

NEW SPECIES OF THE GENUS *BULBOPHYLLUM* (ORCHIDACEAE)  
FROM SUMATRA, BORNEO, AND PAPUA NEW GUINEA

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SUMMARY

Nineteen new species of the genus *Bulbophyllum* Thouars (Orchidaceae) are described. They originate from Sumatra (including the Riau Archipelago), Borneo, and Papua New Guinea. Five species belong to sect. *Hirtula* Ridl., four to sect. *Leptopus* Schltr., three to sect. *Hybochilus* Schltr., two to sect. *Sestochilus* (Breda) Benth. & Hook. f., and one to the sections *Cirrhopetalum* (Lindl.) Rchb. f., *Epicrianthes* (Blume) Benth. & Hook. f., and *Monilibulbus* J.J. Sm. each. Two more species cannot be assigned to any section with certainty; one of these may belong to sect. *Desmosanthes* (Blume) J.J. Sm. The other shows similarity to *B. bisetum* Lindl. and *B. bisetoides* Seidenf.; these three species together may well constitute a separate section.

Section *Cirrhopetalum* (Lindl.) Rchb. f.

*Bulbophyllum subbullatum* J.J. Verm., *spec. nov.* — Fig. 1

Intra sect. *Cirrhopetalum* inflorescentia uniflora, sepalis lateralibus mediali vix longioribus notatum. — Typus: *cult. Jongejan 2419* (L).

*Rhizome* creeping, 1.0–1.5 mm diam. *Pseudobulbs* 1-leafed, ovoid, 0.4–2 cm apart, 0.3–0.8 by 0.3–0.5 cm, not flattened. *Petiole* 0.5–1.5 mm. *Leaf blade* ovate, 1.9–4.6 by 0.6–1.0 cm, index (length/width) 3–6, obtuse. *Inflorescence* 1.3–1.5 cm, 1-flowered. *Peduncle* erect to patent, 0.7–0.9 cm; bracts 4, the longest c. 3 mm, obtuse. *Floral bracts* tubular, the longest c. 2 mm, acute. *Pedicel and ovary* c. 3 mm. *Flowers* not fully open. *Median sepal* erect, somewhat concave, ovate, 3.5–3.8 by 2.5–3 mm, index (length/width) 1.2–1.4, rounded, margins slightly erose and shortly, irregularly ciliate; base rather narrowly attached; thin, surface abaxially slightly and irregularly bullate towards the tip. *Lateral sepals* free, flat, not twisted, not falcate, somewhat oblique, ovate, 4.0–4.5 by c. 2.5 mm, index (length/width) 1.6–1.8, margins erose towards the tip, otherwise as the median sepal. *Petals* erect, not falcate, triangular, 1.5–2.5 by 1.1–1.5 mm, index (length/width) 1.3–1.6, shortly acuminate, margins finely papillose and with a few long hairs towards the tip; base broadly attached; thin; surface adaxially finely papillose towards the tip. *Lip* curved in the basal half, general outline ovate, 2.5–2.7 by 1.0–1.2 mm, index (length/width) 2.2–2.5 (not spread), tip obtuse; thick; glabrous; adaxially concave near the base, with 3 ridges, 2 of these rather distinct, wide, obtuse, diverging and coinciding with the margins towards the base, continuing over about the full length of the lip, the

third along the median line, narrow, flanked by a furrow on each side, starting near the base and continuing over c. 2/3 of the length of the lip; abaxially with a wide, re-use ridge over most of its length. *Column* from ovary to the tip of the stelia c. 1.5 mm. *Stelidia* small, not falcate, deltoid, c. 0.3 mm, acute, with a erose upper margin, and a deltoid, widely rounded wing along the lower margin; stigma not protruding at its base, subtriangular. *Anther* abaxially with an inconspicuous, rounded ridge over most of its length, frontal part distinctly protruding, concave, front margin rounded, glabrous. *Pollinia* 4, obovoid, the outer flattened on both sides, the inner more than half as long as the outer, distinctly flattened on both sides. *Stipes* absent.

Colours — Flowers dark purplish red.

Distribution — Sarawak: 1st Division, Ulu Sungei Sematan, *cult. Jongejan 2369, 2419* (L).

Ecology — Found in primary forest. Altitude c. 50 m asl.

Notes — 1. Vegetatively, this species is difficult to distinguish from *B. acuminatum* Ridl. The flowers are similar to those of *B. auratum* (Lindl.) Rchb. f. in most details, but the lateral sepals differ from any other species of sect. *Cirrhopetalum* in being only slightly longer than the median sepal, and in having erose margins. Besides, the lateral sepals lack the twisting in the basal part, which brings their upper margins together; this character occurs in most species of the section.

2. The name refers to the somewhat bullate abaxial surface of the sepals.

### Section *Epicrianthes* (Blume) Benth. & Hook. f.

#### *Bulbophyllum cyanotriche* J.J. Verm., *spec. nov.* — Fig. 8

*A. B. epicrianthidi* petalorum appendicibus spatulatis, labello obtuso differt. — Typus: *Lamb 1513/92* (L).

*Plant* (not seen, presumably with a pendulous rhizome like all other species of the section). *Petiole* c. 1 mm. *Leaf blade* ovate, c. 4.2 by 1.6 cm, index (length/width) 2.6–2.7, obtuse. *Inflorescence* c. 1 cm, 1-flowered. *Peduncle* 0.3–0.4 cm; bracts 1 (?), c. 4 mm, acute. *Floral bract* tubular, c. 3.5 mm, cuspidate. *Pedicel and ovary* c. 9 mm, with the node c. 3 mm from the floral bract. *Flowers* wide open. *Median sepal* spreading or reflexed, somewhat concave, ovate, c. 9.5 by 4.5 mm, index (length/width) 2.1–2.2, shortly acuminate, base rather narrowly attached; thick; glabrous. *Lateral sepals* free, slightly falcate, slightly oblique, c. 9 by 4 mm, index (length/width) 2.2–2.3; otherwise as the median sepal. *Petals* erect, more or less flat, not falcate, a seam of c. 0.7 by 2.7 mm along the column foot, index (length/width) 0.2–0.3, front margin with c. 13 appendages; appendages mobile, straight, moderately flattened, spatulate, the longest c. 4 by 0.6 mm, index (length/width) 6.6–6.7, rounded, with the base attached to the petal by a thin filament, very soft, surface finely papillose. *Lip* slightly sigmoid in lateral view, general outline ovate, c. 6 by 2 mm, index (length/width) c. 3 (not spread), tip obtuse, margins glabrous near the base (there as two ridges over the surface of the lip when this is observed adaxially), elsewhere with short, irregular, patent, stiff hairs; thick and solid; adaxially with a deeply concave, almost slit-like basal part, top part somewhat convex,

with 2 small, rounded, glabrous ridges about parallel to the margins at about 1/4 of the length of the lip, surface with short, patent, straight hairs; abaxially convex at the base, somewhat channeled in the basal half, with two distinct patches of large, ob-ovoid vesicles near the margin at about 1/3 of the length of the lip, surface otherwise with short, patent, straight hairs. *Column* from ovary to the tip of the stelidia c. 2 mm long. *Stelidia* not falcate, broadly deltoid, c. 0.3 mm, tip finely emarginate, upper margin slightly erose; with a distinct, deltoid, subacute wing along the lower margin; stigma not protruding at its base but with a slightly convex longitudinal callus, sub-triangular. *Anther* abaxially with a narrow, obtuse ridge from base to tip but not overtopping the front margin; front margin not drawn out, not concave, rounded with the tip curled upwards, erose. *Pollinia* (not seen).

Colours — Sepals orange with reddish streaks and spots. Sepals with bluish appendages. Lip bluish.

Distribution — Malaysia: Sabah, Tawau Zone, Danum Valley N.R., *Lamb 1513/92* (L).

Ecology — Found as an epiphyte in open, stunted forest on serpentine soil. Altitude 300 m asl.

Notes — 1. *Bulbophyllum epicrianthes* Hook. f. is most similar; *B. cyanotriche* differs in having distinctly spatulate appendages along the petals, as well as in having an obtuse lip.

2. The name refers to the bluish appendages on the petals.

### Section *Hirtula* Ridl.

#### *Bulbophyllum aithorhachis* J.J. Verm., *spec. nov.* — Fig. 2

*Bulbophyllo spadicefloro* similis, petalis reniformibus, stelidiis falcatis differt. — Typus: *cult. Jongejan 2219* (L).

*Rhizome* creeping, 3–4 mm diam. *Pseudobulbs* 1-leafed, depressed conical, 1.0–2.5 cm apart, 0.6–1.4 by 1.1–2.2 cm, not laterally flattened. *Petiole* 8–35 mm. *Leaf blade* elliptic to ovate, 11.5–16.0 by 2.5–4.0 cm, index (length/width) 4.0–4.6, acute. *Inflorescence* 27–50 cm, 25–50-flowered. *Peduncle* pendulous, 17–28 cm; bracts 5, the longest 7–12 mm, shortly acuminate. *Rachis* pendulous, swollen and spindle-shaped, with slight depressions below the flowers, 10–22 cm by 9–12 mm, surface glabrous. *Floral bracts* triangular, 3.5–4 mm, acute. *Pedicel and ovary* c. 4 mm. *Flowers* spirally arranged, in a lax raceme, few open at a given time, wide open but with the lateral sepal touching the rachis, hardly spreading. *Median sepal* recurved, flat, ovate, c. 5.5 by 2.5 mm, index (length/width) c. 2.2, obtuse, margins very finely ciliate; base rather broadly attached; rather thick, surface adaxially sparsely hirsute, abaxially with few minute, blackish appendages near the base. *Lateral sepals* free, not or hardly falcate, hardly oblique, triangular, c. 5.2 by 3.0 mm, index (length/width) 1.7–1.8, acute, upper margin glabrous, otherwise as the median sepal. *Petals* erect, not falcate, reniform, c. 1.2 by 1.6 mm, index (length/width) 0.7–0.8, the tip rounded, margins long ciliate towards the tip; base narrowly attached; rather thick; surface glabrous. *Lip* curved in the basal half, general outline about elliptic, c. 3.3 by

1.3 mm, index (length/width) 2.4–2.5 (not spread), tip rounded, margins slightly erose, with long hairs increasing in length and thickness towards the tip of the lip; very thick; adaxially hardly concave but with a median slit near the base, with 3 ridges starting in the basal half and continuing up to the tip of the lip, 2 of these rather distinct, obtuse, diverging and coinciding with the margins towards the tip, the third along the median line, very distinct, high and narrow, and overtopping the tip of the lip as a high crest, adaxial surface irregularly hairy except near the base; abaxially with a wide retuse ridge near the base and a distinctly swollen top part, surface glabrous; small, triangular, subacute auricles present at the base of the lip, near the ligament. *Column* from ovary to the tip of the stelidia c. 2 mm. *Stelidia* distinct, falcate, c. 0.7 mm, acute, with a deltoid, obtuse wing along the lower margin, at its base; stigma not protruding at its base, subrectangular; column foot slightly swollen. *Anther* abaxially with a rather distinct, rounded, long-papillose ridge near its top, frontal part not protruding, not concave, front margin truncate, long papillose. *Pollinia* 4, obovoid, the outer flattened on one side, the inner slightly more than half as long as the outer, distinctly flattened on both sides. *Stipes* absent.

Colours — Rachis, pedicel and ovary pale greenish, suffused with reddish purple. Sepals pale greenish, spotted with reddish purple, particularly towards the margins and near the veins. Petals yellow, top margin and ciliae dark reddish purple. Lip pale yellowish, adaxially suffused with dark reddish purple towards the margins, hairs on the midrib off-white; abaxially with a reddish purple swelling towards the tip; hairs along the margin white towards the base of the lip, but the thicker hairs along the top part dark reddish purple.

Distribution — Brunei: Sungei Ingei, surroundings of Batu Melintang, *cult. Jongejan* 2219 (L).

Ecology — Found in primary forest. Altitude c. 50 m asl.

Notes — 1. Shares a distinctly swollen rachis with *B. spadiceflorum* Tixier. This species, however, has narrower petals (index 2.6–2.7), and shorter stelidia.

2. The name refers to the dark colour of the rachis.

### ***Bulbophyllum cerebellum* J.J. Verm., *spec. nov.* — Fig. 7**

*Bulbophyllo polycyclo* similis, sed planta summum 16 cm alta, rhachis 1.8 cm longa, labellum 4 lobis lateralibus gaudet. — Typus: *Giles* 998 (K).

*Rhizome* creeping, 2.0–2.5 mm diam. *Pseudobulbs* 1-leafed, ovoid, 0.4–1.3 cm apart, 1.2–2.5 by 0.7–1.2 cm, not laterally flattened. *Petiole* 15–25 mm. *Leaf blade* elliptic to (ob)ovate, 5–14 by 1.5–3.5 cm, index (length/width) 3.3–4.0, acute. *Inflorescence* 4–12 cm, 10–29-flowered. *Peduncle* patent to pendulous, 3.8–10.0 cm; bracts 5, the longest 3–6 mm, acute. *Rachis* pendulous, slightly swollen, with slight depressions below the flowers, circular in section, 1.0–1.8 cm by c. 3 mm, surface glabrous. *Floral bracts* triangular, 1.0–1.5 mm, acute. *Pedicel and ovary* c. 2.6 mm, with the node 0.2–0.3 mm from the bract. *Flowers* scattered, in a dense raceme, many open at a given time, not much opening. *Median sepal* somewhat incurved, somewhat concave, triangular, 3.5–4.6 by 2.0–2.4 mm, index (length/width) 1.7–1.9, acute; margins with few very fine papillae; base rather broadly attached; rather thin; surface glabrous. *Lateral sepals* free, somewhat recurved, flat, hardly falcate,

somewhat oblique, 4.0–5.5 by 3.2–4.2 mm, index (length/width) 1.2–1.3, rounded, upper margin glabrous, lower finely ciliate, base broadly attached; otherwise as the median sepal. *Petals* erect, not falcate, ovate, 2.8–3.2 by 1.5–1.8 mm, index (length/width) 1.7–1.9, tip rounded, margins sparsely and very finely ciliate, base rather narrowly attached; rather thin; surface glabrous. *Lip* curved about half-way, general outline about elliptic, 2.6–3.4 by 1.4–2.4 mm, index (length/width) 1.4–1.9 (not spread), tip rounded, margins shortly and sparsely ciliate; very thick; surface irregularly wrinkled except for the basal part, glabrous; adaxially concave and with a median slit near the base, distinctly convex towards the tip, with 2 distinct, rounded ridges diverging and coinciding with the margins towards the base, continuing over somewhat less than 1/2 of the length of the lip, and ending in a short, high keel; abaxially with a wide, elliptic swelling towards the tip; 4 semi-elliptic, rounded, glabrous, broadly attached lateral lobes present, 2 of these large, attached over about 1/3 of the length of the lip, obliquely forwards directed, somewhat falcate, 2 others small, at the base of the lip, near the ligament. *Column* from ovary to the tip of the stelidia 1.0–1.5 mm. *Stelidia* distinct, not falcate, subtriangular, 0.7–1.0 mm, acute, along the upper margin with an obliquely forwards directed, deltoid, obtuse wing with a slightly erose anterior margin, along the lower margin with a similar wing with glabrous margins; stigma not protruding at its base, narrowly ovate. *Anther* abaxially with a rather distinct, rounded ridge near its base, frontal part somewhat protruding, not concave, front margin truncate, ciliate. *Pollinia* 4, subrhomboid, the outer moderately flattened on both sides, the inner distinctly more than half as long as the outer, distinctly flattened on both sides. *Stipes* absent.

Colours — Peduncle purplish, rachis green. Pedicel and ovary yellowish green. Sepal yellow, the median with brown veins. Petals yellow with brown spots. Lip yellow with brown spots on the largest pair of lateral lobes.

Distribution — Malaysia: Sabah, West Coast Zone, Kinabalu N.P., Carr 3470 (AMES); 'Borneo', no further details, Giles 998 (K).

Ecology — Found in primary forest. Altitude 1300 m asl. Flowering observed in May.

Note — Most similar is *B. polycyclum* J.J. Verm.; *B. cerebellum* differs in being much smaller (plant, including inflorescence about 16 cm high, rachis 1.8 cm long), and in having a lip with two large lateral lobes (next to 2 small auricles at the very base) which in front abruptly end, so that the lip seems to be constricted at that level in lateral view. The top part of the lip has a warty, more or less brain-like texture (hence the name); particularly the swelling near the tip on the abaxial side resembles a set of human brains.

### ***Bulbophyllum polycyclum* J.J. Verm., spec. nov. — Fig. 3**

*Bulbophyllo atrato* similis, rhachidi ad summum florifera, petalis obtusis differt. — Typus: cult. Hort. Leiden 913457 (L).

*Rhizome* creeping, 3–4 mm diam. *Pseudobulbs* 1-leaved, ovoid to depressed-conical, 0.9–1.2 cm apart, 1.2–1.5 by 1.3–1.8 cm, not laterally flattened. *Petiole* 30–40 mm. *Leaf blade* elliptic to ovate, 12.5–16.0 by 4.5–6.5 cm, index (length/width) 2.2–2.4, obtuse. *Inflorescence* 50–75 cm, 70–90-flowered. *Peduncle* pendulous,

17–40 cm; bracts 5–6, the longest 8–10 mm, shortly acuminate. *Rachis* pendulous, slightly swollen with the flowers inserted on low-conical protuberances, about circular in section, 33–36 cm by 3–4 mm, surface minutely scabrid. *Floral bracts* triangular, 1.2–1.5 mm, acute. *Pedicel and ovary* 2.2–3.0 mm, with the node c. 0.5 mm from the bract. *Flowers* scattered at the base of the inflorescence, arranged in often imperfect whorls of 5–8 in the middle portion, and arranged in interrupted spirals towards the tip, few open at a given time, not much opening. *Median sepal* somewhat incurved, somewhat concave, triangular, 3.6–4.5 by 1.5–2.0 mm, index (length/width) 1.9–2.7, obtuse, margins very finely papillose; base rather narrowly attached; rather thick; surface adaxially glabrous, abaxially minutely scabrid. *Lateral sepals* free, somewhat recurved, flat, hardly falcate, somewhat oblique, 3.3–4.0 by 2.5–3.0 mm, index (length/width) 1.2–1.6, otherwise as the median sepal. *Petals* erect, hardly falcate, ovate to spatulate, with a widened base, 1.9–2.0 by 0.6–1.0 mm, index (length/width) 2.0–3.2, tip rounded, margins long ciliate towards the tip; base rather broadly attached; thin; surface glabrous. *Lip* curved about half-way, general outline about elliptic, 2.2–2.9 by 1.5–1.8 mm, index (length/width) 1.2–2.0 (not spread), tip rounded, margins slightly erose, ciliate with the longest hairs in the middle part; very thick; surface about glabrous; adaxially concave near the base and distinctly convex near the tip with the adaxial surface overtopping the front margin of the lip, with an inconspicuous median slit over most of its length ending in a small circular plug that can be removed, with 3 ridges starting at the base and continuing over c. 1/2 the length of the lip, 2 of these distinct, obtuse, diverging and coinciding with the margins towards the base, the third along the median line, inconspicuous, a mere swelling around a median slit; abaxially with a wide truncate ridge up to about half-way the lip; small subcircular auricles present at the base of the lip, near the ligament. *Column* from ovary to the tip of the stamens 1.8–2.0 mm. *Stamens* distinct, somewhat falcate, triangular, c. 0.7 mm, acute, with an obliquely forwards directed, deltoid, obtuse, slightly erose wing along the upper margin, and an obliquely forwards directed, triangular, obtuse tooth along the lower margin; stigma with a transverse basal callus, callus flanked by two lateral, deltoid, obtuse wings on the column foot. *Anther* abaxially with a rather distinct, rounded ridge near its top, frontal part not protruding, not concave, front margin truncate, ciliate. *Pollinia* 4, obovoid, the outer flattened on one side, the inner distinctly more than half as long as the outer, distinctly flattened on both sides. *Stipes* absent.

**Colours** — *Rachis* dark green. *Sepals* and *petals* greenish, heavily stained with blackish purple, particularly towards the margins and near the veins. *Lip* yellowish, stained with blackish purple.

**Distribution** — Malaysia: Sabah, Interior Zone, Long Pa Sia Area, *cult. Jongejan 1870* (L). Indonesia: Kalimantan Timur, Apo Kayan, Gunung Sungei Pandan, *cult. Hort. Leiden 913457* (L).

**Ecology** — Found in podzolic forest, c. 20 m high, with a mossy forest floor. Altitude 850–1700 m asl.

**Notes** — 1. Most similar to *B. atratum* J.J. Sm. However, this species has a rachis with a top part (of c. 65 cm length) without flowers, and an acuminate median sepal and petals.

2. In the middle part of the rachis the flowers are arranged in a number of dense whorls 1–2 cm distant from each other. This character is rather unusual (it is also found in *B. penduliscapum* J.J. Sm., of sect. *Altisceptrum* J.J. Sm.); the name refers to this character.

***Bulbophyllum xenosum* J.J. Verm., spec. nov. — Fig. 4**

*Bulbophyllo jolandae* inflorescentia partim disticha, petalis acutis differt. — Typus: *cult. Jongejan 4425* (L).

*Rhizome* creeping, 2.5–3.0 mm diam. *Pseudobulbs* 1-leaved, depressed-conical, 2.2–4.2 cm apart, 1.2–1.5 by 1.0–1.4 cm, not laterally flattened. *Petiole* 12–20 mm. *Leaf blade* elliptic, 8.5–13.0 by 0.8–1.2 cm, index (length/width) 10–11, sub-acute. *Inflorescence* c. 44 cm, c. 30-flowered. *Peduncle* patent, c. 19 cm; bracts 4, the longest c. 5 mm, shortly acuminate. *Rachis* arching, not thickened, c. 25 cm by c. 1 mm, surface glabrous. *Floral bracts* triangular, 2.0–2.5 mm, acute. *Pedicel and ovary* 4.5–5.0 mm, with the node c. 0.3 mm from the bract. *Flowers* scattered at the base and the tip of the rachis, imperfectly distichous in between, in a lax raceme, many open at a given time, fully open. *Median sepal* recurved, somewhat concave, ovate, c. 11 by 1.5 mm, index (length/width) 7–8, acute, margins ciliate except near the base; base rather broadly attached; rather thin; surface glabrous. *Lateral sepals* free, somewhat falcate, somewhat oblique, triangular, c. 9.5 by 2.2 mm, index (length/width) 4.3–4.4, upper margin glabrous, base broadly attached; otherwise as the median sepal. *Petals* erect, not falcate, obovate, c. 1.5 by 0.8 mm, index (length/width) 1.8–1.9, tip acute, margins long ciliate towards tip; base broadly attached; thin; surface glabrous. *Lip* curved near base, general outline about ovate, c. 5.5 by 1.5 mm, index (length/width) 2.6–2.7 (not spread), tip obtuse, margins slightly erose, with numerous very long hairs increasing in length towards the tip; rather thin, base thick; adaxially somewhat concave and with a median slit near base, without ridges, surface glabrous; abaxially with a retuse ridge near the base, surface glabrous except for two longitudinal rows of long hairs about half-way the lip; small triangular, obtuse auricles present at base of the lip, near the ligament. *Column* from ovary to tip of the stelia c. 2.2 mm. *Stelidia* distinct, falcate, triangular, c. 0.9 mm, acute, with an inconspicuous, deltoid, acute tooth along the upper margin, and an inconspicuous, deltoid, broadly rounded wing along the lower margin; stigma with a rather inconspicuous, acute tooth at its base. *Anther* abaxially with a rather distinct, rounded, long-haired ridge near its top, frontal part not protruding, not concave, front margin truncate, ciliate. *Pollinia* 4, the outer obovoid, flattened on one side, the inner slightly more than half as long as the outer, elliptic distinctly flattened on both sides. *Stipes* absent.

*Colours* — Rachis, pedicel and ovary suffused with reddish purple. Sepals greenish white, abaxially suffused with pale purple, adaxially heavily stained with purple and with large, blackish purple blotches. Lip yellowish white, suffused with reddish purple towards the margins, with large, more or less transverse, blackish purple blotches, hairs reddish at base, yellow towards the tip.

*Distribution* — Brunei: Temburong, upper zone of Bukit Belalong, *cult. Jongejan 4425* (L).

Ecology — Found in primary forest. Altitude 650–900 m asl.

Notes — 1. Two species are rather similar to *B. xenosum*: *B. jolandae* J.J. Verm. differs in having the flowers scattered along the rachis, acuminate petals, and stelidia with distinct, deltoid teeth along both margins; *B. echinochilum* Kraenzl. differs in having almost orbicular petals with an emarginate tip, and an elliptic lip.

2. The general shape of the flower is remarkably similar to that of the African *B. saltatorium* Lindl. *Bulbophyllum xenosum* seems out of place among the Bornean species of the genus, hence the name. However, the shape of the pseudobulbs, the ciliate petals, and the tuft of hairs on the anther clearly show that it belongs in the Southeast Asian section *Hirtula* Ridl.

***Bulbophyllum xiphion* J.J. Verm., spec. nov. — Fig. 5**

*Bulbophyllo platyrrhachidi* similis, sepalis lateralibus triangularibus breviter acuminatis, stelidiis margine superiore distincte alato differt. — Typus: cult. Hort. Leiden 913241 (L).

*Rhizome* creeping, 5–6 mm diam. *Pseudobulbs* 1-leafed, ovoid, 0.9–1.5 cm apart, 1.0–1.6 by 1.0–1.6 cm, not flattened. *Petiole* 40–60 mm. *Leaf blade* obovate to elliptic, 20–24 by 5.0–6.5 cm, index (length/width) 3.5–4.0, rounded to obtuse. *Inflorescence* c. 42 cm, 60–70-flowered. *Peduncle* patent, c. 28 cm; bracts 4, the longest c. 16 mm, shortly acuminate. *Rachis* slightly nodding at the base (at an angle of about 45°), swollen, widened and flattened, with slight depressions below the flowers, elliptic in section, 11–15 cm by 1.2–1.5 cm by 6–8 mm, surface finely rugose-papillose. *Floral bracts* widely deltoid to triangular, 0.5–1.2 mm, acute. *Pedicel and ovary* 2.0–2.4 mm. *Flowers* scattered in a lax raceme, few open at a given time, not widely open. *Median sepal* not recurved, somewhat concave, triangular, 5.0–5.5 by 2.0–2.4 mm, index (length/width) 2.3–2.5, acute, margins finely and shortly ciliate, base broadly attached; thick; surface adaxially very finely papillose towards the margins, abaxially glabrous. *Lateral sepals* free, somewhat recurved, somewhat falcate, somewhat oblique, 5.5–6.2 by 3.2–3.5 mm, index (length/width) 1.7–1.8, acute, adaxially glabrous, otherwise as the median sepal. *Petals* erect, somewhat falcate, obovate to elliptic, 3.0–3.2 by c. 1.5 mm, index (length/width) 2.0–2.2, tip rounded, margins slightly erose and long ciliate towards the tip; base broadly attached; thin; adaxially very finely papillose and with some long hairs towards the tip; abaxially glabrous. *Lip* curved about half-way, general outline ovate, c. 3.0 by 1.7 mm, index (length/width) 1.4–1.5 (not spread), tip rounded, margins slightly erose, long ciliate, with the longest hairs about half-way the lip; very thick; adaxially somewhat concave near the base, with 2 very inconspicuous, rounded ridges diverging and coinciding with the margins towards the base, and continuing over c. 2/3 of the length of the lip, surface very finely papillose towards the tip; abaxially with an inconspicuous, wide, truncate ridge starting at the base and continuing up to about half-way the lip, with a distinctly convex top part, surface glabrous but top part finely papillose and with scattered long hairs; small, semi-elliptic, rounded auricles with erose margins present at the base of the lip, near the ligament. *Column* from ovary to the tip of the stelidia c. 2.0–2.2 mm. *Stelidia* distinct, not falcate, triangular, c. 0.6 mm, acute, with a deltoid, subacute wing with erose margins along the upper margin, and a small, triangular, acute tooth along the lower margin at its



base; stigma not protruding at its base, elliptic. *Anther* abaxially with a rather distinct, rounded, long-papillose ridge about half-way, frontal part not protruding, not concave, front margin truncate, long papillose. *Pollinia* 4, obovoid, the outer flattened on one side, the inner more than half as long as the outer, distinctly flattened on both sides. *Stipes* absent.

Colours — Rachis yellowish green, either spotted with bronze-purple or not. Sepals off-white, adaxially spotted with purple. Lip purple.

Distribution — Indonesia: Kalimantan Timur, Apo Kayan, Gunung Sungei Pandan area, *cult. Hort. Leiden* 913241 (L), *de Vogel & Cribb* 9062 (K).

Ecology — Found in primary forest on a ridge; also on a tree overhanging a river. Altitude 650–1050 m asl. Flowering observed in October.

Notes — 1. At first sight very similar to *B. platyrrhachis* Ridl. The latter differs in having the rachis nodding about 180° at its base, in having ovate lateral sepals with a widely rounded and finely mucronate top part, in having longer and spatulate petals (slightly over 2/3 the length of the median sepal in *B. platyrrhachis*, slightly over 1/2 in *B. xiphion*), and in lacking a distinct wing with an erose margin along the upper margin of the stelidia.

2. The name refers to the flattened, sword-like rachis.

### Section *Hybochilus* Schltr.

#### *Bulbophyllum camptochilum* J.J. Verm., *spec. nov.* — Fig. 13

*Bulbophyllo comberi* similis, labelli in dimidio parte carina mediali humiliore, labelli apice valide curvato differt. — Typus: *cult. Jongejan* 2337 (L).

*Rhizome* creeping, 0.4–0.6 mm diam. *Pseudobulbs* 1-leaved, ovoid, basal part slightly recumbent, 0.2–0.4 cm apart, 0.25–0.35 by 0.15–0.25 cm, slightly flattened. *Petiole* c. 0.2 mm. *Leaf blade* ovate, 0.4–0.5 by 0.20–0.25 cm, index (length/width) c. 2, mucronate. *Inflorescence* 0.6–0.7 cm, 1-flowered. *Peduncle* patent, 0.20–0.25 cm; bracts 2, the longest c. 1.2 mm, acuminate. *Floral bracts* tubular, 1.0–1.2 mm, acuminate. *Pedicel and ovary* 1.2–1.6 mm, with the node 0.4–0.5 mm from the floral bract. *Flowers* not fully open. *Median sepal* recurved, somewhat concave, ovate, c. 4.0 by 1.3 mm, index (length/width) 3.0–3.1, acute, base rather narrowly attached; rather thin; glabrous. *Lateral sepals* free, flat, somewhat falcate, somewhat oblique, c. 4.3 by 1.6 mm, index (length/width) 2.6–2.7; otherwise as the median sepal. *Petals* erect, not falcate, elliptic, c. 1.7 by 0.7 mm, index (length/width) 2.4–2.5, acuminate, base rather narrowly attached; thin; glabrous. *Lip* curved in the top half, general outline subrectangular, c. 1.4 by 0.6 mm, index (length/width) 1.3–1.4 (not spread), tip rounded, margins entire, long ciliate with the longest hairs about half-way the lip; thick; adaxially slightly concave near the base, with 3 rather distinct, obtuse ridges continuing over c. 2/3 of the length of the lip, 2 of these diverging and coinciding with the margins towards the base, the third along the median line, wide and with a median slit over its crest near the base, narrowing towards the tip of the lip, adaxial surface papillose except for the median ridge, with longer hairs towards the margins; abaxially with an inconspicuous, widely rounded ridge over most of its length, surface more or less glabrous. *Column* from

ovary to the tip of the stelidia c. 1.2 mm; column foot with a median callus near the ligament. *Stelidia* distinct, somewhat falcate, triangular, c. 0.7 mm, obtuse, with a large, obliquely forwards directed, triangular, subacute, wing along the upper margin which widely overtops the stelidia; stigma slightly protruding at its base, semi-elliptic. *Anther* abaxially with an inconspicuous, rounded ridge towards the tip, the frontal part not protruding, not concave, front margin rounded, glabrous. *Pollinia* 2, obovoid, flattened on one side. *Stipes* absent.

Colours — Sepals white towards the base, reddish purple towards the tip. Petals white. Lip reddish purple. Column white.

Distribution — Brunei: Sungei Ingei, surroundings of Batu Melintang, *cult.* *Jongejan* 2337 (L).

Ecology — Found in primary forest. Altitude c. 100 m asl.

Notes — 1. In general habit very similar to *B. comberi* J.J. Verm. This latter species has a narrower lip which is hardly curved near the top, more distinctly widened towards the base, it has a higher median ridge and a median slit only close to the base.

2. The name refers to the distinctly recurved top part of the lip.

***Bulbophyllum cavipes* J.J. Verm., *spec. nov.* — Fig. 14**

*Bulbophyllo papulifero* petalis labello minus dimidio longiore, margine laevi differt. —

Typus: de Wilde & de Wilde-Duyffes 14612 (L).

*Rhizome* creeping, 0.2–0.4 mm diam. *Pseudobulbs* 1-leaved, ovoid, 0.5–1.4 cm apart, 0.3–0.5 by 0.12–0.20 cm, somewhat flattened. *Petiole* 0.5–1.5 mm. *Leaf blade* elliptic, 0.5–1.4 by 0.2–0.4 cm, index (length/width) c. 2.5–4.7, finely mucronate. *Inflorescence* 1.8–2.5 cm, 1-flowered. *Peduncle* erect, 1.4–2.0 cm; bracts 2, the longest 1.0–1.5 mm, acuminate. *Floral bracts* tubular, c. 1.6 mm, acute. *Pedicel and ovary* c. 1.7 mm, with the node c. 0.4 mm from the floral bract. *Flowers* fully open. *Median sepal* recurved, somewhat concave, triangular, c. 4.0 by 1.3 mm, index (length/width) 3.0–3.1, subacute, base broadly attached; thin; glabrous. *Lateral sepals* free, flat, not falcate, hardly oblique, c. 4.3 by 1.5 mm, index (length/width) 2.8–2.9, otherwise as the median sepal. *Petals* erect, not falcate, elliptic, c. 1.3 by 0.7 mm, index (length/width) 1.8–1.9, acute, margins slightly erose, base rather narrowly attached; thin; glabrous. *Lip* slightly curved near its base, general outline ovate, c. 3.4 by 0.9 mm, index (length/width) 3.7–3.8 (not spread), tip rounded, margins slightly erose, about glabrous; rather thin; adaxially slightly concave near the base, with 2 rather distinct, rounded ridges diverging and coinciding with the margins towards the base, and continuing over slightly less than 1/3 of the length of the lip, these ridges with two slight, finely papillose calli in between, surface otherwise about glabrous; abaxially without a ridge, surface about glabrous. *Column* from ovary to the tip of the stelidia c. 0.9 mm; column foot with a callus near the ligament. *Stelidia* distinct, not falcate, triangular, c. 0.6 mm, obtuse, with a large, obliquely forwards directed, triangular, along the upper margin with a subacute wing with a somewhat dentate upper margin which overtops the stelidia, along the lower margin with a slightly less prominent, deltoid, obtuse wing with glabrous margins; stigma distinctly protruding at its base, semi-elliptic. *Anther* abaxially with a distinct, obtuse ridge

over most of its length, the frontal part not protruding, not concave, front margin cuspidate, glabrous. *Pollinia* 2, ellipsoid, distinctly flattened on one side. *Stipes* absent.

Colours — Flowers pale orange yellow. Lip orange.

Distribution — Indonesia: Sumatra, G. Leuser National Park, slopes of G. Mamas, *deWilde & de Wilde-Duyfjes 14612* (L).

Ecology — Found in montane rain forest. Altitude 800–1100 m asl. Found growing on a dead branchlet of a shrub. Flowering observed in February.

Note — Most similar to *B. papuliferum* Schltr.; differs in having shorter petals (less than half as long as the lip), a stigma which distinctly protrudes at its base, and a much shorter column foot.

### ***Bulbophyllum foraminiferum* J.J. Verm., *spec. nov.* — Fig. 15**

Intra sect. *Hybochilum* sepalis lateralibus mutue connatis, sepalo mediali apice cum lateralibus connato agnoscens. — Typus: *cult. Hort. Leiden 914135* (L).

*Rhizome* creeping, 0.9–1.2 mm diam. *Pseudobulbs* 1-leaved, ovoid, 0.4–0.8 cm apart, 0.6–1 by 0.4–0.5 cm, not flattened. *Petiole* 2–5 mm. *Leaf blade* ovate, 2.0–4.2 by 0.35–0.50 cm, index (length/width) 5–9, acute or finely mucronate. *Inflorescence* 6.5–8.5 cm, 1-flowered. *Peduncle* erect or patent, 5.0–7.2 cm; bracts 3, the longest 2.2–3.5 mm, acuminate. *Floral bracts* tubular, 2.6–2.8 mm, acute. *Pedicel and ovary* 6.5–10.0 mm, with the node 1.1–1.5 mm from the floral bract. *Flowers* not much open. *Median sepal* adnate to the laterals at the tip, somewhat incurved, concave, elliptic, 12.5–13.0 by c. 4.2 mm, index (length/width) 2.9–3.1, acuminate, margins glabrous; base broadly attached; rather thin; adaxially glabrous; abaxially with a distinct high keel with an erose margin towards the tip, surface irregularly colliculate. *Lateral sepals* adnate along their lower margins, not falcate, hardly oblique, 13–14 by 3.8 mm, index (length/width) 3.4–3.7, otherwise as the median sepal. *Petals* erect, hardly falcate, elliptic, 9–10 by 2.7–2.9 mm, index (length/width) 3.3–3.5, obtuse, margins entire, very finely papillose towards the tip; adaxially very finely papillose towards the tip; abaxially glabrous. *Lip* recurved in the top half, general outline obovate, c. 2 by 1.1–1.2 mm, index (length/width) 1.7–1.8 (not spread), tip rounded, margins papillose towards the tip; thick; surface in the top half papillose towards the margins; adaxially concave near the base, without ridges, median part somewhat channeled; abaxially with an inconspicuous rounded ridge; lateral lobes present in the basal half of the lip which are very large, deltoid, obtuse, with an erose front, thin, about glabrous. *Column* from ovary to the tip of the stelia c. 2.2 mm; column foot without a median callus near the ligament. *Stelidia* distinct, hardly falcate, triangular, c. 1.3 mm, obtuse, along the upper margin with a large, obliquely forwards directed, semi-elliptic, truncate wing, which widely overtops the stelia. *Anther* abaxially with a distinct obtuse ridge near its base, frontal part not protruding, not concave, front margin rounded, glabrous. *Pollinia* 2 (?), ellipsoid, distinctly flattened on one side. *Stipes* absent.

Colours — Plant medium green. Flowers somewhat dull yellow.

Distribution — Malaysia: Sarawak, 4th Division, Mt Hose, *cult. Hort. Leiden 914135* (L).

Ecology — Found among abundant moss in the crowns of trees in podzolic forest. Altitude c. 1200 m asl.

Notes — 1. Within sect. *Hybochilus* recognizable because of the almost entirely closed flowers: the lateral sepals are fused from base to tip along their lower margins, and the median is fused to the laterals at its tip. The petals neatly fit into the openings between the median and the lateral sepals, so that only two tiny holes are left at the top of the flower (hence the name). Otherwise the species can be recognized by the large lateral lobes on the lip and the very long stelia.

2. On the pollinia a vague outline is visible of what may be a second pair of pollinia.

### Section *Leptopus* Schltr.

#### ***Bulbophyllum leptobulbon* J.J. Verm., spec. nov. — Fig. 11**

*Bulbophyllo neoguineense* labello sepalo mediali minus 0.25-plo longiore, steliis brevibus triangularibus differt. — Typus: cult. Jongejan 774 (L).

*Rhizome* creeping, 2.5–3.0 mm diam. *Pseudobulbs* 1-leafed, cylindrical or narrowly obovoid, 2.5–3.3 cm apart, 5.5–6.8 by 0.4–0.5 cm, somewhat flattened. *Petiole* 1–2 mm. *Leaf blade* elliptic to (ob)ovate, 8.0–11.0 by 1.6–2.1 cm, index (length/width) 3.8–6.6, obtuse. *Inflorescence* 9–12 cm, 1-flowered. *Peduncle* 4.0–4.5 cm; bracts 3, the longest c. 6 mm, acute. *Floral bract* tubular, c. 7 mm, cuspidate. *Pedicel and ovary* 62–70 mm, with the node 6–7 mm from the floral bract. *Flowers* wide open. *Median sepal* spreading, flat, ovate, c. 30 by 6 mm, index (length/width) c. 5, acute, base rather narrowly attached; rather thin; glabrous; with 3 veins the median of which is somewhat prominent abaxially. *Lateral sepals* free, hardly falcate, hardly oblique, triangular, c. 34.0 by 5.5 mm, index (length/width) 6.1–6.2; base rather broadly attached; otherwise as the median sepal. *Petals* erect, not falcate, somewhat oblique, obovate, 5.0 by 3.2 mm, index (length/width) 1.5–1.6, tip acuminate, margins entire, finely ciliate; base narrowly attached; thin; with 1 vein; surface glabrous. *Lip* curved about half-way, general outline obovate, c. 5.5 by 3.0 mm, index (length/width) 1.8–1.9 (not spread), tip obtuse, margins entire, ciliate; thick and solid; adaxially with a concave basal part, with an about flat top part, with 2 rather narrow, obtuse ridges diverging and coinciding with the margins near the base, and continuing up to c. 1/2 of the length of the lip, between these ridges two other, widely rounded, longitudinal swellings, adaxial surface glabrous except for 2 patches with very fine transverse riblets in the basal half of the lip, close to the margins; abaxially with a rather distinct, retuse median ridge in the basal half, surface glabrous. *Column* from ovary to the tip of the stelia c. 2.4 mm long; column foot widened and with small, semi-circular lateral wings at its tip. *Stelia* short, not falcate, triangular, c. 0.5 mm, acute, with a small, deltoid, subacute tooth along the upper margin; stigma with a callus at its base flanked by two distinct, deltoid, obtuse wings on the lower margins of the column, elliptic. *Anther* abaxially with the top part papillose, widely overtopping the front margin, and with a distinct, widely rounded ridge over most of its length; front margin not protruding, not concave, rounded. *Pollinia* 4, ellipsoid or obovoid, flattened on both sides, the inner almost as long as the outer. *Stipes* absent.

Colours — Unknown.

Distribution — Papua New Guinea: Enga Province, Miso River near Tumuadan, *cult. Jongejan 774* (L).

Ecology — Found at 2200–2300 m asl.

Notes — 1. Somewhat similar to *B. neoguineense* J.J. Sm.; differs by the lip being shorter than 1/4 of the length of the median sepal, and by the short, triangular stelidia.

2. The name refers to the slender, cylindrical pseudobulbs.

***Bulbophyllum pseudotrias* J.J. Verm., *spec. nov.* — Fig. 10**

*Bulbophyllo lamellulifero* sepalis latioribus, labello brevior apice papilloso differt. —

Typus: *cult. Jongejan 1529* (L).

*Rhizome* creeping, 2–3 mm diam. *Pseudobulbs* 1-leaved, ovoid, 2.8–7.5 cm apart, 1.5–2.0 by 0.5–1.3 cm, somewhat flattened or not. *Petiole* 4–7 mm. *Leaf blade* elliptic to ovate, 4.5–6.5 by 1.5–2.0 cm, index (length/width) 3.0–3.7, acute. *Inflorescence* 3.0–4.5 cm, 1-flowered. *Peduncle* 1.0–1.5 cm; bracts 3, the longest 4–7 mm, acute. *Floral bract* tubular, 6–8 mm, cuspidate. *Pedicel and ovary* 15–28 mm, with the node c. 4 mm from the floral bract. *Flowers* wide open. *Median sepal* spreading, flat, obovate, 17–26 by 12–15 mm, index (length/width) 1.4–1.8, shortly acuminate, margins entire, very finely ciliate, base narrowly attached; rather thick; with 7 major veins; adaxially finely pubescent; abaxially glabrous, veins not prominent. *Lateral sepals* free, flat, somewhat falcate, 16–23 by 12–16 mm, index (length/width) 1.3–1.5, upper margin glabrous; adaxially finely pubescent except near the base and a strip along the upper margin; otherwise as the median sepal. *Petals* erect, not falcate, ovate, 2.5–3.0 by 2.5–3.0 mm, index (length/width) 0.9–1.2, the tip rounded, margins entire, very finely papillose; base narrowly attached; thin; with 1 vein; surface glabrous. *Lip* curved in the basal half, general outline about elliptic, 2.2–3.1 by 1.2–1.6 mm, index (length/width) 1.6–2.0 (not spread), tip rounded, margins entire, papillose and with large, narrowly conical or cylindrical vesicles towards the tip; thick and solid; adaxially with a somewhat concave basal part, with an about flat top part, with a median slit over most of its length, with 3 ridges, 2 of these rather distinct, wide, obtuse, diverging and coinciding with the margins towards the base and towards the tip, continuing over about the full length of the lip, the third a mere swelling around the median slit in the top half of the lip, adaxial surface glabrous; abaxially with a rounded median ridge which is deeply furrowed towards the tip of the lip, surface in the top half papillose, and with narrowly conical to cylindrical vesicles towards the margins. *Column* from ovary to the tip of the stelidia 1.5–2.2 mm long; column foot widened and with rather distinct, about semi-elliptic, rounded lateral wings at its tip. *Stelidia* distinct, slightly falcate, subulate, 0.9–1.2 mm, acute, with a slight, rounded wing along the lower margin, towards its base; stigma slightly protruding at its base, subtriangular. *Anther* abaxially with the top part papillose, overtopping the front margin, and with a distinct, rounded ridge near its base; front margin not drawn out, not concave, truncate. *Pollinia* (not seen). *Stipes* (not seen).

Colours — Flowers whitish, heavily spotted with pinkish purple.

Distribution — Papua New Guinea: Southern Highlands Prov., Mt Yasale, Reeve 1151 (L); Madang Prov., upper Ramu River, Rehona, *cult. Jongejan 1529* (L).

Ecology — Found in forest. Altitude 1000–1300 m asl. Flowering seen in April.

Notes — 1. A distinct species. The general shape of the flowers is somewhat similar to that of *B. lamelluliferum* J.J. Sm., which has narrower sepals and a longer, entirely glabrous lip.

2. The flowers are somewhat reminiscent of those of a mainly continental Asian group of Bulbophyllinae, generally included in the genus *Trias* Lindl.; hence the name.

**Bulbophyllum spissum** J.J. Verm., *spec. nov.* — Fig. 9

*Bulbophyllo gilvo* petalis obtriangularibus, labello adaxialiter diminute subtiliter transversaliter costato differt. — Typus: *O'Byrne LING 010* (L).

*Rhizome* creeping, c. 1 mm diam. *Pseudobulbs* 1-leaved, ovoid, 0.2–0.3 cm apart, 0.6–0.9 by 0.4–0.5 cm, not flattened. *Leaves* (not seen). *Inflorescence* c. 4 cm, 1-flowered. *Peduncle* c. 2.3 cm; bracts 3, the longest c. 3 mm, acute. *Floral bract* tubular, c. 2.5 mm, cuspidate. *Pedicel and ovary* c. 10 mm, with the node c. 1 mm from the floral bract. *Flowers* not much opening. *Median sepal* erect, somewhat concave, ovate, c. 7 by 2.8 mm, index (length/width) c. 2.5, acuminate, base rather broadly attached; rather thin; glabrous; with 3 veins which are prominent abaxially. *Lateral sepals* free, somewhat recurved, flat, hardly falcate, 7.2–8.0 by 3.0–3.3 mm, index (length/width) 3.4–2.5; base broadly attached; otherwise as the median sepal. *Petals* erect, not falcate, obtriangular, c. 2 by 2 mm, index (length/width) c. 1, tip slightly prominent in the front margin, subacute; base rather narrowly attached; thin; with 1 vein; glabrous. *Lip* curved in the basal half, general outline obovate-spathulate, c. 3.1 by 1.7 mm, index (length/width) 1.8–1.9 (not spread), tip obtuse, margins entire; rather thick and solid; almost entirely finely papillose; adaxially with a somewhat concave basal part, top part somewhat convex, with a central patch with very fine, irregular, transverse riblets; abaxially with an inconspicuous, rounded median ridge in the basal half; with two small, semi-circular, rounded, thin, glabrous auricles near the base, close to the ligament. *Column* from ovary to the tip of the stelidia c. 1.3 mm long; column foot widened and with rather distinct, about triangular, obtuse lateral wings at its tip. *Stelidia* distinct, not falcate, triangular, c. 0.5 mm, subacute, upper margin somewhat erose, without teeth along the margins; stigma not protruding at its base, elliptic. *Anther* abaxially with the top part papillose, widely overtopping the front margin, and with an inconspicuous, rounded ridge near its base; front margin not protruding, not concave, truncate. *Pollinia* 4, ellipsoid, flattened on both sides, the inner almost as long as the outer. *Stipes* absent.

Colours — Sepals and petals light yellow. Lip darker yellow.

Distribution — Indonesia: Riau Arch., Pulau Lingga, *O'Byrne LING 010* (L).

Ecology — Found in primary forest. Altitude c. 250 m asl. Common at the only known locality. Flowering observed in February.

Notes — 1. Differs from *B. gilvum* J.J. Verm. by its obtriangular petals as well as by the very fine transverse riblets on the adaxial surface of the lip.

2. The name refers to the densely crowded pseudobulbs.

**Bulbophyllum spongiola** J.J. Verm., *spec. nov.* — Fig. 12

*Bulbophyllo leptopodi* et *B. plagiopetalo* labello multo crassiore spongioso differt. — Typus: *cult. Jongejan 109* (L).

*Rhizome* patent to pendulous, 3–4 mm diam. *Pseudobulbs* 1-leafed, ovoid to ellipsoid, 2.0–2.6 cm apart, 1.5–2.0 by 0.7–1.2 cm, not flattened. *Petiole* 3–4 mm. *Leaf blade* elliptic, 4.5–7.5 by 1.2–2.0 cm, index (length/width) 2.2–6.3, acute. *Inflorescence* 3.0–3.5 cm, 1-flowered. *Peduncle* 2.0–2.5 cm; bracts 3, the longest 3.5–4.0 mm, acute. *Floral bract* tubular, 4.0–4.5 mm, cuspidate. *Pedicel and ovary* 11–13 mm, with the node 3–4 mm from floral bract. *Flowers* fully opening. *Median sepal* recurved, somewhat concave, ovate, c. 11.0 by 3.5 mm, index (length/width) 3.1–3.2, obtuse, margins entire, ciliate, base rather broadly attached; thin; surface glabrous; with 5 veins which are not prominent abaxially. *Lateral sepals* free, hardly falcate, somewhat oblique, otherwise as the median sepal. *Petals* erect, not falcate, oblique, elliptic to ovate, c. 3.2 by 2.5 mm, index (length/width) 1.2–1.34, tip acute; margins entire, very finely ciliate; base rather broadly attached; thin; surface glabrous; with 1 vein. *Lip* hardly curved in the basal half, general outline elliptic, c. 9.0 by 2.5 mm, index (length/width) c. 3.6 (not spread), tip rounded; very thick but very soft; generally glabrous; adaxially with a concave basal part in which a distinct, conical, obtuse, papillose callus; abaxially without a median ridge; with two small, triangular, thick, subacute auricles near the base. *Column* from ovary to the tip of the stelidia 2.0–2.2 mm long; column foot widened and with distinct, about ovate, obtuse lateral wings at its tip. *Stelidia* distinct, not falcate, subulate, 1.3–1.5 mm, acute, with a small, forwards directed, deltoid, subacute tooth wing along the upper margin, near its base; stigma protruding at its base, elliptic. *Anther* abaxially with the top part papillose, widely overtopping the front margin, and with a distinct, rounded ridge over most of its length; the front margin not protruding, not concave, truncate. *Pollinia* 4, ellipsoid, flattened on both sides, the inner more than half as long as the outer. *Stipes* absent.

*Colours* — Sepals abaxially yellowish green, adaxially yellowish brown, the median with a large, dark red blotch in the centre, the laterals slightly spotted with dark red. Petals yellowish brown, with large, dark red spots. Lip yellow, somewhat spotted with dark red. Column almost white.

*Distribution* — Papua New Guinea: locality unknown, *cult. Jongejan 109* (L).

*Ecology* — Unknown.

*Note* — Differs from *B. leptopus* Schltr. and *B. plagiopetalum* Schltr. by its very thick, spongy lip (hence the name), as well as by the wider, (almost) elliptic petals. The long stelidia and the structure of the lip are also reminiscent of *B. tenuifolium* (Blume) Lindl.; this species, however, has a creeping rhizome.

**Section *Monilibulbus*** J.J. Sm.**Bulbophyllum fulgens** J.J. Verm., *spec. nov.* — Fig. 6

*Bulbophyllo cernuo* et *B. stormii* in calli basalis a labelli latere adaxiali presentia, dente distincto conico stelidiorum margine inferiore differt. — Typus: *cult. Jongejan 1948* (L).

*Rhizome* creeping, 1.5–1.8 mm diam. *Pseudobulbs* 1-leafed, prostrate at the base, ovoid, 0.4–0.8 cm apart, 0.6–0.9 by 0.5–0.7 cm, often somewhat flattened. *Petiole* 2–3 mm. *Leaf blade* elliptic, 1.9–2.5 by c. 0.7 cm, index (length/width) 2.6–3.6, rounded. *Inflorescence* 5–7 cm, 1-flowered. *Peduncle* 1.8–2.5 cm; bracts 2 at its base, the longest c. 4 mm, cuspidate. *Floral bract* tubular, 4.2–5.2 mm, cuspidate. *Pedicel and ovary* 18–24 mm, with the node 3.8–5 mm from the floral bract. *Flowers* fully open. *Median sepal* more or less erect, somewhat concave, ovate to triangular, c. 22 by 4.3 mm, index (length/width) 5.1–5.2, acute, margins somewhat erose and finely papillose or ciliate towards the tip; base rather broadly attached; rather thin, with c. 5 major veins which are prominent abaxially; surface glabrous. *Lateral sepals* free, spreading, flat, slightly falcate, c. 25 by 5 mm, index (length/width) 5; lower margin finely papillose, rather thick, otherwise as the median sepal. *Petals* slightly spreading, flat, not falcate, ovate, c. 2 by 1.1 mm, index (length/width) c. 1.8, acute, base rather narrowly attached; thin; with 1 vein; glabrous. *Lip* curved about half-way, general outline ovate, 2.9–3.9 by 1.3–1.6 mm, index (length/width) 2.2–2.5 (not spread), tip obtuse, margins slightly erose; rather thick and solid; glabrous; adaxially with a small rhombiform callus near the base, basal part deeply concave, top part distinctly convex; abaxially distinctly convex at the base, with a deeply channeled median ridge towards the tip. *Column* from ovary to the tip of the stelidia c. 1.7 mm long. *Stelidia* distinct, not falcate, narrowly triangular, c. 0.8 mm, subacute, without teeth along the upper margin, with a distinct, deltoid, obtuse wing along the lower margin, near its base; stigma distinctly protruding at its base, semi-elliptic. *Anther* abaxially with a ridge widely overtopping the front margin; front margin not protruding, not concave, rounded. *Pollinia* 4, ovoid, flattened on both sides, the inner more than half as long as the outer. *Stipes* absent.

**Colours** — Sepals pinkish purple towards the base, white towards the tip, the median sepals with glassy, large cells near the base. Petals and lip pinkish purple. Column white.

**Distribution** — Indonesia: Sumatra, northern part, *cult.* Jongejan 1948 (L).

**Ecology** — Epiphyte in primary forest at 1600–1700 m asl. Flowering observed in September.

**Notes** — 1. Rather similar to *B. cernuum* (Blume) Lindl. and *B. stormii* J.J. Sm. These differ from *B. fulgens* in having at most an inconspicuous wing along the lower margin of the stelidia, as well as in lacking the callus on the adaxial side of the lip, close to its base. The original description and illustration of *B. tapirus* J.J. Sm. suggest a plant similar to *B. fulgens*; the type material of *B. tapirus*, however, shows that it is best included in *B. stormii*.

2. The name refers to the brightly coloured flowers of this species.

### Section *Sestochilus* (Breda) Benth. & Hook. f.

#### *Bulbophyllum signatum* J.J. Verm., *spec. nov.* — Fig. 16

*Bulbophyllo nabawanense* foliis angustioribus, inflorescentia uniflora, sepalo mediali elliptico ad ovato differt. — Typus: *cult.* Jongejan 2207 (L).



*Rhizome* creeping, 1.8–2.0 mm diam. *Pseudobulbs* 1-leafed, ovoid, 0.6–2.0 cm apart, 0.7–3.1 by 0.4–0.6 cm, often somewhat flattened. *Petiole* 6–8 mm. *Leaf blade* ovate, 10.5–14.5 by 0.8–0.9 cm, index (length/width) 12–17, acute. *Inflorescence* 5–8 cm, 1-flowered. *Peduncle* 3–6 cm; bracts 4, the longest 4.5–15.0 mm, acuminate. *Floral bract* triangular, 4.5–9.0 mm, acute. *Pedicel and ovary* 8–18 mm, with the node up to 0.8 mm from the floral bract. *Flowers* fully open. *Median sepal* somewhat recurved, somewhat concave, elliptic to ovate, 13.0–17.5 by 8.0–10.5 mm, index (length/width) 1.6–2.0, shortly acuminate, base narrowly attached; rather thin, with 5 veins, 3 of which are prominent abaxially; glabrous. *Lateral sepals* free, recurved, not falcate, flat, oblique, ovate, 16–18 by 12–15 mm, index (length/width) 1.3–1.5; base rather broadly attached; all 5 veins prominent abaxially; otherwise as the median sepal. *Petals* recurved, not falcate, flat, elliptic, 12–15 by 6.5–8.0 mm, index (length/width) 1.6–1.9, acuminate, base rather narrowly attached; rather thin; with 5 veins; glabrous. *Lip* curved near the base and near the top, general outline ovate, 9–10 by 6.0–7.5 mm, index (length/width) 1.3–1.7 (not spread), tip obtuse, margins erose; rather thick and solid; adaxially with a concave basal part, without ridges, with a deep median furrow near the base, surface distinctly and rather finely verrucate; abaxially with a rather weak, retuse ridge over most of the length of the lip, surface glabrous. *Column* from ovary to the tip of the stelia 2.5–4.5 mm. *Stelidia* rather inconspicuous, not falcate, broadly rounded, 1.2–1.3 mm, tip minutely cuspidate, without teeth along the upper margin, with a distinct, triangular, obtuse wing along the lower margin, just below its base; stigma not protruding at its base, semi-circular. *Anther* abaxially with an inconspicuous, more or less glabrous ridge not overtopping the front margin; front margin slightly protruding, not concave, rounded, somewhat erose. *Pollinia* 4, ovoid, flattened on both sides, the inner almost as long as the outer. *Stipes* absent.

**Colours** — Leaves dull green. Sepals and petals cream-coloured with numerous pinkish purple specks. Lip pinkish purple, but whitish along the median line. Column pale yellow.

**Distribution** — Sarawak: 1st Division, Ulu Sungei Sematan, *cult. Jongejan 2207, 2226, 2245, 2248 (L)*.

**Ecology** — Found in primary forest. Altitude c. 50 m asl.

**Notes** — 1. *Bulbophyllum nabawanense* J.J. Wood & A. Lamb, is most similar; it differs in having wider leaves, usually 2-flowered inflorescence, and a subtriangular, broadly attached median sepal.

2. The name refers to the blotched flowers.

### ***Bulbophyllum taeter* J.J. Verm., *spec. nov.* — Fig. 17**

*Bulbophyllo lasiantho* sepalis extrinsecus longe pilosis, labello adaxialiter verrucoso summe summo differt. — Typus: *cult. Hort. Leiden 914592 (L)*.

*Rhizome* creeping, 5–9 mm diam. *Pseudobulbs* 1-leafed, elliptic to cylindrical, 7–14 cm apart, 4–7 by 1.9–3.0 cm, laterally flattened. *Petiole* 30–50 mm. *Leaf blade* ob-ovate, 30–38 by 6–8 cm, index (length/width) 3.7–5.9, acute to acuminate. *Inflorescence* c. 51 cm, c. 15-flowered. *Peduncle* patent, c. 42 cm; bracts 9, the longest c. 27 mm, acuminate. *Rachis* more or less nodding, not thickened, c. 9 cm by c. 4–5

mm, surface glabrous. *Floral bracts* ovate, 18–24 mm, acuminate. *Pedicel and ovary* 8.0–8.5 mm. *Flowers* scattered, in a rather dense raceme, many open at a given time, not fully open. *Median sepal* somewhat incurved, distinctly concave, ovate, c. 20 by 6 mm, index (length/width) 3.3–3.4, acuminate, margins entire, with some long hairs, base rather narrowly attached; rather thick, with 5 veins which are slightly prominent abaxially; surface adaxially glabrous, abaxially densely covered with long, straggling hairs. *Lateral sepals* adhering at the tip, somewhat falcate, oblique, triangular, c. 21 by 6 mm, index (length/width) c. 3.5, base broadly attached; otherwise as the median sepal. *Petals* erect, not falcate, elliptic, c. 14 by 2 mm, index (length/width) c. 7, acuminate, base broadly attached; rather thick; with 3 veins; glabrous. *Lip* curved near the base, general outline ovate, c. 8.2 by 6.0 mm, index (length/width) 1.3–1.4 (not spread), tip obtuse, margins slightly erose; rather thick and solid; adaxially with a concave basal part, with 2 rather inconspicuous, obtuse ridges which slightly diverge towards the base, with a deep median furrow near the base, surface slightly irregular, somewhat verrucate towards the tip; abaxially broadly convex, with a median furrow, surface glabrous. *Column* from ovary to the tip of the steldia c. 5.5 mm. *Steldia* rather inconspicuous, not falcate, linear, c. 1 mm, tip acute, column with a slightly forwards directed, deltoid, rounded wing along its lower margins; stigma not protruding at its base, about rectangular. *Anther* abaxially with an inconspicuous, about glabrous ridge not overtopping the front margin; front margin slightly protruding, not concave, rounded, somewhat erose. *Pollinia* 4, ovoid, flattened on both sides, the inner as long as the outer. *Stipes* absent.

**Colours** — Plant very dark green, leaves abaxially somewhat suffused with purple. Sepals very pale purple with pinkish purple hairs towards the base, dark blackish purple with partly white hairs towards the tip. Petals greenish at the base, dark blackish purple towards the margins and the tip. Lip mottled with dark purple, tip with some white spots, the somewhat protruding forming the base of the lip white, the surface of the lip yellow in between. Column whitish.

**Distribution** — Brunei: Belait District, Wasa Teraja path to waterfall, *cult. Hort. Leiden* 914592 (L).

**Ecology** — Found in high mixed dipterocarp forest on sandstone soil. Altitude 25 m asl. Flowers with a very offensive, sharp smell (hence the name).

**Note** — Differs from *B. lasianthum* Lindl., by its distinctly hairy sepals and the somewhat verrucate adaxial surface of the lip.

*Species not fitting in existing sections:*

***Bulbophyllum dewildei* J.J. Verm., spec. nov. — Fig. 18**

*Bulbophyllo biseto* inflorescentia elongata, basi sepali medialis dentibus 3 differt. — Typus: de Wilde & de Wilde-Duyffes 13981 (L).

*Rhizome* creeping, 3.5–4.0 mm diam. *Pseudobulbs* 1-leaved, ovoid, c. 5 cm apart, 2.0–2.3 by c. 1 cm, not flattened. *Petiole* 18–22 mm. *Leaf blade* obovate, 13.0–13.5 by 2.1–2.3 cm, index (length/width) 5.8–6.2, obtuse. *Inflorescence* 37–44 cm, 25–30-flowered. *Peduncle* pendulous, 29.5–37.0 cm; bracts 6, the longest 17–20 mm, acute. *Rachis* pendulous, swollen and spindle-shaped, with slight depressions

below the flowers, 7.0–7.5 cm by c. 4 mm, surface glabrous. *Floral bracts* triangular, 4.0–5.5 mm, acute. *Pedicel and ovary* c. 4.5 mm, with the node c. 1 mm from the bract; ovary at the tip with 3 triangular, acute teeth c. 3 mm long, 2 of these between the median and lateral sepals, the third in front of the median sepal. *Flowers* scattered, in a rather lax raceme, few open at a given time, not much open. *Median sepal* erect, concave, triangular, c. 7.3 by 2.2 mm, index (length/width) 3.3–3.4, shortly acuminate, base broadly attached; rather thick; with 3 veins which are very prominent abaxially, the median less so towards the base; glabrous. *Lateral sepals* touching at the tip, slightly falcate, oblique, triangular in lateral view, c. 9.8 by 4.0 mm, index (length/width) 2.4–2.5; margins glabrous; base rather broadly attached; abaxially with a very high median keel with an erose crest; surface slightly verrucate; otherwise as the median sepal. *Petals* erect, hardly falcate, flat, subrectangular with a widened base, c. 4.0 by 1.5 mm, index (length/width) 2.6–2.7, broadly rounded, base broadly attached; thin; with 1 vein; glabrous. *Lip* curved about half-way, general outline about ovate, c. 4.5 by 1.7 mm, index (length/width) 2.6–2.7 (not spread), tip slightly acuminate, margins slightly erose, glabrous; rather thick; adaxially with a deeply concave basal part and a distinct, transverse ridge just above the ligament, with 3 longitudinal, obtuse ridges ending at c. 2/3 of the length of the lip, two of these distinct, diverging and coinciding with the margins towards the base, the third along the median line, inconspicuous, starting about half-way the lip, adaxial surface papillose but glabrous towards the margins; abaxially with a distinct, retuse ridge up to 2/3 of the length of the lip, surface glabrous. *Column* from ovary to the tip of the steldia c. 3 mm; column foot with a distinct, conical, obtuse knob close to the base of the stigma. *Steldia* distinct, falcate, subulate, c. 1.7 mm, the tip minutely knob-shaped, without teeth along the upper margin, with a distinct, deltoid, obtuse wing along the lower margin, near the base; stigma distinctly protruding at its base, semi-circular. *Anther* abaxially with a distinct, about glabrous ridge not overtopping the front margin; front distinctly protruding, slightly concave, subacute, glabrous. *Polinia* (not seen). *Stipes* (not seen).

Colours — Flowers densely mottled with purple-brown.

Distribution — Indonesia: Sumatra, G. Leuser National Park, Gunung Ketambe area, *de Wilde & de Wilde-Duyffes 13981* (L).

Ecology — Found in mossy montane forest. Altitude 1500–1700 m asl. Found on a shaded tree trunk c. 3 m above the forest floor. Flowering observed in August.

Notes — 1. Differs from *B. bisetum* Lindl. by its elongated inflorescence, as well as by the presence of 3 teeth at the basis of the median sepal. *Bulbophyllum dewildei*, *B. bisetum*, and *B. bisetoides* Seidenf. could be included in sect. *Globiceps* Schltr., but differ from this section in having long, subulate steldia. They are probably best accommodated in a separate section.

2. The species are probably autogamous: almost all flowers develop into fruits.

3. The species is named in honour of Dr. W.J.J. O. de Wilde (L), who has recently completed the enormous task of revising the Myristicaceae for Flora Malesiana.

### *Bulbophyllum laetum* J.J. Verm., *spec. nov.* — Fig. 19

Flores *B. medusae* similes, a quo pseudobulbi crebri, inflorescentia 2-flora differt. — Typus: cult. Hort. Leiden 914140 (L).

*Rhizome* creeping, 1.0–1.2 mm diam. *Pseudobulbs* 1-leafed, ovoid, 0.4–0.7 cm apart, 0.4–0.9 by 0.3–0.5 cm, not laterally flattened. *Petiole* 0.5–3.0 mm. *Leaf blade* ovate, 0.9–2.9 by 0.4–0.6 cm, index (length/width) 2–6, acute. *Inflorescence* 4–5 cm, 2-flowered. *Peduncle* erect or patent, 3.0–3.8 cm; bracts 3, the longest 3–4 mm, shortly acuminate. *Rachis* erect, somewhat thickened, 0.10–0.15 cm by c. 0.8 mm, surface glabrous. *Floral bracts* ovate, c. 3 mm, acuminate. *Pedicel and ovary* 2.8–4.0 mm. *Flowers* fully open. *Median sepal* somewhat recurved, concave, elliptic, c. 16.0 by 3.5 mm, index (length/width) 4.5–4.6, caudate (cauda c. 10 mm long), base rather narrowly attached; rather thin; glabrous. *Lateral sepals* free, recurved, not concave, falcate, oblique, ovate, c. 20 by 3 mm, index (length/width) 6.6–6.7, base broadly attached; otherwise as the median sepal. *Petals* erect, not falcate, elliptic, c. 3 by 2 mm, index (length/width) c. 1.5, acute, base rather narrowly attached; thin; with 3 veins; glabrous. *Lip* curved about half-way, general outline ovate, c. 2.4 by 1.4 mm, index (length/width) 1.7–1.8 (not spread), tip obtuse, margins entire, slightly and very finely papillose; rather thick; surface slightly and very finely papillose; adaxially with a widely concave basal part, with 2 rather inconspicuous, obtuse ridges diverging and coinciding with the margins towards the base, continuing over about the full length of the lip, without a median furrow; abaxially with a rather inconspicuous, retuse ridge up to 2/3 of the length of the lip. *Column* from ovary to the tip of the stelia c. 2.5 mm. *Stelia* distinct, slightly falcate, triangular, c. 0.9 mm, tip acute, without teeth along the margins; stigma not protruding at its base, more or less drop-shaped. *Anther* abaxially with a rather distinct, more or less glabrous ridge slightly overtopping the front margin; front margin not protruding, not concave, rounded, glabrous. *Pollinia* 4, semi-elliptic, flattened on both sides, the inner about as long as the outer. *Stipes* absent.

Colours — Sepals and petals buttercup-yellow. Lip orange red.

Distribution — Malaysia: Sarawak, 4th Division, Mt Hose, *cult. Hort. Leiden 914140* (L).

Ecology — Found in podzolic forest with much moss on the forest floor. Altitude c. 1000 m asl.

Notes — 1. Does not fit well in any existing section. Among the species with a creeping rhizome of sect. *Desmosanthes* (Blume) J.J. Sm., it can be distinguished at once because of its closely placed pseudobulbs and its median sepal which narrows rather abruptly into a cauda. The flowers are rather similar to those of *B. medusae* (Lindl.) Rchb. f., but this species is much larger in all parts, and has a many-flowered inflorescence. The general habit of *B. laetum* is reminiscent of a group of species around *B. biflorum* Teijsm. & Binn., and *B. hymenochilum* Kraenzl., although these species are all larger, and have larger flowers.

2. The name refers to the bright colour of the flowers.

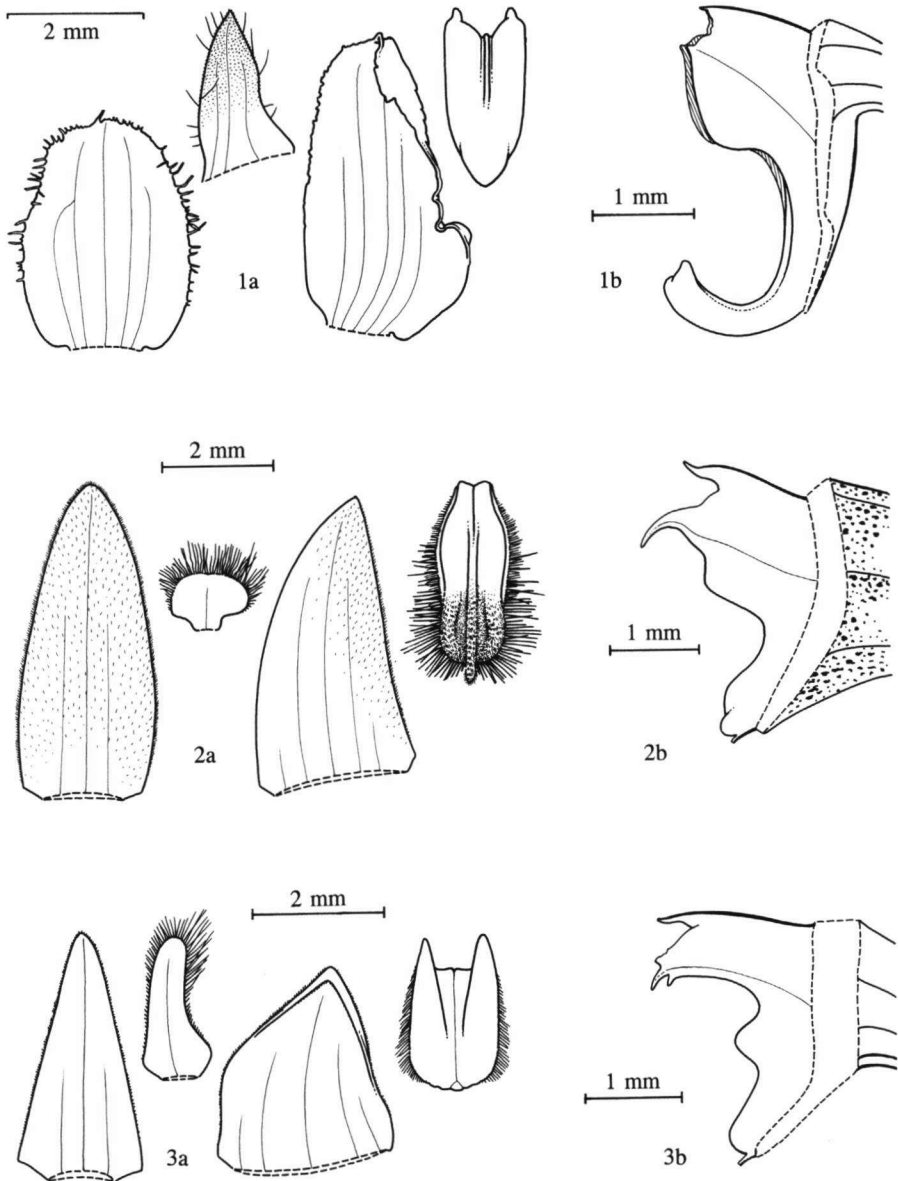


Fig. 1. *Bulbophyllum subbullatum* J.J. Verm. a. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; b. column, lateral view (cult. Jongejan 2419). — Fig. 2. *B. aithorhachis* J.J. Verm. a. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; b. column, lateral view (cult. Jongejan 2219). — Fig. 3. *B. polycyclum* J.J. Verm. a. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; b. column, lateral view (cult. Hort. Leiden 913457).

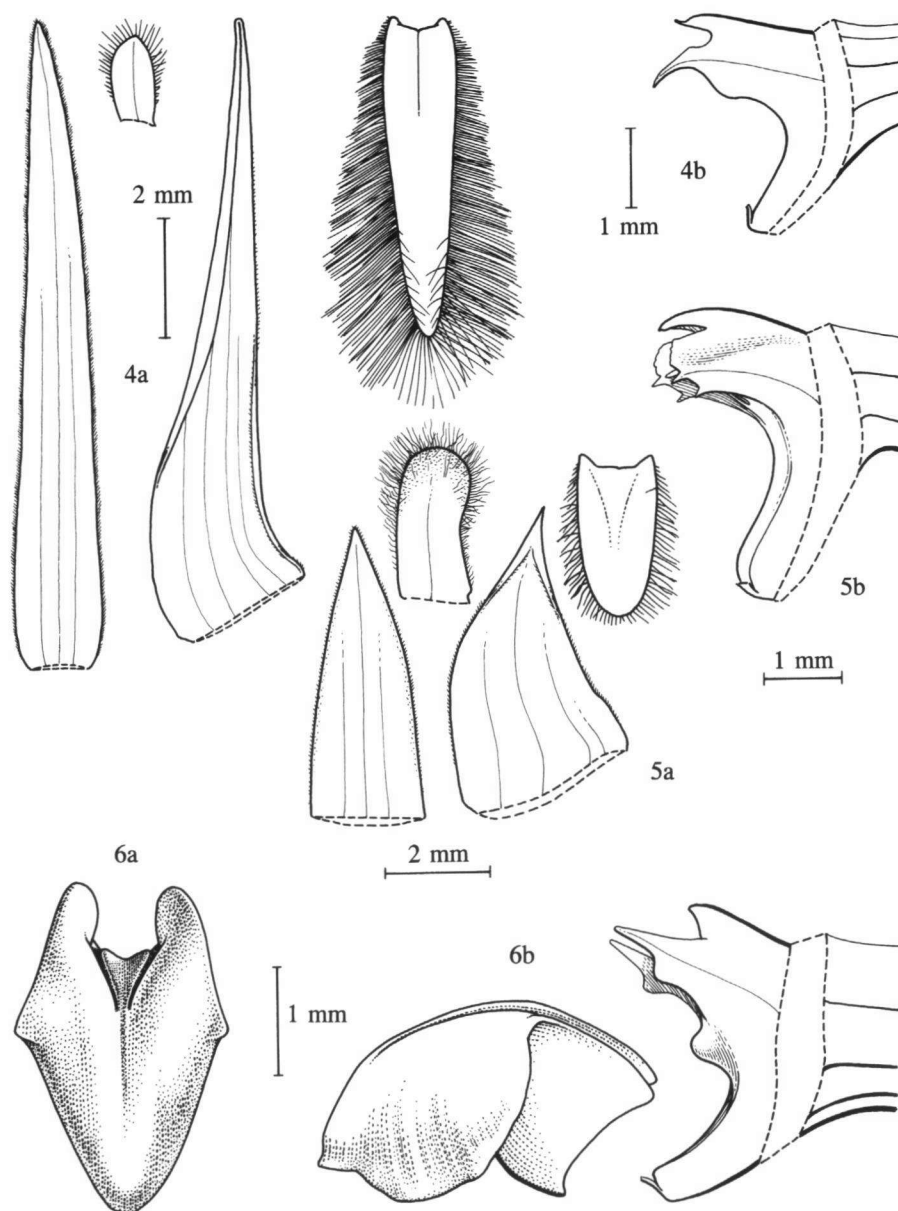


Fig. 4. *Bulbophyllum xenosum* J.J. Verm. a. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; b. column, lateral view (cult. Jongejan 4425). — Fig. 5. *B. xiphion* J.J. Verm. a. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; b. column, lateral view (cult. Hort. Leiden 913241). — Fig. 6. *B. fulgens* J.J. Verm. a. Lip, adaxial view; b. column and lip, lateral view (cult. Jongejan 1948).

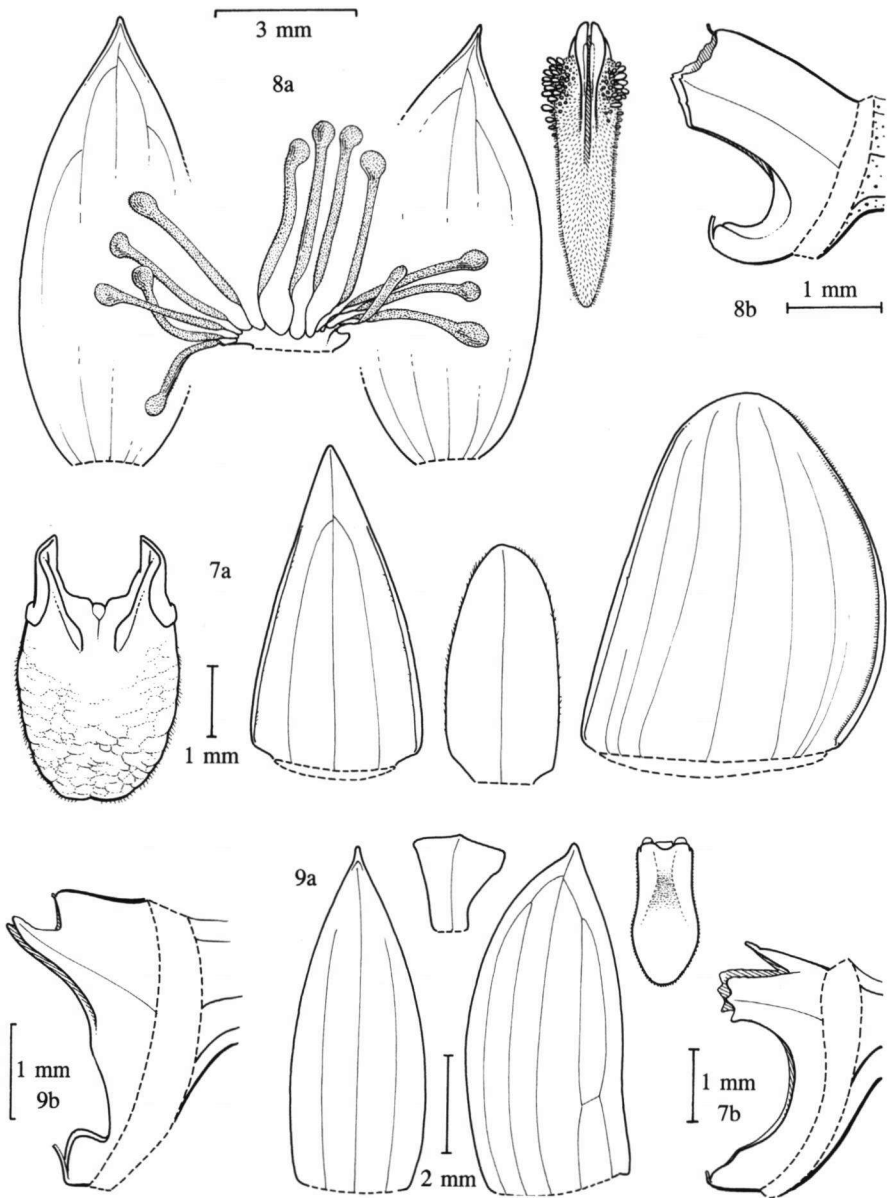


Fig. 7. *Bulbophyllum cerebellum* J.J. Verm. a. Flower analysis, from left to right: lip, median sepal, petal, lateral sepal; b. column, lateral view (Giles 998). — Fig. 8. *B. cyanotriche* J.J. Verm. a. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; b. column, lateral view (Lamb 1513/92). — Fig. 9. *B. spissum* J.J. Verm. a. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; b. column, lateral view (O'Byrne LING 010).

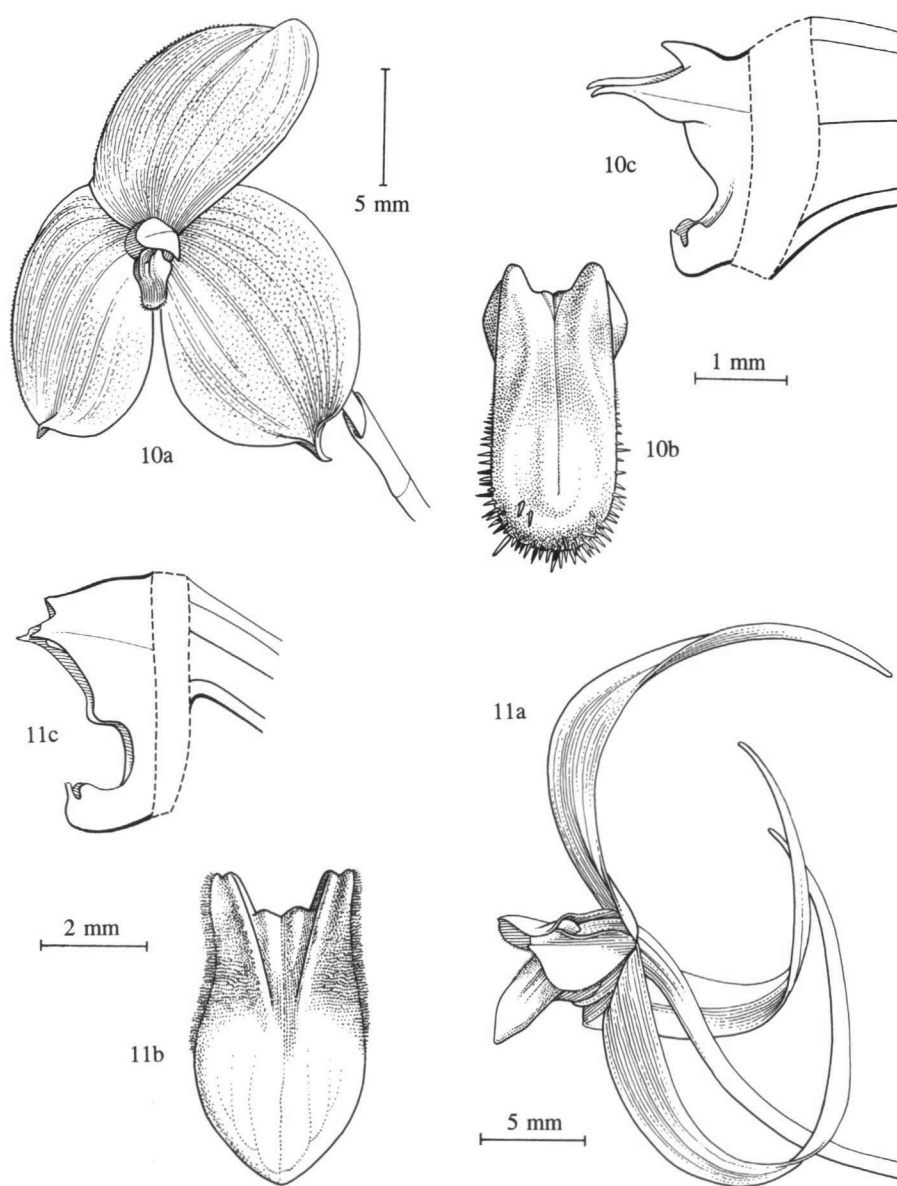


Fig. 10. *Bulbophyllum pseudotrias* J.J. Verm. a. Flower; b. lip, adaxial side; c. column, lateral view (cult. Jongejan 1529). — Fig. 11. *B. leptobulbon* J.J. Verm. a. Flower; b. lip, adaxial side; c. column, lateral view (cult. Jongejan 774).



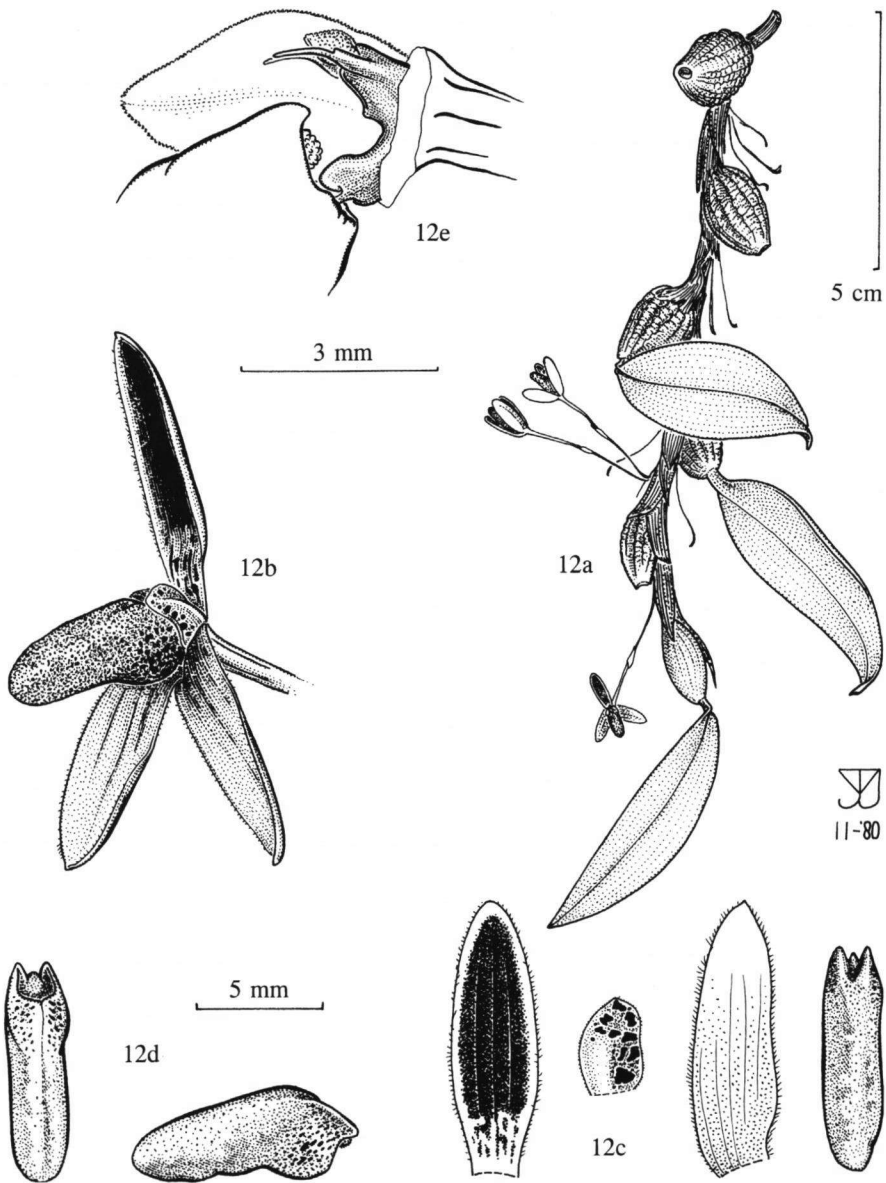


Fig. 12. *Bulbophyllum spongiola* J.J. Verm. a. Plant; b. flower; c. flower analysis, from left to right: median sepal, petal, lateral sepal, lip; d. lip, abaxial view (left) and lateral view; e. column and base of lip, lateral view (cult. Jongejan 109).

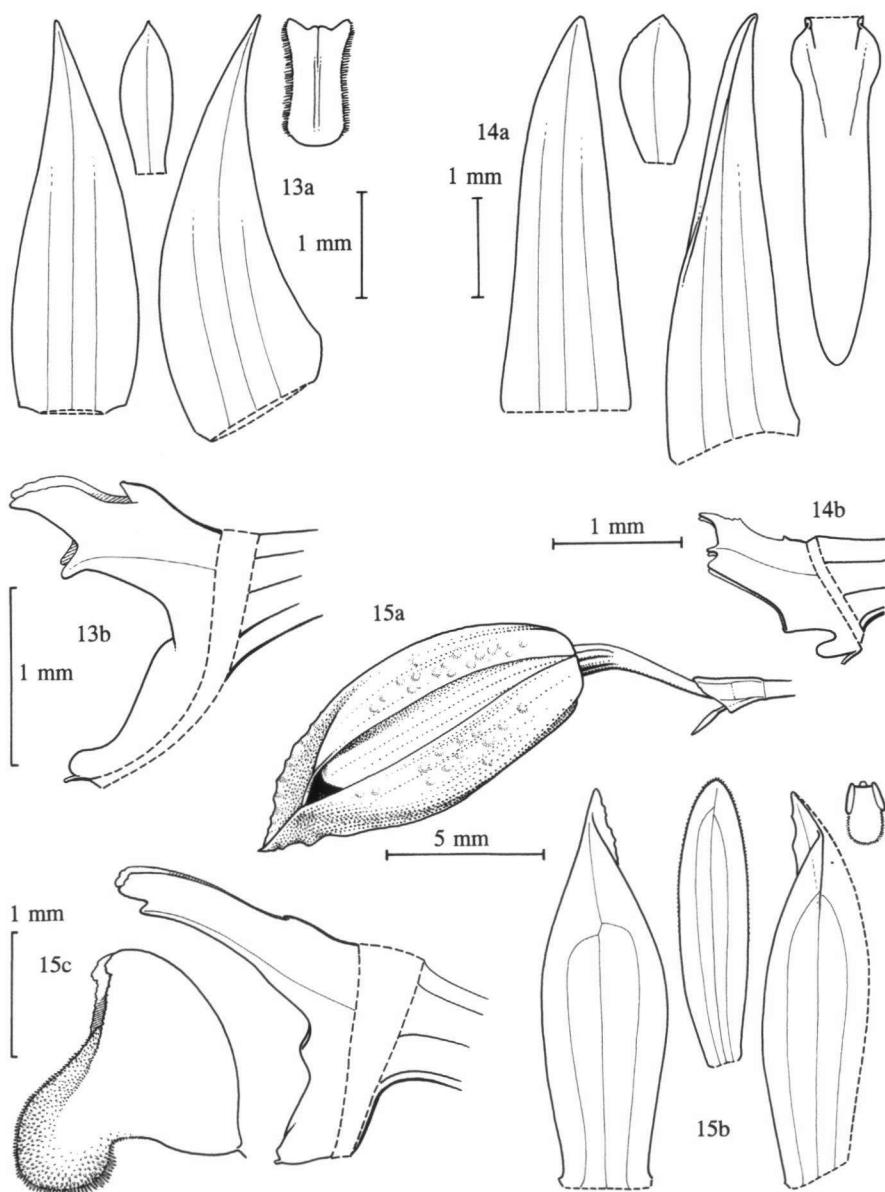


Fig. 13. *Bulbophyllum camptochilum* J.J. Verm. a. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; b. column, lateral view (*cult. Jongejan 2337*). — Fig. 14. *B. cavipes* J.J. Verm. a. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; b. column, lateral view (*de Wilde & de Wilde-Duyffes 14612*). — Fig. 15. *B. foraminiferum* J.J. Verm. a. Flower; b. flower analysis, from left to right: median sepal, petal, lateral sepal, lip; c. column and lip, lateral view (*cult. Leiden 914135*).

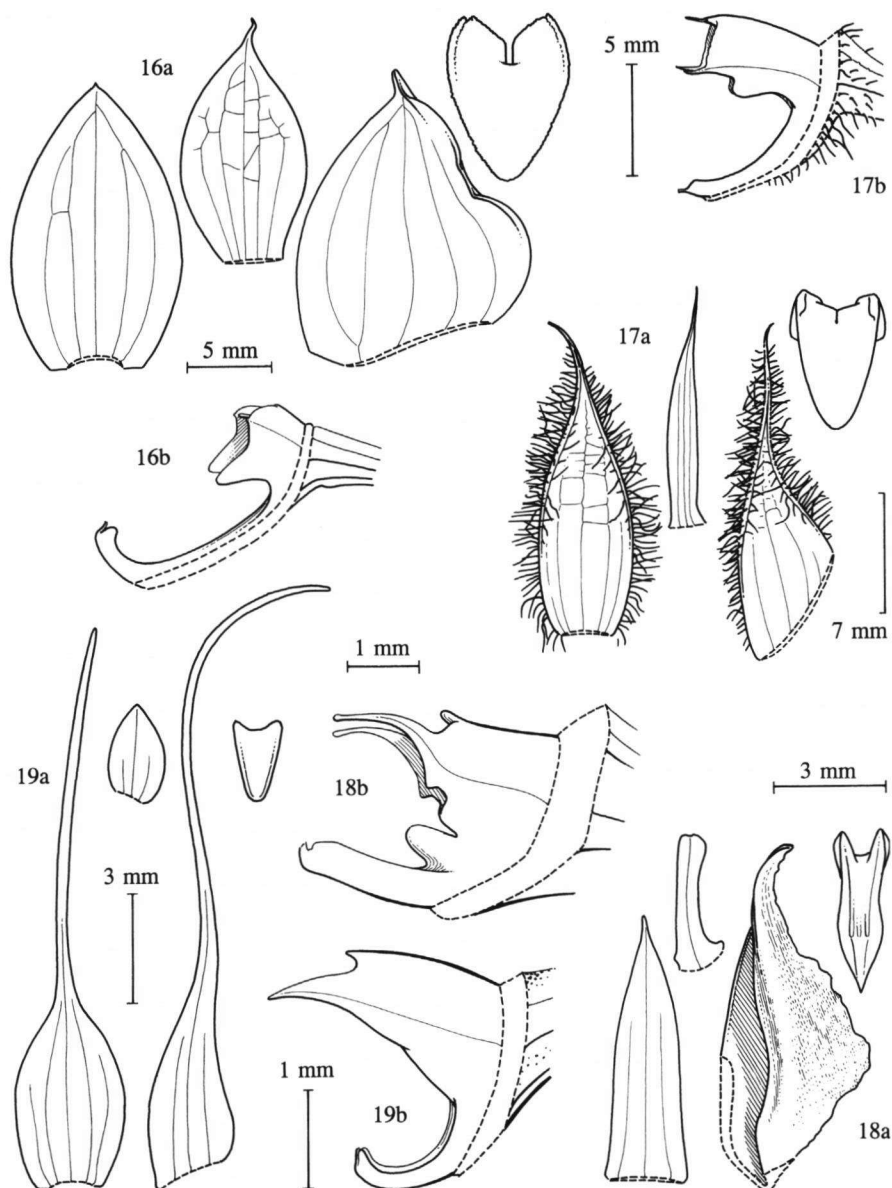


Fig. 16. *Bulbophyllum signatum* J.J. Verm. a. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; b. column, lateral view (*cult. Jongejan 2207*). — Fig. 17. *B. taeter* J.J. Verm. a. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; b. column, lateral view (*cult. Hort. Leiden 914592*). — Fig. 18. *B. dewildei* J.J. Verm. a. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; b. column, lateral view (*de Wilde & de Wilde-Duyffes 13981*). — Fig. 19. *B. laetum* J.J. Verm. a. Flower analysis, from left to right: median sepal, petal, lateral sepal, lip; b. column, lateral view (*cult. Hort. Leiden 914140*).

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