

AN ENUMERATION OF ORCHID COLLECTIONS FROM THE KELABIT HIGHLANDS

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ABSTRACT

Although a Flora of the Kelabit Highlands has not been written, it may be safe to say that orchids constitute the largest family of flowering plants in that flora. The first orchid collections from the Kelabit Highlands were made by J.C. Moulton in 1911, mainly around Batu Lawi. Since that time about two dozen other collectors have obtained orchids from there, but only half that number have gathered significant quantities of specimens. We record here 181 taxa in 52 genera; 135 of these are fully determined and 46 are incompletely determined. Habitats particularly rich in orchids include riverine forests, wet kerangas forests, and mossy lower and upper montane forests. The greatest number of species and genera occurs at about 1,400m elevation. About three-fourths of the taxa are epiphytic, and the rest terrestrial and lithophytic.

INTRODUCTION

The Kelabit Highlands in northeastern Sarawak have long been of interest to scientists and have been the subject of numerous expeditions and reports. In spite of this considerable attention, however, the orchid flora of the area has not been reported on previously, and has been known only through specimens accumulated in various herbaria. During the course of the UNIMAS expedition to Bario in April 1995, we were able to direct attention to orchid collecting and subsequently have assembled data from most of the herbarium specimens that have been collected in that area. This chapter therefore provides an enumeration of the orchid species presently known from the Kelabit Highlands, based on our own collections and those made by other collectors since the first botanical records from the upper Limbang River, mostly or entirely around Batu Lawi, by J.C. Moulton in 1911.

In Sarawak the Kelabit Highlands occupy an area of about 3,000 km² in the Limbang and Miri Divisions and the Lawas, Limbang and Marudi Districts and occur between 3° and 4° N latitude and 115° and 115°45'E longitude. The Kalimantan border runs N-S along the east side, and vegetational and topographic features similar to the Kelabit Highlands extend eastward into the Kayan Mentarang region of East Kalimantan. The political boundary between Malaysia and Indonesia constitutes an artificial biological division of the Kelabit Highlands, but inclusion of data from the Indonesian side is beyond the scope of the present study

The highest mountain in Sarawak, in the northern part of the Kelabit Highlands, is Mt. Murud (2,424m), and it, together with the neighboring Batu Lawi, are among the better collected areas for orchids. Other areas that have received some attention include the Tarna Abu Range, Batu Buli, Apad Keruma, and localities near Bario, particularly in the triangle formed by Bario, Pa' Ukat and Pa' Umor. The latter area is of particular interest because of the extensive occurrence

of a low forest called kerangas or wet kerangas, which is rich in both epiphytic and terrestrial orchids. Other areas in which the orchid flora is well developed include riverine habitats in the bill forest and lower montane forest, mossy forest on many of the ridges above 1,400m elevation, and the higher ridges with dwarf forest on Mt. Murud and around Batu Lawi. Based on the standardized localities we have used for citing herbarium specimens, only about 50 different localities have been visited by orchid collectors in the Kelabit Highlands.

Our own collecting and herbarium searches have resulted in a database of about 300 collections, which, including duplicates, constitutes about 470 specimens. Most of these have been obtained by only 12 collectors who have obtained five or more collections, as can be seen in the index to Numbered Collections at the end of this chapter. To obtain these records we have gone systematically through the herbaria of the Royal Botanic Gardens, Kew (K) and the Sarawak Forest Department (SAR). A few type specimens were located in the Bogor Herbarium (BO), but orchid specimens from Sarawak in that herbarium were not present in sufficient numbers to make a detailed search worthwhile. Five specimens are cited from the Rijksherbarium, Leiden (L), that were studied by J. J. Wood. A number of orchid collections by J. C. Moulton were seen in the Singapore Botanic Gardens Herbarium (SING), but ambiguities about their locality data have caused us to ignore them for purposes of this chapter. Specimens in the Universiti Malaysia Sarawak Herbarium are cited as "UNIMAS" but this herbarium does not yet have an official herbarium symbol.

The enumeration provided here includes 181 taxa in 52 genera; 135 of these are fully determined to species or variety and 46 are incompletely determined, sometimes as 'aff.' or 'cf.' a particular species, and sometimes to a section or subgenus or only to the generic level. Several incompletely determined specimens probably represent undescribed taxa, others are in taxonomic complexes not fully understood, and still others are not sufficiently complete specimens to permit accurate identification. A few of the "taxa" designated as "sp." may include more than one taxon under that category. Based on the *Check-list of the Orchids of Borneo* (Wood & Cribb, 1994) the taxa reported here include five new generic records for Sarawak, 21 new species records, and four records of taxa not identified with certainty to a particular species, but the species to which they appear to be allied have not been reported previously from Sarawak.

The largest genus in the Kelabit Highlands orchid flora is *Dendrochilum*, for which 21 taxa are recognized. *Coelogyne* has 19 taxa, *Eria* has 17, and *Bulbophyllum* and *Dendrobium* each have 14. *Appendicula* has seven taxa and *Liparis* six, with smaller numbers occurring in all other genera.

The collection data upon which the enumeration here is based have been extracted from a database being prepared for an enumeration of the orchids of Sarawak. Much additional work is required to complete the Sarawak enumeration, but the Kelabit Highlands records were readily extracted from the larger database. The computer methodology for preparing this enumeration is similar to that used in making the enumeration of the summit flora of Mt. Murud by J. H. Beaman. The computer programs written by Reed Beaman for the enumeration of the Mount Kinabalu flora, and the file structures, have been used with minor modifications. Additional details on the computer methodology can be found in the Mt. Murud chapter by J. H. Beaman.

The geology of the entire Kelabit highlands consists of Tertiary sedimentary rocks. More area is covered by the Miocene Meligan Formation and the Oligocene-Miocene Setap Formation than by other types. The Oligocene Kelabit, Eocene Pelagas and Paleocene-Eocene Kelalan Formations are exposed over somewhat less area. The geology of a substantial area on the east side of the Kelabit Highlands, including the Apo Duat Range which separates Sarawak from East Kalimantan, is not designated on the most recent geological map of Sarawak (Yin Ee Heng, 1992). A very small area of recent alluvial soils occurs around Bario, but this is virtually all now in wet padi. Mt. Murud, Batu Lawi and the Tama Abu Range, which constitute a substantial portion of the higher elevations in the Kelabit Highlands, have extensive Meligan sandstone exposures. The white sandstones often have kerangas vegetation, which is relatively flat and poorly drained in the vicinity of Bario. Kerangas, an Iban word for land unsatisfactory for hill-rice cultivation, has a particularly diverse and interesting orchid flora.

Four major river drainage systems originate in the Kelabit Highlands. The Dapur River begins on the southeast side of Mt. Murud, flows south, and becomes the major tributary to the great Baram River. The Limbang River originates near Batu Lawi and flows northwestward through the Limbang Division, eventually entering Brunei Bay. The Kelalan River and its tributaries originate on the northeast side of Mt. Murud and pass through the Lawas District, also flowing into Brunei Bay. The Tutoh River originates on the west side of the Tama Abu Range, flows west by the south side of Mt. Mulu, and joins the Baram River not far above Marudi in the western lowlands of northern Sarawak.

Many orchids in the Kelabit Highlands have been collected along rivers such as the Dapur, upper Limbang, Mario, Menalio, and Bor. Some of these riverine habitats probably were once mixed dipterocarp hill forest, but many of the remaining forest areas at the lower elevations with interesting orchid occurrences are old secondary forests. The wet kerangas forest, especially conspicuous between Bario and Pa' Umor at about 1,150m elevation, has a rich orchid flora, including many species that otherwise are generally found at higher elevations. Lower montane forest, in which nearly 100 taxa have been collected, occurs from about 1,300m to 2,000m. Some areas of physiognomically very distinctive mossy forest occur on ridges of the Tama Abu Range, and are very conspicuous when viewed from aircraft flying not very far above them. Upper montane mossy and scrub forest occurs mostly on Mt. Murud and other high ridges above 2,000m.

In terms of elevational distribution of the Kelabit Highlands orchids, there are strong parallels with the distribution patterns of orchids on Mount Kinabalu (Wood et. al., 1993). The greatest number of species and genera in the Kelabit Highlands occurs at 1,400m, whereas it is at 1,500m on Mount Kinabalu. There are no records for orchids in the Kelabit Highlands collected lower than 1,000m, for the principal reason that most of the area is higher than that elevation. Those recorded from the highest elevation are from the summit of Mt. Murud, at 2,424m.

Epiphytes considerably outnumber terrestrial species in the Kelabit Highlands orchid flora, with about 75 per cent of the taxa being characterized as epiphytic, 24 per cent terrestrial, and 5 per cent lithophytic. These percentages sum to more than 100 per cent, because a few taxa can be both terrestrial or lithophytic or even both terrestrial and epiphytic. The number of epiphytic vs.

terrestrial species in this flora is remarkably similar to that in the orchid flora of Mount Kinabalu (Wood et al., 1993), in which about 72 per cent are recorded as epiphytes, 27 per cent terrestrial, and 5 per cent lithophytic. The life-form data for orchids in these two areas may be representative of all Bornean orchids.

ENUMERATION

1. ACRIOPSIS

- 1.1. *Acriopsis javanica* Reinw ex Blume a. var. *javanica*. Epiphyte on tree trunks. Secondary forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Pa' Ram Apong (Bario): 1,100m, T.E. Beaman & Laily TEB 228 (K, UNIMAS).

2. AGROSTOPHYLLUM

- 2.1. *Agrostophyllum majus* Hook. f. Epiphyte on mossy tree trunks. Mossy forest. ELEVATION: 1,300m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: 1,300m, Burt & Martin B 5191 (SAR).

3. ANOECTOCHILUS

- 3.1. *Anoectochilus gniculatus* Ridl. Terrestrial. Loamy soil in submontane forest. ELEVATION: 1,600m. New species record for Borneo and new generic record for Sarawak. MATERIAL EXAMINED: Limbang District Batu Lawi: 1,600m, Cheksum Tawan et al. CST 606 (UNIMAS).

4. APPENDICULA

- 4.1. *Appendicula calcarata* Ridl. Epiphyte. Lower montane riverine forest. ELEVATION: 1,300m. MATERIAL EXAMINED: Marudi District: Tama Abu Range: 1,300m, Dayang Awa & Bernard Lee S. 51186 (K, SAR).
- 4.2. *Appendicula congosta* Ridl. Epiphyte near bases of tree trunks. Lower montane forest. ELEVATION: 1,700m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: 1,700m, Burt & Martin B. 5233 (SAR).
- 4.3. *Appendicula cristata* Blume. Epiphyte. Mixed dipterocarp hill forest. ELEVATION: 1,200m. New record for Sarawak. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,200m, Dayang Awa & Bernard Lee S. 50594 (K, SAR).
- 4.4. *Appendicula foliosa* Ames & C. Schweinf. Terrestrial or lithophytic. On sandstone in lower montane forest. ELEVATION: 1,600m. MATERIAL EXAMINED: Marudi District: Mt. Murud: 1,600m, Yii S. 44421 (K, SAR).
- 4.5. *Appendicula torta* Blume Epiphyte on tree trunks. Mixed dipterocarp hill forest, lower montane forest. ELEVATION: 1,300-1,500m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,500m, Dayang Awa & Bernard Lee S. 50544 (K, SAR); Marudi District: Tama Abu Range: 1,300m, Dayang Awa & Bernard Lee S. 51187 (K, SAR).
- 4.6. *Appendicula undulata* Blume a. var. *undulata* Epiphyte. Riverine forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Pa' Dapur/Menaliu River: 1,100m, Dayang Awa S 51098 (K, SAR).
- 4.7. *Appendicula xytriophora* Rchb. f. Epiphyte on tree trunks. Mixed dipterocarp hill forest, lower montane forest, riverine forest. ELEVATION: 1,400— 1,500m. MATERIAL

EXAMINED: Limbang District: Batu Lawi: 1,400m, Dayang Awa & Bernard Lee S. 50837 (K, SAR); Limbang District: Pa' Mario/Batu Lawi: 1,500m, Dayang Awa & Bernard Lee S. 50714 (K, SAR).

- 4.8. *Appendicula* sp. Epiphyte on tree trunks or terrestrial at tree bases. Hill forest and lower montane forest. ELEVATION: 1,300—1,600m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: Burt & Martin B. 5434 (SAR); Limbang District: Batu Lawi: Moulton 13 (SAR), 1,300m, Nootboom 2312 (SAR); Marudi District: Mt. Murud: 1,600m, Yii 5. 44401 (K, SAR); Marudi District: Tama Abu Range: 1,600m, Dayang Awa & Bernard Lee S. 51107 (K, SAR).

5. ASCIDIERIA

- 5.1. *Ascidieria longifolia* (Hook. f) Seidenf. Epiphyte. Lower montane mossy forest. ELEVATION: 1,500m. MATERIAL EXAMINED: Marudi District: Apad Keruma, Kelabit Highlands: 1,500m, Yii 5. 55929 (K, SAR).

6. BROMHEADIA

- 6.1. *Bromheadia finlaysoniana* (Lindl.) Miq. Terrestrial. Wet kerangas and young secondary forest. ELEVATION: 1,000-2,300m. MATERIAL EXAMINED: Marudi District: Bario/Pa' Ukat: 1,000m, Nootboom 1816 (SAR); Marudi District: Bano/Pa' Umor: 1,100m, Beaman 11234 (K, UNIMAS); 1,100m, T.E. Beaman & Rimi Repin TEB 184 (K, UNIMAS), 1,100m, TEB 194 (K, UNIMAS); Marudi District: Mt. Murud: 2,100m, Burt & Martin B. 5463A (SAR), 2,300m, Yii S. 44482 (SAR); Marudi District: Pa' Ukat/Pa' Umor: Peter Sie S. 35387 (K).

7. BULBOPHYLLUM

- 7.1. *Bulbophyllum apodum* Hook. f. Epiphyte with creeping rhizomes. Montane forest. ELEVATION: 1,900m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: 1,900m, Burt & Martin B. 5404 (SAR).
- 7.2. *Bulbophyllum concinnum* Hook. f. Epiphyte on tree trunks. Old secondary forest, Dacrydium, Podocarpus and oak forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Bario/Pa' Umor: 1,100m, Beaman 11255 (K, UNIMAS); Marudi District: Pa' Umor/Pa' Ukat: 1,100m, T.E. Beaman & Rimi Repin TEB 141 (UNIMAS).
- 7.3. *Bulbophyllum ecornutum* (J.J. Sm.) J.J. Sm. Epiphyte on tree trunks. Wet kerangas. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Bario/Pa' Umor: 1,100m, Beaman 11237 (K, UNIMAS):
- 7.4. *Bulbophyllum flavescens* (Blume) Lindl. Epiphyte on tree trunks. Mixed dipterocarp riverine forest. ELEVATION: 1,100-1,200m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,200m, Dayang Awa & Bernard Lee S. 50577 (K, SAR); Marudi District: Pa' Dapur/Menalio River: 1,100m, Dayang Awa S. 51095 (K, SAR); Marudi District: Pa' LunganlSekelun Hill, 1,100m, Beaman 11508 (K, UNIMAS).
- 7.5. *Bulbophyllum laxiflorum* (Blume) Lindl. Epiphyte on tree trunks. Lower montane forest. ELEVATION: 1,600m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50997 (K, SAR).
- 7.6. *Bulbophyllum lobbii* Lindl. Epiphyte on tree trunks. Hill forest, lower montane forest. ELEVATION: 1,100-1,400m. MATERIAL EXAMINED: Marudi District: Long

- Rapung!Pa' Lungan: 1,100-1,400m, T.E. Beaman & H. Lohok TEB 227 (UNIMAS).
- 7.7. *Bulbophyllum aff montense* Ridl. Epiphyte. Lower montane forest? ELEVATION: 1,500m. *B. montense* has not been recorded for Sarawak. MATERIAL EXAMINED: Limbang District: Batu Buli: 1,500m, Dayang Awa & Bernard Lee S. 50776 (K, SAR).
 - 7.8. *Bulbophyllum obtusum* (Blume) Lindl. Epiphyte. Lower montane forest. ELEVATION: 1,800m. New record for Sarawak, and previously without specific locality in Borneo. MATERIAL EXAMINED: Marudi District: Tama Abu Range: 1,800m, Dayang Awa & Bernard Lee S. 51125 (SAR).
 - 7.9. *Bulbophyllum putidum* (Teijsm. & Binn.) J.J. Sm. Epiphyte on tree trunks. Wet kerangas forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District.: Bario/Pa' Umor: 1,100m, T.E. Beaman & Lim C.K. TEB 281 (UNIMAS).
 - 7.10. *Bulbophyllum sopoetanense* Schltr. Epiphyte near the ground. Lower montane forest. MATERIAL EXAMINED: Limbang District: Batu Buli: Lamb ALSR 255/85 (K).
 - 7.11. *Bulbophyllum cf. succedaneum* J.J. Sm. Epiphyte. Montane forest. *B. succedaneum* has not been recorded for Sarawak. MATERIAL EXAMINED: Limbang District: Batu Lawi: Moulton 16 (SAR).
 - 7.12. *Bulbophyllum* sp. Epiphytes on tree trunks. Hill forest, lower montane forest. ELEVATION: 1,100-1,600m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/tvIt. Murud: 1,300m, Burt & Martin B. 5182 (SAR); Limbang District: Bario/Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50976 (SAR); Limbang District: Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50976 (SAR); Limbang District: Upper Limbang: Sarawak Museum collector s.n. (SAR); Marudi District: Long Rapung/Pa Lungan: 1,100-1,400m, T.E. Beaman & H. Lohok TEB 286 (UNIMAS).
 - 7.13. *Bulbophyllum* sp. sect. *Altiseptum* Epiphyte on tree trunks. Hill forest or lower montane forest. ELEVATION: 1,100-1,400m. MATERIAL EXAMINED: Marudi District: Long Rapung/Pa' Lungan: 1,100-1,400m, T.E. Beaman & H. Lohok TEB 224 (K, UNIMAS).
 - 7.14. *Bulbophyllum* sp. sect. *Aphanobulbon* Terrestrial or lithophytic. Lower montane mossy forest, open secondary forest. ELEVATION: 1,100-1,800m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,800m, Dayang Awa & Bernard Lee S0901 (K, SAR); Marudi District: Pa' Umor/Salt Lick. 1,100m, Beaman 11253 (K, UNIMAS).
 - 7.15. *Bulbophyllum* sp. sect. *Desmosanthe* Epiphyte. Riverine forest. ELEVATION: 1,000m. MATERIAL EXAMINED: Marudi District: Menalio River/Tarna Abu Range: 1,000m, Dayang Awa S. 51039 (K, SAR).

8. CALANTHE

- 8.1. *Calanthe aff. pulchra* (Blume) Lindl. Terrestrial. Lower montane mossy forest. ELEVATION: 1,800m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: 1,800m, Burt & Martin B. 5271 (SAR); Marudi District: Mt. Mumud: 1,800m, Nooteboom 1969 (SAR).
- 8.2. *Calanthe spectosa* (Blume) Lindl. Epiphyte on fallen tree trunks. Lower montane forest. ELEVATION: 1,800m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: 1,800m, Burt & Martin B. 5368 (SAR).
- 8.3. *Calanthe sylvatica* (Tbouars) Lindl. Terrestrial. Lower montane forest. ELEVATION: 1,300-1,800m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,800m, Dayang Awa & Bernard Lee S. 50902 (K, SAR), 1,400-1,500m, Lamb ALSR 218/85 (K); Marudi District: Mt. Murud: 1,300m, Yii S. 44667 (K, SAR).

- 8.4. *Calanthe* sp. 1. Terrestrial. Lower montane mossy forest. ELEVATION: 1,600m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50809 (K, SAR).
- 8.5. *Calanthe* sp. sect. *Styloglossum* Terrestrial. Riverine forest. ELEVATION: 1,000m. MATERIAL EXAMINED: Marudi District: Menalio River/Tama Abu Range: 1,000m, Dayang Awa S. 51037 (K, SAR).

9. CERATOSTYLIS

- 9.1. *Ceratostylis* sp. Epiphyte on tree trunks. Riverine forest, lower montane mossy forest. ELEVATION: 1,000-1,600m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50999 (K, SAR); Marudi District: Menalio River/Tama Abu Range: 1,000m, Dayang Awa S. 51042 (K, SAR).

10. CHELONISTELE

- 10.1. *Cheloniste cimplissirna* (Ames & C. Schweinf.) Carr Epiphyte on tree trunks. Lower montane forest. ELEVATION: 1,500-1,600m. MATERIAL EXAMINED: Limbang District: Kelabit Highlands, Ulu Limbang: 1,600m, Nooteboom 2247 (SAR); Limbang District: Pa' Mario/Batu Lawi: 1,500m, Dayang Awa & Bernard Lee S. 50748 (K, SAR).
- 10.2. *Chelonistele breviamellata* (J.J. Sm.) Cam Epiphyte. Lower montane ridge forest. ELEVATION: 1,600m. New record for Sarawak. MATERIAL EXAMINED: Marudi District: Tama Abu Range: 1,600m, Dayang Awa & Bernard Lee S. 51103 (SAR).
- 10.3. *Chelonistele ingloria* J. J. Sm. Epiphyte on tree trunks. Lower montane forest, riverine forest. ELEVATION: 1,200-1,500m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: 1,200m, Burt & Martin B. 5200 (SAR), 5215 (SAR); Limbang District: Batu Lawi: 1,500m, Dayang Awa & Bernard Lee S. 50703 (SAR).
- 10.4. *Chelonistele* sp. Epiphyte. Lower montane mossy forest. ELEVATION: 1,800m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: 1,800m, Burt & Martin B. 5272 (SAR).

11. CHRYSOGLOSSUM

- 11.1. *Chrysoglossum reticulatum* Carr. Terrestrial. Lower montane mossy forest on ridge tops. ELEVATION: 1,700-1,800m. MATERIAL EXAMINED: Limbang District: Batu Buli: 1,700-1,800m, Lamb ALSR 222/85 (K).

12. CLEISOSTOMA

- 12.1. *Cleisostoma* sp. Epiphyte on tree trunks. Wet kerangas. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Bario/Pa' Umor: 1,100m, T.E. Beaman & Rimi Repin TEB 105 (UNIMAS).

13. COELOGYNE

- 13.1. *Coelogyne albobrunnea* J.J. Sm. Epiphyte on tree trunks. Mixed dipterocarp hill forest. ELEVATION: 1,200m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,200m, Dayang Awa & Bernard Lee S. 50556 (K, SAR).
- 13.2. *Coelogyne compressicaulis* Ames & C. Schweinf. Epiphyte. Riverine forest. ELEVATION: 1,000m. MATERIAL EXAMINED: Marudi District: Menalio River/Tama Abu Range: 1,000m, Dayang Awa S. 51033 (K, L).

- 13.3. *Coelogyne craticulaelabris* Carr. Pendulous epiphyte. Lower montane mossy forest. ELEVATION: 1,800-2,300m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,800m, Lamb ALSR 219/85 (K); Marudi District: Mt. Murud: 2,300m, Burt & Martin B. 5454 (SAR).
- 13.4. *Coelogyne cuprea* H. Wendl. & Kraenzl. a. var. *planiscapa* J.J. Wood & C.L. Chan. Epiphyte. Lower montane forest. ELEVATION: 1,000—1,700m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,700m, Dayang Awa & Berard Lee S. 50944 (K, SAR); Marudi District: Menalio River/Tama Abu Range: 1,000m, Dayan~ Awa 5. 51035 (K).
- 13.5. *Coelogyne gibbifera* J.J. Sm. Epiphyte. Lower montane forest. MATERIAL EXAMINED: Limbana District: Batu Lawi: Moulton 12 (BO nv., holotype, SAR, isotype).
- 13.6. *Coelogyne hirtella* Jj. Sm. Epiphyte low on tree trunks or terrestrial. Wet kerangas and lower montane mossy forest. ELEVATION: 1,100-2,200m. MATERIAL EXAMINED: Limbang District: Pa' Mario/Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50757 (K, SAR); Marudi District: Apad Keruma, Kelabit Highlands: 1,500m, Yii S. 55931 (K, SAR), 1,500m, S. 55940 (K,SAR); Marudi District: Bario: 1,200m, Nooteboom 1720 (SAR); Marudi District: Bario/Pa' Umor: 1,100m, T.E. Beaman & Rimi Repin TEB 110 (K, UNIMAS); Marudi District: Kelabit Highlands: 1,100m, Chai S. 35311 (K,SAR), Yii 5. 35311 (SAR); Mt. Murud, 2,200m, Nooteboom 2019 (K, SAR); Marudi District: Sekelun Hill N of Pa' Lungun: 1,400m, Beaman 11506 (K,UNIMAS).
- 13.7. *Coelogyne incrassata* (Blume) Lindl. a. var. *incrassata*. Epiphyte. Riverine forest. LEVATION: 1,000-1,200m. New record for Sarawak. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,200m, Dayang Awa & Bernard Lee S. 50562 (SAR); Marudi District: Menalio River/Tama Abu Range: 1,000m, DayangAwa S. 51034 (SAR).
- 13.8. *Coelogyne longihulbosa* Ames & C. Schweinf. Epiphyte on tree trunks. Riverine forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Pa' Dapur/Menalio River: 1,100m, DayangAwa S. 51094 (K, SAR).
- 13.9. *Coclogyne aff. macroloba* Carr. Epiphyte. Lower mnontane forest. ELEVATION: 1,600m. MATERIAL EXAMINED: Limbang District: Upper Limbang River: 1,600m, Nooteboom 2226 (SAR).
- 13.10. *Coelogyne aff. monilirachis* Carr. Epiphyte on tree trunks. Hill forest. ELEVATION: 1,100mn. MATERIAL EXAMINED: Marudi District: Bario/Old Reservoir: 1,100m, T.E. Beaman & Rimi Repin TEB 201 (K, UNIMAS).
- 13.11. *Coelogyne moultonii* J.J. Sm. Epiphyte. Lower rnontane forest. ELEVATION: 1,800m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: 1,800m, Burt & Martin B. 5258 (SAR); Limbang District: Labeng Barian Hill: Moulton 17 (BO!, holotype, SAR!, isotype).
- 13.12. *Coelogyne planiscapa* Carr. a. var. *planiscapa*. Terrestrial. Lower mnontane ridge forest. ELEVATION: 1,600m. MATERIAL EXAMiNED: Limbang District: Pa' Mario/Batu Lawi: 1,600m, Dayang Awa & Bernard Lee 50758 (K, SAR).
- 13.13 *Coelogyne cf platyrachis*. Terrestrial. Lower montane ridge forest. ELEVATION: 1,600m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50758 (SAR), Moulton s.n. (SAR).
- 13.14. *Coelogyne radioferens* Ames & C. Schweinf. Epiphyte. Lower montane forest. ELEVATION: 1,000-2,000m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: 1,800-2,000m, Burt & Martin B. 5274 (SAR); Lawas District: Mt. Murud: Ilias

- Paie S. 26519 (SAR); Limbang District: Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50979 (K, SAR); Marudi District: Bario: 1,000m, Nootboom 2142 (SAR); Marudi District: Tama Abu Range: 1,600m, Dayang Awa & Bernard Lee S. 51112 (SAR).
- 13.15 *Coelogyne rhabdobulbon* Schltr. Epiphyte. Lower montane krest. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: Burt & Martin B. 5527 (SAR).
- 13.16 *Coelogyne Sanderiana* Rchb. f. Terrestrial. Wet kerangas. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Bario/Pa Umor: 1,100m, Beaman 11240 (K, UNIMAS).
- 13.17 *Coelogyne swaniana* Rolfe. Epiphyte. Riverine forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Pa' Dapur/Tama Abu Range: 1,100m, Dayang Awa S. 51093 (K, SAR).
- 13.18 *Coelogyne tenompokensis* Carr. Epiphyte on tree trunks. Lower montane forest. ELEVATION: 1,500-1,700m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: 1,700m, Burt & Martin 5245 (SAR); Limbang District: Batu Buli: 1,500m, Dayang Awa & Bernard Lee S. 50775 (K, SAR); Marudi District: Apad Keruma, Kelabit Highlands: 1,500m, Yii S. 55930 (K, SAR).
- 13.19 *Coelogyne venusta* Rolfe. Epiphyte. Mixed dipterocarp hill forest. ELEVATION: 1,300m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,300m, Dayang Awa & Bernard Lee S. 50578 (SAR).
- 13.20 *Coelogyne* sp. Epiphytes. ELEVATION: 1,500-1,700m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/ Mt. Murud: 1,700m, Burt & Martin B. 5247 (SAR); Limbang District: Batu Lawi: Cheksum Tawan et al. CST 766 (UNIMAS); Limbang District: Pa' Mario/Batu Lawi: 1,500m, Dayang Awa & Bernard Lee S. 50697 (K, SAR).

14. COLLABIUM

- 14.1. *Collabium bicameratum* (J.J.Sm.) J.J. Wood. Terrestrial. Lower montane forest. ELEVATION: 1,800m. New generic record for Sarawak. MATERIAL EXAMINED: Limbang District: Batu Buli: 1,800m, Nootboom 2212 (SAR).

15. CYMBIDIUM

- 15.1. *Cymbidium elongatum* J.J. Wood, Du Puy & Shim. Epiphyte. Lower montane forest. ELEVATION: 2,000-2,100m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: 2,000m, Burt & Martin B. 5428 (SAR); Lawas District: Mt. Murud: 2,100m, Burt & Martin B. 5460 (SAR).

16. CYSTORCHIS

- 16.1. *Cystorchis saprophytica* J.J. Sm. Terrestrial. Lower montane ridge forest. ELEVATION: 1,200—1,400m. MATERIAL EXAMINED: Limbang District: Batu Buli: 1,200-1,400m, Lamb ALSR 220/85 (K); Marudi District: Sekelun Hill N of Pa' Lungun: 1,400m, Beaman 11507 (UNIMAS).

17. DENDROBIUM

- 17.1. *Dendrobium cinnabarinum* Rchb. f. a. var. *cinnabarinum*. Epiphyte on riverme tree trunks. Wet kerangas. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Pa' Umor: 1,100m, Beaman 11245 (UNIMAS).
- 17.2. *Dendrobium cymbalipes* J.J.Sm. Epiphyte. Lower montane mossy forest. ELEVATION:

- 1,700m. MATERIAL EXAMINED: Limbang District: Batu Buli: 1,700m, Lamb ALSR 252/85 (K).
- 17.3. *Dendrobium gracile* (Blume) Lindl. Epiphyte. Lower montane forest. ELEVATION: 1,700m. MATERIAL EXAMINED: Limbang District: Batu Buli: 1,700m, Nooteboom 2223 (SAR).
- 17.4. *Dendrobium hendersonii* AD. Hawkes & A.H. Heller. Epiphyte. Riverine forest. MATERIAL EXAMINED: Limbang District: Buyo Hill, Upper Limbang: Moulton 7 (SAR).
- 17.5. *Dendrobium korthalsii* J.J. Sm. Epiphyte. Secondary forest, kerangas. ELEVATION: 1,100m. New record for Sarawak. MATERIAL EXAMINED: Marudi District: Bario/Pa' Umor: 1,100m, Robert Yong 80 (K); Marudi District: Pa' Umor Salt Lick: 1,100m, T.E. Beaman, Laily, & Ghazally TEB 205 (K, UNIMAS).
- 17.6. *Dendrobium lancilobum* Jj. Wood. Epiphyte on tree trunks. Hill forest or lower montane forest. ELEVATION: 1,100-1,400m. New record for Sarawak. MATERIAL EXAMINED: Marudi District: Long Rapung/Pa' Lungan: 1,100-1,400m, T.E. Beaman & H. Lohok TEB 223 (UNIMAS).
- 17.7. *Dendrobium lawaiense* J.J. Sm. Epiphyte. Lower montane forest. MATERIAL EXAMINED: Limbang District: Batu Lawi: Moulton 9 (BO!, holotype).
- 17.8. *Dendrobium lobbii* Teijsm. & Binn. Epiphyte. Wet kerangas. MATERIAL EXAMINED: Marudi District: Bario/Pa' Ukat: Lamb ALSR 248/85 (K).
- 17.9. *Dendrobium piranha* C.L. Chan & P Cribb. Lithophyte. Upper montane ridge forest in open shrubby vegetation. ELEVATION: 1,800-2,200m. New record for Sarawak. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,800m, Dayang Awa & Bernard Lee S. 50894 (SAR); Marudi District: Mt. Murud: 2,200m, Nooteboom 2032 (K, photo).
- 17.10 *Dendrobium secundum* (Blume) Lindl. Epiphyte on tree trunks. Old secondary forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Bario/Pa' Umor: 1,100m, Beaman 11242 (K, UNIMAS); Marudi District: Pa' Umor/Pa' Ukat: 1,100m, T.E. Beaman & Rimi Repin TEB 152 (UNIMAS).
- 17.11 *Dendrobium subulaandes* Schltr. Epiphyte on tree trunks. Old secondary forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Pa' Lungan: 1,100m, Robert Yong 79 (K).
- 17.12 *Dendrobium tetrachromum* Rchb. 1. Epiphyte on riverine tree trunks. Wet kerangas. ELEVATION: 1,100m. New record for Sarawak. MATERIAL EXAMINED: Marudi District: Pa' Umor: 1,100m, Beaman 11244 (K, UNIMAS).
- 17.13 *Dendrobium* sp. Epiphyte on tree trunks. Old secondary forest. ELEVATION: 1,000-2,100m. MATERIAL EXAMINED: Lawas District: Mt. Murud: 2,100m, Burt & Martin B. 5480 (SAR); Marudi District: Bario/Pa' Ukat: 1,000m, Dayang Awa Ct al. S. 50449 (SAR); Marudi District: Pa' Umon/Pa' Ukat: 1,100m, T.E. Beaman & Rimi Repin TEB 310 (UNIMAS), 1,100m, TEB 311 (UNIMAS).
17. 14. *Dendrobium* sp. sect. Calcarifera. Epiphyte. Wet kerangas, lower montane mossy forest. ELEVATION: 1,100-1,400m. MATERIAL EXAMINED: Limbang District: Batu Buli: 1,400m, A. Lamb ALSA 240/85 (K), 1,400m, Lamb /85 240 (K); Marudi District: Bario/Pa' Umor: 1,100m, T.E. Beaman & Rimi Repin TEB 199 (K, UNIMAS); Marudi District: Long Rapung/Pa' Lungan: 1,100-1,400m, T.E. Beaman & H. Lohok TEB 225 (K, UNIMAS).
- 17.15. *Dendrobium* sp. sect. Rhopalanthe. Epiphyte. Upper montane ridge scrub forest.

MATERIAL EXAMINED: Marudi District: Mt. Murud Summit Ridge: 2,300-2,400m, Beaman 11482 (UNIMAS).

18. DENDROCHILUM

- 18.1. *Dendrochilum conopseum* Ridl Epiphyte at base of tree trunks. Old secondary forest. ELEVATION 1,100m MATERIAL EXAMINED: Marudi District: Pa' Umon/Pa' Ukat 1,100m, TE Beaman & Rimi Repin TEB 137 (K, UNIMAS).
- 18.2. *Dendrochilum crassifolium* Ames. a. var. *crassifolium*. Epiphyte. Lower montane forest. ELEVATION: 1,700m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: 1,700m, Burt & Martin 5241 (K). b. var. *murudense* J.J. Wood. Epiphyte on tree trunks. Upper montane mossy forest. ELEVATION: 2,300-2,400m. MATERIAL EXAMINED: Marudi District: Mt. Murud. Summit Ridge: 2,300-2,400m, Beaman 11459 (K, UNIMAS), Mt. Murud: 2,400m, Nooteboom 1995 (K!, holotype); 2,300m, Yii S. 44430A (K, L, SAR).
- 18.3. *Dendrochilum crassilabium* J.J. Wood. Tufted epiphyte. Lower montane forest. ELEVATION: 1,500m. MATERIAL EXAMINED: Limbang District: Batu Buli: 1,500m, Dayang Awa & Bernard Lee S. 50774 (K, SAR).
- 18.4. *Dendrochilum dewindtianum* W.W. Sm. a. var. *dewindtianum*. Epiphyte. Mossy ridge forest. ELEVATION: 2,400m. MATERIAL EXAMINED: Marudi District: Mt. Murud Summit Ridge: 2,300-2,400m, Beaman 11448 (K, UNIMAS), 2,400m, Nooteboom 1995 (L).
- 18.5. *Dendrochilum galbanum* J.J. Wood. Epiphyte. Mossy ridge forest. ELEVATION: 1,800-2,300m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: 1,800m, Burt & Martin B. 5328 (K!, isotype); Marudi District: Mt. Murud: 2,300m, Yii S. 44430 (K, L, SAR).
- 18.6. *Dendrochilum geesinkii* J.J. Wood. Epiphyte on tree trunks. Mixed dipterocarp hill forest. ELEVATION: 1,300m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,300m, Dayang Awa & Bernard Lee S. 50586 (K, SAR).
- 18.7. *Dendrochilum gibbsiae* Rolfe. Epiphyte. Lower montane forest. ELEVATION: 1,600m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud, below Camp 3, 1,600m, Burt & Martin B. 5299 (SAR); Marudi District: Mt. Murud: 1,600m, Yii S. 44402 (K, SAR).
- 18.8. *Dendrochilum gracilipes* Carr. Epiphyte. Lower montane forest. ELEVATION: 1,600m. MATERIAL EXAMINED: Marudi District: Tama Abu Range: 1,600m, Dayang Awa & Bernard Lee S. 51102 (K, SAR).
- 18.9. *Dendrochilum gravenhorstii* J.J. Sm. Terrestrial. Wet kerangas. ELEVATION: 1,000m. MATERIAL EXAMINED: Marudi District: Bario/Pa' Ukat: 1,000m, Dayang Awa et al. S. 50416 (K, SAR).
- 18.10 *Dendrochilum hastilobum* J.J. Wood. Epiphyte. Lower montane forest. ELEVATION: 1,600m. MATERIAL EXAMINED: Limbang District: Pa' Mario/Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50754 (K, SAR).
- 18.11 *Dendrochilum imbricatum* Ames. Epiphyte on tree trunks. Lower montane forest. ELEVATION: 1,500m. MATERIAL EXAMINED: Limbang District: Pa' Mario/Batu Lawi: 1,500m, Dayang Awa & Bernard Lee S. 50704 (K, SAR).
- 18.12 *Dendrochilum lancilabium* Ames. Lithophyte on boulders. Mossy low ridge forest. ELEVATION: 2,100m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt.

- Murud: Burt & Martin B. 5319 (SAR); Marudi District: Mt. Murud: 2,100m, Ilias Pale S. 26455 (K, SAR).
- 18.13 *Dendrochilum longipes* J.J. Sm. Terrestrial or lithophytic on boulders. Mossy ridge forest. ELEVATION: 1,800-2,300m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,800m, Dayang Awa & Bernard Lee S. 50900 (K, SAR); Batu Lawi: Moulton 15 (L n.v., holotype, SAR!, isotype); 2,000m, Nooteboom 2278 (K); Marudi District: Mt. Murud: 1,800m, Nooteboom 1945 (K); 2,300m, Yii S. 44432 (K, SAR).
- 18.14 *Dendrochilum muluense* J.J. Wood. Epiphyte on tree trunks. Lower montane forest, mossy forest. ELEVATION: 1,600-2,200m. MATERIAL EXAMINED: Lawas District: Ba Kelalan Mt. Murud: 1,700m, Burt & Martin B. 5244 (SAR); Limbang District: Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50812 (K, SAR), 1,800m, S. 50937 (K, SAR); Marudi District: Mt. Murud: 2,200m, Yii S. 44616 (K, SAR).
- 18.15 *Dendrochilum pachyphyllum* J.J. Wood & A. Lamb. Epiphyte. Lower montane forest. ELEVATION: 1,500m. MATERIAL EXAMINED: Limbang District: Batu Buli: 1,500m, Dayang Awa & Bernard Lee S. 50774 (K, SAR).
- 18.16 *Dendrochilum pandurichilum* J.J. Wood. Epiphyte. Lower montane forest. ELEVATION: 1,500m. MATERIAL EXAMINED: Limbang District: Pa' Mario/Batu Lawi: 1,500m, Dayang Awa & Bernard Lee S. 50731 (K, SAR).
- 18.17 *Dendrochilum simplex* J.J. Sm. Epiphyte on rotten logs. Wet kerangas, lower montane forest. ELEVATION: 1,100-1,500m. New record for Sarawak. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,500m, Dayang Awa & Bernard Lee S. 50792 (K, SAR), 1,100m, Moulton 10 (SAR!, isotype of *D. remotum* J.J. Sm.); Marudi District: Bario/Pa' Umor: 1,100m, T.E. Beaman & Rimi Repin 103 (K, UNIMAS).
- 18.18 *Dendrochilum subulibrachium* J.J. Sm. Epiphyte on tree trunks. Lower montane ridge forest. ELEVATION: 1,600m. MATERIAL EXAMINED: Limbang District: Pa' Mario/Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50756 (K, SAR).
- 18.19 *Dendrochilum tenompohense* Carr. Epiphyte. Lower montane riverine forest. ELEVATION: 1,500-1,800m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,800m, Dayang Awa & Bernard Lee S. 50898 (K, SAR); Limbang District: Pa' Mario/Batu Lawi: 1,500m, Dayang Awa & Bernard Lee S. 50712 (SAR).
- 18.20 *Dendrochilum* sp. section *Aporum*. Epiphyte. Wet kerangas. ELEVATION: 1100m. MATERIAL EXAMINED: Marudi District: Bario/Pa' Umor: 1,100m, T.E. Beaman & Rimi Repin TEB 104 (UNIMAS).
- 18.21 *Dendrochilum* sp. subgenus *Dendrochilum*. Epiphyte at base of tree trunks. Kerangas, hill forest or lower montane forest. ELEVATION: 1,100-1,400m. MATERIAL EXAMINED: Marudi District: Bario/Pa' Umor: 1,100m, Beaman 11261 (K, UNIMAS); Marudi District: Long Rapung/Pa' Lungan, 1,100-1,400m, T.E. Beaman & H. Lohok 280 (K, UNIMAS).

19. DIDYMOPLEXIS

- 19.1. *Didymoplexis striata* J.J. Sm. Terrestrial saprophyte. Lower montane forest. ELEVATION: 1,300m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,300m, Lamb ALSR 230/83 (K).

20. DILOCHIA

- 20.1. *Dilochia cantleyi* (Hook. f.) Ridl. Terrestrial. Wet kerangas, lower montane forest, secondary forest. ELEVATION: 1,000-1,800m. New record for Sarawak. MATERIAL

- EXAMINED: Limbang District: Batu Lawi: 1,800m, Dayang Awa & Bernard Lee S. 50892 (K, SAR); Marudi District: Bario/Pa' Umor: 1,100m, Beaman 11262 (K, UNIMAS); 1,000m, Dayang Awa et al. S. 50459 (K, SAR); Marudi District: Mt. Murud: 1,700m, Yii 5. 44627 (K, SAR); Marudi District: Pa Umor Salt Lick: 1,100m, T.E. Beaman, Laily, & Ghazally TCB 206 (K, UNIMAS).
- 20.2. *Dilochia parviflora* J.J. Sm. Terrestrial. Kerangas. ELEVATION: 1,000m. MATERIAL EXAMINED: Marudi District: Pa' MainlMarariro River: 1,000m, Anderson S. 20078 (K).
- 20.3. *Dilochia rigida* (Ridl.) J.J.Wood. Terrestrial or lithophytic. Upper montane forest among mosses or on rocks. ELEVATION: 1,800—2,400m. MATERIAL EXAMINED: Lawas District: Mt. Murud: 2,200m, Ilias Paie S. 26408 (K, SAR); Lawas District: Mt. Murud/Ba Kelalan: 2,400m, Ilias Paie S. 26538 (K, SAR); Marudi District: Mt. Murud Summit Ridge: 2,300—2,400m, Beaman 11455 (UNIMAS), 2,300m, Yii 5. 44486 (K, SAR); Marudi District: Tama Abu Range: 1,800m, DayangAwa & Bernard Lee S. 51170 (K, SAR).
- 20.4. *Dilochia aJf waflichii* Lindl. Terrestrial. Wet kerangas, hill kwest. ELEVATION: 1,000—2,100m. MATERIAL EXAMINED: Lawas District: Mt. Murud: 2,100m, Burt & Martin B. 5443 (SAR); Marudi District: Barb/Pa' Ukat: 1,000m, Nooteboom 1787 (K, SAR).
- 20.5. *Dilochia* sp. Lithophyte. Upper montane scrub forest. ELEVATION: 2,400m. MATERIAL EXAMINED: Lawas District: Mt. Murud: 2,400m, Ilias Paie 5. 26539 (SAR); Lawas District: Mt. Murud/Ba Kelalan: 2,400m, Ilias Paie S. 26539 (K).

21. DIPODIUM

- 21.1. *Dipodium pictum* (Lindl.) Rehb. f. Climbing epiphyte on tree trunks. Riverine forest. ELEVATION: 1,000m. MATERIAL EXAMINED: Marudi District: Pa' Dapur/Menaliu River: 1,000m, Bernard Lee S. 51068 (K, SAR).

22. ENTOMOPHOBIA

- 22.1. *Entomophobia kinabaluensis* (Ames) de Vogel. Epiphyte at base of tree trunks. Wet kerangas. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Bario/Pa' Umor: 1,100m, Beaman 11260 (K, UNIMAS); 1,100m, T.E. Beaman & Rimi Repin TEB 182 (K, UNIMAS).

23. EPIGENEIUM

- 23.1. *Epigeneium aff. geminatum* (Blume) Summerh. Epiphytic or terrestrial. Kerangas, secondary forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Bario: 1,100m, Chai S. 35353 (K, SAR); Marudi District: Pa' Umor/Pa' Ukat: 1,100m, T.E. Beaman & Rimi Repin TEB 144 (UNIMAS).
- 23.2. *Epigeneium kinabaluensis* (Ridl.) Summerh. Epiphyte. Lower montane forest. ELEVATION: 1,700m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,700m, Dayang Awa & Bernard Lee S. 50942 (SAR).
- 23.3. *Epigeneium radicosum* (Ridl.) Summerh. Epiphyte on tree trunks. Lower montane forest. ELEVATION: 1,600m. MATERIAL EXAMINED: Limhang District: Pa' Mario/Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50752 (K, SAR).

24. ERIA

- 24.1. *Eria crassipes* Ridl. Terrestrial. Upper montane mossy forest. ELEVATION: 1,800—2,400m. MATERIAL EXAMINED: Marudi District: Mt. Murud: 2,400m, Nooteboom

- 2065 (SAR), 2,300m, Yii 5. 44431 (K, SAR); Marudi District: Tama Abu Range: 1,800m, Dayang Awa & Bernard Lee S. 51132 (SAR).
- 24.2. *Eria cymbidifolia* Ridl. a. var. *cymbidifolia*. Epiphyte at base of tree trunks. Lower montane forest. ELEVATION: 1,400m. New record for Sarawak. MATERIAL EXAMINED: Limbang~District: Batu Lawi: 1,400m, Dayang Awa & Bernard Lee S. 50845 (K, SAR).
- 24.3. *Eria floribunda* Lindl. Terrestrial. Open secondary forest. ELEVATION: 100m. MATERIAL EXAMINED: Marudi District: Pa' Umor/Pa' Ukat: 1,100m, T.E. Beaman & Rimi Repin TEB 167 (K, UNIMAS); Marudi District: Pa' Ukat, 1,100im Beaman 11510 (K, UNIMAS).
- 24.4. *Eria ajf. gibbsiae* Rolfe. Epiphyte creeping on old logs. Riverine threst. MATERIAL EXAMINED: Limbang District: Batu Lawi: Moulton 2 (SAR).
- 24.5. *Eria javanica* (Sw) Blume. Epiphyte on tree trunks. Lower montane mossy forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Bario: 1,100m, T.E. Beaman & Rimi Repin TEB 180 (K, UNIMAS).
- 24.6. *Eria lanuginosa* J.J. Wood. Epiphyte. Riverine forest. ELEVATION: 1,000m. MATERIAL EXAMINED: Marudi District: Pa' Dapur/Menalio River: 1,000m, Dayang Awa 5. 51069 (K, SAR).
- 24.7. *Eria melaleuca* Ridl. Epiphyte. Riverine forest. MATERIAL EXAMINED: Limbang District: Batu Lawi: Moulton 1 (SAR).
- 24.8. *Eria neglecta* Ridl.. Epiphyte. Disturbed hill forest, in thin humus or on sandstone. ELEVATION: 1,000m. MATERIAL EXAMINED: Marudi District: Bario: 1,000m, Nooteboom 1674 (SAR).
- 24.9. *Eria obliqua* Lindl. Epiphyte at base of trees. Riverine forest. ELEVATION: 1,000m. MATERIAL EXAMINED: Marudi District: Menalio River/Tama Abu Range: 1,000m, Dayang Awa 5. 51040 (K, SAR).
- 24.10 *Eria oblitterata* (Blume) Rchb. f. Epiphyte on tree trunks and rotten logs. Wet kerangas. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Bario/Pa' Umor: 1,100m, T.E. Beaman & Rimi Repin TEB 181 (K, UNIMAS); Marudi District: Pa' Umor: 1,100m, Beaman 11246 (K, UNIMAS).
- 24.11 *Eria ovis* J.J. Sm. Epiphyte. Lower montane mossy forest. MATERIAL EXAMINED: Limbang District: Batu Lawi: Moulton 6 (BO!, holotype, SAR!, isotype).
- 24.12 *Eria pseudoleiophylla* J.J. Wood. Epiphyte on tree trunks. Lower montane forest. ELEVATION: 1,500m. MATERIAL EXAMINED: Limbang District: Pa' Mario/Batu Lawi: 1,500m, Dayang Awa & Bernard Lee S. 50753 (K, SAR).
- 24.13 *Eria pulchella* Lindl. Epiphyte. Old secondary forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Pa' Umor/Pa' Ukat: 1,100m, T.E. Beaman & Rimi Repin TEB 145 (K, UNIMAS).
- 24.14 *Eria robusta* (Blume) Lindl. Epiphyte on tree trunks or lithophytic. Hill forest, lower montane forest, upper montane forest. ELEVATION: 1,100-2,400m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,900m, Cheksum Tawan et al. CST 629 (UNIMAS); Limbang District: Pa' Mario/Batu Lawi: 1,500m, Dayang Awa & Bernard Lee S. 50719 (K, SAR); Marudi District: Bario/Pa' Umor: 1,100m, T.E. Beaman & Rimi Repin TEB 106 (UNIMAS), 1,100m, TEB 189 (K, UNIMAS); Marudi District: Mt. Murud Summit Ridge: 2,300- 2,400m, Beaman 11485 (K, UNIMAS), 2,300m, Yii S. 44491 (K, SAR).

- 24.15. *Eria* sp. 1. Epiphyte on tree trunks. Hill forest, kerangas. ELEVATION: 1,000- 1,300m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,300m, Dayang Awa et al. S. 50474 (K, SAR), 1,300m, Dayang Awa & Bernard Lee S. 50502 (K, SAR), 1,300m, S. 50580 (K, SAR); Marudi District: Pa' Dapur/Tama Abu Range: 1,000m, Dayang Awa & Bernard Lee S. 51050 (K, SAR).
- 24.16. *Eria* sp. 2. Epiphyte on tree trunks. Lower montane forest. ELEVATION: 1,600m. MATERIAL EXAMINED: Limbang District: Pa' Mario/Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50733 (K, SAR); Marudi District: Tama Abu Range: 1,600m, Dayang Awa & Bernard Lee S. 51108 (K, SAR).
- 24.17. *Eria* sp. 3. Epiphyte. Riverine forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Pa' Dapur/Menaliao River: 1,100m, Dayang Awa S. 51099 (K, SAR).
- 24.18. *Eria* sp. Epiphytic and terrestrial. Riverine forest, mossy forest. ELEVATION: 1,100-1,800m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: 1,700m, Burt & Martin B. 5231 (SAR), 1,800m, B. 5327 (SAR); Limbang District: Batu Lawi: 1,200m, Dayang Awa & Bernard Lee S. 50558 (K, SAR), Moulton 3 (SAR), 5 (SAR); Marudi District: Apo Duat Range: 1,600m, Chai S. 35498 (SAR); Marudi District: Bario/Pa' Umor: 1,100m, Robert Yong 78 (K), 1,100m, T.E. Beaman & Rimi Repin TEB 109 (K, UNIMAS).

25. GEESINKORCHIS

- 25.1. *Geesinkonchis alaticalloso* de Vogel. Epiphyte on trunks, at base of shrubs or terrestrial. Wet kerangas, secondary forest. Elevation: 1,000-1,100m. MATERIAL EXAMINED: Marudi District: Bario: 1,000m, Lamb ALSR 224/85 (K); Marudi District: Bario/Pa' Umor: 1,000m, Dayang Awa et al. S. 50465 (K, SAR), 1,100m, T.E. Beaman & Rimi Repin TEB 121 (K, UNIMAS); Marudi District: Pa' Urnor Salt Lick: 1,100m, T.E. Beaman, Laily & Ghazally TEB 207 (UNIMAS).

26. GOODYERA

- 26.1. *Goodyera hylophiloides* Carr. Terrestrial. Lower montane mossy forest. ELEVATION: 1,700m. MATERIAL EXAMINED: Limbang District: Batu Buli: 1,700m, Lamb ALSR 251/85 (K).

27. GRAMMATOPHYLLUM

- 27.1. *Grammatophyllum speciosum* Blume. Epiphyte high up on large tree trunks. Disturbed primary hill forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Bario/Quarry: 1,100m, Cheksum Tawan et al. CST 730 (UNIMAS).

28. KUHLSSELTIA

- 28.1. *Kuhlhasseltia javanica* Jj. Sm. Terrestrial. Lower montane forest. ELEVATION: 1,500-1,700m. MATERIAL EXAMINED: Limbang District: Batu Buli: 1,500-1,700m, Lamb AL 203/85 (K).

29. LIPARIS

- 29.1. *Liparis anopheles* Jj. Wood. Epiphyte on logs. Lower montane forest. ELEVATION: 1,600m. MATERIAL EXAMINED: Marudi District: Tama Abu Range: 1,600m, Dayang Awa & Bernard Lee S. 51113 (K, SAR).

- 29.2 *Liparis Compressa* (Blume) Lindl. a. var. *compressa*. Epiphyte. Kerangas. ELEVATION: 1,700m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Mucud, Camp 3: 1,700m, Burt & Martin B. 5237 (SAR); Limbang District: Batu Lawi: Cheksum Tawan et al. CST 765 (UNIMAS).
- 29.3 *Liparis elegans* Lindl. Epiphyte. Old secondary hill forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Pa' Umor/Pa' Ukat: 1,100m, T.E. Beaman & Rimi Repin TEB 151 (K, UNIMAS).
- 29.4 *Liparis gibbosa* Finet. Epiphyte on tree trunks. Lower montane forest. ELEVATION: 1,600m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50978 (SAR).
- 29.5 *Liparis latifolia* (Blume) Lindl. Epiphyte. Secondary hill forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Pa' Ram Apong (Bario): 1,100m, T.E. Beaman & Laily TEB 229 (K, UNIMAS); Marudi District: Pa' Umor Salt Lick: 1,100m, T.E. Beaman, Laily, & Ghazally TEB 204 (K, UNIMAS).
- 29.6 *Liparis* sp. Epiphyte on rotten branches. Lower montane forest. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Konap River: Burt & Martin B. 5540 (SAR).
- 29.7 *Liparis* sp. sect. *Distichae*. Epiphyte on tree trunks. Lower montane forest. ELEVATION: 1,600m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50978 (K, SAR).

30. MALAXIS

- 30.1 *Malaxis micrantha* (Hook. f.) Kuntze. Terrestrial. Lower montane forest. ELEVATION: 1,400m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,400m, Dayang Awa & Bernard Lee S. 50840 (K, SAR).
- 30.2 *Malaxis aff. punctata* J.J. Wood. Terrestrial. Lower montane forest. ELEVATION: 1,300mm. *punctata* has not been recorded for Sarawak. MATERIAL EXAMINED: Limbang District: Batu BulilBatu Lawi: 1,300m, Lamb ALSR 206/85 (K).
- 30.3 *Malaxis repens* (Rolfe) J.J. Wood. Terrestrial. Disturbed lower montane forest. ELEVATION: 1,300m. MATERIAL EXAMINED: Marudi District: Apo Dan, Kelabit Highlands: 1,300m, Chai 5. 35905 (K, SAR).
- 30.4 *Malaxis* sp. Terrestrial. Riverine forest. ELEVATION: 1,200m. MATERIAL EXAMINED: Marudi District: Pa' Ukat/Batu Lawi: 1,200m, Lamb ALSR 226/85 (K).

31. MALLEOLA

- 31.1 *Malleola dentifera* J.J. Sm. Epiphyte on tree trunks. Old secondary forest. ELEVATION: 1,100m. New species record for Borneo and new generic record for Sarawak. MATERIAL EXAMINED: Marudi District: Pa' Lungan: 1,100m, Robert Yong 52 (K).

32. MICROSACCUS

- 32.1 *Microsaccus aff. ampullaceus* J.J. Sm. Epiphyte low on tree trunks. Wet kerangas. ELEVATION: 1,100m. New generic record for Sarawak. MATERIAL EXAMINED: Marudi District: Bario/Pa' Umor: 1,100m, T.E. Beaman & Rirni Repin TEB 107 (K, UNIMAS).

33. NABALUIA

- 33.1 *Nabaluaia exaltata* de Vogel. Lithophyte. Upper montane mossy scrub forest. ELEVATION:

1,800-2,100m. Material examined. Lawas District: Ba Kelalan/Mt. Murud: 1,800m, Burt & Martin B. 5259 (SAR!, isotype); Mt. Murud: 2,100m, Ilias Paie S. 26466 (K, SAR).

34. NEPHELAPHYLLUM

34.1. *Nephelaphyllum pulchrum* Blume. Terrestrial. Lower montane ridge forest. ELEVATION: 1,500m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,500m, Dayang Awa & Bernard Lee S. 50668 (SAR).

35. OBERONIA

35.1. *Oberonia patentifolia* Ames & C. Schweinf. Epiphyte. Secondary hill forest. ELEVATION: 1,100m. New record for Sarawak. MATERIAL EXAMINED: Marudi District: Pa' Umor Salt Lick: 1,100m, T.E. Beaman, Laily, & Ghazally TEB 208 (UNIMAS).

35.2. *Oberonia* sp. Epiphyte. Rivenine forest. ELEVATION: 1,000-1,100m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: Burt & Martin B. 5499 (SAR); Marudi District: Banio/Pa' Umo' 1,100m, Beaman 11256 (UNIMAS); Marudi District: Pa' Dapur/Menaliao Riven: 1,000m, Dayang Awa S. 51086 (K, SAR).

36. OCTARRHENA

36.1. *Octarrhena condensata* (Ridl.) Holttum. Epiphyte. Lower montane forest. ELEVATION: 1,300m MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: 1,300m, Burt & Martin B. 5192 (SAR).

37. PAPHIOPEDILUM

37.1. *Paphiopedilum javanicum* (Reinw ex Lindl.) Pfitzer. a. var. *virens* (Rchb. f.) Stein. Terrestrial. Hill forest or lower montane forest. ELEVATION: 1,100-1,400m. New record for Sarawak. MATERIAL EXAMINED: Marudi District: Long Rapung/Pa' Lungan: 1,100-1,400m, T.E. Beaman & H. Lohok TEB 289 (UNIMAS).

38. PHAIUS

38.1. *Phaius callosus* (Blume) Lindl. Terrestrial. Lower montane mossy forest, among boulders in moss and leaf litter. ELEVATION: 1,800m. MATERIAL EXAMINED: Limbang District: Batu Buli: 1,800m, Lamb ALSR 225/85 (K).

38.2. *Phaius tankervilleae* (Banks ex L'Her.) Blume. Terrestrial. Hill forest, nivenine forest. ELEVATION: 1,100-1,500m. MATERIAL EXAMINED: Limbang District: Batu Buli: 1,500m, Dayang Awa & Bernard Lee S. 50766 (K, SAR); Limbang District: Batu Lawi: Moulton 18 (SAR); Marudi District: Banjo: Mornisson S. 4442 (SAR); Marudi District: Banjo/Old Reservoir: 1,100m, T.E. Beaman & Rimi Repin TEB 203 (K, UNIMAS).

39. PHOLIDOTA

39.1. *Pholidota carnea* (Blume) Lindl. a. var. *carnea*. Epiphyte on tree trunks. Old secondary forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Pa' Lungan: 1,100m, Robert Yong 59 (K).

39.2. *Pholidota clcmensii* Ames. Epiphyte low on tree trunks. Lower montane nvenine forest.

ELEVATION: 1,400m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,400m, Dayang Awa & Bernard Lee S. 50799 (K, SAR).

- 39.3. *Pholidota gibbosa* (Blume) de Vniese. Epiphyte low on tree trunks. Lower montane rivenine forest. ELEVATION: 1,500-1,900m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt Murud: 1,900m, Burt & Martin B. 5390 (SAR); Limbang District: Pa' Mario/Batu Lawi: 1,500m, Dayang Awa & Bernard Lee S. 50698 (K, SAR).

40. PHREATIA

- 40.1. *Phreatia listrophora* Ridl. Epiphyte near the ground. Lower montane mossy forest. ELEVATION: 1,500m. New record for Sarawak. MATERIAL EXAMINED: Limbang District: Batu Buli: 1,500m, Lamb SAR 235/85 (K).
- 40.2. *Phreatia* sp. Epiphyte on tree trunks. Wet kerangas. ELEVATION: 1,000-1,100m. MATERIAL EXAMINED: Marudi District: Banjo/Pa' Umor: 1, 100m, Beaman 11257 (K, UNIMAS); Marudi District: Menalio Riven/Tama Abu Range: 1,000m, Dayang Awa S. 51043 (SAR).

41. PILOPHYLLUM

- 41.1. *Pilophyllum viflosum* (Blurne) Schtr. Terrestrial. Hill forest or lower montane forest. ELEVATION: 1,100—1,400m. New generic record for Sarawak. MATERIAL EXAMINED: Marudi District: Long Rapung/Pa' Lungan: 1,100-1,400m, T.E. Beaman & H. Lohok TEB 290 (UNIMAS).

42. PLOCOGLOTTIS

- 42.1. *Plocoglottis* sp. Rhizomatous, rooting in clumps. Lower montane forest. ELEVATION: 1,800m MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Mucud: 1,800m, Buntt & Martin B. 5329 (SAR).

43. POAEPHYLLUM

- 43.1. *Poaephyllum hansenii* J .J. Wood. Epiphyte. Rivenine forest. ELEVATION: 1,000m. MATERIAL EXAMINED: Marudi District: Pa' Dapun/Menalio River: 1,000m, Bernard Lee S. 51065 (K, SAR).

44. PODOCHILUS

- 44.1. *Podochilus microphyllus* Lindl. Epiphyte. Lower montane nivenine forest. ELEVATION: 1,300-1,100m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: 1,800m, Burt & Martin B. 5287 (SAR); Marudi Distict: Tama Abu Range: 1,300m, Dayang Awa & Bernard Lee S. 51185 (K, SAR).
- 44.2. *Podochilus tenuis* (Blume) Lindl. Lithophyte. Mossy riverside rocks. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: Burt & Martin B. 5518 (SAR).
- 44.3. *Podochilus* sp. Epiphyte on tree trunks. Lower montane forest. ELEVATION: 1,500m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud: Burt & Martin B. 5519 (SAR); Limbang District: Batu Buli: 1,500m, Dayang Awa & Bernard Lee S. 50777 (K, SAR).

45. PRISTIGLOTTIS

- 45.1. *Pristiglottis hasseltii* (Blume) Cretz. & Jj. Sm. Terrestrial. Lower montane niverine and

mossy forest. ELEVATION: 1,500-1,700m. MATERIAL EXAMINED: Limbang District: Batu Buli/Batu Lawi: 1,500-1,700m, Lamb AL 204/85 (K); Limbang District: Pa' Manis/Batu Lawi: 1,500m, Dayang Awa & Bernard Lee S. 50713 (K, SAR).

- 45.2. *Pristiglottis occulata* (Blume) Cretz & Jj. Sm. Terrestrial. Lower montane mossy forest on boulders. ELEVATION: 1,500m. MATERIAL EXAMINED: Limbang District: Batu Buli: 1500m, Bniggs & Lamb ALSR 221/85 (K).

46. ROBIQUETIA

- 46.1. *Robiquetia transversisaccata* (Ames & C. Schweinf.) J.J. Wood. Epiphyte. Lower montane forest. ELEVATION: 1,100-1,400mm New record for Sarawak. MATERIAL EXAMINED: Marudi District: Long Rapung/Pa' Lungan: 1,100-1,400m, T.E. Beaman & H. Lohok TEB 226 (UNIMAS).

47. SCHOENORCHIS

- 47.1. *Schoenorchis* sp. Epiphyte. Rivenine forest. ELEVATION: 1,000m. MATERIAL EXAMINED: Marudi District: Menalio Riven/Tama Abu Range: 1,000m, DayangAwa S. 51041 (SAR).

48. SPATHOGLOTTIS

- 48.1. *Spathoglottis aff. gracilis* Rolfe ex Hook. f. Terrestrial. Habitat unknown. ELEVATION: 1,100m. MATERIAL EXAMINED: Lawas District: Ba Kelalan: 1,100m W Brooke 10445 (SAR).
- 48.2. *Spathoglottis* sp. Terrestrial. Riverine forest. ELEVATION: 1,000m. Material examined. Marudi District: Menalio RiveriTama Abu Range: 1,000m, Dayang Awa S. 51037 (SAR).

49. THRIXSPERMUM

- 49.1. *Thrixspermum aff. borneense* (Rolfe) Ridl. Epiphyte on tree trunks. Lower montane forest. ELEVATION: 1,600m. T. borneense has not been recorded for Sarawak. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50998 (K, SAR).
- 49.2. *Thrixspermum centipeda* Lour. Epiphyte on tree trunks. Old secondary forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Bario Quarry: 1,100m, T.E. Beaman TEB 211 (K, UNIMAS).
- 49.3. *Thrixspermum* sp. Epiphyte. Secondary forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Pa' Ram Apong (Bario): 1,100m, T.E. Beaman & Laily TEB 230 (UNIMAS).

50. TRICHOGLOTTIS

- 50.1. *Trichoglottis pantherina* J.J. Sm. Epiphyte near base of trees. Wet kerangas, open secondary forest. ELEVATION: 1,100m. New record for Sarawak. MATERIAL EXAMINED: Marudi District: Bario/Pa' Umor: 1,100m, T.E. Beaman & Rimi Repin TEB 183 (K, UNIMAS); Pa' Umor/Salt Lick, 1,100m, Beaman 11247 (K, UNIMAS).

51. TRICHOTOSIA

- 51.1. *Trichotosia* all. annulata Blume. Epiphyte. Lower montane forest. ELEVATION: 1,700m. MATERIAL EXAMINED: Marudi District: Mount Murud: 1,700m, Ilias Paie S. 26353

- (K, SAR).
- 51.2. *Trichotosia Zawiensis* (J.J. Sm.) J.J. Wood. Epiphyte. Lower montane forest. MATERIAL EXAMINED: Limbang District: Batu Lawi: Moulton 14 (BO nv, holotype, SAR!, isotype).
- 51.3. *Trichotosia pilosissima* (Rolfe) J.J. Wood. Epiphyte. Lower montane mossy forest. ELEVATION: 1,700m. MATERIAL EXAMINED: Lawas District: Ba Kelalan/Mt. Murud, Camp 3: 1,700m, Burt & Martin 5229 (SAR); 1,700m, Burt & Martin B. 5230 (SAR).
- 51.4. *Trichotosia poculata* (Ridl.) Kraenzl. Epiphyte. Lower montane mossy forest. ELEVATION: 1,800m. MATERIAL EXAMINED: Marudi District: Mt. Murud: 1,800m, Nooteboom 1946 (SAR).
- 51.5. *Trichotosia* sp. Epiphyte on tree trunks. Lower montane mossy forest. ELEVATION: 1,600m. MATERIAL EXAMINED: Limbang District: Batu Lawi: 1,600m, Dayang Awa & Bernard Lee S. 50806 (K, SAR); Marudi District: Apad Runan, Kelabit Highlands: 1,600m, Yii S. 55977 (SAR); Marudi District: Tama Abu Range: 1,600m, Dayang Awa & Bernard Lee S. 51118 (K, SAR).

52. VANILLA

- 52.1. *Vanilla kinabaluensis* Carr. Climber growing fairly high into trees. Old secondary riverine forest. ELEVATION: 1,100m. MATERIAL EXAMINED: Marudi District: Long Rapung: 1,100m, Beaman 1 1494a (K).

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- Peter Sie** 35387 (6.1).
- Robert Yong** 52 (31.1); 59 (39.1a); 78 (24.18); 79 (17.11); 80 (17.5).
- Yü Puan Ching** 35311 (13.6); 44401 (4.8); 44402 (18.7); 44421 (4.4); 44430 (18.5); 44430A (18.2b); 44431 (24.1); 44432 (18.13); 44482 (6.1); 44486 (20.3); 44491 (24.14); 44616 (18.14); 44627 (20.1); 44667 (8.3); 55929 (5.1); 55930 (13.18); 55931 (13.6); 55940 (13.6); 55977 (51.5).

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