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Contributions to the orchid flora of Kalimantan II: A new *Bulbophyllum* sect. *Macrocaulia* from Mount Bukit Raya, Indonesia

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Abstract

A new species of *Bulbophyllum* section *Macrocaulia* named *Bulbophyllum bukitrayaense* Yudistira & Mustaqim is described from the mid-montane forest zone of Mount Bukit Raya, Kalimantan Barat Province. It is similar to *Bulbophyllum scabrum* but differs in having the lower surface of the labellum with two times approaching margin undulation. The new species also have coarsely rugose upper $\frac{1}{4}$ surface of the labellum (vs smooth) and ovary covered by papillose-muriculate indumentum (vs glabrous). A full description, notes, and fresh photograph plates are given.

Key words: *Bulbophyllum*, endemic, epiphyte, orchids, taxonomy, West Malesia

Introduction

Consisting of perhaps 2000 species, the genus *Bulbophyllum* Thouars (1822: t. 3) is among the most diverse plant genera in the world (Frodin 2004, Chase *et al.* 2015). The center of diversity includes Borneo (Comber 1990), the third largest island in the world with nearly 300 species known (Vermeulen *et al.* 2015, Kurniawan *et al.* 2022, Yudistira *et al.* 2022, 2024).

Since the publication of the monographic work *Bulbophyllum* of Borneo (Vermeulen *et al.* 2015), more botanical explorations have been carried out to reveal the diversity of the largest genus in Orchidaceae. These include some new taxa that have been described from Kalimantan, Indonesian part of Borneo (Kurniawan *et al.* 2022, Yudistira *et al.* 2022, 2024).

In July 2024, a biodiversity expedition was conducted on Mount Bukit Raya, facilitated by the Bukit Baka Bukit Raya National Park Agency (Balai Taman Nasional Bukit Baka Bukit Raya). During the expedition, a specimen of a possible new *Bulbophyllum* species was discovered at an elevation of approximately 1,320 m. Forest vegetation is dominated by medium-sized trees and the ground surface is covered by quite steep humus-rich forest floor, overgrown by *Bulbophyllum gibbosum* (Blume 1825: 312) Lindl. (Lindley 1830: 54), and *B. caudatisepalum* Ames & C. Schweinf. (Ames & Schweinfurth 1920: 166). More explorations yielded many further materials for study with one hitherto undescribed species gathered from Mount Bukit Raya and is described here.

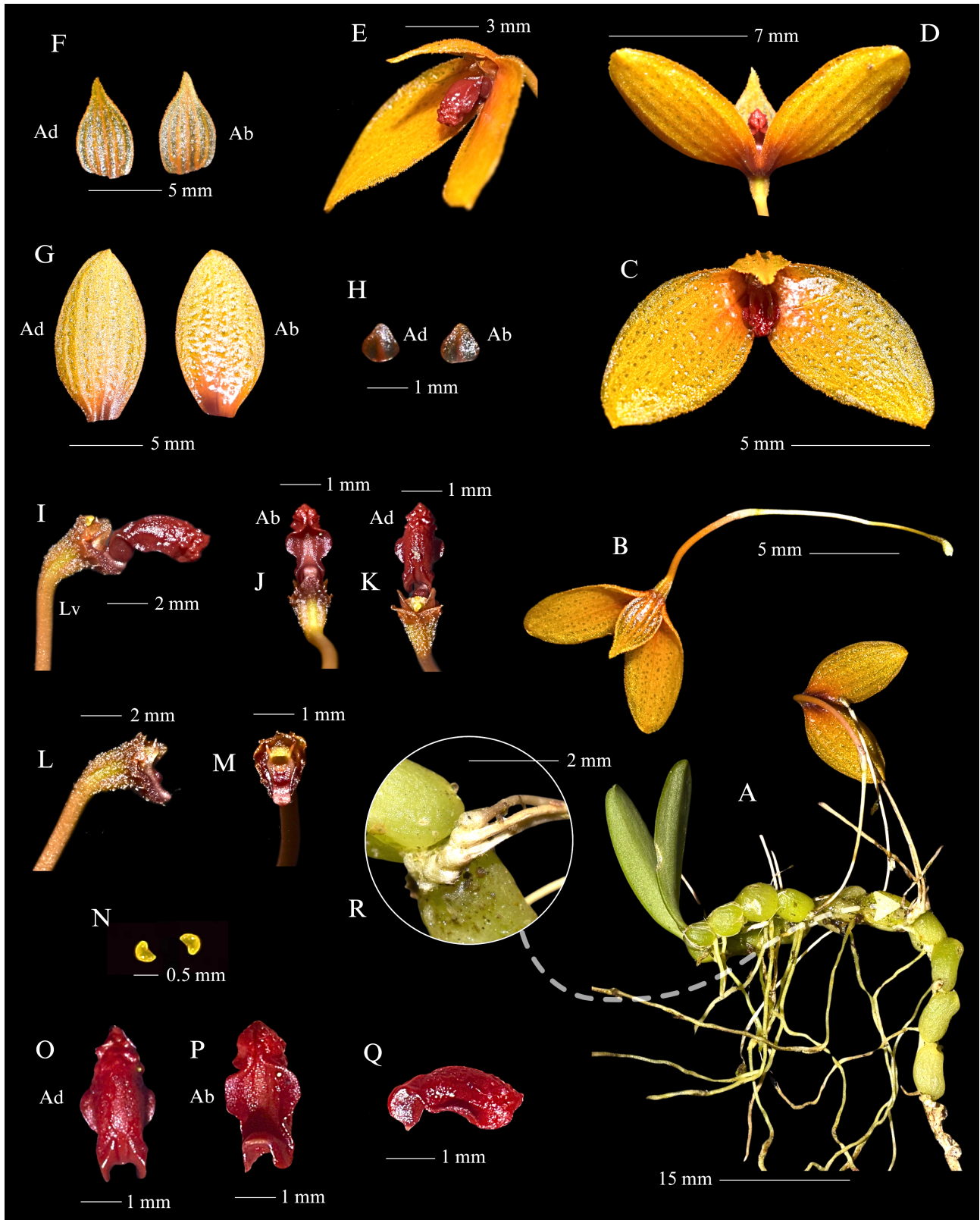


FIGURE 1. Morphology of *Bulbophyllum bukitrayaense*. A. Plant. B. Axis of inflorescences. C. Inflorescence. D. Flowers, frontal view. E. Flowers, abaxial. F. Flowers, side-view. G. Dorsal sepal. H. Lateral sepals. I. Petals. J. Flowers with perianth removed. K. Labellum, abaxial. M. Labellum, adaxial. N. Labellum, lateral view. O. Ovary and column. P. Column, frontal view. Q. Pollinia. Photographs by Yuda R. Yudistira from the holotype.

Taxonomic treatment

Bulbophyllum bukitrayaense Yudistira & Mustaqim *sp. nov.* (Fig. 1)

Type:—INDONESIA. Kalimantan Barat Province, Sintang Regency, Serawai Subdistrict, Rantau Malam Village, Bukit Baka Bukit Raya National Park, trail to summit of Mount Bukit Raya, Linang camp [0°38'44.9"S 112°39'26.0"E], 1320 m.elev., 7 July 2024, *Yudistira & Mustaqim YRY064* (holotype: WAN!-spirit).

Diagnosis:—*Bulbophyllum bukitrayaense* is morphologically similar to *B. scabrum* Vermeulen & Lamb (1988: 46) in having the lower surface of the labellum with two times approaching margin undulation, but the new species has labellum with larger length per width index (2.2 times vs up to 1.7 times) and coarsely rugose upper ¼ surface (vs smooth), broadest point in a non expanded state at half of its length (vs upper third), and ovary covered by papillose-muriculate indumentum (vs glabrous). It is also similar to *B. ovalifolium* (Blume 1825: 318) Lindley (1830: 49) but differs in having the rocket-shaped labellum (vs elliptic to ovate), presence of approaching margin undulation on the lower surface of the labellum (vs absent), ovate petals (vs oblong), and the presence of papillose-muriculate indumentum in the ovary (vs absent). (Table 1).

TABLE 1. The morphological characters used to distinguish *Bulbophyllum bukitrayaense* from *B. scabrum* Vermeulen & Lamb. and *B. ovalifolium* (Blume) Lindl.

Character	<i>B. bukitrayaense</i>	<i>B. scabrum</i>	<i>B. ovalifolium</i>
Flower			
Width across the lateral sepals (cm)	1.0–1.5	0.6–1.0	0.7–2.0
Ovary hairs	papillose muriculate	glabrous	glabrous
Dorsal sepal			
Length (mm)	6.0	4.0–7.5	2.7–6.8
Width (mm)	3.0	3.2–4.2	0.9–3.0
Surfaces	both coarsely papillose	adaxially smooth and abaxially irregularly papillose to finely verrucose	adaxially glabrous and abaxially glabrous or slightly papillose
Apex	acuminate	uspitate to acuminate	acute to acuminate
Lateral sepals			
Shape	ovate	ovate	ovate, oblong, or elliptic
Length (mm)	11.5	4.0–6.5	4.0–18.0
Width (mm)	6.0	2.8–5.0	2.0–12.0
Apex	obtuse, apiculate	cuspidate	obtuse
Surface hairs	dorsal side papillose, inside minutely verrucose	-	glabrous to densely papillose
Petals			
Shape	ovate-rhombiform	ovate-rhombiform	oblong-elliptic
Length (mm)	0.8	1.0–1.5	0.9–2.0
Width (mm)	0.8	0.9–1.1	0.4–1.0
Apex	obtuse, tip rounded	obtuse	truncate to obtuse
Labellum			
Shape	rocket shape	obovate to oblong	obovate, ovate, or oblong
Broadest point	half length	upper third	half length
Length (mm)	3.25	2.0–3.0	2.0–3.5
Width (mm)	1.5	1.2–2.0	1.0–3.5
Index (times)	2.2	1.4–1.7	1.2–2.0
Surface texture	upper ¼ coarsely verrucose, otherwise smooth	entirely smooth	smooth to densely papillose to tuberculate
Apex	rounded	rounded	obtuse
Source	-	Vermeulen <i>et al.</i> (2015)	Vermeulen <i>et al.</i> (2015), pers. obs.

Small, creeping epiphyte herbs. **Roots** below the pseudobulb, flexuous *c.* 0.5 mm diam., white. **Rhizome** creeping, *c.* 1 mm across, section between pseudobulb 0.5–2 mm with thin clustering papery sheath in young pseudobulb, *c.* 2–4 mm long, caducous. **Pseudobulb** fused to the rhizome, pale green, ovoid to elliptic, 4–7 × 3–4 mm, glabrous. **Leaf**: petiole canaliculate 0.5–1 mm long, lamina obovate- or elliptic-oblong, 10–15 × 2–4 mm, base cuneate, apex mucronate-apiculate, entire, glabrous. **Inflorescence** arising from the base of the pseudobulb, 1-flowered; flower 1.0–1.1 cm broad across lateral sepals, these from arranged in secund raceme, the axis up to 2.5 mm long; peduncle curving, 14.5 mm long, thickened at the base, bracts only basal, up to 1.5 mm long, acute, glabrous, strongly keeled at the back; floral bracts tubular, *c.* 1.9 mm long, apex obtuse, entire, glabrous. **Flowers** rather not open widely, 1.0–1.5 cm wide. **Pedicels** terete, ovary shallowly channeled, altogether *c.* 12 mm long, orange, basal nodes 1.7 mm long; ovary papillose-muriculate. **Dorsal sepal** erect, ovate to elliptic, 6 × 3 mm, margin ciliate, apex acuminate, 3-veins and 2 lateral veins forked, prominent adaxially, obscure abaxially, coarsely papillose in adaxial and abaxial; margin orange similar to veins. **Lateral sepals** ovate, slightly asymmetric, 11.5 × 6.0 mm, margin ciliate, apex obtuse, apiculate, outer surfaces coarsely papillose, inner surface verrucose; 4 veins and 2 lateral veins forked, veins prominent outside, obscure inside. **Petals** ovate, rhombiform, *c.* 0.8 × 0.8 mm, apex obtuse, tip rounded; 1-veined, vein prominent dorsally, orange. **Labellum** rocket shape in natural shape, oblong, 3.25 × 1.5 mm, index 2.2, broadest at the middle, slightly recurved, concave at the base, with margin erect at the basal ¼, downcurved in the middle, then spreading before abruptly approaching each other toward the upper third, rounded in the apex; basal part sac-like cavity above the ligament, its margin bordered by two blunt ridges, running toward the lower third, approaching but not anastomosing; upper ¼ coarsely verrucose, glabrous elsewhere. **Column** including stelidia *c.* 0.8 mm, stigma bluntly quadrangular, with a blunt callus at its base, column foot *c.* 1 mm long. **Stelidia** narrowly triangular, facing upwards, *c.* 0.2 mm long, lower margin *c.* with shallow and broad wing, *c.* 0.05 mm. **Anther** cap not seen. **Pollinia** 2.

Phenology:—Flowering in the wild observed in July, fruiting unknown.

Distribution and habitat:—Endemic to Kalimantan: so far only known from the type locality in Mount Bukit Raya (Fig. 2). The species grows as epiphyte on the mossy tree trunk (Fig. 3), mid-montane forest on a slope close to the summit area, at an elevation of 1,320 m.

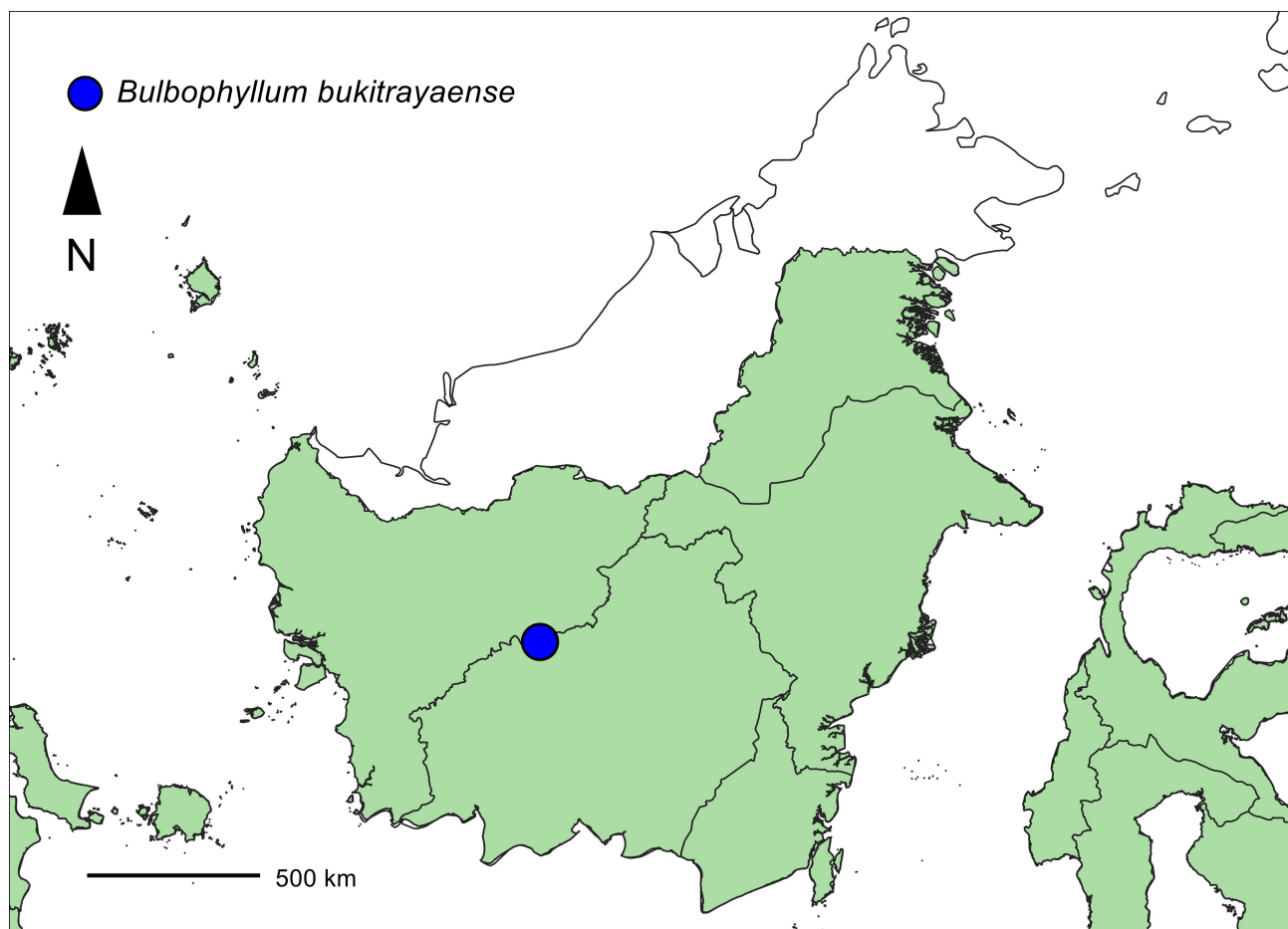


FIGURE 2. Geographical distribution of *Bulbophyllum bukitrayaense*.

Etymology:—The epithet refers to Bukit Raya, the name of the mountain where the species was found for the first time.

Notes:—The section *Macrocaulia* (Blume) Averyanov (1994: 279) in Borneo, where this new species belongs, consists of 42 species with half of them being endemics. It is characterized by the plants having pseudobulb relatively large compared to the whole size of the plants which adnate to the rhizome and flowers with entire petals and labellum without transverse ridge at the base as well as the labellum with the absence of a transverse ridge at the labellum base, labellum connate with and entire petals (Vermeulen *et al.* 2015). The number of species is much larger than the surrounding island in Sundaland, i.e. Sumatra (11 species; Comber 2001, Yudistira *et al.* 2024), Peninsular Malaysia (13 species; checked and added from 11 mentioned Seidenfaden 1992), or Java (5 species; checked from 7 mentioned in Comber 1990).

Bulbophyllum bukitrayaensis and *B. scabrum*, as the most morphologically similar species, has an affinity to the variable and widespread *Bulbophyllum ovalifolium* (see Atmaja *et al.* 2017 and Metusala *et al.* 2020 for discussion regarding morphological variations of *B. ovalifolium*). Vermeulen *et al.* (2015) placed the materials that have ovate-rhombiform petals from the *B. scabrum*-*B. ovalifolium* complex as *B. scabrum*, a species distributed in Sabah and Sarawak from 1500 to 2100 m asl. Based on this reason, the new species is closer in morphological similarity to *B. scabrum* and separated as a new species with the morphological characters mentioned in the diagnostic. Besides that, *B. scabrum* also has short inflorescence and always has constant, single, inflorescence per node instead of racemously arranged inflorescence in *B. bukitrayaensis*.



FIGURE 3. *Bulbophyllum bukitrayaense* (A) in its habitat alongside *Bulbophyllum succedaneum* J.J.Sm. (Smith 1927: 67). Photograph by Wendy A. Mustaqim.

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References

- Ames, O. & Schhweinfurth, C. (1920) The orchids of Mount Kinabalu. *Orchidaceae: Illustration and Studies of the Family Orchidaceae* 6: 3–272.
- Atmaja, M.B., Wibowo, A.R.U. & Tirta, I.G. (2017) Morphological variation among flowers of *Bulbophyllum ovalifolium* (Blume) Lindl. (Orchidaceae) in Bali. *KnE Life Science* 3 (4): 136–140.
<https://doi.org/10.18502/kl.v3i4.697>
- Averyanov, L.V. (1994) *Identification guide to Vietnamese orchids*. World & Family, Saint-Petersburg, 432 pp.
- Blume, C.L. (1825) *Bijdragen tot de flora van Nederlandsch Indië*, pt. 7–12. Ter Lands, Jakarta, pp. 284–636.
- Chase, M.W., Cameron, K.M., Freudenstein, J.V., Pridgeon, A.M., Salazar, G., van den Berg, C. & Schuiteman, A. (2015) An updated classification of Orchidaceae. *Botanical Journal of the Linnean Society* 177: 151–174.
<https://doi.org/10.1111/boj.12234>
- Comber, J. (1990) *Orchids of Java*. Bentham Moxon Trust, Royal Botanic Gardens, Kew, 407 pp.
- Comber, J. (2001) *Orchids of Sumatra*. Kota Kinabalu & Richmond: Natural History Publication (Borneo) & Royal Botanic Gardens Kew, 1036 pp.
- Frodin, D.G. (2004) History and concepts of big plant genera. *Taxon* 53: 753–776.
- Lindley, J. (1830) *The genera and species of orchidaceous plants*. Rigways, London, 554 pp.
<https://doi.org/10.5962/bhl.title.120492>
- Metusala, D., Wibowo, A.R.U., Mambrasar, Y.M. & Hendrian. (2020) A new synonym of *Bulbophyllum ovalifolium* (Orchidaceae: Epidendroideae). *Phytotaxa* 464 (3): 227–235.
<https://doi.org/10.11646/phytotaxa.464.3.4>
- Smith, J.J. (1927) *Bulbophyllum succedaneum* J.J.Sm. *Mitteilungen aus dem Institut für Allgemeine Botanik in Hamburg* 7: 67.
- Thouars, L.M.A. du P. (1822) *Histoire particulière des plantes Orchidées recueillies sur les trois îles australes d’Afrique, de France, de Bourbon et de Madagascar*. Published by the author, Paris, vii + 32 pp. + 110 illustr.
- Vermeulen, J.J. & Lamb, A. (1988) *Bulbophyllum* - some interesting novelties from the Bornean jungle. *Malayan Orchid Review* 22: 44–47.
- Vermeulen, J.J. & O’Byrne, P. (2011) *Bulbophyllum of Sulawesi*. Kota Kinabalu: Natural History Publications (Borneo).
- Vermeulen, J.J., O’Byrne, P. & Lamb, A. (2015) *Bulbophyllum of Borneo*. Natural History Publications (Borneo), Kota Kinabalu, vii + 728 pp.
- Yudistira, Y.R., Ahmad, R.P.P., Adirahmanta, S.N., Mustaqim, W.A. & Randi, A. (2024) Contributions to the orchid flora of Kalimantan I: A new species and a new country record of *Bulbophyllum* (Orchidaceae). *Taiwania* 69 (3): 386–392.
- Yudistira, Y.R., Candra, R. & Mustaqim, W.A. (2024) A new species of *Bulbophyllum* (Orchidaceae: Bulbophyllinae) section *Macrocaulia* from Sumatra, Indonesia. *Gardens’ Bulletin Singapore* 76 (2): 251–258.