

## Six New Species of *Bulbophyllum* (Orchidaceae) from Sulawesi

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### Abstract

Six new species of *Bulbophyllum* are described, all from Sulawesi: *B. trichorhachis* (sect. *Hybochilus*), *B. valeryi* (sect. *Leptopus*), *B. auriculatum* and *B. tubilabium* (both sect. *Monilibulbus*), *B. stenurum* (sect. *Osyricera*), and *B. reductum* (sect. *Pelma*).

### Introduction

The six new species described below once more underline the uniqueness of the Sulawesi orchid flora. The dual origins of its flora are demonstrated by the fact that, for instance, *Bulbophyllum reductum* belongs to an almost exclusively Papuan section of the genus, whereas *B. auriculatum* and *B. tubilabrum* have their phylogenetic roots in Asia, particularly the Sunda Shelf. *B. stenurum*, together with *B. hastiferum* Schltr. and *B. anakbaruppui* J.J. Verm. & P. O'Byrne, form a small, very distinctive series within sect. *Osyricera* entirely restricted to Sulawesi; they demonstrate the amount of speciation that has occurred on the island. *B. trichorhachis* is the second Sulawesi species of sect. *Hybochilus* with a racemose inflorescence. This character is otherwise almost absent in sect. *Hybochilus* as well as in assumedly related sections. Clearly, the Sulawesi flora deserves more attention than it gets at present.

### *Bulbophyllum* sect. *Hybochilus*

*Bulbophyllum trichorhachis* J.J. Verm. & P. O'Byrne, *sp. nov.* – Fig. 1.

*Bulbophyllum trichorhachis* J.J. Verm. & P. O'Byrne, a *Bulbophyllo iteranti* floribus multo minoribus (sepalum medianum 3.8 mm longum), labello carina medialis carenti differt. —TYPE: Indonesia, Sulawesi, central part, SBG-O4348 (SING.holo.).

*Roots* below the pseudobulbs. *Rhizome* creeping, 0.8–1 mm diam., sections between pseudobulbs 0.2–0.6 cm long, bracts not persistent. *Pseudobulbs* close together, ovoid, 0.4–0.65 x 0.2–0.4 cm. *Petiole* up to 0.02 cm long. *Leaf blade* elliptic to (ob)ovate, 1.3–1.9 x 0.35–0.5 cm, index (length/width) 2.6–5.4; acute. *Inflorescence* an elongated raceme, 3–4.8 cm long, 1–22-flowered. *Peduncle* erect to patent, 2.5–2.9 cm, bracts 3, the longest c. 1.5 mm long. *Rhachis* porrect or arching, zigzag bent, not thickened, up to 1.7 cm. *Floral bracts* tubular at the base, 0.7–1 mm, acute. *Flowers* not fully opening, each one developing only after anthesis of the previous. *Pedice*l and ovary 1.9–2.8 mm long, basal node on a c. 0.7 mm-long stump. *Median sepal* recurved, ovate, c. 4 x 1.5 mm, index 2.6–2.7; subacute, margins entire, base broadly attached; thin, 3-veined, glabrous. *Lateral sepals* 4 x 1.5 mm, index 2.6–2.7; lower margin somewhat ciliolate; otherwise as the median sepal. *Petals* porrect, ovate, c. 2.9 x 1.2 mm, index 2.4–2.5; subacute, margins ciliate, base narrowly attached; thin, 1-veined, glabrous. *Lip* slightly recurved near the base, general outline triangular, c. 2.9 x 0.7 mm, index c. 4.1 (all without artificial spreading); rounded, margins ciliate; rather thick; adaxially concave near the base, convex elsewhere, surface glabrous; abaxially without a ridge, surface with stiff hairs near the base, and with softer hairs elsewhere. *Column* c. 0.9 mm long, stigma without a tooth at its base, column foot absent. *Stelidia* porrect, triangular, c. 0.6 mm long, acute, with a slight, rounded wing along the upper margin. *Anther* abaxially with a distinct, papillose crest, surface otherwise finely papillose, front margin drawn out into an incurved, truncate beak with entire margins. *Pollinia* 4; ovoid, the inner c. 3/4 as long as the outer; no appendages present.

*Colour:* Flowers entirely dark purple.

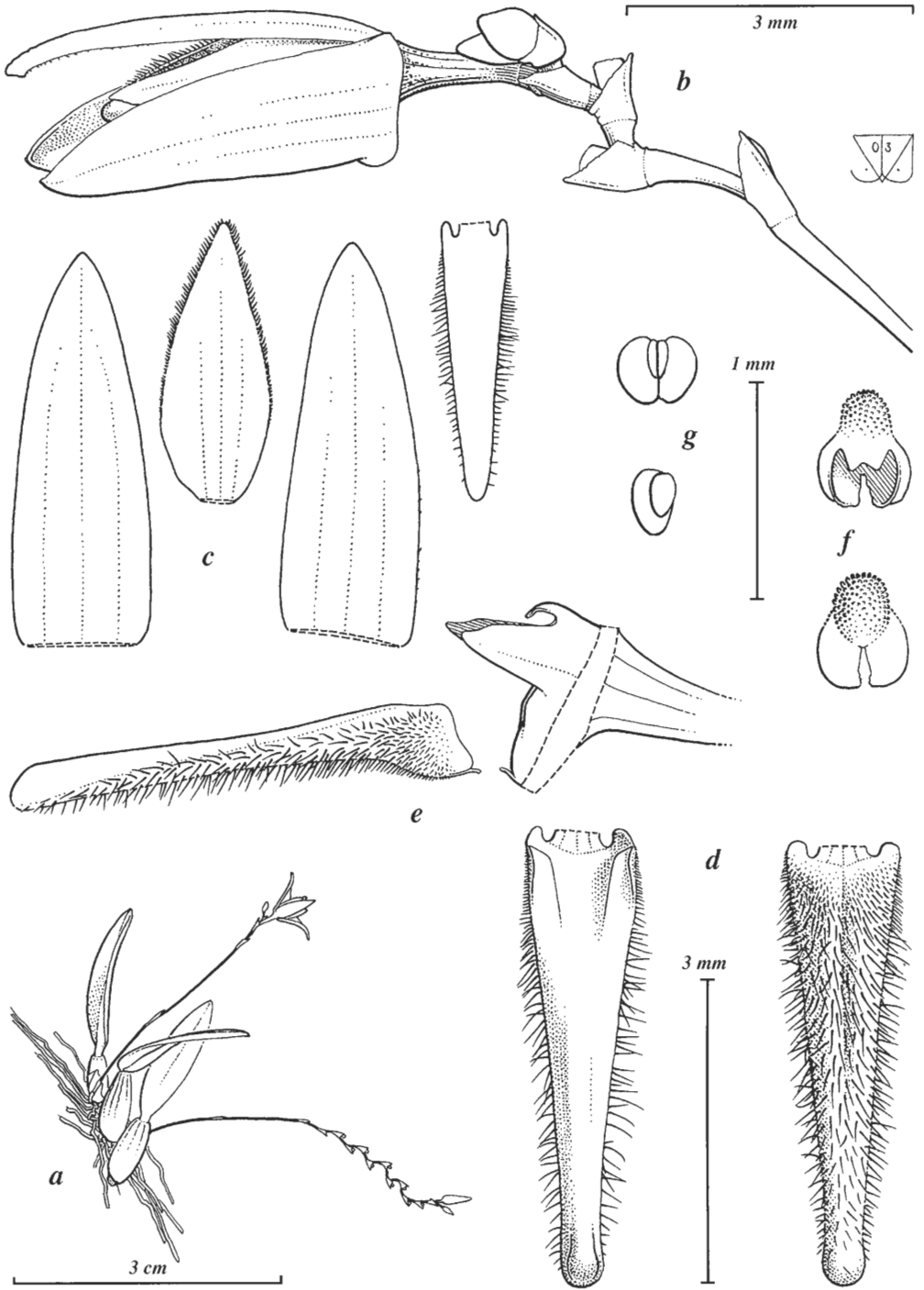
*Habitat:* Epiphyte in montane forest, on branches of medium-sized trees. Alt. c. 1000 m.

*Distribution:* INDONESIA: Sulawesi, central part (1 specimen seen).

*Notes:* Similar to *Bulbophyllum iterans* J.J. Verm & P. O'Byrne, differs in having an unthickened, more elongated rhachis, smaller flowers (median sepal in *B. iterans* 10.5–11.2 mm long, in *B. trichorhachis* c. 4. mm long) and a lip without a median ridge.

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**Figure 1.** *Bulbophyllum trichorhachis* J.J. Verm. & P. O'Byrne – a. Habit; b. Inflorescence; c. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; d. Lip, left: adaxial side, right: abaxial side; e. Column and lip, lateral view; f. Anther, above: adaxial side, below: abaxial side; g. Pollinia, above: two pairs, below: a single pair. – All from SBG-O 4348 (spirit sample).



***Bulbophyllum* sect. *Leptopus***

***Bulbophyllum valeryi* J.J. Verm. & P. O'Byrne, *sp. nov.* – Fig. 2.**

*Bulbophyllum valeryi* J.J. Verm. & P. O'Byrne, a *Bulbophyllo melinantho* pedunculo 2 mm longo, infra stigmatem umbonibus duobus distinctis differt. — TYPE: Indonesia, Sulawesi, central part, SBG-O 4834 (SING, holo.).

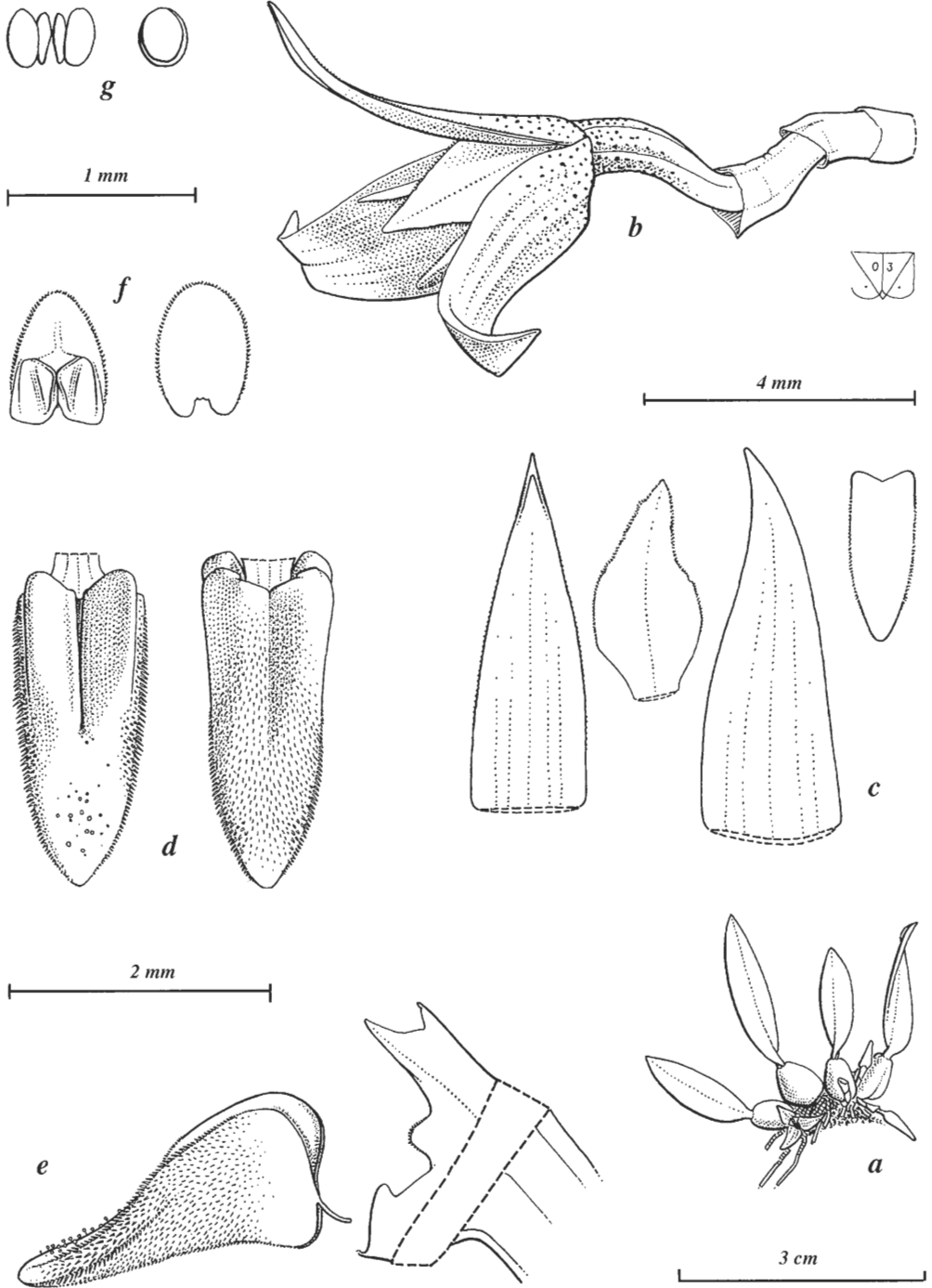
*Roots* below the pseudobulbs. *Rhizome* creeping, 1–1.5 mm diam., sections between pseudobulbs 0.25–0.4 cm long, bracts not persistent. *Pseudobulbs* close together, ovoid, 0.45–0.7 x 0.3–0.55 cm. *Petiole* up to 0.1 cm long. *Leaf blade* elliptic to ovate, 1.2–2.8 x 0.4–0.5 cm, index (length/width) 3–5.6; obtuse to acute. *Inflorescence* 1–1.2 cm long, 1-flowered. *Peduncle* patent, 0.15–0.2 cm, bracts 2, the longest c. 1.8 mm long. *Floral bract* tubular, c. 2 mm, acute. Flowers not fully opening. *Pedicel and ovary* c. 4 mm long, basal node on a c. 1.2 mm-long stump. *Median sepal* recurved, triangular, c. 5.3 x 2 mm, index 2.6–2.7; acute, margins slightly and very finely papillose, base widely attached; thick, glabrous. *Lateral sepals* free, oblique, c. 5.8 x 2.2 mm, index 2.6–2.7; margins glabrous, otherwise as the median sepal. *Petals* porrect, ovate, c. 3.3 x 2 mm, index 1.6–1.7; acute, margins slightly erose and papillose, base narrowly attached; thin, glabrous. *Lip* hardly recurved, ovate, c. 2.8 x 1.2 mm, index 2.3–2.4 (all without artificial spreading), obtuse, margins papillose; thick; adaxially concave and with a median furrow in the basal half, slightly convex in the top half, surface glabrous but papillose towards the margins about half-way up the lip and with a patch of scattered glandular hairs in the top half; abaxially with a retuse median ridge near the base, surface finely papillose, coarser papillose along the margins towards the tip. *Column* c. 1.2 mm long, stigma with 2 distinct, papillose knobs at its base, column foot with retrorse, triangular, obtuse wings near the tip. *Stelidia* triangular, c. 0.5 mm long, acute. *Anther* abaxially with a slight, rounded crest, surface finely papillose, front margin not drawn out. *Pollinia* 4; ellipsoid, the inner c. as long as the outer; no appendages present.

*Colour:* Sepals translucent pale greenish, suffused with ochrish red, veins ochrish red. Petals translucent, some dark purple specks near the base, tip entirely dark purple. Lip white, heavily suffused with purple.

*Habitat:* Epiphyte growing in small clusters on thin branches in montane forest. Alt. c. 1000 m.

*Distribution:* INDONESIA: Sulawesi, central part (1 specimen seen).

**Figure 2.** *Bulbophyllum valeryi* J.J. Verm. & P. O'Byrne – a. Habit; b. Flower; c. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; d. Lip, left: adaxial side, right: abaxial side; e. Column and lip, lateral view; f. Anther, left: adaxial side, right: abaxial side; g. Pollinia, left: two pairs, right: a single pair. – All from SBG-O 4834 (spirit sample).



*Notes:* This belongs to a suite of species within sect. *Leptopus* that is characterized by densely clustered pseudobulbs on a creeping or shortly ascendent rhizome, and a lip shape approaching what is commonly found in sect. *Fruticicola* and in sect. *Epibulbon*. The species most similar to *Bulbophyllum valeryi* is *B. melinanthum* Schltr, from New Guinea. *B. valeryi* differs in having a very short peduncle and two distinct knobs below the stigma.

Named after Valeryus, son of Joseph Nasaret, who discovered this species.

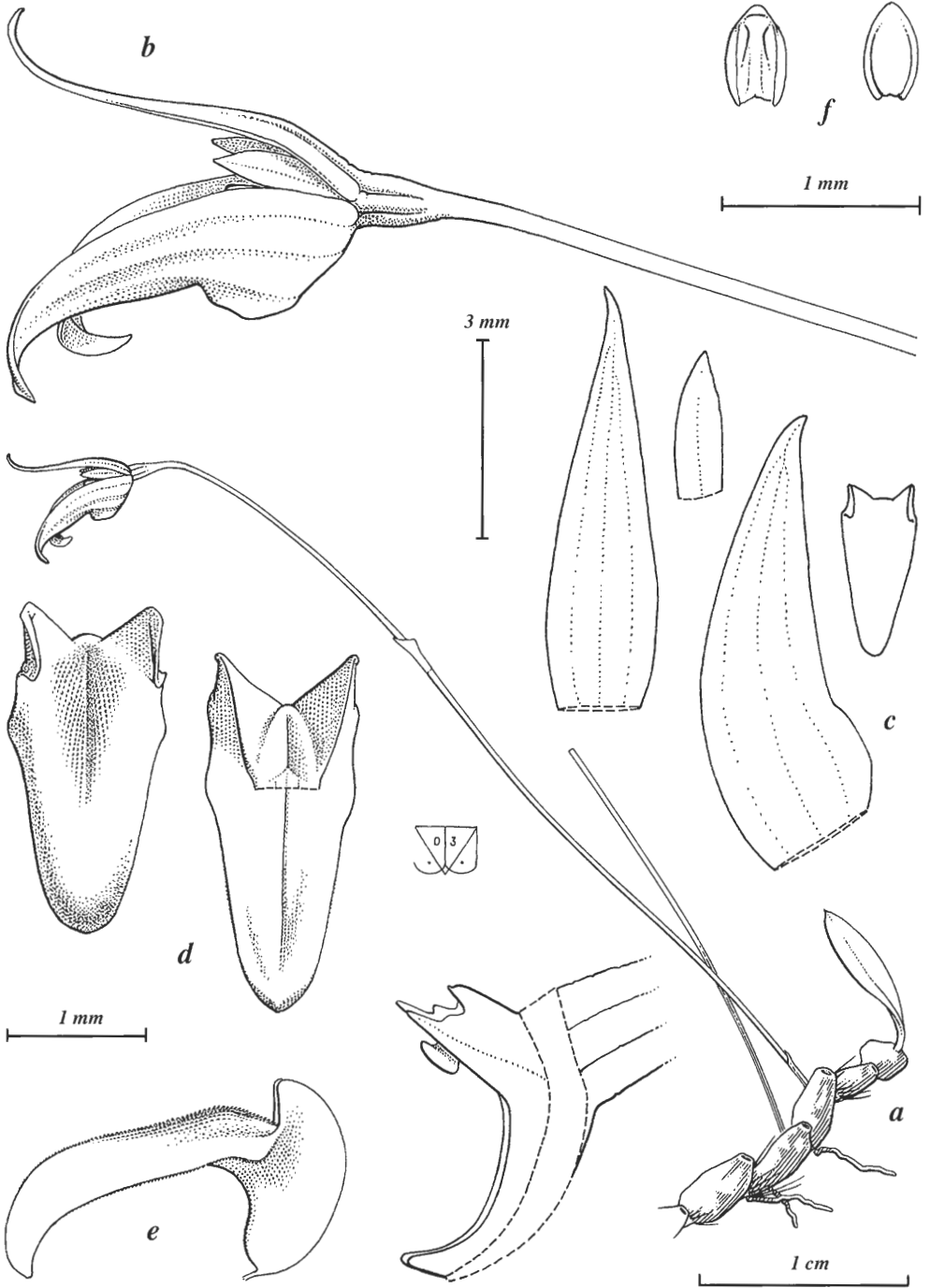
### *Bulbophyllum* sect. *Monilibulbus*

***Bulbophyllum auriculatum* J.J. Verm. & P. O'Byrne, sp. nov.** — Fig. 3.

*Bulbophyllum auriculatum* J.J. Verm. & P. O'Byrne, a *Bulbophyllo minutulo* et *B. schefferi* ad labelli basin lobis lateralibus antrorsis triangularibus obtusis differt. — TYPE: Indonesia, Sulawesi, SBG-O 4360 SING, holo.).

Roots below the pseudobulbs. *Rhizome* creeping, 1.2–1.5 mm diam., sections between pseudobulbs 0.25–0.6 cm long, bracts not persistent. *Pseudobulbs* orbicular to narrowly ovoid, basal half prostrate on and fused to the rhizome, so that the new pseudobulbs arise c. half-way up the old, 0.35–0.9 x 0.28–0.35 cm. *Petiole* 1.8–3 mm long. *Leaf blade* ovate to elliptic, 0.65–1 x 0.22–0.32 cm, index (length/width) 2–3.5; acuminate. Inflorescence c. 5 cm long, 1-flowered. *Peduncle* erect to patent, c. 2.5 cm, bracts 2, the longest 3–3.5 mm long. *Floral* bracts tubular, c. 2 mm, acute. *Flowers* not fully opening. *Pedicel and ovary* c. 16.5 mm long, basal node on a c. 1.4 mm-long stump. *Median sepal* porrect with recurved top, ovate, c. 6.2 x 1.8 mm, index 3.4–3.5; acute, margins slightly erose-papillose towards the tip, base rather widely attached; thin, glabrous. *Lateral sepals* recurved, free, oblique, triangular, c. 7 x 2.3 mm, index 3–3.1; otherwise as the median *sepal*. *Petals* porrect, ovate, c. 2.3 x 0.8 mm, index c. 2.9; acute, margins slightly erose-papillose towards the tip, base widely attached; thin, glabrous. *Lip* recurved at c. 1/3 of its length,  $\pm$  3-lobed; *midlobe* ovate, c. 2.4 x 1.2 mm, index c. 2 (all without artificial spreading), rounded, margins very finely papillose; thick; adaxially concave and with 2 short ridges near the base converging distally and then fused to a small callus, beyond this callus a median furrow reaching up to about half-way the lip, adaxial surface papillose in the centre; abaxially with barely a median ridge, top part slightly concave, surface glabrous; *lateral lobes* erect, antrorse, attached along the proximal third of the lip, obliquely triangular, c. 0.5 mm high, obtuse, thin, glabrous. *Column* c. 1.4 mm long, rostellum thick, knob-shaped.

**Figure 3.** *Bulbophyllum auriculatum* J.J. Verm. & P. O'Byrne – a. Habit; b. Flower; c. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; d. Lip, left: adaxial side, right: abaxial side; e. Column and lip, lateral view; f. Anther, left: adaxial side, right: abaxial side. – All from SBG-O 4360 (spirit sample).



stigma without a tooth at its base, column foot without teeth. *Stelidia* triangular, c. 0.4 mm long, acute, with a small, antrorse, obliquely deltoid, rounded to obtuse tooth along the upper margin. *Anther* abaxially with a widely rounded crest, surface  $\pm$  glabrous, front margin somewhat drawn out into a triangular, obtuse beak. *Pollinia*: not seen.

*Colour*: Sepals yellowish orange. Lip red.

*Habitat*: Understorey epiphyte in montane forest, at c. 1800 m alt. Flowering observed in Sept.

*Distribution*: INDONESIA. Sulawesi, central part (1 specimen seen).

*Notes*: Most similar to *Bulbophyllum minutulum* Ridl., and *B. schefferi* (O. Kuntze) Schltr., *Bulbophyllum auriculatum* differs from both in having distinct lateral lobes at the base of the lip.

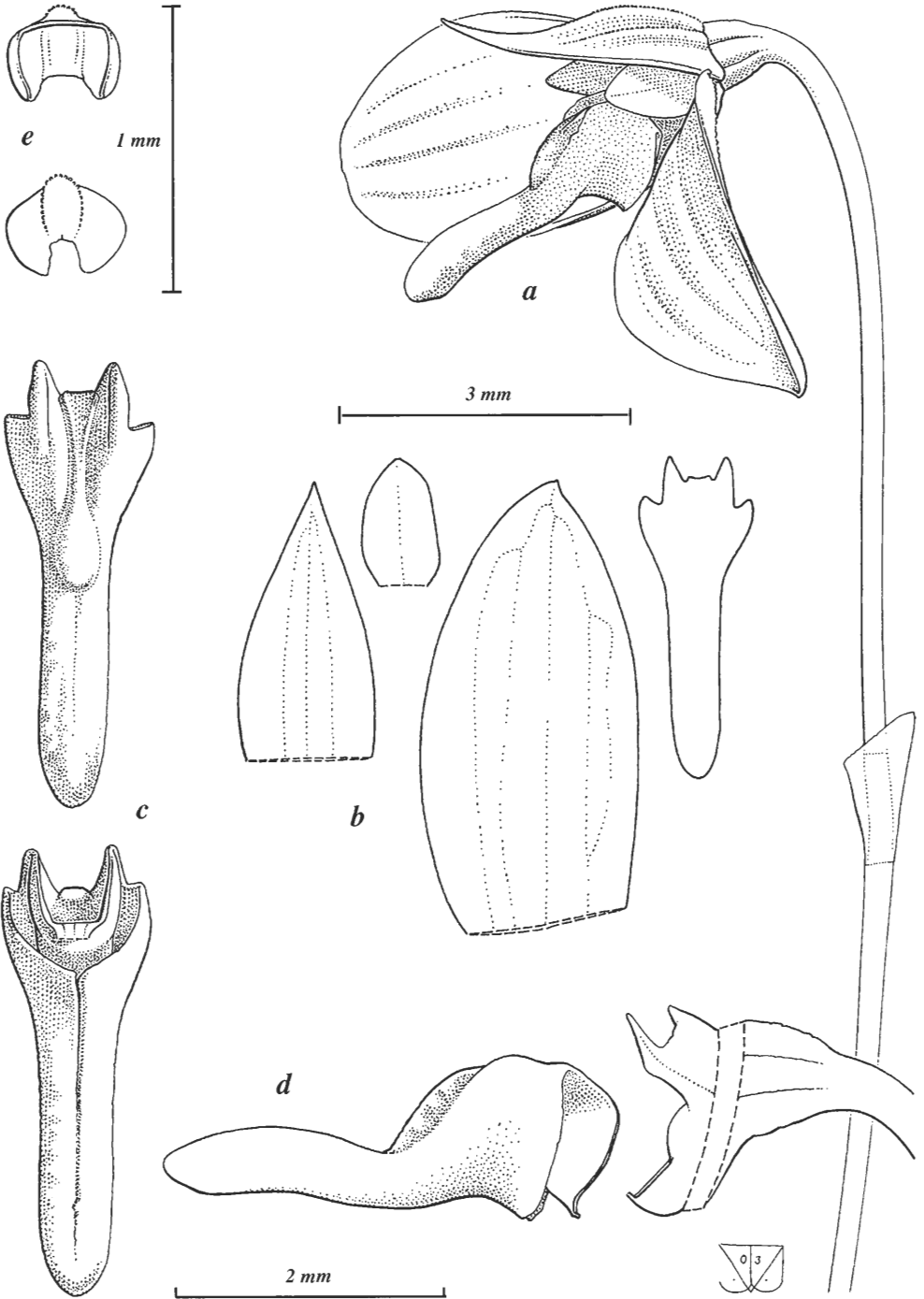
***Bulbophyllum tubilabrum* J.J. Verm. & P. O'Byrne, sp. nov.** — Fig. 4.

*Bulbophyllum tubilabrum* J.J. Verm. & P. O'Byrne, a *Bulbophyllo hodgsonii* sepalo mediano brevi lato (index 1.7–1.8 contra 4–5 in *B. hodgsonii*), floribus multo minoribus (sepala lateralia c. 4.8 mm longa contra c. 15 mm in *B. hodgsonii*) differt. — TYPE: Indonesia, Sulawesi, SBG-O 4935 (SING, holo.).

*Peduncle* erect to patent, c. 2.5 cm, bracts 2, the longest c. 2 mm long. *Floral bracts* tubular, c. 1.7–2 mm, acute. *Flowers* fully opening. *Pedicel and ovary* c. 10 mm long, basal node on a c. 1.2 mm-long stump. *Median sepal* porrect, ovate-triangular, c. 3 x 1.7 mm, index 1.7–1.8: acute-acuminate, margins entire, base widely attached; thin, glabrous. *Lateral sepals* recurved, free, oblique, elliptic-ovate, c. 4.8 x 2.8 mm, index c. 1.7; acute; otherwise as the median sepal. *Petals* porrect, ovate, c. 1.4 x 0.9 mm, index 1.5–1.6; subacute, margins entire, base rather narrowly attached; thin, glabrous. *Lip* somewhat recurved at c. 1/4 of its length, triangular near the base, cylindrical elsewhere with the margins folded back over the abaxial side and fused, c. 3.4 x 1.5 mm, index c. 2.2–2.3 (all without artificial spreading), rounded, margins entire; thick, glabrous; adaxially concave near the base, with a small cavity just above the ligament, ending in a knob that distally continues as a median strip of slightly thickened tissue ending about half-way up the lip as a drop-shaped callus, and with 2 short ridges bordering this median strip from 1/5 to 2/5 of the lip, abaxially with a rounded median ridge near the base. *Column* c. 1 mm long, stigma without a tooth at its base, column foot without teeth. *Stelidia* triangular, c. 0.4 mm long, acute, with a small, deltoid, rounded tooth along the lower margin. *Anther* abaxially with a widely rounded crest, surface papillose, front margin not drawn out. *Pollinia*: not seen.

**Figure 4.** *Bulbophyllum tubilabrum* J.J. Verm. & P. O'Byrne — a. Flower; b. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; c. Lip, above: adaxial side, below: abaxial side; e. Column and lip, lateral view; f. Anther, above: adaxial side, below: abaxial side. — All from SBG-O 4935 (spirit sample).





*Colour:* Sepals yellowish. Lip orange red.

*Habitat:* Understorey epiphyte in montane forest, at c. 1800 m alt. Flowering observed in Sept.

*Distribution:* INDONESIA. Sulawesi, central part (1 specimen seen).

*Notes:* *Bulbophyllum hodgsonii* Hend. is most similar but has larger flowers with narrower sepals: median sepal 12–15 x 3 mm, index 4–5, lateral sepals c. 15 mm long.

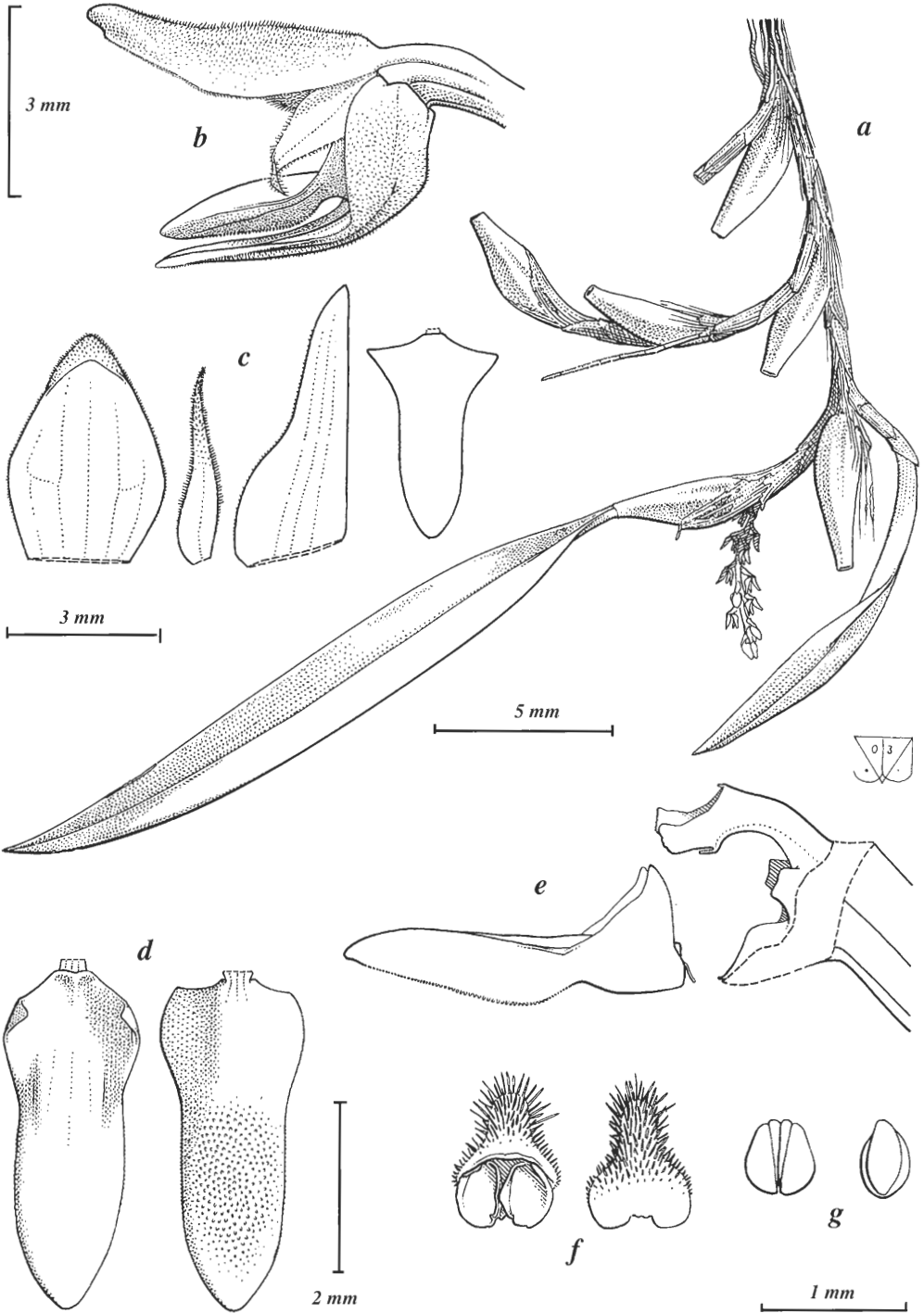
***Bulbophyllum* sect. *Osyricera* (= sect. *Globiceps*)**

***Bulbophyllum stenurum* J.J. Verm. & P. O'Byrne, sp. nov.** — Fig. 5.

*Bulbophyllum stenurum* J.J. Verm. & P. O'Byrne, a *Bulbophyllo hastifero* rhachidi non incrassata differt. — TYPE: Indonesia, Sulawesi, central part, SBG-O 4902 (SING, holo.).

*Roots* creeping along the rhizome towards its point of attachment, then spreading over the substrate. *Rhizome* ± pendulous with ± patent branches, up to 50 cm long, 4.5–5 mm diam., sections between pseudobulbs 3–5.6 cm long, bracts persistent. *Pseudobulbs* distant, ovate, 3.6–4.8 x 1–1.2 cm, distinctly and rather sharply 4–5-angled. *Petiole* c. 1 cm long. *Leaf blade* ovate, c. 19 x 2.2 cm, index (length/width) 8.6–8.7; acute. *Inflorescence* porrect to recurved, a rather dense raceme, c. 6.5 cm long, c. 15-flowered. *Peduncle* c. 1.4 cm, bracts 2, the longest c. 8 mm long. Rhachis not thickened, c. 5 cm long. *Floral bracts* c. 3.5 mm, acute. *Flowers* not resupinate, spirally arranged, not fully opening, many open simultaneously. *Pedicel* and ovary 2.4–2.7 mm long, basal node ± flush with the surface of the rhachis. *Median sepal* ± porrect, ovate, c. 4.5 x 3.1 mm, index 1.4–1.5; top cucullate, rounded, margins entire, papillose-ciliolate, base rather narrowly attached; thin, 5-veined, surface adaxially glabrous, abaxially shortly hirsute. *Lateral sepals* adnate along the lower margins, basal part recurved, top part incurved, oblique, triangular, c. 5.6 x 2.4 mm, index 2.3–2.4, top flat, subacute, base broadly attached; 3-veined, otherwise as the median sepal. *Petals* recurved, ovate-triangular, c. 4 x 0.9 mm, index 4.4–4.5; acute, margins entire, ciliolate, base narrowly attached; very thin, 1-veined, surface adaxially finely papillose towards the tip, abaxially glabrous. *Lip* about straight, general outline ovate, c. 4 x 1.7 mm, index 2.3–2.4 (all without artificial spreading, hastate with a drawn out, elliptic midlobe and deltoid, acute sidelobes when spread); obtuse, margins entire; rather thick, glabrous; adaxially slightly concave near the base, with 2 parallel,

**Figure 5.** *Bulbophyllum stenurum* J.J. Verm. & P. O'Byrne – a. Habit; b. Flower; c. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; d. Lip, left: adaxial side, right: abaxial side; e. Column and lip, lateral view; f. Anther, left: adaxial side, right: abaxial side; g. Pollinia, left: two pairs, right: a single pair. – All from SBG-O 4902 (spirit sample).



short, inconspicuous, rounded ridges at c. 1/3 of the length of the lip, adaxial surface glabrous; abaxially  $\pm$  without a ridge near the base, surface papillose in the distal 1/3 of the lip. *Column* c. 2 mm long, stigma without a tooth at its base, column foot with 2 truncate wings near its base, and a conspicuous swelling just above the ligament. *Stelidia* minute, abruptly bent downwards but with an antrorse,  $\pm$  acute tip, along the upper margin with a very large (far more conspicuous than the stelidia themselves), antrorse, wedge-shaped wing with a broadly rounded, erose top margin. *Anther* abaxially with a crest largely overtopping the front margin, surface coarsely papillose, front margin not drawn out. *Pollinia* 4, the inner  $\pm$  as long as the outer, all ellipsoid-ovoid; no appendages present.

*Colour*: Unknown.

*Habitat*: Epiphyte in montane forest. Alt. c. 1000 m.

*Distribution*: INDONESIA: Sulawesi, central part (1 specimen seen).

*Notes*: *Bulbophyllum hastiferum* Schltr. is most similar but differs in having a thickened, spindle-shaped rhachis, it also has a narrower median sepal, a lip with a narrower midlobe, and an anther with a wider abaxial crest.

### *Bulbophyllum* sect. *Pelma*

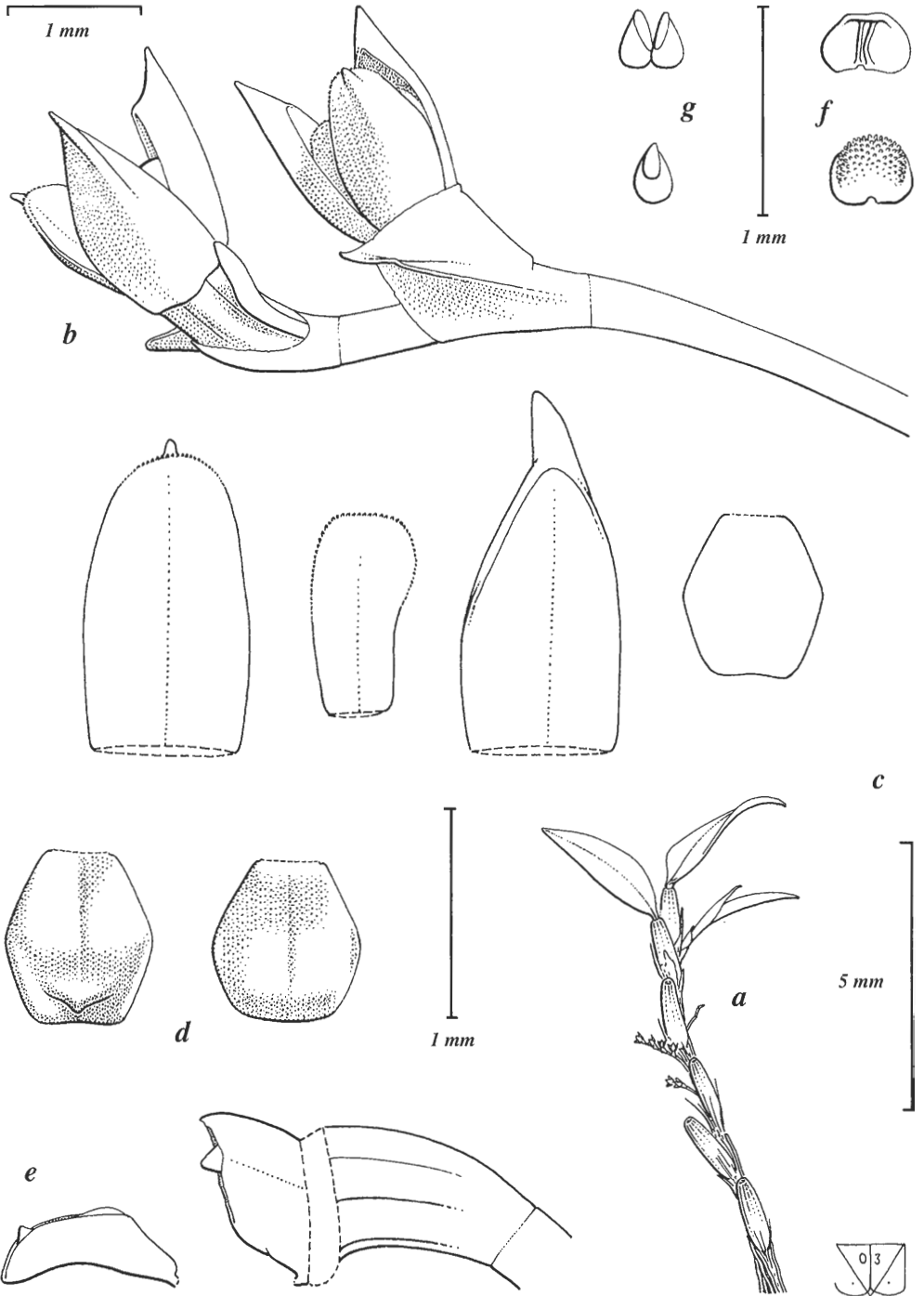
***Bulbophyllum reductum* J.J. Verm. & P. O'Byrne, sp. nov.** – Fig. 6.

*Bulbophyllum reductum* J.J. Verm. & P. O'Byrne, a *Bulbophyllum savaiensi* ssp. *subcubico* columnae pede carenti, ad labelli basin sine cavitate distincta differt.

– TYPE: Indonesia, Sulawesi, central part, SBG-O 3886 (SING, holo).

*Roots* growing along the rhizome towards its point of attachment, then spreading over the substrate. *Rhizome* erect to patent, up to 10 cm long, 1.8–2.4 mm diam., sections between pseudobulbs 0.8–1.2 cm long, bracts persistent. *Pseudobulbs* distant, ovoid, 1.2–1.6 x 0.25–0.4 cm. *Petiole* 0.05–0.1 cm long. *Leaf blade* ovate, 2.3–3.4 x 0.75–0.85 cm, index (length/width) 3–4; acute. *Inflorescences* along the entire rhizome, porrect or recurved, lax racemes, 0.5–1.05 cm long, 1–4-flowered. Peduncle 0.3–0.5 cm, bracts 4–5, the longest 2–3.5 mm long. *Rhachis* up to 0.55 cm. *Floral* bracts tubular proximally, 1.4–1.9 mm long, acuminate. *Flowers* not resupinate, little opening, several open simultaneously. *Pedicel and ovary* 1.3–1.7 mm long, basal node on a c. 0.6 mm-long stump. *Median sepal* porrect, ovate, c. 1.4 x 0.8 mm, index 1.7–1.8; rounded and apiculate, margins papillose towards the tip, base broadly attached; thick,

**Figure 6.** *Bulbophyllum reductum* J.J. Verm. & P. O'Byrne – a. Habit; b. Inflorescence; c. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; d. Lip, left: adaxial side, right: abaxial side; e. Column and lip, lateral view; f. Anther, above: adaxial side, below: abaxial side; g. Pollinia, above: two pairs, below: a single pair. – All from SBG-O 3886 (spirit sample).



1-veined, glabrous. *Lateral sepals* ovate-triangular, c. 1.7 x 0.8 mm, index 2.1–2.2; acuminate, margins entire; otherwise as the median sepal. *Petals* porrect, obovate, c. 0.9 x 0.55 mm, index 1.6–1.7; truncate-rounded, margins papillose towards the tip, base rather narrowly attached; thin, 1-veined, glabrous. *Lip* slightly recurved at c. 3/5 of its length, general outline elliptic, c. 0.8 x 0.7 mm, index 1.1–1.2 (all without artificial spreading); truncate-rounded, margins entire; rather thick, glabrous; adaxially slightly concave near the base, with a slight transverse callus about half way, top half concave with a transverse, triangular, subacute, thick tooth in the centre; abaxially without a ridge. *Column* c. 0.7 mm long, stigma without a tooth at its base, column foot absent. *Stelidia* about absent. *Anther* abaxially without a crest, surface papillose, front margin not drawn out. *Pollinia* 4; ovoid, the inner c. 2/3 as long as the outer; no appendages present.

*Colour*: Flowers cream-coloured.

*Habitat*: Epiphyte in mossy montane forest. Alt. 1100–1200 m.

*Distribution*: INDONESIA: Sulawesi, central part (1 specimen seen).

*Notes*: Deceptively similar in general habit to *Bulbophyllum savaiense* Schltr. ssp. *subcubicum* (J.J. Sm.) J.J. Verm. Only when analyzing the minute flowers can *B. reductum* be distinguished at once by the absence of a column foot, and of a distinct cavity at the base of the lip. The absent column foot makes inclusion of *B. reductum* in sect. *Pelma* problematic, but the marked overall similarity between *B. reductum* and *B. savaiense* leaves no other option.