

Six New Species of *Bulbophyllum* Sect. *Monilibulbus* (Orchidaceae)

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Abstract

Six new species of *Bulbophyllum* sect. *Monilibulbus* (Orchidaceae) from Borneo are described: *B. kestron*, *B. leproglossum*, *B. nubinatum*, *B. pelicanopsis*, *B. scabrum* and *B. thymophorum*. Full descriptions and detailed line drawings are presented of each species. Possible relationships of sect. *Monilibulbus* within the genus *Bulbophyllum* are pointed out.

Introduction

The approximately 50 species of *Bulbophyllum* sect. *Monilibulbus* J.J. Smith range from China (Yunnan), Indochina, Malaysia, Philippines to W. Indonesia (eastwards up to Celebes and the Lesser Sunda Islands). As with most other sections within *Bulbophyllum*, sect. *Monilibulbus* has never been subject to revision. Only enumerations for comparatively small areas within its range have been published: Thailand (Seidenfaden, 1979), West Malaysia (Holtum, 1957) and Java (Smith, 1905). Many more species (often not even recognized as pertaining to sect. *Monilibulbus*) have been described in numerous papers by Smith, Schlechter and Ames, as parts of endless enumerations of new orchid species.

Within the large genus *Bulbophyllum* the species of sect. *Monilibulbus* can be recognized by the following set of characters:

Rhizome creeping. Pseudobulbs distinct, approx. close together, (occasionally widely spaced in *B. inaequale* (Bl.) Lindl.), obliquely reclining and covering or even partly enveloping the subsequent section of rhizome for most of their length, only the very top more or less erect (pseudobulbs distinctly dorsoventrally flattened but not particularly oblique in *B. moniliforme* Par. & Rchb. f.), with one leaf. Inflorescence with one flower. Pedicel with an extra node close to its base.

Sect. *Monilibulbus* is a West Malesian (Van Steenis, 1948: p. XI) element. The combination of characters mentioned distinguishes the section. Elsewhere within *Bulbophyllum* all these characters occur as well, but always in different combinations. They can be found in particular in species belonging to sections which have a mainly East Malesian (New Guinea and surrounding archipelagos) distribution and which have one-flowered inflorescences. The sections *Fruticicola* Schltr, *Epibulbon* Schltr and *Leptopus* Schltr (see Schlechter, 1911–1914) can be mentioned as examples.

The flowers of sect. *Monilibulbus*, although often of a peculiar structure, do not have a single character in common. Here, too, morphological similarities with E. Malesian sections exist, in particular with the sections *Leptopus* Schltr and *Brachypus* Schltr (see Schlechter, 1911–1914).

Among the sections with a one-flowered inflorescence, sect. *Monilibulbus* has a distinctly aberrant range. Most sections with a one-flowered inflorescence are mainly East Malesian, with only few representatives in West Malesia. Examples are sect. *Fruticicola* Schltr, with many species in New Guinea and very few in West Malesia (e.g. *B. perductum* J.J. Smith on Java and an undescribed species on Borneo), and sect. *Polyblepharon* Schltr with numerous species in New Guinea and only few species in W. Malesia (e.g. the widespread *B. tortuosum* (Bl.) (Lindl.).

Few sections with one-flowered inflorescences have an approximately equal number of species occurring in West and East Malesia, e.g. sect. *Sestochilus* (Breda) Benth. & Hook. f. The numbers of species belonging to this section described for Thailand (Seidenfaden, 1979) or West Malaysia (Holtum, 1957) or New Guinea (Schlechter, 1911–1914) are of comparable magnitude.

Sect. *Monilibulbus* is the only section in which a one-flowered inflorescence is combined with an exclusively West Malesian distribution.

Perhaps not supported by distribution patterns, but consistent with shared vegetative and floral characters, a close relationship of sect. *Monilibulbus* to East Malesian sections is suggested, particularly to sect. *Brachypus* Schltr, *Epibulbon* Schltr, *Fruticicola* Schltr and *Leptopus* Schltr.

Basic to this statement are two assumptions.

Firstly, sect. *Monilibulbus* should be a natural (monophyletic) group, i.e. a group of species derived from a single ancestor species. Crucial for recognizing a monophyletic group is that the species of the group share a number of characters which can be considered derived within the group. *Monilibulbus* has a set of characters shared by (almost) all its species. Unfortunately, without further phylogenetic analysis one can only guess whether or not these are derived.

Secondly, within *Bulbophyllum* the character state 'many-flowered inflorescence' should be primitive, and the state 'one-flowered inflorescence' derived. This is very likely, considering the fact that in most genera which may serve as the hypothetical immediate ancestor of *Bulbophyllum* (other genera of Denbrobieae sensu Burns-Balogh & Funk, 1986) most species have many-flowered inflorescences.

Some species of sect. *Monilibulbus* are very variable, particularly *B. ovalifolium* (Bl.) Lindl. The new species *B. kestron*, *B. leproglossum* and *B. scabrum* all occur within the geographical range of *B. ovalifolium* and show a distinct similarity to races of that species. Before describing them as new species the variability of *B. ovalifolium* has been surveyed extensively. The characters of the new species distinguishing them from *B. ovalifolium* are mentioned under the description of each of them.

The other three species *B. nubinatum*, *B. pelicanopsis* and *B. thymophorum* each have one or more outstanding features, which immediately distinguish them from other species of sect. *Monilibulbus*.

Colour slides of all six new species have been published in Vermeulen & Lamb (1988).

Description of the New Species

***Bulbophyllum kestron* J.J. Vermeulen & A. Lamb, sp. nov.**

Fig. 1.

Bulbophyllo ovalifolio affinis, labelli margine denticulato-lacerato differt. Type: Borneo; Lamb 566/86 (K!).

Rhizome creeping, 0.6 mm diam. Pseudobulbs 0.2–0.5 cm apart, ovoid, somewhat flattened, 0.2–0.5 × 0.2–0.4 cm. Petiole 0.8–2 mm long. Leaves rather thin, elliptic to (ob-)ovate, 0.5–1.7 × 0.2–0.5 cm, index 2.5–4. Inflorescence 2.5–4 cm long, 1-flowered. Peduncle 1.8–2.5 cm. Floral bracts tubular, c. 1.5 mm long. Pedicel and

ovary 5–14 mm long. Median sepal thin, elliptic to obovate, $2.5\text{--}6 \times 1.5\text{--}2.5$ mm, index 1.6–2.5, tip rounded, margins finely papillose, surface glabrous. Lateral sepals free, ovate to elliptic, $3.8\text{--}6 \times 2\text{--}3.5$ mm, index 1.5–2.5, otherwise as the median. Petals thin, obovate, $1.2\text{--}1.9 \times 0.7\text{--}1.2$ mm, index 1.5–2, tip rounded, margins erose towards the tip, surface glabrous. Lip recurved, rather thick, c. elliptic, $1\text{--}2.8 \times 0.8\text{--}1.5$ mm, adaxially with 2 keels in the basal part, tip rounded, margins denticulate-lacerate c. half way, surface with large, often flattened, rounded to truncate appendages. Column 0.4–1.2 mm long. Stelidia triangular, 0.15–0.7 mm long, with a distinct, obtuse tooth along the lower margin. Stigma with a rather inconspicuous basal callus. Pollinia 4, of unequal size. Stipes absent.

Colours: Sepals bright orange to salmon red, or green, suffused with dark red. Petals pale yellowish to pale orange red, occasionally with somewhat reddish purple top part and midvein. Lip (dull) dark red or red purple, occasionally yellow near base. Column pale yellow with some purple.

Habitat and Ecology: One observation: high and wet montane forest, on the bole of a large tree. Growing on bark covered with algae or fine moss. Alt. 1500–2000 m. Flowers not scented. Flowering May–July and October.

Distribution: Sabah. West Coast Z./Interior Z.: G. Kinabalu; Crocker Range.

General Distribution: Borneo.

Notes: *B. kestron* is morphologically close to *B. ovalifolium* (Bl.) Lindl. but can be distinguished when looking at the margins of the lip: in *B. kestron* it is denticulate-lacerate about half way the lip where the margins curve downwards, whereas in *B. ovalifolium* it is always entire or at most somewhat irregular.

Some specimens of *B. kestron* have a relatively larger lip (compared to the lateral sepals) than the Bornean specimens of *B. ovalifolium*.

The various ornamentations on the lip (ridges and verrucae) may vary conspicuously in *B. kestron*. When more material becomes available probably it will show a wide range of variation on this point, similar to that in *B. ovalifolium*.

The name is derived from the word 'kestros' which means: rough of tongue.

***Bulbophyllum leproglossum* J.J. Vermeulen & A. Lamb, sp. nov.**

Fig. 2.

Bulbophyllo ovalifolio affinis, labelli latere adaxiali duobus locis rugosis differt. *Type:* Borneo; Vermeulen 584 (L!).

Rhizome creeping, 0.8 mm diam. Pseudobulbs 0.3–0.7 cm apart, ovoid, flattened, $0.3\text{--}0.7 \times 0.2\text{--}0.4$ cm. Petiole 0.5–1 mm long. Leaves rather thick, elliptic to obovate, $0.7\text{--}2.4 \times 0.4\text{--}0.7$ cm, index 1.6–3.5. Inflorescence c. 6.5 cm long, 1-flowered. Peduncle 4.5 cm. Floral bracts tubular, c. 2 mm long. Pedicel and ovary 22 mm long. Median sepal thin, ovate, c. 6.5×1.8 mm, index c. 3.5, tip acute, c. glabrous. Lateral sepals free, c. 11×4 mm, index 3.7, margins somewhat erose, otherwise as the median. Petals thin, elliptic, c. 2.4×1 mm, index c. 2.4, tip acute, glabrous. Lip recurved, rather thin, ovate, c. 3.6×1.6 mm, tip rounded, margins somewhat erose, surface glabrous except for two rugose patches adaxially towards the margins in the lower half. Column c. 2 mm long. Stelidia subulate, c. 1 mm long, with rather inconspicuous, obtuse teeth along the upper as well as the lower margin. Stigma with a distinct, obtuse basal callus. Pollinia 2. Stipes absent.

Colours: Median sepal translucent white with red veins. Lateral sepals white with red veins. Lip dark red purple.

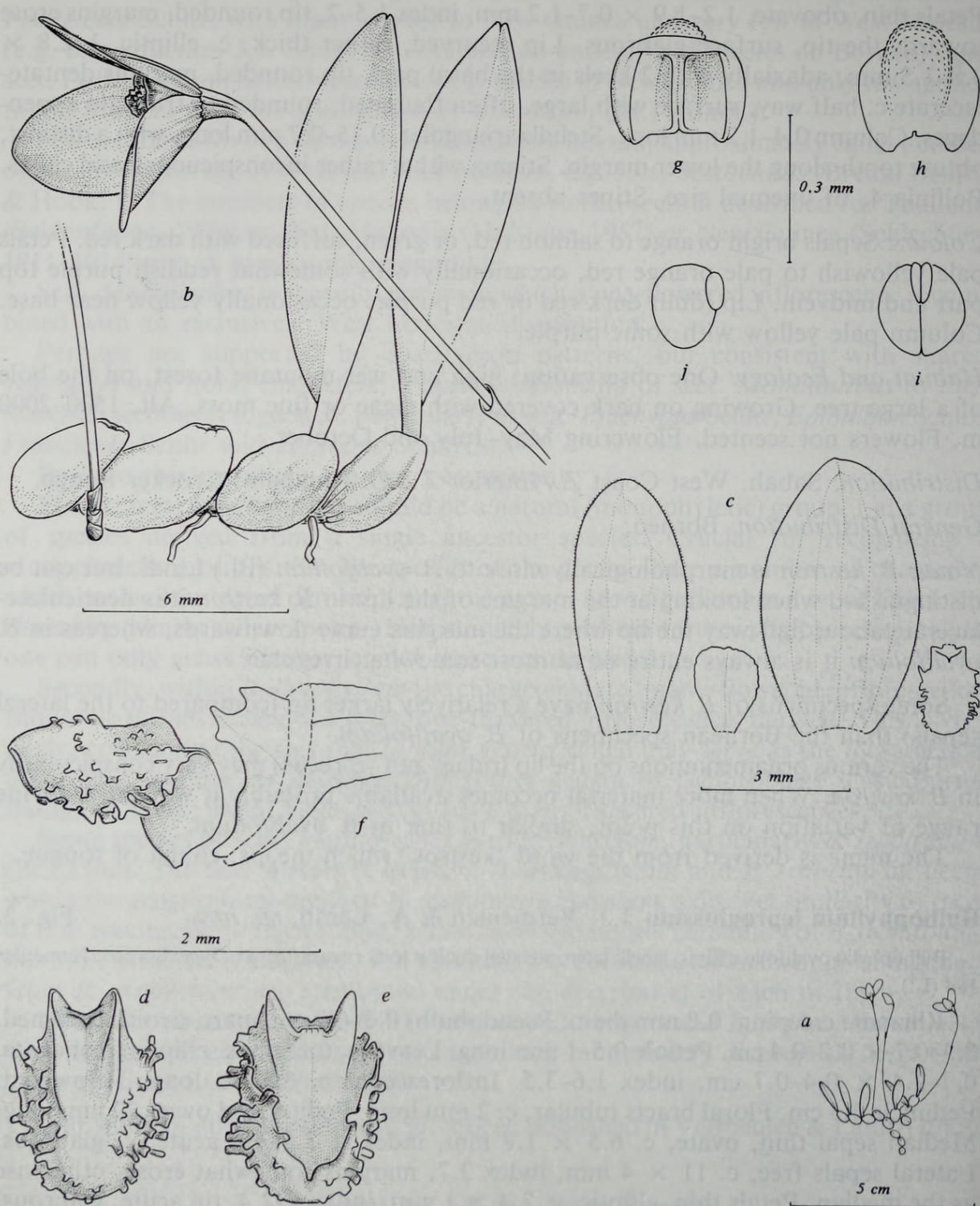


Fig. 1. *B. kestron*. a — habit; b — part of plant; c — flower analysis. From left to right: median sepal, petal, lateral sepal, lip; d — lip, adaxial side; e — lip, abaxial side; f — column and lip, lateral view; g — anther, adaxial side; h — anther, abaxial side; i — pollinia. Drawn from type specimen.

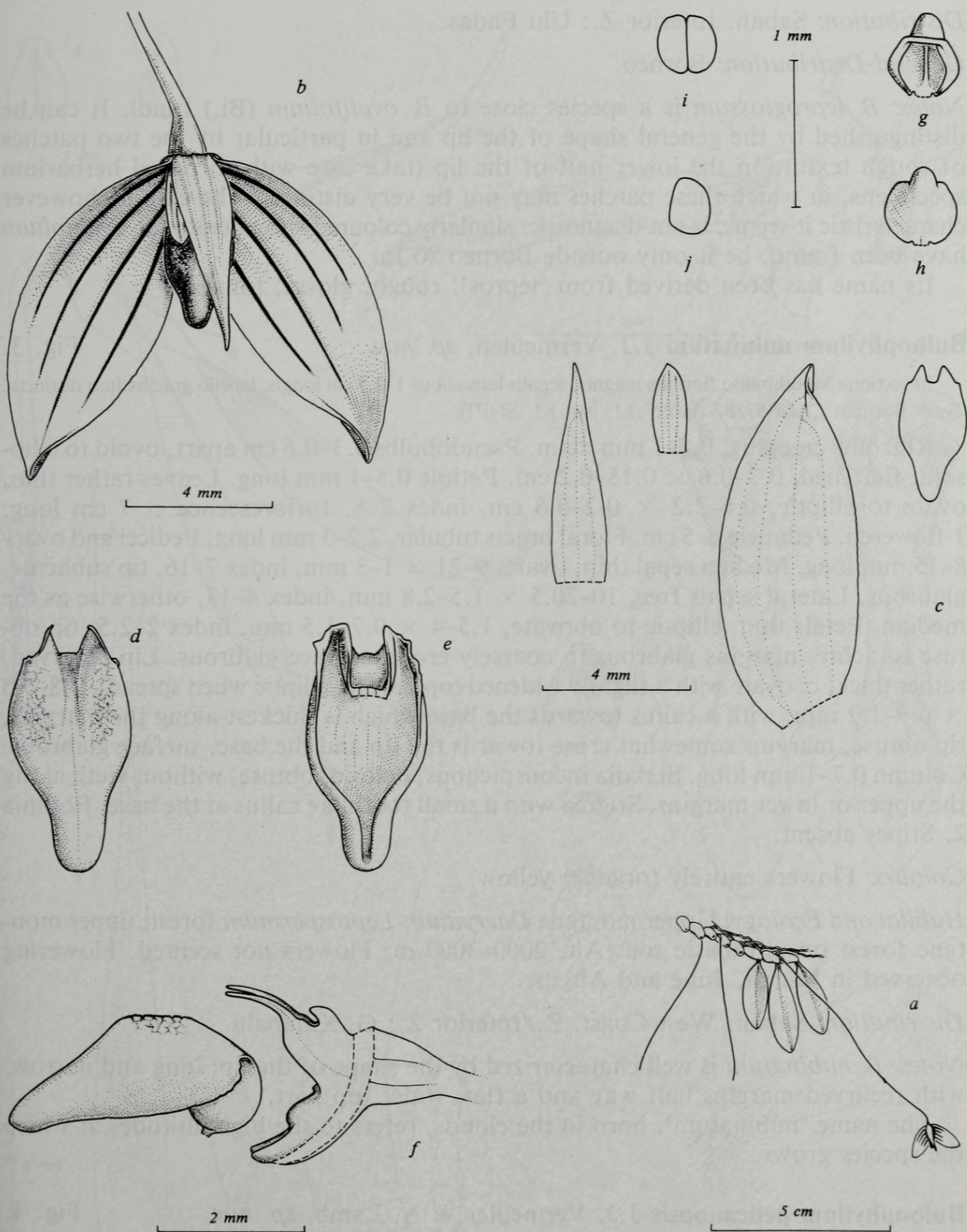


Fig. 2. *B. leproglossum*. a — habit; b — flower; c — flower analysis. From left to right: median sepal, petal, lateral sepal, lip; d — lip, adaxial side; e — lip, abaxial side; f — column and lip, lateral view; g — anther, adaxial side; h — anther, abaxial side; i — pollinia. Drawn from type specimen.

Habitat and Ecology: Found in high montane forest, on mossy branch of small tree. Alt. 1300–1500 m. Flowers not scented. Flowering observed in October.

Distribution: Sabah. Interior Z.: Ulu Padas.

General Distribution: Borneo.

Notes: *B. leproglossum* is a species close to *B. ovalifolium* (Bl.) Lindl. It can be distinguished by the general shape of the lip and in particular by the two patches of rough texture in the lower half of the lip (take care with shriveled herbarium specimens, in which these patches may not be very distinct). The colour, however characteristic it seems, is not diagnostic: similarly coloured specimens of *B. ovalifolium* have been found, be it only outside Borneo so far.

Its name has been derived from 'lepros': rough, glossa: tongue.

Bulbophyllum nubinatum J.J. Vermeulen, *sp. nov.*

Fig. 3.

In sectione Monilibulbo floribus magnis, sepalis lateralibus 1–2.5 cm longis, labello gracilissimo distincta. *Type:* Borneo; *Chan* 63/87 (Holo- L!, iso- K!, SNP!).

Rhizome creeping, 0.8–1 mm diam. Pseudobulbs 0.3–0.6 cm apart, ovoid to ellipsoid, flattened, 0.2–0.6 × 0.15–0.2 cm. Petiole 0.5–1 mm long. Leaves rather thin, ovate to elliptic, 0.6–2.2 × 0.2–0.6 cm, index 2–8. Inflorescence c. 7 cm long, 1-flowered. Peduncle c. 5 cm. Floral bracts tubular, 2.2–3 mm long. Pedicel and ovary 8–15 mm long. Median sepal thin, ovate, 9–21 × 1–3 mm, index 7–16, tip subacute, glabrous. Lateral sepals free, 10–20.5 × 1.5–2.8 mm, index 4–13, otherwise as the median. Petals thin, elliptic to obovate, 1.5–4 × 0.7–1.5 mm, index 2–2.5, tip obtuse to acute, margins glabrous to coarsely erose, surface glabrous. Lip recurved, rather thick, c. ovate with a slightly widened top part (c. elliptic when spread), 2.8–5.5 × 0.9–1.2 mm, with a callus towards the base which is thickest along the margins, tip obtuse, margins somewhat erose towards the tip and the base, surface glabrous. Column 0.7–1 mm long. Stelidia inconspicuous, deltoid, obtuse, without teeth along the upper or lower margins. Stigma with a small toothlike callus at the base. Pollinia 2. Stipes absent.

Colours: Flowers entirely (orange) yellow.

Habitat and Ecology: Upper montane *Dacrydium-Leptospermum* forest; upper montane forest on ultrabasic soil. Alt. 2000–3000 m. Flowers not scented. Flowering observed in March, June and August.

Distribution: Sabah. West Coast. Z./Interior Z.: G. Kinabalu.

Notes: *B. nubinatum* is well characterized by the shape of the lip: long and narrow, with recurved margins half way and a flat, wider top part.

The name 'nubinatum', born in the clouds, refers to the high altitudes at which the species grows.

Bulbophyllum pelicanopsis J.J. Vermeulen & A. Lamb, *sp. nov.*

Fig. 4.

In sectione Monilibulbo sepalis lateralibus ellipticis connatis et labello elliptico distincta. *Type:* Borneo; *Vermeulen* 582 (L!). Plate 4.

Rhizome creeping, c. 0.6 mm diam. Pseudobulbs 0.15–0.6 cm apart, ellipsoid, flattened, 0.15–0.6 × 0.15–0.22 cm. Petiole 0.2–0.3 mm long. Leaves rather thin, ovate, 0.3–0.4 × 0.25–0.3 cm, index 1–1.5. Inflorescence 1–1.2 cm long, 1-flowered. Peduncle 0.7 cm. Floral bracts tubular, 0.8–1 mm long. Pedicel and ovary 2–3 mm long. Median sepal thin with distinctly thickened top part, obovate-spathulate, 2.5–4.2 ×

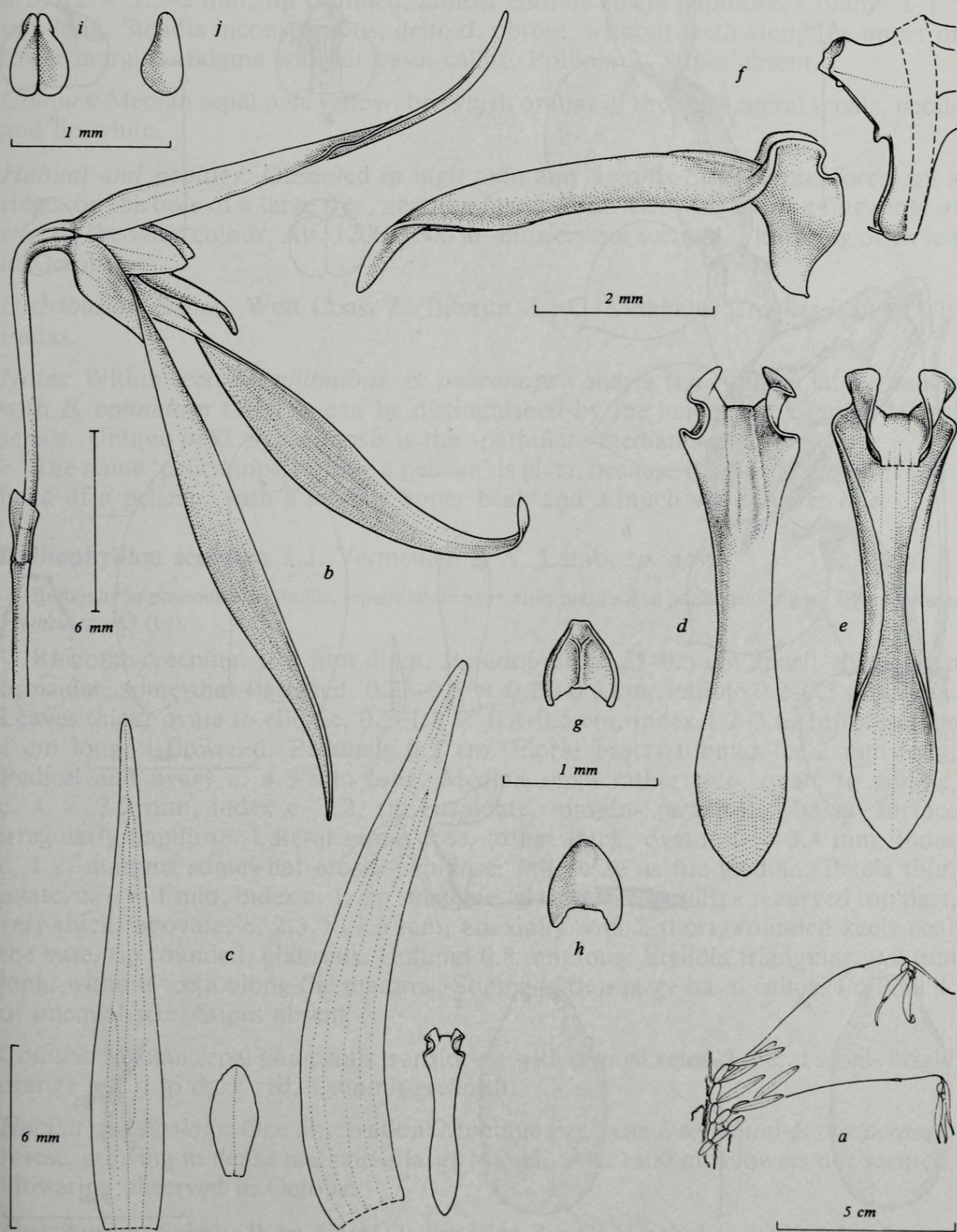


Fig. 3. *B. nubinatum*. a — habit; b — flower; c — flower analysis. From left to right: median sepal, petal, lateral sepal, lip; d — lip, adaxial side; e — lip, abaxial side; f — column and lip, lateral view; g — anther, adaxial side; h — anther, abaxial side. Drawn from type specimen.

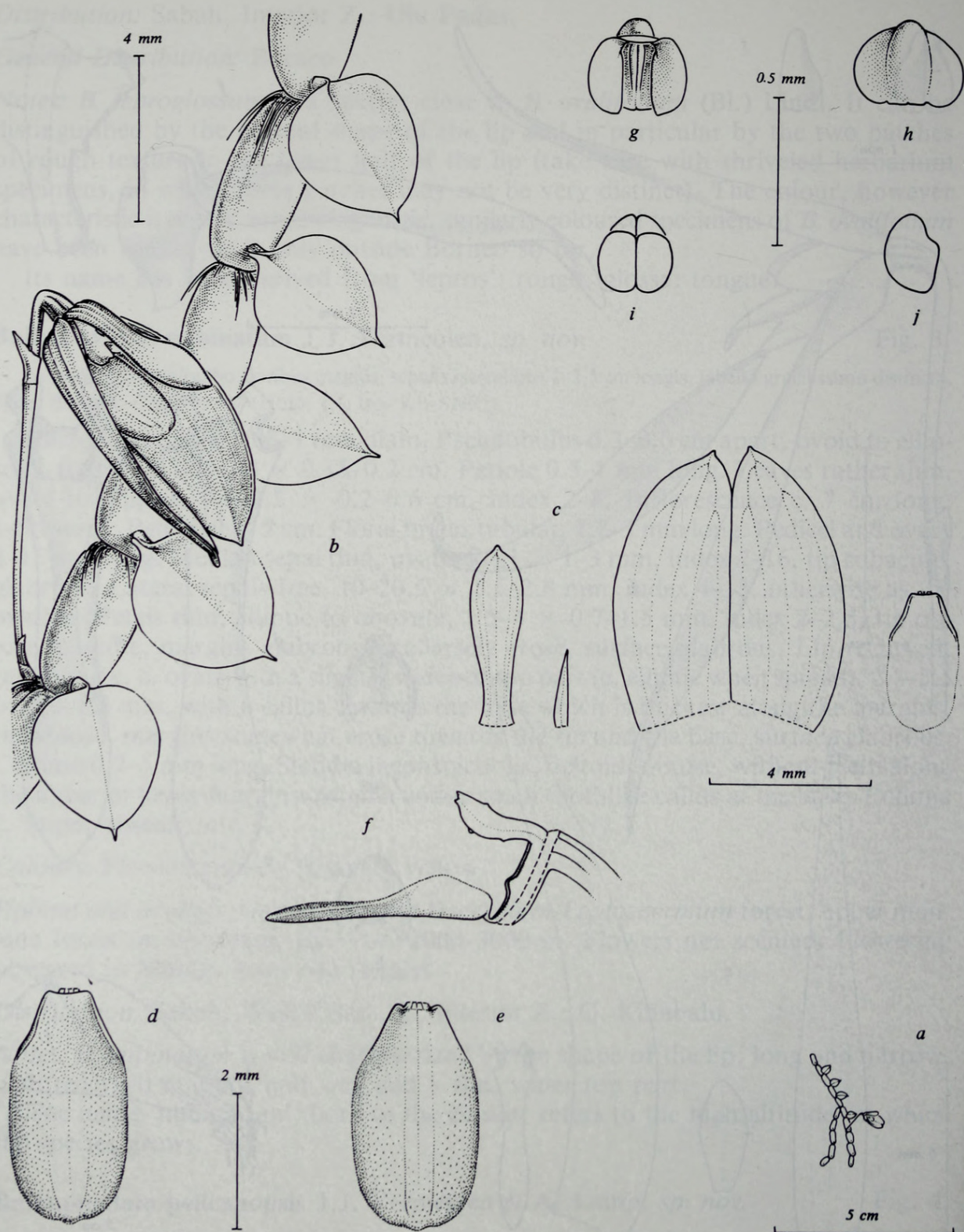


Fig. 4. *B. pelicanopsis*. a — habit; b — part of plant; c — flower analysis. From left to right: median sepal, petal, lateral sepal, lip; d — lip, adaxial side; e — lip, abaxial side; f — column and lip, lateral view; g — anther, adaxial side; h — anther, abaxial side; i — pollinia. Drawn from type specimen.

1–1.4 mm, index 2.5–3, tip rounded to subacute, glabrous. Lateral sepals adnate, thin, elliptic, $4\text{--}7 \times 2\text{--}3$ mm, index 2–2.5, tip cuspidate, glabrous. Petals thin, ovate, $1\text{--}2 \times c. 0.3$ mm, index 3.3–7, tip acute, glabrous. Lip not recurved, thin, elliptic, $2.2\text{--}3.2 \times 1.5\text{--}2$ mm, tip rounded, almost entirely finely papillose. Column 1–1.5 mm long. Stelidia inconspicuous, deltoid, obtuse, without teeth along the upper or lower margins. Stigma without basal callus. Pollinia 2. Stipes absent.

Colours: Median sepal pale yellow, brownish orange at the tip. Lateral sepals, petals and lip white.

Habitat and Ecology: Observed in high montane *Agathis-Lithocarpus* forest on a ridge, on the bole of a large tree, near the forest floor. Growing among fine moss of exactly the same colour. Alt. 1200–1500 m. Flowers not scented. Flowering observed in October.

Distribution: Sabah. West Coast Z./Interior Z.: G. Kinabalu; Crocker Range; Ulu Padas.

Notes: Within sect. *Monilibulbus*, *B. pelicanopsis* shares the connate lateral sepals with *B. connatum* Carr. It can be distinguished by the acute, not caudate lateral sepals. Unique in *B. pelicanopsis* is the spatulate median sepal.

The name 'pelicanopsis', 'like a pelican' is given because the flowers look like the head of a pelican, with a narrow upper beak and a much wider lower one.

***Bulbophyllum scabrum* J.J. Vermeulen & A. Lamb, sp. nov.**

Fig. 5.

Bulbophyllo phaeoneuron similis, sepalis latere abaxiali et marginibus papillosis insignis. *Type:* Borneo; Vermeulen 483 (L!).

Rhizome creeping, c. 1 mm diam. Pseudobulbs 0.25–0.5 cm apart, ellipsoid to orbicular, somewhat flattened, $0.25\text{--}0.5 \times 0.25\text{--}0.5$ cm. Petiole 0.2–0.5 mm long. Leaves thick, ovate to elliptic, $0.5\text{--}1.8 \times 0.4\text{--}0.5$ cm, index 1.2–3.6. Inflorescence 1 cm long, 1-flowered. Peduncle 0.3 cm. Floral bracts tubular, c. 2 mm long. Pedicel and ovary c. 4.5 mm long. Median sepal rather thin, ovate to elliptic, c. 4×3.2 mm, index c. 1.2, tip cuspidate, margins papillose, abaxial surface irregularly papillose. Lateral sepals free, rather thick, ovate, 4×3.4 mm, index c. 1.2, margins somewhat erose, papillose, otherwise as the median. Petals thin, ovate, c. 1×1 mm, index c. 1, tip subacute, glabrous. Lip with a recurved top part, very thick, obovate, c. 2.3×1.6 mm, adaxially with 2 short, rounded keels near the base, tip rounded, glabrous. Column 0.8 mm long. Stelidia triangular, 0.2 mm long, without teeth along the margins. Stigma with a large basal callus. Pollinia 4, of unequal size. Stipes absent.

Colours: Median sepal and petals translucent with orange veins. Lateral sepals bright orange red. Lip dark red. Column greenish.

Habitat and Ecology: One observation: Montane Fagaceae-*Dacrydium-Leptospermum* forest, growing in dense mats on a large branch. Alt. 1500 m. Flowers not scented. Flowering observed in October.

Distribution: Sabah. West Coast Z./Interior Z.: G. Kinabalu.

Notes: *B. scabrum* is characterized by the very short inflorescence, just as *B. phaeoneuron* Schltr from Sumatra and Borneo. It differs from this species in the partly papillose sepals and in the shape of the lip which is gradually recurved towards the tip and which has distinctly sinuose margins. Some specimens of *B. ovalifolium* (Bl.)

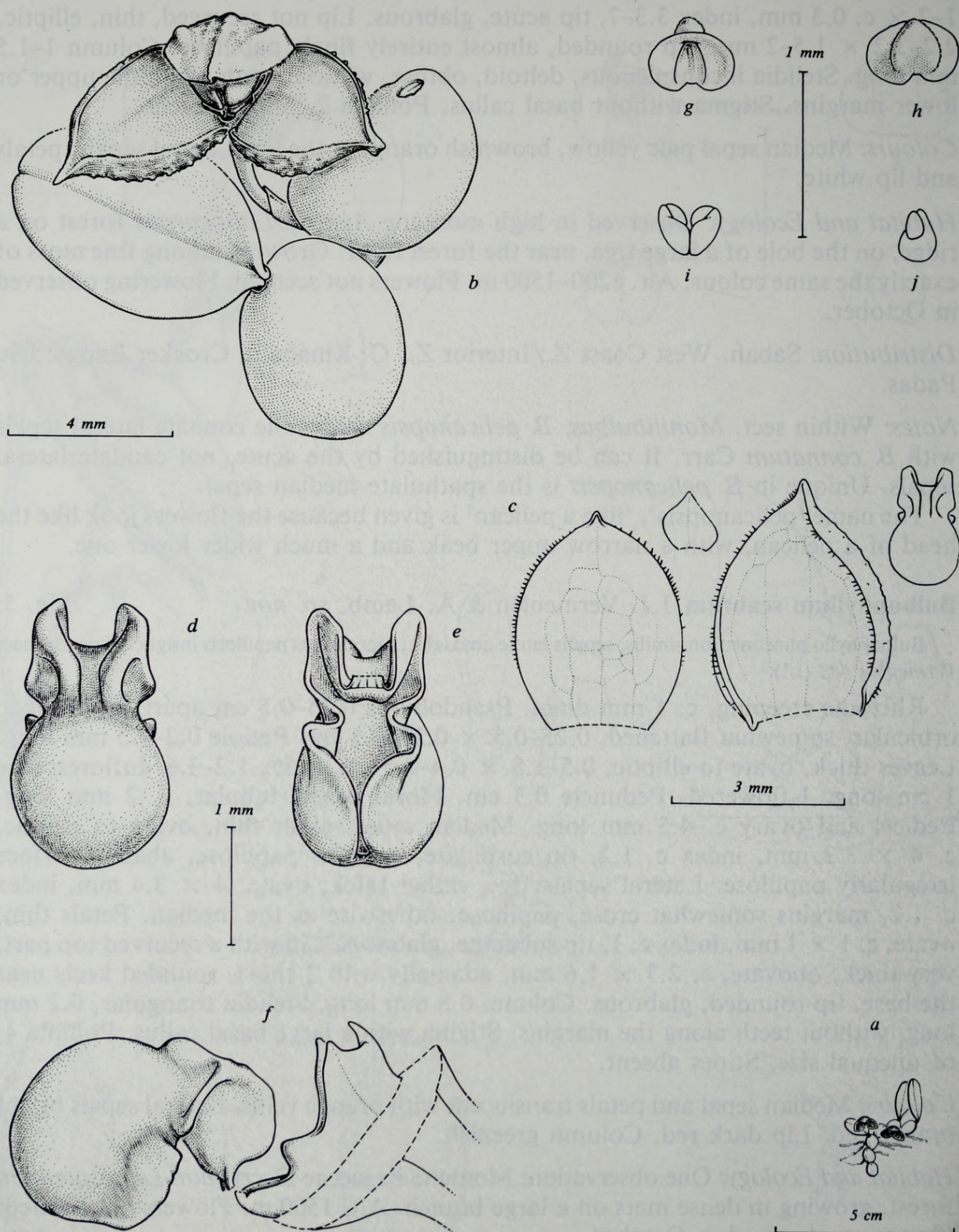


Fig. 5. *B. scabrum*. a — habit; b — part of plant; c — flower analysis. From left to right: median sepal, petal, lateral sepal, lip; d — lip, adaxial side; e — lip, abaxial side; f — column and lip, lateral view; g — anther, adaxial side; h — anther, abaxial side; i — pollinia. Drawn from type specimen.

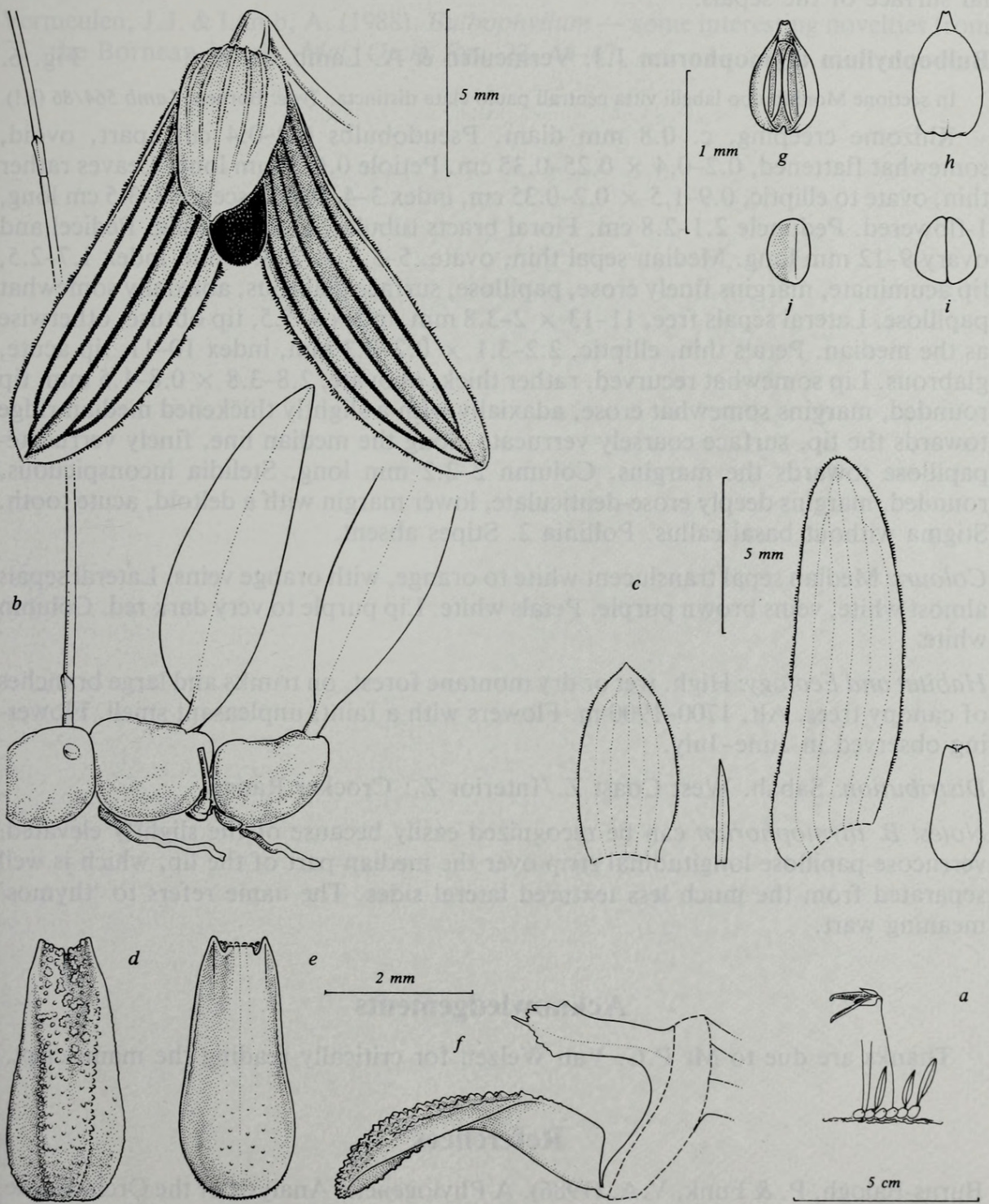


Fig. 6. *B. thymophorum*. a — habit; b — part of plant; c — flower analysis. From left to right: median sepal, petal, lateral sepal, lip; d — lip, adaxial side; e — lip, abaxial side; f — column and lip, lateral view; g — anther, adaxial side; h — anther, abaxial side; i — pollinia. Drawn from type specimen.

Lindl., a species which has been found on Borneo as well, have lips with similarly sinuose margins but a much longer inflorescence.

The name 'scabrum', 'rough' is given because of the papillose margins and abaxial surface of the sepals.

Bulbophyllum thymophorum J.J. Vermeulen & A. Lamb, *sp. nov.* Fig. 6.

In sectione Monilibulbo labelli vitta centrali paulo elata distincta. *Type:* Borneo; *Lamb 564/86* (K!).

Rhizome creeping, c. 0.8 mm diam. Pseudobulbs 0.2–0.4 cm apart, ovoid, somewhat flattened, 0.2–0.4 × 0.25–0.35 cm. Petiole 0.6–1 mm long. Leaves rather thin, ovate to elliptic, 0.9–1.5 × 0.2–0.35 cm, index 3–4. Inflorescence 3–3.5 cm long, 1-flowered. Peduncle 2.1–2.8 cm. Floral bracts tubular, c. 2 mm long. Pedicel and ovary 9–12 mm long. Median sepal thin, ovate, 5–5.8 × 2–3.4 mm, index 1.7–2.5, tip acuminate, margins finely erose, papillose, surface glabrous, abaxially somewhat papillose. Lateral sepals free, 11–13 × 2–3.8 mm, index 4–5.5, tip obtuse, otherwise as the median. Petals thin, elliptic, 2.2–3.1 × 0.2–0.3 mm, index 10–11, tip acute, glabrous. Lip somewhat recurved, rather thick, obovate, 2.8–3.8 × 0.8–1.5 mm, tip rounded, margins somewhat erose, adaxially with a slightly thickened median ridge towards the tip, surface coarsely verrucate along the median line, finely verrucate-papillose towards the margins. Column 2–2.2 mm long. Stelidia inconspicuous, rounded, margins deeply erose-denticulate, lower margin with a deltoid, acute tooth. Stigma without basal callus. Pollinia 2. Stipes absent.

Colours: Median sepal translucent white to orange, with orange veins. Lateral sepals almost white, veins brown purple. Petals white. Lip purple to very dark red. Column white.

Habitat and Ecology: High, wet or dry montane forest, on trunks and large branches of canopy trees. Alt. 1700–1900 m. Flowers with a faint, unpleasant smell. Flowering observed in June–July.

Distribution: Sabah. West Coast Z./Interior Z.: Crocker Range.

Notes: *B. thymophorum* can be recognized easily because of the slightly elevated, verrucose-papillose longitudinal strip over the median part of the lip, which is well separated from the much less textured lateral sides. The name refers to 'thymos' meaning wart.

Acknowledgements

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