

A Purple Flowered New *Globba* (Zingiberaceae), *G. bokorensis*, from Southern Cambodia

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Abstract Ongoing plant inventory research in Mt. Bokor, Cambodia, revealed the existence of a distinctive new *Globba* (Zingiberaceae). Morphologically, it is apparently related to *Globba leucantha* Miq. However, the new species is distinguished from it by glabrous lamina, wholly purple inflorescence and flowers, longer anther crest. It is described as *G. bokorensis* Nob.Tanaka & Tagane in this paper.

Key words: Bokor National Park, Cambodia, *Globba*, new species, Zingiberaceae.

Introduction

The Zingiberaceae are the largest family in the order Zingiberales with 53 genera and over 1200 species. Among them, the genus *Globba* L. is the third largest genus of the Zingiberaceae with over 100 species, ranking in number behind only the polyphyletic genera *Alpinia* and *Amomum* (Kress *et al.*, 2002). The species are distributed throughout tropical and parts of subtropical Asia, ranging from India to southern China, south and east to the Philippines and New Guinea with the center of distribution in monsoonal southeast Asia (Kress *et al.*, 2002; Larsen, 1996; Larsen *et al.*, 1998; Schumann, 1904; Williams *et al.*, 2004). In Cambodia, 12 species with one variety of *Globba* have been recorded: *G. adhaerens* Gagnep. (synonym, *Globba villosula* Gagnep.), *G. angcorensis* Gagnep., *G. bicolor* Gagnep., *G. cambodgensis* Gagnep., *G. candida* Gagnep., *G. geoffrayi* Gagnep., *G. macrocarpa* Gagnep., *G. macrocarpa* Gagnep. var. *densa* Gagnep., *G.*

marantina L. (synonym, *G. barthei* Gagnep.), *G. parva* Gagnep., *G. schomburgkii* Hook.f., *G. siamensis* (Hemsl.) Hemsl. (synonym, *G. graminifolia* Gagnep.), *G. thorelii* Gagnep. (Gagnepain, 1908; Dy Phon, 2000).

Bokor National Park, Kampot Province, southern Cambodia, covers 1,400 km² of sandstone tableland. The area is covered a distinctive wet evergreen forest and showed the high plant diversity with many endemic species, which has been regarded as one of the biodiversity hotspot areas in Indochina region (Rundel, 1999; Bunyavejchewin *et al.*, 2011; Olson and Dinerstein, 2002; Tagane *et al.*, 2015a). This is because of the proximity of the Bokor Plateau (the peak at 1,079 m) to the Gulf of Thailand which brings high rainfall throughout the year (Tixier, 1979). Above all, top of the plateau receives more than 5,000 mm of rainfall annually, resulting in a unique and well-developed dense moist evergreen forest, grassland, and sphagnum bog (Tixier, 1979; Rundel *et al.*, 2003).

Recent inventory research on plant diversity of Bokor National Park (Tagane *et al.*, 2015a; Naiki *et al.*, 2015; Tagane *et al.*, 2015b; Toyama *et al.*, 2015) led us to discover a hitherto-undescribed species of the genus *Globba* with strikingly purple inflorescence. It belongs to sect. *Ceratanthera* (Horan.) Petersen. ser. *Basicalcaratae* K. Schum. with two basally attached appendages following by Schumann (1904) and Larsen (1972). It is named *G. bokorensis* Nob. Tanaka & Tagane, and described here as new to science.

***Globba bokorensis* Nob. Tanaka & Tagane, sp. nov.** — Fig. 1

Sect. *Ceratanthera* (Horan.) Petersen. ser. *Basicalcaratae* K. Schum.

Globba bokorensis Nob. Tanaka & Tagane is related to *G. leucantha* Miq., however, markedly distinct by dark deep red stems with numerous light straw-colored speckles, glabrous lamina, purple inflorescence and wholly purple flowers with oblong, not reflexed labellum, and long extending anther crest (vs. crest not extend in *G. leucantha*).

Globba leucantha auct. non. Miq., Fl. Ned. Ind., Eerste Bijv. 3: 612 (1861); Kim Y.-D. and Cho S.-H., Biodiversity of Cambodia (2012).

Globba geoffrayi auct. non. Gagnep., Bull. Soc. Bot. France 55 (Sess. Extraord.): 34 (1908); Leti *et al.*, Fl. Photogr. Cambodge : 548 (2013).

Type: **CAMBODIA**. Kampot Province: Bokor National Park, in evergreen forest, 1,014 m alt., 10°38'13.59"N, 104°02'06.37"E, 16 July 2012, Tagane S., Fuse K., Chhang P. 3990 (holotype—TNS, isotypes—K and Herbarium of Forest Administration of Cambodia).

Perennial herbs, 60–76 cm in height to the top of uppermost leaf sheath, often being epiphytic on trunk and rocks. Rhizomes unknown. Leafy shoots erect, bladeless sheath 5–6, 8 to 9-leaved, stems dark deep red with numerous light straw-colored to greenish speckles, glabrous. Basal sheaths ca. 2.5 cm long, 1.5 cm wide, glabrous. Leaves subsessile, bright green adaxially, pale green abaxially, glabrous on both surfaces, veins

prominent on both surfaces, lamina elliptic to lanceolate, 15–21 cm long, 2.5–4.5 cm wide, visibly plicate, margin entire, base cuneate, apex acuminate, acumen up to 2.5 cm long, papery. Ligule ca. 1.5 mm long, emarginate, glabrescent outside, glabrous inside. Inflorescence thyrses, terminal on leafy shoots, erect, 8–9 cm long; peduncle 1.5–3 cm long, glabrous, light straw-colored to pale purple, glabrous; rachis glabrous, straight; inflorescence bracts 31–35 per inflorescence, bracts transversely linear, ca. 0.1 mm in height, encircling the lower sides and bottom of the rachis of cincinni, glabrous. Cincinni ca. 0.4–1.4 cm long to the first flower, 1–11 mm apart on the rachis, one per bract containing (2–)3–5 flowers; bracteoles broadly elliptic to suborbicular, 3–3.5 mm long, 2.2–2.8 mm wide, glabrous, densely glandular, purplish gradually lighter toward the base, caducous. Flowers purple; calyx tubular, cup-shaped, ca. 4 mm long, tri-lobed, purple gradually lighter toward base, glabrous, glandular, calyx lobes triangular, (0.8–)1.5–2.1 mm long; corolla tube 10–11.5 mm long, pubescent outside, glabrous inside; corolla lobes elliptic to orbicular, 4.2–5 mm long, 2.3–3.2 mm wide, apex rounded, glossy, cucullate, glabrous, glandular, dorsal ones slightly larger; lateral staminodes oblong-elliptic, ca. 4 mm long, 1 mm wide, purple, glabrous, glandular; labellum oblong, ca. 6.8 mm long, 3 mm wide, fused ca. 4 mm of uppermost part, apex bi-lobed, purple, pubescent along midvein inside, glabrous outside, glandular; fertile stamen with filament ca. 3.2 cm long, purple, glabrous, anther ca. 2.1 mm long, thecae suborbicular, 1.6–1.8 mm in diam., with two horn-like appendages, glabrous, appendage ca. 2.5 mm long; crest ca. 2 mm extended beyond thecae, glabrous, stigma cup-shaped, margin ciliate. Ovary ca. 1 mm in diam., glabrous to very sparsely pubescent. Epigynous (stylodial) glands linear, two, ca. 2.3 mm long, united 2.1 mm long from base. Capsules subglobose, ca. 7–8 mm in diam., trilocular, crowned by persistent calyx, reddish brown. Seeds ellipsoid, yellowish. Bulbils not observed.

Distribution. At present this species is known

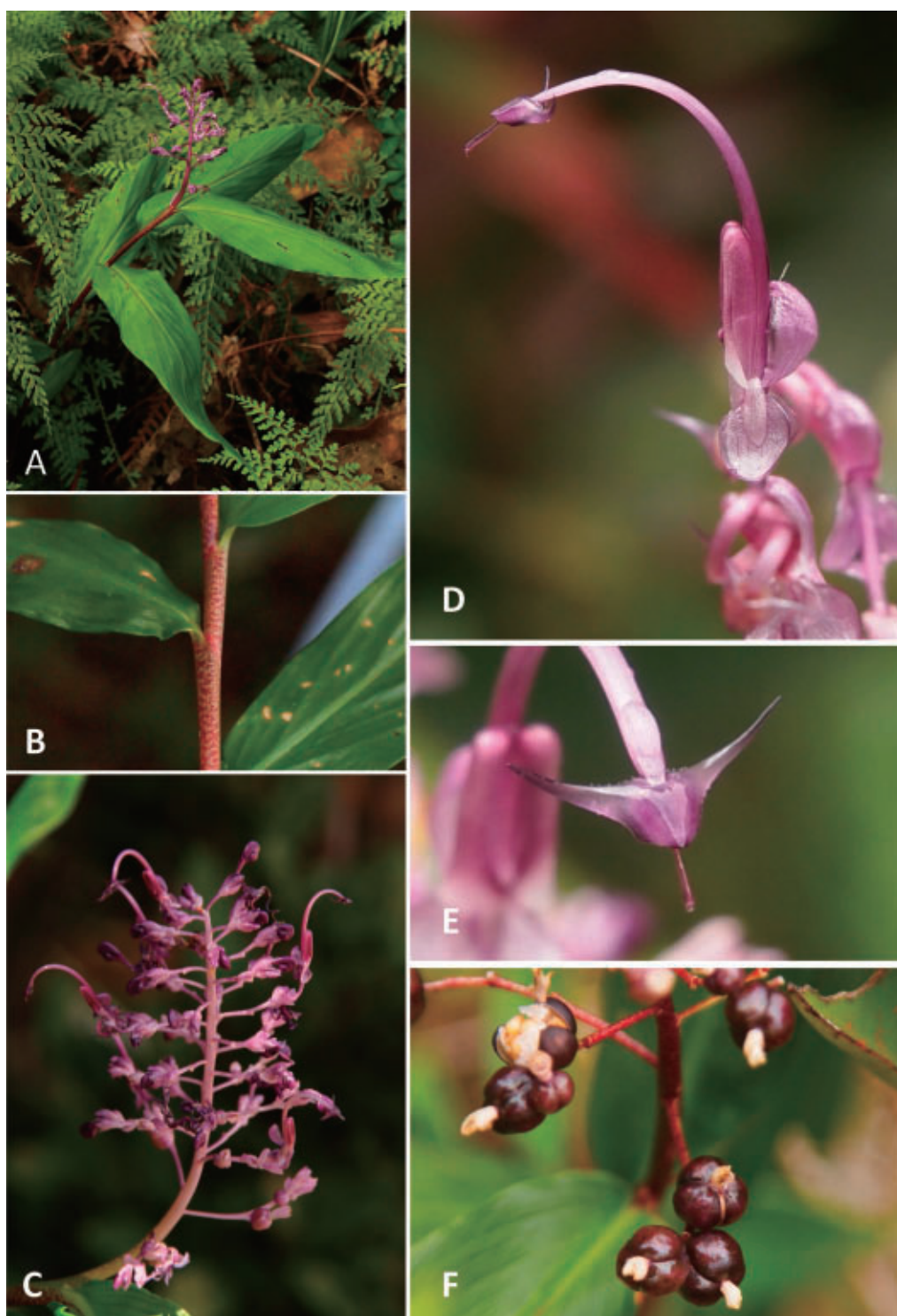


Fig. 1. *Globba bokorensis* Nob.Tanaka & Tagane. A, habit. B, close up view of leafy shoot and ligules. C, inflorescence. D, close up lateral view of flower. E, close up view of anther appendage with long crest. F, capsules.

only from the type locality in Cambodia.

Habitat and Ecology. Occasionally found in open Sphagnum bog and semi-shaded moist evergreen forests on the plateau of Mt. Bokor, often epiphytic on trunk and rocks. Flowering from July to August.

Other specimens examined. CAMBODIA, Kampot Province, Bokor National Park: 1,014 m alt., 10°38'12.59"N, 104°02'06.37"E, 4 December 2011, *Toyama et al. 1511* (FU and Herbarium of Forest Administration of Cambodia); in the same locality, 903 m alt., 10°39'35.42"N, 104°03'03.09"E, 14 May 2012, *Toyama et al. 3177* (FU and Herbarium of Forest Administration of Cambodia).

Etymology. The specific epithet is derived from the type locality, Mt. Bokor, Cambodia.

Note. *Globba bokorensis* Nob. Tanaka & Tagane is related to *G. leucantha* Miq. which is known to be variable species in color of flowers. Ridley (1925) and Holttum (1950) recognized four infraspecific taxa; var. *bicolor* Holttum, var. *flavidula* (Ridl.) Holttum, var. *peninsularis* Holttum ex S.N.Lim, and var. *violacea* (Ridl.) Holttum, from Malay Peninsula in the basis of the color of bract and flower. *Globba bokorensis* is similar to *G. leucantha*, however, *G. bokorensis* is clearly different from it and its infraspecific taxa in the glabrous lamina, purple inflorescence and wholly purple flowers with oblong labellum, and extending anther crest. Further molecular analyses are needed to determine more precise relationships.

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