



The *Bulbophyllum* species attributed to section *Hymenobracteae* (Orchidaceae)

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Key words

Bulbophyllum
New Guinea
Orchidaceae

Abstract A revision is presented of a mainly New Guinean group of species of the genus *Bulbophyllum* (Orchidaceae) that is generally known as section *Hymenobracteae*. Altogether 7 named taxa have been attributed to this section by previous authors; in this revision only two species are distinguished: *Bulbophyllum aemulum* and *Bulbophyllum infundibuliforme*. It appears that *Hymenobracteae* cannot be distinguished from *Bulbophyllum* sect. *Intervallatae* (including sect. *Dialeipanthae* and sect. *Lepidorrhiza*), therefore these two species are included in sect. *Intervallatae*. A key to the sections morphologically similar to *Intervallatae*, viz. *Leopardinae*, *Sestochilos* and *Stenochilus*, is included and full information on the two species provided.

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INTRODUCTION

So far, about 3 000 species have been proposed in *Bulbophyllum* Thouars, about 1 900 can provisionally be accepted as valid taxa. Revision is necessary, but efforts have been sporadic to this point, for instance Vermeulen (1987, 1993). The present revision is a small contribution to the species catalogue of *Bulbophyllum*.

Bulbophyllum sect. *Hymenobracteae* Schltr. is restricted to New Guinea and Maluku. Initially, the section was distinguished by Schlechter (1913: 699, 752), who was the first to extensively study the orchids of eastern New Guinea. Subsequently, it was accepted by Smith (1916: 414), who concentrated his efforts on the western part of the island. Usually, Schlechter loosely based his sections on overall similarity among the species and per section only listed a number of predominant characters. This complicates a proper understanding of his subgeneric divisions. Section *Hymenobracteae* was given the following set of characters: reduced ('barely visible') pseudobulbs, thin bracts, flowers with a mentum, non-resupinate ('inverted'), lip linguiform, flat, smooth, with a thickened midrib, column short, stelia short. This may appear impressive, but lacks solidity when compared to other, similar looking sections of *Bulbophyllum*.

We found the following sections to be most similar to sect. *Hymenobracteae*: *Intervallatae* Ridl., *Leopardinae* Benth. & Hook.f. (see the re-instatement of this section by Vermeulen & O'Byrne 2008), *Sestochilos* (Breda) Benth. & Hook.f., and *Stenochilus* J.J.Sm. Section *Intervallatae* is referred to in a broad sense here to include *Dialeipanthae* Schltr., *Lepidorrhiza* Schltr., and *Pachyanthe* Schltr. All sections listed share the following polythetic set of characters: 3 keels in the stigmatic aperture, petals and sepals more or less glabrous (but not necessarily entire), four pollinia of about equal size. Section *Hymenobracteae* most closely resembles *Intervallatae*. The two share a distichous inflorescence, a character rare among Southeast Asian *Bulbophyllum* (otherwise occurring only in

sect. *Pelma* (Finet) Schltr.). Only a few species, among them those of *Hymenobracteae*, may occasionally develop inflorescences with so few flowers that this character is not obvious, but even then the presence of an aborted flower terminating the inflorescence betrays its structure.

Within *Intervallatae* a wide morphological spectrum is present: flowers resupinate or not; petals entire to deeply incised at the top; lip glabrous to partly or entirely pustular, and often with nectaries present either as a median slit over the adaxial surface of the lip or as a thickened patch; ligament between the lip base and the column-foot shaped such that it functions as a true hinge that leaves the lip mobile in some species, whereas it almost unites the lip to the column-foot in others.

Summarizing, *Hymenobracteae* shares a distichous inflorescence with *Intervallatae*. It also fits within the wide range of morphological variation displayed by *Intervallatae* to the extent that we could find no solid character distinguishing it as a separate group. We therefore include *Hymenobracteae* within *Intervallatae* and, on account of the shared distichous inflorescences, we provisionally assume their monophyly.

We distinguish between the sections mentioned by the following diagnostic sets. A key to the sections is given in the next chapter.

Section *Intervallatae* — Inflorescence racemose, distichous, but sometimes 1-flowered with a second flower developing. Floral bracts proximally tubular. Basal node of pedicel 0.5 times the diameter of the pedicel distant from the floral bract attachment or more (sometimes level with the floral bract attachment in the lowermost flower).

Section *Leopardinae* — Inflorescence racemose, with flowers spirally arranged, or 1-flowered without abortive second flower. Floral bracts not tubular, or tubular (in species similar to *B. leopardinum* only). Basal node of pedicel 1.5 times the diameter of the pedicel distant from the floral bract attachment or less.

Section *Sestochilos* — Inflorescence 1-flowered without abortive second flower (racemose with flowers spirally arranged in *B. anceps*). Floral bracts proximally tubular (not so in *B. anceps*). Basal node of pedicel 2 times the diameter of the

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pedicel distant from the floral bract attachment or more. Flowers resupinate (dorsal sepal pointing upwards).

Section *Stenochilus* — Inflorescence 1-flowered without abortive second flower. Floral bracts proximally tubular. Basal node of pedicel 2 times the diameter of the pedicel distant from the floral bract attachment or more. Flowers not resupinate (dorsal sepal pointing downwards).

KEYS AND DESCRIPTIONS

Key to the sections

1. Inflorescence racemose, or inflorescence 1-flowered with a second flower developing, or a second abortive flower present 2
1. Inflorescence 1-flowered, without a trace of a second flower 5
2. Floral bracts not tubular 3
2. Floral bracts tubular (except sometimes the lowermost in a raceme) 4
3. Basal node of pedicel 2 times the diameter of the pedicel distant from the floral bract attachment or more
..... sect. *Sestochilos* (*B. anceps*)
3. Basal node of pedicel 1.5 times the diameter of the pedicel distant from the floral bract attachment or less
..... sect. *Leopardinae*
4. Either inflorescence racemose with flowers spirally arranged, or inflorescence 1-flowered without a second abortive or developing flower
..... sect. *Leopardinae* (species similar to *B. leopardinum*)
4. Either inflorescence racemose with flowers distichous, or inflorescence 1-flowered with a second abortive or developing flower sect. *Intervallatae*
5. Flowers resupinate (with dorsal sepal pointing upwards)
..... sect. *Sestochilos*
5. Flowers not resupinate (with dorsal sepal pointing downwards) sect. *Stenochilus*

Key to the species formerly included in sect. *Hymenobractea*

1. Leaf tip acute to acuminate; rhizome ascending in mature plants *B. aemulum*
1. Leaf tip obtuse to rarely subacute; rhizome creeping
..... *B. infundibuliforme*

Bulbophyllum aemulum Schltr. — Fig. 1

Bulbophyllum aemulum Schltr. (1905) 195; (1928) 948. — Type: *Schlechter 14056* (n.v.).

Bulbophyllum dubium J.J.Sm. (1909) 36. — Type: *Djibdja 585* (n.v.).

Rhizome short, ascending in mature plants, 1–6 mm diam, sections between pseudobulbs 4–12 mm long. **Pseudobulbs** close together, ovoid to cylindrical, 8–24 by 2–4 mm. **Petiole** 18–23 mm long. **Leaf-blade** elliptic, 51–145 by 9–27 mm, index 2.4–6.5, tip acuminate, leaf surface glabrous. **Inflorescence** an erect raceme, generally shorter than the leaves, 2–5-flowered; peduncle 39–93 mm long, bracts 5–9, the longest 5–9 mm long; rachis flexuose, 5–22 mm long, internode between the lowermost flowers 5 mm long, 1.5 times as long as the tubular part of the first floral bract; floral bracts funnel-shaped, oblique, laterally flattened, 6–10 mm long, tip acuminate, abaxial keel distinct. **Pedicel-and-ovary** 4–10 mm long, articulation 1–2 mm distant from the floral bract. **Flowers** 2–4 open at the time, widely opening. **Dorsal sepal** recurved, ovate, 8.7–11.5 by 4.5–5.8 mm, index 1.7–2.2, tip acuminate, base rather broadly attached; thin, glabrous, 7-veined. **Lateral sepals** spreading, oblique, almost triangular, 11.5–14 by 6.5–8.3 mm, index

1.5–1.9, with a rounded to acute tooth proximally along the upper margin, base broadly attached; 5–9-veined; otherwise as the dorsal sepal. **Petals** recurved, oblique, ovate, 5–7.5 by 2.5–3 mm, index 1.6–2.8, tip acute to acuminate, base broadly attached; thin, glabrous, 3–5-veined. **Lip** distinctly recurved at 1/3–1/2 of its length, general outline ovate to elliptic, 9.7–10.8 by 3.2–3.6 mm, index c. 3 (not spread), tip acute; rather thick, glabrous; adaxially slightly concave towards the base, at the base with two slight, partly fused calli which continue as a single gradually narrowing median ridge up to 1/3–1/2 of the length of the lip, with two more obtuse ridges starting close to the margin of about 1/3 of the length of the lip, converging towards its tip and continuing over 1/3–1/2 of its length, top part of the lip convex; abaxially more or less without a median ridge. **Column** from ovary to the tip of the stamens 3–3.3 mm long; stigma more or less orbicular; column-foot without accessories; stamens prominent, about ovate, tip acute to acuminate or minutely 2- or 3-denticulate.

Colours — Leaves green without darker green margins, adaxial surface dull, abaxially without minute white dots. Floral bracts pale green with dark dots and lines. Sepals and petals white, lip creamy, with red purple lines, sometimes with a yellowish midrib, stigma pale green, anther creamy white.

Ecology — Epiphyte in forest. Altitude 100–1500 m. Flowering observed in January, March, April, September (October to December in culture).

Distribution — Indonesia: Papua (Lorentz National Park, fide Smith). Papua New Guinea: Gulf, Central Highlands, Simbu, Southern Highlands Prov.

Note — Distinct from *B. infundibuliforme* mainly in the vegetative parts: rhizome ascending in mature plants, leaves with an acute to acuminate tip. The pseudobulbs are usually more slender, almost cylindrical.

Bulbophyllum infundibuliforme J.J.Sm.

References: see below the subspecies

Rhizome short, creeping, 1–4 mm diam, sections between pseudobulbs 2–8 mm long. **Pseudobulbs** close together, ovoid to conical, sometimes globose, 2–8.5 by 2–5 mm. **Petiole** 10–76 mm long. **Leaf-blade** elliptic to obovate, 33–190 by 7–30 mm, index 2.4–10.8, tip obtuse to acute, leaf surface glabrous to rugulose. **Inflorescence** a patent to erect raceme, 1–10-flowered; peduncle 12–178 mm long, bracts 2–8, the longest 2–9 mm long; rachis patent to erect, sometimes slightly thickened, more or less flexuose, 2–45 mm long, internode between the lowermost flowers 2–23 mm long, 1–6 times as long as the tubular part of the first floral bract; floral bracts funnel-shaped, more or less oblique, 4–10 mm long, tip obtuse to acute to acuminate, abaxial keel more or less distinct. **Pedicel-and-ovary** 4–19 mm long, articulation 0.1–2 mm distant from the floral bract. **Flowers** 1–3 open at the time, widely opening. **Dorsal sepal** recurved, ovate, 5–12.5 by 4–6.8 mm, index 1.5–2.1, tip acute to acuminate, base rather broadly attached; thin, glabrous, 5–7-veined. **Lateral sepals** spreading, oblique, about triangular, 9–17 by 7–9.8 mm, index 1.2–1.8, upper margin proximally with a rounded to acute tooth, base broadly attached; 5–9-veined, otherwise as the dorsal sepal. **Petals** recurved, oblique, (ob)ovate, 4–8.8 by 2.5–3.5 mm, index 1.5–3.0, tip acute to acuminate, base broadly attached; thin, glabrous, 3–5-veined. **Lip** distinctly recurved at 1/3–1/2 of its length, general outline ovate to elliptic, 8–15 by 3–4.8 mm, index 2.4–4.4 (not spread), tip acute; rather thick, glabrous; adaxially concave towards the base, at the base with two slight, partly fused calli which continue as a single gradually narrowing median ridge up to 1/3–1/2 of the length of the lip, with two obtuse ridges starting close to the margin at about 1/3 of the length of the lip,

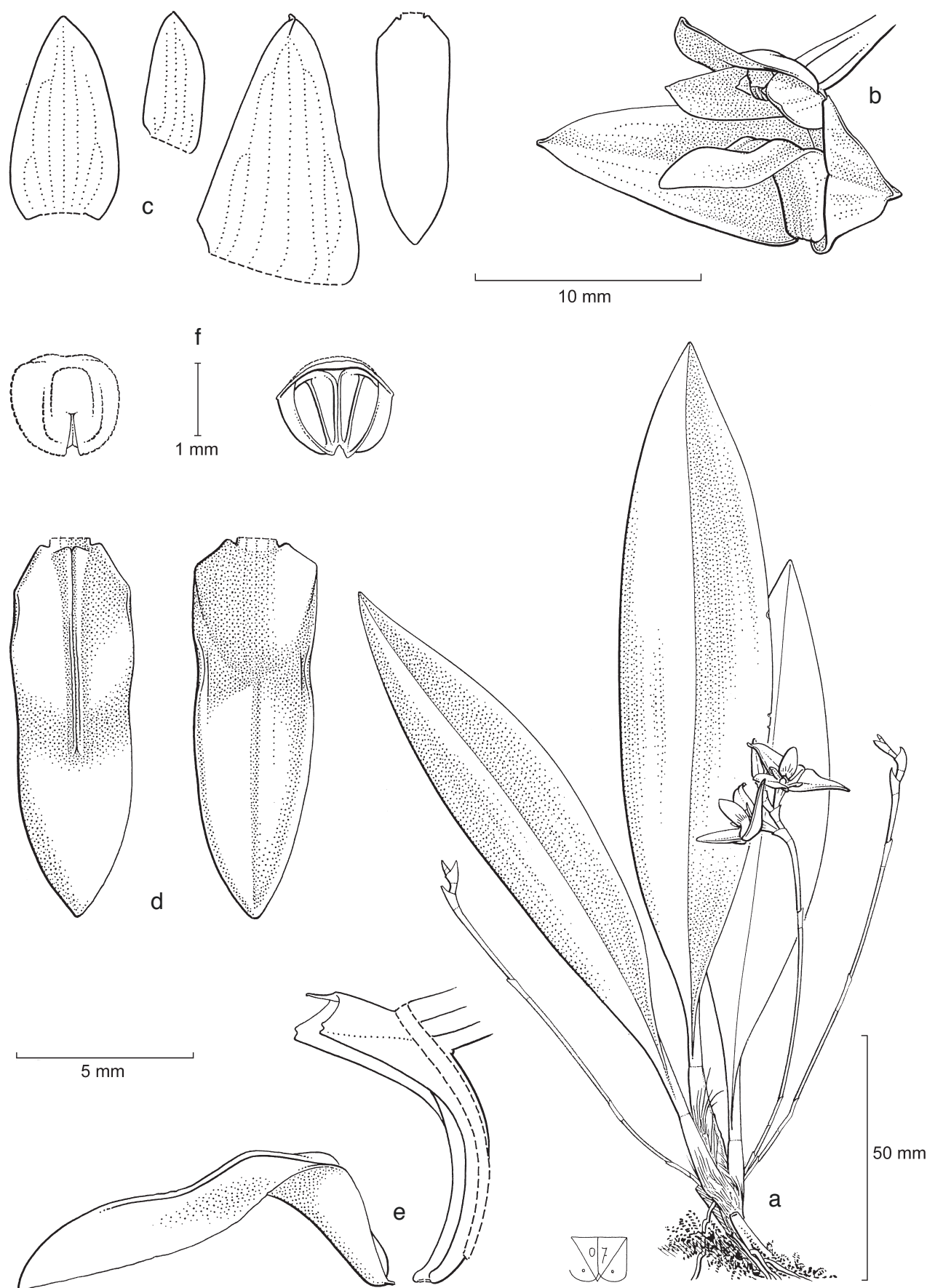


Fig. 1 *Bulbophyllum aemulum* Schltr. a. Habit; b. flower; c. flower analysis, from left to right: dorsal sepal, petal, two lateral sepals, lip; d. lip, left: adaxial side, right: abaxial side; e. column and lip, lateral view; f. anther, left: abaxial side, right: adaxial side (all *Hort. LEI 20031770*, spirit sample). – Drawing by J.J. Vermeulen.

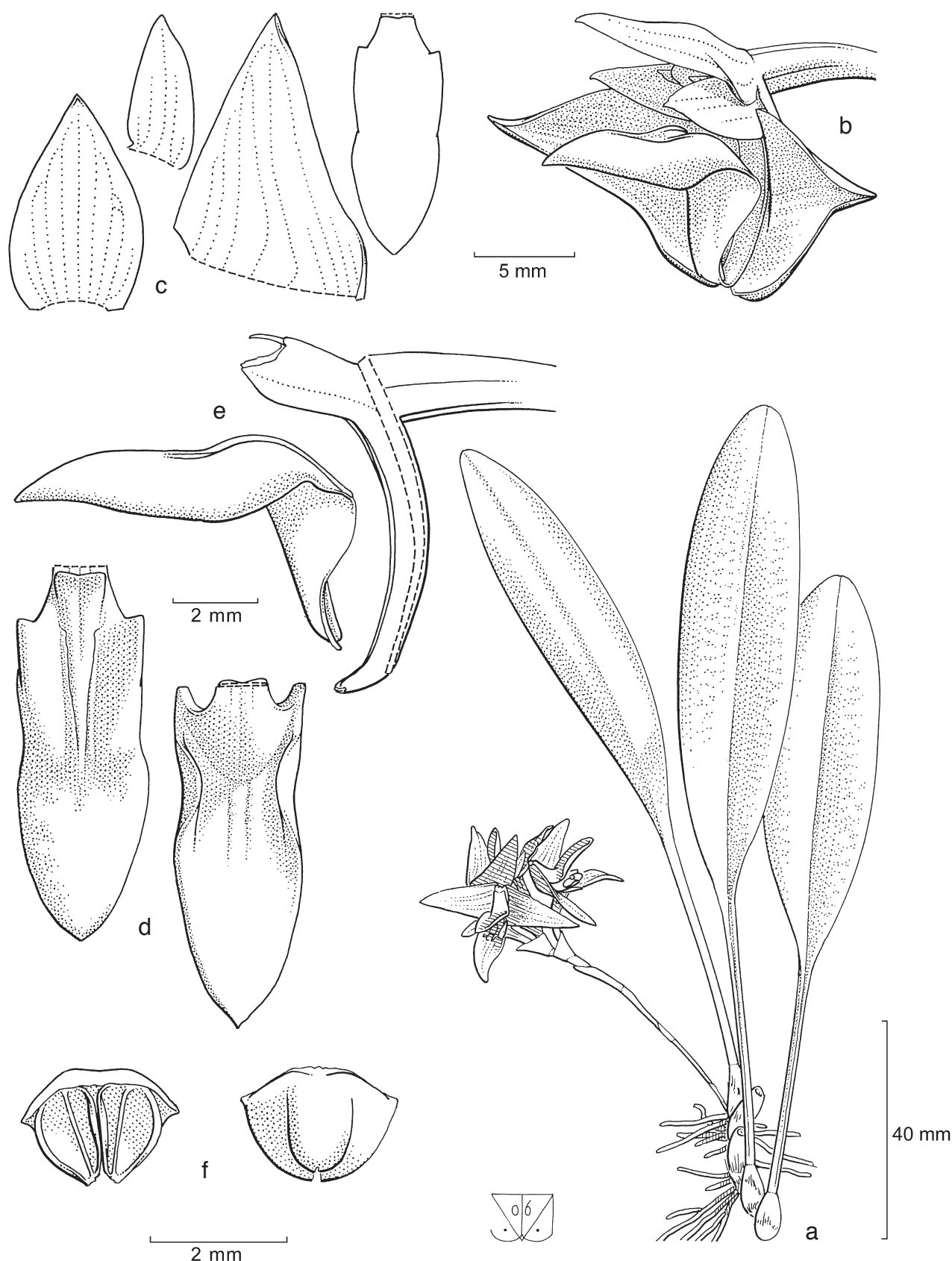


Fig. 2 *Bulbophyllum infundibuliforme* J.J.Sm. subsp. *infundibuliforme* a. Habit; b. flower; c. flower analysis, from left to right: dorsal sepal, petal, two lateral sepals, lip; d. lip, left: adaxial side, right: abaxial side; e. column and lip, lateral view; f. anther, left: adaxial side, right: abaxial side (all *Hort. LEI* 31617, spirit sample). – Drawing by J.J. Vermeulen.

converging towards its tip and continuing over 1/3–1/2 of its length, top part of the lip convex; abaxially more or less without a median ridge. *Column* from ovary to the tip of the steldia 2.5–5.5 mm long; stigma more or less orbicular; column-foot without accessories; steldia prominent, about ovate, acute to acuminate or minutely 2- or 3-denticulate.

Colours — Leaves adaxially slightly shiny, abaxial surface with minute white dots (stomata). Flowers white, with or without red markings.

Notes — *Bulbophyllum infundibuliforme* is extremely variable. Two groups can be distinguished. However, about 12 % of the specimens seen are intermediate and difficult to assign

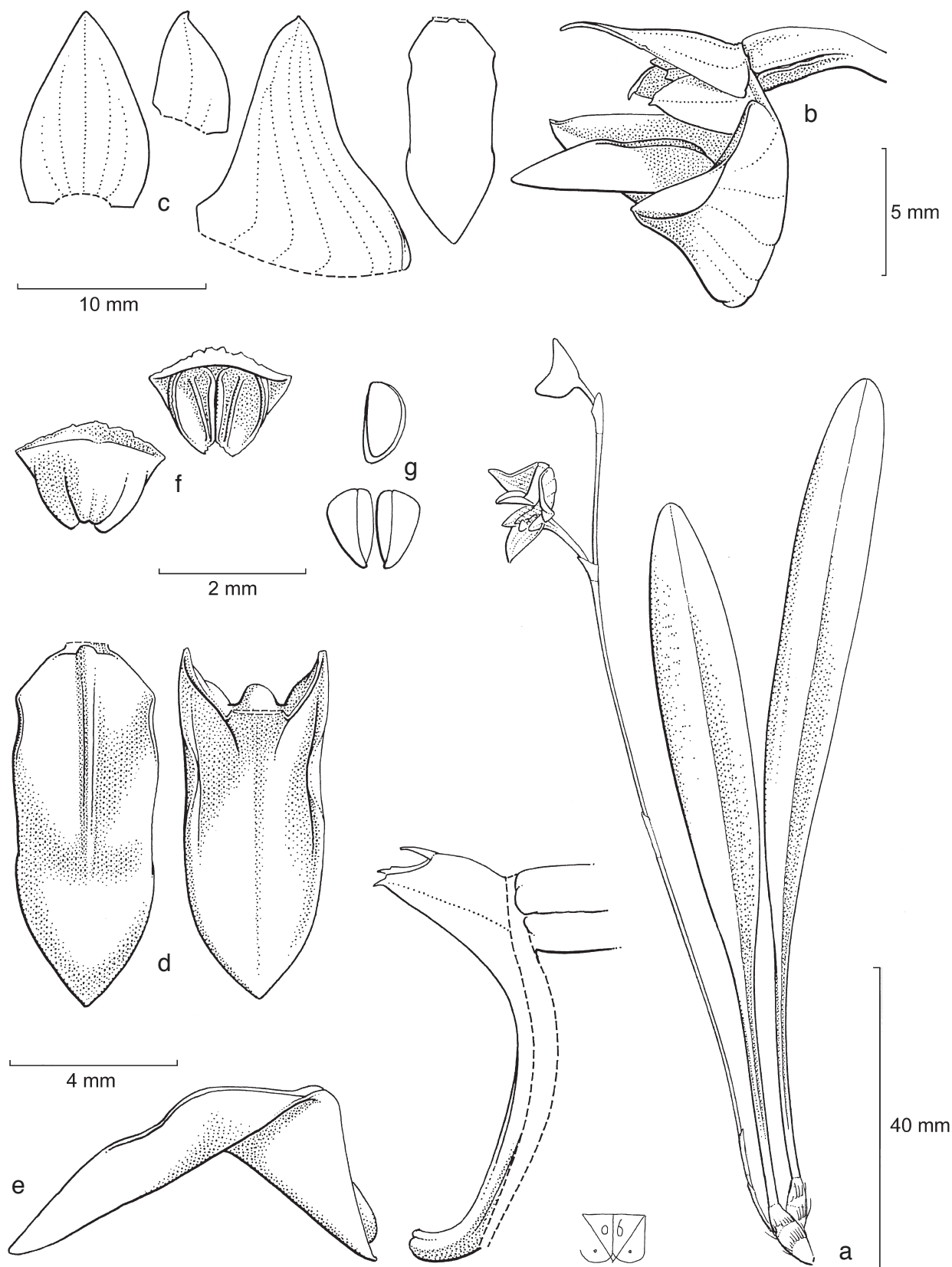


Fig. 3 *Bulbophyllum infundibuliforme* J.J.Sm. subsp. *hymenobracteum* (Schltr.) De Witte & J.J.Verm. a. Habit; b. flower; c. flower analysis, from left to right: dorsal sepal, petal, two lateral sepals, lip; d. lip, left: adaxial side, right: abaxial side; e. column and lip, lateral view; f. anther, left: abaxial side, right: adaxial side; g. pollinia, above: a single pair, below: two pairs (all *Hort. LEI* 20031662, spirit sample). – Drawing by J.J. Vermeulen.

to one group, more or less filling up the morphological gap between the two. We therefore distinguish two subspecies. Future molecular research may determine whether the imperfect separation is caused by speciation or by hybridization.

Key to the subspecies

1. Inflorescence with one flower, peduncle length 30 mm or less, or inflorescence with 2–5 flowers and lowermost internode of rachis 6 mm or shorter; leaves with a darker green margin; flowers white with red purple dots and lines; rachis 2–17 mm long; peduncle 12–65 mm long a. subsp. *infundibuliforme*

1. Inflorescence with one flower, peduncle length 40 mm or more, or inflorescence with 2–10 flowers and lowermost internode of rachis longer than 6 mm; leaves without a darker green margin; flowers white; rachis 5–60 mm long; peduncle 50–180 mm long b. subsp. *hymenobracteum*

a. subsp. *infundibuliforme* — Fig. 2

Bulbophyllum infundibuliforme J.J.Sm. (1903) 103. — Lectotype (here designated): *Smith s.n.* (BO n.v.).

Bulbophyllum garupinum Schltr. (1913) 752; (1928) 946. — Type: *Schlechter 20350* (n.v.).

Bulbophyllum ternatense J.J.Sm. (1932) 142. — Type: *Lam 5* (n.v.).

Leaf-blade 40–190 by 10–30 mm, index 2.4–8, adaxially rugulose or not. **Inflorescence** a more or less patent raceme, 1–5-flowered; peduncle 12–65 mm long; rachis 2–17 mm long, if flowers 2 or more internode between the lowermost flowers 2–6 mm long, 1–2.5 times as long as the tubular part of the first floral bract. **Lip** 8.5–15.0 by 3.0–4.8 mm, index 2.0–4.5 (not spread).

Colours — Leaves green with darker green margins. Floral bracts greenish with red dots and lines. Sepals and petals translucent white with red-purple spots, lip white or cream, sometimes with a longitudinal yellow band at base, sometimes with purple veins, stigma bright green, anther creamy-white.

Ecology — Epiphyte in forest. Altitude 60–1200 m. Flowering observed in January, September, December (May, June, July in culture).

Distribution — Indonesia: Maluku Islands, Papua (Jayapura; Puncak Jaya). Papua New Guinea: West Sepik, East Sepik, Western Highlands Prov.

Notes — 1. Vegetatively distinct from the other subspecies in the length of the peduncle, the rachis and the length of the internode between the lowermost flowers. The margin of the leaf in this subspecies is generally a darker green. The flowers have red dots and lines.

2. Some specimens are intermediate between the two subspecies in one or more characters listed above.

3. The type material of *B. infundibuliforme* consists of two syntypes: *Teijsmann s.n.* (L, SING) and *J.J. Smith s.n.* (BO n.v.). Both sets of *Teijsmann s.n.* are intermediate between the subspecies in the 6–7 mm long lowermost internode of the rachis; therefore *J.J. Smith s.n.* has been selected as lectotype. We have not seen the material at BO, but the description shows that it has the congested inflorescence typical of subsp. *infundibuliforme*.

4. The original descriptions of *B. ternatense* J.J.Sm. and *B. garupinum* Schltr. (types not seen) indicate that these also belong to subsp. *infundibuliforme*. The type of *B. ternatense* is remarkable for its obtuse petals; this is, however, incidental variability and not characteristic of material from the Moluccas.

b. subsp. *hymenobracteum* (Schltr) De Witte & J.J.Verm., stat. nov. — Fig. 3

Bulbophyllum hymenobracteum Schltr., Nachtr. Fl. Schutzgeb. Südsee (1905) 204; Repert. Spec. Nov. Regni Veg., Beih. 1 (1913) 753; Repert. Spec. Nov. Regni Veg., Beih. 21 (1928) 749. — Type: *Schlechter 14584* (iso K).

Bulbophyllum hymenobracteum var. *giriwoense* J.J.Sm. (1916) 414. — Type: *Janowsky 180* (holo L).

Leaf-blade 30–130 by 5–25 mm, index 3–11, adaxially rugulose. **Inflorescence** a more or less erect raceme, 1–10-flowered; peduncle 50–180 mm long; rachis 5–60 mm long, if flowers 2 or more internode between the lowermost flowers 6.2–20 mm long, 1.5–6 times as long as the tubular part of the first floral bract. **Lip** 7.0–10.5 by 2.5–3.8 mm, index 2.2–3.0 (not spread).

Colours — Leaves green without darker green margins. Floral bracts greenish with dark dots and lines. Sepals and petals translucent white, sepal midrib pale green, lip white, stigma yellowish green, anther yellowish green.

Ecology — Epiphyte in forest. Altitude 100–1000 m. Flowering observed in April, May (March in culture).

Distribution — Indonesia: Papua (Jayapura, Yapen-Waropen, Raja Ampat). Papua New Guinea: Central, Northern, Simbu, Madang, Gulf, East Sepik, West Sepik, Morobe Province.

Notes — 1. As far as we can ascertain from the material at hand, the leaf margin of this subspecies is generally not darkened and the flowers have no red dots and lines.

2. According to the description, *B. hymenobracteum* var. *giriwoense* J.J.Sm. differs from *B. hymenobracteum* only by the smaller lip. We find that the description of the variety falls well within the morphological variability of subsp. *hymenobracteum*.

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