

## New and Noteworthy Orchid Species from the Arfak Mountains, West Papua Province, Indonesia

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**SUMMARY.** Seventeen orchid species from the Arfak Mountains are discussed and illustrated. One of these is new to science: *Dendrobium spiculatum* (sect. *Calypstrochilus* s.s.). Two are new records for New Guinea: *Bulbophyllum hortorum* and *Habenaria stenopetala*. *Dendrobium rhomboglossum* var. *latipetalum* is raised to species level, as *D. latipetalum*. *Acanthephippium splendidum*, *Bulbophyllum minutipetalum*, *B. nasica*, *Crepidium epiphyticum*, *Dendrobium bulbophylloides*, *D. fluctuosum* (syn. *D. citrinum* Ridl. non W. Bull), *D. subacaule*, *Habenaria dryadum*, and *Rhomboda polygonoides* are new records for the Arfak Mountains. *Aphyllorchis odoardoii*, *A. torricellensis* and *A. gracilis* are reduced to synonymy of *A. pallida*. *Bulbophyllum elephantinum*, *B. pristis*, and *Mediocalcar pygmaeum* are also presented.

### Introduction

The Arfak Mountains (**Fig. 1**) are a geologically complex range in the Indonesian province of West Papua, just south of the town of Manokwari in the north-eastern part of the Bird's Head Peninsula of New Guinea. The highest peaks rise to about 2900 m elevation, and in the centre, at around 1900 m, there

are two scenic lakes, the Anggi Lakes. Several villages are situated in the Arfak Mountains, mainly along the few roads and near the lakes. As it lies near the coast, it was one of the first mountain ranges in New Guinea to be visited by botanists. The Italian naturalist Odoardo Beccari was one of the earliest explorers in the region; he visited the Arfak Mountains in 1872 and 1875, and his collections include a number of orchid species, some of which were described by Reichenbach. The Danish medical doctor and explorer Knud Gjellerup collected several new orchid species in the Arfak Mountains during an expedition in 1912; these were described by J.J. Smith. In 1913 and 1914, the British botanist Lilian S. Gibbs spent some months collecting in the area, and wrote a book about the flora and vegetation of the Arfak Mountains (Gibbs, 1917), with contributions on the orchids by J.J. Smith. Many other collectors followed, and at present about 153 orchid species have been recorded from the Arfak Mountains (Schuiteman, unpublished). The actual number of species to be found in these mountains is certainly far higher, as many collections have not yet been fully identified, and large parts of the area are still virtually unexplored botanically.



**Fig. 1.** The Arfak Mountains seen from Manokwari, with Lemon Island in the middle distance. Photo: André Schuiteman.

Between 22 July and 3 August 2014, a party from the Royal Botanic Gardens, Kew (André Schuiteman and Marie Briggs) and the University of Papua in Manokwari (Soetjipto Moeljono, Jimmy Frans Wanma, Frandz Rumbiak Pawere, Marthen Jitmau, Philep Mambor, Darius Trirbo, Barselina Inggese, and Victor Simbiak) made excursions into the Arfak Mountains, both from the south-east (Ransiki) and from the north (Manokwari), while also staying some days in Irai III village near Anggi Giji Lake. We here describe some of the new species and interesting records resulting from these trips.

**1. *Acanthephippium splendidum* J.J. Sm., *Natuurk. Tijdschr. Ned.-Indië* 58: 360 (1898). **Fig. 2.****

*Acanthephippium papuanum* Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 1: 371 (1912); 21: t. 131, fig. 494 (1923).

**Distribution.** Sulawesi, Moluccas, New Guinea (Indonesia; PNG), Solomon Islands, Vanuatu, New Caledonia, Fiji, Tonga, Horne Islands.

**Arfak material examined.** NW Arfak Mts, near Wariori River, 880 m, primary forest on steep slope, terrestrial in shade, 02/08/2014, *Schuiteman 2014-83*, with Marie Briggs, Frandz Rumbiak Pawere, Soetjipto Moeljono, Marthen Jitmau, and Jimmy Frans Wanma (BO, MAN).

This appears to be the first record from the Bird's Head Peninsula, also known as the Vogelkop or Kepala Burung Peninsula.

**2. *Aphyllorchis pallida* Blume, *Tab. Pl. Jav. Orchid.*: t. 77 (1825). **Figs. 3 & 4.****

*Aphyllorchis gracilis* Schltr., *Repert. Spec. Nov. Regni Veg.* 10: 8 (1911), **syn. nov.**

*Aphyllorchis odoardo* Rchb. f., *Bot. Centralbl.* 28: 345 (1886), **syn. nov.** ('odoardi')

*Aphyllorchis torricellensis* Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 1: 35 (1911), **syn. nov.** ['toricellensis']; 21: t. 16, fig. 49 (1923).

**Distribution.** Thailand, Cambodia, Vietnam, Peninsular Malaysia, Singapore, Sumatra, Java, Borneo, Philippines, Sulawesi, New Guinea (Indonesia; PNG).

**Arfak material examined.** NW Arfak Mts, near Wariori River, 880 m, primary forest on steep slope, terrestrial in shade near fallen tree, 02/08/2014, *Schuiteman*



**Fig. 2.** *Acanthephippium splendidum*, in situ. After *Schuiteman 2014-83*. Photo: André Schuiteman.



**Fig. 3.** *Aphyllorchis pallida*, in situ. After *Schuiteman 2014-77*. **Fig. 4** (inset). *Aphyllorchis pallida*, flower. After *Schuiteman 2014-77*. Photos: André Schuiteman.

2014-77, with Marie Briggs, Frandz Rumbiak Pawere, Soetjipto Moeljono, Marthen Jitmau, and Jimmy Frans Wanma (BO, K, MAN).

*Aphyllorchis odoardi* was described on the basis of material collected by Beccari in the Arfak Mountains. The differences between this species, *A. gracilis* from Sulawesi, and *A. torricellensis* from New Guinea, appear trivial. Having seen several specimens from different parts of the distribution area (although the types of *A. gracilis* and *A. torricellensis* are lost), I consider these taxa to fall within the range of variation of the widespread *A. pallida*.

**3. *Bulbophyllum elephantinum*** J.J. Sm., *Repert. Spec. Nov. Regni Veg.* 12: 398 (1913). **Fig. 5.**

**Distribution.** New Guinea (Indonesia; PNG).

**Arfak material examined.** 3.5 km WNW of Mokwam, 1800 m, epiphyte in montane forest on broad ridge, rather open, with tall trees, 25/07/2014, *Schuiteman 2014-42*, with Marie Briggs, Frandz Rumbiak Pawere, Soetjipto Moeljono, and Philep Mambor (MAN).

The type of this uncommon and striking species of section *Hyalosema* was collected in 1912 by K. Gjellerup near the Anggi Lakes at 1900 m. We found a single flowering specimen, with the flower almost past anthesis.



**Fig. 5.** *Bulbophyllum elephantinum*, in situ. After *Schuiteman 2014-42*. Photo: André Schuiteman.

**4. *Bulbophyllum hortorum*** J.J. Verm., P. O'Byrne & Lamb, *Bulbophyllum Borneo*: 57 (2015). **Figs. 6 & 7.**

**Distribution.** New Guinea (Indonesia). Erroneously reported from Borneo (see below).

**Arfak material examined.** Ransiki area, foothills of the Arfak Mts near Nij village, 240 m, somewhat stunted and rather open primary rainforest on ridge crest, epiphyte on tree trunks, often close to the ground, locally common, 28/07/2014, *Schuiteman 2014-51*, with Marie Briggs, Frandz Rumbiak Pawere, Darius Tirbo and Victor Simbiak (BO, K, MAN).



**Fig. 6.** *Bulbophyllum hortorum*, in situ. After *Schuiteman 2014-51*. Photo: André Schuiteman.

This species of sect. *Sestochilos* was recently described on the basis of a specimen cultivated in a European collection. As Vermeulen et al. (2015) explain, *B. hortorum* has been in cultivation for years, but its origin has always been uncertain, with some claiming a specific locality in Borneo. This possibility can now almost certainly be discarded, as we found this species growing wild in the Ransiki area of West Papua. Our photos were identified by Vermeulen as representing *B. hortorum*, just after the manuscript of *Bulbophyllum of Borneo* had gone to the printer.

All the flowers we observed in situ were continuously being visited by black-and-yellow fruit flies, often three or four at the same time.



**Fig. 7.** *Bulbophyllum hortorum*, flowers with fruit fly. After Schuiteman 2014-51. Photo: André Schuiteman.

**5. *Bulbophyllum minutipetalum*** Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 1: 761 (1913); 21: t. 252, fig. 962 (1928); Vermeulen (1993):164, fig. 118, pl. 6a. **Figs. 8–10.**

See Vermeulen (1993) for full synonymy.

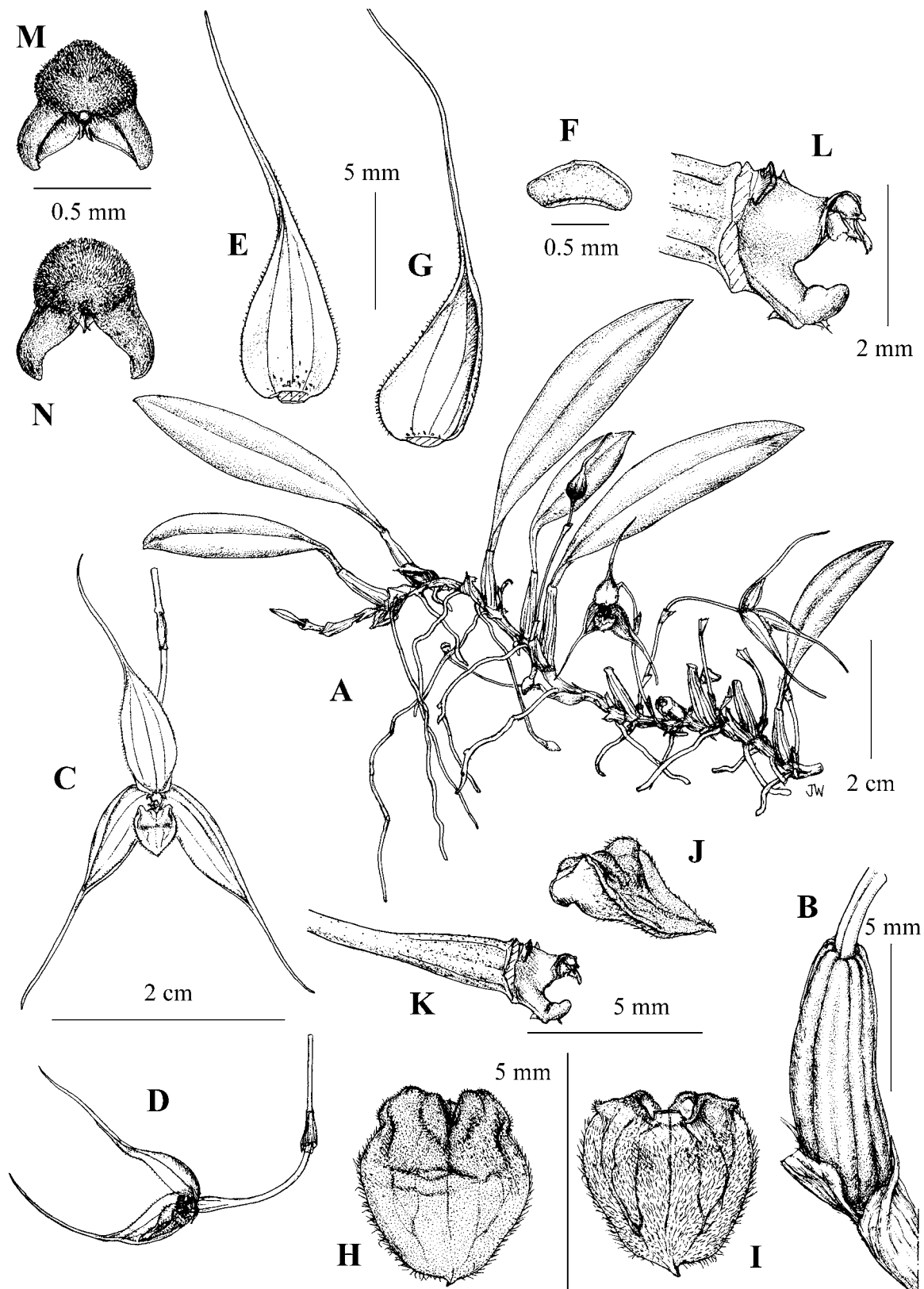
**Distribution.** New Guinea (Indonesia; PNG).

**Arfak material examined.** Forest along stream near Anggi Giji Lake, 1990 m, epiphyte on mossy trunks of small trees in montane forest, 24/07/2014, Schuiteman 2014-16, with Marie Briggs, Frandz Rumbiak Pawere, Soetjipto Moeljono, and Philep Mambor (BO, K, MAN).

This rather variable species (Vermeulen, 1993) of sect. *Peltopus* was so far only known from Papua New Guinea, where it is not uncommon. Our Arfak specimens agree well in morphology with certain specimens from PNG, but they differ in the yellow flowers (white to cream in PNG), and in the pubescent lip (subglabrous with papillose-ciliate margins in PNG). There is at present a disjunction of about 1000 km between the Arfak locality and the nearest locality for this species in PNG, but *B. minutipetalum* will undoubtedly be discovered in between. When we know more about the variability of this species in Indonesian New Guinea, the Arfak form may be found to warrant formal recognition.



**Fig. 8** (above). *Bulbophyllum minutipetalum*, flowers. After Schuiteman 2014-16. **Fig. 9** (below). *Bulbophyllum minutipetalum*, in situ. After Schuiteman 2014-16. Photos: André Schuiteman.



**Fig. 10.** *Bulbophyllum minutipetalum*. A, plant; B, pseudobulb; C & D, flower; E, dorsal sepal; F, petal; G, lateral sepal; H, lip, adaxial view; I, lip, abaxial view; J, lip, side view; K, column, side view; L, column, side view enlarged; M, anther cap, front view; N, anther cap, rear view. All from *Schuiteman 2014-16*. Drawn by J. Beentje.

6. *Bulbophyllum nasica* Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 1: 777 (1913). **Fig. 11.**

*Bulbophyllum blumei* (Lindl.) J.J. Sm. var. *pumilum* J.J.Sm., *Nova Guinea* 8(1): 90, t. 30, fig. 97 (1909).

*Bulbophyllum blumei* (Lindl.) J.J. Sm. var. *longicaudatum* J.J.Sm., *Nova Guinea* 8(3): 583, t. 100a (1911).

*Bulbophyllum longicaudatum* (J.J. Sm.) J.J. Sm., *Bull. Jard. Bot. Buitenzorg, sér. 2*, 13: 67 (1914).

**Distribution.** New Guinea (Indonesia; PNG).

**Arfak material examined.** Ransiki area near Nij village, 240 m, somewhat stunted and rather open primary rainforest on ridge crest, epiphyte on tree trunks close to ground level, 28/07/2014, *Schuiteman 2014-52*, with Marie Briggs, Frandz Rumbiak Pawere, Darius Trirbo and Victor Simbiak (BO, K, MAN).

This pretty little species of sect. *Polymeres* is common and widely distributed in New Guinea and has a remarkably broad altitudinal range, from 50 to at least 1900 m, and possibly up to 2900 m (Schuiteman et al., 2010). Although it was already known from the central part of the Bird's Head Peninsula, this is the first record from the Arfak Mountains. It is interesting to note that two colour forms were growing intermixed here: some specimens had red-brown and others bright golden yellow lateral sepals.



**Fig. 11** (above). *Bulbophyllum nasica*, in situ. After *Schuiteman 2014-52*. . **Fig. 12** (right). *Bulbophyllum pristis*, inflorescence. After *Schuiteman 2014-43*. Photos: André Schuiteman.

7. *Bulbophyllum pristis* J.J. Sm., *Repert. Spec. Nov. Regni Veg.* 12: 399 (1913). **Fig. 12.**

**Distribution.** New Guinea (Indonesia).

**Arfak material examined.** 3.5 km WNW of Mokwam, 1800 m, epiphyte on trunk of small tree in montane forest on broad ridge, rather open, with tall trees, 25/05/2014, *Schuiteman 2014-43*, with Marie Briggs, Frandz Rumbiak Pawere, Soetjipto Moeljono, and Philep Mambor (BO, K).

This species of sect. *Intervallatae* with its strange 'flat' flower is at present only known from the Arfak Mountains, and may represent an endemic element.



**8. *Crepidium epiphyticum*** (Schltr.) Szlach., *Fragm. Florist. Geobot. Suppl.* 3: 126 (1995). **Figs. 13 & 14.**

*Microstylis epiphytica* Schltr. in K. Schum. & Lauterb., *Nachtr. Fl. Deutsch. Schutzgeb. Südsee*: 99 (1905).

*Pseudoliparis epiphytica* (Schltr.) Finet, *Bull. Soc. Bot. France* 54: 537 (1907).

*Malaxis pseudoliparis* P.F. Hunt, *Kew Bull.* 24: 83 (1970).

Not *Malaxis epiphytica* Ames.

**Distribution.** New Guinea (Indonesia; PNG).

**Arfak material examined.** NW Arfak Mts, near Wariori River, 380 m, primary forest along small stream, epiphyte on trunks of small trees, up to 3 m above the ground, 03/08/2014, *Schuiteman 2014-86*, with Marie Briggs, Frandz Rumbiak Pawere, Soetjijto Moeljono, Marthen Jitmau, and Jimmy Frans Wanma (BO, K, MAN).

This lowland species is noteworthy for being one of very few epiphytic species in the genus *Crepidium*. The horn-like projection on the column and the bluish colour of the column-arms identify this as a representative of subgen. *Pseudoliparis*, of which it is the type species. *Crepidium epiphyticum* is a new record for the Bird's Head Peninsula.



**Fig. 13.** *Crepidium epiphyticum*, flower. After *Schuiteman 2014-86*. Photo: André Schuiteman.



**Fig. 14.** *Crepidium epiphyticum*, in situ. After *Schuiteman 2014-86*. Photo: André Schuiteman.

**9. *Dendrobium bulbophylloides*** Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 1: 457 (1912). **Fig. 15.**  
See Ormerod (2017) for the synonymy.

**Distribution.** New Guinea (Indonesia; PNG).

**Arfak material examined.** Ransiki – Anggi Lakes road, 1650 m, epiphyte on thin branch in mossy montane forest, 29/07/2014, *Schuiteman 2014-66*, with Marie Briggs, Frandz Rumbiak Pawere, Darius Trirbo and Victor Simbiak (BO).

Our new record from the Arfak Mountains represents a considerable range extension for this species, which was not known to occur west of the Cyclops Mountains near Jayapura. It belongs to sect. *Microphytanthe*, which is at present the only known endemic section of *Dendrobium* in New Guinea.



**Fig. 15.** *Dendrobium bulbophylloides*, in situ. After *Schuiteman 2014-66*. Photo: André Schuiteman.

**10. *Dendrobium fluctuosum*** J.J. Sm., *Bot. Jahrb. Syst.* 66: 186 (1934). **Fig. 16.**

*Dendrobium citrinum* Ridl., *Trans. Linn. Soc. London, Bot.* 9: 175 (1916), nom. illeg., non W. Bull. (1874).  
*Cadetia fluctuosa* (J.J. Sm.) P.F. Hunt, *Kew Bull.* 26: 179 (1971).  
*Cadetia citrina* (Ridl.) Schuit., *Blumea* 39: 235 (1994).

**Distribution.** New Guinea (Indonesia; PNG).

**Arfak material examined.** Ransiki – Anggi Lakes road, 1650 m, mossy montane forest, epiphyte on trunk of tall tree, c. 3 m above the forest floor, 29/07/2014, *Schuiteman 2014-59*, with Marie Briggs, Frandz Rumbiak Pawere, Darius, and Victor Simbiak (MAN).

The name *Dendrobium citrinum* Ridl. cannot be used for this species because of the earlier *D. citrinum* W. Bull., a name (and synonym of *D. heterocarpum* Wall. ex Lindl.) overlooked by the compilers of *Index Kewensis*. *Dendrobium fluctuosum* is the largest-flowered species of sect. *Cadetia*, with pure white flowers (apart from a greenish callus on the lip) up to 2.5 cm across. The slender, spur-like mentum suggests that it is pollinated by moths. This is the first record from the Arfak Mountains, although an entirely predictable one, given the occurrence of this species in the nearby Tamrau Mountains and the Wandamen Peninsula.



**Fig. 16.** *Dendrobium fluctuosum*, in situ. After *Schuiteman 2014-59*. Photo: André Schuiteman.



**11. *Dendrobium latipetalum* (J.J. Sm.) Schuit., stat. nov. Figs. 19 & 20.**

Basionym: *Dendrobium rhomboglossum* J.J. Sm. var. *latipetalum* J.J.Sm., *Nova Guinea* 12(4): 320 (1916).

**Distribution.** New Guinea (Indonesia).

**Arfak material examined.** Anggi Giji Lake near Irai III, 2000 m, terrestrial in open scrub with *Rhododendron laetum* J.J. Sm., 22/07/2014, *Schuiteman 2014-4*, with Marie Briggs, Frandz Rumbiak Pawere, Soetjipto Moeljono, and Philep Mambor (BO, K, MAN); Anggi Gita Lake, 7000 ft, terrestrial in open marsh, abundant, December 1913, *Gibbs 5511* (K); top of Gunung Kobrei near Anggi village Iraiweri, hamlet Irai I, 2050 m, 08/06/1991, *Widjaja EAW4239* (K); Arfak Mountains, *Gjellerup 1114* (L); Anggi Giji lake, Iray, 2000 m, open young secondary growth on peaty clay, *Versteegh BW 217* (drawing K); Anggi Gita Lake, 1800 m, on sandy soil, 09–22/10/1948, *Kostermans 2075 & 2186* (L); Anggi Gita Lake, 1840 m, in grassland on marshy soil, 10/01/1962, *Sleumer & Vink 4202* (L); Koebré (=Kobrei) ridge between Anggi Lakes, 2400 m, in open ‘heath’ vegetation, 14/01/1962, *Sleumer & Vink 4281* (L); Mt Sensenemés above Surerei, Anggi Giji lake, 2650 m, in open heath-like formation, 20/01/1962, *Sleumer & Vink 4342* (L); Anggi Giji lake, Mt. Gwamongga, 2500 m, vegetation of herbs and some low shrubs on peat, 21/01/1962, *Sleumer & Vink BW 14267* (L).

This beautiful terrestrial orchid, which can be up to a metre tall (Gibbs, 1917, as *D. rhomboglossum*), is still fairly common in open places around the Anggi Lakes (Fig. 17) between 1800 and 2650 m. It is not clear to us why J.J. Smith described this member of sect. *Latouria*



**Fig. 17.** Anggi Gita Lake. *Dendrobium latipetalum* occurs in open places around the lake. Photo: André Schuiteman.

as a variety of *D. rhomboglossum* J.J. Sm., as it differs in the three callus ridges on the lip terminating well below the base of the midlobe (terminating at the base of the mid-lobe in *D. rhomboglossum*), which is one of the diagnostic characters in this alliance. Moreover, *D. latipetalum* has obovate-oblong petals (versus spatulate petals), and elliptic, rather than linear-oblong leaves. In lip morphology, *D. latipetalum* is virtually indistinguishable from *D. montis-yulei* Kraenzl. (syn. *D. terrestre* J.J. Sm.; *D. magnificum* Schltr.; Fig. 18). Indeed, Schuiteman and de Vogel (2002) reduced it to



**Fig. 18** (above). *Dendrobium montis-yulei*, cultivated ex PNG. Photo: Jon Cara. **Fig. 19** (below). *Dendrobium latipetalum*, flower. Photo: André Schuiteman.

the synonymy of that species. However, *D. latipetalum* differs in the much taller inflorescences, with the internodes between the peduncle-scales several times longer than the peduncle scales (versus internodes between the peduncle scales shorter than the peduncle scales), obovate-oblong petals (vs. spatulate petals), and smaller flowers (lip c. 2 cm long vs. lip c. 3 cm

long) with a relatively larger mentum (*c.* 6 mm long in *D. latipetalum*, 4–5 mm in *D. montis-yulei*). Since *D. montis-yulei* also occurs in the Anggi Lakes area (although we have ourselves only seen a specimen in a local village garden), the two taxa clearly behave as different species: they have passed the test of sympatry, as Alwin Gentry (1990) put it. Although *D. montis-yulei* is variable in colour, the sepals are never solid magenta-purple outside and creamy white inside, as in *D. latipetalum*. The complex of species comprising the taxa already mentioned, as well as *D. acutisepalum* J.J. Sm., *D. guttatum* J.J. Sm., and *D. rigidifolium* Rolfe, needs further study based on field observations.

**12. *Dendrobium spiculatum* Schuit., *spec. nov.*** Similar to *D. fruticicola* J.J. Sm., but with much smaller leaves and flowers, and with prominent, conical papillae on the sepals and the ovary. Type: Indonesia, West Papua Province, Arfak Mountains, Anggi Giji Lake near Irai III, -1.33802°S, 133.92105°E, terrestrial in disturbed, mossy, montane forest, 2100 m, uncommon, 22/07/2014, *Schuiteman 2014-6*, with Marie Briggs, Frandz Rumbiak Pawere, Soetjipto Moeljono, and Philep Mambor (holotype BO; isotypes K, MAN).

Epiphytic or terrestrial **herb**. **Roots** *c.* 1 mm diam., branching, tips orange. **Stems** tufted, prostrate-ascending (when growing in the shade) to erect (in



**Fig. 20.** *Dendrobium latipetalum*, inflorescences. Photo: André Schuiteman.



**Fig. 21.** *Dendrobium spiculatum*, in situ. Photo: André Schuiteman.

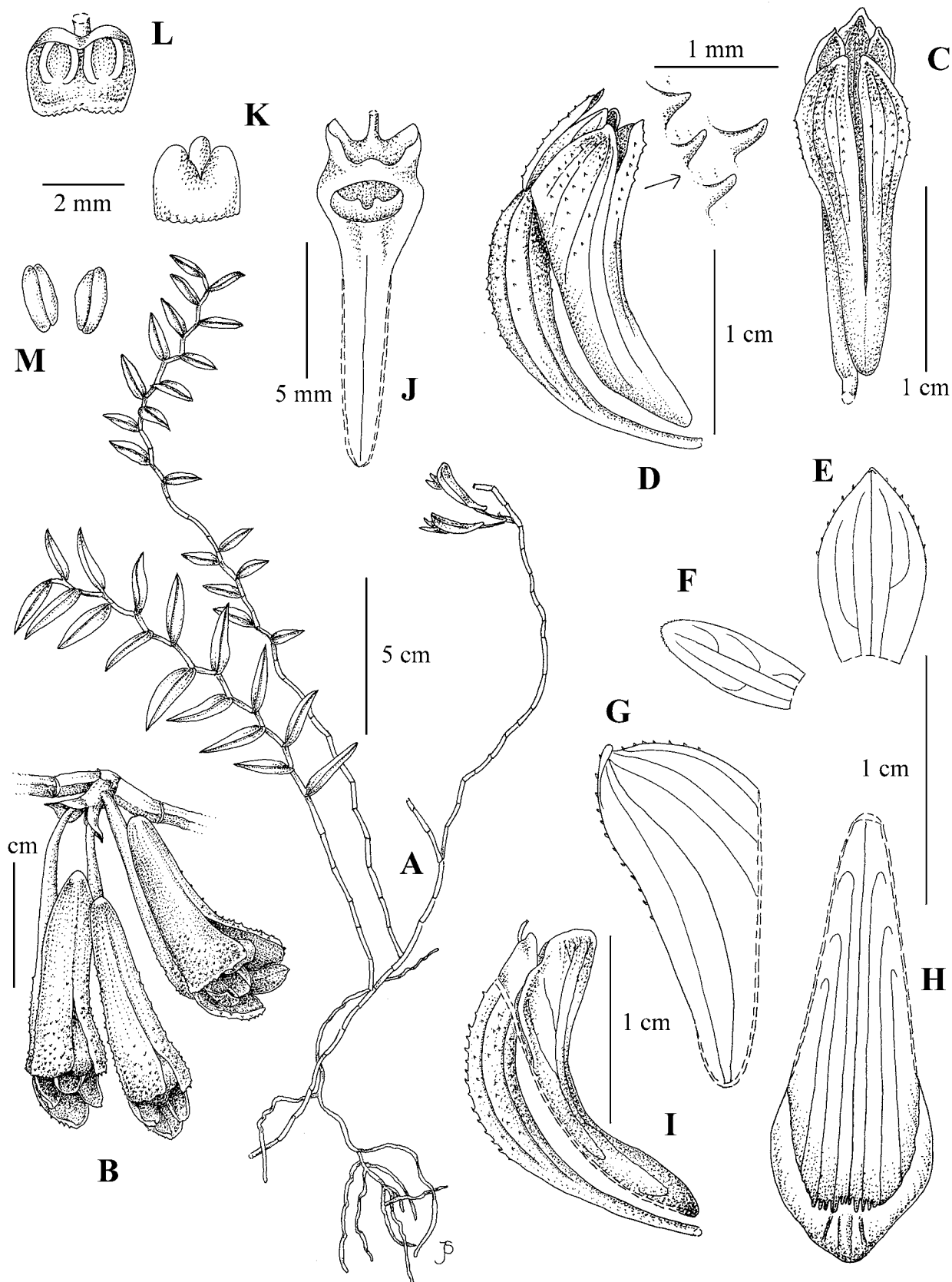


Fig. 22. *Dendrobium spiculatum*. A, plant; B, flowers; C & D, flower; E, dorsal sepal; F, petal; G, lateral sepal; H, lip, adaxial view; I, ovary, column and lip, side view; J, column; K, anther cap, abaxial view; L, anther cap, adaxial view; M, pollinia. All from *Schuiteman 2014-6* (type). Drawn by J. Stone.

exposed positions), slender, not or sparsely branching, 12–24 cm long, 4–7 mm diam., tapering towards the apex and almost moniliform in exposed positions, thinner and of more uniform thickness in the shade, flexuose, internodes 0.6–1.5 cm long; many-leaved. **Leafsheaths** tubular, glabrous except for sparse papillae on the veins. **Leaves** suberect, not spreading in one plane with the stem, deciduous, coriaceous, narrowly ovate-oblong, 1.4–2.6 cm × 3–7 mm, margins smooth, apex obtuse, minutely mucronate. **Inflorescences** arising laterally from the upper half of the leafless stems, very short, 2–4-flowered, peduncle c. 5 mm long, enveloped by c. 3 membranous, imbricating, tubular scales. **Floral bracts** cupular, broadly ovate, c. 4 × 2 mm, acuminate, membranous, sparsely papillose. **Pedicel-with-ovary** clavate, c. 1.9 cm long, terete, sparsely covered with conical or cylindrical, often somewhat incurved papillae up to 0.6 mm long. **Flower** c. 2 cm long, bright orange, patent or pendulous, not opening widely; sepals abaxially covered with conico-cylindrical papillae up to c. 0.7 mm long, more densely so towards the apex, sparsely on the mentum. **Dorsal sepal** elliptic, 7.0 × 4.3 mm, obtuse, 3-veined at base, 5-veined near the middle. **Lateral sepals** obliquely ligulate, 7 mm long along upper margin, 19 mm long along lower margin, obtuse, 5-veined; mentum in lateral view conico-cylindrical, 14 mm long, apical tubular (closed) part 3 mm long, obtuse. **Petals** oblong, 7.0 × 2.4 mm, apical margins finely denticulate, apex obtuse, veins branching, near the middle 3-veined. **Lip** extending to the column-apex, spatulate when flattened, hood-like in apical part, 18.5 mm long, when flattened 7.8 mm wide, adnate to the column-foot in basal 11 mm, ecallose, hood when flattened 3.2 mm deep, indistinctly 3-pleated, apical margin truncate, finely irregularly denticulate-fimbriate. **Column** short and stout, 2.8 mm long, 4.3 mm wide; stigma large, transversely elliptic, lower margin with two low, broad teeth; rostellum and scraper truncate; back margin of clinandrium with a slender, 1.0 mm long tooth and two slightly shorter lateral lobes; column-foot linear, c. 12 mm long, 1.6 mm wide. **Anther** helmet-shaped, 2.1 mm wide, minutely papillose-hairy, apex truncate. **Pollinia** narrowly oblong in outline, 1.6 × 0.4 mm, arranged in two pairs. **Fruit** not seen. **Figs. 21–24.**

**Distribution.** New Guinea (Indonesia).

**Additional material seen.** At the type locality this species was only seen as a terrestrial in shaded places, and the plants had almost prostrate stems (**Fig. 23**). We also observed and photographed it on 25/07/2014, 13 km N of Anggi Giji Lake, in mossy montane forest at



**Fig. 23** (above). *Dendrobium spiculatum*, in situ. After Schuiteman 2014-6. **Fig. 24** (below). *Dendrobium spiculatum*, flowers. After Schuiteman 2014-6. Photos: André Schuiteman.

1970 m. Here it occurred both as a terrestrial in more open places, together with *Mediocalcar arfakense* J.J. Sm., and as an epiphyte high up on the trunks of tall trees (**Fig. 21**). The plants seen here had shorter, erect and more fleshy, almost moniliform stems with denser foliage, but with flowers identical to the type.

*Dendrobium spiculatum* is unique among the species of sect. *Calyptrochilus* s.s. because of the prominent, conical papillae on the sepals and ovary, which produce a spiky (spiculate) appearance when seen in close up. The morphology of the flower and its parts is similar to that of *D. fruticicola* J.J. Sm., also from the Arfak Mountains. That species, however, has larger, smooth flowers (up to 3.2 cm long), longer leaves (2.7–4.5 cm long), and densely verruculose leaf sheaths.

**13. *Dendrobium subacaule*** Reinw. ex Lindl., *J. Proc. Linn. Soc., Bot.* 3: 11 (1859). **Fig. 25.**

For the extensive synonymy see Ormerod (2017) and Schuiteman & de Vogel (2002).

**Distribution.** Moluccas, New Guinea (Indonesia; PNG), Solomon Islands.



**Fig. 25.** *Dendrobium subacaule*, in situ. Photo: André Schuiteman.

**Arfak material examined.** Forest along stream near Anggi Giji Lake, 2025 m, montane forest, epiphyte, mainly on thin horizontal branches in exposed positions, also on small shrubs, 24/07/2014, *Schuiteman 2014-21*, with Marie Briggs, Frandz Rumbiak Pawere, Soetjipto Moeljono, and Philep Mambor (BO, K, MAN).

The colourful species of the former section *Oxyglossum*, now included in a broader defined sect. *Calyptrochilus*, are apparently not as common in the Arfak Mountains as they are in the highlands of Papua New Guinea and the main range of Indonesian Papua. The present species, relatively frequent throughout the uplands of New Guinea, and a typical twig epiphyte, had not been recorded from the Arfak Mountains before.

**14. *Habenaria dryadum*** Schltr., *Repert. Spec. Nov. Regni Veg.* 3: 80 (1906). **Fig. 26.**

*Habenaria epiphylla* Schltr. in K. Schum. & Lauterb., *Nachtr. Fl. Deutsch. Schutzgeb. Südsee:* 78 (1905), nom. illeg., non Rehb. f. & Warm.

*Habenaria dryadum* Schltr. var. *major* Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 1: 15 (1911).



**Fig. 26.** *Habenaria dryadum*, flowers. After *Schuiteman 2014-49*. Photo: André Schuiteman.

**Distribution.** New Guinea (Indonesia; PNG).

**Arfak material examined.** Ransiki area near Nij village, 50 m, primary rainforest near stream, terrestrial in shade, 28/07/2014, *Schuiteman 2014-49*, with Marie Briggs, Frandz Rumbiak Pawere, Darius Trirbo and Victor Simbiak (BO, K, MAN).

This is a robust forest plant (up to 80 cm tall), not previously recorded from the Bird's Head Peninsula. It is noteworthy for the extremely narrow lobes of the lip and the petals. The South Indian *H. multicaudata* Sedgw. seems remarkably similar.

**15. *Habenaria stenopetala*** Lindl., *Gen. Sp. Orchid. Pl.*: 319 (1835); Cootes (2011): 171. **Fig. 27.**

See Seidenfaden (1977) for additional synonymy.

**Distribution.** India, Nepal, Bhutan, Myanmar, China, Thailand, Vietnam, Taiwan, Philippines, New Guinea (Indonesia).



**Fig. 27.** *Habenaria stenopetala*, inflorescence. After *Schuiteman 2014-68*. Photo: André Schuiteman.

**Arfak material examined.** Ransiki–Anggi Lakes road, 1300 m, riverine montane forest, terrestrial in shade, 29/07/2014, *Schuiteman 2014-68*, with Marie Briggs, Frandz Rumbiak Pawere, Darius Trirbo and Victor Simbiak (BO, K).

This is a new record for New Guinea. The Arfak material of this widespread species agrees well with Indian specimens examined. It remains to be seen if *H. pantlingiana* Kraenzl. (*H. stenopetala* var. *polytricha* Hook. f.) can be upheld as a distinct species.

**16. *Mediocalcar pygmaeum*** Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 1: 233 (1911). **Figs. 28 & 29.**

*Mediocalcar pygmaeum* Schltr. var. *altigenum* Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 1: 234 (1911).

*Mediocalcar sigmoideum* Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 1: 234 (1911).

*Mediocalcar crassifolium* J.J. Sm., *Repert. Spec. Nov. Regni Veg.* 11: 559 (1913).

**Distribution.** New Guinea (Indonesia; PNG).

**Arfak material examined.** Anggi Giji Lake near Irai III, 2100 m, disturbed mossy montane forest, epiphyte on logs, 22/07/2014, *Schuiteman 2014-7*, with Marie Briggs, Frandz Rumbiak Pawere, Soetjijto Moeljono, and Philep Mambor (BO, K, MAN).

The type of the synonym *M. crassifolium* was collected by Gjellerup in the Arfak Mountains. Although this is a widespread species in New Guinea, it is not often seen, and there are no published photographs of it, to our knowledge. The commonly cultivated and quite distinct *M. decoratum* Schuit. used to be misidentified as *M. pygmaeum* before it was recognized as a new species.



**Fig. 28.** *Mediocalcar pygmaeum*, flowering plant. After *Schuiteman 2014-7*. Photo: André Schuiteman.



**Fig. 29.** *Medicalcar pygmaeum*, in situ. After *Schuiteman 2014-7*. Photo: André Schuiteman.

**17. *Rhomboda polygonoides*** (F. Muell.) Ormerod, *Orchadian* 11: 333 (1995). **Figs. 30 & 31.**

For the extensive synonymy see Ormerod (2017).

**Distribution.** Moluccas, New Guinea (Indonesia; PNG), Australia. According to Ormerod (2017), records from the Solomon islands are referable to *R. dennisii* Ormerod.

**Arfak material examined.** NW Arfak Mts, near Wariori River (**Fig. 32**), 880 m, primary forest on steep slope, terrestrial in shade, 02/08/2014, *Schuiteman 2014-75*, with Marie Briggs, Frandz Rumbiak Pawere, Soetjipto Moeljono, Marthen Jitmau, and Jimmy Frans Wanma (BO, K, MAN).

This appears to be the first record from the Bird's Head Peninsula.



**Fig. 30.** *Rhomboda polygonoides*, flower. After *Schuiteman 2014-75*. Photo: André Schuiteman.



**Fig. 31.** *Rhomboda polygonoides*, in situ. After *Schuiteman 2014-75*. Photo: André Schuiteman.



**Fig. 32.** Wariori River, NW Arfak Mountains, habitat of several species mentioned in this paper. Photo: André Schuiteman.

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