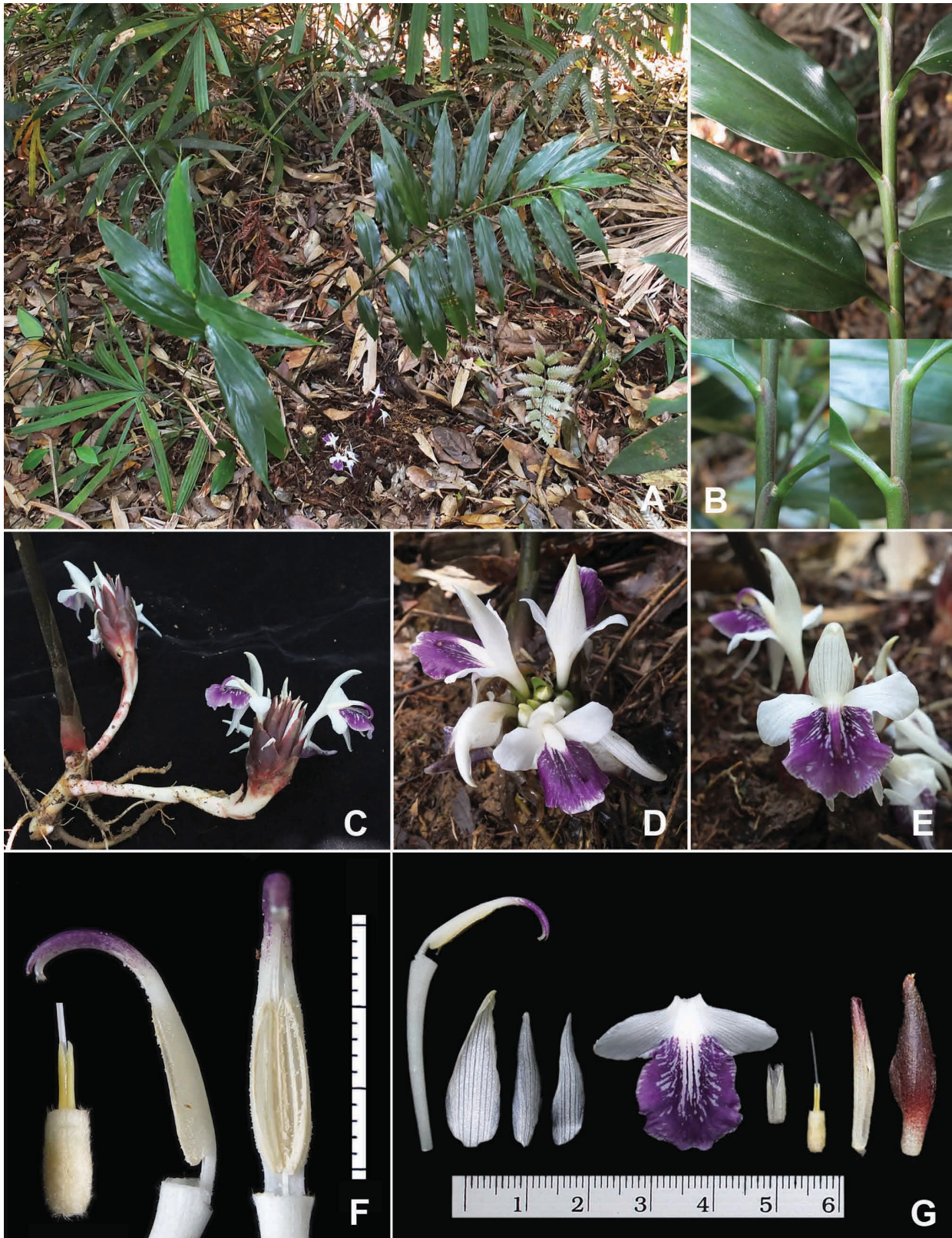
### *Zingiber lecongkietii* Škorničk. & H.Đ.Trần, *sp. nov.* (sect. *Cryptanthium*)

Similar to *Zingiber emeiense* Z.Y.Zhu in having purple-white flowers, but differs in the narrowly ovate to narrowly elliptic leaves (15–20 × 3.5–4 cm), short ligules (c. 1–2 mm, shallowly bilobed), pure white corolla lobes, purple to dark violet labellum with white blotches and pure white lateral staminodes (vs. laminae 25–35 × 6–9 cm; ligules papery, bifid, c. 7 mm long; red corolla lobes, and both labellum and lateral staminodes purple).

**Type:**—VIETNAM. Kon Tum Province, Kon Plong Dist., Xã Hiếu, 1237 m, 14°39'01.3"N, 108°24'38.5"E, 25 April 2012, *Jana Leong-Škorničková*, *Nguyễn Quốc Bình*, *Trần Hữu Đăng*, *Eliška Závěská JLS-1572* (holotype SING, isotypes E, P, PR, VNMN). **Fig. 1.**

Rhizomatous herbs up to 1 m tall, forming small clumps. *Rhizome* sparsely branched, somewhat creeping, c. 1 cm in diam., externally cream to light brown, internally cream-white covered with brown papery triangular scales. *Leafy shoot* slightly arching, with up to 20 leaves, basal 1/3 of pseudostem leafless; *bladeless sheaths* 4–6, green with dark red tinge, puberulous, especially towards margins; *leaf sheaths* green, glabrous, margins puberulous; *ligule* 1–2 mm long, shallowly bilobed, pubescent; *petiole* up to 12 mm, light green, glabrous; *lamina* 15–20 × 3.5–4.0 cm, narrowly ovate, apex attenuate, base obtuse to rounded, dark green glossy above, smooth (no prominent plication), glabrous, slightly lighter green beneath, glabrous. *Inflorescence* radical, c. 15 cm long; *peduncle* subterranean or procumbent, up to 10 cm long, covered by sheathing bracts, white or with red tinge, puberulous; *spike* ovate to obovate, c. 5 × 2–3 cm, consisting of 10–20 bracts; *bracts* ovate, c. 3.0 × 1.5 cm (smaller towards the apical part of inflorescence), dark red-brown, puberulous, apex acute to narrowly acute, enclosing single flower; *bracteole* c. 25 × 12 mm, ovate, semi-translucent white at base, red-brown towards apex, puberulous to villous externally, glabrous internally. *Flowers* c. 6 cm long; *calyx* c. 10 mm long, with unilateral incision c. 8 mm, semi-translucent white, puberulous, apex with three small teeth; *floral tube* c. 32 mm, externally and internally white, puberulous externally, internally puberulous at base, puberulent towards the apical part; *dorsal corolla lobe* triangular-ovate, c. 25 × 10 mm, pure white with semi-translucent veins, sparsely puberulous externally, glabrous internally, apex acute, concave, slightly hooded; *lateral corolla lobes* narrowly triangular-ovate, 21 × 5–6 mm broad, pure white with semi-translucent veins, sparsely puberulous externally, glabrous internally, apex acute, concave; *labellum* broadly obovate, c. 26 × 20 mm (c. 30 mm broad inclusive lateral staminodes) purple to dark violet with white blotches; *lateral staminodes* obovate, 17 × 7 mm, pure white, connate to labellum by basal 1/2–1/3; *stamen* c. 20 mm long (unmanipulated); *filament* 2.0 × 2.5 mm, pure white, with sparse short glandular hairs; *anther* 22 mm long (with straightened crest), c. 4 mm broad, connective tissue

white, glabrous, anther crest up to 12 mm, wrapped around stigma, purple, glabrous; *anther thecae* 10–11 mm long, dehiscent along the entire length. *Epigynous glands* two, 4–5 mm long, c. 0.6 mm in diam at base, ochraceous, apex acute. *Ovary* 6.0 × 2.5–3.0 mm, cream-white, puberulous, trilobular with central placentation. *Style* white, glabrous, stigma slightly thicker than style, white, ostiole front facing, ciliate. Fruit not seen.



**FIGURE 1.** *Zingiber leongkietii*. A. Habit. B. Pseudostem and detail of ligules (front and back view). C. Inflorescence (side view). D. Inflorescence (top view). E. Flower (front view). F. Detail of ovary with epigynous glands and anther (side and front view; scale bar in mm). G. Dissection (from left): corolla lobes and labellum, floral tube with anther in side view, calyx, ovary with epigynous glands, bracteole, bract (scale bar in cm). *Photo: Jana Leong-Škorničková.*

**Etymology:**—We dedicate this species to Prof. Lê Công Kiệt for his life-long contributions to Vietnamese botany.

**Distribution & IUCN preliminary assessment:**—So far known only from the type locality in central Vietnam. Only two populations have been seen by us, but the species is expected to be found in adjacent areas as suitable habitat still seems to exist. Until further collections, this species should be treated as Data Deficient.

**Ecology and phenology:**—Occurring on the ridges in broadleaved evergreen montane forest around 1200 m. Flowering in April to May.

**Additional specimens examined (paratypes):**—VIETNAM. Kon Tum Province, Kon Plong Dist., Xã Hiếu, 1213 m, 14°40'59.4"N, 108°22'38.3"E, 26 April 2012, *Jana Leong-Škorničková, Nguyễn Quốc Bình, Trần Hữu Đăng, Eliška Závěská JLS-1575* (SING, VNMN)

*Zingiber leongkietii* belongs to sect. *Cryptanthium* and can be easily recognized by its pure white flowers with dark purple to violet labellum—a colour combination not known from any other *Zingiber* species in Vietnam.

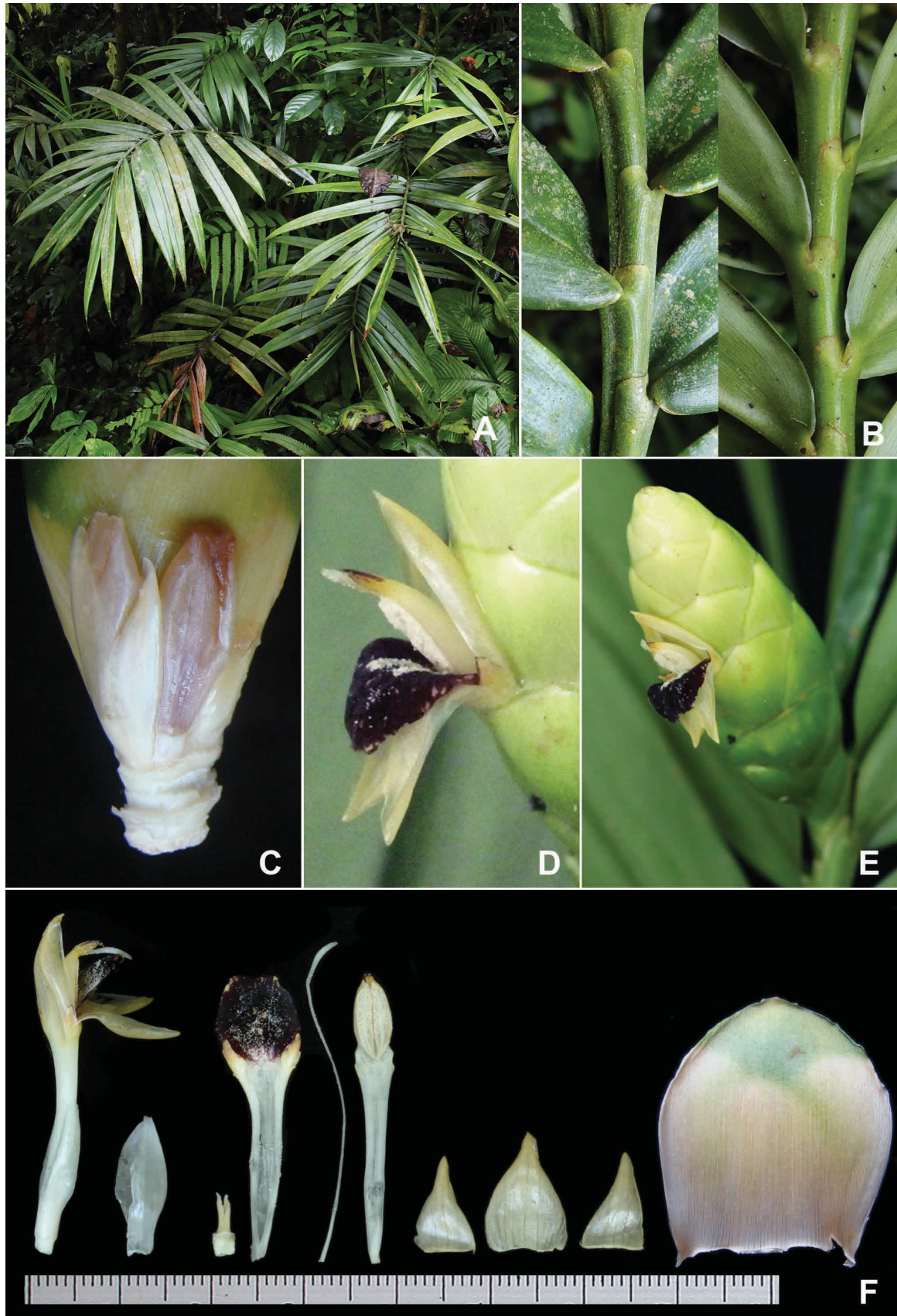
***Zingiber atroporphyreus* Škorničk. & Q.B.Nguyễn, sp. nov.** (sect. *Dymczewiczia*)

Similar to *Zingiber cardiocheilum* Škorničk. & Q.B.Nguyễn (see below) in habit and its narrowly ovate lamina and pendent inflorescences, but differs in the ovoid shape of the inflorescence, larger bracteoles c. 18 × 7 mm, dark purple, almost black labellum with emarginate apex, and longer calyx c. 16 mm long (vs. narrowly fusiform inflorescence, bracteoles 4–10 × 2–4, bright to dark red entire labellum, calyx 12 mm long).

**Type:**—VIETNAM. Phú Thọ Province, Tân Sơn Dist., Xuân Sơn N.P., 21°07'07.3"N, 104°57'05.2"E, 446 m, 20 August 2014, *Q.B. Nguyễn VNM-B0002177* (holotype SING, isotype E, P, VNMN). **Fig. 2.**

Clump forming rhizomatous herbs. *Rhizome* to 1.2 cm in diam., branched, 3–5 cm between leafy shoots, externally light brown, internally pale ochraceous, weakly aromatic, scales broadly triangular, up to 1.5 cm long, tinged pink when young (soon decaying). *Leafy shoot* to 1.8 m tall, with 20–25 leaves, base swollen c. 15 mm in diam, red, basal 1/2 of pseudostem leafless; *bladeless sheaths* green with faint dark red tinge towards base; *leaf sheaths* dark green, mostly glabrous, sparsely pubescent at apical part; *ligule* 3–5 mm long, shallowly bilobed, light green, sparsely pubescent; *petiole* absent; *lamina* narrowly ovate, up to 30 × 2.5–3.7 cm, gradually tapering to narrowly acute apex, base rounded to weakly subcordate, above dark glossy green, smooth (no prominent plication), lighter green beneath, fairly leathery, glabrous both sides. *Inflorescence* terminal, hanging down; *spike* 6–7 cm long, c. 2 cm broad, ovoid to narrowly ovoid, consisting of 25–45 bracts; *bracts* glossy green, broadly ovate, lowermost c. 5 bracts sterile, up to 2.6 × 2.8 cm (gradually smaller towards the apical part of inflorescence), glabrous externally and internally, apex broadly acute to obtuse; enclosing 3 flowers per bract (possibly 2 or 1 in upper bracts). *Bracteole* narrowly ovate, outermost 18 × 7 mm (inner two gradually smaller), unequally folded with one keel, translucent white, glabrous externally and internally. *Flower* 3.5–4.0 cm long; *calyx* c. 16 mm long, translucent white, glabrous, apex truncate with two inconspicuous teeth, unilateral incision c. 7 mm; *floral tube* c. 22 mm, externally and internally white, externally glabrous, internally puberulous; *dorsal corolla lobe* ovate-triangular, 15 × 10 mm, semi-translucent pale yellow, externally and internally glabrous, apex acute, mucronate, mucro c. 1 mm, margins incurved; *lateral corolla lobes* ovate triangular, c. 14 × 6 mm, semi-translucent pale yellow, externally and internally glabrous, apex minutely mucronate (c. 0.5 mm); *labellum* c. 12–14 mm long, c. 11 mm broad, ovate, dark purple, almost black, sometimes with sparse pale yellow blotches near margins, velvety in appearance, apex emarginate, margins slightly reflexing; *lateral staminodes* 4 × 2 mm, ovate to triangular, connate to the labellum by basal 2/3, yellow, sometimes with dark purple tinge. *Stamen* 12–13 mm long (with anther crest not straightened); *filament* 2 mm long, 4 mm broad at base, 3 mm broad at apex, cream-white, glabrous; *anther* c. 10 × 4 mm (excl. anther crest), connective tissue cream-white, glabrous, anther crest 4–5 mm long, wrapped around stigma, dark yellow with purple streaks, glabrous; *anther thecae* c. 9 mm long, dehiscing along entire length. *Epigynous glands* two, c. 6–7 mm long, c. 0.8 mm in diam., cream-white. *Ovary* cylindrical, 3 × 2.5 mm, white, glabrous, trilobular with central placentation. *Style* white, glabrous, stigma c. 3 mm long, slightly thicker than style, white, ostiole front-facing, glabrous. *Fruit* and *seeds* not seen.

**Etymology:**—The specific epithet '*atroporphyreus*' is derived from Greek, reflecting the characteristic dark purple-brown colour of the labellum.



**FIGURE 2.** *Zingiber atroporphyreus*. A. Habit. B. Detail of ligules in upper part of the leafy shoot (front view on the left, back view on the right). C. Cincinnus of three flowers. D. Flower (side view). E. Inflorescence (in manipulated position, naturally hanging down). F. Dissection (from left): entire flower in side view, calyx, ovary with epigynous glands attached, ventral half of the floral tube with labellum and staminodes attached, style with stigma, dorsal half of floral tube with stamen attached, three corolla lobes (dorsal in the middle), and fertile bract (opened and viewed from inside) (scale bar in mm). Photo: A & B: Jana Leong-Škorničková, C–F: Nguyễn Quốc Bình.

**Distribution & IUCN preliminary assessment:**—So far known only from the type locality in Xuân Sơn National Park. Although this species is under protection of the National Park, we propose to treat this species provisionally as vulnerable (VU D1 and D2) for the AOO is less than 20 km<sup>2</sup> and less than hundred adult individuals in two subpopulations at one location were encountered during our fieldwork, which covered various parts of Xuân Sơn National Park.

**Ecology and phenology:**—Flowering at type locality is from August to September. It is predicted that fruiting occurs from the end of September onwards and may last about two months.

**Other specimens examined:**—VIETNAM. Phú Thọ Province, Tân Sơn Dist., Xuân Sơn N.P., 21°07'10.8"N, 104°56'47.1"E, 619 m, 12 April 2013, *J. Leong-Škorničková, Q.B. Nguyễn & O. Šída JLS-2175* (SING, VNMN).

***Zingiber cardiocheilum* Škorničk. & Q.B.Nguyễn, sp. nov.** (sect. *Dymczewiczia*)

Similar to *Zingiber rufopilosum* in its fusiform downward-facing inflorescence, but differs in the glabrous leaf sheaths, ligules and margins of the laminae, narrower inflorescence 4–11 × 1.5–1.8 cm, entire labellum and glabrous ostiole (vs. leaf sheaths and ligules densely pilose, margins of laminae pilose, inflorescence c. 6 × 3 cm and distinctly bifid labellum with incision about 1/3 of its length and ciliate ostiole).

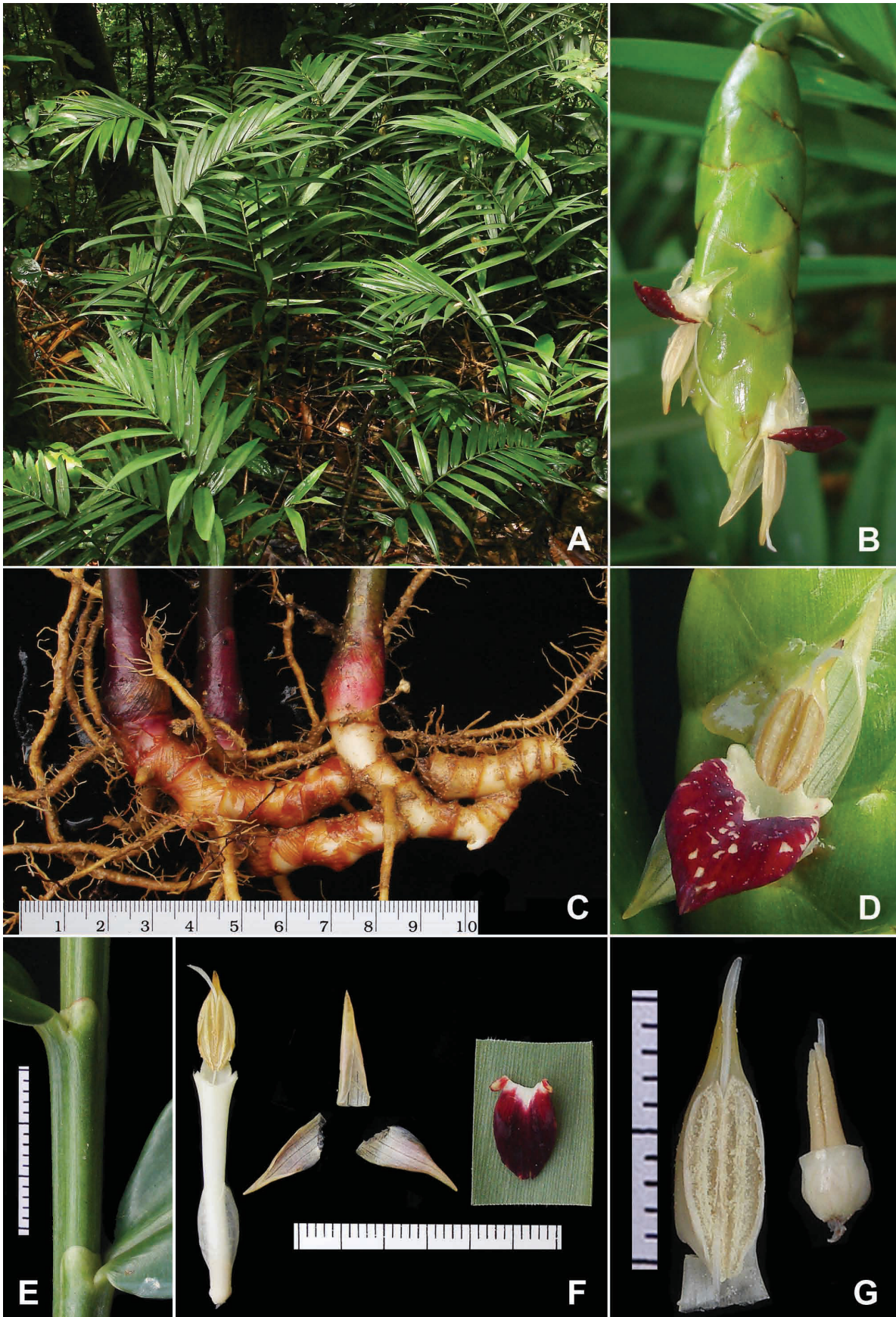
**Type:**—VIETNAM. Vĩnh Phúc Province, Tam Đảo N.P, 583 m, 21°26'51.3"N, 105°37'27.9"E, 19 September 2011, *Nguyễn Quốc Bình, Jana Leong-Škorničková, Trần Hữu Đăng, VNMN-B 1446* (holotype SING (inclusive spirit), isotypes E, P, PR, VNMN (incl. spirit).

**Fig. 3.**

Clump forming rhizomatous herbs. *Rhizome* to 1 cm in diam., branched, 3–5 cm between leafy shoots, externally dirty white to cream coloured, internally ochraceous, weakly aromatic, scales broadly triangular, up to 1.5 cm long, rusty brown, striate, glabrous. *Leafy shoot* to 1.2 m tall, with 20–25 leaves, base swollen c. 17 mm in diam., dark red, basal part of pseudostem leafless for 1/4–1/3; *bladeless sheaths* green with faint dark red tinge towards base; *leaf sheaths* dark green, glabrous; *ligule* 3–5 mm long, shallowly bilobed, light green, glabrous; *petiole* absent; *lamina* narrowly ovate, up to 30 × 2.5(–3.0) cm, gradually tapering to narrowly acute apex, base rounded, above dark glossy green, smooth (no prominent plication), lighter green beneath, fairly leathery texture, glabrous both sides. *Inflorescence* terminal, hanging down; *spike* 4–11 cm long, 1.5–1.8 cm broad, spindle shaped, consisting of 20–45 bracts; *bracts* green, glossy, obovate, lowermost c. 5 bracts sterile, up to 2.3 × 2.3 cm (gradually smaller towards the apical part of inflorescence), apex broadly acute to obtuse; enclosing 2 flowers per bract (occasionally 3 flowers at the basal bracts, and only 1 in uppermost bracts). *Bracteole* obovate triangular, 4–10 × 2–4 mm, unequally folded with one keel, translucent white, glabrous externally and internally. *Flower* 3–4 cm long; *calyx* c. 12 mm long, translucent white, glabrous, with two inconspicuous teeth at apex (appears truncate), with unilateral incision 4–7 mm; *floral tube* 18–25 mm, externally and internally white, externally glabrous, internally sparsely puberulous; *dorsal corolla lobe* ovate-triangular, 10–14 × 6–8 mm, semi-translucent light yellow, sometimes with faint pinkish tinge, darker towards apex, externally and internally glabrous, apex acute, mucronate, mucro c. 1 mm; *lateral corolla lobes* ovate triangular, 10–12 × 5–6 mm, semi-translucent light yellow, sometimes with faint pinkish tinge, darker towards apex, externally and internally glabrous, apex acute; *labellum* c. 11 mm long, c. 9 mm broad, broadly ovate, dark red to deep maroon violet, sometimes with yellow blotches, velvety in appearance, margins of the labellum reflexing at apical half (resulting in heart shape of the labellum); *lateral staminodes* 1.5–3.0 × 1.5 mm, ovate to broadly triangular, connate to the labellum by basal 1/2, yellow or with red patch. *Stamen* 12 mm long; *filament* 2–3 mm long, 3–4 mm broad at base, 2.5–3.0 mm broad at apex, light yellow, glabrous; *anther* 9–11 × 3–4 mm, connective tissue light yellow, glabrous, anther crest 1.5–2.0 mm, wrapped around stigma, dark yellow, sometimes with red tinge, glabrous; *anther thecae* 7–9 mm long, dehiscing along entire length. *Epigynous glands* two, c. 6 mm long, c. 0.5 mm in diam., ochraceous, sometimes with pink tinge, apex acute. *Ovary* nearly spherical, 2 × 2 mm, white, glabrous, trilocular with central placentation. *Style* white, glabrous, stigma c. 1.5 mm long, slightly thicker than style, white with a pink tinge at dorsal part, ostiole front-facing, glabrous. *Fruit* and *seeds* not seen.

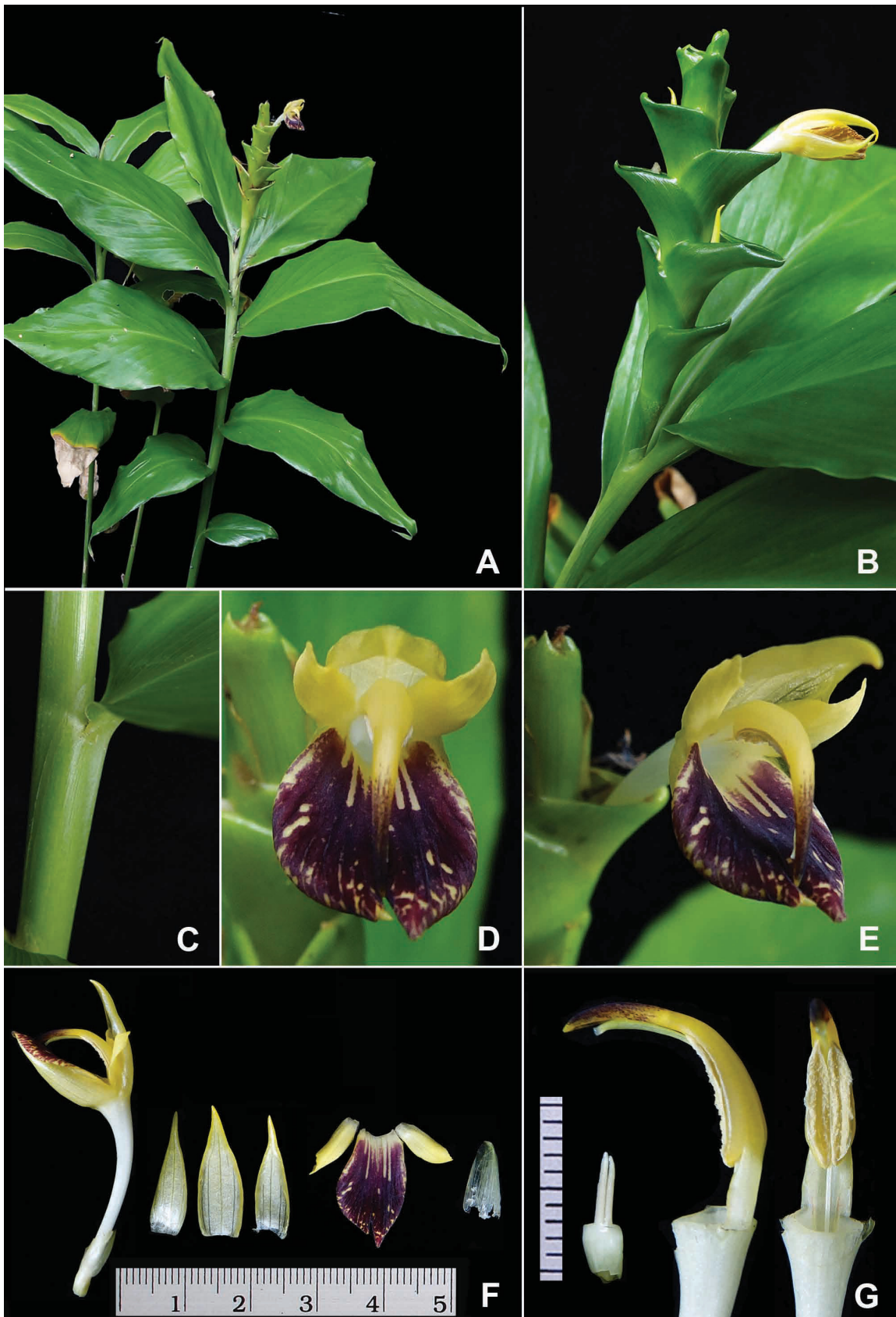
**Etymology:**—Derived from Greek, the epithet denotes the heart-shaped appearance of the labellum.

**Distribution & IUCN preliminary assessment:**—So far known only from the type locality in Tam Đảo National Park. While this species is under protection of the National Park, we propose to treat this species for the time being as vulnerable (VU D1 and D2) as the AOO is less than 20 km<sup>2</sup> and only a few hundred individuals in a few subpopulations at one location were encountered during our fieldwork that covered various parts of Tam Đảo National Park.



**FIGURE 3.** *Zingiber cardiocheilum*. A. Habit. B. Inflorescence (in natural hanging down position) with detail of flowers in side view. C. Rhizome (scale in cm). D. Flower (front view). E. Detail of ligules (scale bar in mm). F. Dissection (from left): floral tube with ovary, calyx and anther (front view; image rotated 180°), dorsal and lateral corolla lobes, labellum with lateral staminodes, (scale bar in mm). G. Detail of anther (front view), ovary and epigynous glands (scale bar in mm). *Photo: Jana Leong-Škorničková.*

**Ecology and phenology:**—Growing on slopes in evergreen broadleaved forest around 600 m. Flowering in late August to early October. Bumble-bees were observed to effectively pollinate the flowers.



**FIGURE 4.** *Zingiber castaneum*. A. Habit. B. Inflorescence with flower in side view. C. Detail of ligule. D. Flower (front view). E. Flower (semi-front view). F. Flower from the side view, lateral corolla lobes with dorsal lobe in between, labellum with lateral staminodes and bracteole (scale bar in mm). G. Detail of ovary and epigynous glands and anther (side and front view) (scale bar in mm). Photo: Jana Leong-Škorničková.



***Zingiber castaneum* Škorničk. & Q.B.Nguyễn, sp. nov.** (sect. *Dymczewiczia*)

Similar to *Zingiber mellis* in having upright inflorescence and similar flower colour, but differs by the thinner bright green laminae, green papery ligules, reflexed bracts, shape of the labellum and anther with pronounced filament.

**Type:**—VIETNAM, Ninh Binh Province, Cúc Phương N.P., Cây Sấu Cổ Thụ trail, 397 m, 20°21'28.16"N, 105°34'52.96"E, 11 September 2011, Nguyễn Quốc Bình & Trần Hữu Đăng VNM-B 1370 (holotype SING (incl. spirit), isotype VNMN). **Fig. 4.**

Rhizomatous herbs forming small clumps. *Rhizome* creeping, to 1.5 cm in diam., externally light brown, internally cream white, aromatic (somewhat unpleasantly), scales broadly triangular, c. 1 cm long, light brown, glabrous. *Leafy shoot* c. 0.75 m tall, with 6–9 leaves, basal 1/3–1/2 leafless; *bladeless sheaths* and *leaf sheaths* mid green, glabrous; *ligule* 5–7 mm long, ovate, translucent light green, glabrous; *petiole* absent; *lamina* sessile, up to 25 × 7.8 cm, elliptic, gradually tapering to caudate apex, base rounded, above glossy green, lighter green beneath, fairly thin in texture, mildly plicate, glabrous both sides. *Inflorescence* terminal, in upright position; *spike* 6–9 cm long, 3.0–3.5 cm broad (inclusive tips of reflexed bracts), consisting of 7–11 bracts; *bracts* green (turning yellow with age), glossy, obovate, lowermost bract sterile, fertile bracts up to 3 cm long and 2.8 cm broad (largest in the middle of the inflorescence), with broadly acuminate reflexed apex; *cincinnus* of 3 flowers per bract (2 or 1 flower per bract towards the apex); *bracteole* triangular-ovate, c. 11 mm long, up to 10 mm broad at base, unequally folded, translucent white with greenish apex, glabrous externally and internally. *Flower* c. 5 cm long; *calyx* 9–11 mm long, translucent white, glabrous, with no conspicuous teeth at apex (appears to be truncate), with unilateral incision 4–5 mm; *floral tube* c. 29 mm, externally and internally white, externally and internally glabrous; *dorsal corolla lobe* ovate-triangular, 18–22 × 11–13 mm, semi-translucent pale yellow, darker towards apex, externally and internally glabrous, apex acute, mucronate, mucro c. 1 mm; *lateral corolla lobes* ovate triangular, 18–20 × 9–10 mm, semi-translucent light yellow, darker towards apex, externally and internally glabrous, apex narrowly acute; *labellum* 17–18 mm long, c. 12.5–14.0 mm broad, ovate to weakly obovate, dark maroon with pale yellow lines radiating from the base to about third of the labellum and small pale yellow blotches near margins, velvety in appearance; *lateral staminodes* 10–11 × 2–3 mm, oblong, connate to labellum by basal 1 mm, yellow. *Stamen* 17–18 mm long; *filament* 2–3 mm long, 3 mm broad at base, 2.5 mm broad at apex, cream white, glabrous; *anther* 16–18 mm long (with anther crest straightened), 2.5–3.0 mm broad, connective tissue yellow, glabrous, anther crest 6.5–8.0 mm long, wrapped around stigma, richly tinged with maroon towards the apex, glabrous; *anther thecae* 8–9 mm long, dehiscing along entire length. *Epigynous glands* two, c. 4 mm long, c. 0.5 mm in diam., cream white. *Ovary* nearly cylindrical to weakly obconical, 3.0–4.0 × 2.5 mm, white, glabrous, trilobular with central placentation. *Style* white, glabrous, stigma c. 1.5 mm long, slightly thicker than style, white, ostiole front facing, ciliate. *Fruit* and seeds not seen.

**Etymology:**—The Latin epithet refers to the chestnut colour of the labellum.

**Distribution & IUCN preliminary assessment:**—So far known only from the type collection in Cúc Phương National Park, Vietnam. Because the number of populations and their sizes are not well known, we suggest to treat this species as Data Deficient until more information is available.

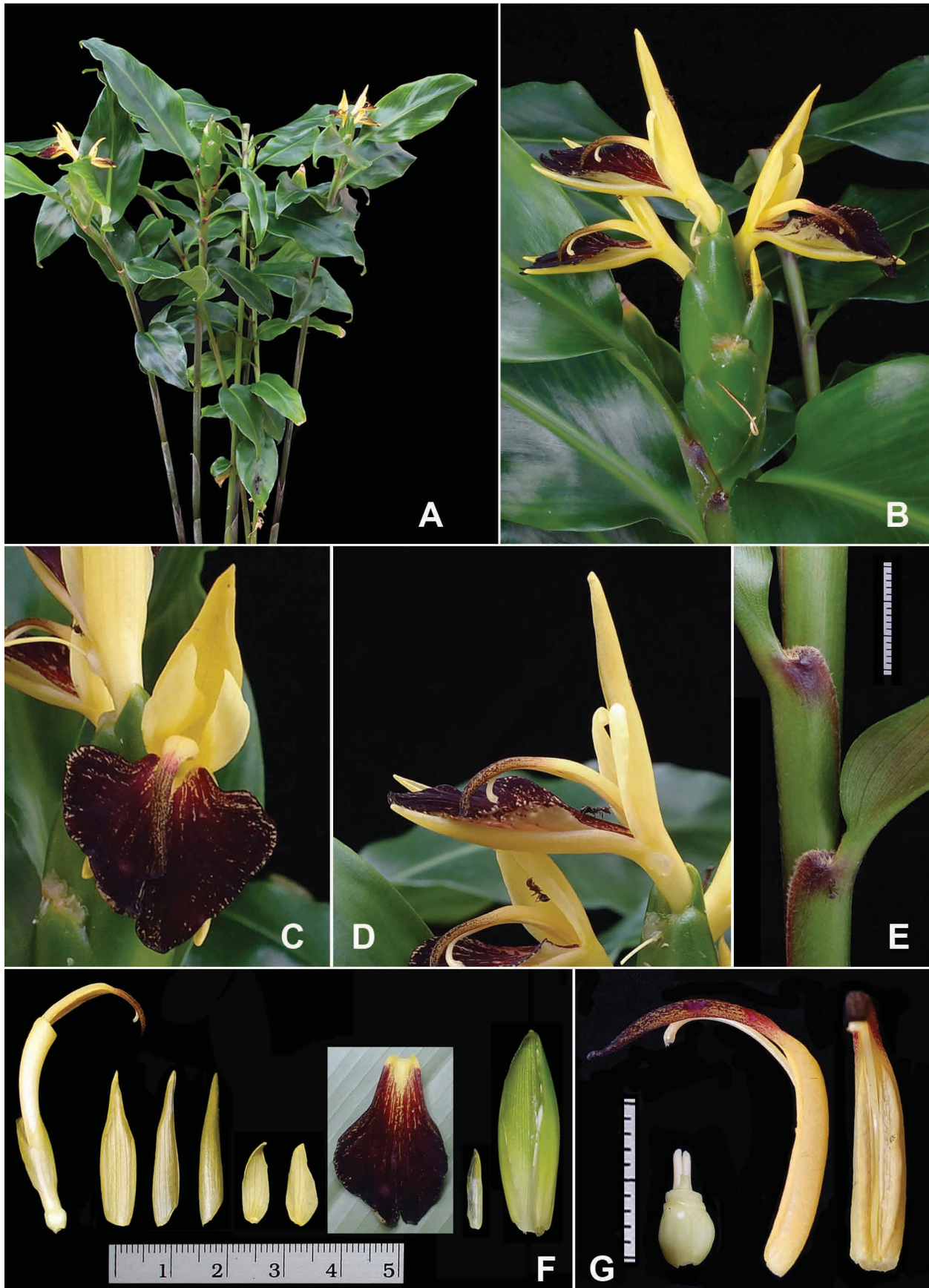
**Ecology and phenology:**—Growing in broad-leaved evergreen forest, in transition area to lime stones, at altitude about 400 m. Flowering starts in July and extends to September.

*Zingiber castaneum* is easily recognized among other terminally flowering species by its upright inflorescence with reflexed bracts.

***Zingiber mellis* Škorničk., H.Đ.Trần & Šída f., sp. nov.** (sect. *Dymczewiczia*)

Similar to *Zingiber castaneum* in having an upright inflorescence, but differs by its leafy shoots being composed of dark green leaves with short (c. 3 mm), thick, dark maroon, densely pilose ligules, spindle-shaped inflorescences with bracts tightly overlapping, honey scented flowers and an anther with almost reduced filament (compared to mid-green to bright green leaves, thin green glabrous ligules, inflorescence composed of strongly reflexed bracts, unscented flowers and anther with well-developed filament in *Z. castaneum*).

**Type:**—VIETNAM, Kon Tum Province, Kon Plong Dist., Mãng Cành 14°44'25.2"N, 108°14'22.1"E, 1155 m, 20 July 2010, Trần Hữu Đăng, Lê Công Kiệt, Nguyễn Duy Linh, Otakar Šída, Vũ Huy Đức 361 (holotype SING, isotypes E, VNM). **Fig. 5.**



**FIGURE 5.** *Zingiber mellis*. A. Habit. B. Inflorescence. C. Flower (front view). D. Flower (side view). E. Detail of ligules (scale bar in mm). F. Flower dissection (from left): floral tube with ovary, calyx and anther (side view), dorsal and lateral corolla lobes and lateral staminodes, labellum, bracteole, and bract (scale bar in cm). G. Detail of anther (front view), ovary and epigynous glands (scale bar in mm). Photo: Jana Leong-Škorničková

Rhizomatous herbs forming small clumps. *Rhizome* c. 1 cm in diam. *Leafy shoot* 0.6–1.0 m tall, with 5–12 leaves, basal 1/3–1/2 leafless; *bladeless sheaths* 4–6 leafless sheaths, green with dark red tinge towards base, pilose (denser in apical part and towards the margins); *leaf sheaths* dark green with maroon tinge at margins, sparsely pilose, denser towards margins; *ligule* c. 3 mm long, shallowly bilobed, maroon, densely pilose; *petiole* up to 5 mm long; *lamina* ovate to elliptic, up to 20 × 7 cm, apex attenuate to caudate, base rounded, dark glossy green above, lighter green beneath, fairly leathery in texture with no prominent plication, glabrous on upper side, finely hairy with silky long hairs beneath. *Inflorescence* terminal, in upright position; *spike* 5.0–7.5 cm long, 1.5–2.0 cm broad, spindle shaped, consisting of 8–12 bracts; *bracts* obovate, up to 3.8 cm long and 2.8 cm broad (largest in the middle of the inflorescence), glossy green (turning through yellow to bright red with age), glabrous, with broadly acuminate apex; *cincinnus* of 2 flowers per bract (only 1 flower at uppermost bracts, lowermost 1–3 bracts sterile); *bracteole* obovate-triangular, 13–20 × 4–11 mm broad, unequally folded with one keel, translucent yellow, glabrous externally and internally. *Flower* 5–6 cm long, opening in the afternoon, emitting slight honey-like scent; *calyx* 7–9 mm long, translucent yellow, glabrous, with no conspicuous teeth at apex (appears truncate), with unilateral incision 2–4 mm; *floral tube* 24–38 mm, externally and internally yellow (lighter towards the base), glabrous externally, pubescent at apical part internally; *dorsal corolla lobe* narrowly ovate-triangular, 28–33 × 9–10 mm, semi-translucent yellow, glabrous externally and internally, apex mucronate, mucro less than 1 mm; *lateral corolla lobes* narrowly ovate-triangular, 28–30 × 6–7 mm, semi-translucent yellow, glabrous externally and internally, apex narrowly acute; *labellum* broadly trullate, c. 30 × 22 mm, dark maroon-brown, with minute yellow streaks, velvety appearance, flat (margins not reflexed); *lateral staminodes* narrowly unequally ovate, 15–17 × 6–7 mm, connate to labellum by 1 mm, yellow. *Stamen* c. 22 mm long (anther crest unmanipulated); *filament* c. 1 mm long, 2.0–2.5 mm broad at base, yellow, glabrous; *anther* 27–30 mm long (with anther crest straightened), 3–4 mm broad, connective tissue yellow with dark maroon-brown tinge towards the anther crest, glabrous, anther crest 13–15 mm long, wrapped around stigma, heavily tinged dark-maroon-brown, glabrous; *anther thecae* c. 14 mm long, dehiscing along entire length; *Epigynous glands* two, 3–5 mm long, c. 1 mm diameter at base, cream-white. *Ovary* 3.0 × 2.5 mm, light yellow-greenish, glabrous, trilocular with central placentation. *Style* light yellow with red tinge in middle part, glabrous; *stigma* c. 2 mm long, slightly thicker than style, light yellow, ostiole front facing, shortly ciliate. *Fruit* and *seeds* not seen.

**Etymology:**—The epithet ‘*mellis*’ denotes the honey-scented flowers.

**Distribution & IUCN preliminary assessment:**—So far it is known only from the type collection in central Vietnam. Until more exploration of the region will be made, this species shall be considered as Data Deficient.

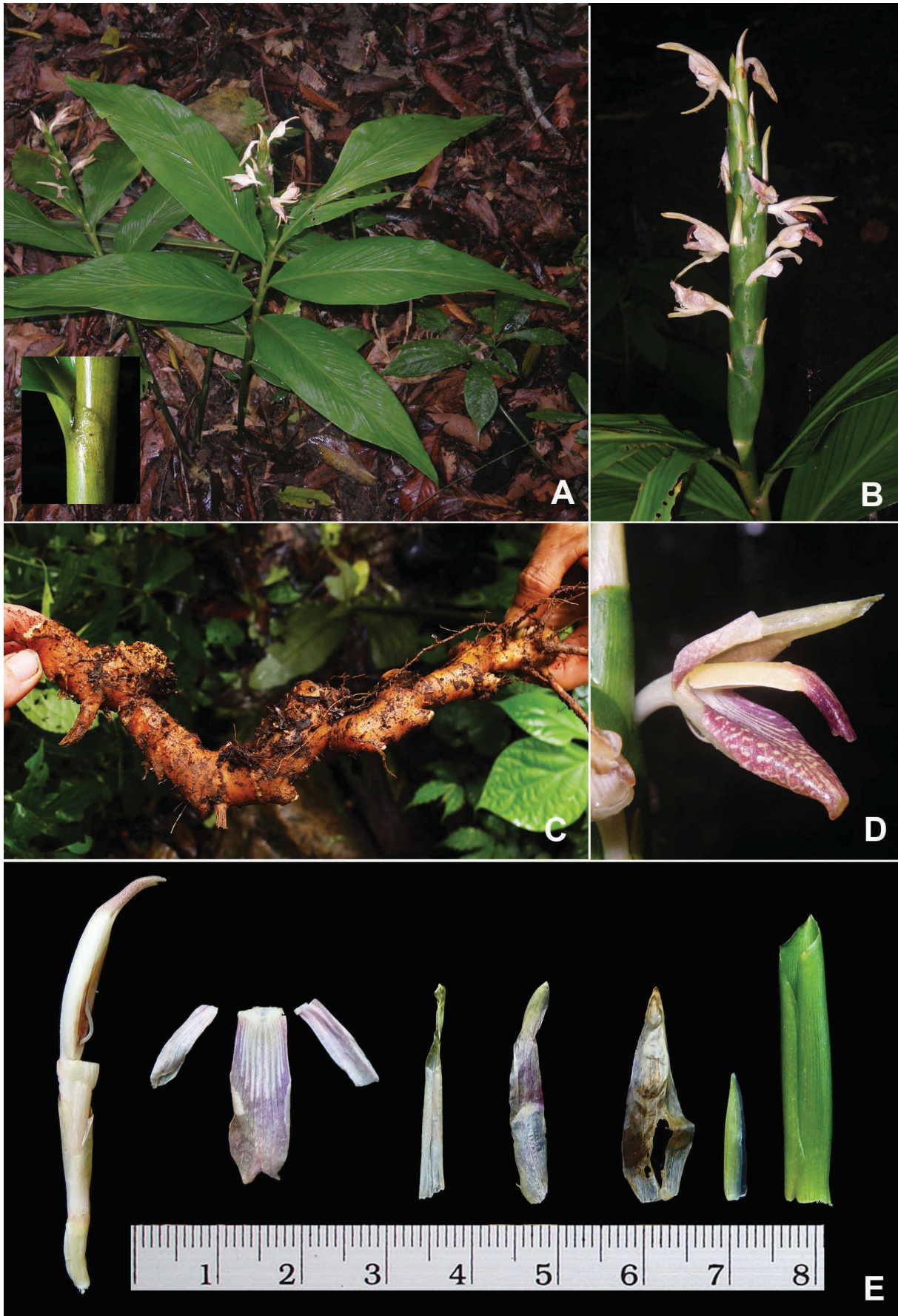
**Ecology and phenology:**—Growing in broadleaved evergreen montane forest at altitude about 1150 m. Flowering in June to July.

***Zingiber plicatum* Škorničk. & Q.B.Nguyễn, sp. nov.** (sect. *Dymczewiczia*)

*Zingiber plicatum* is unique among all terminally flowering species by its prominently plicate leaves. Its erect inflorescence is similar to *Z. castaneum* and *Z. mellis*, but it differs from the first in its bracts not being recurved at apex (vs. bracts recurved at apex) and from the second by its thin prominently plicate lamina, green thin ligules and labellum peach-purple to purple, with cream white or pale yellow lines radiating from the base, margins reflexed (vs. leathery lamina with no prominent plication, thick dark maroon ligules, and labellum dark maroon-brown, with minute yellow streaks broadly trullate, flat).

**Type:**—VIETNAM. Phú Thọ Province, Tân Sơn Dist., Xuân Sơn N.P., 21°07′07.3″N, 104°57′05.2″E, 446 m, 12 April 2013, *J. Leong-Škorničková, Q.B. Nguyễn & O. Šída JLS-2170* (holotype SING, isotype VNMN). **Fig. 6.**

Rhizomatous herb. *Rhizome* to 2.5 cm in diam, creeping, externally light brown, internally ochraceous, weakly aromatic. *Leafy shoot* to 1 m tall, with 5–10 leaves, basal part of pseudostem c. 1/3 leafless; *bladeless sheaths* 2–3, usually with vestige of leaves, green, puberulent (slightly rough to touch); *leaf sheaths* green, puberulent; *ligule* 3–5 mm long, shallowly bilobed, puberulent; *petiole* 3–7 mm long; *lamina* up to 25 × 10 cm, elliptic to broadly elliptic to obovate, apex acuminate to caudate, base obtuse, above bright green, lighter green beneath, prominently plicate, glabrous on both sides. *Inflorescence* terminal, in upright position; *spike* 12–18 cm long, 1.5–2.0 cm broad, consisting of 6–17 bracts (topmost 1–2 bracts usually sterile); *bracts* green (turning yellow with age), glossy, to 3.5–4.0 × 1.7–3.5 cm, elliptic to weakly obovate, with broadly acute to rounded apex, supporting 1–2 flowers; *bracteole* c. 13 × 4 mm, narrowly ovate-triangular, unequally folded with one keel, translucent greenish, glabrous externally and internally. *Flower* (described from almost mature flower bud; measurements expected to be slightly larger in fully matured open flowers) c. 5.3 cm long; *calyx* c. 15 mm long, translucent white, glabrous, with one or two teeth at apex, with unilateral incision 6–8 mm; *floral tube* c. 18 mm,



**FIGURE 6.** *Zingiber plicatum*. A. Habit. B. Inflorescence. C. Rhizome. D. Detail of ligule. E. Flower dissection (from left): floral tube with ovary, calyx and anther (side view), lateral staminodes with labellum in between, lateral corolla lobes, dorsal corolla lobe, bracteole, and bract (scale bar in cm). Photos: A, B, D—Maxim Nuraliev; A (inset only), C, E—Jana Leong-Škorničková.

externally and internally white, externally glabrous, internally puberulent; *dorsal corolla lobe* ovate triangular, c. 25 × 9 mm, cream-white to pale yellow, sometimes with pink-purple tinge, greenish towards apex, externally and internally glabrous, apex acute, mucronate, mucro c. 1 mm; *lateral corolla lobes* ovate triangular, 22–23 × 5–6 mm, cream-white to pale yellow, sometimes with pink-purple tinge, greenish towards apex, externally and internally glabrous, apex acute; *labellum* c. 19 × 12 mm, obovate, peach-purple to purple, with cream white or pale yellow lines radiating from the base to about half of the labellum, apex incised c. 2 mm; *lateral staminodes* c. 12 × 4 mm, oblong, connate to labellum by basal 1 mm, peach or pink-purple at base, fading pale yellow to cream white towards apex, outer sides and apices reflexed. *Stamen* c. 23 mm long (with anther crest not manipulated); *filament* c. 1 mm long, 2.5 mm broad at base, cream white, covered with short glandular hairs; *anther* 24 × 5 mm (with anther crest straightened), connective tissue cream white to yellow, covered by short glandular hair, anther crest 8 mm long, wrapped around stigma, tinged purple or red-purple, glabrous, apex bifid, incision 1–2 mm; *anther thecae* c. 16 mm long, dehiscing along entire length. *Epigynous glands* two, c. 3 mm long, c. 0.6 mm in diam., ochraceous. *Ovary* nearly cylindrical to weakly obconical, 6 × 2–3 mm, cream white, with sparse appressed silky hair, trilocular with central placentation. *Style* white, glabrous, stigma c. 2 mm long, slightly thicker than style, white, ostiole front facing, shortly ciliate. *Fruit* and *seeds* not seen.

**Etymology:**—The epithet reflects the prominently plicate laminae of this species, which readily distinguishes it from any other terminally flowering *Zingiber* species in Vietnam.

**Distribution & IUCN preliminary assessment:**—So far it is known only from the type locality in Xuân Sơn National Park. Although this species is under protection of the National Park, we propose to treat this species provisionally as vulnerable (VU D1 and D2) for the AOO is less than 20 km<sup>2</sup> and less than hundred adult individuals in two subpopulations at one location were encountered during our fieldwork which covered various parts of Xuân Sơn National Park.

**Ecology and phenology:**—Growing in broadleaved evergreen lowland forest on limestone, at altitude around 400–500 m. While two inflorescences in buds were found in mid April, this species, according to staff of Xuân Sơn National Park, usually flowers from June to July.

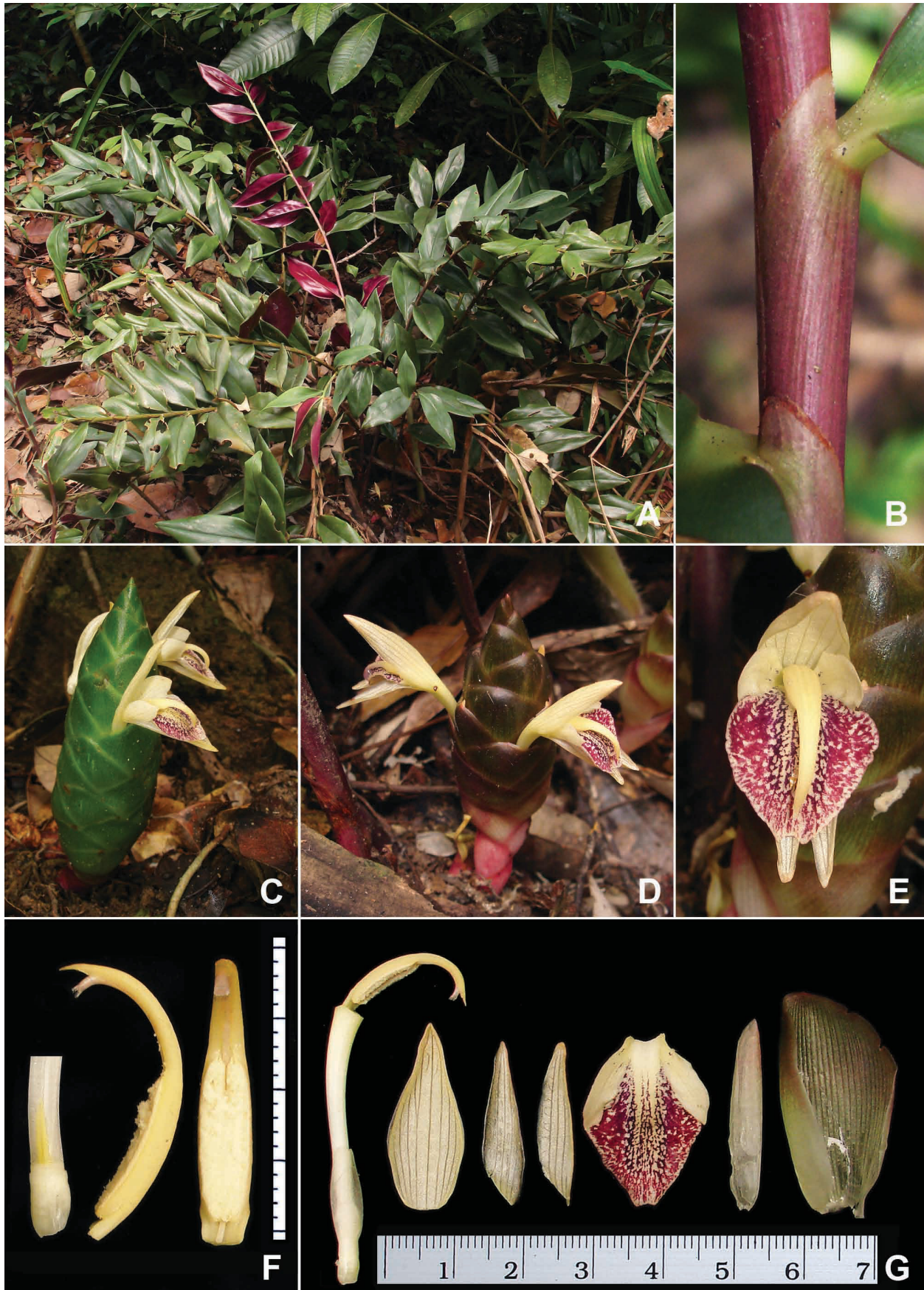
**Other specimens examined (paratypes):**—VIETNAM. Phú Thọ Province, Thanh Sơn District, Xuân Sơn municipality, Xuân Sơn National Park, near road from Lập village to the waterfall, 21°08'15"N, 104°56'15"E, 250 m, 17 October 2014, *M.S. Nuraliev & N.A. Vislobokov 1094* (MW, photo seen).

***Zingiber discolor* Škorničk. H.Đ.Trần & Rybková, sp. nov.** (sect. *Zingiber*)

Unique among all Vietnam *Zingiber* species by its coriaceous leaf blades that are abaxially have a prominent glossy, rich dark purple-violet colour.

**Type:**—VIETNAM. Khánh Hòa Province, Hòn Bà Nature Reserve, 897 m, 12°06'46.3"N, 108°58'27.1"E, 4 July 2010, *Jana Leong-Škorničková, Romana Rybková, Jan Ponert, Trần Hữu Đăng, Trịnh Tấn Thành, Trương Quang Tâm, Trương Bá Vương HB-96* (holotype VNM, isotype E, PR, SING, Hòn Bà Nature Reserve). **Fig. 7.**

Clump-forming rhizomatous herbs. *Rhizome* brown externally, purple-brownish internally, pleasantly aromatic with mild camphor smell. *Leafy shoots* up to 1 m long, arching, with 5–20 leaves; base swollen up to 3 cm in diam.; basal 1/4–1/3 of pseudostem leafless; *bladeless sheaths* 3–5, richly tinged by dark red, glabrous; *leaf sheaths* green with various degree of red tinge (greener towards the apex of pseudostem), glabrous; *ligule* up to 5 mm long, bilobed, lobes round, pale green with various degree of red tinge, glabrous, with brownish papery margin (well visible even in dried material); *petiole* inconspicuous, consisting of light green, glabrous pulvinus; *lamina* elliptic, up to 16 × 6 cm (gradually smaller towards the apex of pseudostem), coriaceous, smooth (no prominent plication), dark green or with grey-silverish sheen adaxially, dark purple-red and shiny abaxially, glabrous both sides, margin entire, base obtuse, apex attenuate. *Inflorescence* radical, erect; *peduncle* up to 3–7(–9) cm long, with 4–8 sheathing bracts; *spike* up to 9.0 × 3.5 cm, fusiform to ovoid, composed of 10–30 bracts; *bracts* broadly ovate to broadly elliptic, up to 3.5 × 2.5 cm, greenish to cream at base, plain green or with various degree of reddish tinge towards apex, glabrous on both sides, margin translucent, c. 1 mm broad, enclosing a single flower; *bracteole* ovate to elliptic, up to 3 cm long, translucent cream to greenish, sometimes with pink tinge, glabrous on both sides. *Flower* 5–7 cm long; *calyx* 12–15 mm long, translucent white, sparsely puberulous towards base, apex with 3 inconspicuous teeth unilateral incision 6–8 mm; *floral tube* 32–37 mm long, cream white at base, pale yellow towards apex, externally glabrous, internally sparsely pubescent in apical part; *dorsal corolla lobe* ovate-elliptic, up to 28 × 12 mm, cream white to pale yellow with translucent veins,



**FIGURE 7.** *Zingiber discolor*. A. Habit. B. Detail of ligules. C–D. Inflorescence (note the difference in colour of bracts) E. Flower (front view). F. Detail of ovary with epigynous glands and anther (side and front view). G. Dissection (from left): Floral tube with ovary, calyx and stamen attached, dorsal corolla lobe, two lateral corolla lobes, labellum, bracteole and fertile bract (scale bar in cm). Photo: Jana Leong-Škorničková.

glabrous externally and internally, apex acute; *lateral corolla lobes* narrowly triangular-ovate, up to 24 × 6 mm, cream white to pale yellow with translucent veins, glabrous externally and internally, apex acute; *labellum* c. 24 × 14 mm (to 20 mm wide incl. the staminodes), ovate to rhomboid, often with retuse or emarginate apex; pale yellow at base, with rich purple-red to dark maroon tinge and numerous pale yellow blotches; *lateral staminodes* 14–15 × 4–7 mm, elliptic to narrowly obovate, connate to labellum by basal 2/3–3/4, cream white to pale yellow, held upwards (not spreading). *Stamen* 18–22 mm long (measured unmanipulated); *filament* 2–3 mm long, 3–4 mm broad, cream to pale yellow, glabrous; *anther* c. 20 mm long (crest not straightened), c. 4 mm broad, connective tissue pale yellow, glabrous, anther crest c. 13 mm long (straightened), pale yellow, wrapped around style, apex acute; *anther thecae* 10–12 mm long, dehiscing along the entire length. *Epigynous glands* two, c. 4 mm long, c. 0.6 mm in diam. at base, yellow. *Ovary* c. 4.0–4.5 × 3.0–4.0 mm, ovoid to cylindrical, cream white, glabrous. *Style* white, glabrous, stigma c. 1 mm long, slightly thicker than style, ostiole front-facing, ciliate. Mature fruits not seen.

**Etymology:**—The specific epithet is derived from Latin, reflecting that the two faces of its leaf blades are unlike in colour.

**Distribution & IUCN preliminary assessment:**—Apart of the type locality, this species has been also observed in forests in Lâm Đồng Province, Bảo Lâm district (*Nuraliev 830*, photographic record of flowering material seen), which is distanced c. 200 km (air distance) from Hòn Bà mountain. It is expected that this species will be reported from other localities in near future.

**Ecology and phenology:**—Flowering at type locality occurs in May to July, young fruits were observed in July and it is expected that fruiting continues until September. Bảo Lâm populations have been observed to flower in April (M. Nuraliev, pers. com.).

**Other specimens examined (paratypes):**—VIETNAM. Khánh Hòa Province, Cam Lâm District, Hòn Bà Nature Reserve, 1541 m, 12°07'00.0"N, 108°56'43.9"E, 30 June 2011, *Jana Leong-Škorničková, Romana Rybková, Jan Ponert, Trần Hữu Đăng, Trịnh Tấn Thành, Trương Quang Tâm, Trương Bá Vương HB-31*; Lâm Đồng Province, Bảo Lâm District, Lộc Bắc municipality, 14 km WNW from Lộc Thắng town, 11°44'38"N, 107°42'22"E, 1000 m, 16 April 2013, *M.S. Nuraliev 830* (MW, photo seen).

*Zingiber discolor* is readily recognized even in its sterile stage by the coriaceous leaves that are prominently coloured below with a glossy, rich, dark purple-violet, a character so far unique to *Zingiber* species in Vietnam. The upper side of the leaves can be either mid to dark green or with a greyish silver sheen. The colour of the bracts varies from plain green to brownish red (see Fig. 7 C, D).

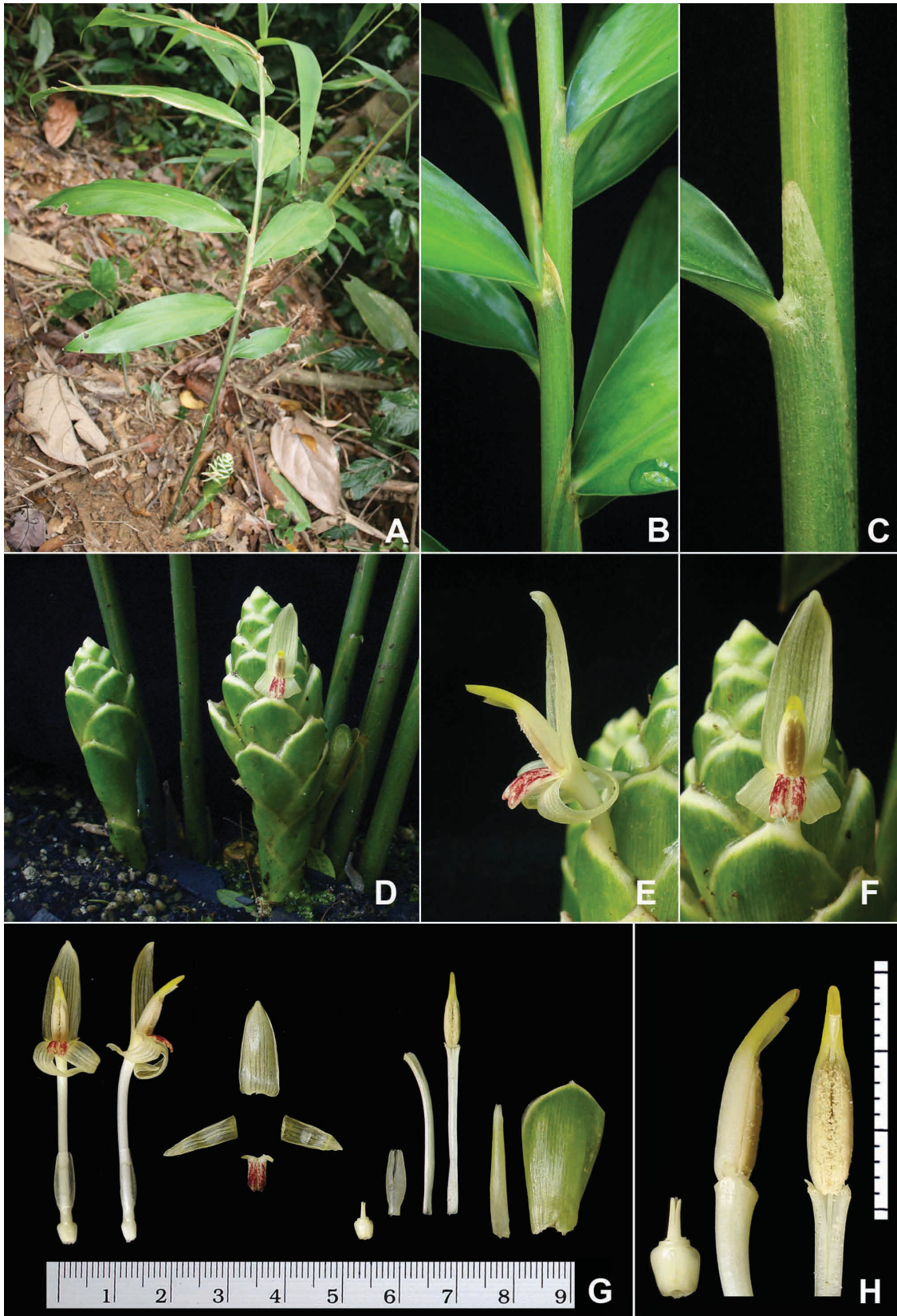
***Zingiber microcheilum* Škorničk., H.Đ. Trần & Šída f., sp. nov.** (sect. *Zingiber*)

Similar to *Zingiber officinalis* L. in the shape and colour of the inflorescence, but markedly different in its very small labellum, a unique character in the genus.

**Type:**—VIETNAM. Quảng Nam Province, Phước Sơn District, Phước Mỹ, 15°18'00.8"N, 107°43'44.1"E, 686 m, 22 July 2010, *Trần Hữu Đăng, Lê Công Kiệt, Nguyễn Duy Linh, Otakar Šída, Vũ Huy Đức 382* (holotype SING, isotypes PR, VNM). **Fig. 8.**

Rhizomatous herbs. *Rhizome* branched, externally light brown, internally dirty yellowish to ochraceous. *Leafy shoot* to 0.8 m tall, slightly arching, with up to 10 leaves, basal third of pseudostem leafless or with remnants of leaves; *bladeless sheaths* and *leaf sheaths* green, pubescent; *ligule* up to 10 mm long, ovate, thin, pubescent; *petiole* 2–3 mm long, consisting of pulvinus only; *lamina* elliptic, 15–35 × 3–5 cm, apex narrowly acute to narrowly attenuate, base obtuse, green above, somewhat smooth (no prominent plication), light green, with sparse silky hair beneath. *Inflorescence* radical, erect; *peduncle* up to 3–15 cm, with c. 6 sheathing bracts; *spike* spindle-shaped, to 11 × 3.5 cm, consisting of 15–45 bracts; *bracts* ovate, c. 2.8 × 2.1 cm (gradually smaller towards the apical part of inflorescence), concave, bright green with white margin, glabrous externally and internally, apex obtuse; 1 flower per bract; *bracteole* obovate, c. 23 × 13 mm long, greenish, glabrous externally and internally. *Flower* 5.0–5.5 cm long; *calyx* c. 12 mm long, translucent white, glabrous, with unilateral incision to 7 mm, apex truncate; *floral tube* c. 30 mm long, white, externally and internally glabrous; *dorsal corolla lobe* triangular-ovate, 16–18 × 7–8 mm, semi-translucent light yellow, glabrous externally and internally, apex acute, concave, minutely hooded; *lateral corolla lobes* narrowly triangular-ovate, reflexed, c. 18 × 4 mm, semi-translucent light yellow, glabrous externally and internally, apex acute; *labellum* elliptic, 5–7 × 3–4 mm, light yellow with rich bright red tinge; *lateral staminodes* linear, 2–3 × 1 mm, light yellow. *Stamen* c. 13 mm long (unmanipulated); *filament* reduced; *anther* 14 mm long (with straightened crest), c. 3 mm broad, connective tissue cream-white, glabrous, anther crest 5–6 mm, wrapped around stigma, bright yellow, glabrous; *anther*

*thecae* c. 8 mm long, dehiscing along the entire length. *Epigynous glands* two, 2–3 mm long, c. 0.6 mm in diam. at base, cream-white. *Ovary* obovate, c. 3.5 × 3.0 mm, cream-white, glabrous, trilobular with central placentation; *style* white, glabrous, stigma slightly thicker than style, white, ostiole front facing, ciliate. *Fruit* and *seeds* not seen.



**FIGURE 8.** *Zingiber microcheilum*. A. Habit. B. Pseudostem. C. Detail of ligule. D. Inflorescence. E. Flower (side view). F. Flower (front view). G. Dissection (from left): Flower (front view), flower (side view), corolla lobes and labellum, ovary with epigynous glands, calyx, floral tube (split in half) with anther in front view, bracteole, bract; (scale bar in cm). H. Detail of ovary with epigynous glands and anther (side and front view). *Photo: Jana Leong-Škorničková.*



**Etymology:**—The specific epithet reflects the much reduced labellum, which is smallest in the genus and the most striking feature of this interesting species.

**Distribution & IUCN preliminary assessment:**—So far known only from the type locality.

**Ecology and phenology:**—On steep slopes in lower montane semi-deciduous forest around 600–700 m. Flowering occurs in July to August.

Based on morphology, *Zingiber microcheilum* seem to be related to the best known member of the family, the ginger of commerce, *Zingiber officinale*. The shape and colour of the inflorescence is somewhat similar, but the striking difference lies in the size and shape of the much reduced labellum, which is yellow with a reddish tinge throughout, while *Zingiber officinale* has a well developed dark red to maroon labellum with yellowish speckles. The small size of the labellum in *Z. microcheilum* is unique in the genus *Zingiber*.

***Zingiber yersinii* Škorničk., H.Đ.Trần & Rybková, sp. nov.** (sect. *Zingiber*)

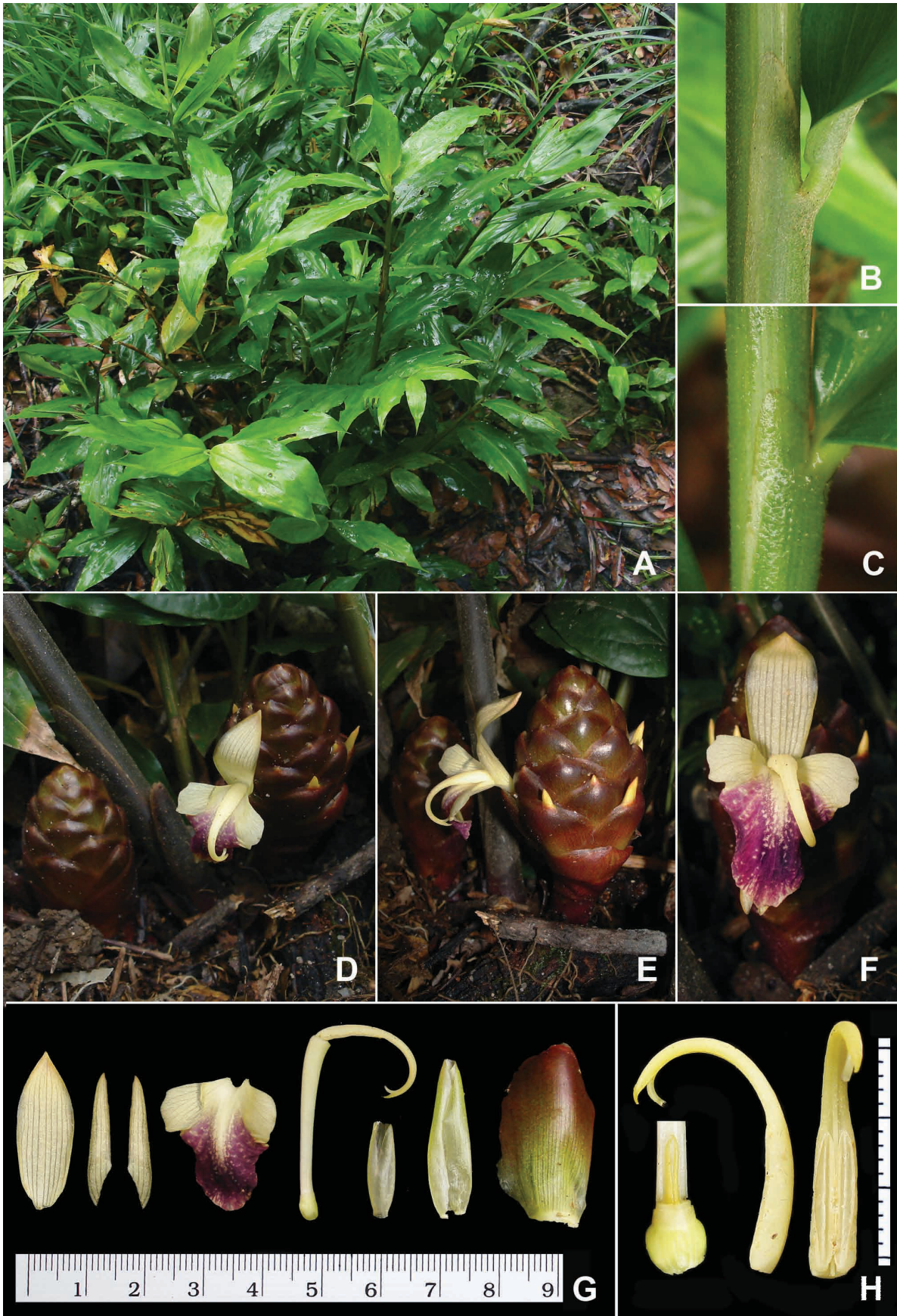
Similar to *Z. discolor* in the size of the inflorescence and the coloration of the flowers, but differs by the thin slightly plicate leaf blades that are bright mid-green on both sides, pubescent pulvinus and reflexed spreading obovate lateral staminodes (vs. smooth coriaceous leaf blades adaxially dark green and abaxially prominently coloured with a glossy dark purple-violet, glabrous pulvinus and elliptic to narrowly obovate, lateral staminodes held upwards, not spreading).

**Type:**—VIETNAM. Khánh Hòa Province, Hòn Bà Nature Reserve, 1518 m, 12°7'09.4"N, 108°56'49.8"E, 3 July 2010, *Jana Leong-Škorničková, Romana Rybková, Jan Ponert, Trần Hữu Đăng, Trịnh Tấn Thành, Trương Quang Tâm, Trương Bá Vương HB-77* (holotype SING (inclusive spirit), isotype E, PR, VNM, Hòn Bà Nature Reserve). **Fig. 9.**

Clump-forming rhizomatous herbs. *Leafy shoots* to 0.8 m long, arching with c. 15 leaves, basal 1/4–1/3 of pseudostem leafless, sheathed by 3–5 leafless sheaths; *bladeless sheaths* 3–5, brown-maroon, puberulous; *leaf sheaths* dark green with brown-maroon tinge at base, plain green towards the apex of pseudostem), puberulous; *ligule* up to 1 cm long, bilobed, lobes green thin, slightly puberulous to almost glabrous; *petiole* inconspicuous, consisting of light green, pubescent pulvinus; *lamina* narrowly elliptic, up to 22.0 × 6.5 cm (measured from dry material), weakly plicate, bright mid green adaxially, slightly lighter abaxially, glabrous both sides, margin entire, base obtuse, apex attenuate. *Inflorescence* radical, erect; *peduncle* up to 10 cm long, with 4–8 sheathing bracts; *spike* up to 9.0 × 3.5 cm, ovoid to ellipsoid, composed of 10–30 bracts; *bracts* broadly ovate to broadly elliptic, 3.0–3.5 × 1.8–2.0 cm (smaller towards apex), light green at base, with rich red-brown tinge at apical half, margin translucent, c. 1 mm broad, glabrous on both sides, enclosing a single flower; *bracteole* c. 2.6 cm long, semi-translucent cream at base, light green towards the apex, glabrous externally and internally. *Flower* c. 5 cm long; *calyx* c. 16 mm long, semi-translucent, greenish-white, glabrous, apex with 3 inconspicuous teeth, unilateral incision c. 9 mm; *floral tube* c. 26 mm long, cream white to pale yellow, externally glabrous, internally sparsely puberulent in apical part; *dorsal corolla lobe* elliptic, c. 27 × 10 mm, cream white to pale yellow with translucent veins, glabrous externally and internally, apex acute; *lateral corolla lobes* narrowly triangular-ovate, up to 23 × 4 mm, cream white to pale yellow with translucent veins, glabrous externally and internally, apex acute; labellum 22–24 × 14–16 mm (c. 22 mm inclusive the staminodes), irregularly ovate, with irregularly obtuse to rounded apex; pale yellow at base and basal half of central median, the rest purple with small yellow blotches; *lateral staminodes* 14–15 × 6–7 mm, obovate, connate to labellum fully or by basal 4/5, cream white to pale yellow, reflexed (spreading). *Stamen* c. 18 mm long (measured unmanipulated); *filament* reduced; *anther* c. 18 mm long (crest not straightened) connective tissue cream to pale yellow, anther crest c. 13 mm long (straightened), dull yellow, wrapped around stigma, apex acute; *anther thecae* c. 10 mm long, dehiscing along the whole length. *Epigynous glands* two, 5 mm long, c. 0.5 mm in diam. at base, dull yellow. *Ovary* almost globose, c. 3.5 × 4.0 mm, pale yellow-green, glabrous. *Style* white, stigma ciliate, c. 0.5 mm long, slightly thicker than style, ostiole front-facing, ciliate. Mature fruits not seen.

**Etymology:**—The specific epithet honours Alexandre Emile Jean Yersin, a well-known physician and bacteriologist, who spent a considerable part of his life in Nha Trang, southern Vietnam, and had a house on the top of Hòn Bà mountain where this species occurs.

**Distribution & IUCN preliminary assessment:**—Currently known only from the type locality at the top of Hòn Bà mountain, but this species is expected to be found in adjacent areas (particularly from Bidoup Núi Bà N.P.) as the exploration progresses.



**FIGURE 9.** *Zingiber yersinii*. A. Habit. B–C. Detail of ligule. D–E. Inflorescence. F. Flower (front view). G. Dissection (from left): dorsal corolla lobe, two lateral corolla lobes, labellum with lateral staminodes connate to it, Floral tube with ovary and stamen attached (calyx removed), bracteole, bract; scale bar in cm). H. Detail of ovary with epigynous glands and anther (side and front view). *Photo: Jana Leong-Škorničková.*

**Ecology and phenology:**—This species appears to be fairly rare in broadleaved evergreen forest on Hòn Bà N.R. It has been seen only near the top at an elevation of c. 1500 m. Initiation of flowers at the type locality was observed in July and presumably continues through August, followed by fruiting, to be predicted to last at least until October.

### Key to terminally flowering *Zingiber* species (sect. *Dymczewiczia*) in Vietnam

|    |  |                          |
|----|--|--------------------------|
| 1. | Inflorescence hanging down.....  | 2                        |
| 1. | Inflorescence erect.....   | 5                        |
| 2. | Leaf sheaths glabrous.....   | 3                        |
| 2. | Leaf sheaths pilose or pubescent.....  | 4                        |
| 3. | Inflorescence ovoid, bracteoles c. 18 × 7 mm, labellum emarginate, dark purple, almost black, calyx c. 16 mm long.....   |                          |
|    | .....  | <i>Z. atroporphyreus</i> |
| 3. | Inflorescence narrowly fusiform, bracteoles 4–10 × 2–4, labellum entire, bright to dark red, calyx c. 12 mm long.....  |                          |
|    | .....  | <i>Z. cardiocheilum</i>  |
| 4. | Laminae elliptic, bracts densely pubescent throughout, lateral staminodes well-developed petaloid, elliptic.....   | <i>Z. pellitum</i>       |
| 4. | Laminae narrowly elliptic, bracts glabrous or with pilose margin, lateral staminodes small, linear.....  | <i>Z. rufopilosum</i>    |
| 5. | Bracts not recurved at apex.....   | 6                        |
| 5. | Bracts recurved at apex.....   | <i>Z. castaneum</i>      |
| 6. | Lamina somewhat leathery with no prominent plication, ligules thick, dark maroon, labellum dark maroon-brown, with minute yellow streaks broadly trullate, flat.....         | <i>Z. mellis</i>         |
| 6. | Lamina thin, prominently plicate, ligules thin, green, labellum peach-purple to purple, with cream white or pale yellow lines radiating from the base, margins reflexed..... | <i>Z. plicatum</i>       |

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