



Globba philippinensis (Zingiberaceae), a new endemic species from Western Visayas, Philippines

Jade Ann Grace P. DALISAY¹, Mark Arcebal K. NAIVE^{2,3,4,*}, Porferio S. BANGCAYA⁵,
Sunisa SANGVIROTJANAPAT^{6,*}

1. Biological Science Department, College of Teacher Education, University of Antique, Tario-Lim Memorial Campus, Tibiao, Antique 5707, Philippines. 2. Center for Integrative Conservation, Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, Mengla, Yunnan 666303, China. 3. University of Chinese Academy of Sciences, Beijing 100049, China. 4. College of Arts and Sciences, Jose Rizal Memorial State University, Tampilisan Campus, Znac, Tampilisan 7116, Zamboanga del Norte, Philippines. 5. Office of the Campus Administrator, University of Antique, Libertad Extension Campus, Libertad, Antique 5711, Philippines. 6. Sireeruckhachati Nature Learning Park, Mahidol University, Nakhon Pathom 73170, Thailand. *Corresponding authors' emails: MAKN: arciinaive19@gmail.com; SS: sunisa.sav@mahidol.edu

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ABSTRACT: A new species, *Globba philippinensis* Naive, J.A.G. Dalisay, Bangcaya & Sangvir. from Antique Province, Philippines, is herein described and illustrated. A detailed description, colour plates, discussion of similar taxa, information on its distribution and habitat are provided. A preliminary conservation assessment is proposed and a key to the species of *Globba* section *Nudae* subsection *Mediocalcaratae* is amended.

KEY WORDS: Antique Province, Philippine flora, section *Nudae*, subsection *Mediocalcaratae*, Zingiberales.

INTRODUCTION

Globba L. is the largest of the three genera in the tribe Globbeae encompassing about 120 species distributed in Sri Lanka, India and throughout Southeast Asia as far as Australia (Leong-Škorničková and Newman, 2015; Sangvirotnjanapat *et al.*, 2019). They are found mostly in the understorey of semi-deciduous and tropical rain forests, growing a few meters away from the water (Leong-Škorničková and Newman, 2015; Sangvirotnjanapat *et al.*, 2020). The genus can be easily recognized by having a flower with a long-exserted filament which is curved and ends with an anther. Number of anther appendages can be zero, two or four which is one of the important characters to identify into sectional range. Recently, six-appendaged anthers was found in *G. siamensis* (Hemsl.) Hemsl., *G. propinqua* Ridl., *G. atrosanguinea* Teijsm. & Binn (Cao *et al.*, 2018). The well-known species used as an ornamental plant are *G. sheewoodiana* W.J.Kress & V.Gowda and *G. williamsiana* Sangvir. & M.F.Newman because of their permanent and colourful bracts. In addition, some species of *Globba* are traditionally used by the local people of Malaysia in treating several illnesses and diseases (*e.g.* mouth ulcer, post-partum, asthma, food poisoning, cough and many others) and in the Philippines, *Globba marantina* was reported to cure inflammations (Aslam and Ahmad, 2017; Dalisay *et al.*, 2018).

At present, Philippine *Globba* is represented by ten species, four of them are doubtful (Pelser *et al.*, 2011; Docot *et al.*, 2019; Sangvirotnjanapat *et al.*, 2019). The genus is underexplored in the Philippines, however, future fieldwork will probably result in the discovery of

more species either endemic or as new records from neighbouring countries.

As part of our ongoing systematic studies of the Philippine Zingiberaceae, materials of a flowering *Globba* species were collected in the tropical forests of Sta. Ana, Pandan and Mt. Igpasungaw, province of Antique, Philippines during the first author's botanical excursions in February 2017 and September 2018, respectively. After a meticulous examination of all protologues and available type specimens from across the Philippines and neighbouring countries, it was found that this taxon does not match any other known *Globba* species in *Globba* section *Nudae* subsection *Mediocalcaratae* (K.Schum) K.J.Williams. This new addition brings the total number of Philippine representatives of this genus to seven. Also, *Globba* sect. *Nudae* subsect. *Mediocalcaratae* now contains 20 species. Here, the new species from the Philippines is described and a key to the species of *Globba* sect. *Nudae* subsect. *Mediocalcaratae* is provided.

MATERIALS AND METHODS

The measurements and descriptions were based on fresh collected materials, unless otherwise indicated. The style of description follows the recent work of Sam & Ibrahim (2016) and Sangvirotnjanapat *et al.* (2019) with general plant descriptive terminology following Beentje (2016). Identification to section and subsection follows Williams *et al.* (2004) and Sangvirotnjanapat *et al.* (2019). Relevant type specimens of *Globba* spp. from the Philippines were examined in different herbaria (AUU, BK, BM, C, E, FI, HBG, K, L, MICH, MO, P, SING, US,



USTH) through high-resolution images accessed at <https://plants.jstor.org>. An assessment of the conservation status was carried out following IUCN (2019), based on current knowledge and using their terminology on categories, criteria and subcriteria. The extent of occurrence (EOO) and area of occupancy (AOO) were estimated using GeoCAT (Bachman *et al.*, 2011).

TAXONOMIC TREATMENT

Globba philippinensis Naive, J.A.G. Dalisay, Bangcaya & Sangvir., *sp. nov.* **Fig. 1**

Type: PHILIPPINES. Western Visayas, Antique, Pandan, Sta. Ana, elev. 14 m, 18 September 2018, P.S. Bangcaya & J.A.G. Dalisay 103 (holotype PNH [PNH 258560!]; isotype USTH incl. spirit [016424!]).

Diagnosis: *Globba philippinensis* Naive, J.A.G. Dalisay, Bangcaya & Sangvir. is similar to *G. campsophylla* K.Schum. (Fig. S1A) and *G. argyrocygnos* Sangvir. & M.F.Newman (Fig. S1B) in floral structure and flower colour, respectively. Similar to *Globba campsophylla* K.Schum. in its decurrent labellum, base of filament with cornicula, and linear lateral staminodes but differs in its contrasting flower colour of yellowish orange (floral tube, corolla lobes, lateral staminodes, and labellum lobes) and white (filament and anther thecae) (versus flower pure white with yellow spot at labellum) and bulbils produced at peduncle (versus at tip of the inflorescence). Similar to *Globba argyrocygnos* Sangvir. & M.F.Newman in its contrasting flower colour of yellowish orange (floral tube, corolla lobes, lateral staminodes, and labellum lobes) and white (filament and anther thecae) but differs in its decurrent labellum base with cornicula (versus decurrent labellum base on filament without cornicula).

Description: Terrestrial herb in loose clump, leaning with erect inflorescence, 25–43 cm tall. **Rhizome** 4–12 mm in diameter, fleshy, brownish to whitish externally, whitish to creamy white internally. **Leafy shoot** 55–75 cm long, base slightly swollen, 4–6 mm in diameter; **bladeless sheaths** 2–3, glabrous, green; **ligule** truncate, 1–3 mm long, glabrous, green; **blades** 10–12, sessile, narrowly elliptic, 18–26 × 2.8–3.5 cm, base obliquely obtuse, apex caudate, glabrous both sides, pale green below, green above. **Inflorescence** terminal, lax, erect, conical, 5–12 cm long; **peduncle** 4–5 cm long, glabrous; **bracts and bracteoles** caducous, elliptic, 3–6 × 2–3 mm, apex acute, membranaceous, greenish; **cincinni** 2.5–3 cm long; **pedicel** 1.5–2 mm long. **Flower** 3–3.5 cm long, yellowish orange with white filament and anther thecae; **Ovary** barrel-shaped, 1–2 mm long, glabrous, green to yellowish green, slightly sulcate; **style** filiform, 3–3.2 cm long; **stigma** cuneiform, 1 mm long in ♀ flower; **epigynous glands** 2, linear, c. 2 mm long; **calyx** funnel-shaped, 4–6 mm long, apex trilobed, lobes acute, 1–1.5 mm long, light green to yellowish green; **floral tube** to 1

cm exerted from calyx, yellow to yellowish orange, puberulent; **dorsal and lateral corolla lobes** ovate to elliptic, 5–6 × 2–3 mm, cucullate, glabrous, apex obtuse, yellow to yellowish orange; **lateral staminodes** linear, 9–10 × 1.5–2 mm, apex acuminate, densely pubescent, yellow; **labellum** obtriangular to narrowly cuneiform, 7–8 × 3–4 mm, bilobed, base decurrent to filament, with short cornicula at tip, 0.8–1 mm long, white, apex obtuse, reddish brown spot at centre, nectar tube 6–7 mm long; **filament** 13–16 mm long, white; **anther thecae** elliptic c. 2 × 1 mm long; **appendages** 2, triangular, ♀ appendages slightly falcate, c. 3 × 1 mm, apex acuminate, white, ♂ appendages linear, c. 3 × 1 mm long, apex acuminate, white. **Fruit** ellipsoid, 2–2.5 × 0.5–0.8 cm, longitudinal ridged, green. **Bulbils** ellipsoid, 10–13 × 2–3 mm, corky, greyish green, produced at peduncle.

Distribution: The species has so far only been observed and documented in the municipalities of Sebaste and Pandan, province of Antique, Philippines (Fig. 2).

Ecology: This species found growing in the different type of habitats, such as in agroforestry plantations, along the trails and near creeks and streams from 10 to 100 m above sea level (Fig. S2).

Phenology: Flowering and fruiting in the months of February, July, August and September.

Etymology: Named after the country of origin, the Philippines, where the species was discovered and collected.

Vernacular name: Known as “tabayag” by the local people of its type locality.

Additional specimen examined (Paratype): PHILIPPINES, Western Visayas, Antique, Sebaste, Mt. Igpasungaw, 14 m, 12 September 2018, J.A.G. Dalisay 104 (PNH258561!).

Proposed conservation status: Endangered (EN), *Globba philippinensis* is found in two localities of Antique province, Panay Island wherein 50–100 mature individuals are found giving an Area of Occupancy (AOO) of 8 km² when calculated using the GeoCAT system (Bachman *et al.* 2011). Furthermore, though the type locality is a protected area the species was found growing near places where occupied by people making it prone to anthropogenic activities such as conversion of the land to agriculture and grazing that could lead to forest destruction and habitat loss. Following the Red List Criteria of the IUCN Standards and Petitions Subcommittee (2019), *G. philippinensis* is herein proposed as Endangered under criterion D.

Taxonomic notes: This species is the fourth member of *Globba* section *Nudae* subsection *Mediocalcaratae* from the Philippines. The other three species are *G. francisci* Ridl., *G. campsophylla*, and *G. gracilis* K.Schum. These four species show the same floral structure by bearing a decurrent labellum base on the filament with cornicula as well as by having lateral staminodes that are linear and much longer than the lateral corolla lobes. *Globba francisci* has a pure orange



Fig. 1. *Globba philippinensis* Naive, J.A.G. Dalisay, Bangcaya & Sangvir. **A.** Habit **B.** Leaves, scale bar: 10 cm **C.** Excavated rhizome **D.** Ligule **E.** Inflorescence **F.** Flower (front view), scale bar: 2 cm **G.** Flower (side view), scale bar: 2 cm **H.** Dissected flowers (fl: flower; ls: lateral staminode, scale bar: 5 mm; la: labellum (no decurrent and cornicula), scale bar: 5 mm; lcl: lateral corolla lobes, scale bar: 5 mm; o: ovary and calyx, scale bar: 1 mm; an: anther, scale bar: 2 mm) **I.** Fruit, scale bar: 2 cm **J.** Bulbil, scale bar: 10 mm. (Photos by JAG Dalisay).



Table 1. Comparison of *Globba argyrocynos*, *G. camsophylla*, *G. francisci*, *G. gracilis* and *G. philippinensis*.

Characters	<i>G. argyrocynos</i>	<i>G. camsophylla</i>	<i>G. francisci</i>	<i>G. gracilis</i>	<i>G. philippinensis</i>
Flower colour	Yellowish orange and white (floral tube, corolla lobes, lateral staminodes, and labellum lobes: orange; labellum base, filament, lateral staminodes, and anther thecae: white)	White throughout with yellow spot	Orange throughout with orange, red spot	White throughout with yellow spot	Yellowish orange and white (floral tube, corolla lobes, lateral staminodes, and labellum lobes: orange; labellum base, filament, lateral staminodes, and anther thecae: white)
Bulbil production	Absent	Corky, at the tip of inflorescence and peduncle	Corky, at peduncle	Corky, at peduncle	Corky, at peduncle
Lateral staminodes	Yellowish orange, oblong, c. 4–7 × 2 mm, apex obtuse	White, linear, c. 5×1.5 mm, apex acute	Orange, linear, 9–12×1–2 mm, apex acute	White, linear, c. 5×1.5 mm, apex acute	Yellowish orange, linear, 9–10 × 1.5–2 mm, apex acuminate
Labellum base	Decurrent on filament without cornicula	Decurrent on filament with cornicula	Decurrent on filament with cornicula	Decurrent on filament with cornicula	Decurrent on filament with cornicula
Distribution	Thailand	The Philippines	The Philippines	The Philippines	The Philippines

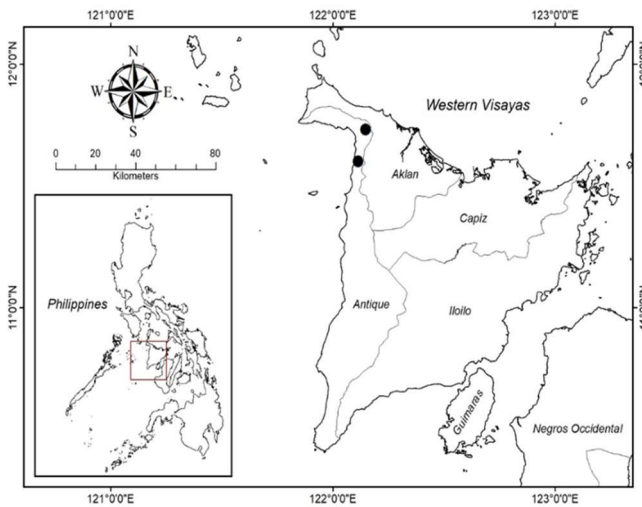


Fig. 2. Map showing the distribution of *Globba philippinensis* Naive, J.A.G. Dalisay, Bangcaya & Sangvir. *sp. nov.*

flower with red spot while *G. camsophylla* and *G. gracilis* have a white flower with yellow spot (Table 1).

Globba philippinensis shows a distinct flower colour combination of yellowish orange and white which is the most distinguishing character of the species versus the other Philippine species. This pattern of flower colour is similar to *G. argyrocynos* (Fig. S1B) from Thailand. The contrasting colour of orange and white gives the appearance of the flower being divided in half. The lower part of the flower, floral tube, corolla lobes, lateral staminodes, and lobes of labellum are orange, while the upper part, filament and anther thecae, are white. This makes a defining character for these two species (Table 1). Here we provide an amended key of *Globba* section *Nudae* subsection *Mediocalcaratae*.

Key to the species of *Globba* section *Nudae* subsection *Mediocalcaratae*.

1a. Labellum base long decurrent on filament with cornicula, c.1.5 mm long 2

- 1b. Labellum base long decurrent on filament or truncate, without distinct cornicula 9
- 2a. Flower white with yellow patch on labellum 3
- 2b. Flower orange throughout with or without red spot on labellum ... 7
- 3a. Labellum with brown or dark green on yellow patch; dorsal corolla lobe mucronate, c.1.5 mm long 4
- 3b. Labellum with bright yellow spot; dorsal corolla lobe obtuse or short mucronate 5
- 4a. Labellum base long decurrent on filament with distinct cornicula, c.2 mm long; appendages usually purple sometimes white; bulbils corky *G. lilacina*
- 4b. Labellum base short decurrent on filament with short cornicula, c.1 mm long; appendages white; bulbils absent *G. macrocarpa*
- 5a. corolla lobes yellowish orange; filament white *G. philippinensis*
- 5b. Corolla lobes white or yellow; filament colour same as corolla lobes 6
- 6a. Medium clump plant, 40–80 cm; blades lanceolate, 1–4.5 cm wide; inflorescence 9–18 cm long; flowers c.3 cm; bulbils produced at tip of inflorescence *G. camsophylla*
- 6b. Small clump plant, to 50 cm; blades oblong to elliptic, 0.7–1.7 cm wide; inflorescence 6–7 cm long; flowers c.2.6 cm; bulbils produced at peduncle *G. gracilis*
- 7a. Labellum with red spot at centre; dorsal corolla lobe short mucronate, < 1 mm long; bulbils many *G. thorelii*
- 7b. Labellum with red spot or without; dorsal corolla lobe long mucronate, c.1.5–2 mm long; bulbils rare 8
- 8a. Labellum triangular, without spot; cincinni crowded ... *G. newmanii*
- 8b. Labellum oblong, with red spot or absent; cincinni lax ... *G. francisci*
- 9a. Base of labellum long decurrent on filament 10
- 9b. Base of labellum truncate or obtuse or triangular 16
- 10a. Corolla white; labellum with yellow patch 11
- 10b. Corolla yellow or golden orange, sometimes with white filament; labellum pure colour or red, brown spot 15
- 11a. Labellum with two green-brown spots on yellow patch, apex round; dorsal corolla lobe long mucronate *G. macrocarpa*
- 11b. Labellum with yellow spot, apex acute or truncate usually pushed forwards (observed laterally); dorsal corolla lobe short mucronate ... 12
- 12a. Labellum with yellow patch nearly covering the labellum lobes; lateral staminodes sparsely hairy 13
- 12b. Labellum with yellow spot at centre; lateral staminodes dense glandular hairs 14
- 13a. Leaf linear to narrowly oblong; ligule ciliate (rarely glabrous); bracts and bracteoles glabrous; bulbils fusiform, corky, many *G. xantholeuca*
- 13b. Leaf lanceolate to elliptic; ligule glabrous; bracts and bracteoles ciliate; bulbils absent *G. chrysochila*
- 14a. Medium clump plant, 40–80 cm; blades lanceolate, 4.5–18 × 1–4.5 cm; inflorescence 9–18 cm long; flowers c.3 cm; bulbils produced at tip of inflorescence *G. camsophylla*



- 14b. Small clump plant, to 50 cm; blades oblong to elliptic, 4.5–15 × 0.7–1.7 cm; inflorescence 6–7 cm long; flowers c.2.6 cm; bulbils produced at peduncle *G. gracilis*
- 15a. Corolla yellow or golden orange with red spot on labellum; filament and anther appendages white; lateral staminodes oblong, 4–7 × 2 mm; blades elliptic to ovate, 5–28 × 3.6–9 cm, plain green *G. argyrocygnos*
- 15b. Corolla pure orange except red spots on labellum; filament orange; lateral staminodes linear, 11–15 × 1 mm; blades narrowly elliptic, 19–22.5 × 3–3.5 cm, usually bearing silver stripes along midrib ... *G. decora*
- 16a. Flower pure orange; labellum without spot 17
- 16b. Flowers white or orange; labellum with orange-red, red or brown spot 19
- 17a. Fruit globose, shallowly ridged *G. paniculata*
- 17b. Fruit ellipsoid, deeply ridged 18
- 18a. Dorsal corolla lobe obtuse; lateral staminodes obovate, 6–8 mm wide *G. ranongensis*
- 18b. Dorsal corolla lobe mucronate; lateral staminodes linear, 1.5 mm wide *G. newmanii*
- 19a. Flowers white, spot on labellum red or orange ... *G. pyrrhopoikila*
- 19b. Flowers pale yellow, cream; spot on labellum orange or brown ... 20
- 20a. Flowers orange with red or brown spot on labellum; filament orange; appendages white 21
- 20b. Flowers cream, pale yellow or white; filament colour same as corolla lobe; appendages white 22
- 21a. Inflorescence narrowly conical, 12–25 × 4–8 cm; all cincinni stalked, labellum with two brown spots *G. cataractarum*
- 21b. Inflorescence linear, 16–35 × 3–10 cm; cincinni in upper two-thirds sessile, labellum with two red spots *G. pycnostachys*
- 22a. Lateral staminodes as long as corolla lobes, linear, c.8 × 1.5 mm, cream; fruit ellipsoid, deeply ridged *G. nitens*
- 22b. Lateral staminodes much longer than corolla lobes, linear, 10–14 × 1.5 mm, white; fruit ovoid to ellipsoid, shallowly ridged 23
- 23a. Labellum triangular, anther appendages falcate, apex acuminate, white; crest truncate *G. albiflora*
- 23b. Labellum oblong, anther appendages triangular, apex acute, pale yellow; crest round *G. virginea*

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Supplementary materials are available from Journal Website.