



## A new species of *Bulbophyllum* (Orchidaceae) sect. *Saurocephalum* from Sulawesi, Indonesia

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(Manuscript received 4 November 2021; Accepted 16 December 2021; Online published 10 January 2022)

**ABSTRACT:** *Bulbophyllum mamasense* Wibowo, Juswara & J. Champ., a new species of *Bulbophyllum* section *Saurocephalum* from Sulawesi, Indonesia, is described, illustrated with line drawings, and completed with high resolution photographs. The novel species is sister to *Bulbophyllum pubiflorum* Schltr. and *Bulbophyllum kiamfeeanum* J.J.Verm. & P.O'Byrne. Diagnostic characters of this novelty are the fleshy thick rachis in comparison with to other members in the section and the lip simple with two ridges at the base.

**KEY WORDS:** *Bulbophyllum kiamfeeanum*, *B. pubiflorum*, *B. mamasense*, Celebes, epiphyte, Mamasa, West Sulawesi.

### INTRODUCTION

The genus *Bulbophyllum* Thouars (1822) is the largest in the family Orchidaceae, comprising around 2200 currently accepted species (Vermeulen *et al.*, 2014a). Most species are epiphytes and grow in dry to cloud tropical forests. The genus is widely distributed from tropical Africa, Madagascar, India, China to the Northeast Japan, Malay Peninsula, Indonesia, the Philippines, Papua New Guinea, the eastern part of Australia, New Zealand, and as far as Tahiti in the Pacific (Vermeulen *et al.*, 2014a; Vermeulen and O'Byrne, 2011). The hyperdiversity within the genus is often associated with minute differences in flower characters that makes classification at the sectional level an unresolved task causing frequent changes and updates (Vermeulen, 1996; Vermeulen and O'Byrne, 2008; Vermeulen *et al.*, 2014a; Vermeulen *et al.*, 2014b). The most recent infrageneric classification of *Bulbophyllum* accepts 62 sections with 1600 species occurring in Asia (Vermeulen *et al.*, 2014a; Vermeulen *et al.*, 2014; Vermeulen *et al.*, 2015). Which include a new section *Saurocephalum* J.J.Verm. inedit. (Vermeulen *et al.*, 2014a).

In that classification some members of section *Brachystachyae* Benth. & Hook.f. were transferred into the new section *Saurocephalum* J.J.Verm. inedit. (Vermeulen *et al.*, 2014a). However, Schlechter had mentioned section *Saurocephalum* (1911) which *B. pubiflorum* and *B. hastiferum* have a similarity in flower structure with *B. saurocephalum* and these three species might place in the same section. Section *Saurocephalum* differs from sect. *Brachystachyae* by its distinct pseudobulbs; elongate racemes with flowers spirally arranged; rachis distinctly thickened or not; flowers

resupinate, open simultaneously; stelia half length of the column or shorter, the upper margin winged and more prominent than the stelia; anther with an abaxial conical crest. Approximately 16 species belong to sect. *Saurocephalum* and are distributed over Sulawesi and the Philippines (Vermeulen and O'Byrne, 2011; Vermeulen *et al.*, 2014a).

The new species of the genus *Bulbophyllum* described here, has been recorded only from one locality in Mamasa, West Sulawesi. Living collections of this species have been available in the trade for some years and cultivated for more than five years in the private garden of the second author in Bedugul area, Bali (1200 m). Comparative analysis of the living plant suggested that these plants are best placed into section *Saurocephalum*. However, further investigation revealed that these plants do not fit with any species known to science. Here, we propose to name these plants *Bulbophyllum mamasense* Wibowo, Juswara & J. Champ. belonging to the section *Saurocephalum*. A full description, high resolution photos and line drawings are provided.

### MATERIALS AND METHODS

Fresh material was collected and stored as pressed herbarium specimens and preserved in spirit. The material is deposited in BO and Herbarium of Bali Botanic Garden. Measurements and morphological descriptions are based on examination of living plants, fresh flowers, dried herbarium specimens and spirit materials. The morphological observations have been conducted in the Conservation Genetics Lab (Bali Botanic Garden) and Research Center for Biology using an Olympus stereomicroscope SZ61, a Nikon Eclipse 80i



with 20× and 40× and Euromex. Photographs of living plants were taken using an Olympus E-M5MarkII. Terminology for the morphological description follows Harris and Harris (2001). For morphological comparison between members of section *Saurocephalum*, we studied herbarium specimens in BO, the online repository of L, K, MNHN and protologues (Reichenbach, 1886; Schlechter, 1911; Smith, 1914; O'Byrne, 1999; Vermeulen, 2003a, 2003b; Vermeulen and O'Byrne, 2008, 2011). We follow the IUCN Red List Categories and Criteria (2019) for regional conservation status assessment of *B. mamasaense*.

## TAXONOMIC TREATMENT

*Bulbophyllum mamasaense* Wibowo, Juswara & J. Champ., *sp. nov.*

**Figs. 1-2**

**Type:** Indonesia. West Sulawesi, Mamasa Regency, District Mesawa, 500 – 700 m, cultivated in Bedugul 1200 m, JKC018/E2019090052 (holotype, BO; isotype, Bali Botanic Garden).

**Diagnosis:** *Bulbophyllum mamasaense* is morphologically similar to *B. pubiflorum* Schltr. in its habit, and *B. kiamfeeanum* J.J.Verm. & P.O'Byrne in its ovate lip. However, *B. mamasaense* has distinct 3-angled pseudobulbs, oblong and larger leaves, flat lateral sepals compared to *B. pubiflorum*, and is different from *B. kiamfeeanum* by its lip forming a canal at the base and presenting a verrucose surface, while *B. kiamfeeanum* has a rounded callus and a glabrous surface (Table 1).

**Description:** Simpodial, epiphytic herb. **Roots** below the pseudobulb, spreading, filiform, smooth, wiry. **Rhizome** creeping, 3–4 mm diameter; scales fibrous, barely persistent. **Pseudobulbs** distinct, closely arranged, ovate-oblong, 15–30 mm apart, (3.6)5–6.7 × 2–2.6 cm (width (0.6)1–1.3 cm when dried), obtusely 3-angled, unifoliate, dark green turning reddish brown when old. **Petiole** conduplicate, glabrous, 1.5 cm long. **Leaf** oblong, slightly unequal, midrib adaxial inconspicuous, midrib abaxial pronounce, acute, leathery, 16–16.5 × 5.3–5.5(7.7) cm. **Inflorescence** arising from the base side of pseudobulb, pendulous, 114–165 floweres. **Peduncle** thick, fleshy, purple-brownish, 5.5 × 0.6 cm; bracts 3, amplexicaule, acute, ca. 4 mm long. **Rachis** nodding, much swollen, surface glabrous, 6.5–9 cm long, 1.2–1.5 cm wide at the position of the 1<sup>st</sup> flower at the base and then narrowed towards the apex, 1.5 cm in diameter. **Floral bract** ovate, concave, 3-veined, acuminate, papillose, margin entire, 2 × 1.5 mm. **Pedicel with ovary** basal node on the same surface with the rachis, 1–1.5 mm long. **Flowers** spirally arranged in 8 rows, dense, opening simultaneously, not fully open, 2.5–4 mm in diameter. **Dorsal sepal** oblong, concave, apex obtuse, hooded, 3-veined, outer and inner surface papillose, margin entire, yellowish-cream with reddish-purple stripes, 4 × 2.5 mm.

**Lateral sepals** adnate along the lower margin, ovate-falcate, flat, apex acute, fleshy, outer surface papillose, inner surface glabrous, margin entire, dull yellow with reddish-purple stripes, 5.5 × 2.5 mm. **Petals** lanceolate, oblique, 1-veined, apex acute, margin entire, surface glabrous, 2–2.5 × 0.5–1 mm. **Lip** simple, mobile, broadly ovate, thick, 2.5 × 1.5 mm, articulate with thin ligament, the basal part broad with deep groove and curved; the middle part shallow furrow in between two rounded ridge, flattened towards the apex, apex obtuse; margin papillose, surface verrucose. **Column** 2.5 × 1 mm, stigma with tooth at the top margin, column foot with 2 slight wings near its base; stelia minute, abruptly bent downwards, ca. 0.4 mm, sub-triangular, apex acute, antrorse; wing oblong, more prominent than stelia, thick, bent downwards, apex truncate, antrorse, 1 mm long; anther cap bifid at the base and then acute toward the tip, blunt, margin coarsely papillose, 1 mm long; pollinia 4, in 2 pairs, unequal, 0.5 × 0.5 mm per pair, enveloped in two sacks. **Capsule** ovoid, 13 × 4 mm.

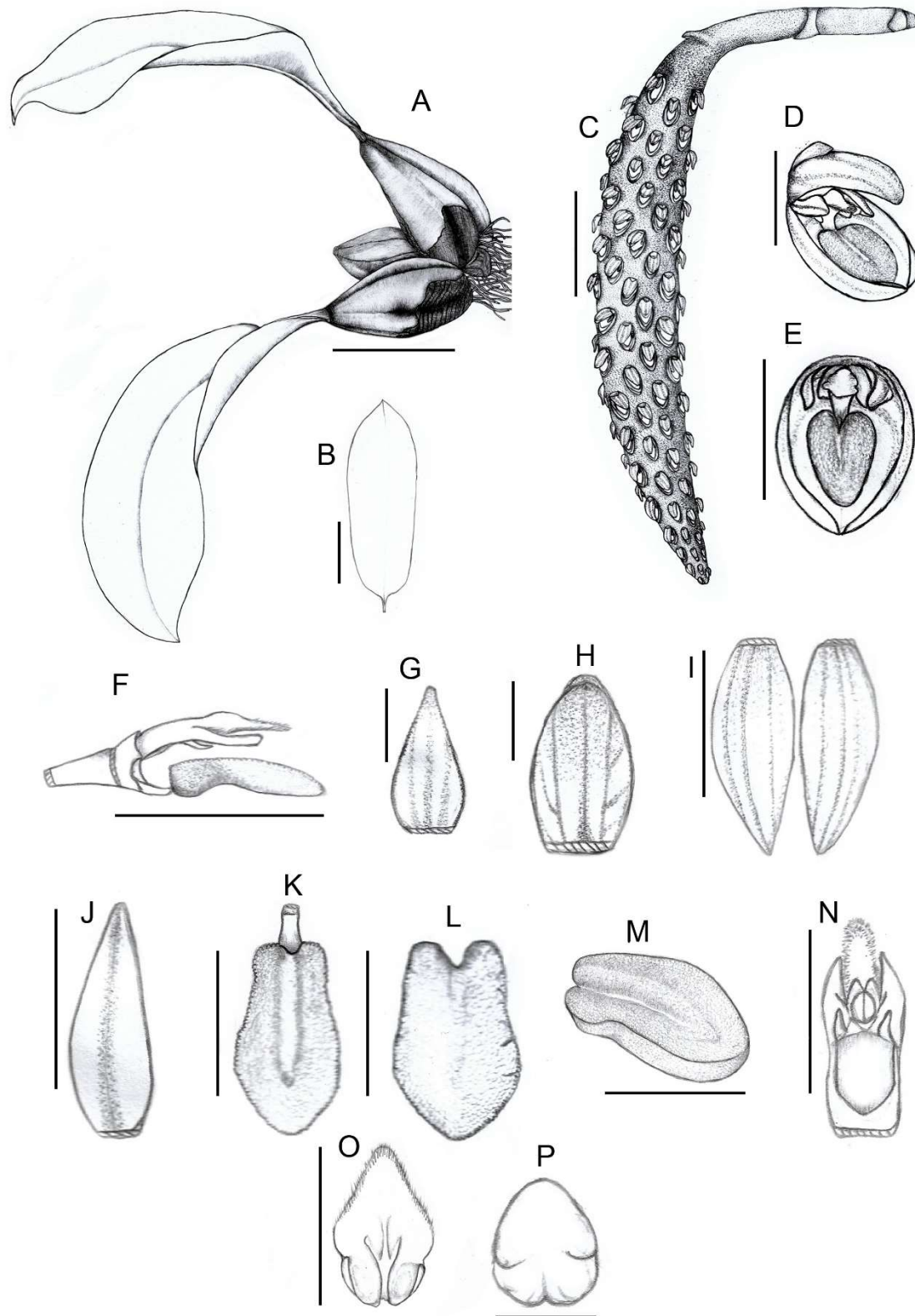
**Distribution:** Mesawa District, Mamasa Regency, West Sulawesi, Indonesia.

**Etymology:** The specific epithet “mamasaense” was named after the location where this species was first discovered.

**Conservation status:** This new species has insufficient information to assess the status. The distribution is so far only known from its type locality and a single population. Following IUCN (2019), we propose this species to be provisionally treated as ‘Data Deficient’ (DD). Further surveys are needed for this species and the assessment shall be updated as more information collected.

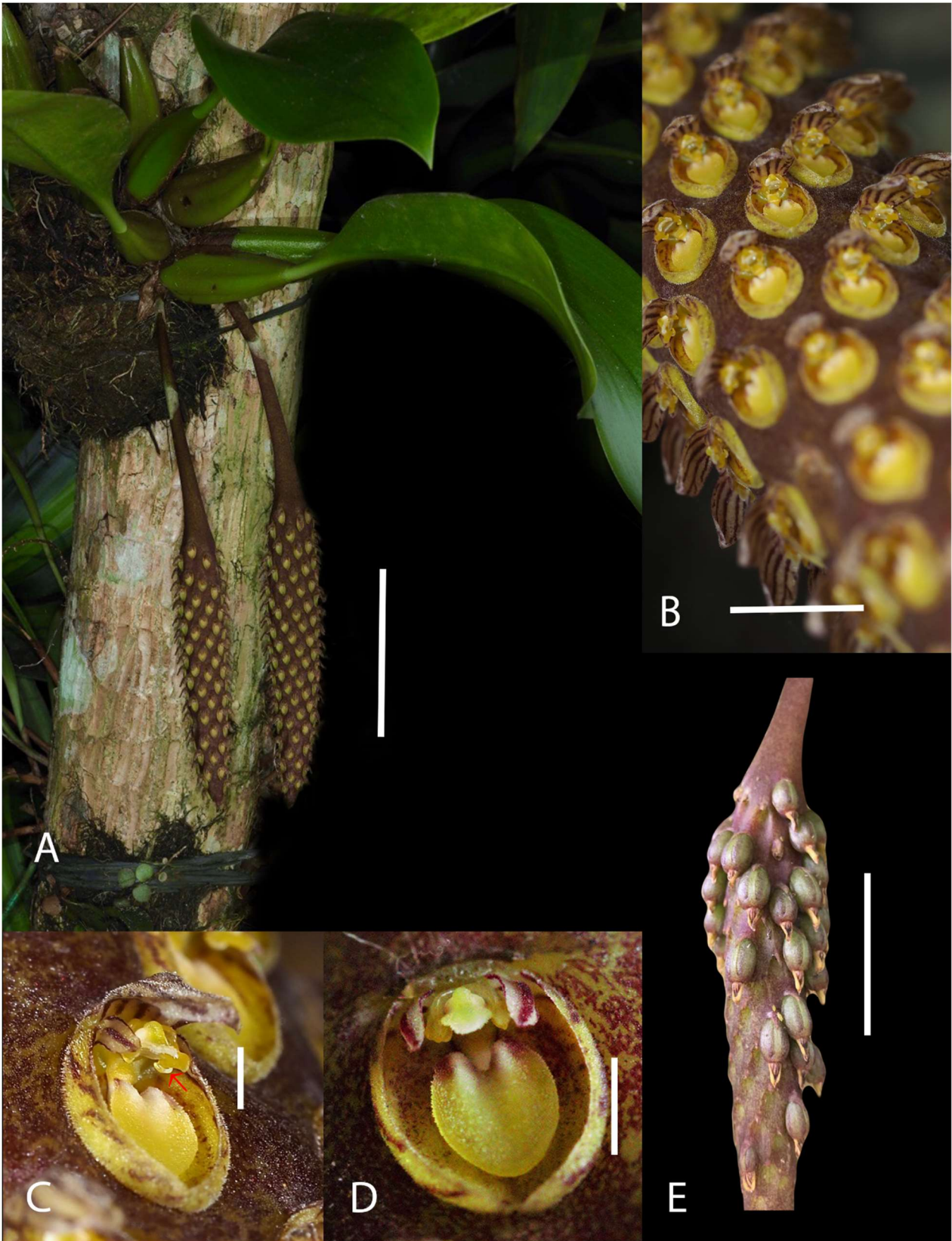
**Taxonomic notes:** *Bulbophyllum mamasaense* belongs to sect. *Saurocephalum* by its unifoliate leaves, flowers spirally arranged in rows, rachis distinct and thickened, flowers resupinate and opening simultaneously, stelia shorter than half length of the column and winged on the upper margin. The most recognizable characters of *B. mamasaense* are the very thickened rachis with 1.5 cm in diameter and dense flowers. The stelia is so minute so that it might be difficult to observe in the spirit specimens, but it is noticeable in the fresh specimen and illustration (Fig. 1-F, N; Fig. 2-C).

**Additional specimens examined:** INDONESIA. Sulawesi. **Central Sulawesi:** *Bulbophyllum ankyledon* J.J.Verm. & P.O'Byrne, Mangkutana road, SBGO nr. 4713 (L0402285); *Bulbophyllum efferatum* J.J.Verm. & P.O'Byrne, locality unknown, cult. *Jongejan*, P. no. 393 (L0738250); *Bulbophyllum fraternum* J.J.Verm. & P.O'Byrne, Gunung Potong, Lore Tengah District, SBGO nr. 5827 (L0284972); *Bulbophyllum hastiferum* Schltr., Lempe Village, Lore Tengah District, SBGO nr. 5881 (L0284403); *Bulbophyllum hastiferum* Schltr., Wanga Village, Napu Subdistrict, Poso District, SBGO nr. 1977 (L0402205); *Bulbophyllum stenurum* J.J.Verm. & P.O'Byrne, Kampung Doda, Poso, SBGO nr. 4902 (L0402265); **North Sulawesi:** *Bulbophyllum stenurum* J.J.Verm. & P.O'Byrne, Gunung Ambang, Bolaang Mongondo Regency, Passi Timur, Singsong 1350 m, *I Nyoman Lugrayasa et al. LG 561/E199807236* (living specimen in Bali Botanical Garden); **South Sulawesi:** *Bulbophyllum anakbaruppii* J.J.Verm., Baruppu, SBGO nr.



**Fig. 1.** Illustration of *Bulbophyllum mamasaense* Wibowo, Juswara & J. Champ., *sp. nov.* **A.** Habit, **B.** Leaf, **C.** Inflorescence, **D.** Flower, oblique view, **E.** flower, top view after median sepal removed, **F.** Column and lip, **G.** Flower bract, **H.** Dorsal sepal, **I.** Lateral sepals, **J.** Petal, **K.** Lip, **L.** Lip, flattened, **M.** Lip, oblique view showing canal, **N.** Column, ventral view, **O.** Anther cap, ventral view, **P.** Pollinia in pairs. Scale bars: A = 5 cm; B = 5 cm; C = 2 cm; D, E, F = 5 mm; G = 1 mm; H = 2 mm; I = 5 mm; J, K, L, M, N = 2 mm; O = 1 mm; P = 0.2 mm. Drawn by: Aninda Retno Utami Wibowo.





**Fig. 2.** Photographs of *Bulbophyllum mamasaense* Wibowo, Juswara & J. Champ., *sp. nov.* **A.** Habit, **B.** Flowers on rachis, **C.** Flower, oblique view, stelia indicated with the red arrow, **D.** Flower, top view after median sepal removal, **E.** Fruits. Scale bars: A = 10 cm; B = 5 mm; C, D = 1 mm; E = 5 mm. Photos by: Jeffrey Champion (A, C), Aninda Retno Utami Wibowo (B, D, E).



**Table 1.** Diagnostic morphological characters of *B. mamasaense* and of its two morphologically closely related species (data collected from herbarium specimens, literature (Vermeulen and O'Byrne 2011) and photos provided by Rogier van Vugt).

Character	<i>B. mamasaense</i>	<i>B. kiamfeeanum</i>	<i>B. pubiflorum</i>
Pseudobulb	ovate-oblong, 1.5–3.0 cm apart, (3.6)–5–6.7 × 2–2.6 cm, obtusely 3-angled.	ovoid, without distinct angles, 2.5–3 × 1–1.2 cm.	ellipsoid or ovoid, 5–10 cm apart, 4-angled, 3.5–5 × 1.3–2 cm.
Leaves	oblong, apex slightly unequal, acute, 16–16.5 × 5.3–5.5(–7.7) cm.	elliptic-ovate, apex acute, 10–13 × 1.8–2.2 cm.	elliptic-ovate, apex acute, narrowed at the base, 13–16 × 1.7–2.7 cm
Rachis	nodding, thickened, surface glabrous, 6.5–9 cm × 1.2–1.5 cm	nodding, thickened, surface finely papillose-hirsute, 4.5 cm × 0.3 cm.	arching, thickened, surface densely papillose-hirsute, 6.5–16 cm × 0.5–0.7 cm.
Flower	spirally arranged in 8 rows, open simultaneously	spirally arranged in 4 rows, open simultaneously	spirally arranged in 4–5 rows, open simultaneously
Pedical & ovary	1–1.5 mm long.	Ca. 2 mm long.	2–2.5 mm long.
Dorsal sepal	oblong, concave, apex obtuse, hooded, 3-veined, outer and inner surface papillose, margin entire, 4 × 2.5 mm.	recurved, ovate, apex rounded, hooded, 3-veined, outer and inner surface glabrous, margin papillose-ciliolate, 4.2 × 2.9 mm.	ovate-elliptic, apex obtuse, hooded, 3-veined, outer surface glabrous, inner surface papillose-ciliolate, margin papillose-ciliolate, 3.2–4.2 (–5) × 2.5–3 mm.
Lateral sepals	adnate along the lower margin, ovate-falcate, flat, apex acute, outer surface papillose, inner surface glabrous, margin entire, 5.5 × 2.5 mm.	adnate along the lower margin, ovate-triangular, flat, oblique, apex obtuse, outer and inner surface glabrous, margin papillose-ciliolate, 4.2 × 2 mm.	adnate along the lower margin, ovate-elliptic, recurved, oblique, apex sub-acute, outer surface puberulate, inner surface glabrous, margin papillose-ciliolate, 4–6 × 1.5–2.5 mm.
Petals	lanceolate, oblique, 1-veined, apex acute, margin entire, surface glabrous, 2–2.5 × 0.5–1 mm.	triangular, recurved, 1-veined, apex acute, margin papillose-ciliolate, surface glabrous, 3.6 × 0.9 mm.	triangular, recurved, 1-veined, apex acute, margin papillose-ciliolate, surface glabrous to densely hirsute, 3–4 × 0.6–1 mm.
Lip	Lip simple, mobile, broadly ovate, the basal part broad with deep groove and curved, the middle part shallow furrow in between two ridges, flattened towards the apex, apex obtuse, margin papillose, surface verrucose, 2.5 × 1.5 mm.	Lip simple, ovate, rounded callus in the apical half, apex rounded, margin finely papillose, surface glabrous, 3.2 × 1.5 mm.	Lip 3-lobed, hastate, triangular, obtuse to subacute lateral lobes, mid-lobe apex rounded to obtuse, margin slightly papillose towards the tip, surface glabrous, ca. 2.5–3.5(–4) × 1.5–2.5 mm.
Column	2.5 mm long, column foot with with 2 slight wings near its base.	1.8 mm long, column foot with 2 slight wings near its base.	1.5–2.2 mm long, column foot with 2 rounded calli near its base.
Stelidia	abruptly bent downwards, apex acute, antrorse, upper margin winged.	abruptly bent downwards, apex obtuse, antrorse, upper margin winged.	abruptly bent downwards, apex acute, antrorse, upper margin winged.
Wing	prominent than the stelidia, oblong.	prominent than the stelidia, obliquely rectangular.	prominent than the stelidia, obliquely rectangular.
Anther cap	bifid at the base and then acute toward the tip, blunt, margin coarsely papillose.	abaxially with a crest near the base, surface approximately glabrous, front margin drawn out into a triangular, rounded beak, margin coarsely papillose.	bifid at the base and then acute toward the tip, blunt, margin coarsely papillose.

3287 (K000829228); *Bulbophyllum ankyledon* J.J.Verm. & P.O'Byrne, Mangkutane-Pendolo Divide, SBGO nr. 5126 (L0283949); *Bulbophyllum condylochilum* J.J.Verm. & P.O'Byrne, Mangkutane-Pendolo Divide, SBGO nr. 5086 (L0283974); *Bulbophyllum hastiferum* Schltr., Kampung Batu, SBGO nr. 4808 (L0284401); *Bulbophyllum hastiferum* Schltr., Kampung Pembu, SBGO nr. 4363 (L0402203); *Bulbophyllum illecebrum* J.J.Verm., Baruppu Village, SBGO nr. 3215 (K000829222); **West Sulawesi:** *Bulbophyllum stenuroides* J.J.Verm. & P.O'Byrne, Mamasa, Kampung Mala'bo, Hort. Leiden no. 20051787 (L0819626).

## ACKNOWLEDGMENTS

The authors would like to express their gratitude to the head of Bali Botanic Gardens, Research Center for Biology - Botany Division, and Research Center for Plant Conservation and Botanic Gardens, for using their research facilities under their care. We also thank to technical support staffs from Bali Botanic Gardens (I Ketut Toya, I Gusti Made Sudirga) and Research Center for Biology, J.J. Vermeulen for the personal advice to the second author, Rogier van Vugt as the head of greenhouses

at Hortus Botanicus Leiden for providing us with photos of similar *Bulbophyllum* material, and Alexander Kocyan, Paul Ormerod, and Roderick Bouman for valuable suggestions.

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