

Notes on new records of Orchidaceae at Fraser's Hill, Pahang, Malaysia

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Abstract

Ninety two species of orchids are reported as new records for Fraser's Hill. From the account, seven species are new records for Malaysia, four for Peninsular Malaysia and fifteen for the state of Pahang. All new records were collected in the fields except for nine species that were gathered from the examined herbarium specimens at the herbaria Singapore Botanic Gardens (SING), Forest Research Institute Malaysia (KEP), Universiti Malaya (KLU) and Universiti Kebangsaan Malaysia (UKMB).

Introduction

This is a first scientific study specifically on the orchids of Fraser's Hill, Pahang, Malaysia. Previously, accounts on the orchids of Fraser's Hill were recorded from works done by Ridley (1907), Ridley and Hutchinson (1924), Holttum (1964), Seidenfaden and Wood (1992), Henderson (1974), Turner (1995), Kiew (1998) and Choy (2010). Kiew (1998) listed 148 species from Fraser's Hill and expanding the search in accessible forest trails and historical tracks botanized by early collectors in Fraser's Hill has led to the discovery of these new records. However, the finding of these new records in Fraser's Hill is no surprise as their distribution is also confirmed in other neighbouring states and countries.

Materials and Methods

Fourteen monthly of field visits were made to Fraser's Hill from August 2009 until December 2010. All accessible forest trails and locations in Fraser's Hill were thoroughly botanized.

Results

A total of ninety two orchid species are reported as new records for Fraser's Hill. From the enumeration, seven species are new records for Malaysia (marked *), four for Peninsular Malaysia (marked **) and fifteen for Pahang (marked ***), and are listed in the checklist below. All new records were collected during this study except for nine species (marked #) that were identified from examined herbarium specimens in SING, KEP, KLU and UKMB.

Checklist on 92 new records for Fraser's Hill.

1. *Acriopsis liliifolia* var. *liliifolia* (J.König) Seidenf. Opera Bot.:124 (1995) 58, Synonym: *Acriopsis javanica* Reinw. ex Blume, Bijdr. (1825) 377.
General Distribution: Sikkim, Myanmar, Thailand, Indochina, Indonesia, Papua New Guinea, Australia, the Philippines, the Solomon Islands and Malaysia. In Malaysia it is a common species in the lowlands throughout the country. Epiphyte on the tree branches, in rather open area. **Material examined:** Farah Alia Nordin, FAN.FH.134 (UPM).
2. *Aerides odorata* Lour. [Plate 1A] FI. Cochinch. (1790) 525. **Homotypic Synonym:** *Epidendrum odoratum* (Lour.) Poir. in J.B.A.M.de Lamarck, Encycl. Suppl. 1 (1810) 385. **Heterotypic Synonym:** *Epidendrum aerides* Raeusch., Nomencl. Bot. ed. 3. (1797) 265.
General Distribution: India, Himalaya, Vietnam, Indonesia, the Philippines and Malaysia. In Malaysia it was recorded from many localities mainly in the lowlands and near the sea. An epiphyte hanging on tree branches by the roadsides in rather exposed area. **Material examined:** Farah Alia Nordin, FAN.FH.317 (UPM).
3. *Agrostophyllum majus* Hook.f. [Plate 1B] FI. Brit. India 5 (1890) 824.
General Distribution: Thailand, Sumatra, the Solomon Islands, Borneo and Peninsular Malaysia. In Peninsular Malaysia it is a common species in both lowlands and mountains. Growing in a huge clump on a tree next to the mosque. **Material examined:** Farah Alia Nordin, FAN.FH.108 (UPM).
4. *Anoectochilus geniculatus* Ridl. J. Linn. Soc., Bot.: 32 (1896) 406.
General Distribution: Myanmar, Thailand, Singapore and in Peninsular Malaysia from Penang to Johor. From lowlands to mountains up to 900 m. **Material examined:** Lim, C. L., Farjon, A. and Bridger, M., FRI 65685 (KEP).
5. *Appendicula anceps* Blume [Plate 1C] Bijdr. (1825) 299. **Synonym:** *Podochilus anceps* (Blume) Schltr., Mém. Herb. Boissier 21 (1900) 33.

General Distribution: Thailand, Indonesia, the Philippines and Malaysia. In Malaysia this species is common in both lowlands and mountains up to about 1050 m. Growing on the tree trunk in rather exposed area. **Material examined:** *Farah Alia Nordin, FAN.FH.157* (UPM).

6. *Appendicula cornuta* Blume [Plate 1D] Bijdr. (1825) 302. **Homotypic Synonym:** *Podochilus cornutus* (Blume) Schltr., Mém. Herb. Boissier 21 (1900) 34. **Heterotypic Synonym:** *Appendicula bifaria* Lindl., Hooker's J. Bot. Kew Gard. Misc. 7 (1855) 35.

General Distribution: China, Sikkim, Myanmar, Thailand, Cambodia, Vietnam, Indonesia, Borneo, the Philippines and Peninsular Malaysia. In Peninsular Malaysia this is a common species mostly in the lowlands. **Materials examined:** *Farah Alia Nordin, FAN.FH.068, FAN.FH.088, FAN.FH.147* (UPM).

7. *Appendicula longa* J.J.Sm.* [Plate 1E] *Orch. Java* (1905):531.

General Distribution: Java and Sumatra. A long, pendulous epiphyte growing on the tree trunk by the small creek. **Material examined:** *Farah Alia Nordin, FAN.FH.412* (UPM).

8. *Appendicula lucida* Ridl.# *J. Linn. Soc., Bot.* 32 (1896): 392. **Synonym:** *Podochilus lucidus* (Ridl.) Schltr., Mém. Herb. Boissier 21 (1900) 87.

General Distribution: Borneo and Peninsular Malaysia; in Pahang and the south; mainly on trees by the river. **Material examined:** *Mohd Kasim Rejab, UKM12536* (UKMB).

9. *Appendicula ovalis* (Schltr.) J.J.Sm. ex Mansf.[Plate 1F and 1G]. Repert. Spec. Nov. Regni Veg. Beih. 74 (1934) 3. **Synonyms:** *Podochilus ovalis* Schltr., Mém. Herb. Boissier 21 (1900) 54. *Appendicula purpurascens* auct. non Blume, Ridley & Hutchinson, Fl. Malay. Penin. (1924) 195.

General Distribution: Java, Sumatra and Malaysia. In Malaysia common in the mountains. A long, pendulous epiphyte growing in a tuft clump on trees in rather exposed area. **Materials examined:** *Farah Alia Nordin, FAN.FH.155, FAN.FH.246, FAN.FH.247, FAN.FH.281, FAN.FH.453* (UPM), *Choy, S.H., CSH 037* (UPM).

10. *Biermannia ciliata* (Ridl.) Garay., Bot. Mus. Leafl. 23 (1972) 162. **Synonyms:** *Dendrocolla ciliata* Ridl., J. Straits Branch Roy. Asiat. Soc. 44 (1905) 192. *Thrixspermum blepharolobum* Schltr., Orchis 5 (1911) 56. *Sarcochilus ciliatus* (Ridl.) J.J.Sm., Bull. Jard. Bot. Buitenzorg III, 8 (1926) 63. *Pteroceras ciliatum* (Ridl.) Holttum, Kew Bull. 14 (1960) 269.

General Distribution: Thailand and Malaysia. In Malaysia recorded from Sungai Siput (Perak), Sungai Sat (Pahang) and Kemaman (Terengganu). Growing on twigs

of trees; shaded in between the leaves. **Materials examined:** *Farah Alia Nordin*, *FAN.FH.237* (UPM), *Choy, S. H.*, *CSH 096* (UPM).

11. *Bromheadia brevifolia* Ridl. J.Linn. Soc. Bot 32 (1897) 340.

General Distribution: Peninsular Malaysia, Borneo and Sumatra. In Peninsular Malaysia found on Cameron Highlands, Maxwell Hill, Langkap and Ulu Kali (Pahang). On the tree branches by the roadside growing together with *Campanulorchis pellipes*. **Materials examined:** *Farah Alia Nordin*, *FAN.FH.492*, *FAN.FH.497* (UPM).

12. *Bromheadia scirpoidea* Ridl., J. Bot. 38 (1900) 71.

General Distribution: Borneo, in Peninsular Malaysia from the north to south mainly in the lowlands. On the fallen tree branches growing in a tuft clump. **Material examined:** *Farah Alia Nordin*, *FAN.FH.284* (UPM).

13. *Bulbophyllum angustifolium* (Blume) Lindl. [Plate 1H]. Gen. Sp. Orchid. Pl. (1830) 57. **Synonyms:** *Diphyes angustifolia* Blume, Bijdr. (1825) 314. *Phyllorkis angustifolia* (Blume) Kuntze, Revis. Gen. Pl. 2 (1891) 677. *Bulbophyllum capitatum* auct. non Lindl., Ridley, Mat. Fl. Malay. Penins. (1907) 73.

General Distribution: Java and Malaysia. In Malaysia, common on mountains in exposed places. Pendulous epiphytes growing on tree branches, mostly in area with opening to the light sources. **Materials examined:** *Farah Alia Nordin*, *FAN.FH.078*, *FAN.FH.139*, *FAN.FH.209*, *FAN.FH.221*, *FAN.FH.308*, *FAN.FH.315*, *FAN.FH.423* (UPM), *Choy, S.H.*, *CSH 002*, *CSH 071* (UPM), *Ng, F.S.P.*, *KEP 77780/FRI 5820* (KEP).

14. *Bulbophyllum annandalei* Ridl., J. Straits Branch Roy. Asiat. Soc. 82 (1920) 197. **Synonym:** *Bulbophyllum annandalei* Ridl., Fl. Malay Penins. 4 (1924) 78, *nom. illeg.*

General Distribution: Thailand and Malaysia, Genting Highlands. **Material examined:** *Farah Alia Nordin*, *FAN.FH.472* (UPM).

15. *Bulbophyllum apodum* Hook.f.*** [Plate 1I]. *Fl. Brit. India* 5 (1890): 766. **Heterotypic Synonym:** *Bulbophyllum vaginulosum* Carr, Gard. Bull. Straits Settle. 5 (1930) 140.

General Distribution: Vietnam, Thailand, Sumatra, Java, Borneo and Peninsular Malaysia. In Peninsular Malaysia common at the southern part of the country. **Materials examined:** *Farah Alia Nordin*, *FAN.FH.101*, *FAN.FH.276*, *FAN.FH.377* (UPM).

Note: The plant turned red after being preserved as herbarium specimen.

16. *Bulbophyllum comberi* J.J.Vermeulen. In Comber, Orchids Java; (1990) 267.

General Distribution: Java, Lesser Sunda Islands, Borneo and Peninsular Malaysia. In Peninsular Malaysia recorded once from Cameron Highlands. **Material examined:** Farah Alia Nordin, FAN.FH.278 (UPM).

17. *Bulbophyllum farinulentum* J.J.Sm. *[Plate 1J]. Bull. Jard. Bot. Buitenzorg III, 2(1920) 87.

General Distribution: Endemic to Sumatra. Plant covering the whole tree trunk, forming a dense population in rather exposed area. **Material examined:** Farah Alia Nordin, FAN.FH.200 (UPM).

Notes: Vegetatively it is closely similar to *B. wrayi* but larger in size and due to the greenish-purple of the inflorescence (dark purple in *B. wrayi*), it was identified as *B. farinulentum*.

18. *Bulbophyllum gibbosum* (Blume) Lindl. Gen. Sp. Orchid. Pl. (1830) 54. **Heterotypic Synonyms:** *Bulbophyllum pangerangi* Rchb.f., Bonplandia (Hannover) 5 (1857) 57. *Bulbophyllum selangorensis* Ridl., J. Fed. Malay States Mus. 5 (1914) 47. *Bulbophyllum igneocentrum* J.J.Sm., Bull. Jard. Bot. Buitenzorg II, 25 (1917) 67. *Bulbophyllum magnivaginatam* Ames & C.Schweinf. in O.Ames, Orchidaceae 6 (1920) 186.

General Distribution: Sumatra, Java, Borneo and Peninsular Malaysia; from the Main Range. Growing on tree branches forming a dense clump. **Material examined:** Farah Alia Nordin, FAN.FH.215 (UPM).

Notes: The base of the scape that envelops the petiole is the most distinct characteristic for this species.

19. *Bulbophyllum macranthum* Lindl., Edwards's Bot. Reg. 30 (1844) 13.

General Distribution: Myanmar, Thailand, Indochina, Indonesia, the Philippines, Papua New Guinea, Borneo and Peninsular Malaysia. In Peninsular Malaysia, it is a widespread lowland species. Found on fallen tree branches with few other *Bulbophyllum* species. **Materials examined:** Farah Alia Nordin, FAN.FH.153, FAN.FH.515 (UPM), Choy, S.H., CSH 057 (UPM).

20. *Bulbophyllum obtusipetalum* J.J.Sm. [Plate 1K]. Orch. Java. (1905) 424. **Synonym:** *Bulbophyllum spinulipes* J.J.Sm., Mitt. Inst. Allg. Bot. Hamburg 7 (1927) 61.

General Distribution: Indonesia, Borneo and Peninsular Malaysia. In Peninsular Malaysia, only a single collection was recorded from Cameron Highland. Growing on high tree branches in a tuft clump, in rather shady area. **Material examined:** Farah Alia Nordin, FAN.FH.419 (UPM).

Notes: This species is easily identified by looking at the thick, fleshy flower that is not widely open as all sepals and petals connate at base. The petal is obtuse and finely hairy at the margin.

21. *Bulbophyllum obtusum* (Blume) Lindl. [Plate 1L]. Gen. Sp. Orchid. Pl. (1830) 56. **Homotypic Synonyms:** *Diphyes obtusa* Blume, Bijdr. (1825) 315. *Phyllorkis obtusa* (Blume) Kuntze, Revis. Gen. Pl. 2 (1891) 677. **Heterotypic Synonym:** *Bulbophyllum parvilabium* Schltr., Bot. Jahrb. Syst. 45, 104 (1911) 52.

General Distribution: Sumatra, Java and Malaysia. In Malaysia previously recorded from Penang Hill and Ulu Kali (Selangor). Growing on high tree branches in a tufted clump, in rather shady area. **Materials examined:** Farah Alia Nordin, FAN.FH.172, FAN.FH.176, FAN.FH.191, FAN.FH.207, FAN.FH.234, FAN.FH.277 (UPM), Choy, S.H., CSH 031 (UPM).

22. *Bulbophyllum ovalifolium* (Blume) Lindl.#. Gen. Sp. Orchid. Pl. (1840) 49. **Homotypic Synonyms:** *Diphyes ovalifolia* Blume, Bijdr. (1825) 318. *Phyllorkis ovalifolia* (Blume) Kuntze, Revis. Gen. Pl. 2 (1891) 677. **Heterotypic Synonyms:** *Diphyes pusilla* Blume, Bijdr. (1825) 317. *Bulbophyllum parvulum* Lindl., Gen. Sp. Orchid. Pl. (1830) 49. *Phyllorkis parvula* (Lindl.) Kuntze, Revis. Gen. Pl. 2 (1891) 677. *Bulbophyllum tineia* Ridl., J. Fed. Malay States Mus. 4 (1909) 66. *Bulbophyllum ovatilabellum* Seidenf., Dansk Bot. Ark. 33 (1979) 52.

General Distribution: A widespread species in Thailand, Indonesia, Borneo and Malaysia. In Malaysia it was recorded only from Cameron Highlands. **Material examined:** J. Dransfield, Collection No. 8562 (KLU).

23. *Bulbophyllum vaginatum* (Lindl.) Rchb.f. In W.G. Walpers, Ann. Bot. Syst. 6 (1861) 261. **Homotypic Synonyms:** *Cirrhopetalum vaginatum* Lindl., Gen. Sp. Orchid. Pl. (1830) 59. *Phyllorkis vaginata* (Lindl.) Kuntze, Revis. Gen. Pl. 2 (1891) 677. **Heterotypic Synonyms:** *Cirrhopetalum caudatum* Wight, Icon. Pl. Ind. Orient. 5 (1851) t. 1658. *Cirrhopetalum stramineum* Teijsm. & Binn., Natuurk. Tijdschr. Ned.-Indië 24 (1862) 310. *Cirrhopetalum whiteanum* Rolfe, Bull. Misc. Inform. Kew 1895 (1895) 7. *Bulbophyllum whiteanum* (Rolfe) J.J.Sm., Bull. Jard. Bot. Buitenzorg II, 8 (1912) 29.

General Distribution: Common and widespread in Thailand, Indonesia, Maluku, Borneo and Peninsular Malaysia. Growing on a tree trunk by the stream with *Dendrobium pachyphyllum* and *Schoenorchis minutiflora*, in exposed area. **Material examined:** Farah Alia Nordin, FAN.FH.503 (UPM).

24. *Callostylis rigida* Blume** [Plate 1M]. Bijdr. (1825) 340. **Homotypic Synonyms:** *Tylostylis rigida* (Blume) Blume, Fl. Javae, Praef. (1828) vi. *Eria rigida* (Blume) Rchb.f., Bonplandia (Hannover) 5 (1857) 55, nom. illeg. **Heterotypic Synonym:** *Liparis bidentata* Griff., Not. Pl. Asiat. 3 (1851) 277. *Eria discolor* Lindl., J. Proc. Linn. Soc., Bot. 3 (1859) 51; Comber (2001)

501. *Tylostylis discolor* (Lindl.) Hook.f., Ann. Roy. Bot. Gard. (Calcutta) 5 (1895) 22. *Eria pholidotoides* Gagnep., Bull. Mus. Natl. Hist. Nat. II, 3 (1931) 682. *Callostylis rigida* subsp. *discolor* (Lindl.) Brieger, Schlechter Orchideen 1, 1 - 12 (1981) 749.

General Distribution: India, Myanmar, Laos, Vietnam, Thailand, Java, Borneo and Peninsular Malaysia. Creeping on a fallen tree trunk forming a dense clump. **Materials examined:** *Farah Alia Nordin*, FAN.FH.239, FAN.FH.406 (UPM).

25. *Ceratostylis radiata* J.J.Sm.***[Plate 1N]. Orch. Java (1905) 295. **Synonym:** *Ceratostylis linearifolia* Ridl., Fl. Malay Penins. 4 (1924) 110.

General Distribution: Thailand, Vietnam, Sumatra, Java, Borneo and Peninsular Malaysia. In Peninsular Malaysia previously only known from a single collection in Langkawi. **Material examined:** *Farah Alia Nordin*, FAN.FH.499 (UPM).

26. *Cleisomeria lanatum* (Lindl.) Lindl. ex G. Don. In J.C. Loudon, Encycl. Pl., new ed., Suppl. 2; (1855) 1472. **Homotypic Synonyms:** *Cleisostoma lanatum* Lindl., J. Hort. Soc. London 4 (1849) 164. *Saccolabium lanatum* (Lindl.) Hook.f., Fl. Brit. India 6 (1890) 60. *Gastrochilus lanatus* (Lindl.) Kuntze, Revis. Gen. Pl. 2 (1891) 661. *Sarcanthus lanatus* (Lindl.) Holttum, Gard. Bull. Singapore 11 (1947) 288. **Heterotypic Synonym:** *Uncifera maxilla-leonis* Guillaumin, Bull. Soc. Bot. France 77 (1930) 334.

General Distribution: Myanmar, Thailand, Indochina and Malaysia. In Malaysia recorded from Kedah, Kuantan (Pahang) and Gunung Pulai (Johor). **Material examined:** *Farah Alia Nordin*, FAN.FH.462 (UPM).

Note: The sheath scales at the base of the stem is a diagnostic character for this species.

27. *Cleisostoma duplicilobum* (J.J. Sm.) Garay** [Plate 1O] Bot. Mus. Leaflet 23 (1972) 171. **Homotypic Synonyms:** *Sarcanthus duplicilobus* J.J.Sm., Bull. Dép. Agric. Indes Néerl. 13 (1907) 64. *Garayanthus duplicilobus* (J.J.Sm.) Szlach., Fragm. Florist. Geobot., Suppl. 3 (1995) 136. **Heterotypic Synonyms:** *Sarcanthus carinatus* Rolfe ex Downie, Bull. Misc. Inform. Kew 1925 (1925) 408. *Cleisostoma carinatum* (Rolfe ex Downie) Garay, Bot. Mus. Leaflet 23 (1972) 170. *Garayanthus carinatus* (Rolfe ex Downie) Szlach., Fragm. Florist. Geobot., Suppl. 3 (1995) 136.

General Distribution: Thailand, Laos, Vietnam, Java, Sumatra and Borneo. Growing on tree trunk and branches; always together with *Polystachya concreta*. **Materials examined:** *Farah Alia Nordin*, FAN.FH.067, FAN.FH.076, FAN.FH.117, FAN.FH.210, FAN.FH.397, FAN.FH.487 (UPM).

Notes: This species looks almost similar to *Pelatantheria cristata* in the shape of the flower except for the latter having longer stems and downturn lips.

28. *Collabium simplex* Rchb.f. [Plate 1P]. Gard. Chron. 15 (1881) 462.

Synonym: *Chrysoglossum simplex* (Rchb.f.) J.J.Sm., Orch. Java (1905) 177.

General Distribution: Java, Sumatra, Borneo, Sulawesi and Peninsular Malaysia. Previously in Peninsular Malaysia was only recorded from Maxwell Hill and Cameron Highland. On the shady, wet forest floor among leaves litter, near to a small creek.

Material examined: Farah Alia Nordin, FAN.FH.149 (UPM).

Notes: The spot character for this species is the presence of the purple spots beneath the leaves.

29. *Crepidium metallicum* (Rchb.f.) Szlach.** Fragm. Florist. Geobot. Suppl. 3

(1995) 129. **Synonyms:** *Microstylis metallica* Rchb.f., Gard. Chron., 12 (1879)

750 n. s. *Malaxis metallica* (Rchb.f.) Kuntze, Revis. Gen. Pl. 2 (1891) 673;

Wood & Cribb (1994) 101.

General Distribution: Borneo. Growing on the wet, dark forest floor among leaf litters and together with *Liparis rheedei*. **Material examined:** Farah Alia Nordin, FAN.FH.222 (UPM).

Notes: The metallic purple of the foliages is a distinct character of identifying this species.

30. *Crepidium rheedei* Blume*** [Plate 2A]. Bijdr (1825) 387. **Heterotypic**

Synonyms: *Microstylis acutangula* Hook.f., Hooker's Icon. Pl. 19 (1889) t.

1835. *Crepidium acutangulum* (Hook.f.) Szlach., Fragm. Florist. Geobot.

Suppl. 3 (1995) 123.

General Distribution: Maxwell Hill (Perak), Bukit Hitam and Sokor (Kelantan). Growing on the wet, shady forest floor among leaf litters or on the banks by the roadside. **Materials examined:** Farah Alia Nordin, FAN.FH.123, FAN.FH.131, FAN.FH.225, FAN.FH.332, FAN.FH.383 (UPM).

31. *Cymbidium finlaysonianum* Lindl. [Plate 2B and 2C]. Gen. Sp. Orchid. Pl.

(1833) 164. **Heterotypic Synonyms:** *Cymbidium wallichii* Lindl., Gen. Sp.

Orchid. Pl. (1833) 165. *Cymbidium tricolor* Miq., Choix Pl. Buitenzorg (1864)

19.

General Distribution: Vietnam, Cambodia, Thailand, Sumatra, Java, the Philippines, Sulawesi, Borneo and Peninsular Malaysia. Growing on trees in exposed area forming a large clump. **Material examined:** Farah Alia Nordin, FAN.FH.504 (UPM).

32. *Cymbidium roseum* J.J.Sm. Orch. Java (1905) 475. **Synonym:** *Cyperorchis*

rosea (J.J.Sm.) Schltr., Repert. Spec. Nov. Regni Veg. 20 (1924) 107.

General Distribution: Java, Sumatra and Peninsular Malaysia; found on Gunung Tahan, Ulu Kali and Cameron Highlands (1500 - 1800 m). **Material examined:** Farah Alia Nordin, FAN.FH.376 (UPM).

33. *Cystorchis aphylla* Ridl. [Plate 2D]. J. Linn. Soc., Bot. 32 (1896).
General Distribution: Thailand, Java, Sumatra, Buru, the Philippines, Borneo and Peninsular Malaysia. In Peninsular Malaysia found in the lowlands, moderate elevation and up to 900 - 1200 m on Gunung Tahan. Saprophytes on the shady, damp forest floor among leaves litter. **Materials examined:** *Farah Alia Nordin, FAN.FH.203* (UPM), *Choy, S. H., CSH 081* (UPM), *J. Dransfield, Collection No. 893/KLU 8749* (KLU).
34. *Dendrobium crumenatum* Sw. [Plate 2E]. J. Bot. (Schrader) 2 (1799) 237.
General Distribution: China, India, Philippines, Malaysia. In Malaysia, common especially on the lowlands and exposed area. Growing on a tree by the streams in rather exposed area. **Material examined:** *Farah Alia Nordin, FAN.FH.502* (UPM).
35. *Dendrobium foxii* Ridl.*** [Plate 2F]. J. Bot 38 (1900) 70. **Synonym:** *Pedilonum foxii* (Ridl.) Rauschert, Feddes Repert. 94 (1983) 459. *Eurycaulis foxii* (Ridl.) M.A.Clem., Telopea 10 (2003) 286.
General Distribution: Endemic. Previously found on Maxwell Hill only. On the tree branches inside the trail and by the roadsides; forming a very long pendulous clump in rather exposed area. **Materials examined:** *Farah Alia Nordin, FAN.FH.290, FAN.FH.395, FAN.FH.407* (UPM), *SBGO, Nr114/SING 0097863* (SING).
36. *Dendrobium heterocarpum* Wall. ex Lindl.***Gen. Sp. Orchid. Pl. (1830) 78. **Homotypic Synonyms:** *Callista heterocarpa* (Wall. ex Lindl.) Kuntze, Revis. Gen. Pl. 2 (1891) 654. **Heterotypic Synonyms:** *Dendrobium aureum* Lindl., Gen. Sp. Orchid. Pl. (1830) 77; *Dendrobium atractodes* Ridl., J. Bot. 23 (1885) 123. *Callista aurea* (Lindl.) Kuntze, Revis. Gen. Pl. 2 (1891) 654. *Dendrobium minahassae* Kraenzl. in H.G.A.Engler (ed.), Pflanzenr. IV, 50 II B 21 (1910) 107.
General Distribution: A widespread species in India, Sri Lanka, the Philippines, Laos, Vietnam, Thailand and Malaysia. In Malaysia previously it was only collected once in Taiping Hills. **Materials examined:** *Farah Alia Nordin, FAN.FH.091, FAN.FH.097, FAN.FH.102, FAN.FH.226* (UPM).
37. *Dendrobium hymenopterum* Hook.f.*** Hooker's Icon. Pl. 21 (1890) 2032.
Homotypic Synonym: *Dendrobium hymenanthum* Hook.f., Fl. Brit. India 5 (1890) 732, *nom. illeg.* **Heterotypic Synonym:** *Dendrobium singalanense* Kraenzl. in H.G.A.Engler (ed.), Pflanzenr. IV, 50 II B 21 (1910) 167.
General Distribution: Thailand, Sumatra and Malaysia. In Malaysia previously was only recorded from Gunung Batu Putih, Perak. **Materials examined:** *I.H. Burkill & R.E. Holttum, Collection No. 8502/SING 0135728* (SING).

38. *Dendrobium longipes* Hook.f. [Plate 2G]. Fl. Brit. India 5 (1890) 713.
Homotypic Synonyms: *Callista longipes* (Hook.f.) Kuntze, Revis. Gen. Pl. 2 (1891) 655. *Sarcopodium longipes* (Hook.f.) Rolfe, Orchid Rev. 18 (1910) 238; *Katherinea longipes* (Hook.f.) A.D.Hawkes, Lloydia 19 (1956) 96. *Epigeneium longipes* (Hook.f.) Summerh., Kew Bull. 12 (1957) 263.
Heterotypic Synonym: *Epigeneium kalianum* B.C.Stone, Fed. Mus. J. (Kuala Lumpur) 23 (1978) 118.
General Distribution: A mountain species in Sumatra and Malaysia. Found on fallen tree trunks, pseudo bulb forming a dense mat. **Materials examined:** *Farah Alia Nordin*, FAN.FH.319, FAN.FH.325 (UPM).
39. *Dendrobium manii* Ridl.*** J. Linn. Soc., Bot. 32 (1896) 246. **Synonym:** *Aporum manii* (Ridl.) Rauschert, Feddes Repert. 94 (1983) 440.
General Distribution: India, Thailand, Vietnam, and Malaysia. In Malaysia it was previously recorded from Gunung Ledang and Sungai Sedili, Johor. Found on a fallen tree trunk. **Material examined:** *Farah Alia Nordin*, FAN.FH.285 (UPM).
40. *Dendrobium pachyphyllum* (Kuntze) Bakh.f. [Plate 2H]. Blumea 12 (1963) 69. **Synonym:** *Dendrobium pumilum* Roxb., Fl. Ind. ed. 1832, 3 (1832) 479, nom. illeg.
General Distribution: India, Myanmar, Thailand, Vietnam, Sumatra, Java, Riau, Mentawi, Borneo and Peninsular Malaysia. Growing on the tree trunk by the stream in an exposed area. **Materials examined:** *Farah Alia Nordin*, FAN.FH.256, FAN.FH.392, FAN.FH.505 (UPM).
41. *Dendrobium rupicola* Ridl. [Plate 2I]. J.Fed. Malay States Mus. 5 (1915) 174. **Synonyms:** *Dendrobium distichophyllum* A.D.Hawkes & A.H.Heller, Lloydia 20 (1957) 120, nom. illeg. *Distichorchis rupicola* (Ridl.) M.A.Clem., Telopea 10 (2003) 282.
General Distribution: Endemic and recorded from Cameron Highlands, Gunung Tahan and other locations on the Main Range. **Materials examined:** *Farah Alia Nordin*, FAN.FH.251, FAN.FH.466 (UPM), *J.W. Purseglove*, Collection No. 1914155/SING 0135598 (SING).
42. *Dendrobium salaccense* (Blume) Lindl. Gen. Sp. Orchid. Pl. (1830) 86.
General Distribution: China, Myanmar, Laos, Thailand, Vietnam, Java, Borneo and Peninsular Malaysia. In the peninsula found on many locations from the extreme north to the south. Growing on a small tree trunk by the roadside, among the other ferns and grasses. **Material examined:** *Farah Alia Nordin*, FAN.FH.297 (UPM).

43. *Dendrobium sanguinolentum* Lindl., Edward's Bot. Reg. Misc. 28 (1842) 62. **Homotypic Synonyms:** *Callista sanguinolenta* (Lindl.) Kuntze, Revis. Gen. Pl. 2 (1891) 655. *Pedilonum sanguinolentum* (Lindl.) Brieger, Schlechter Orchideen 1, 11 - 12 (1981) 681. *Anisopetala sanguinolenta* (Lindl.) M.A. Clem., Telopea 10 (2003) 284. **Heterotypic Synonyms:** *Dendrobium cerinum* Rchb.f., Gard. Chron. 12, 2 (1879) 554 n.s. *Eurycaulis cerinus* (Rchb.f.) M.A.Clem., Telopea 10 (2003) 285.

General Distribution: Thailand, Indonesia, Borneo, Tambelan, the Sulu Archipelago, Borneo and Peninsular Malaysia. In the peninsula found on moderate elevations on the mountains. Growing on a trunk of the tree-fern (Cyathaceae) by the roadsides.

Materials examined: Farah Alia Nordin, FAN.FH.365, FAN.FH.457, FAN.FH.490 (UPM), Vermeulen, J.J. and Lok, A., Collection No. 2196/SING 0136766 (SING) C.E. Carr, Collection No. 160/SING 0135768 (SING), SBGO, Nr166/SING 0135760 (SING).

Note: The stems and leaves of this plant are usually dark and purple in colour.

44. *Dendrobium singaporense* A.D.Hawkes & A.H.Heller [Plate 2J]. Lloydia 20 (1957) 124. **Homotypic Synonyms:** *Dendrobium teres* Lindl., Edwards's Bot. Reg. Misc. 26 (1840) 51, nom. illeg. *Callista teres* Kuntze, Revis. Gen. Pl. 2 (1891) 655. *Aporum teres* (Kuntze) Rauschert, Feddes Repert. 94 (1983) 442.

General Distribution: Thailand, Sumatra, Natuna Islands, Borneo, Singapore and Peninsular Malaysia. Found on Gunung Jerai, Maxwell Hill, Kuala Lipis, Penang, Pahang and Selangor. Growing on a trunk of the oak, *Lithocarpus* sp. by the roadside.

Material examined: Farah Alia Nordin, FAN.FH.099 (UPM).

45. *Dendrobium sociale* J.J.Sm.*[Plate 2K]. Bull. Jard. Bot. Buitenzorg II, 3 (1912) 61. **Synonym:** *Dendrobium batakense* J.J. Sm., Bull. Jard. Bot. Buitenzorg III, 5 (1922) 90.

General Distribution: Recorded in Thailand and Sumatra. Scrambling on grassy bank by the roadsides. **Materials examined:** Farah Alia Nordin, FAN.FH.212, FAN.FH.464, FAN.FH.476 (UPM).

46. *Dendrobium spurium* (Blume) J.J.Sm., Orch. Java (1905) 343. **Homotypic Synonyms:** *Dendrocolla spuria* Blume, Bijdr. (1825) 290. *Aerides spuria* (Blume) Lindl., Gen. Sp. Orchid. Pl. (1833) 241. *Sarcochilus spurius* (Blume) Rchb.f. in W.G.Walpers, Ann. Bot. Syst. 6 (1863) 500. *Thrixspermum spurium* (Blume) Rchb.f., Xenia Orchid. 2 (1868) 122. *Euphlebium spurium* (Blume) Brieger, Schlechter Orchideen 1, 11 - 12 (1981) 722. **Heterotypic Synonyms:** *Dendrobium unguiculatum* Teijsm. & Binn., Natuurk. Tijdschr. Ned.-Indië 5

(1853) 491. *Dendrobium euphlebioides* Rchb.f. ex Lindl., J. Proc. Linn. Soc., Bot. 3 (1859) 7. *Callista euphlebia* (Rchb.f. ex Lindl.) Kuntze, Revis. Gen. Pl. 2 (1891) 654. *Callista unguiculata* (Teijsm. & Binn.) Kuntze, Revis. Gen. Pl. 2 (1891) 655.

General Distribution: Recorded in the Philippines, Indonesia and Malaysia. Found on limestone rocks in Pahang and Selangor, and in mangrove in the south. **Material examined:** *Farah Alia Nordin, FAN.FH.500* (UPM).

47. *Dendrochilum gracile* (Hook.f.) J.J. Sm. [Plate 2L]. Recueil Trav. Bot. Néerl. 1 (1904) 69. **Synonyms:** *Platyclinis gracilis* Hook.f., Fl. Brit. India 5 (1890) 708. *Acoridium gracile* (Hook.f.) Rolfe, Orchid Rev. 12 (1904) 220.

General Distribution: Java, Sumatra, Borneo, in Peninsular Malaysia recorded from the Main Range, Genting Highlands and Taiping Hills. Growing on a *Psidium guava* branch opposite to the waterfall. **Materials examined:** *Farah Alia Nordin, FAN.FH.171* (UPM), *Mohd Shah, MS 2786/SING 0136980* (SING).

48. *Dendrochilum longifolium* Rchb.f.#. Bonplandia (Hannover) 4 (1856) 329. **Homotypic Synonyms:** *Platyclinis longifolia* (Rchb.f.) Hemsl., Gard. Chron., 16 (1881) 656 n.s. *Acoridium longifolium* (Rchb.f.) Rolfe, Orchid Rev. 12 (1904) 220. **Heterotypic Synonyms:** *Dendrochilum bracteosum* Rchb.f. in W.G. Walpers, Ann. Bot. Syst. 6 (1861) 241. *Dendrochilum fuscum* Teijsm. & Binn., Natuurk. Tijdschr. Ned.-Indië 24 (1862) 305. *Acoridium bracteosum* (Rchb.f.) Rolfe, Orchid Rev. 12 (1904) 220. *Dendrochilum clemensiae* Ames, Orchidaceae 2 (1908) 109. *Platyclinis bartonii* Ridl., J. Straits Branch Roy. Asiat. Soc. 50 (1908) 128. *Dendrochilum bartonii* (Ridl.) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 1 (1911) 106.

General Distribution: Sumatra to Papua New Guinea and Malaysia. A common epiphyte on old mangroves and on trees by the riverside in Pahang and the southern part of the country. **Materials examined:** *B. Perumal, Gan, C.L., Sahahrul, K.Z., Agan & Badul, Kepong 114480/FRI 41519* (KEP).

49. *Dendrochilum pallidiflavens* Blume#. Bijdr. (1825) 399. **Synonym:** *Dendrochilum album* Ridl., J. Linn. Soc., Bot. 32 (1896) 287.

General Distribution: Myanmar, Thailand, Java, Borneo (Sabah) and Peninsular Malaysia. Lowland and mountains species. Found on Gunung Tahan, Gunung Jasar (Cameron Highlands), Gunung Korbu, Sungai Kayu and Sungai Sedili (Johor). **Materials examined:** *R.E.S., UKMB 00503* (UKMB); *Strugnell, E.J., KEP 11126* (KEP).

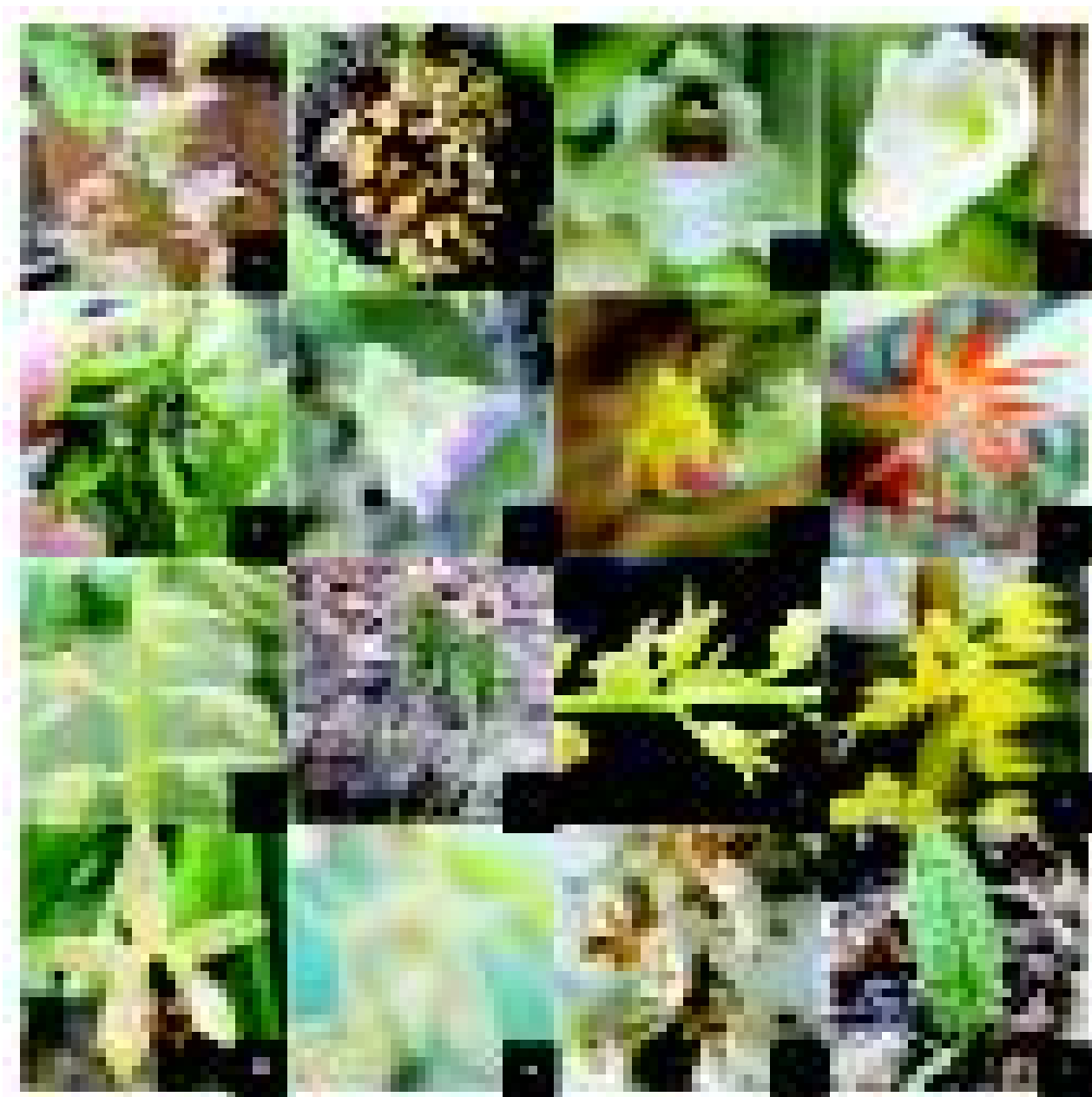


Plate 1. **A.** *Aerides odorata* (inflorescence); **B.** *Agrostophyllum majus* (inflorescence); **C.** *Appendicula anceps* (flower); **D.** *Appendicula cornuta* (flower); **E.** *Appendicula longa* (infructescence); **F.** *Appendicula ovalis* (flower, white); **G.** *Appendicula ovalis* (flower, yellow); **H.** *Bulbophyllum angustifolium* (inflorescence); **I.** *Bulbophyllum apodum* (inflorescence); **J.** *Bulbophyllum farinulentum* (plant and infructescence); **K.** *Bulbophyllum obtusipetalum* (inflorescence); **L.** *Bulbophyllum obtusum* (inflorescence); **M.** *Callostylis rigida* (flower); **N.** *Ceratostylis radiata* (flower); **O.** *Cleisostoma duplicilobum* (inflorescence); **P.** *Collabium simplex* (plant).



Plate 2. A. *Crepidium rheedei* (inflorescence); B. *Cymbidium finlaysonianum* (flower); C. *Cymbidium finlaysonianum* (plant); D. *Cystorchis aphylla* (inflorescence); E. *Dendrobium crumenatum* (flower); F. *Dendrobium foxii* (flower); G. *Dendrobium longipes* (inflorescence); H. *Dendrobium pachyphyllum* (flower); I. *Dendrobium rupicola* (flower); J. *Dendrobium singaporense* (flower); K. *Dendrobium sociale* (flowers); L. *Dendrochilum gracile* (inflorescence); M. *Dipodium conduplicatum* (flower); N. *Eria neglecta* (flowers); O. *Eulophia spectabilis* (flowers); P. *Hippeophyllum scortechinii* (flowers).

- 50. *Dendrochilum pallidiflavens* var. *pallidiflavens*** Blume#. Ridley & Hutchinson (1924) 82. **Heterotypic Synonyms:** *Dendrochilum album* Ridl., J. Linn. Soc., Bot. 32 (1896) 287. *Dendrochilum ellipticum* Ridl., J. Straits Branch Roy. Asiat. Soc. 39 (1899) 77. *Dendrochilum spathulatum* Ridl., J. Straits Branch Roy. Asiat. Soc. 50 (1908) 134.

General Distribution: Sumatra and Malaysia. Found on Gunung Tahan, Gunung Jasar (Cameron Highlands), Gunung Korbu, Sungai Kayu and Sungai Sedili (Johor).

Material examined: *Strugnell, E.J., KEP 11126* (KEP).

- 51. *Dipodium conduplicatum*** J.J. Sm.*[Plate 2M], Bull. Jard. Bot. Buitenzorg III, 9 (1927) 177.

General Distribution: Endemic to Sumatra. Climbing on small trees by the road sides, in rather exposed location. **Materials examined:** *Farah Alia Nordin, FAN.FH.261, FAN.FH.442* (UPM), *Choy, S.H., CSH 091* (UPM).

Note: It differs from *D. pictum* by having axillary inflorescence, a linear midlobe from a narrow and thick base, and by having a triangular hairy callus on the apex.

- 52. *Eria biflora*** Griff., Not. Pl. Asiat. 3 (1851) 302. **Homotypic Synonyms:** *Pinalia biflora* (Griff.) Kuntze, Revis. Gen. Pl. 2 (1891) 679. *Cylindrolobus biflorus* (Griff.) Rauschert, Feddes Repert. 94 (1983) 445. **Heterotypic Synonyms:** *Eria choneana* Kraenzl., Bot. Jahrb. Syst. 8 (1887) 203. *Eria dacrydium* Gagnep., Bull. Mus. Natl. Hist. Nat. II, 2 (1930) 305.

General Distribution: Sikkim, Sumatra, Sabah (Gunung Kinabalu) and Peninsular Malaysia. In the country collected in Gua Musang, Bertam and Galas in Kelantan and Tanum in Pahang. **Material examined:** *Farah Alia Nordin, FAN.FH.360* (UPM).

- 53. *Eria neglecta*** Ridl.[Plate 2N], J. Linn. Soc. Bot. 31 (1896) 283. **Synonym:** *Trichosma neglectum* (Ridl.) Rauschert, Feddes Repert. 94 (1983) 470.

General Distribution: Thailand, Lingga Archipelago, Borneo, Singapore and Peninsular Malaysia. In the peninsula common in the lowlands of southern part, found on Gunung Jerai and Air Puteh in Terengganu. Growing on a tree branches by the road sides forming a large clump. **Materials examined:** *Farah Alia Nordin, FAN.FH.081, FAN.FH.357* (UPM), *R.E.S., UKMB 00505* (UKMB).

Note: This species shows variability in the colour of the flower, pale cream and pink. Pale cream flower has cream keels while pink flower with dark red keels.

- 54. *Eria tenuiflora*** Ridl., J. Linn. Soc., Bot. 32 (1896) 291. **Synonym:** *Eria godefroyana* Gagnep., Bull. Mus. Natl. Hist. Nat. II, 2 (1930) 307.

General Distribution: Myanmar, Thailand, Sumatra, Vietnam, Java, Borneo and Peninsular Malaysia. In the peninsula it is common in the lowlands of southern part and on mountains up to 1050 m in the north parts. Found on a fallen tree trunk together

with a clump of *E. iridifolia*. **Material examined:** Farah Alia Nordin, FAN.FH.469 (UPM).

- 55. *Eulophia spectabilis*** (Dennst.) Suresh. [Plate 2O]. In D.H.Nicolson, C.R.Suresh. & K.S.Manilal, Interpret. Van Rheede's Hort. Malab. (1988) 300. **Heterotypic Synonym:** *Eulophia nuda* Lindl., Gen. Sp. Orchid. Pl. (1833) 180. *Eulophia squalida* Lindl., Edwards's Bot. Reg. Misc. 27 (1841) 77.

General Distribution: Sri Lanka, India, China, the Himalayas, Myanmar, Thailand, Indochina, Indonesia, Malaysia, Papua New Guinea, Tonga and Fiji. A common species throughout the country. Growing on open ground. **Material examined:** Farah Alia Nordin, FAN.FH.356 (UPM).

Notes: This species was found without any leaves on the stem and it is common in *Eulophia*.

- 56. *Flickingeria xantholeuca*** (Rchb.f.) A.D.Hawkes. Orquidea (Rio de Janeiro) 27 (1965) 307. **Synonyms:** *Dendrobium xantholeucum* Rchb.f., Xenia Orchid. 2 (1865) 73; Seidenfaden & Smitinand, Orchids Thailand (1959) 190. *Callista xantholeuca* (Rchb.f.) Kuntze, Revis. Gen. Pl. 2 (1891) 655. *Desmotrichum xantholeucum* (Rchb.f.) Kraenzl. in H.G.A.Engler (ed.), Pflanzenr. IV, 50 II B 21 (1910) 354. *Ephemerantha xantholeuca* (Rchb.f.) P.F.Hunt & Summerh., Taxon 10 (1961) 107.

General Distribution: Thailand, Java, Sumatra, Riau, Borneo and Peninsular Malaysia; recorded from Pahang, Perak, Langkawi and Johor. Found hanging on a tree by the stream. **Material examined:** Farah Alia Nordin, FAN.FH.359 (UPM).

- 57. *Hippeophyllum scortechinii*** (Hook.f.) Schltr. [Plate 2P]. Bot. Jahrb. Syst. 45, 104 (1911) 13. **Synonyms:** *Oberonia scortechinii* Hook.f., Fl. Brit. India 5 (1888) 683. *Iridorkis scortechinii* (Hook.f.) Kuntze, Revis. Gen. Pl. 2 (1891) 669.

General Distribution: Java, Sumatra, Borneo and Peninsular Malaysia. In the peninsula found in the lowlands of Pahang and Perak. Growing on a pine tree together with *Appendicula reflexa* and *Thrixspermum trichoglottis*. **Material examined:** Farah Alia Nordin, FAN.FH.260 (UPM).

- 58. *Hylophila lanceolata*** (Blume) Miq. ** [Plate 3A]. Fl. Ned. Ind. 3 (1859) 746. **Homotypic Synonym:** *Dicerostylis lanceolata* Blume, Coll. Orchid. (1859) 116. **Heterotypic Synonym:** *Dicerostylis kinabaluensis* Carr, Gard. Bull. Straits Settlements. 8 (1935) 192.

General Distribution: Thailand, Java, Borneo, the Philippines and Sumatra. Growing on rather wet forest floor, location shady and dark. **Materials examined:** Choy, S.H., CSH 095 (UPM), Carr, C.E., K000079069 (KEW).

Notes: This species is closely related to *H. cheangii*, in terms of the flower part but it has slightly larger and have a trilobed tongue-like lip which is absent in *H. cheangii*.

- 59. *Lepidogyne longifolia*** (Blume) Blume [Plate 3B]. Coll. Orchid (1859) 93.
Homotypic Synonyms: *Neottia longifolia* Blume, Bijdr. (1825) 406.
Spiranthes longifolia (Blume) Lindl., Gen. Sp. Orchid. Pl. (1840) 476.
Heterotypic Synonyms: *Lepidogyne minor* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 1 (1911) 56. *Lepidogyne sceptrum* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 1 (1911) 55.

General Distribution: Sumatra, the Philippines, Papua New Guinea (probably) and in Malaysia; found in Pahang and Johor (peat forests). On the shady, damp forest floor among leaves litter by the roadsides. **Material examined:** *Farah Alia Nordin, FAN.FH.475* (UPM).

- 60. *Liparis rheedei*** Lindl. Gen. Sp. Orchid. Pl. (1830) 26. **Homotypic Synonyms:** *Malaxis rheedei* Blume, Bijdr. (1825) 389, nom. illeg. *Liparis transtillata* Ridl., J. Linn. Soc., Bot. 32 (1896) 225, nom. illeg. *Diteilis rheedei* (Lindl.) M.A. Clem. & D.L. Jones, Orchadian 15, 1 (2005) 41. **Heterotypic Synonym:** *Liparis paludigena* Kerr, Bull. Misc. Inform. Kew 1927 (1927) 216.

General Distribution: Thailand, Sumatra, New Guinea and Malaysia. In Malaysia common on mountains of about 1300 m. Growing on the moist forest floor, once found growing together with *Crepidium metallica*. **Materials examined:** *Farah Alia Nordin, FAN.FH.243, FAN.FH.416* (UPM).

- 61. *Micropora proboscidea*** (J.J. Sm.) Garay***. Bot. Mus. Leafl. 23 (1972) 186.
Synonyms: *Sarcanthus proboscideus* J.J.Sm., Bull. Dép. Agric. Indes Néerl. 5: (1907) 24. *Camarotis proboscidea* (J.J.Sm.) J.J.Sm., Natuurw. Tijdschr. Ned.-Indië 72: (1912) 98.

General Distribution: Bangka, Sumatra and Malaysia; from two locations near Kelang, Selangor. On tree branches by the roadsides. **Materials examined:** *Farah Alia Nordin, FAN.FH.380, FAN.FH.435* (UPM).

- 62. *Neuwiedia veratrifolia*** Blume [Plate 3C]. Tijdschr. Natuul. Gesch. Physiol. 1 (1834) 142. **Synonyms:** *Neuwiedia calanthoides* Ridl., J. Bot. 24 (1886) 355. *Neuwiedia lindleyi* Rolfe, J. Linn. Soc., Bot. 25 (1889) 233. *Neuwiedia cucullata* J.J. Sm., Bull. Dép. Agric. Indes Néerl. 45 (1911) 1. *Neuwiedia amboinensis* J.J. Sm., Bull. Jard. Bot. Buitenzorg II, 13 (1914) 1.

General Distribution: Sumatra, Papua New Guinea, the Solomon Islands and in Malaysia found on many locations in the lowlands. Found on the bank by the roadside, habitat rather shady. **Material examined:** *Farah Alia Nordin, FAN.FH.274* (UPM).

Note: This species is easily recognized based on its 3-angled dry capsules. A lowland species found on a higher elevation.

63. *Oberonia ciliolata* Hook.f. [Plate 3D]. Hooker's Icon. Pl. 24. (1894) t. 2317.

Synonym: *Oberonia lampongensis* J.J. Sm., Bull. Jard. Bot. Buitenzorg II, 25 (1917) 22.

General Distribution: Sumatra, Java and Malaysia. In Malaysia found in many locations in Pahang, including Gua Musang, Cameron Highlands and the southern parts, mostly in the lowlands. **Materials examined:** *Farah Alia Nordin, FAN.FH.070, FAN.FH.073* (UPM).

64. *Oberonia costeriana* J.J. Sm.*[Plate 3E]. Orch. Java (1905) 244.

General Distribution: Sumatra, Java and Sulawesi. **Materials examined:** *Farah Alia Nordin, FAN.FH.109, FAN.FH.214, FAN.FH.220, FAN.FH.369* (UPM).

Notes: The dark yellow lobules at the lip apex and yellowish-orange leaves are distinct features on this species.

65. *Oberonia fungumolens* Burkill*** [Plate 3F]. Gard. Bull. Straits. Settle. 3 (1924) 292.

General Distribution: Thailand and Malaysia; near Tanjung Malim (Perak).

Material examined: *Farah Alia Nordin, FAN.FH.145* (UPM).

66. *Oberonia rufilabris* Lindl.***. Sert. Orchid. (1838) t. 8 A. **Homotypic**

Synonyms: *Malaxis rufilabris* (Lindl.) Rchb.f. in W.G. Walpers, Ann. Bot. Syst. 6 (1861) 213. *Iridorkis rufilabris* (Lindl.) Kuntze, Revis. Gen. Pl. 2 (1891) 669. **Heterotypic Synonyms:** *Oberonia tiomanensis* M.R.Hend., Gard. Bull. Straits Settle. 5 (1930) 79. *Oberonia neotixieri* Guillaumin, Bull. Mus. Natl. Hist. Nat. II, 35 (1963) 204. *Oberonia pulchrebracteata* Tixier & Guillaumin, Bull. Mus. Natl. Hist. Nat. II, 35 (1963) 304. *Oberonia pantlingiana* L.R. Shakya & R.P. Chaudhary, Harvard Pap. Bot. 4 (1999) 360.

General Distribution: A widespread species in Nepal, Thailand, Indochina and Malaysia. In Malaysia found on Gunung Jerai and Pulau Tioman. Growing on a tree branch in rather exposed area. **Material examined:** *Farah Alia Nordin, FAN.FH.291* (UPM).

67. *Peristylus lacertifer* (Lindl.) J.J.Sm. Bull. Jard. Bot. Buitenzorg. III, 9 (1972)

23. **Homotypic Synonyms:** *Coeloglossum lacertiferum* Lindl., Gen. Sp. Orchid. Pl. (1835) 302. *Habenaria lacertifera* (Lindl.) Benth., Fl. Hongk. (1861) 362. **Heterotypic Synonyms:** *Gymnadenia tenuiflora* Lindl. ex Wall., Numer. List (1832) 7055, nom. inval. *Coeloglossum acuminatum* Lindl., Gen. Sp. Orchid. Pl. (1835) 302. *Choeradoplectron spiranthes* Schauer, Nov. Actorum

Acad. Caes. Leop.-Carol. Nat. Cur. 19 (suppl. 1) (1843) 436. *Peristylus chloranthus* Lindl. ex Benth., Hooker's J. Bot. Kew Gard. Misc. 7 (1855) 37. *Habenaria meyenii* Merr., J. Arnold Arbor. 18 (1937) 67. *Peristylus spiranthes* (Schauer) S.Y. Hu, Chung Chi J. 13 (1976) 2.

General Distribution: Sikkim, Khasia, Myanmar, Thailand, Thailand, Japan, Sumatra, Java and Malaysia. Usually found growing in exposed area in many locations throughout the country. Growing on ground in exposed grassy area. **Material examined:** Sangmi, E., SM 35 (UPM).

68. *Pholidota carnea* var. *carnea* (Blume) Lindl. [Plate 3G]. Gen. Sp. Orchid. Pl. (1830) 37. **Synonyms:** *Crinonia carnea* Blume, Bijdr. (1825) 339. *Coelogyne carnea* (Blume) Rchb.f. in W.G. Walpers, Ann. Bot. Syst. 6 (1862) 237. *Pleione carnea* (Blume) Kuntze, Revis. Gen. Pl. 2 (1891) 680.

General Distribution: Sumatra, Java, Thailand, Sunda islands, Borneo, Sulawesi, Papua New Guinea, the Philippines and Peninsular Malaysia; recorded before in Pahang and Perak on high mountains. Growing on a tree near at rather shady and humid location near the peak. **Materials examined:** Choy, S. H., CSH 070, CSH 101 (UPM).

Note: Plants found on Fraser's Hill having larger flowers as compared to what has been described in Seidenfaden and Wood (1992).

69. *Pholidota carnea* var. *pumila* (Ridl.) de Vogel. Orchid. Monogr. 3 (1988) 56. **Synonym:** *Pholidota parviflora* var. *pumila* Ridl., J. Linn. Soc., Bot. 38 (1908) 329.

General Distribution: Endemic to Peninsular Malaysia, collected from Kedah, Perak and Pahang on mountains above 2000 m. Growing on a tree near at rather shady and humid location near the peak. **Materials examined:** Choy, S. H., CSH 076, CSH 102 (UPM).

70. *Pinalia bractescens* (Lindl.) Kuntze [Plate 3H]. Revis. Gen. Pl. 2 (1891) 679. **Homotypic Synonym:** *Eria bractescens* Lindl., Edwards's Bot. Reg. Misc. 27 (1841) 18.

General Distribution: India, Nepal, Sikkim, Myanmar, Thailand, Indochina, the Philippines, Indonesia and Peninsular Malaysia. Found both in lowlands up to mountains of 1200 m. Growing on tree branches. Always together with *P. pachystachya*.

Materials examined: Farah Alia Nordin, FAN.FH.061, FAN.FH.167, FAN.FH.168, FAN.FH.302, FAN.FH.430 (UPM), Choy, S. H., CSH 040 (UPM).

71. *Pinalia densa* (Ridl.) W. Suarez & Cootes [Plate 3I]. Orchideen J. 16 (2009) 71. **Synonyms:** *Eria densa* Ridl., J. Linn. Soc., Bot. 31 (1896) 281. *Urostachya densa* (Ridl.) Rauschert, Feddes Repert. 94 (1983) 471.

General Distribution: Thailand, Sumatra, Mentawai, Borneo and Peninsular Malaysia. A mountain species found at many places at 1300 - 2000 m. Growing on tree branches together with *P. pachystachya*. **Materials examined:** *Farah Alia Nordin*, FAN.FH.300, FAN.FH.354 (UPM), *Choy, S. H.*, CSH 052 (UPM).

72. *Pinalia xanthocheila* (Ridl.) W.Suarez & Cootes*** Orchideen J. 16 (2009)
70. **Homotypic Synonym:** *Eria xanthocheila* Ridl., Mat. Fl. Malay. Penins. 1 (1907) 102. **Heterotypic Synonym:** *Eria wichersii* Schltr., Bot. Jahrb. Syst. 45, 104 (1911) 45.

General Distribution: Myanmar, Thailand, Mentawai, Sumatra, Java, Peninsular Malaysia. In the peninsula found on the lowlands and by the rivers, mostly on the southern parts of the country. **Materials examined:** *Farah Alia Nordin*, FAN.FH.270, FAN.FH.298, FAN.FH.514 (UPM).

73. *Podochilus microphyllus* Lindl. [Plate 3J]. Gen. Sp. Orchid. Pl. (1833) 234.
Synonym: *Podochilus sciuroides* auct. non. Reichb.f.; Ridley, Mat. Fl. Malay. Penins. (1907) 192. *Podochilus confusus* J.J.Sm., Bull. Jard. Bot. Buitenzorg III, 8 (1927) 358.

General Distribution: Myanmar, Thailand, Indochina, Indonesia and Peninsular Malaysia; common on most shady places both in the lowlands or the mountains. Growing on wet tree trunks and rocks, forming a dense mat. **Materials examined:** *Farah Alia Nordin*, FAN.FH.069, FAN.FH.098, FAN.FH.280 (UPM), *Phoon, S.N.*, *Kamarudin, S.*, *Kueh, H.L.* and *Rafidah, A.R.*, *Kepong 117256/FRI 51586* (KEP), *M.E.D. Moore*, Collection No. 1076/KLU 006076 (KLU).

74. *Podochilus muricatus* (Teijsm. & Binn.) Schltr. [Plate 3K]. Mém. Herb. Boissier 21 (1900) 64. **Homotypic Synonym:** *Appendicula muricata* Teijsm. & Binn., Natuurk. Tijdschr. Ned.-Indië 24 (1862) 322. **Heterotypic Synonym:** *Appendicula echinocarpa* Hook.f., Fl. Brit. India 6 (1890) 85.

General Distribution: Sumatra, Java and Peninsular Malaysia. In the peninsula found on trees and rocks only on mountains at 1000–1300 m. Growing on wet tree trunks. **Materials examined:** *Farah Alia Nordin*, FAN.FH.181 (UPM), *Choy, S.H.*, CSH 065 (UPM), *R.E. Soeriatmadja*, UKMB 00506 (UKMB), *Mohd. Kassim*, KLU 01246 (KLU).

75. *Robiquetia spathulata* (Blume) J.J.Sm. [Plate 3L]. Natuurw. Tijdschr. Ned.-Indië 72 (1912) 114. **Homotypic Synonym:** *Cleisostoma spathulatum* Blume, Bijdr. (1825) 364. **Heterotypic Synonym:** *Saccolabium densiflorum* Lindl., Gen. Sp. Orchid. Pl. (1833) 220.

General Distribution: Sikkim, Indochina, Hainan, Thailand, Sumatra, Halmahera, Java, Borneo; and in Peninsular Malaysia common in the lowlands and Pulau Tioman.

Growing on the tree branches by the roadsides, on rather shady area. **Materials examined:** Farah Alia Nordin, FAN.FH.455, FAN.FH.491 (UPM).

76. *Stichorkis bicolor* (J.J.Sm.) Marg., Szlach. & Kulak***. Acta Soc. Bot. Poloniae 77 (2008) 37. **Synonym:** *Liparis bicolor* J.J.Sm., Orch. Java (1905) 270.

General Distribution: Java, Sumatra, Singapore (specimen incomplete, thus identification cannot be confirmed), in Peninsular Malaysia recorded from Galas, Kelantan. Growing on a tree trunk forming a dense clump. **Materials examined:** Farah Alia Nordin, FAN.FH.244, FAN.FH.411 (UPM).

77. *Stichorkis parviflora* (Blume) Marg., Szlach. & Kulak#. Acta Soc. Bot. Poloniae 77 (2008) 39. **Synonyms:** *Malaxis parviflora* Blume, Bijdr. (1825) 392. *Liparis parviflora* (Blume) Lindl., Gen. Sp. Orchid. Pl. (1830) 31. *Leptorkis parviflora* (Blume) Kuntze, Revis. Gen. Pl. 2 (1891) 671. *Cestichis parviflora* (Blume) M.A. Clem. & D.L. Jones, Orchadian 15 (2005) 40.

General Distribution: Thailand, the Philippines, Indonesia and Peninsular Malaysia. A common species growing on tall trees both in the lowlands and 1300 m on the mountains. **Material examined:** C.E. Carr, Collection No. 296/SING 0140195 (SING). This is a new record to Fraser's Hill (unpublished).

78. *Stichorkis viridiflora* (Blume) Marg., Szlach. & Kulak#. Acta Soc. Bot. Poloniae 77 (2008) 39. **Synonyms:** *Malaxis viridiflora* Blume, Bijdr. (1825) 392. *Liparis viridiflora* (Blume) Lindl., Gen. Sp. Orchid. Pl. (1830) 31. *Leptorkis viridiflora* (Blume) Kuntze, Revis. Gen. Pl. 2 (1891) 671.

General Distribution: Sri Lanka, India, China, Taiwan, the Philippine, Indonesia, Samoa, Fiji and Peninsular Malaysia. This species is not common in the peninsula, found in Pahang, Perak and Penang previously both in mountains and the lowlands. **Material examined:** B.C. Stone, BCS 12035/KLU 20491 (KLU).

79. *Tainia wrayana* (Hook.f.) J.J. Sm.***[Plate 3M]. Bull. Jard. Bot. Buitenzorg II, 8 (1912) 6. **Homotypic Synonyms:** *Ipsea wrayana* Hook.f., Fl. Brit. India 5 (1890) 812. *Mischobulbum wrayanum* (Hook.f.) Rolfe, Orchid Rev. 20 (1912) 127. **Heterotypic Synonyms:** *Nephelaphyllum grandiflorum* Hook.f., Fl. Brit. India 6 (1890) 192. *Tainia atropurpurea* Ridl., J. Linn. Soc., Bot. 32 (1896) 315. *Mischobulbum grandiflorum* (Hook.f.) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 1 (1911) 98. *Tainia sumatrana* J.J. Sm., Bull. Jard. Bot. Buitenzorg III, 5 (1922) 24. *Tainia grandiflora* (Hook.f.) Gagnep., Bull. Mus. Natl. Hist. Nat. II, 4 (1932) 706.

General Distribution: Thailand, Sumatra and in Peninsular Malaysia recorded from Gunung Bintang, Gunung Batu Puteh, Taiping Hills, Gunung Jerai and Penang Hill.

Growing on shady forest floor. **Materials examined:** *Farah Alia Nordin*, *FAN.FH.324*, *FAN.FH.370*, *FAN.FH.440* (UPM), *Chew, M.Y.*, *Imin, R.* *Kiew*, *Kepong 144182/FRI 53673* (KEP).

- 80. *Thrixspermum anceps*** (Blume) Rchb.f.* [Plate 3N]. *Xenia Orchid.* 2 (1868) 122; Comber (2001) 962. **Synonyms:** *Dendrocolla anceps* Blume, *Bijdr.* (1825) 286. *Aerides anceps* (Blume) Lindl., *Gen. Sp. Orchid. Pl.* (1833) 242. *Sarcochilus anceps* (Blume) Rchb.f. in W.G. Walpers, *Ann. Bot. Syst.* 6 (1863) 500.

General Distribution: Java and Sumatra only. **Material examined:** *Farah Alia Nordin*, *FAN.FH.336* (UPM).

Notes: The much flattened stems and paired inflorescence were distinct vegetative characters to identify this species.

- 81. *Thrixspermum annamense*** (Guill.) Garay* [Plate 3O]. *Bot. Mus. Leafl.* 23 (1972) 206. **Homotypic Synonym:** *Ascochilus annamensis* Guillaumin, *Bull. Mus. Natl. Hist. Nat.* II, 33 (1961) 333. **Heterotypic Synonyms:** *Thrixspermum austrosinense* Tang & F.T. Wang, *Acta Phytotax. Sin.* 12 (1974) 46. *Thrixspermum devolium* T.P. Lin & C.C. Hsu, *Taiwania* 22 (1977) 69.

General Distribution: Hainan, Taiwan, Vietnam, Thailand. Growing on small branches and twigs of pine tree. **Materials examined:** *Farah Alia Nordin*, *FAN.FH.177*, *FAN.FH.331*, *FAN.FH.398* (UPM).

- 82. *Thrixspermum brevibracteatum*** J.J. Sm. *Bull. Jard. Bot. Buitenzorg* III, 10 (1928) 71.

General Distribution: Sumatra; in Peninsular Malaysia recorded from Cameron Highlands and Gunung Korbu. Found on a fallen tree branch. **Material examined:** *Farah Alia Nordin*, *FAN.FH.323* (UPM).

Note: The flower was yellow at base and purplish towards tip, compared to pale or bright yellow colour as recorded in Seidenfaden & Wood (1992).

- 83. *Thrixspermum brevicapsularis*** Holttum. *Gard. Bull. Singapore* 11 (1974) 290.

General Distribution: Endemic. Only known from Cameron Highlands and Ulu Kali. **Material examined:** *Farah Alia Nordin*, *FAN.FH.116* (UPM).

- 84. *Thrixspermum calceolus*** Hook.f. [Plate 3P]. *Xenia Orchid.* 2. (1868) 122.

Homotypic Synonym: *Sarcochilus calceolus* Lindl., *Edwards's Bot. Reg.* 32 (1846) t. 19. **Heterotypic Synonyms:** *Aerides lobbii* Teijsm. & Binn., *Natuurk. Tijdschr. Ned.-Indië* 24 (1862) 323. *Sarcochilus brachystachys* Hook.f., *Fl. Brit. India* 6 (1890) 41. *Thrixspermum brachystachyum* (Hook.f.) Kuntze, *Revis. Gen. Pl.* 2 (1891) 682.

General Distribution: Vietnam, Sumatra, Riau, Borneo and Peninsular Malaysia. Found mostly in the lowlands on rocks or trees. Climbing and creeping on grounds and lower tree branches, habitat in light shade. **Materials examined:** *Farah Alia Nordin*, *FAN.FH.343*, *FAN.FH.390* (UPM).

- 85. *Thrixspermum centipeda*** Lour. [Plate 4A]. Fl. Cochinch. (1790) 520. **Homotypic Synonyms:** *Epidendrum thrixspermum* Raeusch., Nomencl. Bot., ed. 3 (1797) 265. *Sarcochilus centipeda* (Lour.) Náves in F.M. Blanco, Fl. Filip., ed. 3, 4, 13A (1880) 238. **Heterotypic Synonyms:** *Aerides flos-aeris* Sw., J. Bot. (Schrader) 2 (1799) 233. *Dendrocolla arachnites* Blume, Bijdr. (1825) 287. *Vanda pauciflora* Breda, Gen. Sp. Orchid. Asclep. 3 (1829) t. 13. *Dendrobium auriferum* Lindl., Gen. Sp. Orchid. Pl. (1830) 83. *Aerides arachnites* (Blume) Lindl., Gen. Sp. Orchid. Pl. (1833) 238, nom. illeg. *Sarcochilus arachnites* (Blume) Rchb.f. in W.G. Walpers, Ann. Bot. Syst. 6 (1863) 498. *Sarcochilus auriferus* (Lindl.) Rchb.f. in W.G. Walpers, Ann. Bot. Syst. 6 (1863) 498. *Thrixspermum arachnites* (Blume) Rchb.f., Xenia Orchid. 2 (1868) 121. *Thrixspermum auriferum* (Lindl.) Rchb.f., Xenia Orchid. 2 (1868) 121. *Sarcochilus hainanensis* Rolfe, Bot. Mag. 122 (1896) t. 7489. *Thrixspermum hainanense* (Rolfe) Schltr., Orchis 5 (1911) 55. *Thrixspermum papillosum* Carr, Gard. Bull. Straits Settlements. 5 (1929) 33.

General Distribution: Widespread in Peninsular Malaysia except for the extreme south. Growing on the tree branches or on the rocky banks by the roadsides in rather exposed and sunny area. **Materials examined:** *Farah Alia Nordin*, *FAN.FH.066*, *FAN.FH.083*, *FAN.FH.219*, *FAN.FH.249*, *FAN.FH.252*, *FAN.FH.318*, *FAN.FH.326*, *FAN.FH.330*, *FAN.FH.344*, *FAN.FH.378*, *FAN.FH.385*, *FAN.FH.386*, *FAN.FH.417*, *FAN.FH.506*, *FAN.FH.507* (UPM).

- 86. *Thrixspermum merguense*** (Hook.f.) Kuntze. Revis. Gen. Pl. 2 (1891) 682. **Homotypic Synonyms:** *Sarcochilus merguensis* Hook.f., Fl. Brit. India 6 (1890) 40. *Dendrocolla merguensis* (Hook.f.) Ridl., J. Linn. Soc., Bot. 32 (1896) 380. **Heterotypic Synonyms:** *Thrixspermum comans* J.J. Sm., Bull. Dép. Agric. Indes Néerl. 13 (1907) 61. *Thrixspermum bicristatum* Ames, Orchidaceae 5 (1915) 202. *Sarcochilus kusukusensis* Hayata, Icon. Pl. Formosan. 6 (1916) 83. *Thrixspermum kusukusense* (Hayata) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4 (1919) 274. *Thrixspermum comans* var. *bicristatum* (Ames) L.O. Williams, Bot. Mus. Leafl. 6 (1938) 80. *Ascochilus pulvinatus* Guillaumin, Bull. Mus. Natl. Hist. Nat. II, 36 (1965) 539.

General Distribution: Myanmar, Taiwan, the Philippines, Sumatra, Java, Krakatau and Peninsular Malaysia; found once only in the Cameron Highlands. Growing on a pine tree branches. **Material examined:** *Farah Alia Nordin*, *FAN.FH.320* (UPM).

- 87. *Thrixspermum scortechinii*** (Hook.f.) Kuntze***. Revis. Gen. Pl. 2. (1891) 682. **Synonym:** *Sarcochilus scortechinii* Hook.f., Fl. Brit. India 6 (1890) 40. **General Distribution:** Endemic. Found on Gunung Jerai, on a mountain in Perak and four locations in Selangor. Growing on the rocky banks by the roadsides in rather exposed and sunny area, together with *T. centipeda*. **Materials examined:** Farah Alia Nordin, FAN.FH.488, FAN.FH.498 (UPM). **Note:** The larger size of the plant and flowers make it distinct from *T. centipeda*.
- 88. *Thrixspermum trichoglottis*** (Hook.f.) Kuntze***[Plate 4B]. Revis. Gen. Pl. 2. (1891) 682. **Homotypic Synonyms:** *Sarcochilus trichoglottis* Hook.f., Fl. Brit. India 6 (1890) 39. *Dendrocolla trichoglottis* (Hook.f.) Ridl., J. Linn. Soc., Bot. 32 (1896) 381; Ridley, Mat. Fl. Malay. Penins. (1907) 185. **Heterotypic Synonyms:** *Dendrocolla alba* Ridl., J. Straits Branch Roy. Asiat. Soc. 44 (1905) 191. *Thrixspermum album* (Ridl.) Schltr., Orchis 5 (1911) 56. **General Distribution:** Widely distributed in the Andaman Islands, Khasia Hills, Myanmar, Thailand, Indochina, Sumatra, Java, Singapore, Borneo and Peninsular Malaysia. In the peninsula it was found on many locations throughout the country. **Materials examined:** Farah Alia Nordin, FAN.FH.086, FAN.FH.454 (UPM), Choy, S.H., CSH 033 (UPM).
- 89. *Trichotosia gracilis*** (Hook.f.) Kraenzl. [Plate 4C]. In H.G.A.Engler (ed.), Pflanzenr. IV, 50, 50 (1911) 143. **Homotypic Synonyms:** *Eria gracilis* Hook.f., Fl. Brit. India 5 (1890) 806. *Pinalia gracilis* (Hook.f.) Kuntze, Revis. Gen. Pl. 2 (1891) 679. **Heterotypic Synonyms:** *Eria oligantha* Hook.f., Fl. Brit. India 5 (1890) 807. *Pinalia oligantha* (Hook.f.) Kuntze, Revis. Gen. Pl. 2 (1891) 679. *Trichotosia oligantha* (Hook.f.) Kraenzl. in H.G.A.Engler (ed.), Pflanzenr. IV, 50, 50 (1911) 155. **General Distribution:** Thailand, Indochina, Singapore, Borneo and Peninsular Malaysia. It is a common epiphyte both in the lowlands and mountains of moderate elevation throughout the country. Growing on tree branches in rather sun-shaded area, hanging. **Materials examined:** Farah Alia Nordin, FAN.FH.110, FAN.FH.127, FAN.FH.146, FAN.FH.175 (UPM), Choy, S.H., CSH 029 (UPM).
- 90. *Trichotosia microphylla*** Blume [Plate 4D]. Bijdr. (1825) 343. **Synonyms:** *Eria microphylla* (Blume) Blume, Mus. Bot. 2 (1856) 184. *Pinalia microphylla* (Blume) Kuntze, Revis. Gen. Pl. 2 (1891) 679. **General Distribution:** Thailand, Vietnam, Sumatra, Java, Borneo and Peninsular Malaysia. Recorded previously from Ulu Kali and Samayok Pass. Creeping on the tree trunks in rather exposed area. **Materials examined:** Farah Alia Nordin, FAN.FH.104, FAN.FH.436 (UPM), Choy, S.H., CSH 026 (UPM).



Plate 3. **A.** *Hylophila lanceolata* (flowers); **B.** *Lepidogyne longifolia* (plant and infructescence); **C.** *Neuwiedia veratrifolia* (flowers); **D.** *Oberonia ciliolata* (flowers); **E.** *Oberonia costeriana* (flowers); **F.** *Oberonia fungumolens* (flowers); **G.** *Pholidota carnea* var. *carnea* (flowers); **H.** *Pinalia bractescens* (flower); **I.** *Pinalia densa* (flowers); **J.** *Podochilus microphyllus* (flower); **K.** *Podochilus muricatus* (flower); **L.** *Robiquetia spathulata* (inflorescence); **M.** *Tainia wrayana* (flowers); **N.** *Thrixspermum anceps* (plant with flower buds and fruit); **O.** *Thrixspermum annamense* (flower); **P.** *Thrixspermum calceolus* (flower).



Plate 4. **A.** *Thrixspermum centipeda* (flowers); **B.** *Thrixspermum trichoglottis* (flower); **C.** *Trichotosia gracilis* (flower); **D.** *Trichotosia microphylla* (flower); **E.** *Trichotosia poculata* (inflorescence); **F.** *Vrydagzynea lancifolia* (inflorescence). [All photos: Nordin *et al.*]

Note: The author agrees with Seidenfaden and Wood (1992) that plant figured in Yong (1990) 123 was an unidentified species. The shape of the lip is different.

91. *Trichotosia poculata*(Ridl.) Kraenzl. [Plate 4E]. In H.G.A.Engler (ed.), Pflanze. IV, 50, 50 (1911) 142. **Synonym:***Eria poculata* Ridl., *J. Linn. Soc., Bot.* 32 (1896) 305.

General Distribution: Sumatra, Borneo and Peninsular Malaysia. Common on mountains of about 900 m. Growing in a large clump on the tree trunks in rather shaded area. **Material examined:** *Farah Alia Nordin, FAN.FH.437* (UPM).

92. *Vrydagzynea lancifolia* Ridl. [Plate 4F]. *J. Linn. Soc., Bot.* 32 (1896) 398.

General Distribution: Recorded once in Thailand and Sabah. In Peninsular Malaysia this is a common species found in the lowland forests throughout the country. Growing on a wet, shady forest floor. **Material examined:** *Farah Alia Nordin, FAN.FH.185* (UPM).

Discussion

The unpublished records were collected in the early 1930's or 1940's but were never included as species found in Fraser's Hill. This could be due to misidentification or they were overlooked during the early revision study. Kiew (1998) recorded 148 species of orchids from Fraser's Hill which include *Bulbophyllum musciferum*, a synonym of *Bulbophyllum rhizomatosum*. Thus making these two entries as a single species (World Checklist of Selected Plant Families, accessed on March 25, 2011) resulting in total enumeration of orchids in Fraser's Hill as recorded previously by Kiew to 147 species. Totalling up the records from previous studies and these new discoveries, the grand total of known orchid species from Fraser's Hill to date is 239 species in 81 genera.

Conclusion

Ninety two species of orchids are new records for Fraser's Hill thus making the total enumeration of orchids in Fraser's Hill to date is 239 species in 81 genera.

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