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Nomenclatural changes in *Bulbophyllum* (Orchidaceae; Epidendroideae)

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Abstract

New combinations in *Bulbophyllum* (Orchidaceae) are made to correspond to the revised classification of the genus in *Genera orchidacearum*, vol. 6. Several new sections introduced in that publication are formally described and validated here.

Key words: Bulbophyllinae, Dendrobieae, infrageneric classification, large genera

Introduction

Opinions about the number of genera within the former subtribe Bulbophyllinae (now subsumed in the tribe Dendrobieae) vary between extremes. Some recognized only a few small satellite genera in addition to the megagenus *Bulbophyllum*, e.g. Vermeulen (1996), whereas others, e.g. Clements & Jones (2002) and Szlachetko & Margońska (2001), divided the genus into numerous smaller genera. Over the years, more than 50 generic names have been proposed in addition to *Bulbophyllum*. In *Genera orchidacearum* (Pridgeon *et al.* 2014), supported by unpublished DNA studies by Gravendeel and coworkers, only a single genus is recognized within the former Bulbophyllinae. However, that publication presents only the outline of a revised classification of *Bulbophyllum*. A more detailed account of the Asian and Australian sections of *Bulbophyllum* is in preparation by the authors. New infrageneric nomenclature for *Genera orchidacearum*, as far as it is relevant to our forthcoming account, is validated below, along with the many new combinations made here. We hope that this will bring stability to the nomenclature of *Bulbophyllum*. Among the better-known genera of which the species are here formally transferred to *Bulbophyllum* are *Drymoda*, *Pedilochilus*, *Sunipia* and *Trias*. The necessary new combinations for species in the former genus *Monosepalum* were recently made by Shaw (2014).

Taxonomy

SECTION ACROCHAENE

Bulbophyllum* section *Acrochaene (Lindl.) J.J.Verm., Schuit. & de Vogel, *stat. nov.*

Basionym: *Acrochaene* Lindley (1853: *Acrochaene* 1).

SECTION BLEPHARISTES

Bulbophyllum* section *Blepharistes J.J.Verm., Schuit. & de Vogel, *sect. nov.*

Type species: *Bulbophyllum blepharistes* Reichenbach (1872: 278).

Epiphytic herbs with creeping or straggling rhizomes, shoots developing from nodes below the pseudobulbs, not fused to these; rhizome scales approx. glabrous. Roots spreading, approx. glabrous to rugose. Pseudobulbs conspicuous compared to the

size of the plant, 2-leafed, minutely papillose. Leaves persistent, veins inconspicuous. Inflorescences developing from the basal node of pseudobulbs, solitary, a many-flowered, subumbellate raceme with spirally arranged flowers. Peduncle scales 8–9. Rachis somewhat thickened. Flowers per inflorescence 1–few open simultaneously; floral bracts not amplexicaul; pedicel with the basal node less than 0.5 times the diameter of the pedicel above the attachment of the floral bract, distinctly longer than the ovary. Median sepal free, 15–20 mm long, approx. triangular, acute, margins entire; glabrous, 7–9-veined; lateral sepals as the median but 1.1–1.2 times as long, adnate along their lower margins. Petals 3–4 mm long, elliptic to obovate, almost circular, retuse to rounded, distal margin erose and fimbriate, margins glabrous, adaxial surface distally finely papillose, 5-veined. Lip mobile on a thin ligament, undivided, 4.5–5.0 mm long, ovate-cordate (without spreading), margins entire; glabrous; adaxially with 2 flattened, retrorse, calli close to the base. Column with the rostellum front almost level with the stelia apices, stigma proximally not protruding, column foot tapering towards the apex, with a small, flat, median tooth near the apex. Stelia shorter than 1/2 of the length of the column with stelia, deltoid, acute, upper margin slightly erose, lower margin with an inconspicuous, rounded wing. Anther abaxially with a low, rounded crest; connective hardly concave, margin not drawn-out. Pollinia 4, the inner almost as long as the outer; without appendages.

This section differs from other Asiatic sections with 2-leafed pseudobulbs by having persistent leaves; it differs from extralimital 2-leafed sections by having a subumbellate inflorescence.

SECTION CODONOSIPHON

Bulbophyllum* section *Codonosiphon Schlechter (1911: 178).

Bulbophyllum campanuliflorum J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Codonosiphon campanulatum* Schlechter (1913 [1911–1914]: 894).

Not *Bulbophyllum campanulatum* Rolfe (1909: 62).

Bulbophyllum saccoglossum J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Saccoglossum papuanum* Schlechter (1912 [1911–1914]: 684).

Not *Bulbophyllum papuanum* (Schltr.) J.J.Verm., Schuit. & de Vogel; see section *Pedilochilus*.

Bulbophyllum smileiphyllum J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Saccoglossum lanceolatum* Williams (1943: 297).

Not *Bulbophyllum lanceolatum* Ames & Schweinfurth (1920 : 180).

Bulbophyllum takeuchii (Howcroft) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Saccoglossum takeuchii* Howcroft (2001: 519).

Bulbophyllum verrucosum (L.O.Williams) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Saccoglossum verrucosum* Williams (1943: 297).

SECTION DRYMODA

Bulbophyllum* section *Drymoda (Lindl.) J.J.Verm., Schuit. & de Vogel, *stat. nov.*

Basionym: *Drymoda* Lindley (1838 [1837–1841]: pl. 8c).

Bulbophyllum ayuthayense J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Drymoda siamensis* Schlechter (1906: 170).

Not *Bulbophyllum siamense* Reichenbach (1867 : 572).

Bulbophyllum drymoda J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Drymoda picta* Lindley (1838 [1837–1841]: pl. 8c).

Not *Bulbophyllum pictum* Reichenbach (1874: 150)

Not *Bulbophyllum pictum* Schlechter (1913 [1911–1914]: 758).

SECTION EUBLEPHARON

Bulbophyllum* section *Eublepharon J.J.Verm., Schuit. & de Vogel, *sect. nov.*

Type species: *Bulbophyllum eublepharum* Reichenbach (1861: 252).

Epiphytic herbs with creeping, sometimes partly straggling rhizomes; shoots developing from nodes below the pseudobulbs, not fused to these; rhizome scales approx. glabrous to densely and finely papillose. Roots glabrous, shortly papillose-hirsute in places. Pseudobulbs distinct, wrinkling with age along longitudinal lines, 1-leafed. Leaves persistent, veins inconspicuous to distinct. Inflorescences developing from below the pseudobulbs; solitary, a 2–many-flowered, elongated to subumbellate raceme with spirally arranged flowers. Peduncle scales 3–5. Rachis not thickened. Flowers per inflorescence open simultaneously; floral bracts not amplexicaul; pedicel with the basal node less than 1 time its diameter above the attachment of the floral bract, distinctly longer than the ovary. Median sepal free, 2.7–9.0 mm long, elliptic to ovate, rounded to acuminate, margins entire to erose or denticulate, glabrous to somewhat papillose, surface glabrous, rarely irregularly papillose abaxially; 3–5-veined; lateral sepals as the median but 1–2 times as long, free or adnate along the lower margin, 3–15 mm long, elliptic to ovate-triangular, obtuse to long-acuminate, margins entire, rarely erose, 3–5-veined. Petals 1.8–5.0 mm long, elliptic-obovate to ovate, rounded to acuminate, margins slightly erose to denticulate to fimbriate, (minutely) papillose to ciliate, surface glabrous; 1–3-veined. Lip mobile on a thin ligament, undivided, 1.8–3.6 mm long, elliptic to triangular (without spreading), margins entire; glabrous to finely papillose in places; adaxially without ridges, or with 2 inconspicuous to distinct ridges. Column with the rostellum front receding in between the stelia, stigma proximally not protruding, column foot widening or thickening towards its apex, with patent teeth and/or a transverse ridge near the apex. Stelia 1/2 of the length of the column with stelia or shorter; approx. deltoid to subulate, without teeth or with an inconspicuous tooth along the upper margin, or upper margin denticulate, without teeth or with a deltoid, obtuse wing along the lower margin. Anther abaxially with a small, rounded crest; connective not concave, margin drawn-out or not. Pollinia 4, the inner 0.7–0.9 times as long as the outer; appendages absent.

Several species of section *Eublepharon* have ciliate petals, a character shared with section *Hirtula*. The two differ by the pseudobulbs that wrinkle with age along longitudinal lines in section *Eublepharon* rather than in random patterns as in section *Hirtula*. Additionally, section *Eublepharon* never has auricles at the base of the lip, flanking the ligament. Species of section *Eublepharon* with a congested or subumbellate raceme resemble section *Recurvae* and section *Rhytionanthos*, but differ by having the lateral sepals not curved inwards proximally.

SECTION IMITATORES

Bulbophyllum* section *Imitatores J.J.Verm., Schuit. & de Vogel, *sect. nov.*

Type species: *Bulbophyllum imitator* Vermeulen (1992: 7).

Epiphytic herbs with patent to pendulous rhizomes; shoots developing from nodes below the pseudobulbs, not fused to these; rhizome scales glabrous to colliculate or transversely ribbed. Roots spreading, approx. glabrous to finely hirsute in places. Pseudobulbs distinct to minute compared to the size of the plant, 1-leafed. Leaves persistent, veins inconspicuous. Inflorescences developing from nodes below pseudobulbs, also from nodes scattered along the rhizome, solitary or few-fasciculate, 1-flowered, or a 2–many-flowered, subumbellate or a congested raceme with spirally arranged flowers. Peduncle scales c. 3. Rachis, if present, not thickened. Flowers usually approx. all open simultaneously per inflorescence if racemose; floral bracts not amplexicaul, or (the upper) amplexicaul if inflorescence 1–2-flowered; pedicel with the basal node 0.3–1.5 times the diameter of the pedicel above the floral bract attachment, shorter to distinctly longer than the ovary. Sepals free, more or less equal, 3–7(25) mm long, elliptic to triangular, obtuse to acuminate, margins entire; glabrous, 3(5)-veined. Petals 1.2–2.7(5) mm long, elliptic to (ob-)ovate, obtuse to acuminate, margins entire to slightly erose; glabrous, 1(3)-veined. Lip mobile on a thin ligament, undivided, 1.0–1.8 (7.0) mm long, ovate (without spreading), margins entire; glabrous; adaxially usually with 2 ridges, rarely without ridges. Column with the rostellum front approx. level with the stelia apices or somewhat receding in between these, stigma proximally not protruding, column foot tapering or slightly widening towards its apex, without teeth. Stelia shorter to longer than 1/2 of the length of the column with stelia; short but not vestigial, triangular, margins without teeth or with a tooth along the upper and lower margin. Anther abaxially with a low, rounded crest; connective not concave, margin not drawn-out, or with a small, triangular beak. Pollinia 2, or 4 with the inner 0.5–0.6 times as long as the outer; without appendages.

This section is most similar to section *Macrouris*, but the proximal edge of the stigma does not protrude from the column face.

SECTION IONE

Bulbophyllum* section *Ione (Lindl.) J.J.Verm., Schuit. & de Vogel, *stat. nov.*

Basionym: *Ione* Lindley (1853: Ione 1).

Synonym: Section *Sunipia* auct. J.J.Verm. in Pridgeon *et al.* (2014: 39).

Not *Sunipia* Buchanan-Hamilton ex Smith in Rees (1816, Art. Stelis nos. 11 & 13).

Notes: Typification of *Ione* with *B. paleaceum* (Lindley 1853: Ione 2) Hooker (1890 [1886-1890]: 769) in Pridgeon *et al.* (2014: 5) is superfluous because Senghas (1991: 1467) designated *Ione bicolor* Lindl. as type species.

Bulbophyllum angustipetalum (Seidenf.) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Sunipia angustipetala* Seidenfaden (1980: 7).

Bulbophyllum arunachalense (A.N.Rao) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Ione arunachalense* Rao (1997:48).

Bulbophyllum australe (Seidenf.) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Ione australis* Seidenfaden (1969: 234).

Bulbophyllum bifurcatoflorens (Fukuyama) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Ione bifurcatoflorens* Fukuyama (1935: 440).

Bulbophyllum cumberlegei (Seidenf.) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Ione cumberlegei* Seidenfaden (1969: 217).

Bulbophyllum interpositum J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Ione intermedia* King & Pantling (1896: 120).

Not *Bulbophyllum intermedium* Bailey (1896: 12).

Not *Bulbophyllum intermedium* De Wildeman (1916 [1916–1919]: 176).

Bulbophyllum jainii (Hynn. & Malhotra) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Sunipia jainii* Hynniewta & Malhotra (1978: 31).

Bulbophyllum kachinense (Seidenf.) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Sunipia kachinensis* Seidenfaden (1981: 211).

Bulbophyllum kipgenii (Kishor, Chowlu & Vij) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Ione kipgenii* Kishor, Chowlu & Vij (2012: 517).

Bulbophyllum lomsakense J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Ione thailandica* Seidenfaden & Smitinand (1965 [1958–1965]: 813).

Not *Bulbophyllum thailandicum* Seidenfaden & Smitinand (1965 [1958–1965]: 797).

Bulbophyllum lopalanthum J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Ione grandiflora* Rolfe (1908: 413).

Not *Bulbophyllum grandiflorum* Blume (1850: 42).

Bulbophyllum medioximum J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Ione annamensis* Ridley (1921: 115).

Not *Bulbophyllum annamense* (Garay 1999: 306) Sieder & Kiehn in Sieder *et al.* (2009: 406).

Bulbophyllum minutior J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Ione minor* Seidenfaden (1969: 218).

Not *Bulbophyllum minus* De Wildeman (1921: 94).

Bulbophyllum raskotii J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Sunipia nepalensis* Raskoti & Ale (2011: 55).

Not *Bulbophyllum nepalense* Raskoti & Ale (2013: 381).

Bulbophyllum nigricans (Aver.) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Sunipia nigricans* Averyanov (2007: 302).

Bulbophyllum pallidulum (Aver.) J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Ione pallida* Averyanov (1997: 143).

Not *Bulbophyllum pallidum* Seidenfaden (1979: 206).

Bulbophyllum purpureofusum J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Ione fuscopurpurea* Lindley (1853: Ione 2).

Not *Bulbophyllum fuscopurpureum* Wight 1852: t. 1651).

Bulbophyllum sunipia J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Sunipia scariosa* Lindley (1833 [1830–1840]: 179).

Not *Bulbophyllum scariosum* Summerhayes (1953: 145).

Bulbophyllum rimannii (Rchb.f.) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Acrochaene rimannii* Reichenbach (1882: 796).

Bulbophyllum roseopictum J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Ione bicolor* Lindley (1853: Ione 3).

Not *Bulbophyllum bicolor* Lindley (1830 [1830–1840]: 49).

Bulbophyllum rutiliflorum J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Ione rutilans* Seidenfaden (1995: 54).

Not *Bulbophyllum rutilans* Vermeulen & Lamb (2008: 68).

Bulbophyllum sasakii (Hayata) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Ione sasakii* Hayata (1912: 139).

Bulbophyllum soidaoense (Seidenf.) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Ione soidaoensis* Seidenfaden (1969: 220).

Bulbophyllum tsii J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Sunipia hainanensis* Z.H.Tsi in Tsi, Chen & Ding (1995: 590)

Not *Bulbophyllum hainanense* Z.H.Tsi (1982: 118).

Bulbophyllum xanthochloron J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Ione viridis* Seidenfaden (1969: 222).

Not *Bulbophyllum viride* Rolfe (1893: 170).

SECTION LEOPARDINAE

Bulbophyllum* section *Leopardinae Bentham & Hooker (1883 [1880–1883]: 502).

Bulbophyllum yunnanense Rolfe (1903: 14).

Heterotypic synonym: *Trias verrucosa* Liu *et al.* (2007: 4461).

SECTION LEPANTHANTHE

Bulbophyllum* section *Lepanthanthe Schlechter (1913 [1911–1914]: 704, 875.

Bulbophyllum paulianum J.J.Verm., Schuit. & de Vogel, *spec. nov.*

Type:—PAPUA NEW GUINEA. Eastern Highland Province, Goroka, Gahavisuka National Park, *cult. Jongejan 1342* (L!).

Bulbophyllum nephropetalum auct. Vermeulen (1993: 81).

Notes: The interpretation and neotypification of *B. nephropetalum* Schltr., in Vermeulen (1993) has to be rejected. Various parts of Schlechter's original description show that *B. nephropetalum* is synonymous with *B. erinaceum* Schltr., such as the leaf width, the shape of the appendage of the median sepal and the shape of the lip. Here, *B. nephropetalum* auct. Vermeulen (1993 : 81) is renamed in honour of Paul Ormerod, who drew the first author's attention to this and other mistakes in his earlier work.

SECTION MACROCAULIA

Bulbophyllum* section *Macrocaulia (Blume 1825: 318) Averyanov (1994: 279).

Bulbophyllum jeosephii J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Trias pusilla* Joseph & Deka (1973: 378).

Not *Bulbophyllum pusillum* Petit Thouars (1822: t. 102).

Not *Bulbophyllum pusillum* De Wildeman (1921: 95).

SECTION MONOMERIA

Bulbophyllum* section *Monomeria (Lindl.) J.J.Verm., Schuit. & de Vogel, *stat. nov.*

Basionym: *Monomeria* Lindley (1830 [1830–1840]: 61).

Bulbophyllum crabro (E.C.Parish & Rchb.f.) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Monomeria crabro* Reichenbach (1874: 143).

Heterotypic synonym: *Bulbophyllum monomeria* J.J.Verm. in Pridgeon *et al.* (2014: 33), *nom. inval.*

Bulbophyllum fengianum (Ormerod) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Monomeria fengiana* Ormerod (2011: 44).

SECTION PEDILOCHILUS

Bulbophyllum* section *Pedilochilus (Schltr.) J.J.Verm. & O'Byrne (2011: 199).

Bulbophyllum alpinum (P.Royen) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Pedilochilus alpinum* Van Royen (1979: 251).

Bulbophyllum araiophyllum J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Pedilochilus angustifolius* Schlechter (1919b: 120)

Not *Bulbophyllum angustifolium* (Blume 1825: 310) Lindley (1830 [1830–1840] : 57).

Not *Pedilochilus angustifolium* Schlechter (1912 [1911–1914]: 687).

Bulbophyllum balgooiji J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Pedilochilus subalpinum* Van Royen (1979: 267).

Not *Bulbophyllum subalpinum* Van Royen (1979: 180).

Bulbophyllum brachiatum (Schltr.) J.J.Verm., Schuit. & de Vogel, *comb. nov.*
Basionym: *Pedilochilus brachiatus* Schlechter (1919: 47).

Bulbophyllum brachypus (Schltr.) J.J.Verm., Schuit. & de Vogel, *comb. nov.*
Basionym: *Pedilochilus brachypus* Schlechter (1912 [1911–1914]: 692).

Bulbophyllum clemensiorum J.J.Verm., Schuit. & de Vogel, *nom. nov.*
Replaced name: *Pedilochilus clemensiae* Williams (1946: 162).
Not *Bulbophyllum clemensiae* Ames (1912: 129).

Bulbophyllum cyatheicola (P.Royen) J.J.Verm., Schuit. & de Vogel, *comb. nov.*
Basionym: *Pedilochilus cyatheicola* Van Royen (1979: 256).

Bulbophyllum dolichopus J.J.Verm., Schuit. & de Vogel, *nom. nov.*
Replaced name: *Pedilochilus longipes* Schlechter (1912 [1911–1914]: 691).
Not *Bulbophyllum longipes* Reichenbach (1861: 253).

Bulbophyllum erythrokyle J.J.Verm., Schuit. & de Vogel, *nom. nov.*
Replaced name: *Pedilochilus stictanthum* Schlechter (1912 [1911–1914]: 693).
Not *Bulbophyllum stictanthum* Schlechter (1913 [1911–1914]: 726).

Bulbophyllum hermonii (Cribb & B.Lewis) J.J.Verm., Schuit. & de Vogel, *comb. nov.*
Basionym: *Pedilochilus hermonii* Cribb & Lewis (1989: 135).

Bulbophyllum kermesinostriatum (J.J.Sm.) J.J.Verm., Schuit. & de Vogel, *comb. nov.*
Basionym: *Pedilochilus kermesinostriatum* Smith (1915: 16).

Bulbophyllum lagaropetalum J.J.Verm., Schuit. & de Vogel, *nom. nov.*
Replaced name: *Pedilochilus parvulum* Schlechter (1912 [1911–1914]: 686).
Not *Bulbophyllum parvulum* Lindley (1830 [1830–1840]: 49).

Bulbophyllum lagarophyllum J.J.Verm., Schuit. & de Vogel, *nom. nov.*
Replaced name: *Pedilochilus angustifolium* Schlechter (1912 [1911–1914]: 687).
Not *Bulbophyllum angustifolium* (Blume 1825: 310.) Lindley (1830 [1830–1840]: 57).
Not *Pedilochilus angustifolius* Schlechter (1919b: 120).

Bulbophyllum leptotriche J.J.Verm., Schuit. & de Vogel, *nom. nov.*
Replaced name: *Pedilochilus ciliolatum* Schlechter (1912 [1911–1914]: 688).
Not *Bulbophyllum ciliolatum* Schlechter (1913 [1911–1914]: 809).

Bulbophyllum macrorrhinum (P.Royen) J.J.Verm., Schuit. & de Vogel, *comb. nov.*
Basionym: *Pedilochilus macrorrhinum* Van Royen (1979: 265).

Bulbophyllum montisdischorensense J.J.Verm., Schuit. & de Vogel, *nom. nov.*
Replaced name: *Pedilochilus dischorensense* Schlechter (1912 [1911–1914]: 689).
Not *Bulbophyllum dischorensense* Schlechter (1913 [1911–1914]: 775).

Bulbophyllum obovatum (J.J.Sm.) J.J.Verm., Schuit. & de Vogel, *comb. nov.*
Basionym: *Pedilochilus obovatum* Smith (1929: 441).

Bulbophyllum oreomene J.J.Verm., Schuit. & de Vogel, *nom. nov.*
Replaced name: *Pedilochilus montana* Ridley (1916: 190).
Not *Bulbophyllum montanum* Schlechter (1913 [1911–1914]: 801).

Bulbophyllum papuanum (Schltr.) J.J.Verm., Schuit. & de Vogel, *comb. nov.*
Basionym: *Pedilochilus papuanum* Schlechter (1905: 219).

Bulbophyllum pedilochilus J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Pedilochilus guttulatum* Schlechter (1912 [1911–1914]: 689).

Not *Bulbophyllum guttulatum* (Hooker 1890 [1886–1890]: 776.) Balakrishnan (1970: 66).

Bulbophyllum petioliferum J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Pedilochilus petiolatum* Schlechter (1912 [1911–1914]: 690).

Not *Bulbophyllum petiolatum* Smith (1910: 58).

Bulbophyllum petrophilum (P.Royen) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Pedilochilus petrophilum* Van Royen (1979: 248).

Bulbophyllum piundaundense (P.Royen) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Pedilochilus piundaundense* Van Royen (1979: 270).

Bulbophyllum psychrophilum (F.Muell.) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Dendrobium psychrophilum* Von Mueller (1889: 34).

Bulbophyllum spaniostagon J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Pedilochilus pusillum* Schlechter (1912 [1911–1914]: 686).

Not *Bulbophyllum pusillum* Petit Thouars (1822: t. 102).

Not *Bulbophyllum pusillum* De Wildeman (1921: 95).

Bulbophyllum sarawaketense (P.Royen) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Pedilochilus sarawaketensis* Van Royen (1979: 275).

Bulbophyllum teinophyllum J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Pedilochilus grandifolium* Van Royen (1979: 273).

Not *Bulbophyllum grandifolium* Schlechter (1913 [1911–1914]: 743).

Bulbophyllum tapeinophyton J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Pedilochilus humile* Smith (1929: 440).

Not *Bulbophyllum humile* Schlechter (1913 [1911–1914]: 730).

Bulbophyllum terrestre (J.J.Sm.) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Pedilochilus terrestre* Smith (1929: 442).

Bulbophyllum theiochroma J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Pedilochilus sulphureum* Smith (1914: 72).

Not *Bulbophyllum sulphureum* Schlechter (1925 : 225)

Bulbophyllum vanroyenii J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Pedilochilus perpusillum* Van Royen (1979: 241).

Not *Bulbophyllum perpusillum* Ridley (1908a: 130).

Bulbophyllum zephyranthum J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Pedilochilus flavum* Schlechter (1912 [1911–1914]: 691).

Not *Bulbophyllum flavum* Schlechter (1913 [1911–1914]: 853).

SECTION PLANIBULBUS

Bulbophyllum* section *Planibulbus J.J.Verm., Schuit. & de Vogel, *sect. nov.*

Type species: *Bulbophyllum planibulbe* (Ridley 1893: 364) Ridley (1908 :79).

Epiphytic herbs with long-creeping or straggling rhizomes; shoots usually developing from near the apex of the pseudobulbs; rhizome scales approx. glabrous. Roots spreading, glabrous, shortly papillose-hirsute in places. Pseudobulbs distinct, 1-leaved. Leaves persistent, veins inconspicuous. Inflorescences developing from nodes below pseudobulbs or from nodes

scattered along the rhizome; solitary, a 2–many-flowered, congested or subumbellate raceme with spirally arranged flowers. Peduncle scales 3–4. Rachis not thickened. Flowers per inflorescence open simultaneously; floral bracts amplexicaul or not, not tubular; pedicel with the basal node level with the attachment of the floral bract, distinctly longer than the ovary. Sepals free, the median 4.5–13.0 mm long, ovate, acuminate, margins entire; glabrous, 3-veined; lateral sepals as the median but 1.5–2.2 times as long, 8.5–25.0 mm long, triangular. Petals 2.0–5.5 mm long, elliptic to ovate, obtuse to acuminate, margins entire or distally erose; glabrous, 1–3-veined. Lip mobile on a thin ligament, undivided, 1.4–3.8 mm long, approx. ovate to triangular (without spreading), margins entire, papillose; adaxially without ridges or with 3 ridges converging into a distal callus, surface papillose; abaxial surface glabrous to papillose. Column with the rostellum front receding in between the stelia, stigma proximally not protruding, column foot not widening towards its apex. Stelia shorter than 1/2 of the length of the column including stelia; triangular to subulate, with a slight, rounded wing along the lower margin. Anther abaxially virtually without crest; connective not concave, margin not drawn-out. Pollinia 4, the inner 0.7–0.8 times as long as the outer; appendages absent.

The young shoots pierce the pseudobulbs and arise from their apex, similar to many species of section *Macrocaulia*. Plants in section *Planibulbus* are larger, however, with long-creeping rhizomes that are wiry and not brittle and have a racemose inflorescence.

SECTION PLUMATA

Bulbophyllum* section *Plumata J.J.Verm., Schuit. & de Vogel, *sect. nov.*

Type species: *Bulbophyllum plumatum* Ames (1915: 184).

Epiphytic herbs with creeping rhizomes, shoots developing from nodes below pseudobulbs, not fused to these; rhizome scales densely and finely colliculate to papillose. Roots glabrous, shortly papillose-hirsute locally. Pseudobulbs distinct, 1-leafed. Leaves persistent, veins inconspicuous. Inflorescences developing from nodes below pseudobulbs; solitary, 1-flowered or a 2–4-flowered, subumbellate raceme with spirally arranged flowers. Peduncle scales 3–5. Rachis slightly thickened or not. Flowers per inflorescence open simultaneously if inflorescence racemose; floral bracts not amplexicaul; pedicel with the basal node 0.3–1.0 times its diameter above the attachment of the floral bract, distinctly longer than the ovary. Median sepal free, 6–19 mm long, elliptic to ovate, acute to acuminate, margins entire, glabrous to minutely papillose-ciliolate, surface glabrous; 3–17-veined; lateral sepals as the median but 2.5–16.0 times as long, adnate along (the proximal part of) the upper and lower margin, or along the upper margin only, 24–94 mm long, elliptic to triangular to linear, acute to caudate, margins entire, glabrous, surface glabrous, or abaxially finely papillose; 5–11-veined. Petals 1–2 mm long excluding the appendages, elliptic to oblong to transversely ovate, rounded, apical margin with 12–32 appendages, glabrous, surface glabrous; 1–3-veined; appendages 0.8–5.5 mm long, narrowly attached or stalked, elliptic/ellipsoid to obovate/obovoid, obtuse to acute, thin and flat to approx. orbicular in section, glabrous to vesiculate. Lip mobile on a thin ligament, undivided, 1.8–3.5 mm long, triangular (somewhat narrowed towards the apex) (without spreading), margins entire; glabrous to finely papillose; adaxially without ridges, or with 2 weak ridges. Column with the rostellum front receding in between the stelia, stigma proximally not protruding, column face furrowed longitudinally, column foot not widened towards its apex. Stelia shorter than 1/2 of the length of the column with stelia; approx. triangular to subulate, with a deltoid, obtuse tooth along the upper margin, or upper margin denticulate, with a deltoid to triangular, rounded to obtuse wing along the lower margin. Anther abaxially with a rounded crest; connective deeply concave, margin not drawn-out. Pollinia 4, the inner 0.7–1.0 times as long as the outer; appendages absent.

Among the sections with the upper margin of the lateral sepals approaching to adnate, section *Plumata* is distinguished by the longitudinally furrowed column face.

SECTION REPTANTIA

Bulbophyllum* section *Reptantia J.J.Verm. in Pearce *et al.* (2001: 121).

Synonym: *Sunipia* Buchanan-Hamilton ex Smith in Rees (1816, Art. Stelis nos. 11 & 13).

Notes: Senghas (1991: 1467) indicated *Sunipia racemosa* (Buch.-Ham. ex Sm.) Tang & Wang (1951: 90) as lectotype of *Sunipia*. Garay (1994: 612) observed that the only extant type material of *Sunipia racemosa* is a plate in LINN (collection Buchanan-Hamilton, t. 20, fig. 2, marked "Sunipia racemosa", and "Stelis"). This plate represents *B. reptans* Lindley (1830 [1830–1840]: 51), type species of section *Reptantia*.

SECTION RHINANTHERA

Bulbophyllum* section *Rhinanthera J.J.Verm., Schuit. & de Vogel, *sect. nov.*

Type species: *Bulbophyllum wrayi* J.D.Hooker (1890 [1886–1890]: 766).

Epiphytic herbs with creeping rhizomes; shoots developing from nodes below pseudobulbs, not fused to these; rhizome scales minutely papillose. Roots spreading, glabrous to minutely hirsute locally. Pseudobulbs distinct, 1-leafed. Leaves persistent, veins inconspicuous. Inflorescences developing from nodes below pseudobulb, solitary, an elongate raceme with spirally arranged flowers. Peduncle scales 4–10. Rachis not thickened. Flowers per inflorescence more or less open simultaneously; floral bracts not amplexicaul; pedicel with the basal node 0.5–1.5 times its diameter above the floral bract attachment, distinctly longer than the ovary. Sepals free, the median 6–10 mm long, obovate to ovate-triangular, rounded to acuminate, margins entire; glabrous, 3-veined; lateral sepals approx. equally long or shorter, 4.5–9.0 mm long, obliquely ovate to triangular. Petals 2.5–5.5 mm long, (sub-)spathulate to elliptic to oblong to triangular, rounded to subacute, margins entire; glabrous, 1-veined. Lip mobile on a thin ligament, undivided or sub-3-lobed, 1.8–3.0 mm long; oblong to ovate, or divided in a wide, ovate basal part and a drawn-out, narrow, oblong to ovate apical part (without spreading), margins entire; glabrous; adaxially with 2 knob-like ridges close to the base or with 2 distinct ridges more distally positioned. Column with the rostellum front almost level with the stelidia apices or receding in between, stigma proximally with a protruding tooth, column foot not widened towards the apex, but with a median tooth at the apex. Stelidia approx. 1/2 of the length of the column with stelidia rarely slightly longer, triangular to subulate, with or without a rounded to triangular wing along the upper margin, with or without a deltoid to triangular, approx. obtuse wing along the lower. Anther abaxially with a rounded crest; connective concave, margin distinctly drawn-out into an elliptic to triangular beak. Pollinia 4, the inner 0.8–1.0 times as long as the outer, appendages absent.

This section is most similar to racemose species of *B.* section *Beccariana*; it generally differs by having 3-veined sepals and 1-veined petals. A few species of section *Beccariana* have the same set of characters, but these differ in having cylindrical pseudobulbs. It is also similar to sections *Altisceptrum* and *Phreatiopsis*; the drawn-out connective front of the anther is distinctive.

SECTION RHYTIONANTHOS

Bulbophyllum* section *Rhytionanthos (Garay, Hamer & Siegerist) J.J.Verm., Schuit. & de Vogel, *stat. nov.*

Basionym: *Rhytionanthos* Garay, Hamer & Siegerist (1994: 637).

SECTION TRIAS

Bulbophyllum* section *Trias (Lindl.) J.J.Verm., Schuit. & de Vogel, *stat. nov.*

Basionym: *Trias* Lindley (1830 [1830–1840]: 60). *Bulbophyllum* [unranked, "§"] *Trias* (Lindl.) Reichenbach (1861: 249) ("*Bolbophyllum*").

Bulbophyllum antheae (J.J.Verm. & Lamb) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Trias antheae* Vermeulen (1994: 347).

Bulbophyllum bonaccordense (C.S.Kumar) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Trias bonaccordensis* Kumar (1989: 105).

Bulbophyllum cambodianum (Christenson) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Trias cambodiana* Christenson (2003: 542).

Heterotypic synonym: *Trias nummularia* Averyanov & Averyanova (2006: 32).

Not *Bulbophyllum nummularia* Rolfe (1897: 35).

Bulbophyllum capnophyton J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Trias nana* Seidenfaden (1976: 24).

Not *Bulbophyllum nanum* De Wildeman (1903 [1903–1905]: 122).

Bulbophyllum leion J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Trias mollis* Seidenfaden (1976: 23).

Not *Bulbophyllum molle* Vermeulen & O'Byrne (2008: 84).

Bulbophyllum meson J.J.Verm., Schuit. & de Vogel, *nom. nov.*

Replaced name: *Trias intermedia* Seidenfaden & Smitinand (1965 [1958–1965]: 809).

Not *Bulbophyllum intermedium* Bailey (1896: 12).

Not *Bulbophyllum intermedium* De Wildeman (1916 [1916–1919]: 176).

Bulbophyllum stocksii (Hook.f.) J.J.Verm., Schuit. & de Vogel, *comb. nov.*

Basionym: *Trias stocksii* Hooker (1890 [1886–1890]: 781).

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