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# THE FIRST WILD RECORD OF *BULBOPHYLLUM LEMNISCATOIDES* CONFIRMS ITS OCCURRENCE IN THE PHILIPPINE ARCHIPELAGO WITH NOTES ON ITS HABITAT AND CONSERVATION STATUS

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**ABSTRACT.** *Bulbophyllum lemniscatoides* Rolfe is a species native to Peninsular Malaysia, Thailand, Laos, Cambodia, Vietnam, Sumatra, Java, and Borneo. It was recently collected in Mt. Timolan Protected Landscape of Zamboanga del Sur, confirming its occurrence in the Philippine archipelago. Here, we provide species descriptions based on our collected material and photographs to aid identification, geographical distribution information, habitat, phenology, and an IUCN conservation assessment.

**KEYWORDS/PALABRAS CLAVE:** *Bulbophyllum* sect. *Lemniscata*, Dendrobieae, Mindanao, Orchidaceae, Península de Zamboanga, plant taxonomy, taxonomía de plantas, Zamboanga Peninsula.

**Introduction.** *Bulbophyllum* Thouars is one of the largest genera of angiosperm belonging to the family Orchidaceae. It is represented by over 2200 species widely distributed in tropical and subtropical regions throughout Africa, Asia, and the South Americas (Lin *et al.* 2020, Vermeulen *et al.* 2015). In the Philippines, the genus is represented by approximately 204 species (of which 71% are endemics) belonging to over 20 sections (Cootes 2011, Pelser *et al.* 2011 onwards). Currently, the taxonomy of the genus in the country is very problematic and requires revision. Furthermore, given the increasing pace of forest destruction and habitat loss in the Philippines (Naive 2017), it is likely that some unknown or poorly known *Bulbophyllum* species face extinction before their taxonomy, phylogeny, and ecological or economic uses, can be fully explored.

An unknown *Bulbophyllum* species identified as a member of section *Lemniscata* was collected in Mount Timolan Protected Landscape, Zamboanga del Sur of the island of Mindanao in January 2022, as part of the first authors' ongoing exploratory and conservation work on Philippine Orchidaceae. We identified this as *Bulbophyllum lemniscatoides* Rolfe using Vermeulen

*et al.* (2015), a species distributed in Borneo, Java, Lesser Sunda Islands, Malaysia, Sumatera, Thailand, and Vietnam (POWO 2022). In the account of Co's Digital Flora of the Philippines, the species was reported to occur in Negros based on the photographs taken from the cultivated material of Mr. Ravan Schneider in February 2013 but without exact locality data (Pelser *et al.* 2011 onwards). We confirm the occurrence of *B. lemniscatoides* in the Philippine archipelago with a voucher specimen and provide a description based on our collected material, photographs to aid identification, updated geographical distribution information, habitat, phenology, and a preliminary IUCN conservation assessment.

**Materials and methods.** The measurements and descriptions were based on freshly collected material. Multiple photographs were taken using Canon EOS 800D, and coloured plates were prepared and edited in Affinity Photo software. Flowers were preserved in 70% ethanol and were subjected to stereomicroscopy. The general plant descriptive terminology follows Beentje (2016). Herbarium citations follow Index Herbariorum (Thiers 2022). Relevant specimens and literature of *Bulbophyl-*

lum section *Lemniscata* species from neighbouring countries were examined in different herbaria through high-resolution images from Global Plants on JSTOR accessed at <https://plants.jstor.org/> or Global Biodiversity Information Facility (GBIF) accessed from <https://www.gbif.org>. An assessment of the conservation status was carried out following IUCN (2019), based on our current knowledge and using their terminology on categories, criteria, and subcriteria.

#### TAXONOMIC TREATMENT

*Bulbophyllum lemniscatoides* Rolfe, Gardeners' Chronicle Series 3, 7: 67, 1890. *Hordeanthos lemniscatoides* (Rolfe) Szlach., Richardiana 7(2): 89, 2007. LECTOTYPE (designated by Averyanov *et al.* 2019): INDONESIA. Java, *cult.* *Van Lansberge s.n.* (K000829216-image seen!). Fig. 1.

Small to medium-sized, epiphytic herb. *Pseudobulbs* ovoid, 1.6–2.0 cm long, 1.3–1.7 cm in diameter, glabrous, furrowed as it matures, green suffused with purple. *Leaves* 2, deciduous when flowering; *petiole* ca. 7–10 mm long, glabrous, pale green; *blade* elliptic, 10–14 cm long by 2–3 cm wide, glabrous both sides, margin entire, apex subacute. *Inflorescences* dense raceme, 19–20 cm long, 15–25-flowered; *peduncle* terete, 15–17 cm long, gradually thickening towards the rachis but thin again at the base of the rachis, glabrous, scales 2, persistent, 7–8 mm long, chartaceous, margin entire, apex acute; *rachis* 2.0–2.5 cm long; *floral bracts* persistent, narrowly ovate, 3–4 mm long by 1.0–1.5 mm wide, glabrous, apex long acuminate. *Flowers* sepals green, largely suffused with blackish purple except near the base, hairs white, appendage white with pale purple bands; petals white; lip blackish purple. *Pedicel with ovary* stout, 1–2 mm long. *Dorsal sepal* slightly porrect, ovate, 1.5–1.7 mm long by 1.0–1.1 mm wide, adaxially glabrous, abaxially sparsely hirsute with thin hairs, margin entire to slightly erose distally, apex obtuse, with a narrowly cylindrical appendage, 6.2–7.8 mm long by 0.10–0.15 mm wide, minutely papillose, obtuse to subacute. *Lateral sepals* ovate to triangular, 1.5–1.8 mm long by 1.3–1.4 mm wide, adaxially glabrous, abaxially sparsely hirsute with thin hairs, margin entire to slightly erose distally, apex obtuse, with appendage, appendage narrowly

cylindrical, 6.2–7.8 mm long by 0.10–0.15 mm wide, minutely papillose, obtuse to subacute. *Petals* porrect, ovate, 1.5–1.7 cm long by 0.4–0.5 cm wide, glabrous, margins erose to finely lacerate, apex acuminate. *Lip* recurved, elliptic, 1.5–1.7 mm by 0.9–1.0 mm wide, papillose, margin entire, adaxially slightly concave near the base, slightly convex and channeled along median line, abaxially with a rounded ridge towards the base, concave towards the apex, apex rounded. *Column* 9–10 mm long; *stelia* conspicuous, triangular, 0.4–0.5 mm, glabrous, apex acuminate; *pollinia* 4. *Capsule* 8–14 mm long, 4–5 mm in diameter, corrugated, sparsely pubescent, green.

**DISTRIBUTION:** Peninsular Malaysia, Thailand, Laos, Cambodia, Vietnam, Sumatra, Java, Borneo, and the Philippines. *Bulbophyllum lemniscatoides* was reported from Myanmar by Kress *et al.* (2003), Nyan Tun (2014), and Averyanov *et al.* (2019). However, this report was found erroneous by Ormerod *et al.* (2021) as this is a misidentification of its closely similar species *Bulbophyllum lemniscatum* C.S.P. Parish ex Hook. f. In the Philippines, we will only report its occurrence in Zamboanga del Sur on the island of Mindanao, as the record in Negros of Visayas by Pelsner *et al.* (2011) is based only on photos taken from a cultivated material without exact or sure locality.

**HABITAT:** The species was found in the peak of Mt. Timolan growing as an epiphyte in the branches or trunks of *Mangifera indica* L. together with *Oberonia* sp. with direct sunlight and cool environment at elevations between 1000–1200 m a.s.l. In Borneo, the species was found in forest of lowland conditions (Vermeulen *et al.* 2015). In Vietnam, it was observed growing in evergreen broadleaved and semideciduous submontane forests at elevations between 600–1200 m a.s.l. (Averyanov *et al.* 2019).

**PHENOLOGY:** Observed flowering and fruiting in the wild in January and February. Under cultivation at Kew, the species flowers in March (POWO 2022). Based on herbarium records, the species flowers in November. The recorded flowering season of this species revealed to be in congruence with the observations of Averyanov *et al.* (2019), which is from November to February.

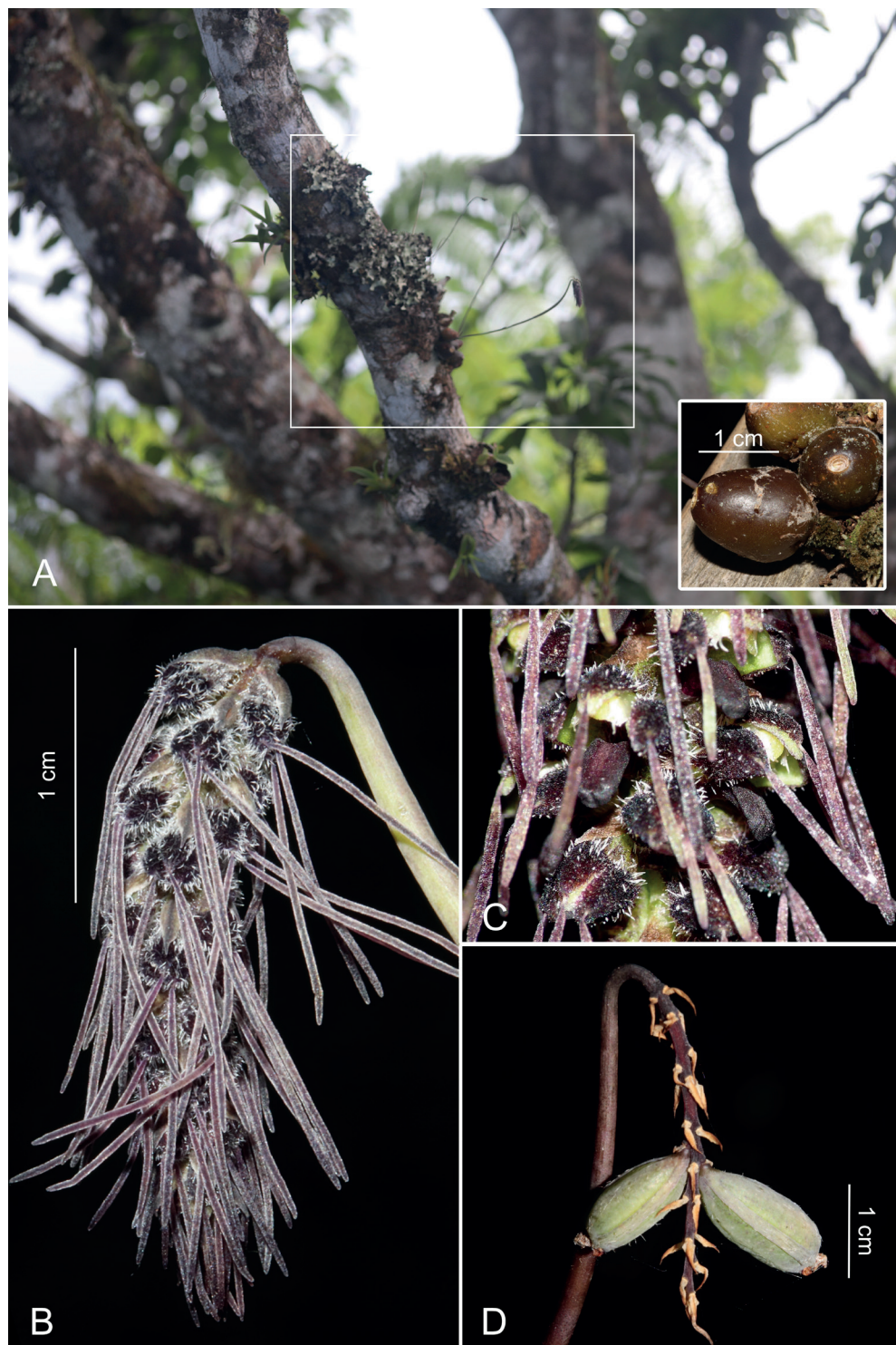


FIGURE 1. *Bulbophyllum lemniscatoides* in the wild. **A.** Habitat and habit, inset: pseudobulbs. **B.** Inflorescence. **C.** Detail of flowers. **D.** Fruits. Photos by M.A.K. Naive (A–B, D–E) and R. Schneider (C) based on MAK Naive 128 (HNUL).



**PROPOSED CONSERVATION STATUS:** Endangered (EN). Although widespread across Southeast Asia, the species observed to be very rare. In the Philippines, we found it at the peak of Mt. Timolan with less than 20 individuals and where anthropogenic activities are occurring. Mindanao embeds a diverse natural forest, however, the island is experiencing environmental pressures at present due to expansion of oil pal and rubber plantations coupled with other anthropogenic threats such as wildlife hunting and poaching (Tanalgo 2017). Thus, in this paper, we proposed this species to be treated as ‘Endangered’ following the Red List criteria of the IUCN Standards and Petitions Subcommittee (IUCN 2019). Accordingly, our assessment on *Bulbophyllum lemniscatoides* is in agreement to the proposed conservation status in Vietnam by Averyanov *et al.* (2019).

**SPECIMEN EXAMINED:** PHILIPPINES. Mindanao: Zamboanga Peninsula, Zamboanga del Sur, Tigbao, Mt. Timolan Protected Landscape, elev. 1150 m, 29 January 2022, *MAK Naive 128* (HNUL).

*Bulbophyllum lemniscatoides* belongs to the section *Lemniscata*, characterized by having pseudobulbs of flowering shoots 2-leaved combined with deciduous leaves. This section is represented by approximately 32 species distributed in India, Nepal, Bhutan, China, Myanmar, Laos, Vietnam, Thailand, Peninsular Malaysia, Sumatra, Java, Borneo (Vermeulen *et al.* 2015), and now they can also be found in the Philippines, represented only by *B. lemniscatoides*.

All in all, the study was able to discover specimens of *B. lemniscatoides* in the wild enabling us to confirm its occurrence in the Philippine archipelago. Since the discovery of *B. lemniscatoides*, possibly further specimens could persist in the neighbouring localities, especially in relatively under-collected and under-explored forests and mountains of Mindanao. Therefore, it is highly recommended to conduct more extensive explorations to reveal the actual species diversity of Philippine Orchidaceae. We also advise *in situ* conservation plan for the species, including studies on phenology, pollination ecology, seed dispersal, and population dynamics, as well as to conduct fieldwork to search for other populations in any potential areas where this species may occur, such as in Negros.

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