



Complete list of the native orchids of Taiwan and their type information

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ABSTRACT: This is a comprehensive name list of native orchids of Taiwan identified since the publication of *Flora of Taiwan* Vol. 5, second edition (2000). The 330 species, subspecies, varieties and natural hybrids of native orchids reported in that publication increases to 455 in the current list. Type information and selected references, diagnostic notices for each species are reported herein for reference.

KEY WORDS: Flora of Taiwan, Orchid, Taxonomy, Typification.

INTRODUCTION

Given that a voucher specimen serves as a piece of supporting evidence vouching for the validity of scientific records, knowing the collection, origin, and status changes of these specimens is crucial. The Herbarium of National Taiwan University (TAI) is the most critical herbarium housing information about orchid species discovered in Taiwan, and is followed in importance by the Herbarium of the University of Tokyo (TI) and the Herbarium of Taiwan Forestry Research Institute (TAIF). Because orchids are in a stage of active evolution, the dry specimens in many species have limited use; in Taiwan, this is compounded by the subtropical weather, which does not allow specimens to be maintained in favorable conditions. Photographs and line drawings presented in each original publication of orchid species are always highly useful in identifying a species.

In 2000, *Flora of Taiwan*, Vol. 5, second edition (2000) reported 330 species, subspecies, varieties, and natural hybrids of Taiwan native orchids; this number had increased to 455 as of 2015. This substantial increase can be partly attributed to the rich terrain of mountain systems, which host an assortment of wild orchids. More importantly, a vibrant economy, improved public health, the digitalization of old literature, and increased prevalence of Internet use have resulted in many amateur collectors of orchids from different parts of Taiwan, thus driving the detailed exploration of orchid flora in the country.

Because speciation is a continuous process, it is unsurprising to find that many orchids are similar but distinguishable, or even sometimes are only quality difference but hard to give a clear depiction. We attempted not to compile this list *sensu lato*; we sought to respect the existence of natural variations by recording possible variations if they could survive at least in a small population.

This is the first publically available comprehensive name collection since the aforementioned *Flora of Taiwan* publication. In this list, most information about voucher type specimens is referenced from the Plants of Taiwan (PoT) database (<http://tai2.ntu.edu.tw>) and the TAIF (http://taif.tfri.gov.tw/taif_en/). However, many specimens, especially those documented by Hayata and Fukuyama, are missing and cannot be found in the TAI, TAIF, or TI; the available plant information can be extracted only from original publications. Many of N. Fukuyama's specimens deposited in his private herbarium (Herb. Orch. Fuk.) in Taiwan were taken to Japan after World War II by G. Masamune. Inoue *et al.* (1998) found that most of the labels showing Fukuyama's collection numbers were cut from voucher specimens and they inferred that Masamune had separated the specimens and labels in packing to return to Japan and then remounted the specimens later. This confusion makes identifying the original types difficult. The type materials of Fukuyama and Masamune were gifted to the Kanagawa Prefectural Museum of Natural History in Odawara, Japan. In the presented type information, "Without Fukuyama no." indicates that the original collection number is missing. A high percentage of orchid species in this list were published in the nineteenth and twentieth centuries referring to orchids native to other Asia countries, and many of the original publications and figures for these orchids can be traced using the digitalized Biodiversity Heritage Library website. The type material information that we collected from published papers has not been validated and we are not responsible for its accuracy. Usually only the first publication about a specific species native to Taiwan is cited. Influential references showing clear descriptions and images are also included. Many earlier localities cited in the type specimens are not precisely known at present time; thus, the original sites were copied from the literature. In addition to information



from the first publications about the species, some information extracted from the label of the type specimen is also presented. Many lectotypes are typified for the first time in this study.

Approximately 220 diagnostic notices are included in this list to explain new treatments, to indicate questions that future research must address, or to separate closely related species. Of the listed species, 167 (37%) are considered endemic. One hundred and fifty-one species (33%) are epiphytes, and 53 species (12%) are mycoheterotrophic. It is interesting to note that *Spiranthes australis* Lindl., the earliest record of our native orchid, was collected by Robert Swinhoe in 1857 (Swinhoe, 2010). This was followed by *Goodyera procera* (Ker Gawl.) Hook. f., *Herminium angustifolium* Benth. & Hook. f. var. *longicrura* (C. Wight) Makino, *Liparis nervosa* (Thunberg) Lindl. and *Microtis formosana* Schltr. ex Masam., and they were collected by R. Oldham from Tamsui in 1864. Herbaria are presented with their Index Herbariorum abbreviations (<http://sweetgum.nybg.org/ih/>). Species endemic to Taiwan are indicated with a dot (●).

TAXONOMIC TREATMENT

Acampe rigida (Buch.-Ham. ex J.E. Sm.) P.F. Hunt, Kew Bull. 24: 98. 1970; Seidenf., Bot. Mus. Leaflets, Harvard Univ. 25(2): 49-69. 1977; T.P. Lin, Native Orch. Taiwan 2: 42, photo 1-2. 1977. *Aerides rigida* Buch.-Ham. ex Sm., Cycl. 12. 1818. **Type:** Nepal: Buchanan-Hamilton's drawing (holo. LINN). Note: Seidenfaden (1977b) reproduced the drawing as his plate 9. The description of J.E. Smith was based on a drawing by Buchanan but not a specimen. This drawing is now deposited in the Linnean Society.

蕉蘭

Acampe longifolia (Lindl.) Lindl., Fol. Orch., Acampe 1. 1853; Liu & Su, Quart. J. Taiwan Museum. 25(1-2): 149, f1-2. 1972. *Vanda longifolia* Lindl., Gen. Sp. Orch. 215. 1833. **Type:** Burma: Tavoy, Collected by Gomez, W. Wallich 7322 (holo. K001127173). Specimen: Taiwan: Taitung, Tawuchi, 50 m, Dec. 16, 1969, H.J. Su 0188, only fruit. Note: The earliest record in Taiwan: Pingtung: Shihwen [士文(春日)] Jan. 1, 1916, E. Matuda 825 (TAI 032028). This specimen was identified as *Sarcanthus formosanus* Rolfe.

Acampe taiwaniana S.S. Ying, Tech. Bull. Exp. For. Natl. Taiwan Univ. 114: 156. 1974. **Type:** Mt. Arisan, 600–800 m, Aug. 1974, Hung s. n. (NTUF, not found).

Acanthephippium pictum Fukuy., Bot. Mag. (Tokyo) 49(586): 666-668. 1935. *Acanthephippium sylhetense* Lindl. var. *pictum* (Fukuy.) Hashimoto, Ann. Tsukuba Bot. Gard. 3: 11. 1985. **Type:** Taiwan: Lanyu: Kotosan [紅頭山], Jul. 17, 1934, N. Fukuyama 4679 (holo. KPM-NA0105501 without Fukuyama's no. on the label, photo T00010 in PoT). Specimen: (TAI032031) collected in Jul. 16, 1934 by N. Fukuyama and identified as this species by him in 1935.

延齡蠟花蘭

Acanthephippium sylhetense Lindl. var. *pictum* (Fukuy.) Hashimoto, Ann. Tsukuba Bot. Gard. 3: 11. 1985.

Acanthephippium striatum Lindl., Edwards's Bot. Reg. 24(Misc.): 41. 1838; S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1: 42. 1977; Lin, Native Orch. Taiwan 3: 1-3, photo 1-2. 1987. **Type:** Nepal, via Bateman; cult. Kew, Jun. 1838 (holot. K-LINDL).

一葉蠟花蘭

Tainia unguiculata Hayata, Icon. Pl. Formos. 4: 61, f.28. 1914. *Tainiopsis unguiculata* Hayata, nom. nud. in sched. *Acanthephippium unguiculatum* (Hayata) Fukuy., Bot. Mag. Tokyo, 48: 301. 1934.; Liu & Su, Fl. Taiwan 5 (1st ed.): 868. 1978. **Type:** Taiwan: cult. Taipei (holo. TI, photo T00868 in PoT). Specimen: Miaoli: Nanchuang, Apr. 1931, N. Fukuyama s.n. (KPMG00900).

Acanthephippium sylhetense Lindl., Gen. Sp. Orchid. Pl. 177. 1833; J. Linn. Soc. 3: 21. 1859; Nackejima, Enum. Orch. Ryukyu 2: 114. 1971. **Type:** Bangladesh: Sylhet, Wallich s.n. (not located). Note: Thomas (1997) listed Hooker & Thomson 198 (K) as the type of this species is a mistake. Lindley (1833) cited Wallich s.n. from Sylhet for this new species, and in 1859 cited the specimen Hooker & Thomson 198 from Sikkim for India orchid study. Specimen: Taiwan: Taichung: Tahsuehshan, Aug. 23, 1973, T.P. Lin 48 (TAIF155384).

台灣蠟花蘭

Acanthephippium yamamotoi Hayata, Icon. Pl. Formos. 6: 73-74. 1916; Masam., J. Geobot. 14(3): pl.113. 1966. **Type:** Taiwan: Uraisha, K. Yamamoto s.n. not found. Specimen: Taipei: Wulai, Sept. 6, 1931 (fruit), K. Yamamoto s.n. (TAI031824).

Agrostophyllum formosanum Rolfe in Hemsl., Ann. Bot. (Oxford) 9(33): 157. 1895; Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 92. 1896; Ormerod, Taiwania 57(3): 253, 2012. **Type:** Taiwan: South Cape, 1893-1894, Henry 1350 (holo. Photo K000810709; iso. NY00008563).

●台灣糠穗蘭

Agrostophyllum inocephalum auct. non (Schauer) Ames: Liu & Su, Fl. Taiwan 5: 870. 1978.

Note: This species may be closely related to or even conspecific with *Agrostophyllum saccatilabium* Ames & Quisumb from Philippine according to Ormerod (2012).

Amitostigma alpestre Fukuy., Bot. Mag. (Tokyo) 49(586): 664-665. 1935. *Ponerorchis alpestris* (Fukuy.) X.H. Jin, Schuit. et W.T. Jin, Mol. Phylogenet. Evol. 77: 41-53. 2014. *Hemipilia alpestris* (Fukuy.) Y. Tang & H. Peng, BMC Evol. Biol. 15: 27. 2015. **Type:** Taiwan: Nankotaizan [南湖大山], Bunakkei [南湖園谷], Jul. 26, 1933, N. Fukuyama 4692 (holo. KPM-NA0105502, photo T00011 in PoT; iso. KPM-NA0105616, Photo T00012 in PoT!).

高山雜蘭

Note: *Amitostigma* Schltr. is characterized by 2 well-developed staminodes and 2 separate complete bursicles, and these features can be observed in *A. alpestris* and *A. gracile*. However, using both nuclear and plastid gene markers, East Asian *Amitostigma* alliance species (Orchidaceae: Orchideae) which are distributed almost exclusively in East Asia were confirmed to have a monophyly origin by Tang *et al.* (2015), but highly complex phylogenetic relationships have been observed among *Amitostigma* alliance genera (6 previously fairly well-accepted genera: *Amitostigma*, *Hemipilia*, *Hemipiliopsis*, *Neottianthe*, *Ponerorchis* and *Tsaiorchis*). Tang *et al.* treated the East Asia clade as a single supergenus containing 7 sections, all under the genus name *Hemipilia* because this was the earliest established genus among the 6 genera. In this report, I still accept the conventional concept that *Amitostigma*, *Hemipilia* and *Ponerorchis* are 3 different genera.



Amitostigma gracile (Miq.) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 93. 1919. *Mitostigma gracile* Blume, Mus. Bot. 2: 190. 1856. *nom. nud.* (type in Japan). *Gymnadenia gracilis* (Blume) Miq., Ann. Mus. Bot. Lugduno-Batavi 2: 207. 1866. *Cynorkis gracilis* (Blume) Kraenzl., Orchid. Gen. Sp. 1: 488. 1898. *Orchis gracilis* (Blume) Soó, Ann. Hist.-Nat. Mus. Natl. Hung. 26: 348. 1929, non *Orchis gracilis* Fisch. 1835. *Ponerorchis gracilis* (Blume) X.H. Jin, Schuit. et W.T. Jin, Mol. Phylogenet. Evol. 77: 51. 2014. *Hemipilia gracilis* (Blume) Y. Tang, H. Peng & T. Yukawa, BMC Evol. Biol. 15:96, 28. 2015. **Types:** Korea: Jul. 1, *R. Oldham 1027* (syn. K). Note: There are three specimens (K000796375–K000796377) collected at different islands, mounted on a single sheet, Kew no. 851 in Kew herbarium. Miquel (1866) cited “Oldham 851” in his paper, so these three specimens are treated as syntypes here.

小雛蘭

Amitostigma yuukiana Fukuy., Bot. Mag. (Tokyo) 48(571): 429. 1934; Masam., J. Geobot. 18(3-4): pl.163. 1970. **Type:** Taiwan: Shinchiku: Yuuki, 7000 ped., Jul. 1932, *N. Fukuyama 4116* (KPM-NA0105503 without Fukuyama's no., photo T00013 in PoT). *Orchis formosensis* S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 266. 1977. **Type:** Taiwan: Nantou: Hohuanshan, 2300–2500m, Jul. 27, 1976, *S.S. Ying 4921* (holo. NTUF, photo F00008213 in PoT) *Orchis sooi* S.S. Ying, Col. Ill. Indig. Orch. Taiwan 2: 290–291. 1990. *nom. illeg.*
Note: Jin *et al.* (2014) proposed combining the genera *Amitostigma* and *Neottianthe* with *Ponerorchis*.

Androcorys pusillus (Ohwi & Fukuy.) Masam., Hokuriku J. Bot. 12: 88. 1963; Lin, Native Orch. Taiwan 3: 36. 1987. *Herminium pusillum* Ohwi & Fukuy., Bot. Mag. (Tokyo) 48(571): 430. 1934. **Type:** Taiwan: monte Niitaka-yama [新高山] inter Shuzan [主山] et Niitaka-chuuzaisho, collected by *J. Ohwi* Jul. 1933, *Fukuyama 4119* (holo. KPM-NA0105548, Masamune handwriting on the envelope label, no Fukuyama's no., photo T00058 in PoT; iso. KYO, with Fukuyama's no. in pencil). 小兜蕊蘭

Note: Based on phylogenetic analyses, Raskoti *et al.* (2015) proposed to widen the circumscription of *Herminium* to include *Androcorys* and others.

Ania penangiana (Hook. f.) Summerh., Bot. Mag. 161: t.9553. 1939; Lin, Native Orch. Taiwan 2:20. 1977. *Tainia penangiana* J.D. Hooker, Fl. Brit. India 5: 820. 1890. Hooker's Icon. Pl. 21: t. 2089. 1892. **Types:** Malaysia: Malaya: Penang, *A.C. Maingay 164* (holo. K000974259). Specimen: Tainan: Mt. Sanchiaonan 1000 m. Jun 19, 1975, *Lin 390* (TAIF). 綠花安蘭

Tainia hookeriana King & Pantling, J. Asiat. Soc. Beng., Pt.2, Nat. Hist. 64: 336. 1895; Seidenf., Opera Bot. 89: 32, f. 13. 1986. *Ania hookeriana* (King & Pantling) T. Tang & F.T. Wang ex Summerhayes, Bot. Mag. 161, t.9553. 1939; Lin, Native Orch. Taiwan 3:38, photo 12–14. 1987. **Type:** India: Sikkim: Himalaya, Mar. 1892, *R. Pantling 204* (BM000514233, BR0000009973305, P). Note: There is a label marked “isotype” on K000387852. However, as the original description is without herbarium indication and K000387852 fit the authors' description, this specimen is better treated as a syntype, or holotype if there is no specimen at CAL fit the original description. Another specimen in Kew (K000387853 in the same folder with K000387852) also labelled *R. Pantling 204*, is better not treated as the type as its collected place is at 2500 feet, not the 1000 feet indicated in the original description.

Tainia taiwaniana S.S. Ying, Quart. J. Chin. Forest. 20(2): 55. 1987. **Type:** Pingtung, Ching-shui-ying, Aug. 24, 1984, *S.S.*

Ying s.n. (Not found). Note: Judging from the photo Ying has supplied, this plant though smaller is still *A. penangiana*.

Note: The separation of *Tainia* in 2 genera, that is, *Tainia* (including *Nephelaphyllum* and *Mischobulbum*) and *Ania* was strongly supported based on combined *rbcl*, *matK* and *psaB* plastid data (Xiang *et al.* 2014). *Ania* was reinstated to be an independent genus, and is sister to *Chrysoglossum*, *Collabium*, *Tainia* and *Hancockia* (Chase *et al.* 2015).

Anoectochilus formosanus Hayata, Icon. Pl. Formos. 4: 101, pl.53. 1914; Masam., J. Geobot. 14(1): pl.107. 1965. **Type:** Taiwan, cult. Taipei. Mar. 1914, *B. Hayata s.n.* (not found). Specimen: Miaoli: Nanchung, Sept. 1, 1914, *S. Sasaki s.n.* (TAIF102736). 台灣金線蓮

Note: In the genus *Anoectochilus* the spur is exposed, and 2 stigma are located on the lateral side of the column, whereas in *Odontochilus*, the sac is concealed by the bases of the lateral sepals, thus forming a mentum; stigma 1 or 2 closely placed under base of rostellum (Pridgeon *et al.* 2003).

Anoectochilus koshunensis Hayata, Icon. Pl. Formos. 4: 104, f.54. 1914. *Odontochilus koshunensis* (Hayata) S.S. Ying, Col. Ill. Orch. Taiwan 1: 64. 1996. **Type:** Taiwan: Koshun [恆春] (not found. According to the original literature, the description was based on a living collection). Specimen: Ilan: Taiheizan, Jul. 28, 1929, *S. Suzuki 1125* (TAI 115306). 恆春金線蓮

Note: This is a variable species in Taiwan. The mesochile wing is entire or cleft, and the two lobes of spur is approximate or divergent.

Aphyllorchis montana Reichb. f., Linnaea 41: 57. 1877; Lin, Native Orch. Taiwan 1: 32, photo1-2. 1975. *Apaturia montana auct.non* Lindl.: Thwaites, Enumeratio Plantarum Zeylanicae 301. 1864. **Type:** Sri Lanka “Ambagumowa District”, 1853, *G.H.K. Thwaites Ceylon Plant no. 3189* (lecto. K000942661) & *Walker s.n.* (K000387569 in the same sheet with K000942661). 紫紋無葉蘭

Aphyllorchis tanegashimensis Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 344–345. 1911. **Type:** Japan: Tange-gashima, Sep. 1891, *S. Tanaka 442*.

Aphyllorchis purpurea Fukuy., Bot. Mag. (Tokyo) 48(571): 431. 1934. **Type:** Taihoku, Syo-agyku-san [下阿玉山], Aug. 1933, *N. Fukuyama 4121* (holo. KPM-NA0105504, without Fukuyama's collection no., photo T00014 in PoT, Flower damaged).

Aphyllorchis montana var. *rotundatipetala* (C.S. Leou, S.K. Yu & C.T. Lee) TP Lin, *com. nov.* *Aphyllorchis rotundatipetala* C.S. Leou, S.K. Yu & C.T. Lee, Ann. Bot. Fennici 50: 179–182. 2013. **Type:** Taiwan: New Taipei City: Sanxia 400 m, Aug. 30, 2012, *C.T. Lee 033* (holo. TAI284548). ●圓瓣無葉蘭

Note: Both *Aphyllorchis simplex* Tang et F.T. Wang, found in Vietnam and Southern China, and *A. rotundatipetala* are considered to be peloric actinomorphic forms of *A. montana*. However, they have evolved in different directions. For example, in *A. simplex*, 2 large curved staminodes are present apically on both sides of the column (see figs. 3 & 5F in Averyanov 2011), which are absent in *A. rotundatipetala*.

Appendicula fenixii (Ames) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 1: 336. 1912; Ormerod, Taiwania 47(4). 239. 2002. *Podochilus fenixii* Ames, Philipp. J. Sci., C 6: 48. 1911. **Type:** Philippines: Batanes Isl., Mt. Iraya, Jun. 8, 1907, *B.S. Fenix 3794* (holo. AMES00103323).

長葉竹節蘭



Appendicula terrestris Fukuy., Bot. Mag. Tokyo 50:22. 1936. **Type:** Taiwan: insl. Koto-syo, monte Omori-yama [大森山], Jun. 3, 1934, *Fukuyama 4809* (not located). Specimen: TAI115309 collected by Fukuyama in Jul. 1934.

Appendicula lucbanensis (Ames) Ames, Philipp. J. Sci., C 8: 415. 1913 publ. 1914; Hsu *et al.*, Quart. J. Forest Res. 37(1): 1-4. 2015. *Podochilus lucbanensis* Ames, Leaflet Philipp. Bot. 5: 1566. 1912. **Type:** Philippine: Luzon, Tayabas Prov., Lucban, 5750 ft, May 1907, *A.D.E. Elmer 8068* (holo. AMES00103337; iso. F265587, F0046464F, MO2140690, NY00009262). Specimen: Taiwan: Taitung: Daren, Mt. chiapuan, 800-1000 m, May 28, 2014, *T.C. Hsu 7117* (TAIF).

多枝竹節蘭

Appendicula reflexa Blume, Bijdr. 301. 1825; Liu & Su, Fl. Taiwan 5: 880, 1978; Ormerod, Taiwania 47(4): 239. 2002; 49(3): 175-182, 2004. **Type:** Java: Tjapus River, *Blume s. n.* (syn. L); Mt. Pantjar, *Blume 296* (syn. L0052471 - L0052473).

台灣竹節蘭

Appendicula formosana Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 340-341. **Type:** Taiwan: 1896, *T. Uchiyama s.n.* (holo. TI, photo T00873 in PoT!). Note: Lip figure on the label.

Podochilus taiwanianus S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 297. 1977. **Type:** Taiwan: Pingtung: Nanjenshan. Jan. 23, 1976, *S.S. Ying 4692* (holo. NTUF, photo F00008207 in PoT; iso. NTUF, photo F00008208 in PoT).

Appendicula reflexa Blume var. *kotoensis* (Hayata) T.P. Lin, *comb. nov.* *Appendicula kotoensis* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 341. 1911. *Appendicula formosana* Hayata var. *kotoensis* (Hayata) T.P. Lin, Nat. Orch. Taiwan 2: 54, photo 7. 1977. **Type:** Taiwan: Kotosho [Lanyu Is.], Aug. 1906, *T. Kawakami et U. Mori 5802* (holo. TI, photo T00874 in PoT. *Podochilus kotoensis* on the label).

蘭嶼竹節蘭

Note: This variety has the same flower morphology, particularly the column and labellum, but has a shorter stem than that of *A. formosana*.

Arachnis labrosa (Lindl. & Paxton) Reichb. f., Bot. Centralbl. 28: 343. 1886; Seidenf., Opera Botanica 95:140, fig.84. 1988. Su, Fl. Taiwan 2nd edit. 5: 753. pl. 320. 2000. *Arrhynchium labrosum* Lindl. & Paxt., Paxton's Fl. Gard. 1: 142. 1851. *Armadorum labrosum* (Lindl. & Paxton) Schltr., Repert. Spec. Nov. Regni Veg. 10: 197. 1911; Liu & Su, Quart. J. Taiwan Mus. 28(1-2): 269-276. 1975. **Type:** "tropical Asia" cult. by Philip Egerton in London.

龍爪蘭

Renanthera leptantha Fukuy. ex A.T. Hsieh, Quart. J. Taiwan Mus. 8(3): 276. 1955. *nom. illeg.* **Type:** [Kaohsiung: Chishan], Tyusinron [中心崙]. Oct. 26, 1934, *N. Fukuyama 5568* (TAI118747).

Renanthera leptantha Fukuy. ex A.T. Hsieh f. *flavicans* Fukuy. ex A.T. Hsieh, Quart. J. Taiwan Mus. 8(3): 276. 1955. *nom. illeg.* **Type:** Taiwan: Taihoku-syu, Suoo-gun [蘇澳], Mt. Oobi [澳尾山], Apr. 23, 1938, *G. Masamune 7457* (TAI118748).

Renanthera taiwanensis Fukuy. ex A.T. Hsieh, Quart. J. Taiwan Mus. 8(3): 276. 1955. *nom. illeg.* **Type:** Suao, Mt. Oobi [澳尾山], Apr. 23, 1938, *G. Masamune s.n.* (TAI115488).

Arundina graminifolia (D. Don)Hochr., Bull. New York Bot. Gard. 6: 270. 1910; Lin, Native Orch. Taiwan 1:34, photo 3-5. 1975. *Bletia graminifolia* D. Don, Prodr. Fl. Nepal. 29 1825. **Type:** Nepal: Sembu, Jul. 15, 1802, *Buchanan s.n.* (holo. BM 000091395). **竹葉蘭/鳥仔花**

Arundina chinensis Blume, Bijdr. Fl. Ned. Ind. 402. 1825; A. Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 92. 1896. **Type:** Java: cult. China introd. (holo. L0052540). Specimen: Tamsui, 1893-1894, *A. Henry 1386*.

Note: This species is variable in Asia, and requires further study.

Bletilla formosana (Hayata) Schltr. f., Repert. Spec. Nov. Regni Veg. 10: 256. 1911. *Bletia formosana* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 323-324. 1911; Masam., J. Geobot. 14(3): pl.115. 1966. **Type:** Taiwan: Yilan: Chiuchiung Lake (九芎湖), Jun. 11, 1906, *T. Kawakami et U. Mori 1335* (isosyn. TAI6525; TAI6526 without collection no.). Specimen: Nantou: Mandaikai, Jan. 1908, *T. Kawakami et U. Mori 6277*.

●台灣白及

Bletia morrisonicola Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 324-325. 1911. **Type:** Taiwan: Mt. Morrison, 10000[8000] ped, Nov. 25, 1906. *T. Kawakami et U. Mori 2311* (holo. TI, photo T00875 in PoT; iso. TAI6536).

Bletia kotoensis Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 325-326. 1911. **Type:** Taiwan: Kotosho, Apr. 15, 1907, *T. Kawakami et U. Mori 2452* (holo. TI, photo T00876 in PoT!; iso. TAI6534 & 6535, K000942610).

Bletilla formosana (Hayata) Schltr. f. *rubrolabella* S.S. Ying, Mem. Coll. Agric. Natl. Taiwan Univ. 30(2): 68. 1990. **Type:** Taiwan: Yilan: Tu-li-shan (獨立山) to Chi-lan, Jun. 17, 1990, *S.S. Ying s.n.* (holo. NTUF).

Brachycorythis galeandra (Rchb. f.) Summerh., Kew Bull. 10: 241. 1955; Su, Fl. Taiwan 2nd edit. 5: 760. pl. 324. 2000. *Platanthera galeandra* Rchb. f., Linnaea 25: 226 1852. *Habenaria galeandra* (Rchb. f.) Benth., Fl. Hongk. 363. 1861; Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 93. 1896. **Type:** Hong Kong: 1845, *Fortune s.n.* (K000894310, K000894311, K000894446). Specimen: Taiwan: [Pingtung:] Banksing [萬金庄], 1893-1894, *A. Henry 850*.

寬唇芭葉蘭

Platanthera obcordata auct. non Lindl.: Matsumura et Hayata, J. Coll. Sci. Univ. Tokyo 22: 419. 1906. Specimen: Formosa: [Pingtung:] Banksing [萬金庄], 1893-1894, *A. Henry 850*.

Platanthera truncatolabellata Hayata, Icon. Pl. Formos. 4: 124, f. 65. 1914. **Type:** Taiwan: Nanto: Randaizan, Jul. [30], 1907, *T. Kawakami et U. Mori 3482* (iso. TAI6919). Specimens: Pingtung: Laiyi, Jul. 2, 1916, *E. Matuda 592* (TAI115477).

Note: an extreme rare species. S.S. Ying has observed this orchid in Patungkuang (八通關) in 1985.

Brachycorythis peitawuensis T.P. Lin & W.M. Lin, Taiwania 54(4): 323-325, f.1. 2009. **Type:** Taiwan: Pingtung: Mt. Peitawu, 2100 m, Aug. 3, 2009, *Y.F. Wang s.n.* (holo. TAI268953). **北大武芭葉蘭**

Note: This species is also found in Thailand.

Bulbophyllum affine Lindl., Gen. Sp. Orchid. Pl. 48. 1830; Seidenf., Bull. Mus. Hist. Nat. (Paris) 3. ser. 71. Bot. 109. 1973; Seidenf., Dansk Bot. Arkiv 33(3): 18, f.3. 1979. **Type:** Nepal: 1821, *N. Wallich 1982* (holo. K000894322; iso. BR0000009972834, E00157483, & K001114844).

紋星蘭

Bulbophyllum kusukusense Hayata, Icon. Pl. Formos. 4: 48, f.19. 1914. **Type:** Taiwan: Pingtung, Kusukusu [高士佛], Jun. 1912, *B. Hayata et S. Sasaki s.n.*

Bulbophyllum albociliatum (T.S. Liu & H.J. Su) Seidenf., Dansk Bot. Ark. 29(1): 89, f.42. 1973. *Cirrhopetalum albociliatum* T.S. Liu & H.J. Su, Quart. J. Taiwan Mus. 24 (1-2): 173, pl.1. 1971. *Bulbophyllum albociliatum* (T.S. Liu & H.J. Su) K. Nakaj., Biol. Mag. Okinawa 10: 36. 1973. (pub. date: May 1974). **Type:** Taiwan: Chinshuiying, *Su 174* (holo. NTUF, photo F00017993 in PoT).

白毛捲瓣蘭



Bulbophyllum taichungianum S.S. Ying, Quart. J. Chin. Forest. 11(2): 102, f.1. 1978. **Type:** Taiwan: Lishan, 1850 m, [Jul. 14, 1977], S.S. Ying 6201 (holo. NTUF, photo F00000330 in PoT).

Bulbophyllum albociliatum (Liu & Su) Seidenf. var. ***brevipedunculatum*** (T.C. Hsu & S.W. Chung) W.M. Lin, Wild Orch. Taiwan, An Ill. Guide 126 and photo 2014. *Bulbophyllum brevipedunculatum* T.C. Hsu & S.W. Chung, *Taiwania* 53(1): 23–26, f.1, 2a–c & 3. 2008. **Type:** Taiwan: Yilan: Taipingshan Forest Recreation Area, 1800 m, Apr. 18, 2007, *Hsu & Chung* 766 (holo. TAI256489). Specimen: Hualien: Panshih (磐石)-Mt. Tienchang 1600 m, Apr. 2, 2006, *Hsu & Chung* 422 (TAIF273541).

●短梗豆蘭

Bulbophyllum albociliatum (T.S. Liu & H.J. Su) Seidenf. var. ***shanlinshiense*** T.P. Lin & Y.N. Chang, *Taiwania* 58(4): 260–262, f.2F & 4. 2013. **Type:** Taiwan: Nantou: Shanlinshi, 1600–1800 m, Jun 2013, *B.N. Shen s.n.* (holo. TAI283128).

●杉林溪捲瓣蘭

Bulbophyllum albociliatum (Liu & Su) Seidenf. var. ***weiminianum*** T.P. Lin & L.L.K. Huang, *Taiwania* 50(4): 290–294, f.1, 4a–b. 2005. **Type:** Taiwan: Taitung: 1800–2300 m, *Weimin Lin s.n.* (holo. TAI224766).

●維明豆蘭

Note: This species is similar to the *B. kuanwuensis* var. *luchuensis* but with long inflorescence axis.

Bulbophyllum aureolabellum T.P. Lin, Native Orch. Taiwan 1: 38, photo 7–8. 1975. **Type:** Taiwan: Lientiensa, 1200m, *T.P. Lin* 63 (TAIF).

●小豆蘭

Bulbophyllum gracillimum sensu Hayata, Icon. Pl. Formos. 2: 132–133. 1912. *non* Rolfe 1907 **Type:** Taiwan: Nokoizan [能高], Jan. 16, 1908, *T. Kawakami et U. Mori* [6260] (holo. TI, photo T00879 in PoT).

Bulbophyllum cilisepalum T.C. Hsu & S.W. Chung, *Taiwania* 53(1): 26–27, f.2d–f, 3 & 4. 2008. **Type:** Taiwan: Taichung: Daxueshan Forest Recreation Area, 2000–2100 m, Jun. 30, 2007, *Hsu* 874 (holo. TAI297354). Note: Peduncles are 2.5–4 cm in length, and lateral sepals are 3.5–4 cm in length.

●毛線萼豆蘭

Bulbophyllum confragosum T.P. Lin & Y.N. Chang, *Taiwania*, 58(4): 257, figs. 1 & 2A. 2013. **Type:** Taiwan: Taichung: Forest above the Te-Chi Reservoir, 1900 m, Apr. 1, 2008, *Wei-Min Lin s.n.* (holo. TAI283130).

●斷尾捲瓣蘭

Bulbophyllum electrinum Seidenf. var. ***calvum*** T.P. Lin & W.M. Lin, *Taiwania* 54(4): 325, f. 2B. 2009. **Type:** Taiwan: Pingtung: Shouka, 350 m, May 25, 2009, *Weimin Lin s.n.* (holo. TAI268955).

●無毛捲瓣蘭

Bulbophyllum electrinum Seidenf. var. ***sui*** T.P. Lin & W.M. Lin, *Taiwania* 54(4): 324–325. 2009. **Type:** Taiwan: Taitung: Chingshuiying, 1000–1500 m, Mar. –Apr. *Su* 162 (holo. NTUF?); Specimen: Hualien: Lakulakuchi, *Su & Hsu* 8239 & 8240.

●長軸捲瓣蘭

Bulbophyllum hirundinis var. *electrinum* (Seidenf.) S.S. Ying, Col. Ill. Orch. Taiwan 2: 408. 1990.

Bulbophyllum maxii W.M. Lin, Wild Orch. Taiwan, An Ill. Guide 162 and photo 2014. *nom. nud.* Note: This species is similar to *B. electrinum* var. *sui* but has wavy white hairs, unlike the yellow clavate hairs of the mentioned species. (天池捲瓣蘭)

Note: The flower of *B. electrinum* Seidenf. (Seidenfaden 1973, p.77, f. 32) of Yunnan (Type: *A. Henry* 13087 in E, K000867017, MO) is characterized by hairless margins of lateral sepals, whereas var. *sui* has short club-like ciliates on the lateral sepals, which are also shown in the line drawing of *B. electrinum* by Su (1989).

Bulbophyllum fimbriperianthium W.M. Lin, L.L.K. Huang & T.P. Lin, *Taiwania* 51(3): 162–163, f.1, 5A. 2006. **Type:** Taiwan: Pingtung: Tahanshan, 1300–1400 m, Sep. 10, 2005, *Weimin Lin s.n.* (holo. TAI256489).

●流蘇豆蘭

Bulbophyllum flaviflorum (T.S. Liu & H.J. Su) Seidenf., Bull. Mus. Paris 3. s. 71: 109. 1973. *Cirrhopetalum flaviflorum* T.S. Liu & H.J. Su, Quart. J. Taiwan Mus. 24 (1–2): 174, pl. 2. 1971. **Type:** Taiwan: Nantou: Mt. Shui-she-ta-shan, *H.J. Su* 180 (holo. NTUF, photo F00017992 in PoT). Hsinchu: Mt. Li-tung, *H.J. Su* 230; Chinsuiying *H.J. Su* 376 (para. NTUF, photo F00008304).

●翠華捲瓣蘭

Note: Seidenfaden (1992) reduced *B. flaviflorum* to synonym of *B. pectenvenensis* (Gagnep.) Seidenf. (Seidenfaden 1974) but I consider *B. flaviflorum* to be non-conspecific with *B. pectenvenensis*. *B. pectenvenensis* is characterized by flowers that are red or red mixed with other shades; the sepals and petals have clavate, moniliform yellow hairs, and the lateral sepals are 5–9 cm in length, narrowly lanceolate, and occasionally extremely slender. By contrast, *B. flaviflorum* is characterized by green flowers that turn yellow-green; the sepals and petals have green needle-like hairs and are never club-like, and the lateral sepals are 3–5 cm in length, and lanceolate.

Bulbophyllum griffithii (Lindl.) H. G. Reichb., Ann. Bot. Syst. 6: 247. 1861. X. Chen *et al.*, Fl. China 25: 408. 2009. *Sarcopodium griffithii* Lindl., Fol. Orchid. 2: 6. 1853. **Type:** India: Khasia hills, T. Lobb (syn. K000363908); Khasia hills, 5000 ft, *J.D. Hooker & T. Thomson* 53 (syn. K000078663), Oct. 16, 1850, *J.D. Hooker & T. Thomson* 2505 (Lecto. designed here: K000894320); Myrung wod, *Griffith s.n.* (syn.).

●溪頭豆蘭

Bulbophyllum calodictyon Schltr.; Repert. Spec. Nov. Regni Veg. Beih. 4: 70–71. 1919. **Type:** China: Yunnan: Szemao, *Henry* 13609 (iso. K000810995, NY39321).

Bulbophyllum chitouense S.S. Ying, Col. Ill. Fl. Taiwan 5: 591–592, pl.83–84. 1992. **Type:** Taiwan: Nantou: Chitou, 1160 m, Nov. 25, 1994, S.S. Ying 9220 (holo. NTUF, photo F00000141 in PoT).

Bulbophyllum insulsoides Seidenf., Dansk Bot. Ark. 29(1): 89, f.41. 1973; Liu & Su, Fl. Taiwan 5: 894. 1978.

●穗花捲瓣蘭

Bulbophyllum racemosum Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 317–318. 1911. *non* Rolfe 1893. *Cirrhopetalum racemosum* (Hayata) Hayata, Gen. Ind. Fl. Formos. 76. 1917. **Type:** Taiwan: Nantou: Shojodaizan [守城大山], Aug. [12], 1906, *T. Kawakami et U. Mori* 1239 (holo. TI, photo T00882 in PoT; iso. TAI256608).

Bulbophyllum insulsum auct. non (Gagnep.) Seidenf.: Su, Quart. J. Chin. Forest Sci. 22: 22, pl.2. 1989. (Wrong identification indicated by Opera Bot. 114: 267. 1992.)

Bulbophyllum japonicum (Makino) Makino, Bot. Mag. (Tokyo) 24: 31. 1910; Lin, Native Orch. Taiwan 1: 48, photo 14. 1975. *Cirrhopetalum japonicum* Makino, Ill. Fl. Jap. t.442. 1891. **Type:** Japan: Osumi: Yaku-shima, Sep. 1909, *T. Makino s.n.* (Herbarium?).

●瘤唇捲瓣蘭

Bulbophyllum inabai Hayata, Icon. Pl. Formos. 4: 47, pl.9. 1914. *Cirrhopetalum inabai* Hayata *nom. nud.* in sched. *Cirrhopetalum inabae* (Hayata) Hayata, Gen. Ind. Fl. Formos. 76. 1917. **Type:** Taiwan: Maisha, Jul. 1911, *H. Inaba s.n.* not found.



Bulbophyllum karenkoensis T.P. Lin *sp. nov.*, *Bulbophyllum remotifolium auct. non* (Fukuy.) K. Nakaj.: T.P. Lin in Native Orch. Taiwan 1: 44–45, photo 11. 1975. **Type:** Taiwan: Taitung: Mt. Tulan, 900 m. Aug. 10, 2004, T.C. Hsu & S.W. Chung 109 (holo. TAI211529). Specimen: Taitung: Mt. Tulan, 900 m. Oct. 12, 2005, S.W. Chung, T.C. Hsu & S.K. Yu 8772 (TAIF273690 inflorescence only); Yilan: Wumaotzushan, 350 m, Jun. 3, 1938, K. Segawa *s.n.* (KPM, photo G100108 in PoT). Note: TAI122351 (Nantou: Lienhuachih, 600–700 m. Aug. 1, 1975, T.P. Lin 182) was the original specimen I presented in the Native Orchid of Taiwan (1975, p44) and is badly damaged. Here I designated two well-preserved specimens in TFR as type.

●朱紅冠毛蘭/花蓮捲瓣蘭

Bulbophyllum hirundinis (Gagnep.) Seidenf. var. *pinlinianum* W.M. Lin, Wild Orch. Taiwan, Ill. Guide 148 and photo 2014. *nom. nud.*

Note: *B. karenkoensis* was mistaken as *B. remotifolium* (Biol. Mag. 10: 36 1973) in Native Orch. Taiwan (Lin 1975). *B. remotifolium* is characterized by distant pseudobulbs, 2–3 cm apart, small flower, violate-black veins in basal or lower lateral sepals, whereas *B. karenkoensis* is characterized by aggregate pseudobulbs, larger flower and doesn't have violate-black veins. From numerous living plants and available photos, I consider that aggregate but not distant pseudobulbs is a stable property of *B. karenkoensis*. Unfortunately, type of *B. remotifolium* (*J. Ohwi 4710*) could not be found in TAI or TI.

Bulbophyllum karenkoensis var. *puniceum* (T.P. Lin & Y.N. Chang) T.P. Lin *comb. nov.*, *Bulbophyllum hirundinis* var. *puniceum* T.P. Lin & Y.N. Chang, *Taiwania*, 58(4): 260–261. 2013. **Type:** Taiwan: Taoyun: Xicun, Northern Cross-Island Highway, 800 m, Jun. 2013, cult. to flower, Liangzu Chang *s.n.* (holo. TAI283127). ●張氏捲瓣蘭

Bulbophyllum hirundinis var. *rubriflorum* W.M. Lin, Wild Orch. Taiwan, An Ill. Guide 149 and photo 2014. *nom. nud.* Note: This plant also has vermilion flowers.

Bulbophyllum kuanwuensis S.W. Chung & T.C. Hsu, *Taiwania* 51(2): 139–142, f.1–5. 2006. **Type:** Taiwan: Hsinchu: Kuanwu, 2000 m. epiphytic on *Tsuga chinensis*, Jul. 11, 2004, Hsu 500 (holo. TAI277952). ●觀霧豆蘭

Bulbophyllum kuanwuensis S.W. Chung & T.C. Hsu var. *luchuensis* T.P. Lin & W.M. Lin, *Taiwania* 54(4): 325–326, f.2C. 2009. **Type:** Taiwan: Nantou: Luchushan, 2170 m, Aug. 11, 2005, Wei-Min Lin *s.n.* (holo. TAI256487).

●克森豆蘭

Bulbophyllum kuanwuensis S.W. Chung & T.C. Hsu var. *rutilum* T.P. Lin & W.M. Lin, *Taiwania* 54(4): 327, f.2D. 2009. **Type:** Taiwan: Nantou: Luchushan, 2140 m, Mar. 6, 2008, Wei-Min Lin *s.n.* (holo. TAI268961). ●石仙桃豆蘭

Bulbophyllum macraei (Lindl.) Rchb. f., *Ann. Bot. Syst.* 6: 263. 1861; Seidenf., *Dansk Bot. Arkiv* 29(1): 217, f.118. 1973; Lin, *Native Orch. Taiwan* 1: 50, photo 15–16. 1975. *Cirrhopetalum macraei* Lindl., *Gen. Sp. Orchid. Pl.* 59. 1830. **Type:** Ceylon: sine loc., *Macrae s.n.* (Herb. Lindl.). 一枝瘤/烏來捲瓣蘭

Bulbophyllum uraiense Hayata, *Icon. Pl. Formos.* 4: 50. 1914. **Type:** Taiwan: Urai, Jun. [1] 1912, *B. Hayata et S. Sasaki s.n.* (syn. TI, Photo T000887–890 in PoT). Specimen: Urai, May 13, 1912, *S. Sasaki s.n.* (TAIF6619); Urai, Jun. [1] 1912, *B. Hayata et S. Sasaki. [& 田中市二] s.n.* (TAI 032234).

Cirrhopetalum formosanum Rolfe, *Bull. Misc. Inform. Kew* 1914(10): 372–373. 1914. *Bulbophyllum formosanum* (Rolfe) Seidenf., *Dansk Bot. Arkiv* 29(1): 172. 1973. *Bulbophyllum formosanum* (Rolfe) Nakaj., *Biol. Mag. Okinawa* 10: 36. 1973. **Type:** Formosa. Plant without flower! *W. R. Price 1043* (syn. K000867018, & K000867019). Note: *C. formosanum* is described as follows: leaves reach 10 cm long and 4 cm wide, sepal and petal are not ciliate, flowers are straw-yellow with a deep yellow lip, and the scape is 9 cm long with few closely arranged umbellate flowers and pseudobulbs; this description seems to be highly consistent with that of *B. macraei*. I think K000867019 is most probably *B. macraei* because it has a long inflorescence scape, about 18 cm and long narrow lateral sepals. However, the description is strongly dissimilar with that of the K000867018, which shows oblong leaves that are 3.5 to 5 cm long and 1 cm wide, with pseudobulbs that are 3 to 4 cm apart, and inflorescence 7–8 cm long and bearing several flower bracts. No flowers is available; hence, this plant is most probably *B. retusiusculum* (sepal and petal are not ciliate) or *B. melanoglossum* (sepal and petal are ciliate).

Cirrhopetalum autumnale Fukuy., *Bot. Mag. (Tokyo)* 49(587): 760. 1935.

Type: Taiwan: [Pintung]: prope Botan-sya [牡丹], May 30, 1934, N. Fukuyama 4722 (KPM-NA0105521, photo T00023 in PoT).

Bulbophyllum tanegasimense Masam., *J. Geobot.* 16: 57. 1968. **Type:** Japan: Tanegasima, Kagosimaken, cult. Kagosima fl. 1927.

Bulbophyllum melanoglossum Hayata, *Icon. Pl. Formos.* 4: 49, pl.10. 1914; Lin, *Native Orch. Taiwan* 1: 52, photo17–18. 1975. **Type:** Taiwan: location not indicated, cult. Taipei (holo. TI, photo T00880 in PoT).

●紫紋捲瓣蘭

Cirrhopetalum striatum T.S. Liu & H.J. Su, *Quart. J. Taiwan Mus.* 24 (1–2): 176, pl. 3. 1971. **Type:** Taiwan: Taitung: Chi-pan (知本), 1200 m, Aug. 3, 1970, H.J. Su 380 (holo. NTUF, photo F00017991 in PoT). Mt. Ta-pu (大埔山) H.J. Su 268 (para.); Liu-kuei H.J. Su 272 (para.).

Bulbophyllum linchianum S.S. Ying, *Col. Ill. Indig. Orch. Taiwan* 1: 61. 1977. **Type:** Taiwan: Hualien: Taipalung, S.S. Ying 3510 (NTUF).

Bulbophyllum rubropunctatum S.S. Ying, *Col. Ill. Indig. Orch. Taiwan* 1(2): 75. 1977. ***Bulbophyllum melanoglossum*** var. *rubropunctatum* (S.S. Ying) S.S. Ying, *Col. Ill. Orch. Taiwan* 2: 415. 1990. **Type:** Taiwan: Hualien: Taipalung, 1100m, Feb. 4, 1975, S.S. Ying *s.n.*

Bulbophyllum omerandrum Hayata, *Icon. Pl. Formos.* 4: 50. 1914. *Cirrhopetalum omerandrum* Hayata *nom. nud.* in sched. *Cirrhopetalum omerandrum* (Hayata) Hayata, *Gen. Ind. Fl. Formos.* 76 1917. **Type:** Taiwan: Mt. Arisan: Heishana, 6000 ped. May 11, 1914, *B. Hayata et Takeo Ito s.n.* (holo. TI, photo T00881 in PoT).

●毛藥捲瓣蘭

Bulbophyllum pauciflorum Ames, *Philipp. J. Sci.*, C, 7: 132. 1912; X. Chen *et al.*, *Fl. China* 25: 437. 2009. **Type:** Philippines: Luzon: Bontoc Subprovince, 1650 m, Aug. 17, 1911, *F.M. Vanoverbergh 1381* (holo. AMES00105775). Note: The original description is highly consistent with that of *B. riy anum*.

非豆蘭

Bulbophyllum riy anum Fukuy., *Bot. Mag. (Tokyo)* 49(586): 668–669. 1935. **Type:** Taiwan: Taipei, Mt. Syoagyokusan [小阿玉山], Jan. 17, 1935, *K. Segawa et N. Fukuyama s.n.* (holo. KPM-NA0105506 without Fukuyama's no., photo T00016 in PoT).

Bulbophyllum pectinatum Finet, *Bull. Soc. Bot. France* 44: 268. 1897; Seidenf., *Dansk Bot. Arkiv* 33(3): 25, f.9. 1979; Su, *Fl. Taiwan*, 2nd edit. 5: 771. pl. 328. 2000. **Type:** China: Yunnan, entre Mienning et Yung-Chan, 1894–1895, *H. d'Orléans s.n.* (holo. P00252785). 百合豆蘭/阿里山豆蘭

Bulbophyllum transarisanense Hayata, *Icon. Pl. Formos.* 6: 73. 1916; Masam., *J. Geobot.* 17(2): pl.149. 1969. ***Bulbophyllum viridiflorum sensu*** Hayata, *Icon. Pl. Formos.* 2: 133–134. 1912.



non Schltr. *Bulbophyllum pectinatum* var. *transarisanense* (Hayata) S.S. Ying, Mem. Coll. Agric. Natl. Taiwan Univ. 29: 51. 1989.

Type: Taiwan: Mt. Arisan, Jan. 1912, *B. Hayata et S. Sasaki s.n.*
Bulbophyllum transarisanense Hayata f. *alboviride* Fukuy., List Vasc. Pl. Taiwan 167. 1954. *nom. nud.*

Bulbophyllum pingtungense S.S. Ying & S.C. Chen, Col. Ill. Fl. Taiwan 1: 499. 1985. *Cirrhopetalum pingtungense* (S.S. Ying & S.C. Chen) Garay, Hamer & Siegerist, Nordic J. Bot. 14: 621. 1994. **Type:** Taiwan: Pingtung: Nanjenshan, 450 m. Apr. 1983, *S.C. Chen s.n.* (iso. NTUF, photo F00008282 in PoT). 屏東捲瓣蘭

Bulbophyllum wightii auct. non Reichb. f.: Su in Quart. J. Chin. For. 20(4): 97, pl. 1. 1987. Specimen: Luliaoichi, *Su 6919 & Su 7029* (NTUF).

Bulbophyllum remotifolium (Fukuy.) K. Nakaj., Biol. Mag. 10: 36 1973. *Cirrhopetalum remotifolium* Fukuy., Bot. Mag. (Tokyo) 49(586): 669-670. 1935. *Bulbophyllum remotifolium* (Fukuy.) S.S. Ying, Bull. Exp. Forest Nation. Taiwan Univ. 114: 156 1974. **Type:** Taiwan: Karenko, Nogogoe, Sakahen, Jul. 1933, *J. Ohwi 4710* (not in TAI or TI). 間距捲瓣蘭

Note: *Bulbophyllum remotifolium* is an unknown species. *B. remotifolium* was reduced to synonym of *B. hirundinis* (Gagnep.) Seidenf. by Seidenfaden (1973). The type of *B. hirundinis*, *Balansa 2032*, has distant pseudobulbs on the rhizome as *B. remotifolium* has, but differs from *B. remotifolium* based on the front edge of the operculum, which has a densely long ciliate (see Seidenf. 1973). *B. remotifolium* is characterized by distant pseudobulbs, small flower, violate-black veins in basal or lower lateral sepals, very slender rhizome only 0.65 mm in diameter, orange-red flower. It looks some variety of the *B. albociliatum* is able to meet these criteria.

Bulbophyllum retusiusculum Rchb. f., Gard. Chron. 1869: 1182. 1869; Seidenf., Dansk Bot. Ark. 29(1): 195, f.106-108. 1973; T.P. Lin, Native Orch. Taiwan 1: 60, photo 21-22. 1975. **Type:** Burma: Bhamo, Moulmein, Benson *Veitch 93* (Herb. Reichenb.). Nepal, 1819, stored under *Cirrhopetalum wallichii* (Lindl.) Rchb.f. (iso. BM000516919). 黃萼捲瓣蘭

Bulbophyllum flavisepalum Hayata, Icon. Pl. Formos. 2: 131-132. 1912; Masam., J. Geobot. 17(2): pl.148. 1969. **Type:** Taiwan: Arisan, prope Taroyen [哆羅焉], Jan. 1912, *B. Hayata et S. Sasaki s.n.* (holo. TI, photo T00877 in PoT; iso. TAI 6605).

Bulbophyllum rubrolabellum T.P. Lin, Taiwania 20(2): 163. 1975; Ormerod, Taiwania 47(4): 240. 2002. **Type:** Taiwan: Miaoli: Yangmeishan (楊梅山), Oct. 25, 1972, *T.P. Lin 129* (holo. TAI 118097). 紅心豆蘭

Bulbophyllum fenghuangshanianum S.S. Ying, Col. Ill. Indig. Orch. Taiwan 2: 113-114. 1990. **Type:** Taiwan: Nantou: Fenghuang, May 1987, *S.S. Ying s.n.* (holo. NTUF).

Bulbophyllum setaceum T.P. Lin, Native Orch. Taiwan 1: 55-57, photo 25-27. 1975. **Type:** Taiwan: Miaoli: Guan-wu, Apr. 25, 1974, *T.P. Lin 99* (TAIF?). 鶴冠蘭

Bulbophyllum taitungianum S.S. Ying, Col. Ill. Indig. Orch. Taiwan 2: 111-112. 1990. **Type:** Taiwan: Taitung: Li-dou, May. 24, 1989, *S.S. Ying s.n.* (NTUF).

Bulbophyllum somae Hayata, Icon. Pl. Formos. 9: 109, f.37. 1920; Masam., J. Geobot. 19(1-2): pl. 166. 1971. **Type:** Taiwan: Taipei: Uraisha, Jun. 1916, *T. Soma s.n.* (holo. TI, photo T00885 in PoT). 狹萼豆蘭

Bulbophyllum drymoglossum auct. non Maxim. ex Okubo, Bot. Mag. (Tokyo) 1: 14, t.3. 1887; Lin in Native Orch. Taiwan 1: 40, photo 9. 1975.

Note: Hayata (1920) indicated that *B. somai* resembles *B. drymoglossum*, but is distinguishable from it because *B. somai* has substantially longer and narrower sepals. Moreover, *B. somai* has larger leaves (6- to 20-mm-long, 4- to 10-mm-wide), longer inflorescence (> 4 cm long), and larger flowers compared with *B. drymoglossum*, which has 7- to 13- mm-long and 5- to 10-mm-wide leaves, an inflorescence less than 2.5 cm in length, and considerably shorter sepals (7- to 8-mm-long), and short distance between leaves (6.4- to 8-mm-long). These can be observed from several publications in Japan, e.g., Maekawa 1971, Ohwi 1983, Hayakawa *et al.* 2014. Because we didn't observe continuous variations between these 2 entities, it is reasonable to consider that they are discretely differentiated in 2 independent landmass. We believe that *B. drymoglossum* Hayata subsp. *somai* is also suitable. Nakajima (1973) indicated that *B. drymoglossum* distributes in Amami-Oshima Island, Japan is the same type as mainland Japan but it is the *B. somai* type in Okinawa Island and southward.

Bulbophyllum taiwanense (Fukuy.) Seidenf., Dansk Bot. Ark. 29(1): 89. 1973; Liu & Su, Fl. Taiwan 5: 901. 1978. *Cirrhopetalum taiwanense* Fukuy., Bot. Mag. (Tokyo) 49(587): 761. 1935. *Bulbophyllum taiwanense* (Fukuy.) K. Nakaj., Biol. Mag. Okinawa 10: 36. 1973; Su, Fl. Taiwan 5: 774. 2000. **Type:** Taiwan: praef. Takao [Kaohsiung]: prope Botan-sya, collected by K. Segawa, Feb. 1934 cult. and flowering Mar. 1935, *N. Fukuyama 4731*. (iso. KPM-NA0105522, photo T00004 in PoT).

●台灣捲瓣蘭

Bulbophyllum tenuislinguae T.P. Lin & S.H. Wu, Taiwania 57(4): 377-378, f.1A & 2. 2012. **Type:** Taiwan: Miaoli: Mt. Hakanni, 1600 m. Mar. 22, 2012, *L.Z. Chang s.n.* (holo. TAI281142). 金枝雙花豆蘭
Bulbophyllum tokioi Fukuy., Bot. Mag. (Tokyo) 49(583): 439.1935. **Type:** Taiwan: Taipei: Mt. Kaposan prope Tonroku, 800 m. Apr. 26, 1933, *Suzuki-Tokio 4548*.

●小葉豆蘭

Bulbophyllum tokioi Fukuy. f. *alboviride* Fukuy., Bot. Mag. (Tokyo) 52(617): 246. 1938. **Type:** Taiwan: Hsinchu: Inoue [清泉(五峰)] 600 m. Collected by K. Segawa in Jan. 1, 1936, et floret in Apr. 1936. *N. Fukuyama 6102*. Specimen: *Fukuyama s.n.* Jul. 1936 (possible type KPM-NA0105507, photo T00002 in PoT).

Bulbophyllum derchianum S.S. Ying, J. Jap. Bot. 64(5): 148.1989. **Type:** Taiwan: Taichung: Derchi (德基) to Chingshan, 1500 m. May. 4, 1988, *S.S. Ying s.n.* (holo. NTUF, photo F00000331 in PoT).

Note: *B. tokioi* is similar to *B. hymenanthum* Hook. f. (Hook 1890), but differs in that it has relatively smaller leaves and flowers. *B. tokioi* has triangular lip blade, unlike the rectangular lip blade shown by Seidenfaden (1979, p.185, f.131). Moreover, the lip is nearly the same size as the petals of *B. hymenanthum*, whereas it is substantially larger than the petals of *B. tokioi*.

Bulbophyllum umbellatum Lindl., Gen. Sp. Orchid. Pl. 56. 1830; Seidenf., Dansk Bot. Arkiv 29(1):178, f.90. 1973; T.P. Lin, Native Orch. Taiwan 1: 66, photo 28-29. 1975. **Type:** Nepal: sine loc., *Wallichi 151* (Wall. Cat. 1984). 繖形捲瓣蘭

Bulbophyllum saruwatarii Hayata, Icon. Pl. Formos. 6: 72-73. 1916. **Type:** Taiwan: Nantou: Keitao, 4000 ped. Apr. [8], 1916, *B. Hayata [238]* (holo. TI, photo T00884 in PoT; iso. TAI 6611 & 6612). Specimen: Taiwan: Keitao, Apr. [11], 1916, *B. Hayata s.n.* (TAIF6610, *Cirrhopetalum saruwatarii* on the label). Note: Seidenfaden visited TI in 1972 and marked the following on the voucher label: I don't think this can be kept separate from *B. umbellatum*.



Calanthe alismifolia Lindl., Fol. Orchid. 6-7 (Calanthe): 8. 1855 ["*alismaefolia*"]; Garay & Sweet, Orch. S. Ryukyu Isl. 122. 1974; Liu & Su, Fl. Taiwan 5: 905. 1978. **Types:** India: Skkim, 2000 ft, *J.D. Hooker s.n.* (isosyn. BM000514443, & GH00106106); Khasia, 4000 feet, *J. D. Hooker and Thomson s.n.* **細點根節蘭**

Calanthe nigropuncticulata Fukuy., Bot. Mag. (Tokyo) 48(571): 437. 1934. **Type:** Taiwan: Miaoli, Higashi-sensui-zan [東洗水山], Jul. 1932, *N. Fukuyama 4133* (KPM-NA0105515 without collected no., photo T00020 in PoT); Kappanzan and Urai, Jul 15, 1931, *N. Fukuyama 4136* (para.).

Calanthe alpina Hook. f. ex Lindl., Fol. Orchid. 6-7 (Calanthe): 4. 1855. Su, Fl. Taiwan 2nd edit. 5: 780. 2000. **Type:** India: Sikkim, 8000-10000 ft, 1859, *J.D. Hooker & Thomson s.n.* (holo. MNHN-P-P00378785, also in Herb. J. Lindley no. 245; iso. GH00106107 & P00378785). **羽唇根節蘭**

Calanthe fimbriata Franch., Nouv. Arch. Mus. Hist. Nat. Paris, s. 2. 10: 86. 1888; King et Pantl., Ann. Bot. Gard. Calanthe 8: 170, pl. 229. 1898; Su, Quart. J. Expt. Forest. Natl. Taiwan Univ. 4(2): 152. 1990. **Type:** China: Sichuan, Moupin [Baoping 寶興], 1870, *A. David s.n.* (possible type, original description indicated a 1869 flowering individual).

Calanthe fimbriatomarginata Fukuy., Bot. Mag. (Tokyo) 48(569): 301. 1934. **Type:** Taiwan: Taipei: in silvis monte Mururoahu, inter Kyanraha et Saukan, prope Taihei-zan, 6000 ped. Jul. 3, 1933, *N. Fukuyama 3978*. not found.

Calanthe arcuata Rolfe subsp. *caudatilabella* (Hayata) T.P. Lin, **comb. nov.** *Calanthe caudatilabella* Hayata, Icon. Pl. Formos. 4:66. pl.13. 1914. **Type:** Taiwan: Nantou: Rinkihō [林杞埔, Chushan]: Gosarin, 7000 ped. Aug., 1912, *H. Inaba s.n.* (holo. TI, photo T00892 in PoT).

●尾唇根節蘭

Note: This species can be found at heights of up to 2700 m in Central Taiwan. Chen *et al.* (1999) is probably the first author to indicate that *C. arcuata* Rolfe (Rolfe 1896; **Type:** *A. Henry 6514*. China: Hubei, Hsingshan) also occurs in Taiwan. *C. arcuata* is similar to *C. caudatilabella*, but can be distinguished by the narrowly elliptic-lanceolate or narrowly lanceolate leaf blade, greenish sepal and petal, and white lip tinged purple at apex, whereas *C. caudatilabella* shows linear leaves, reddish-brown sepal and petal, and no purple patch in the labellum. These variations are not continuous and reflect discret geographical differentiation.

Calanthe arisanensis Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 327-328. 1911. **Type:** Taiwan: Arizan, Mar. 22, 1908, *T. Kawakami & U. Mori 3609* (TAIF 6546).

●阿里山根節蘭

Calanthe sasakii Hayata, Icon. Pl. Formos. 4: 71, f. 35. 1914. **Type:** Taiwan: Ako, Mt. Buyesan [武威山], Mar., 1910. *S. Sasaki s.n.* (holo. TI with lip figure on the label, photo T00903 in PoT; iso. TI with photo T00902 in PoT, TAIF 6585). Specimen: Pintung: Buyesan, Mar. 2, 1920, *S. Sasaki s.n.* (TAIF6586).

Calanthe aristulifera Rchb. f., Bot. Zeitung (Berlin) 36: 74. 1878; Liu & Su, Fl. Taiwan 5: 906, f.1557. 1978. **Type:** Japan: Satsuma, May 2, 1875, *J.J. Rein 187* (holo. GOET013925). **潤葉根節蘭**

Calanthe kirishimensis Yatabe, Bot. Mag. (Tokyo) 6: 253 1893. *Calanthe elliptica* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 329. 1911. **Type:** Taiwan: Shintiku: Gakokei [鶉公髻山], Apr. 1908, *T. Kawakami et K. Watanabe s.n.* (holo. TI, photo T00895 in PoT).

Calanthe raishaensis Hayata, Icon. Pl. Formos. 6: 77-78. 1916. *Calanthe furcata* f. *raishaensis* (Hayata) M.Hiroe, Orchid Flowers 2: 88. 1971. **Type:** Taiwan: Raisha [來義], 1000 m. Mar. 1914, *U. Faurie 905* (holo. TI, photo T00904 in PoT; iso. HAST111711 & KYO photo T01666 & T01667 in PoT.).

Calanthe davidii Franch., Nouv. Arch. Mus. Hist. Nat., sér. 2, 10: 85. 1888; Lang & Tsi, Icon. Corm. Sin. 5: 725, f.8279. 1976; Su, Quart. J. Expt. Forest. Natl. Taiwan Univ. 4(3): 149, pl.5. 1990. **Type:** China: Province de Moupin [Baoping 寶興]. 1870, *A. David s.n.* (holo. P00378879, iso. P00378880). **長葉根節蘭**

Calanthe matsudae Hayata, Icon. Pl. Formos. 9: 112, f.38, 39. 1920. **Type:** Taiwan: Taoyuan: Rarazan, Jul. [27], 1918, *Y. Matsuda [Eizi Matuda T401]* (holo. TI, photo T00901 in PoT; iso. TAI 118704, TAIF6591)

Calanthe × *dominyi* Lindl., Gard. Chron. 1858: 4. 1858; Su, Quart. J. Expt. Forest. Natl. Taiwan Univ. 4(2): 148. pl. 3. 1990. **Type:** Original description indicated this plant was obtained from Mr. J. Veitch, of the Exotic Nursery, Chelsea in Oct. 28, 1856. The flower carried features of both *C. furcata* and *C. masuca*.

長距白鶴蘭

Calanthe kintaroi Yamam., J. Soc. Trop. Agric. 6(3): 550.1934. **Type:** Taiwan: Mt. Arisan, cult. & fl. Jun. 1933. *Y. Yamamoto s.n.*, not found. *Calanthe albolongicalcarata* S.S. Ying, Bull. Exp. For. Natl. Taiwan Univ. 114: 155. 1974. **Type:** Taiwan: Urai, 700-800 m, Sept. 16, 1973, *S.S. Ying 2106* (holo. NTUF, photo F00000320 in PoT). Note: The habit of this hybrid resembles that of *C. seikooensis* (= *Calanthe masuca*) and *C. arisanensis*, but the flowers resemble those of *C. furcata*.

Calanthe graciliflora Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 329-330. 1911. **Type:** Taiwan: Yilan: Nano [南澳], Kimmonsha, 3200 ped, Apr. 1909, *U. Mori 15* (holo. TI, photo T00897 in PoT)

纖花根節蘭

Calanthe × *hsinchuensis* Y.I. Lee, Bot. Stud. 54: 25. 2013. **Type:** Taiwan: Hsinchu: Jiashih Township, Niao Zui Shan, 1500 m, Mar. 25, 2008, *Y.I. Lee 200902*, (holo. TNM). Note: Hybridization occurs naturally between *C. arisanensis* and *C. sieboldii*.

●新竹根節蘭

Calanthe kinabaluensis Rolfe, J. Linn. Soc., Bot. 42: 156. 1914; W.M. Lin, Wild Orch. Taiwan, An Ill. Guide 208 and photo 2014. **Type:** Borneo: Kinabalu, Lobang, 5000 ft, Feb. 1910, *Gibbs 4108* (holotype K000364294). Flowers orange-yellow.

黃曉距根節蘭

Calanthe × *kibanakirishima* F. Maek. Wild Orchids of Japan in Colour 363. 1971.

Calanthe masuca (D. Don) Lindl., Gen. Sp. Orch. 249. 1833; Liu & Su, Fl. Taiwan 5: 912. 1978. *Bletia masuca* D. Don, Prodr. Fl. Nepal 30. 1825. **Type:** Nepal: Harain Letty, Feb. 21, 1803, *F. Buchanan-Hamilton s.n.* (holo. BM000514496; iso. K-Wall).

長距根節蘭

Calanthe sylvatica auct. non (Thouars) Lindl.: J.B. Comber, Orchids Java 96. 1990; Seidenf. & Wood, Orch. Penins. Malaya Singap. 167. 1992; H.J. Su, Fl. Taiwan 5:789. 2000.



- Calanthe textori* Miq., Ann. Mus. Bot. Lugduno-Batavum 2: 204. 1866; Lin, Native Orch. Taiwan 1: 96, photo 47-48. 1975. **Type:** Japan: *Textor s.n.* (holo. L0062120).
- Calanthe longicalcarata* Hayata ex Yamam., Trans. Nat. Hist. Soc. Taiwan 20: 39. 1930. **Type:** Taiwan: Taichung: Hosha. Mar. 27, 1908, *T. Kawakami* & *U. Mori s.n.* (holo. TAI22311; iso. TI, photo T00898 in PoT, Line drawing on both types showed lip)
- Calanthe seikooensis* Yamam., J. Soc. Trop. Agric. 3(3): 237, f.1. 1931. **Type:** Taiwan: Taitung: Seikoozan [成廣澳山], 3700 ped. Aug. 1931, *Y. Yamamoto s.n.* (holo. TAI18705, Line drawing on the label).
Note: *Calanthe masuca* was recognized as a separate species, but is not conspecific with African *Calanthe sylvatica*, according to Vaddhanaphuti (2005 p. 52) and Pedersen *et al.* (2014).
- Calanthe puberula* Lindl., Gen. Sp. Orch. 252. 1833; Su, Quart. J. Expt. Forest. Natl. Taiwan Univ. 4(3): 151, pl. 9. 1990. *Calanthe reflexa* var. *puberula* (Lindl.) Kudo, J. Soc. Trop. Agric. 2: 236. 1930. **Type:** NE. India: Sylhet, collector: F. De Silva, Wallich Cat. no. 7342 (holo. K001127201). 反捲根節蘭**
- Calanthe reflexa* Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersbourg 18: 68. 1873; Hayata, Icon. Pl. Formos. 4:71, f.34. 1914. **Type:** Japan: Kiusiu: Nagasaki, Wunzen, 1863, *C.J. Maximowicz s.n.* (lectotype LE; syn. GH00106359, LE, & P00392472).
- Calanthe reflexa* var. *formosana* Murata, Acta Phytotax. Geobot. 19: 71. 1962. **Type:** Taiwan: Mt. Nankotaizan, Ekijukei to Kiritto, Jul. 17, 1933, *J. Ohwi 3900* (KYO).
Note: Su (1990) considered *C. reflexa* to be conspecific with *C. puberula* Lindl. and checked the outer surface of the sepals of Taiwan's plants, ranging from glabrous to sparsely puberulent.
- Calanthe striata* R. Br. ex Lindl., Gen. & Sp. Orch. Pl. 251. 1833; P. Cribb & C. Bailes, Curtis's Bot. Mag. 104, pl.418. 2002. *Limodorum striatum sensu* Banks, Icon. Kaempfer. t.2. 1791, non Thumb 1784. **Type:** Based on Kaempfer's illustration (Cribb & Bailes, Curtis's Bot. Mag. 18(2): 104. 2002). 黃根節蘭**
- Calanthe sieboldii* Decne., Rev. Hort. ser. 4, 4: 381, f. 20. 1855.
Calanthe striata R. Br. ex Lindl. var. *sieboldii* (Decaisne ex Regel) Maximowicz, Bull. Acad. Imp. Sci. Saint-Petersburg 8: 641. 1872; Lin, Native Orch. Taiwan 1: 94, photo 46. 1975. **Type:** Japan: Jan. 1, 1863, *C.J. Maximowicz s.n.* (iso. GH00106364).
- Calanthe kawakamii* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 330-331. 1911. **Type:** Taiwan: Shintiku: Gakokeizan [鶉公髻山], Apr. 1907, *T. Kawakami et K. Watanabe s.n.* (holo. TI, photo T00896 in PoT).
- Calanthe tricarinata* Lindl., Gen. Sp. Orchid. Pl. 252. 1833; Lin, Native Orch. Taiwan 1: 98, photo 49-50. 1975; P. Cribb & C. Bailes, Curtis's Bot. Mag. 95, pl.416. 2002. **Type:** Nepal: Mt. Vallis, Jul. 1821, *Wallich 7339* (holo. K001127196). 綉邊根節蘭**
- Calanthe lamellate* Hayata, Icon. Pl. Formos. 4: 70, f.33. 1914.
Paracalanthe lamellata (Hayata) Kudô, J. Soc. Trop. Agric. 2: 237. 1930. **Type:** Taiwan: Taitung, Mt. Rontabun, Apr. 17, 1910, *U. Mori s.n.* (holo. TI, photo T00899 in PoT).
- Calanthe triplicata* (Willemet) Ames, Philipp. J. Sci., C. 2:326. 1907; Liu & Su, Fl. Taiwan 5: 915. 1978. *Orchis triplicata* Willemet, Ann. Bot. (Usteri) 18: 52. 1796. *Calanthe veratrifolia* R. Br. ex Ker Gawl., Bot. Reg. 9: pl. 720. 1823 *nom. illeg. superfl.*; Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 92. 1896. **Lectotype:** Maluku, Amboina, icon. in Rumphius, Herb. Amb. 6: t.52, f.2. Specimen: Taiwan: South cape, *A. Henry 1327*. 白鶴蘭**
- Calanthe furcata* Bateman ex Lindl., Bot. Reg. 24. 1838; Sasaki, List Pl. Formosa 122. 1928; Masam., J. Geobot. 19(4): pl.172. 1971. **Type:** Philippines: *Cuming s.n.*, in Herb. J. Lindley.
- Calanthe rubicallosa* Masam., J. Geobot. 23(2): t.7. 1975. *nom. nud.* Note: The figure legend mentions that this plant is a larger type of *C. furcata*. No other description is provided.
- Calanthe triplicata* (Willemet) Ames f. *purpureoflora* S.S. Ying, Col. Ill. Indig. Orch. Taiwan 2: 127. 1990. 200-900 m. no Type.
- Cephalanthera alpicola* Fukuy., Bot. Mag. (Tokyo) 52(617): 242. 1938; Masam., J. Geobot. 14(1): pl.109. 1965. **Type:** Taiwan: Karenko; Gokwan-zan [合歡山], collected by K. Segawa, Jun. 16, 1935, *N. Fukuyama 5915* (holo. KPM-NA0105517 without Fukuyama's no., photo T0005 in PoT); Taityu, Tataka et Niitaka-sita, *N. Fukuyama 5998* (paratype KPM without Fukuyama's no., photo G00241 in PoT); Taihoku, Mt. Nanko-taizan, Jun 1, 1935, *J. Ohwi 2584* (para.). 高山頭蕊蘭/高山金蘭**
- Cephalanthera taiwaniana* S.S. Ying, Mem. Coll. Agric. Natl. Taiwan Univ. 28(2): 37, pl.3, photo 7-8. 1988. **Type:** Taiwan: Tayulin (大禹嶺) Ho-huan-chi, 2350 m, May. 12, 1988, *S.S. Ying s.n.* (holo. NTUF, photo. F00000344 in PoT). 高山立花蘭**
Note: This species is different from *C. alpicola* because it has a slightly undulated rounded midlobe with 5-7 lamellae. I believe that this might be conspecific with Japanese *C. erecta* (Thunb.) Blume.
- Cephalantheropsis dolichopoda* (Fukuy.) T.P. Lin, Taiwania 59: 363. 2014. *Calanthe dolichopoda* Fukuy., Bot. Mag. (Tokyo) 49(581): 296. 1935. **Type:** Taiwan: Taipei: prope Shinten, Daitoozan[大桶山], Nov. 10, 1933, *N. Fukuyama 4536* (KPM-NA0105513, photo T00018 in PoT). 白花肖頭蕊蘭**
- Phaius longipes* (Hook. f.) Holtt. var. *calanthoides auct. non* (Ames): T.P. Lin in Native Orch. Taiwan 1: 232. 1975. Specimen: Taiwan: Urai., *T.P. Lin 58*.
Note: Fukuyama (1935) observed that this species resembles *Calanthe gracilis*, *C. venusta* and *C. kooshunensis*, but it does not resemble any of these species in its floral characteristics.
- Cephalantheropsis halconensis* (Ames) S.S. Ying, Col. Ill. Fl. Taiwan 3: 622. 1988. *Phaius halconensis* Ames Philipp. J. Sci., C 2: 323 1907. **Type:** Philippines: Mindora Isl., Mt. Halcon, 1951 m., Nov. 16, 1906, *E.D. Merrill 5513* (holo. AMES00102891, iso. NMNH 710763.2138713 & K000829037). Specimen: Taiwan: Taitung: Mt. Tulan, Jan. 3, 1989, *J.L. Tseng 11505* (TAIF61141). 細葉肖頭蕊蘭**
- Calanthe kooshunensis* Fukuy., Annual Rep. Taihoku Bot. Gard. 3: 85. 1933. **Type:** Taiwan: Pingtung: prope Kooshun, Manritoku-zan [萬里得山], Jan. 1, 1932, *N. Fukuyama 4101* (holo. KPM-NA0105514, photo T00019 in PoT)
Note: Fukuyama indicated that this species resembles *Calanthe gracilis* Lindl. and *C. venusta* Schltr., but the plant is substantially smaller, the column is slenderer, and the margin of the midlobe does not undulate at all. These characteristics are highly consistent with those of *Cephalantheropsis halconensis*.
- Cephalantheropsis longipes* (Hook. f.) Ormd., Orchid Digest 62: 156. 1998; T.P. Lin, Taiwania 59: 360, figs. 1A, 2A & 3. 2014. *Calanthe longipes* Hook.f., Fl. Brit. India 6: 195 1890. *Phaius longipes* (Hook. f.) Holttum, Gard. Bull. Singapore 11: 286. 1947. **Type:** India: Sikkim, *King s.n.* (BM?). Taiwan: Tahanshan, Dec. 5, 2012, *Shyh-Shiarn Lin s.n.* (TAI282147). 三伯肖頭蕊蘭**



Phaius mindorensis Ames, Philipp. J. Sci., C 2: 324. 1907. **Type:** Philippines: Mt. Haleon, Nov. 13, 1906, *E.D. Merrill 5612* (holo. AMES00056715).

Phaius calanthoides Ames, Orchidaceae 2: 153. 1908. **Type:** Philippines: Benguet: Luzon, Baguio, Oct. 25, 1904, *R.S. Williams 1947* (syn. NY9150-9151; isosyn. NMNH707721.2093069 & AMES 00102888); Feb 1903, *D.L. Topping 20* (syn.).

Note: This species, but not *C. dolichopoda*, can be found in Lanyu.

Cephalantheropsis obcordata (Lindl.) Ormerod, Orchid Digest 62: 157. 1998. *Bletia obcordata* Lindl., Gen. Sp. Orchid. Pl. 123. 1831. **Type:** Bangladesh: Sylhet, *Wallich s.n.* (K-LINDL).

綠花肖頭蕊蘭

Calanthe gracilis Lindl., Gen. Sp. Orchid. Pl. 251. 1833.

Cephalantheropsis gracilis (Lindl.) S.Y. Hu, Quart. J. Taiwan Mus. 25: 215. 1972. **Type:** Bangladesh: Sylhet, *F. De Silva s.n.*, *Wallich Cat. no. 7341* (syn. K001127199, & K001127200). Specimen: Taiwan: Nantou: Rengechi [蓮華池], Dec. 1927, *S. Sasaki 40053* (TAI032353).

Phaius longipes auct. non (Hook. f.) Holttum: Lin, Native Orch. Taiwan 1: 230, photo 143-144. 1975.

Chamaeanthus wenzelii Ames, Orchidaceae 5: 200. 1915; Hsieh, Quart. J. Taiwan Mus. 8: 224. 1955. **Type:** Philippines: Island of Leyte, 1913, *Wenzel, C.A. 110* (holo. GH00106681; iso. AMES00106682, K000891328, & MO 2140466). Specimen: Taiwan: Lanyu, Jun. 14, 1926, *S. Sasaki s.n.* (TAI032225, This specimen was renamed as *ThrixspERMUM fantasticum* by T.C. Hsu on the label. Unknown species).

威氏細花蘭

Note: This plant has long and narrow leaves.

Cheirostylis chinensis Rolfe, Ann. Bot. (Oxford) 9(33): 158. 1895; A. Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 92. 1896. **Type:** South of Taiwan, Jan. 26, 1887, *A. Hance 390* (Lectotype designed here: K000942815); Takow, Summit of Ape's Hill, *A. Henry 320* (syn. K000942816, & NY8644). **台灣指柱蘭/中國指柱蘭**

Cheirostylis taiwanensis Yamam., J. Soc. Trop. Agric. 5(1): 54. 1933. **Type:** Taiwan: Pingtung: Kusukusu [高士佛], Jan. 1, 1929, *Y. Kudo & S. Suzuki 16016* (holo. TAI118708)

Note: *Hance 390* and *Henry 320* are in the same voucher specimen. Herein, we designate *Hance 390* (K000942815) as a lectotype of *C. chinensis*.

Cheirostylis chinensis var. *clibborndyeri* (S.Y. Hu & Barretto) T.P. Lin, *com. nov. Cheirostylis clibborndyeri* S.Y. Hu & Barretto, Chung Chi J. 13(2): 15. 1976; Ormerod, Taiwania 47(4): 240. 2002. **Type:** Hong Kong: Victoria Peak, Mar. 6, 1973, collected by R. Clibborndyer, *S.Y. Hu 13055* (holo. K000942814; iso. A, CUHK, PE PE00271157, HK, Harvard Univ. barcode-00106686).

斑葉指柱蘭

Cheirostylis hungyehensis T.P. Lin, Native Orch. Taiwan 2: 73, photo 19-20. 1977. **Type:** Taiwan: Taitung: Hungyeh village.

Y.P. Young & S.Y. Lu 5089 (TAIF), not found.

Note: Ormerod (2002) considered this species to be conspecific with *C. clibborndyeri*.

Cheirostylis liukuensis Masam., J. Soc. Trop. Agric. 2(1): 36. 1930; Lin, Native Orch. Taiwan 2: 78, photo 23-24. 1977. **Type:** Ryukyu: Insula Uchina [Kunigami], *S. Sonohara s.n.* (holo. TAI118707). Specimen: Taichung: Erkengshan [二崙山] (TAI267960); Nantou: Shenmutsun (TAI282766)

墨綠指柱蘭

Cheirostylis liukuensis var. *derchiensis* (S.S. Ying) T.P. Lin, *com. nov. Cheirostylis derchiensis* S.S. Ying, Mem. Coll. Agric. Natl. Taiwan Univ. 31(1): 20, photo 1-2. 1991. **Type:** Taiwan: Taichung: Derchi Dam, 1400 m, Apr. 4, 1991, *S.S. Ying s.n.* (holo. NTUF, photo F00008281 in PoT). A peloric of *C. liukuensis*.

●德基指柱蘭

Cheirostylis monteiroi S.Y. Hu & Barretto, Chung Chi J. 13(2): 15, f.7. 1976. **Type:** Hong Kong: Mt. Violet, Mar. 6, 1973, *S.Y. Hu 13056* (holo. K000942813; iso. AMES00106687, CUHK, HK, P, US); May 17, 1972, *R. Clibborn-Dyer s.n.* (para. AMES00556371); Mt. Parker, U. A on Herb. HK 7133 (para. HK).

雄尾指柱蘭

Cheirostylis cochinchinensis auct. non Blume: Leou, Quart. J. Expt. Forest. Natl. Taiwan Univ. 3(4): 119, f.1-3. 1989. Specimen: Taichung: in between Guguan and Chiabaotai, 700-1000 m, *C.S. Leou 3681, 3743*.

Cheirostylis taichungensis S.S. Ying, Col. Ill. Indig. Orch. Taiwan 2: 135-136. 1990. **Type:** Taiwan: Taichung: Tashiehshan, May. 25, 1987, *S.S. Ying s.n.* (NTUF).

Note: I do not consider *C. cochinchinensis* Blume (Blume 1858) to be conspecific with *C. monteiroi*, because the type specimen (*Gaudichaud 62*) of *C. cochinchinensis* is characterized by substantially broader petals (Seidenf. 1978 & 1992), and the epichile of lip has 20 long laciniae compared with 14 elongate triangle laciniae in *C. monteiroi*.

Cheirostylis octodactyla Ames, Philipp. J. Sci., C, 2: 314. 1907; Ormerod, Taiwania 47(4): 241. 2002. **Type:** Philippines: Mt. Halcon, Mindanao, 8200 ft, Nov. 22, 1906, *E.D. Merrill 5834* (holo. AMES00106688; iso. K000942807)

羽唇指柱蘭

Cheirostylis inabai Hayata, Icon. Pl. Formos. 4: 108, f.56. 1914. **Type:** Taiwan: Rinkoho, 5000 ped. Aug. 19, 1911, *H. Inaba s.n.* (holo. TI, photo T00908 in PoT).

Cheirostylis oligantha Masam. & Fukuy., Trans. Nat. Hist. Soc. Taiwan 30(200-201): 241. 1940. **Type:** Taiwan: Nantou: Musya [霧社山地農場], Aug. 1, 1939, *G. Masamune et K. Mori [& T.Nakamura] 2220* (holo. KPM-NA0105520 without collection no., photo T0009 in PoT).

Cheirostylis rubrifolius T.P. Lin & W.M. Lin, Taiwania 54: 327, f.2E & 3. 2009. **Type:** Taiwan: Pingtung: Shantimen, Feb. 16, 2009, *Wei-Min Lin s.n.* (holo. TAI268960). Rare and unique species.

●紅衣指柱蘭

Cheirostylis takeoi (Hayata) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 171. 1919. *Arisanorchis takeoi* Hayata, Icon. Pl. Formos. 4: 110, pl. 57. 1914; Masam., J. Geobot. 16(4): pl.144. 1968. **Type:** Taiwan: Chiayi: Arisan, inter Karapin [交力坪] et Suisharyo, 3300 ped., Mar. 28, 1914, *Takeo Ito [伊藤武夫] s.n.* (TI, photo T00906 in PoT with Hayata's hand-writing. This was collected by U. Mori and the date on label was Mar. 27, 1914).

全唇指柱蘭

Cheirostylis tatewakii Masam., J. Soc. Trop. Agric. 4(2): 195. 1933.

Type: Taiwan: Taroko, Mar. 14, 1932, *Tatewaki et Kitamura s.n.*

Cheirostylis tortilacinia C.S. Leou, Quart. J. Exp. Forest, NTU. 4(4): 71-76, f.1-2. 1990. *Cheirostylis chinensis* Rolfe var. *tortilacinia* (C.S. Leou) S.S. Ying, Col. Ill. Orch. Taiwan 1: 224. 1996. **Type:** Taiwan: Nantou: Hoshe, 1000 m., *C.S. Leou 4143*. not found. **●和社指柱蘭**



Chiloschista parishii Seidenf., Opera Bot. 95: 176. 1988; T.P. Lin & W.M. Lin, Taiwania 54 (4): 328, f.4. 2009. **Type:** Burma: Mouimein, Parish 55 (K000894349), Herb. Reichenbach 11583, 26237. Note: Specimen in Taiwan is not available.

寬囊大蜘蛛蘭

Note: This plant is similar to *C. segawae* in every aspect, but exhibits a round sac instead of the conical sac exhibited by *C. segawae*. This plant is distributed from E. Nepal to Indochina

Chiloschista segawae (Masam.) Masam. & Fukuy., Bot. Mag. (Tokyo) 52: 247. 1938. *Sarcohilus segawae* Masam., Trans. Nat. Hist. Soc. Taiwan 24(132): 212. 1934. **Type:** Taiwan: Miaoli: Taikogun [大湖郡], Mapiruri [麻必浩], Jul. 6, 1933, *Segawa s.n.* (holo. KPM- NA0105603, photo T00080 in PoT; iso. KPM- NA0105617, photo T00081 in PoT)

大蜘蛛蘭

Chiloschista segawae var. *taiwaniana* S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 107. 1977. **Type:** Taiwan: Nantou: Hosheh, S.S. Ying 2430 (NTUF), not found.

Chiloschista hoi S.S. Ying, Quart. J. Exp. Forest, NTU. 1(1): 89. 1987. **Type:** Taiwan: Taichung, Jun. 1986, *F.S. Ho s.n.* (NTUF), not found.

Chrysoglossum ornatum Blume, Bijdr., Fl. Ned. Ind. 7: 338. 1825; Lin, Native Orch. Taiwan 1:106, photo 55. 1975. **Type:** Java: in sylvis Salak ad ripas Tjapus, *C.L. Blume s.n.* (holo. L0360184).

金蟬蘭

Chrysoglossum formosanum Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 318-319. 1911. **Type:** Taiwan: Nanto: Tokunkei, Jul. [30] 1907, *Kawakami & U. Mori 3490* (holo. TI, photo T00907 in PoT).

Cleisostoma paniculatum (Ker Gawl.) Garay, Bot. Mus. Leaf. Harv. Univ. 23: 173. 1972; T.P. Lin, Native Orch. Taiwan 2: 82, photo 26-27. 1977. *Aerides paniculata* Ker Gawl., Bot. Reg. 3: t.220. 1817. **Type:** China: cult. Smallberry-Green, London, *J. Banks* (LINN?).

虎紋隔距蘭

Cleisostoma formosanum Hance, J. Bot. 22: 364. 1884. *Sarcanthus formosanus* (Hance) Rolfe, J. Linn. Soc., Bot. 36(249): 37. 1903. **Type:** Taiwan: Taipei: Tamsui, Jun. 1884, *C. Ford s.n.* (BM000539543). Specimen: Kelung, Jun. 1884 and cult. Jul. 12, 1884, *C. Ford 93* (K000942295).

Sarcanthus fuscomaculatus Hayata, Icon. Pl. Formos. 4: 94, f. 48. 1914. *Cleisostoma fuscomaculatum* (Hayata) Garay, Bot. Mus. Leaf. 23: 171. 1972. *Garayanthus fuscomaculatus* (Hayata) Szlach., Ann. Bot. Frnnci 40: 69. 2003. **Type:** Taiwan: location not indicated, [Jul. 1, 1913], cult. [in Taipei] (holo. TI with Hayata's hand writing, photo T01192 in PoT).

Cleisostoma uraiensis (Hayata) Garay & Sweet, Orchids S. Ryukyu Isl. 156. 1974. *Sarcanthus uraiensis* Hayata, Icon. Pl. Formos. 8: 130, f. 58. 1919. **Type:** Taiwan: Taipei: Urai, *B. Hayata s.n.* (holotype TI, photo T01194 in PoT). [Wrong location].

綠花隔距蘭

Sarcanthus viridescens Fukuy., Bot. Mag. (Tokyo) 50(589): 24. 1936. **Type:** Taiwan: Koto-syo [Lanyu], prope Imaururu [紅頭村], 200 m. Jul. 7, 1934. *N. Fukuyama 4818* (holo. KPM-NA0105577 without Fukuyama's no., photo T00040 in PoT); prope Irararai, 100m. Jul. 29, 1934, *N. Fukuyama 4819* (para. KPM without Fukuyama's no. photo G00845 in PoT); Kotozan, Jul 1934, *N. Fukuyama 4820* (para.).

Collabium chinense (Rolfe) T. Tang & F.T. Wang, Fl. Hainan. 4: 217, f.1101. 1977; Seidenf., Opera Bot. 72: 24, f.8. 1983; Su, Quart. J. Chin. Forest. 22(2): 24, pl. 4. 1989. *Nephelaphyllum chinense* Rolfe, Kew Bull. 194. 1896. *Collabiopsis chinensis* (Rolfe) S.S. Ying, Col. Ill. Orch. Taiwan 2: 456. 1990. **Type:** China: Guangdong, Tinghushan. Jul. 17, 1872, *H.F. Hance 17733* (holo. BM000090315).

柯麗白蘭

Collabium uraiense Fukuy., Bot. Mag. (Tokyo) 48(569): 300.1934. *Collabiopsis uraiensis* (Fukuy.) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 435. 1977. **Type:** Taiwan: Taihoku, Agyoku, Sept. 7, 1932, *N. Fukuyama 3977*, not found.

Collabium formosanum Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 319-320. 1911. *Collabiopsis formosana* (Hayata) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1, 2:112. 1977. **Type:** Nantou: Randaizan, Jul. 30, 1907, *T. Kawakami et U. Mori 3181* (iso. TAI6621).

●臺灣柯麗白蘭

Corybas puniceus T.P. Lin & W.M. Lin, Taiwania 54(4): 329. f.2F. 2009. **Type:** Taiwan: Yunlin: Shyrpishan, 1200 m, Jul. 22, 2009, *W. Lin s.n.* (holo. TAI268952).

●艷紫盞蘭

Note: Our plant is closely related to *C. mirabilis* (Schltr.) Schltr. native to Papua New Guinea, and Solomon Islands.

Corybas sinii T. Tang & F.T. Wang, Acta Phytotax. Sin. 1(2): 186. 1951; Su, Fl. Taiwan 5: 815. 2000. *Calcearia sinii* (Tang & F.T. Wang) M.A. Clements & D.L. Jones, Orchardian 13: 446. 2002. **Type:** China: Kwangsi, Yaoshan, 1500 m, Nov. 6, 1931, *S. Sin 21529* (Herbarium?).

辛氏盞蘭

Corybas taiwanensis auct. non T.P. Lin & S.Y. Leu: J. C. Wang & Y. C. Lu, Biol. Bull. Natl. Taiwan Normal Univ. 29(1): 53, f.1. 1994. Specimen: Nantou: Shanlinshi, Jun. 17, 1994, *Y.C. Lu 1528* (TNU).

Note: No author has confirmed that our plant is conspecific with *C. sinii* because the type specimen in China has not been studied. This species is closely related to *C. annamensis* Aver. (Averyanov 2010, p4) which differs in that it has much larger flower, and entire margin of upper sepal.

Corybas taiwanensis T.P. Lin & S.Y. Leu, Taiwania 20(2): 162.1975. *Calcearia taiwanensis* (T.P. Lin & S.Y. Leu) M. A. Clements & D. L. Jones, Orchardian 13: 446. 2002. **Type:** Taiwan: Taoyuen: Nachiehshan, 1400 m. Aug. 4, 1974, *S.Y. Leu 2093* (holo. TAI167096).

●紅盞蘭

Corybas taliensis T. Tang & F.T. Wang, Acta Phytotax. 1(2): 185-186. 1951. *Calcearia taliensis* (Tang & F.T. Wang) M.A. Clements & D.L. Jones, Orchardian 13: 446. 2002. **Type:** China: Yunnan, Dali, 2500-3000 m, flowering Sept., *C.Y. Wu and T.I. Liu 20049* (holo. PE?; iso. KUN1218490).

杉林溪盞蘭

Corybas shanlinshiensis W.M. Lin, T.C. Hsu & T.P. Lin, Taiwania 52(4): 281-282, f.1 & 2A. 2007. **Type:** Taiwan: Nantou: Shanlinshi, 1750 m, *Weimin Lin s.n.* (holo. TAI259402).

Corybas himalaicus auct. non (King & Pantl.) Schltr.: S.W. Chung and T.C. Hsu, Taiwan J. For. Sci. 23(1): 99-103, figs. 1-3. 2008. Specimens: Nantou: Sanlinshi, 1900 m. Jul. 22, 2006, *S.W. Chung & T.C. Hsu 13356* (TAIF), *T.C. Hsu 545* (TAI); Jul. 20, 2007, *T.C. Hsu 887, 888, 889* (TAIF).



Note: It is unclear whether our plant is conspecific with *C. taliensis* because the type specimen in China has not been studied. Based on the color photo of Jin *et al.* (2009), *C. taliensis* has precisely the same morphology as *C. shanlinshiensis*.

Chung and Hsu (2008) argued that *C. himalaicus* is the correct name. Considering the type specimen of *Pantling 385*, 1897 (RBG Kew online), I concluded that *C. himalaicus* is a distinct species. *C. shanlinshiensis* differs from *C. himalaicus* because its petals are longer than the upper sepal, whereas *C. himalaicus* has short lateral sepals that are only half the length of the upper sepals. The pattern of rich dark purple markings on the flower also differs (<http://naresh.org.in/blog/corybas-himalaicus>). Additional differences were mentioned in the original description of *Corysanthes himalaica* King and Pantling (1896): petal none, labellum with 2 short cylindrical spurs and with unequally denticulate margins on the anterior half.

Corymborkis veratrifolia (Reinwardt) Blume, Coll. Orch. Arch. Ind. 125, pl. 43-44. 1858; Ying, Col. Ill. Orch. Taiwan 1: 436. 1977 et 2: 457. 1992; C.L. Yeh, C.R. Yeh et C.S. Leou, Taiwania 51(1): 53-57, f.1 & 2. 2006. *Hysteria veratrifolia* Reinw., Syll. Pl. Nov. 2: 5. 1825. **Type:** Indonesia: Jawa, *T. Lobb 162* (neo. K000942850, designated by Rasmussen in Bot. Tidsskr. 71:170. 1977; isoneo. BM000076806). Specimen: Lanyu, Aug. 19, 2005, C.L. Yeh & C.R. Yeh 4031 (PPI).

管花蘭

Cremastra appendiculata (D. Don) Makino var. ***variabilis*** (Blume) I.D. Lund, Nord. J. Bot. 8(2): 197-203. 1988; Seidenf., Opera Botanica 95:15. 1988. *Hyacinthorchis variabilis* Blume, Mus. Bot. Lugd. 2:48, f.16. 1849. *Cremastra variabilis* (Blume) Nakai, Rep. Veg. Daisetsusan 27. 1930. **Type:** Japan: sine loc. cult. Bogor, P.F. v. Siebold s.n. (L0059265, L0061166).

馬鞭蘭

Cremastra appendiculata auct. non (D. Don) Makino, Bot. Mag. (Tokyo) 18: 24. 1904; Lin in Native Orch. Taiwan 1:110, photo 58. 1975.

Cremastra triloba Hayata, Icon. Pl. Formos. 2: 135-136. 1911. **Type:** Taiwan: Mt. Nashitanzan, Mt. Rontabunzan, Jiogesha, Apr. [17], 1910, *U. Mori s.n.* (holo. TI, photo T00912 in PoT; iso. Apr. [17], 1910, TAI6623).

Note: After examining several collections, Dr. Ormerod (pers. comm.) indicated that *C. appendiculata* should be regarded as one species, but locally they can seem really distinct. Material of *C. appendiculata* from Japan had quite some variability in the callus: var. *variabilis* has the callus prostrate, whilst var. *appendiculata* has an erect callus, however there are intermediates. Another point of variation is in the sidelobes, ligulate and obtuse in var. *appendiculata*, ovate-lanceolate and acute in var. *variabilis*, again intermediates exist in the material.

Crepidium bancanoides (Ames) Szlachetko, Fragm. Florist. Geobot., Suppl. 3: 124. 1995. *Malaxis bancanoides* Ames, Orchidaceae 2: 129. 1908; Nakaj., Enum. Orch. Ryukyu 2:111. 1971; T.P. Lin, Native Orch. Taiwan 2: 255, photo 126-127. 1977. **Type:** Philippines: Mountains back of San Fernando, Sibuyan Island, 609 m, Jul. 9, 1904, R.C. McGregor 14 (AMES00101599).

涼草/蘭嶼小柱蘭

Microstylis miyakei Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 437. 1911. **Type:** Taiwan: Insel Kotosho, Nov. 24, 1899, K. Miyake 129 (holo. B, destroyed; lecto. TI, designated by Yukawa and Ohba in Lindleyana 10: 30. 1995, photo T01155 in PoT). Fukuyama identified a plant (*N. Fukuyama s.n.*, Oct. 30, 1934, KPM-photo G00632 in PoT) collected from Lanyu as

Microstylis miyakei Schltr. indicating that this species differs from *M. roohutuensis*.

Microstylis kotoensis Fukuy. *nom. nud.* in sched. Specimen: Taiwan: Taitung: Daishinzan [大森山], Oct. 10, 1934, *N. Fukuyama s.n.* (KPM, photo T00088 in PoT).

Crepidium matsudae (Yamamoto) Szlach., Fragm. Florist. Geobot., Suppl. 3: 129. 1995. *Microstylis matsudai* Yamam., Icon. Pl. Formosan., Suppl. 2: 4, f.2. 1926. *Malaxis matsudai* (Yamam.) Hatus., Fl. Ryukyu 863. 1971. **Type:** Taiwan: [Pintung:] Daizyurin, Jul. [24], 1919, *E. Matsuda [22]* (holo. TI, photo T01152 in PoT). Specimen: Taiwan: Takao: Arikobanti. [高雄阿里港] Jul. 8, 1919, *E. Matsuda s.n.* (TAIF 22339 & 22341)

●凹唇小柱蘭

Note: Genus status of *Malaxis*, *Pseudoliparis*, *Crepidium* and *Dienia* was discussed by Margonska and Kowalkowska (2008).

Crepidium purpureum (Lindl.) Szlach., Fragm. Florist. Geobot., Suppl. 3: 131. 1995. *Microstylis purpurea* Lindl. Gen. Sp. Orchid. Pl. 20. 1830. *Malaxis purpurea* (Lindl.) Kuntze., Revis. Gen. Bot. 2: 673. 1891; Su, Quart. J. Chin. Forest. 23(3): 48, pl.3. 1986. **Type:** Ceylon: *Macrae s.n.* One specimen in Herb. J. Lindley. Specimen: Taiwan: Kaohsiung: Sanping, *Su & Chen 9087*; Pingtung: Mt. Tahan, *Su & Chen 9337*.

紫花軟葉蘭

Microstylis wallichii Lindl. var. *biloba* sensu King & Pantling, Ann. Roy. Bot. Gard. Calcutta 8: 16, pl.19. 1898. *non Microstylis biloba* Lindl. Note: King & Pantling considered this taxon as the same as Lindley's species. Although two taxa are different, the variety name is considered as a new combination nomenclaturally and not a new name for a new taxon. Specimen: Tropical Himalayan valleys, below 5000 ft, Jul.-Sept., *Pantling 37*.

Malaxis rizalensis Ames, Philipp. J. Sci. 6: 46. 1911. **Type:** Philippines: Luzon, Rizal Province, Bosoboso, Aug. 1907, *M. Ramos Bur. Sci. 4561* (holo. AMES00101164).

Malaxis biloba auct. non Ames: C. S. Leou, Quart. J. Expt. Forest. Natl. Taiwan Univ. 11(2): 74, f.1. 1997. Specimen: Nantou, 300 m., Jun 1996, *C.S. Leou 6193*. [*Malaxis biloba* (Lindl.) Ames is a synonym of *Crepidium acuminatum* (D. Don) Szlach.]

Note: Based on Seidenfaden (1980), the types of *M. purpurea* and *M. rizalensis* have bilobed midlobe but no teeth between sidelobe and midlobe.

Crepidium roohutuensis (Fukuy.) T.P. Lin, *comb. nov.* *Microstylis roohutuensis* Fukuy., Trans. Nat. Hist. Soc. Taiwan 22: 415. 1932. *Malaxis roohutuensis* (Fukuy.) S. Y. Hu, Quart. J. Taiwan Mus. 27: 435. 1974. **Type:** Taiwan: Pintung: Koosyun, Roohutu-san [老佛山], 1000 ped. Dec. 31, 1931, cult. & flowering Oct. 1932, *N. Fukuyama 3553* (holo. KPM-NA0105566, photo T00029 in PoT).

●紫背小柱蘭

Cryptostylis arachnites Blume, Coll. Orchid. 133 1859. Lin, Native Orch. Taiwan 1:112, photo 59-60. 1975. *Zosterostylis arachnites* Blume, Bijdr. Fl. Ned. Ind. 8: 419. 1825, *nom. invalid. sine descript.* *Cryptostylis arachnites* (Blume) Hassk., Cat. Hort. Bot. Bogor. 8. 1844, *nom. illeg.* **Type:** Indonesia: Java, *Blume 323* (holo. L0059262; iso. S07-558); *Blume s.n.* (iso. U0074227).

滿綠隱柱蘭

Cryptostylis erythroglossa Hayata, Icon. Pl. Formos. 4: 117-118, pl.18. 1914. **Type:** Taiwan: location not indicated, cult. Taipei, Jan. 1912, *B. Hayata s.n.* (holo. TI-photo T00915 in PoT).



Cryptostylis taiwaniana Masam., Trans. Nat. Hist. Soc. Taiwan 23(126): 208. 1933. *Cryptostylis arachnites* var. *taiwaniana* (Masam.) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1: 118, 437, f. 37. 1988. **Type:** Taiwan: Pingtung: Nanninzan [南仁山], Mar. 21, 1929, *Segawa s.n.* (holo. KPM-NA0105595, photo T00073 in PoT)

●蓬萊隱柱蘭

Cymbidium cochleare Lindl., J. Proc. Linn. Soc., Bot. 3: 28. 1859; S. Chen *et al.*, Fl. Reipubl. Popul. Sin. 18: 212. 1999. Su, Fl. Taiwan, 5: 822. 2000. *Cyperorchis cochlearis* (Lindl.) Benth., J. Linn. Soc. Bot. 18: 317. 1881. **Type:** India: Sikkim: hot valleys. Apr. 1850, *J.D. Hooker 235* (holo. K000852995; iso. K000838851), *J.D. Hooker s.n.* (iso. K000838850).

香莎草蘭

Cyperorchis babae Kudo ex Masam., J. Jap. Bot. 8: 258-260. 1932. *Cymbidium babae* (Kudo ex Masam.) Masam., Trop. Hort. 3: 333. 1993; J. Geobot. 16(4): pl.143. 1968. Specimen: Taiwan: Kaohsiung, Oct. 24, 1933, *S. Sasaki s.n.* (TAI032495 under "*Cymbidium dayanum*"); Sanhehsi [六龜], Jan. 21, 1934, *K. Segawa 6392* (KPM, photo G00947 in PoT, fruits with persistent column attached).

Note: Lindley (1859) indicated that the floral bracts are almost obsolete, tepals and column are extremely narrow with a full length of 2 in., and the lamellae of lip are fused into a spoon-shaped process attached by its middle. Our native plants are basically consistent with these description of *C. cochleare*.

Cymbidium dayanum Rchb. f., Gard. Chron. 1869: 710. 1869; Masam., J. Geobot. 16(3): pl.139. 1968; Seidenf., Opera Bot. 72: 82. 1983. **Type:** India: Assam, 1868, *Day, J. s.n.* (K000838849).

鳳蘭

Cymbidium leachianum Rchb. f., Gard. Chron. 10: 106. 1878. *Cymbidium dayanum* var. *leachianum* (Rchb. f.) S.S. Ying, Mem. Coll. Agric. Natl. Taiwan Univ. 29(1): 84. 1989. **Type:** Taiwan: *Arthur Corner s.n.* (K?).

Cymbidium simonsianum King & Pantl., J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 64(2): 239. 1895. **Type:** India: Sikkim, Tropical valleys to 3000 ft, Aug. 1895, *R. Pantling 51* (syn. K000891136; isosyn. *R. Pantling 57*, BR0000009973916 & GH00098562). Taiwan: Nantou: Sun Moon Lake, Sept. 20, 1929, *Kudo & Sasaki 15420* (TAI1115351).

Cymbidium alborubens Makino, Bot. Mag. (Tokyo) 16: 11. 1902. **Type:** Japan: Musashi, Tokyo Bot. Gard. Koishikawa, cult. Jan. 1902, *T. Makino s.n.* This orchid was originated from Taiwan?

Cymbidium dayanum var. *albiflorum* S.S. Ying, Col. Ill. Fl. Taiwan 5: 594, pl. 87. 1992. **Type:** Taiwan: Taipei: Pinglin, Sept. 1993, *S.S. Ying s.n.* (NTUF).

Cymbidium ensifolium (L.) Sw., Nova Acta Regiae Soc. Sci. Upsal., ser. 2, 6: 77. 1799; Lin, Native Orch. Taiwan 2:106, photo 36-39. 1977. *Epidendrum ensifolium* L., Sp. Pl. 954. 1753. **Type:** China: Canton: *Osbeck s.n.* (lecto. LINN 1062.10, designated by Du Puy & Cribb, Genus *Cymbidium* 156. 1988).

焦尾蘭/四季蘭

Cymbidium arrogans Hayata, Icon. Pl. Formos. 4: 76-77. 1914. **Type:** Taiwan: Kusukusu, Juni. 1912, *B. Hayata et S. Sasaki s.n.* (holo. TI, photo T00918 in PoT)

Cymbidium misericors Hayata, Icon. Pl. Formos. 4: 79, f. 386. 1914. **Type:** Taiwan: Tamsui, Kwannonzan, cult. Taipei, Mar. 22, 1914, *B. Hayata et T. Soma s.n.* (holo. TI, photo T00922 in PoT). Note: This orchid is characterized by shorter leaves and pale green flowers without any maculation.

Cymbidium rubrigemmum Hayata, Icon. Pl. Formos. 6: 81, f. 15. 1916. **Type:** Taiwan: cult. Taipei, Mar. 1914, *T. Soma s.n.* Type not found. Note: This is easily distinguished from the typical *C. ensifolium* by the almost absent lines on the sepals and petals.

Liuguishania taiwanensis Z.J. Liu & J.N. Zhang, J. S. China Agric. Univ. 19(1): 73-74, fig.1. 1998. **Type:** Taiwan: Kaohsiung, Luiguishan [六龜山], Aug 20, 1995, *Z.J. Liu 145* (holo. Shenzhen city Wutongshan Nurseries).

Cymbidium faberi Rolfe, Bull. Misc. Inform. Kew 1896: 198. 1896; Lin, Native Orch. Taiwan 2:109, photo 40. 1977. **Type:** China: Zhejiang, Ningpo, Mt. Tientai. 1889, *E. Faber 94* (syn. K000838841; isosyn. NY00008688); Sichuan, S Wushan, *A. Henry 5515* (syn. K000838839).

一莖九華

Cymbidium oiwakensis Hayata, Icon. Pl. Formos. 6: 80, f.14. 1916. **Type:** Taiwan: Gokwanzan [合歡山] Oiwake [追分] 7500 ped., Apr. 1916, *B. Hayata s.n.* (iso. TAI66642).

Cymbidium faberi var. *viridiflorum* S.S. Ying, Alp. Pl. Taiwan 2: 446. 1978. **Type:** Taiwan: Lishan, *S.S. Ying 5282*. Type not found

Cymbidium floribundum Lindl., Gen. Sp. Orchid. Pl. 162. 1833, in note of *C. sinense*; S.S. Ying, Mem. Coll. Agric., NTU 30(1): 30. 1990. **Type:** icon in Bibl. Hort. Soc. Lond.

金稜邊

Cymbidium pumilum Rolfe, Bull. Misc. Inform. Kew 1907: 130. 1907. **Type:** China: Yunnan, Tsekou, date ? *T. Monbeig s.n.* (holo. K000891143; iso. K000891144).

Cymbidium illiberale Hayata, Icon. Pl. Formos. 4: 78-79. 1914; Masam., J. Geobot. 16(3): pl.140. 1968. **Type:** Taiwan: Location not indicated, (fl.) Mar. [24], 1914, *B. Hayata s.n.* (holo. TI, photo T00920 in PoT).

Cymbidium formosanum Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 335. 1911; Masam., J. Geobot. 16(1): pl.134. 1968. **Type:** Taiwan: Ako: Raisha, 3000 ped., Jan. 1907, *G. Nakahara s.n.* (holo. TI, photo T0919 in PoT).

台灣春蘭

Cymbidium gracillimum Fukuy., Trans. Nat. Hist. Soc. Taiwan 22: 413-414, f.12. 1932. *Cymbidium formosanum* var. *gracillimum* (Fukuy.) T.S. Liu & H.J. Su, Fl. Taiwan 5: 943. 1978. **Type:** Taiwan: Sintiku: monte Tyotui-zan, 5000 [4000] ped., Jan. 1931, *N. Fukuyama 3220* (holo. KPM-NA0105529 without Fukuyama's no. photo T00025 in PoT; iso. KPM-NA0105530). Note: Leaf width < 4 mm.

Cymbidium formosanum Hayata f. *albiflorum* S.S. Ying, Quart. J. Chin. Forest. 20(2): 54. 1987. without Type

Cymbidium gracillimum Fukuy. var. *serratum* auct. non (Schltr.) W.S. Wu & S.C. Chen, Acta Phytotax. Sin. 18(3): 300. 1980: Su in Fl. Taiwan 5: 826. 2000. **Type:** China: Guizhou: Lofou, Kouy-tcheou, 1909, *J. Esquirol s.n.* Note: *C. gracillimum* is different from *C. serratum* Schltr. (FOC 25: 276).

Cymbidium goeringii auct. non (Rchb. f.) Rchb. f., Ann. Bot. Syst. 3: 547. 1852: Su in Fl. Taiwan 5: 826. 2000. Note: The sepals and petals of *C. goeringii* are bright emerald green with purple striations, and occasionally exhibit blotching. The dorsal sepal and petals always bends forward over the lip. The tepals have an obtuse or round apex. These properties of *C. goeringii* are different from those of *C. formosana*.

Cymbidium kanran Makino, Bot. Mag. (Tokyo) 16: 10. 1902; W.N. Simmons, Orchid Rev. 69(882): 375. 1961; Liu & Su, Fl. Taiwan 5: 946. 1978. **Type:** Japan: Musashi, cult. Tokyo Bot. Gard. Koishikawa, Jan. 1902, *Makino s.n.* (MAK).

寒蘭



Cymbidium oreophilum Hayata, Icon. Pl. Formos. 4: 80, f. 38(c). 1914. *Cymbidium misericors* Hayata var. *oreophilum* Hayata in sched. **Type:** Formosa: Location not indicated, Mar. [22] 1914, *B. Hayata s.n.* (holo. TI, photo T00925 in PoT). Note: According to the original description, the tapels of *C. oreophilum* are more similar to those of *C. karan* than to those of *C. ensifolium*.

Cymbidium purpureo-hiemale Hayata, Icon. Pl. Formos. 4: 81. 1914. **Type:** Taiwan: Location not indicated, Mar. 1914, *B. Hayata s.n.* (holo. TI, photo T00926 in PoT).

Cymbidium linearisepalum Yamam., Trans. Nat. Hist. Soc. Taiwan 20(106): 40. 1930. **Type:** Taiwan: Yilan, monte Taihei [太平山], Oct. 26, 1929, *T. Noya s.n.* (TAI118710)

Cymbidium linearisepalum Yamam. f. *atropurpureum* Yamam., Trans. Nat. Hist. Soc. Taiwan 20(106): 41. 1930. **Type:** Taiwan: Yilan: monte Taihei [太平山], prope Kashinoki-daira, Oct. 26, 1929, 3000 ped, *T. Noya s.n.-A.* (TAI118710).

Cymbidium linearisepalum Yamam. f. *atrovirens* Yamam., Trans. Nat. Hist. Soc. Taiwan 20(106): 41. 1930. **Type:** Taiwan: Yilan: monte Taihei, prope Kashinoki-daira, Oct. 26, 1929, 3000 ped, *T. Noya s.n.-B.* (TAI118710).

Cymbidium tosaensis Masam., Trans. Nat. Hist. Soc. Taiwan 25(136-139): 14. 1935. **Type:** Taiwan: Takao-syu: Heitogun [霧台] Tosga (cult. Watanabe).

Cymbidium lancifolium Hook., Exot. Fl. 1: ad t. 51. 1823; Hayata, Icon. Pl. Formosan. 4: 79. 1914; T.P. Lin, Native Orch. Taiwan 2: 119, photo 47-48. 1977. **Types:** Nepal: 1821, *Wallich s.n.* (K000395361, K000891129); Nepal: 1823, *Wallich7351* (K001127214).

竹柏蘭

Cymbidium nagifolium Masam., Bot. Mag. Tokyo 45: 220. 1930.

Type: Japan: Yakusima Isl., *G. Masamune s.n.* Note: The distal leaf margins are minutely serrulated and flowers are whitish.

Cymbidium lancifolium Hook. f. var. *aspidistrifolium* (Fukuy.) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1: 439. 1977. *Cymbidium aspidistrifolium* Fukuy., Bot. Mag. (Tokyo) 48(571): 438, f.2-3. 1934. **Type:** Taiwan: Taihoku: Syo-agyku-san [小阿玉山], Oct. 1933, *N. Fukuyama 4137* (KPM-NA0105605 without Fukuyama's no. and dated Aug., photo T00024 in PoT). Note: Fukuyama (1934): it is easily distinguished from *C. lancifolium* based on its smaller and green flowers.

綠花竹柏蘭

Cymbidium bambusifolium F. Mark, F.S. Ho et J.A. Fowlie, Orchid Digest Jan.-Feb. 18-19. 1986. *non* Roxburgh, 1832.

Type: Taiwan: Taichung: 800-1000 m, *Fu-shun Ho s.n.* (FMH 83 T 8) [Aug. 15, 1985] blossom (UCLA Herbarium). Note: This dwarf herb has only less than 15 cm in height, and no serrulations are evident on the distal leaf edges.

Cymbidium lancifolium Hook. f. var. *syunitianum* (Fukuy.) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1: 439. 1977. *Cymbidium syunitianum* Fukuy., Bot. Mag. (Tokyo) 49(587): 757. 1935. **Type:** Taiwan: Hualien: Kwarenko, Taroko-taizan [太魯閣大山], collected by S.Sasaki, Jun. 1933. cult. flowering Jan. 1935. *N. Fukuyama 4688* (holo. KPM without Fukuyama's no., photo T00084 in PoT; iso. KPM photo T00085 in PoT).

●大竹柏蘭

Note: This species is 40-66 cm tall, and the tapels are linear.

Cymbidium macrorhizon Lindl., Gen. Sp. Orchid. Pl. 162. 1833. C.J. Yang and J.C. Wang, Taiwan J. Biodivers. 16(1): 85-93. 2014. **Type:** India: Kashmir, *Royle s.n.* (K000395362 illustr.). Specimen: Taitung: Neibenlu ancient trail, 800 m. Nov. 11, 2009, *C.J. Yang 330 & 559* (TNU); Jul. 21, 2010, *C.J. Yang 694* (TNU).

大根蘭

Bletia nipponica Franch. & Sav., Enum. Pl. Jap. 2: 511. 1878.

Type: Japan: peninsula Parry, flower in Jun., *P.A.L. Savatier s.n.* (P00385292).

Cymbidium sinense (Jacks. ex Andrews) Willd., Sp. Pl. 4: 111. 1805. *Epidendrum sinense* Jacks. ex Andrews, Bot. Repos. 3: t. 216. 1802. **Type:** ex China, cult. G. Hibbert, imported to London by J. Slater in 1793. Icon. in Andr., Bot. Rep. 3: t. 216. 1802. Specimen: Taiwan: Taitung: Mt. Taito, Dec. 28, 1930, *Y. Yamamoto 1659* (TAI160109).

拜歲蘭

Cymbidium albojucundissimum Hayata, Icon. Pl. Formos. 4: 74. 1914. **Type:** Taiwan: Location not indicated, Taipei, cult., Mar. 1914. *B. Hayata s.n.* (holo. TI, photo T00917 in PoT).

Cymbidium sinense (Jacks. ex Andrews) Willd. var. *margicoloratum* Hayata, Icon. Pl. Formos. 6: 82, f.16-b & 17. 1916. **Type:** Taiwan: Taipei, cult., Feb. 1914. *T. Soma s.n.* (holo. TI, photo T00928 in PoT).

Cymbidium sinense (Jacks. ex Andrews) Willd. var. *pallidiflorum* S.S. Ying, Quart. J. Chin. Forest. 20(2): 54. 1987. **Type:** Taiwan: Taipei, cult., Feb. 5, 1987, *S.S. Ying s.n.* (NTUF). Note: Flower pink.

Cymbidium sinense (Jacks. ex Andrews) Willd. var. *taiwanianum* S.S. Ying, Quart. J. Chin. Forest. 20(2): 54. 1987. **Type:** Taiwan: Taipei, cult., Feb. 5, 1987, *S.S. Ying s.n.* (NTUF). Note: Petals are greenish, and sepals do not open.

Cymbidium tortisepalum Fukuy., Bot. Mag. (Tokyo) 48(569): 304, f.1. 1934. *Cymbidium goeringii* (Rchb. f.) Rchb. f. var. *tortisepalum* (Fukuy.) Wu & Chen, Acta Phytotax. Sin. 18(3): 300. 1980; Su, Fl. Taiwan 5: 828. 2000. *Cymbidium goeringii* (Rchb. f.) Rchb. f. var. *tortisepalum* (Fukuy.) W.S. Wu & S.C. Chen f. *albiflorum* (S.S. Ying) S.S. Ying, Mem. Coll. Agr. Natl. Taiwan Univ. 30(1): 35. 1990. **Type:** Taiwan: Shinchiku, Taiko, Higashi-sensuizan, Apr. 10, 1932, *N. Fukuyama 3983*. Type not found.

菅草蘭

Cymbidium tentyozanense Masam. *nom. nud.* in sched. specimen:

Hualien: 奇萊溪. cult. Jan. 1, 1936, *G. Masamune s.n.* (TAI032486 no flower). Note: The original description indicated that this species has a 30-cm-long receme and greenish and fragrant flowers, which are approximately 5 cm in diameter and loosely arranged approximately 2 to 5 cm apart, and sepals are 4 cm long and 4 mm wide, and greenish with purple veins. The specimen demonstrated that *Cymbidium tentyozanense* Masam has narrow leaves with an approximate width of 5 mm, and this species was recognized as *C. tortisepalum* by T.C. Hsu on the label. I am uncertain as to whether this is correct, because *C. tortisepalum* has wider leaves (> 1 cm) and sepals (> 7 mm).

Cymbidium tortisepalum Fukuy. var. *viridiflorum* S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 41. 1977. **Type:** Taiwan: Lishan, *S.S. Ying 5282*. Type not found.

Cymbidium tortisepalum Fukuy. f. *albiflorum* S.S. Ying, Quart. J. Chin. Forest. 20(2): 54. 1987. without type.

Cypripedium debile Rchb.f., Xenia Orchid. 2: 223. 1874; Liu & Su, Fl. Taiwan 5: 951. 1978. **Type:** Japan: Based on a figure in the Soc-mok-dru-sets, vol. 8.

小喜普鞋蘭/小老虎七

Cypripedium formosanum Hayata, Icon. Pl. Formos. 6: 66, f. 9. 1916. *Cypripedium japonicum* Thunberg var. *formosanum* (Hayata) S.S. Ying, Chin. Flower 15: 33, pl.1. 1075. **Type:** Taiwan: Oiwake, 7500 ped [合歡山追分], Apr. [22], 1916, *B. Hayata s.n.* (holo. TI, photo T00931 in PoT; iso. TAI6654 & 6655; K000077937).

●台灣喜普鞋蘭



- Cypripedium japonicum* auct. non Thunb.: Hayata, Icon. Pl. Formos. 2: 136. 1912. Specimen: Taiwan: Mt. Rontabunzan, Apr. 1910, *U. Mori* s.n.
- Cypripedium macranthos*** Swartz, Kongl. Vetensk. Acad. Nya Handl. 21: 251. 1800; Curtis's Bot. Mag. 56: t.2938. 1829; Hayata, Icon. Pl. Formos. 2: 136. 1912. **Type:** E. Siberia. Specimen: Japan: May 1876, *J. Bisset* 371 (K000077918). Taiwan: Montbus Centalibus, 1910, *U. Mori* s.n.
- 奇萊喜普鞋蘭**
- Cypripedium taiwanianum* Masam., Trop. Hort. 3: 31. 1933. *nom. nud.* *Cypripedium macranthos* Sw. var. *taiwanianum* (Masam.) F. Maek., Wild Orch. Japan Colour 80. 1971, *nom. illeg.* Specimen: Taiwan: Taitung, Hsiangyang 向陽, May 6, 1936, *K. Segawa* s.n. (KPM, photo G00975 in PoT).
- Cypripedium segawae*** Masam., Trans. Nat. Hist. Soc. Taiwan 23: 209. 1933; Masam, Trop. Hort. 3:31. 1933; Masam., J. Geobot. 17(3): pl.152. 1969. *Cypripedium guttatum* Swartz var. *segawae* (Masam.) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1: 357. 1977. **Type:** Taiwan: Hualien: Kiraisyuzan, Mar. 28, 1930, *Segawa* s.n. (holo. TI, photo T00932 in POT). Specimen: Hualien: Tien-tsang Cliff, 1500 m, Apr. 1, 1998, *H.J. Su* s.n. (HAST105320).
- 寶島喜普鞋蘭**
- Cyrtosia javanica*** Blume, Bijdr. Fl. Ned. Ind. 396, pl.6. 1825; Seidenf., Dansk Bot. Ark. 32(2): 130, f.79. 1978. ***Galeola javanica*** (Blume) Benth. & J. D. Hooker, Gen. Pl. 3: 590. 1883; Leou & Chung, Quart. J. Expt. Forest Natl. Taiwan Univ. 9(4): 20, fs. 1, 2. 1995. **Type:** Java ("montium Javae insulae"). Specimen: Taiwan: Nantou: Chitou, in artificial bamboo forest. *C.S. Leou* 5830.
- 肉果蘭**
- Dactylorhiza viridis*** (L.) R.M. Bateman, A.M. Pridgeon & M.W. Chase, Lindleyana 12: 129. 1997. *Satyrium viride* L. Sp. Pl. 944. 1753. *Coeloglossum viride* (L.) Hartm., Handb. Skand. Fl. 329. 1820; T.P. Lin, Native Orch. Taiwan 1: 108, photo 56-57. 1975. **Type:** Europe, Unknown country. *Anon. s.n.* (lecto. LINN 1055-3, designated by Renz, Fl. Pakistan 164: 32. 1984).
- 窩舌蘭**
- Herminium nankotaizanense* Masam., J. Soc. Trop. Agric. 4(2): 194. 1932; Masam., J. Geobot. 14(4): pl.118. 1966. *Platanthera nankotaizanense* (Masam.) Masam., Bot. Mag. Tokyo 46: 773. 1932. **Type:** Taiwan: Nankotaizan, Jul. 15, 1931, *G. Masamune* et *K. Mori* s.n. Type not found. Specimen: Hsuehsan, Jul. 8, 1930, *S. Suzuki* 5362 (TAI115446) & 5307 (TAI115476).
- Coeloglossum taiwanianum* S.S. Ying, Alp. Pl. Taiwan. 1: 74, pl.101. 1975. **Type:** Taiwan: Taichuang: Hsuehsan, 3750 m, Jul. 8, 1975, *S.S. Ying* 3843 (holo. NTUF-F00000318; iso. *S.S. Ying* 3845, & NTUF-F00008280).
- Note: Recent classifications consider *Coeloglossum* to be a part of the larger genus of *Dactylorhiza*.
- Dendrobium catenatum*** Lindl., Gen. Sp. Orchid. Pl. 84. 1830; Ormerod, Taiwania 47(4): 241. 2002. **Type:** China: icon *Reeves* s.n. (lecto. RHS); Japan: *Thunberg* s.n.
- 黃石斛**
- Dendrobium perefauriei* Hayata, Icon. Pl. Formos. 6: 70. 1916. **Type:** Taiwan: Kwarenko, Jul. 1915, *U. Faurie* s.n. (iso. TAI6695 no flower).
- Dendrobium tosaense* Makino var. *chingshuishanianum* S.S. Ying, J. Jap. Bot. 64(5): 151, f. 2. 1989. **Type:** Taiwan: Hualien: Chingshuishan 800 m, Apr. 5, 1988, *S.S. Ying* s.n. (NTUF). Type not found.
- Dendrobium chameleon*** Ames, Orchidaceae 2: 174. 1908; Lin, Native Orch. Taiwan 1: 140, photo 79-80. 1975. **Type:** Philippines: Baguio, Prov. Benguet, Northern Luzon. Sep. 30, 1904, *R.S. Williams* 1940 (holo. NY8718; iso. AMES00074969, K001085102, NY8717, NY8719). **長距石斛/巒大石斛**
- Dendrobium randaiense* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 315. 1911. **Type:** Taiwan: Nantou: Randaizan, Jul. [30], 1907, *T. Kawakami* et *U. Mori* s.n. (holo. TI, photo T00945 in PoT)
- Dendrobium longicalcaratum* Hayata, Icon. Pl. Formos. 4: 43, pl. 8. 1914. **Type:** Taiwan: Urai, Aug. 1912. flowering Nov. 1912 in Tokyo, *B. Hayata* et *S. Sasaki* s.n. (holo. TI, photo T00940 in PoT).
- Dendrobium chryseum*** Rolfe, Gard. Chron., ser. 3, 3: 233. 1888; X. Chen *et al.*, Fl. China 25: 386. 2009. **Type:** India: Assam, *J. Veitch & Sons* s.n. **金草**
- Dendrobium aurantiacum* H.G. Reichb., Gard. Chron. 1887 (2): 98. 1887. *non* F. Mueller 1870. *Dendrobium clavatum* Lindl. var. *aurantiacum* (Rchb. f.) T. Tang & F.T. Wang, Acta Phytotax. Sin. 1: 40, 80 1951, *nom. illeg.*; Yang *et al.*, Man. Taiwan Vasc. Pl. 5: 240. 2001. **Type:** Burma: *Hildebrandt* s.n.
- Dendrobium flaviflorum* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 312-313. 1911. **Type:** Taiwan: Location not indicated. Jul. [10], 1907 (holo. TI, photo T00935 in PoT; iso. K000943765)
- Dendrobium comatum*** (Blume) Lindl., Gen. Sp. Orchid. Pl. 76. 1830; A. Schuiteman & P.B. Adams, Muelleria 29(1): 67. 2011. *Desmotrichum comatum* Blume, Bijdr. Fl. Ned. Ind. 7: 330. 1825. *Flickingeria comata* (Blume) Hawkes, Orchid Weekly 2: 452. 1961. *Ephemerantha comata* (Blume) Hunt & Summerh., Taxon 10(4): 103. 1961; T.P. Lin, Native Orch. Taiwan 1: 157, photo 91-92. 1975. **Type:** Indonesia: Java: Buitenzorg. Flower in Sept. (holo. L0063871) **木斛**
- Dendrobium fimbriatolabellum* Hayata, Icon. Pl. Formos. 4: 38, f.13(b). 1914. **Type:** Taiwan: Kuskusu, Jul. 1912, *B. Hayata* et *S. Sasaki* s.n. (holo. TI, photo T00934 in PoT).
- Note: The genus *Flickingeria* is nested within the Australasian clade of *Dendrobium*. The separation between *Flickingeria* and other clades is not well-supported phylogenetically (Xiang *et al.* 2013).
- Dendrobium crumenatum*** Sw., J. Bot. (Schrader) 2: 237. 1799; Lin, Native Orch. Taiwan 1: 124, photo 64-65. 1975. **Type:** Based upon Rumphius's Herb. Amb. 6: t.47, f.2. 1750. **鶴石斛**
- Dendrobium kwashotense* Hayata, Icon. Pl. Formos. 4: 41, f. 13(d-g) & f. 15. 1914. **Type:** Taiwan: Kwashoto [火燒島], Jun. 1, 1913, *T. Soma* s.n. (holo. TI, photo T00938 in PoT, iso. TAI6681).
- Dendrobium equitans*** Kraenzl., Engler, Pflanzenr. 45(IV. 50. II. B. 21): 228. 1910; Lin, Native Orch. Taiwan 1: 126, photo 85-87. 1975. **Type:** Taiwan: cultivated in H. Goldsmith collection (holo. HBG501523). Specimen: Taiwan: Lanyu: Tashenshan, Jul. 3, 1934, *N. Fukuyama* s.n. (KPM, photo G00308 in PoT). **燕石斛**
- Note: This species was misidentified as *Dendrobium ventricosum* Kraenzl. in Fl. Taiwan. 5: 969. 1978.
- Dendrobium falconeri*** Hook., Bot. Mag. 82: t.4944. 1856; A. Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 91. 1896; Lin, Native Orch. Taiwan 1: 128, photo 66. 1975. **Type:** Bhutan: 4000 ft. Purchased in London by G. Reid, in Apr. 1856. One specimen in Herb. H.G. Reichenbach 21640. Specimen: Taiwan: South cape [鶴鑾鼻], A. Henry 1372. **紅鶴石斛/新竹石斛**



Dendrobium erythroglossum Hayata, Icon. Pl. Formos. 4: 36, f. 19(a). 1914. **Type:** Taiwan: Location not indicated, Jun. 1912, R. Kanehira *s.n.* Type not found.

Dendrobium furcatopedicellatum Hayata, Icon. Pl. Formos. 4: 39, f.14. 1914. *Grastidium furcatopedicellatum* (Hayata) Rauschert, Feddes Repert. 94: 449 1983. **Type:** Taiwan: Maisha, Aug. 1912, B. Hayata et S. Sasaki *s.n.* not found. Specimen: Location not indicated, in nursery, May 24, 1912 (TI, photo T00936 in PoT).

●雙花石斛

Dendrobium goldschmidtianum F. Kranzl., Repert. Spec. Nov. Regni Veg. 7: 40. 1909; E.A. Christenson, Brittonia 46(4): 344-354.1994. **Type:** Philippines: cult. & flowered in Jul. 1907, H. Goldschmidt-Essen *s.n.* (holo. HBG501530).

紅石斛

Dendrobium hainanense auct. non Rolfe: Matsumura and Hayata in J. Coll. Sci. Imp. Univ. Tokyo 22: 408. 1906. *Dendrobium miyakei* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 64-65. 1919; Lin, Native Orch. Taiwan 1: 134, photo 71-74. 1975. *Dendrobium victoriae-reginae* var. *miyakei* (Schltr.) T.S. Liu & J.H. Su, Fl. Taiwan 5: 969. 1978. *Dendrobium pseudohainanense* Masam., Trop. Hort. 3: 33. 1933. *nom. nud.* **Type:** Taiwan: Isle Kotosho, Nov. [20] 1899, K. Miyake *s.n.* (B, destroyed; lec. TI, photo T00941 in PoT).

Dendrobium leptocladum Hayata, Icon. Pl. Formos. 4: 43. 1914; Lin, Native Orch. Taiwan 1: 130, photo 67-68. 1975. *Dendrobium tenuicaule* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 316-317. 1911. *non* J.D. Hooker & *non* Ridley 1899. **Type:** Taiwan: Shokwa, Jul. 30, 1907, T. Kawakami & U. Mori *s.n.* (holo. TI, photo T00939 in PoT). Jul. 1907, Y. Shimada *s.n.* (iso. K000943747).

●細莖石斛

Dendrobium linawianum Rchb. f., Ann. Bot. Syst. 6: 284. 1861; Lin, Native Orch. Taiwan 1: 132, photo 69-70. 1975. **Type:** No data listed, with references to Lindl., Edwards's Bot. Reg. 16: t. 1314. 1830 and Hook. f., Bot. Mag. n.s. 71: t. 4153. 1845. Note: One specimen collected from N. Taiwan, collector unknown, with inflorescence (K, spirit 76749.000).

金石斛/櫻石斛

Dendrobium alboviride Hayata, Icon. Pl. Formos. 9: 108, f.36. 1920. **Type:** Taiwan: Kappanzan, Jul. [May. 15] 1917, B. Hayata et S. Sasaki *s.n.* (holo. TI-photo T00933 in PoT; iso. TAI6671).

Dendrobium luzonense Lindl., Edwards's Bot. Reg. 30 (Misc.): 54. 1844; Merrill, Enum. Philippine Flowering Pl. 1: 351. 1925; W.M. Lin *et al.*, Taiwania 52(4): 281-286, f.2B & 4. 2007. **Type:** Philippines: Luzon, specimen not found. Note: One specimen collected from Mindaro, Philippines, *Cuming s.n.*, in Herb. J. Lindley. Specimen: Taiwan: Taitung: Lichishi 300-400 m, Nov. 16, 2015, W.M. Lin *s.n.* (TAI286043).

呂宋石斛

Note: The stem can grow longer than 2 m and flowering occurs in April and November.

Dendrobium moniliforme (L.) Sw., Nova Acta Regiae Soc. Sci. Upsal., ser. 2, 6: 85. 1799; Hayata, Icon. Pl. Formos. 4: 44. 1914. *Epidendrum moniliforme* L., Sp. Pl. 954. 1753. **Type:** Japan. "Fu Ran" in Kaempfer, Amoen. Exot. Fasc., 864, 865, 1712 (designated by Merrill in J. Arnold Arbor. 19: 330. 1938). Specimen: Taiwan: Bunkiko 1500 m, *Faurie 1809* (AMES); from nursery, Mar. 23, 1914, T. Kawakami & Y. Shimada *s.n.* (KPM G00318).

石斛/白石斛

Dendrobium heishanense Hayata, Icon. Pl. Formos. 4: 40, f.13(c). 1914. **Type:** Taiwan: Arisan: inter Heishana et Nimandaira,

7000 ped., Apr. 28, 1914, B. Hayata *s.n.* (holo. TI, photo T00937 in PoT). Note: The stem is between 30 and 40 cm long. The flowers are pinkish and 2-2.5 cm in diameter, and the tapels are 1.8 cm long and 6 mm wide.

Dendrobium taiwanianum S.S. Ying, Quart. J. Chin. Forest. 11 (2): 102. 1978. *Dendrobium moniliforme* (L.) Sw. f. *taiwanianum* S.S. Ying, Quart. J. Chin. Forest. 11 (2): 102. 1978, *pro syn.* *Dendrobium moniliforme* var. *taiwanianum* S.S. Ying, Quart. J. Chin. Forest. 11 (2): 102. 1978, *pro syn.* *Dendrobium moniliforme* var. *taiwanianum* (S.S. Ying) S.S. Ying Col. Ill. Orch. Fl. Taiwan 1: 377. 1996. **Type:** Taiwan: Taichung: Wu-lin. Ying 6521. Note: The diameter of flower of this variety is 2-2.5 cm, and the tapels are 2.5-3 cm long and 6-8 mm wide. The stem is dark reddish brown and 30-40 cm long. This variety differs from f. *moniliforme* because it has a pink and not widely opened flower, and shorter sepals. It occurs in central Taiwan at 1000-1800 m.

Note: After extensive study of *D. moniliforme* complex, Jin *et al.* (2009) indicated that *D. moniliforme* is characterized by the following features: upper sepal 1.2-2 cm long, 0.2-0.5 cm wide; petal elliptic to lanceolate, 1-2.3 cm long, 0.4-0.9 cm wide, lip rhomboid, ovate, triangular to lanceolate, 1.1-2.5 cm long, 0.5-1.4 cm wide. However, flower size variation of *D. moniliforme* is even greater in Taiwan. It is interesting to note that population genetic diversity of *D. moniliforme* in Taiwan was found to be greater than China populations that have been tested (Ye *et al.* 2015).

Dendrobium moniliforme (L.) Sw. subsp. *okinawense* (Hatusima & Ida) T.P. Lin, *comb. nov.* *Dendrobium okinawense* Hatusima & Ida, J. Geobot. 18: 77. 1970; Chung & Lu, Taiwania 52(1): 106. 2007). **Type:** Ryukyu: Is. Okinawa. Specimen: Taiwan: Taitung: Taimali, Kueinashan, 900-1150 m, Mar. 12, 2004, Chung 6987 (TAIF).

琉球石斛

Note: *Dendrobium moniliforme* is a widespread and highly variable species in Taiwan, and *D. okinawense* is just one variant of them. Jin *et al.* (2009) even suspected that *D. okinawense* could be a polyploidy of *D. moniliforme*. Phylogenetic relationships based on the combination ITS and plastid gene sequences indicated that *D. moniliforme* and *D. okinawense* are nested together (Xiang *et al.* 2013). This suggests that it would be logical to consider they are the same species.

Dendrobium nakaharaei Schltr., Repert. Spec. Nov. Regni Veg. 2 (24): 169. 1906; Liu & Su, Fl. Taiwan 5: 965, pl.1582. 1978. *Epigeneium nakaharae* (Schltr.) Summerh., Kew Bull. 12: 263. 1957. **Type:** Taiwan: Bei Rakurakusha, Aug. 1905, G. Nakahara *s.n.* (holo. B, destroyed; lec. TI, selected by T. Yukawa & H. Ohba in 1995, photo T00942 in PoT).

臘石斛

Note: *E. nakaharaei* exhibits 2 types of flower in Taiwan; one type has a triangular-ovate midlobe with a pointed tip, and the other has a round midlobe with emarginated tip. The notched midlobe is relatively abundant in the wild compared with pointed midlobe, which is the flower type detailed in the original description. Schuiteman and Adams (2011) indicated that *Epigeneium* is not morphologically distinct from genera such as *Cadetia* or *Flickingeria*, and according to them, it should be reintegrated in *Dendrobium*.

Dendrobium nobile Lindl. var. *formosanum* Rchb. f., Gard. Chron., n.s. 19: 432. 1883. *Dendrobium formosanum* (Rchb. F.) Masam., Trop. Hort. 3: 32. 1933. "...grown by the lte General Munro, and kindly sent in Apr. 1876 by the Rev. C. S. P. Parish. It was introduced from Formosa by Mr. B. S. Williams." Specimen not found.

●台灣石斛



Dendrobium parietiformis J.J. Sm., Icon. Bogor. 2:92. T.117c. 1903. *Flickingeria parietiformis* (J.J. Sm.) A.D. Hawkes, Orquídea (Rio de Janeiro) 27: 306.1965. **Type:** Indonesia: Celebes, bei Palele, *Behaghel s.n.*

世富暫花蘭

Flickingeria shihfuana Lin & Huang, *Taiwania* 50(4): 292, f.3. 2005. *Dendrobium shihfuana* (T.P.Lin & Kuo Huang) Schuit. & P.B. Adams, *Muelleria* 29(1): 67. 2011. **Type:** Taiwan: Pingtung: Wutai, 1200 m, Sept. 25, 2004, *S.F. Huang s.n.* (holo. TAI224764).

Dendrobium sanseiense Hayata, Icon. Pl. Formos. 6: 70-71. 1916. *Epigeneium sanseiense* (Hayata) Summerh., Kew Bull. 264. 1957. *Epigeneium sanseiense* (Hayata) Nachejima, Biol. Mag. Okinawa 9: 37. 1972; T.P. Lin, Nat. Orch. Taiwan 3: 62. 1987. **Type:** Taiwan: Girancho: Mt. Sanseizan [三星山], May. [16] 1916, *B. Hayata s.n.* (holo. TI, photo T00946 in PoT; iso. TAI6696, Flower missing). ●小攀籠

Epigeneium fargesii auct. non (Finet) Gagnep., Bull. Mus. Paris ser.2, 4:595. 1932; Su, Quart. J. Chin. Forest. 22(2): 26. pl.5. 1989.

Note: Ormerod indicated that *E. fargesii* does not occur in Taiwan. This is because the flower morphology is different between *E. sanseiense* and *E. fargesii*. Seidenfaden (1995) showed that the column-foot in *E. fargesii* is approximately twice as long as the dorsal sepal. The ratio of the column-foot to upper sepal is less than 2 in the type specimen *Farges 1506* of *E. fargesii* (Seidenfaden 1980a). However, the ratio of column-foot to upper sepal in *E. sanseiense* is more than 2. Flower coloration is another significant difference between these 2 species.

The original description of *D. sanseiense*: [Lip margin minutely eroded; discs 2-keeled, in the form of letter A placed below the terminal lobe.] is inconsistent with that of *E. nakaharae*. The original measurement and description may be incorrect. The leaf and pseudobulb of *E. sanseiense* are typically smaller than those of *E. nakaharae*. Although the leaves and pseudobulbs of *E. sanseiense* are usually less than 1.2 cm, their measurements is 1.7 cm in the type plants (TAIF6696 no flower) are still within the range of *E. sanseiense*. The most crucial evidence proving that this type specimen is *D. sanseiense* is that flowering occurs in May. In contrast, *E. nakaharae* blossoms in Oct.~Jan. Thus, our second species of *Epigeneium* was designated *Epigeneium sanseiense* as the correct name.

Dendrobium somae Hayata, Icon. Pl. Formos. 6: 71-72. 1916. *Grastidium somae* (Hayata) Rauschert, Feddes Repert. 94: 452. 1983. **Type:** Taiwan: Taihoku, cult. Aug. 1915, *T. Soma s.n.* (holo. TI, photo T00947 in PoT).

●小雙花石斛

Dendrobium xantholeucum Rchb.f., Xenia Orchid. 2: 73. 1865; T.C. Hsu *et al.*, *Taiwania*, 57(3): 275, fig. 1M-O. 2012. *Flickingeria xantholeuca* (Rchb.f.) A.D. Hawkes, Orquídea (Rio de Janeiro) 27: 307. 1965. **Type:** Java: Hariang, *Kuhl & Van Hasselt s.n.* (holo. L0061258). Specimen: Taiwan: Pingtung: Shuangliu [雙流], 300 m, T.C. Hsu 3190 (TAIF).

淺黃暫花蘭

Dendrobium xantholeucum var. *tairukounia* (S.S. Ying) T.P. Lin, *com. nov.* *Ephemerantha tairukounia* S.S. Ying, Quart. J. Chin. Forest. 11(2): 103, f.2. 1978. *Dendrobium tairukounia* S.S. Ying, Quart. J. Chin. Forest. 11(2): 103, f.2. 1978, *pro syn.* *Flickingeria tairukounia* (S.S. Ying) T.P. Lin, Native Orch. Taiwan 3: 85, photo 29-30. 1987. **Type:** Taiwan: Tairukou, near to Chang-chuan Bridge [長春橋], Apr. 22, 1978, *S.S. Ying 7218* (NTUF). not found. ●尖葉暫花蘭

Note: This plant is a peloric form of *D. xantholeucum*.

Dendrochilum uncatum Rchb. f., Bonplandia 3: 222. 1855; Su, Quart. J. Chin. Forest. 21(1): 116, pl.1. 1988. **Type:** Philippines, *H. Cuming 2103* (holo. GOET013907; iso. K000943726, K000943728 & K000943729). Specimen: Mt. Lilung, 1000 m., *Su & Chen 8117* (NTUF).

穗花蘭/黃穗蘭

Platyclinis formosana Schltr., Bull. Herb. Boissier, sér. 2 6(4): 302. 1906. *Dendrochilum formosanum* (Schltr.) Schltr., Repert. Fedde Beih. 4: 185. 1919; S. Sasaki, List of Plants of Formosa 3: 128. 1928; Lin, Native Orch. Taiwan 1: 155, photo 88-90. 1975. **Type:** Taiwan: Isle Kotosho., Nov. [22], 1899, *K. Miyake s.n.* [lecto. TI, designated by T.Yukawa and H. Ohba in Lindleyana 10:31 (1995) photo T01183 in PoT]. Specimen: Pingtung: Mt. Lilung, 1100 m, Jan. 1, 1974, *T.P. Lin s.n.* (TAIF110061).

Note: The earliest record of collection from Taiwan: Pingtung: Nainaisya [女仍社]. *K. Segawa s.n.*, Nov. 21, 1934 (KPM, photo G01002 in PoT). Su (1988) has noticed a lot of variations of flower especially the lip and column.

Didymoplexiella siamensis (Rolfe ex Downie) Seidenf., Bot. Tidsskr. 67: 99. 1972; Su, Quart. J. Chin. Forest. 20(4): 100. 1987. *Leucolena siamensis* Rolfe ex Downie, Bull. Misc. Inform. Kew 1925: 416. 1925. **Type:** Thailand: Chiangmai, Doi Suthep, 6-900 m, May 8, 1910, *A.F.G. Kerr 245* (syn. K000942689); May 19, 1912, *A.F.G. Kerr 305* (syn. K000942688). Specimen: Pingtung: Luliaochi, Apr. *Su 7035* (NTUF).

錨柱蘭

Note: I observed differences between Taiwanese and Thailand's plant. *D. siamensis* of Thailand (Seidenfaden 1978) has a heart-shaped or bifid callocity near the bilobed tip of labellum, and *D. siamensis* from Taiwan has a broad central longitudinal raised and blunt callocity near the lip tip, where the front margin reflexed downward to form a cap-like structure. Two other smaller callocities are located at the base of lip, which are not found in plants from Taiwan. Lip morphology of the plants from Taiwan is almost identical to those of Ryukyu's (Nakajima 2012) and Hong Kong's *D. siamensis* (Hu *et al.* 2014).

Didymoplexis micradenia (Rchb.f.) Hemsl., J. Linn. Soc. Bot. 20: 311, 1883; T.C. Hsu and S.W. Chung, *Taiwania* 52(4): 360-364, f.1-3. 2007. *Epiphanes micradenia* Rchb.f., Fl. Vit. 295. 1868. **Type:** Fiji: Ovalau. 1860, *B.C. Seemann 610* (holo. W; iso. K000942690). Specimen: Taiwan: Lanyu, Tianchi, 220 m, Apr. 13, 2004, *S.W. Chung 8327* (TAIF273640).

小鬼蘭

Didymoplexis pallens Griff., Calcutta J. Nat. Hist. 4: 383. 1844; A. Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 93. 1896; Liu & Su, Fl. Taiwan 5: 973. 1978. **Type:** India: Near Sultan's Battery in Coory, *R. Wight s.n.* (K000387608, CAL, BR). Specimen: Taiwan: Takow, *Henry 1878*.

鬼蘭

Didymoplexis subcampanulata Hayata, Icon. Pl. Formos. 2: 136-137. 1912. **Type:** Taiwan: Koshun, Mar. 14, 1910, *T. Kawakami s.n.* (syn. TI, photo T00948 in PoT); Aug., 1912. *B. Hayata s.n.*, not found.

Note: Seidenfaden (1995) indicated that *D. pallens* (Seidenfaden 1978, p.178, f.110) is different from *D. subcampanulata*. However, I agree with most authors who consider them to be conspecific. More information on the lip surface of plants from Thailand's would be helpful.



Dienia ophrydis (J. König) Ormerod & Seidenf., *Contr. Orchid Fl. Thailand* 13: 18. 1997. Margonska & Kowalkowska, *Ann. Bot. Fennici* 45: 99. 2008. ***Epidendrum ophrydis*** J. König, *Observ. Bot.* 6: 46. 1791. ***Malaxis ophrydis*** (J.G. König) Ormerod in Seidenf., *Descr. Epidendrorum* J.G. König: 18. 1995; Ormerod, *Fl. Taiwan*, 2nd edit. 6: 136. 2003. **Type:** Thailand: Phuket region, *J. König s.n.* (lec. K; iso. LIV).

花柱蘭/貓尾蘭

Malaxis latifolia J.E. Sm., *Rees. Cycl.* 22. *Malaxis* n. 3. 1812; Lin, *Native Orch. Taiwan* 2: 258, photo 128-129. 1977. **Type:** Nepal: Narainhetty Upper Nepal, Aug. 12, 1802, *F. Buchanan-Hamilton s.n.* Herb. J.E. Smith 1396-3-1 (holo. LINN). ***Microstylis kizanensis*** G. Masam., *Ann. Rep. Taihoku Bot. Gard.* 3: 75. 1933. ***Malaxis kizanensis*** (Masam.) Hatus., *Fl. Ryukyus* 863. 1971. **Type:** Taiwan: Yilan: Kueishan Island, Jul. 3, 1932, *G. Masamune & S. Suzuki s.n.* (TAI033097, this type is confirmed by the label, since no type designated).

Malaxis latifolia var. *nana* S.S. Ying, *Mem. Coll. Agric. Natl. Taiwan Univ.* 25(2): 101. 1985. **Type:** Nan-jen-shan, Aug. 23, 1974, *S.S. Ying s.n.*

Dienia shuicae (S.S. Ying) T. P. Lin, *comb. nov.* ***Malaxis shuicae*** S.S. Ying, *J. Jap. Bot.* 62(3): 70, as 'shuicai'. 1987. **Type:** Taiwan: Pingtung: Shui-Ca. Feb. 14, 1986, flowering Aug. *S.S. Ying s.n.* (holo. NTUF, photo F00008223 in PoT).

•毒卡小柱蘭

Malaxis sampocae T.P. Lin & W.M. Lin, *Taiwania* 56(4): 319. 2011. **Type:** Taiwan: Pingtung, Shouka. *S.S. Lin s.n.* (holo. TAI274758)

Diploprora championii (Lindl.) Hook. f., *Fl. Brit. India* 6: 26. 1890; A. Henry, *Trans. Asia. Soc. Jpn.* 24(Suppl): 93. 1896; T.P. Lin, *Native Orch. Taiwan* 2: 135, photo 63-64. 1977. ***Cottonia championii*** Lindl., *Hooker's J. Bot. Kew Gard. Misc.* 7: 35 1855. **Type:** Hong Kong, Victoria Peak, *J.G. Champion 277* (holo. K000883992). Specimen: Taiwan: Bankingsing, *A. Henry 898 & 1606*.

黃吊蘭

Diploprora kusukusensis Hayata, *Icon. Pl. Formos.* 4: 86, f.42. 1914. **Type:** Taiwan: Kusukusu, Jun. 1912, *B. Hayata et S. Sasaki s.n.* Type not found.

Diploprora uraiensis Hayata, *Icon. Pl. Formos.* 4: 87, f.43. 1914. **Type:** Taiwan: Uraisha, May 1914, *B. Hayata s.n.* (holo. TI, photo T00950 in PoT).

Disperis neilgherrensis Wight, *Icon. Pl. Ind. Orient.* 5: t.1719. 1852; X. Chen *et al.*, *Fl. China* 25: 165. 2009. **Type:** S. India: Nilgherri Hills, *Wight s.n.* (syn. K000827269-827270 & K000883986); Lectotype (designated by H. Kurzweil, *Blumea* 50: 145. 2005): S. India: Coimbatore. *Wight 3018*, date not cited (isolecto. AMES, C, GH00098943, S, & W).

蘭嶼草蘭

Disperis siamensis Rolfe ex Downie, *Kew Bull.* 422. 1925; Seidenf., *Dansk Bot. Arkiv* 31(3): 139, f.89. 1977. **Type:** Thailand: Doi Sutep, 660-900 m, deciduous jungle, Aug. 27, 1911, *A.F.G. Kerr 1987* (holo. K000827015, C10016216).

Disperis orientalis Fukuy., *Bot. Mag. (Tokyo)* 50(589): 17. 1936; Lin, *Native Orch. Taiwan* 2: 145, photo 66. 1977. **Type:** Taiwan: Koto-syo, monte Sadakirei, Jul. 25, 1935, *N. Fukuyama 4839* (holo. KPM-NA0105536 without Fukuyama's no., photo T00028 in PoT).

Note: All ten Asian species are conspecific with the oldest taxon *D. neilgherrensis* which is a widespread and highly variable species (Kurzweil 2005).

Epipactis fascicularis T.P. Lin, *Taiwania* 60(4): 169, f.1 and 2A&B. 2015. **Type:** Taiwan: Taichung: near Lishan, 1900 m, Jul. 21, 2013, *Sheng-Kun Yu s.n.* (holo. TAI286042).

•余氏鈴蘭

Epipactis ohwii Fukuy., *Bot. Mag. (Tokyo)* 48(569): 298. 1934. ***Epipactis helleborine*** (L.) Crantz ssp. *ohwii* (Fukuy.) H.J. Su, *Fl. Taiwan* 5: 861. 2000. **Type:** Taiwan: Taihoku, Nankotaizan, Bunakkei-Piyanan-anbu [南湖園谷-思源啞口] 8000 ped. Jul. 21, 1933, *N. Fukuyama 3973* (holo. KPM-NA0105537 without Fukuyama's no., photo T00049 in PoT).

•台灣鈴蘭

Note: *E. ohwii* differs considerably from *E. helleborine*.

Epipogium aphyllum Swartz, *Summa Veg. Scand.* 32. 1814; S.W. Chung, *Orch. Taiwan* 146. 2008. ***Satyrium epipogium*** L., *Sp. Pl.* 2: 945. 1753. **Type:** "Epipogium" in Gmelin, *Fl. Sibirica*, 1: 12, t. 2, f. 2, 1747 (Lectotype, designated by Renz & Taubenheim in Davis (ed.), *Fl. Turkey* 8: 470. 1984). Taiwan: Tapachienshan, 3100 m, Sept. 19, 2014, *W.S. Wu s.n.* (TAI284549). **無葉上鬚蘭** ***Epipogium japonicum*** Makino, *Bot. Mag. (Tokyo)* 18: 131. 1904; Su, *J. Expt. Forest Natl. Taiwan Univ.* 13 (3): 207. 1999. **Type:** Japan: Shimotsuke: Nikko, Mt. Nyoho, Sept. 28, 1904, *N. Aoki and M. Kurushima s.n.* (Herb.?). Specimen: Taiwan: Meifong, 2200 m. Nov. 16, 1997, *Su et al. 9569* (HAST).

日本上鬚蘭

Epipogium kentingensis T.P. Lin & S.H. Wu, *Taiwania* 57(4): 378-379, f.1B, C & 3. 2012. **Type:** Taiwan: Pingtung: Kenting, Mar. 27, 2012, *S.H. Wu s.n.* (holo. TAI281012).

•墾丁上鬚蘭

Note: The characteristics of *Epipogium poneranthum* Fukuy. (Fukuyama 1942) native to the Ryukyu islands are inconsistent with those of *E. kentingensis*. A putative hybrid between *E. kentingensis* and *E. roseum* can be found in Southern Taiwan.

Epipogium roseum (D. Don) Lindl., *J. Proc. Linn. Soc., Bot.* 1: 177. 1857; T.P. Lin, *Nat. Orch. Taiwan* 2: 148-150, photo 67-69. 1977. ***Limodorum roseum*** D. Don, *Prodr. Fl. Nepal.* 30. 1825. **Type:** Nepal: 1818, *N. Wallich s.n.* (holo. BM000061526).

泛亞上鬚蘭

Galera rolfei Hayata, *J. Coll. Sci. Imp. Univ. Tokyo* 30(1): 348. 1911; *Icon. Pl. Formos.* 4: 121-122, f.64. 1914. ***Epipogium rolfei*** (Hayata) Schltr., *Repert. Spec. Nov. Regni Veg.* 10: 5. 1911. **Type:** Okinawa, May 1891, *S. Tanaka 147*.

Galera kusukusensis Hayata, *Icon. Pl. Formos.* 4: 121, pl.20. 1914. ***Epipogon kusukusense*** Hayata *nom. nud.* in sched. **Type:** Taiwan: Kusukusu [高士佛], Jul. 1912, *B. Hayata et S. Sasaki s.n.* (holo. TI, photo T00967 in PoT).

Note: *Epipogium poneranthum* Fukuy. of the Ryukyu [**Type:** *N. Fukuyama 7123*, Jun. 7, 1938 (TAI 123093; Iso. 118717)] has few flowers on a short stem does not resemble *E. roseum*.

Eria amica Reichb. f., please see *Pinalia amica* (Reichb.f.) Kuntze ***Eria corneri*** Reichb. f., *Gard. Chron.* 10: 106. 1878; Masam., *J. Geobot.* 14(1): pl.108. 1965; T.P. Lin, *Nat. Orch. Taiwan* 2: 154, photo 72. 1977. **Type:** Taiwan: A. Corner *s.n.* (W-RCHB). This species was discovered in Formosa by Mr. Arthur Corner, and grown by Mr. Charles Leach, King's Road, Clapham Park. **黃絨蘭**

Eria septemlamella Hayata, *Icon. Pl. Formos.* 4: 56, f.24. 1914.

Type: Taiwan: Rinkihō [竹山], Aug. 1911 [flowering Oct. 9, 1914], *H. Inaba s.n.* (holo. TI with Hayata's hand-writing, photo T00956 in PoT).



Eria herklotsii P.J. Cribb, Orchid Rev. 84: 131. 1976. G. Barretto, P. Cribb and S. Gale, The Wild Orchids of Hong Kong 498. 2011. **Type:** Hong Kong: S. of Ma On Shan, G.A.C. Herklots s.n. (holo. K000827413). **香港毛蘭**

Trichosma simondii Gagnep., Bull. Mus. Nat. Hist. (Paris) ser. 2, 22: 505. 1950, non *Eria simondii* Gagnep. Bull. Mus. Nat. Hist. (Paris) ser. 2, 22: 503. 1950. **Type:** China: Yunnan, Szemao (Simao), *Simond* 96 (P).

Eria gagnepainii A.D. Hawkes & A.H. Heller, Lloydia 20: 130. 1957; Hu *et al.*, Taiwan J. For. Sci. 25(4): 369-375. 2010. Taiwan: Taitung: Chinfeng, Chienchingshan, 900 m., Mar. 5, 2009, H.M. Chang 7319 (TNU). Note: This is a new name for *Trichotoma simondii*, mistakenly for *Trichosma simondii* Gagnep. (Barretto *et al.* 2011).

Eria javanica (Swartz) Blume, Rumphia 2: 23. 1836; Lin, Native Orch. Taiwan 2: 157. 1977. *Dendrobium javanicum* Sw., Neues J. Bot. 1(1): 96. 1805. **Type:** Indonesia: E. Java, *Thunberg* s.n. not found. Specimen: Taiwan: Nantou: Chusan 300 m., Sept. 10, 1976, F.S. Ho s.n. (TAIF). **大葉絨蘭**

Eria ovata Lindl. please see *Pinalia ovata* (Lindl.) W. Suarez & Cootes
Eria robusta (Blume) Lindl., Gen. Sp. Orch. 69. 1830; Liu & Su, Fl. Taiwan 5: 987, pl. 1593. 1978. *Dendrobium robustum* Blume, Bijdr. Fl. Ned. Ind. 7: 347. 1825. *Aeridostachya robusta* (Blume) Brieger, Schltr., Orchideen, ed. 3, 1A (11-12): 714. 1981. **Type:** Indonesia: Java, in mountains of Borgor and Cianjur, Jun. 1, 1893, C.L. Blume s.n. (syn. HBG 506662 & L0059900). **細花絨蘭**

Eria sawadae Yamam., J. Soc. Trop. Agric. 3(3): 238. 1931.

Type: Taiwan: Taitung, Shinsuiei [Chinshuiyin] 4500 ped., flowering May 1931, K. Sawada s.n. (holo. TAI118719).

Eria uchiyamae Tuyama, Bot. Mag. (Tokyo) 54(643): 269. 1940.

Type: Micronesia: Caroline, Palau; Ins. Baobeldaob, Aug 15, 1939, cult. in. Ngathpan, flor., Aug. 29, 1939, T. Tuyama & S. Uchiyama s.n. (holo. TD); flor. Sept. 7, 1939, T. Tuyama s.n. (para.); Gardok, Apr. 17, 1938, S. Hatusima s.n. (para.).

Erythrodes aggregatus (T.P. Lin & W.M. Lin) T.P. Lin, *stat. nov.* *Erythrodes Blumei* (Lindl.) Schltr. var. *aggregatus* T.P. Lin & W.M. Lin, Taiwania 54(4): 329, f.2G. 2009. **Type:** Taiwan: Kaohsiung: Lieukuei, Minghaishan. *Weimin Lin* s.n. (holo. TAI268959). **●密花小唇蘭**

Erythrodes chinensis (Rolfe) Schltr., Die Orchideen 117, fig.3C-F. 1914; Ormerod, Lindleyana 17: 194, f.3C-F. 2002. *Physurus chinensis* Rolfe, Bull. Misc. Inform. Kew 1896: 200. 1896; Forbes and Hemsl., J. Linn. Soc. Bot. 36 (Ind. Fl. Sin.): 41. 1903; J. Matsumura and B. Hayata, J. Coll. Sci. Imp. Univ. Tokyo 22: 99, f.52. 1906. Hayata, Icon. Pl. Formos. 4: 99, t.52. 1914. **Syntypes:** China: Guangdong, Guangzhou, Lienchan river. 1889, *Ford 134* (K000482472) & *Ford 240* (K000482471); cult. in Garden, specimen made in Apr. 1, 1889 (K000482473, K000942726). Specimen: Taiwan: Mt. Arisan, Mar. 1914, B. Hayata *et T. Ito* s.n.; Location not indicated. anno 1898, C. Owatari s.n.

小唇蘭

Physurus chinensis Matsum. & Hayata, Icon. Pl. Formosan. 4: 99, f. 52. 1914. refers to Rolfe, not a sp. nov.

Erythrodes formosana Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 169. 1919. **Type:** Taiwan: Karapin, Mar. 24, 1914, B. Hayata s.n. (lecto. TI, photo T00960 in PoT; This lectotype was designated by Yukawa and Ohba (1995).

Note: Ormerod (2002) studied the type material of *E. Blumei* and considered *E. chinensis* to differ from *E. Blumei*, although Seidenfaden did not believe that *E. chinensis* is different from *E.*

Blumei (Seidenfaden 1978). *E. Blumei* has a transversely elliptic epichile to the lip and a spur that extends 1 mm beyond the lateral sepals, whereas *E. chinensis* has an ovate-subquadrate epichile and a spur that extends 2 mm beyond the lateral sepals. Here I am in agreement with Ormerod's concept, and consider this plant found in Taiwan to be *E. chinensis*.

Erythrodes chinensis (Rolfe) Schltr. var. *triantherae* (C.L. Yeh & C.S. Leou) T.P. Lin, *comb. nov.* *Erythrodes triantherae* C.L. Yeh & C.S. Leou, Taiwania 51(4): 266-269, f.1-2. 2006. **Type:** Taiwan: Lanyu: Mt. Koto, Feb. 2, 2006, C.R. Yeh 4068 (holo. PPI); Tienchi, C.R. Yeh 4069 (para.); Oubenlin C.R. Yeh 4070 (para. PPI).

●三藥細筆蘭

Note: A specimen (KPM with photo G00360 in PoT) collected by Segawa in Mar. 1930 from Lanyu could be this species. The spur of *E. triantherae* is shorter than that of other plants from Taiwan. The spur extends approximately 1 mm beyond the lateral sepals, and the length between the tip of spur and junction between lip and ovary is 1.7 mm. The plants in Lanyu are slightly smaller and weaker than their counterparts in Taiwan. I consider this species to be deteriorating, because I have observed several flowers with collapsed and off-type lip, probably because of poor development. I propose this species as a variety of *E. chinensis*.

Erythrochis altissima (Blume) Blume, Rumphia, 1: 200. 1837; Gagnep., Fl. Gen. Indochine 6, 5: 632, fig. 61, 2-8. 1934; Seidenf., Dansk Bot. Ark. 32(1): 136. f.85. 1978; Seidenf. & Wood, Orch. Malay. Sing.: 132, fig. 54 a, b. 1992; H.J. Su, Quart. J. Chin. For. 20(4): 100, pl. 2. 1987. **Type:** Indonesia: Java, Mt. Seribu (GH00099432). Specimen: Taiwan: Pingtung: Luliaohsi to Lanjenhsi, Jun. 5, 1986, Su 7163 (HAST104618).

倒吊蘭/蔓莖山珊瑚

Galeola ochobiensis Hayata, Icon. Pl. Formos. 6: 87, f.19. 1916.

Erythrochis ochobiensis (Hayata) Garay, Bot. Mus. Leaflet. Harv. Univ. 30(4): 234. 1986; Seidenf., Opera Bot. 114: 73. 1992. **Type:** Taiwan: Ochobi [烏石鼻], May 14, 1916, B.

Hayata s.n. (not found). Specimen: Ochobi, May 1916, TAI6739; May 13, 1916, TAI6740.

Vanilla taiwaniana S.S. Ying, Quart. J. Chin. For. 20(2): 55, photo 7. 1987. **Type:** Taiwan: Taichung, Jul. 1984, F.S. Ho s.n.

Note: Ying (1987) may have mistakenly described the leaves appearing on the stem.

Note: The race of this species that is distributed in Japan, Taiwan and Hainan, and has a rather slender to near-fuliform fruit, was treated as a distinct species by Garay (1986).

Eulophia brachycentra Hayata, Icon. Pl. Formos. 4: 72, f.36a. 1914. **Type:** Taiwan: Taitung: Shinkogai [新港街] Jun. [8], 1906, Z. Kobayashi s.n. (holo. TI, photo T00961 in PoT)

台東芋蘭/短裂芋蘭

Note: This giant *Eulophia* has 3-4 leaves that are linear-lanceolate and 50 cm long and 1.2 cm wide. The inflorescence can be up to 75 cm long with dense flowers. In his letter, Ormerod considered the lamellate lip and the shape of this tall plants strongly indicated that this plant is the species *Eulophia exaltata* Rchb.f., which is extremely common in the Philippines. However, I have no knowledge about this plant in Taitung.

Eulophia graminea Lindl., Gen. Sp. Orchid. Pl. 182. 1833; Liu & Su, Fl. Taiwan 5: 993. 1978. **Type:** Singapore: 1822, *Wallich* 7372 (holo. K001127245). **美冠蘭**

Eulophia ramose Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 332-333. 1911; Icon. Pl. Formos. 4: 72, f.36b-h. 1914. **Type:** Taiwan: Nokoan, Jan. 16, 1908, T. Kawakami *et U. Mori* 6281 (iso. TAI6733).



Eulophia pulchra (Thouars) Lindl., Gen. Sp. Orchid. Pl. 182. 1833; T.P. Lin, Native Orch. Taiwan 3: 70, 79, photo 36-37. 1987. *Limodorum pulchrum* Thouars, Hist. Orchid. t.43. 1822. *Oeceoclades pulchra* (Thouars) P.J. Cribb & M.A. Clem., Austral. Orchid Res. 1: 99. 1989. **Type:** Madagascar: 1816, *D.P. Thouars 3* (iso. BM000525727).

大芋蘭

Eulophia macrostachya Lindl., Gen. Sp. Orch. Pl. 183. 1833; Fukuy., Bot. Mag. Tokyo 48: 304. 1934. **Type:** Sri Lanka: *Macrae s.n.* Taiwan: Hengchun, *Fukuyama 3985*, Jan 1, 1932.

Eulophia pulchra* var. *pelorica (D.L. Jones & M.A. Clem.) T.P. Lin, **com. nov.** *Eulophia pelorica* D.L. Jones & M.A. Clem., Orchadian 14(8): sci. suppl. 9. 2004; Hsu & Chung, Taiwania 54(1): 82-87. 2009. **Type:** Australia: Adjacent to Rocky Claudie River Crossing, 40 m, May 14, 2003, *B. Gray & D.L. Jones 9624* (holo. QRS).

輻射芋蘭

Eulophia pulchra (Thouars) Lindl. var. *actinomorpha* W.M. Lin, L.L.K. Huang & T.P. Lin, Taiwania 51(3): 163-164, f.2, 5B. 2006. **Type:** Taiwan: Pingtung: Beyishan, *Weimin Lin s.n.* (holo. TAI256485).

Eulophia segawae Fukuy., Bot. Mag. (Tokyo) 48(571): 437, f.1. 1934. **Type:** Taiwan: Taitoo, Riran-shichoo, Tokobanryo, Feb. 15, 1933, *K. Segawa s.n.* (holo. KPM-NA0105538, photo T00050 in PoT).

●瀨川氏芋蘭

Note: *Eulophia segawae* has wider tapels than *E. taiwanensis*, and this is clearly shown in the photo in the original publication.

Eulophia taiwanensis Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 333-334. 1911. **Type:** Taiwan: Taito: Takai, Jan. 1906, *T. Kawakami et G. Nakahara 684* (Lectotype designed here: TI, photo T00964 in PoT; Isosyn.: Ako, Feb. 1906, *T. Kawakami 1087*, TI, photo T00963 in PoT; *T. Kawakami s.n.* K000078311).

紫芋蘭

Eulophia kitamurai Masam., J. Soc. Trop. Agric. 4(2): 192. 1932.

Eulophia taiwanensis var. *kitamurai* Masam. Bot. Mag. (Tokyo) 46(552): 803. 1932. **Type:** Taiwan: Taitung, Tamari, Mar. 12, 1932, *S. Kitamura s.n.* not found.

Note: Ormerod (2003) indicated that *E. taiwanensis* is conspecific with *E. dentata* Ames. However, *E. dentata* (Type: *Curran 17035*, AMES00099441) is a huge plant over 1 m tall, and has a substantially wider sepal and petal, and a considerably larger midlobe that is approximately 45% of the lip length, whereas our entity has narrow tapels, and the midlobe is approximately 25% of lip length. The small midlobe of *E. taiwanensis* is also shown in a good drawing by Nakajima (2012).

Eulophia zollingeri (Rchb. f.) J.J. Sm., Orch. Java, 228. 1905; S.S. Ying, Col. Ill. Indign. Orch. Taiwan 1:456. 1977; Ormerod, Taiwania 49(2):98. 2004. *Cyrtopera zollingeri* Rchb. f., Bonpl. 5: 38. 1857. **Type:** Java: Lampung and Gebbok Klakka, Nov. 1844, *H. Zollinger 585* (W-Rchb. Orch. 0044978).

山芋蘭

Cyrtopera formosana Rolfe, Bull. Misc. Inform. Kew 1896(119):198. 1896; A. Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 92. 1896. *Eulophia formosana* (Rolfe) Rolfe, J. Linn. Soc. Bot. 36: 28. 1903. **Type:** Taiwan: South cape, A. Henry 1974 (holo. K000078314). 台灣芋蘭

Eulophia ochobiensis Hayata, Icon. Pl. Formos. 6: 78. 1916. **Type:** Taiwan: Ochobi, May 13, 1916, *B. Hayata s.n.* not found.

Galeola falconeri J.D. Hooker, Fl. Brit. India 6: 88. 1890; King et Pantl., 1898, Ann. Roy. Bot. Gard. Calcutta, 8: 265, tab. 353; T.S. Liu & H.J. Su, Fl. Taiwan 5: 882, pl.1596. 2000. *Cyrtosia falconeri* (Hook. f.) Aver., in L.V. Averyanov, Turczaninowia 14(2): 38. Figs. 15 & 24 c,d. 2011. **Syntypes:** NE. India: Garhwal, *Falconer s.n.*; Sikkim, *T. Thomson s.n.* Specimen: Taiwan: Nanhutashan, From Shiyuen, hiking trail, Jun. 18, 1986, *H.J. Su 7176* (HAST104622).

直立山珊瑚/小囊山珊瑚

Galeola kuhlii auct. non (Rchb. f.) Rchb. f.: T.S. Liu & H.J. Su, Fl. Taiwan 5: 996, pl. 1596. 1978.

Galeola matsudai auct. non Hayata: T.P. Lin, Native Orch. Taiwan 3: 91, photo 47-50. 1987.

Note: Averyanov considered *Cyrtosia* to closely resemble *Galeola* Lour., but the latter differs in the climbing vine habit, aerial roots at nodes, and the dry dehiscent fruit that is a capsule rather than a berry. However, molecular evidence is required to support *G. falconeri* and *G. lindleyana* being conspecific with *Cyrtosia*. Chen *et al.* (2009) found differences between the plants from Taiwan and the Himalayas. Some considered that *G. nudifolia* is conspecific with *G. falconeri*. However, *G. nudifolia* is a vine and flower detail is inconsistent with that of Taiwan's plants (Seidenfaden 1978, f.82).

Galeola lindleyana (Hook. f. & Thoms.) Rchb. f., Xenia Orchid. 2: 78. 1865; S.S. Ying, Col. Ill. Indign. Orch. Taiwan 1:456. 1977. *Cyrtosia lindleyana* Hook. f. & Thomson, Ill. Himal. Pl. t. 22. 1855. **Type:** NE. India ("India, Khasia") 1219 m, *J.D. Hooker 357* (K000387590); Sikkim: 1857, 1524-2134 m, *T. Thomson s.n.* (K000387588 fruit only).

山珊瑚

Galeola matsudai Hayata, Icon. Pl. Formos. 9: 114, f.40. 1920.

Type: Taiwan: Akocho: Paiwan, Jun. 1917. Type not found.

Gastrochilus ciliaris F. Maekawa, J. Jap. Bot. 12: 92. 1936; Chung & Leou, Quart. J. Expt. Forest. Natl. Taiwan Univ. 7(1): 80, f.1, 2. 1993. *Saccolabium ciliare* (Maek.) Ohwi, Bull. Natl. Sci. Mus. Tokyo n.s., 1(1): 1 1954. **Type:** Japan: Kiusiu, Insula Yaku, Y. Doi anno 1935 (TI). Specimen: Nantou: Honghuanshan, 1800 m, *C.S. Leou & N.J. Chung 4535 & 4557*.

緣毛松蘭

Gastrochilus formosanus (Hayata) Hayata, Icon. Pl. Formosan. 6(Suppl.): 78. 1917. *Saccolabium formosanum* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 336-37. 1911. **Type:** Taiwan: Arizan, Mar. [23], 1908, *T. Kawakami et U. Mori 3164* (holo. TI, photo T01206 in PoT; iso. TAI6744 & 6745; K000891614) ●台灣松蘭

Gastrochilus nebulosus Fukuy., Bot. Mag. (Tokyo) 49(587): 762.

1935. **Type:** Taiwan: Taihoku, in *Sakakietis dorso montis Haro*, 1000 m. Mar. 20, 1935, *Suzuki-T. 4715*, not found.

Gastrochilus rupestris Fukuy., Bot. Mag. (Tokyo) 49(587): 763.1935. **Type:** Taiwan: Sintiku, Rito-san [李棟山], 1500 m. Jan. 7, 1932, *N. Fukuyama 4716* (holo. KPM-NA0105541, photo T00052 in PoT).

Gastrochilus quercetorum Fukuy., Bot. Mag. (Tokyo) 50(589): 16. 1936. **Type:** Taiwan: Takao: Naihonroku-goe, in *Quercetis prope Hudieda* [藤枝], 1500m, Oct. 24, 1934, *N. Fukuyama 4720* (holo. KPM-NA0105539, photo T00062 in PoT; iso. KPM-NA0105540, photo T00051 in PoT).

Saccolabium shaoyaoi S.S. Ying, Col. Ill. Indign. Orch. Taiwan 1(2): 310. 1977. **Type:** Yilan: Taipingshan, Sept. 30, 1973, *S.S. Ying 2165* (NTUF).



Gastrochilus fuscopunctatus (Hayata) Hayata, Icon. Pl. Formo. 6(Suppl.): 78. 1917. *Saccolabium fuscopunctatum* Hayata, Icon. Pl. Formos. 2: 143. 1912. *Gastrochilus fuscopunctatus* (Hayata) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 288. 1919. **Type:** Taiwan: Arisan, Jan., 1912, *B. Hayata et S. Sasaki s.n.* (holo. TI, photo T01207 in PoT, good line drawing in the Type specimen). ●紅斑松蘭

Note: *G. fuscopunctatus* is not *G. pseudodistichus* (King & Pantl.) Schltr. which has a wide glabrous lip and linear leaves. *G. kadooriei*, described from Hong Kong is very similar to *G. fuscopunctatus* (Kumar *et al.* 2014).

Gastrochilus hoii T.P. Lin, Native Orch. Taiwan 3: 103. 1987. **Type:** Taiwan: Mt. Nanhuta, Jan. 5, 1979, *T.P. Lin 434* (holo. TAIIF). ●何氏松蘭

Gastrochilus japonicus (Makino) Schltr., Repert. Spec. Nov. Regni Veg. 12: 315. 1913; Su, Native Orch. Taiwan 1975. *Saccolabium japonicum* Makino, Ill. Fl. Jap. 1(7): 3. 1891. **Type:** Japan: Mt. Honokawa, Yoshinaga. *Makino s.n.*; Nanokawa, *Watanabe s.n.* (MAK) 黃松蘭

Saccolabium somai Hayata, Icon. Pl. Formos. 4: 93-94. 1914.

Gastrochilus somae (Hayata) Hayata, Icon. Pl. Formos. 6(Suppl.): 79. 1917. **Type:** Taiwan: Pinansha [卑南社], Mar. 1913, *T. Soma s.n.* (holo. TI, photo T01190 in PoT).

Saccolabium taiwanianum S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 311. 1977. **Type:** Taiwan: Urai, May 30, 1976, *S.S. Ying 2130* (holo. NTUF, photo, F00008221 in PoT).

Gastrochilus linii Ormerod, Taiwania 47(4): 242. 2002.

Gastrochilus flavus T.P. Lin, Native Orch. Taiwan 3: 95, photo 51. 1987, *non* (J.D. Hooker) Kuntze 1891. **Type:** Taiwan: Nantou: Wang Hsiang (望鄉), 2300 m, May. 15, 1978, *Y.P. Young s.n.* (TAIF). ●金松蘭

Gastrochilus matsudae Hayata, Icon. Pl. Formos. 9: 116, pl.40. 1920. **Type:** Taiwan: Mt. Daibusan, Nov. [20] 1918, *Y. Matsuda s.n.* (holo. TI, photo T01205 in PoT; iso. TAI032825). ●寬唇松蘭

Gastrochilus rantabunensis C. Chow, ex T.P. Lin, Native Orch. Taiwan 3: 109, photo 61-62. 1987. *Gastrochilus rantabunensis* C. Chow, Formosan Orchid 61. 1968. *nom. nud.* **Type:** Taiwan: Taichung: Piluchi (碧綠溪), Jan. 17, 1979, *Lin 433* (holo. TAIIF). ●合歡松蘭

Note: Ying (1987b) considered this species to be conspecific with *Gastrochilus bellinus* (Reichb. f.) Kuntze (Revis. Gen. Pl. 2: 661. 1891). *G. bellinus* has considerably larger flowers compared with *G. rantabunensis*. Moreover, the epichile of the labellum in *G. bellinus* is substantially larger, and is characterized by an erose or fimbriate margin, and the central cushion yellow with a cavity at base. This species can be distinguished from *G. rantabunensis* based on these characteristics.

Gastrochilus raraensis Fukuy., Bot. Mag. (Tokyo) 48(571): 441. 1934. **Type:** Taiwan: Taihoku, Rara-san 2000 m, Oct. 1933, *N. Fukuyama 4138*. ●紅檜松蘭

Gastrodia albida T.C. Hsu & C.M. Kuo, Ann. Bot. Fennici 48: 272-274. 2011. **Type:** Taiwan: Taipei: Wulai, Pataoerhshan, 800 m. Jun. 12, 2007, *T.C. Hsu 838* (holo. TAI; iso. TAIIF440365); Pataoerhshan, *T.C. Hsu 530* (para. TAI, TAIIF), Yun Hsien Holiday Resort, *T.C. Hsu 877, 1421* (para. TAIIF). ●白赤箭

Gastrodia appendiculata S. Leou & N.J. Chung, Quart. J. Exp. Forest, NTU. 5(4): 138, f.2. 1991. **Type:** Taiwan: Nantou: Chitou, 1200 m. *C.S. Leou & N.J. Chung 4178* (holo. NTUF), not found. ●無蕊喙赤箭

Gastrodia callosa J.J. Sm., Repert. Spec. Nov. Regni Veg. 29: 248. 1931; T.C. Hsu & C.M. Kuo, Taiwania 55(3): 245, f.3. 2010. **Type:** Java: Bogor, Oct. 17, 1927, *Leeuwen 11567*. Specimen: Taiwan: Lanyu: Tienchih, 150 m. Jun. 29, 2008, *T.C. Hsu 1429* (TAIF300335) 緋赤箭

Gastrodia clausa Hsu, Chung & Kuo, Taiwania, 57(3): 271, f.1A-D & 2. 2012. **Type:** Taiwan: New Taipei City: Sanchih, Peihsinchuang (北新莊), 400 m. Mar. 24, 2008, *T.C. Hsu 1299* (holo. TAI) 閉花赤箭

Gastrodia confusa Honda & Tuyama, J. Jap. Bot. 15: 659. 1939; Leou & Chung, Quart. J. Expt. Forest Natl. Taiwan Univ. 6(1): 65, f.1-2. 1992. **Type:** Japan: Kii, Hidaka-gun oppido Yukawa-nura, Maruyama, 6 Oct. 1938, *T. Sibaguti s.n.* Specimen: Taiwan: Shenmu village, 1300 m, *C.S. Leou 4172, 4175, 4195*. 八代赤箭

Gastrodia leoui T.C. Hsu & C.M. Kuo, Taxonomy of *Gastrodia* (Orchidaceae) in Taiwan. Mater thesis, Taiwan Univ. 125, f.5.18-5.19. 2008. *nom. invalid.* Note: Hsu (2012) indicated that this taxon is highly similar to *G. confusa*, but differs because of the ovate-triangular lip flush with reddish orange compared with ovate-oblong flush with yellowish white. Based on my and Hsu's line drawing (2008) of *G. leoui* of the type locality and drawing of *G. confusa* by Nakajima (2012), I found that both Taiwan and Ryukyu entities have a similar lip shape, ovate-triangular and a well-developed rostellum.

Gastrodia confusoides T.C. Hsu, S.W. Chung & C.M. Kuo, Taiwania 57(3): 273, f. 1E-H & 3. 2012. **Type:** Taiwan: Taichung: Tahsuehshan 15-16k, 1000 m. Sep. 14, 2007, *T.C. Hsu 966* (holo. TAI; iso. TAIIF440366) ●擬八代赤箭

Gastrodia taitungensis T.C. Hsu & C.M. Kuo, Taxonomy of *Gastrodia* (Orchidaceae) in Taiwan. Mater thesis, Taiwan Univ. 151, f.5.29-5.30. 2008. *nom. invalid.*

Note: Hsu *et al.* (2012) indicated several minor differences between *G. confusoides* and *G. taitungensis* in his description. I could not observe any differences when I compared both living plants from type localities carefully. They also indicated that this taxon is highly similar to *G. confusa* and only differ by column morphology. *G. confusoides* lacks a rostellum, and the stigma is located above the middle of the column, whereas in *G. confuse*, a well-developed rostellum is observed, and the stigma is located below the middle of column.

Gastrodia elata Blume, Mus. Bot. Ludg.-Bat. 2: 174. 1856; Tuyama, J. Jap. Bot. 41(11): 339. 1966; Liu & Su, Fl. Taiwan 5: 1003. 1978. **Type:** Japan: *H. Burger s.n.* (holo. L0061308). One specimen in Herb. H.G. Reichenbach no. 17858 with figure. Specimen: Taiwan: Niitaka, Jul. 19, 1935, Bokuro. *K. Segawa s.n.*; Nantou: Tuikuan to Kuankao, 2100-2500 m, Jul. 7, 1993, *C.H. Chen 75* (HAST 26425). 高赤箭

Gastrodia elata Blume f. *pilifera* Tuyama, J. Jap. Bot. 17(10): 582. 1941. **Type:** Taiwan: Niitaka, Bokuro. Jul. 19 1935, *K. Segawa s.n.* Note: Rhizome covered with hairs.

Gastrodia flavilabella S.S. Ying, Quart. J. Chin. Forest. 17(4): 83. 1984. **Type:** Taiwan: Nantou: Chi-tou, 1265 m. Jul. 29, 1984, *S.S. Ying s.n.* (holo. NTUF, photo F00000328 in PoT; iso. NTUF, photos F00017989 & F00017990) ●夏赤箭



Gastrodia flexistyla T.C. Hsu & C.M. Kuo, *Taiwania* 55(3): 243-244, f.1. 2010. **Type:** Taiwan: Taipei: Beitou, Chongchengshan, 700-800 m. Mar. 24, 2008, *T.C. Hsu 1300* (holo. TAI; iso. TAI440367). **摺柱赤箭**

Note: This species shows a close relationship to *G. nipponica*, and differs by the trilobed column with a strongly incurved central lobe which carries anther and inserts into the ovary, thus forming a complete cleistogamous flower. This species was also reported from Japan (K. Suetsugu, 2014).

Gastrodia fontinalis T.P. Lin, *Native Orch. Taiwan* 3: 129-130, photo 72-73. 1987. **Type:** Taiwan: Taipei: Mt. Pataoerh, Feb. 25, 1979, *Lin 435* (holo. TAI). **春赤箭**

Gastrodia gracilis Blume, *Mus. Bot. Ludg.-Bat.* 2: 174. 1856. **Type:** Japan (L0061309). **山赤箭**

Gastrodia dioscoreirhiza Hayata, *Icon. Pl. Formos.* 6: 93. 1916;

Tuyama, *J. Jap. Bot.* 17: 583, f.3, 1942; 31 (3) f.2c. 1956. **Type:**

Taiwan: Girancho: Soseikyaku [雙生腳] May 12, 1916, *B.*

Hayata s.n. (holo. TI, photo T00971 in PoT; iso. TAI6749).

Gastrodia taiwaniana Fukuy., *Bot. Mag. (Tokyo)* 48(569): 299.

1934. **Type:** Taiwan: Shinchiku, Minami-sooten-zan [南插天山]

prope Kappan-zan, 2000 ped. May 24, 1933, *N. Fukuyama 3976*.

Gastrodia nantoensis T.C. Hsu et C.M. Kuo ex T.P. Lin *sp. nov.* *Gastrodia nantoensis* T.C. Hsu et C.M. Kuo, *Taxonomy of Gastrodia (Orchidaceae) in Taiwan*. Mater thesis, Taiwan Univ. 130, f.5.20-5.21. 2008. *nom. invalid.* **Type:** Taiwan: Nantou: Wenkeng, 900 m. Sep. 7, 2006, *T.C. Hsu 579* (TAI). Specimen: Urai: Pataoerhshan, 760 m, Oct. 11, 2008, *W.M. Lin s.n.* (TAI 271854). **●南投赤箭**

Note: *Gastrodia nantoensis* is similar to the *Gastrodia appendiculata* but can be distinguished by features listed below. In fact, these two species are occupying the same locality, and the flowering periods are overlapping.

Features	<i>G. appendiculata</i>	<i>G. nantoensis</i>
Column appendage	Yes	No
Lip	Attach to very short column-foot	Attach to corolla
Callus on labellum claw	Much reduced	Claw & callus absent
Corolla	Lateral sepal almost separate	Lateral sepal connate for 1/2 length
Ventral side of corolla	Bulge	Flat

Gastrodia nipponica (Honda) Tuyama, *Bot. Mag. (Tokyo)* 53: 4. 1939; T.C. Hsu & C.M. Kuo, *Taiwania* 55(3): 243-248, 2010. *Didymoplexis nipponica* Honda, *Bot. Mag. (Tokyo)* 46(544): 168. 1932. **Type:** Japan: Hondo: Iwada, Kii, *K. Kashtyama no. 1*, anno 1929; *K. Kashtyama no. 2*, anno 1931 (holo. TI). Specimen: Taiwan: Taipei: Wulai, Dadaoshan, 500-600 m. *T.C. Hsu 732, 1319* (TAIF). **日本赤箭**

Gastrodia peichatieniana S.S. Ying, *Col. Ill. Fl. Taiwan* 2: 690. 1987. **Type:** Taiwan: Peichatienshan, 1100 m. Oct. 10, 1985, *S.S. Ying s.n.* (holo. NTUF, photo F00000311 in PoT). **北插天赤箭/秋赤箭**

Gastrodia autumnalis T.P. Lin, *Native Orch. Taiwan* 3: 122-123,

photo 65-66. 1987. **Type:** Taiwan: Taipei: Mt. Tatung, Oct. 10,

1976, *Lin 392* (holo. TAI). Note: This species was also

recently found in Hong Kong (Hu *et al.* 2014)

Gastrodia pubilabiata Sawa, *Res. Rep. Kôchi Univ.* 29: 60. 1980; Leou, *Fl. Taiwan* 5: 896. 2000. **Type:** Japan. **冬赤箭**

Garstrodia hiemalis T.P. Lin, *Native Orch. Taiwan* 3: 131, photo 74-77. 1987. **Type:** Taiwan: Taipei: Mt. Pataoerh. Dec. 26, 1980, *Lin 600* (TAIF). Note: A paper by Kobayashi & Yukawa on *G. pubilabiata* was published in *Acta Phytotax. Geobot.* 52 (1): 49-55. 2001.

Gastrodia shimizuana Tuyama, *Acta Phytotax. Geobot.* 33: 380-382. 1982; Chung and Hsu, *Taiwania* 51(1): 50-52, f.1 & 2. 2006. **Type:** Ryukyus: Isl. Iriomote, Feb. 15, 1981, *D. Shimizu [清水大典] s.n.* (holo. TD); Specimen: Taipei: Sanzhi, Beixinzhuang, 300-350 m, Mar. 23, 2005, *S.W. Chung & T.C. Hsu 8006* (TAIF). **清水氏赤箭**

Gastrodia stapfii Hayata, *J. Coll. Sci. Imp. Univ. Tokyo* 30(1): 347-348. 1911; T. Tuyama, *J. Jap. Bot.* 17(10): 579-586. 1941; Masam., *J. Geobot.* 16(4): pl.142. 1968. **Type:** Ryukius: Yaeyama, Jun. 1891, *S. Tanaka s.n.* **黃赤箭**

Gastrodia lutea Fukuy., *Bot. Mag. (Tokyo)* 49(586): 666. 1935.

Type: Taiwan: Kotosyo, Mt. Omori-yama [大森山(望南峰)], Jul. 3, 1934, *N. Fukuyama 4681* (holo. KPM-NA0105542 without Fukuyama's no., photo T00053 in PoT).

Gastrodia javanica auct. non (Blume) Lindl.: Garay and Sweet, *Orchids S. Ryukyu Islands*, 1974; Liu & Su, *Fl. Taiwan* 5: 1004, 1978.

Note: *G. lutea* is not conspecific with *G. javanica*. The gross morphology of flower is similar but labella is different. The claw (hypochile) of lip in *G. lutea* is narrow and is provided with on both edges a thickened twisted callus, whereas the claw in *G. javanica* is much wider and the callus is flattened forming a wing-like appendage (Blume 1858, seite 322, fig.1).

Gastrodia sui C.S. Leou, T.C. Hsu & C.L. Yeh, *Nordic J. Bot.* 29: 417. 2011. **Type:** Taiwan: Pingtung: Mt. Lilung, 500-700 m. Jun. 13, 2010, *C. R. Yeh 2259* (holo. TAI). **●蘇氏赤箭**

Gastrodia theana Aver., *Rhedeia* 15 (2): 1-19. 2005, & Turczaninowia 14(2): 70, fig. 34. 2011; S.I. Hsieh *et al.*, *Taiwania* 57(4): 399-402, 2012. **Type:** Vietnam, Nam Dong: Huong Son, 300-400 m. Mar. 31, 2005, *A. Averyanova, NT Vinh, HAL 7165* (holo. HN; iso. LE). Specimen: Taiwan: Nantou: Sinyi 950-1100 m, May 1, 2012, *C.T. Lee 005* (PPI); *C.T. Lee 006* (TAI). **●蘇氏赤箭**

Gastrodia uraiensis T.C. Hsu & C.M. Kuo, *Taiwania* 55(3): 244-245, f.2. 2010. **Type:** Taiwan: Taipei: Wulai, 400 m. Feb. 15, 2007, *T.C. Hsu 715* (holo. TAI; iso. TAI440364). **●烏來赤箭**

Geodorum densiflorum (Lam.) Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 4: 259. 1919; T.P. Lin, *Native Orch. Taiwan* 1: 164, photo 96-97. 1975. *Limodorum densiflorum* Lam., *Encycl.* 3: 516. 1792. **Type:** based upon 'Bela-pola' of Rheede, *Hort. Malab.* 11: 69, t.35. 1692. **垂頭地寶蘭**

Geodorum semicristatum Lindl., *Fol. Orchid.* 6: 2 1855. **Type:**

Philippines: *Cuming s.n.* Formosa: Takow: Ape's Hill. *Playfair* 96.

Geodorum formosanum Rolfe ex Hemsl., *Ann. Bot. (Oxford)*

9(33): 157. 1895; A. Henry, *Trans. Asia. Soc. Jpn.* 24(Suppl):

92. 1896. **Type:** Taiwan: Takow, *A. Henry 1137* (syn.

K000891008 & K000891006); South Cape, *A. Henry 1375*,

pink fls. growing in amongst rocks. (syn. K000891007).

Note: DNA sequence analyses support the nested position of *Geodorum* in *Eulophia* (Bone *et al.* 2015). Due to its phylogenetic position, and the lack of clear morphological distinction of *Geodorum* from *Eulophia*, they propose the transfer of these species to *Eulophia*.



Goodyera biflora (Lindl.) J.D. Hooker, Fl. Brit. India 6: 114. 1894; T.P. Lin, Native Orch. Taiwan 1: 166, photo 98. 1975. *Georchis biflora* Lindl., Gen. Sp. Orchid. Pl. 496. 1840. **Type:** Nepal, 4-6000 ft, *Wall. Cat.* 7379 (holo. K000364600; iso. K001127259). **長花斑葉蘭**

Goodyera macrantha Maxim., Gartenflora 16: 35. 1867. *Goodyera biflora* var. *macrantha* (Maxim.) T. Hashim., Proc. World Orchid Conf. 12: 122. 1987. **Type:** Japan: Yokohama, cult. Yedo, Aug. 6-18, 1862; C. J. Maximowicz s.n. (lectotype? LE); Korea: *Oldham s.n.* Taiwan: Ilan, Taipingshan, Feb. 15, 1972, *T.P. Lin* 26 (TAIF154652).

Goodyera bomiensis K.Y. Lang, Acta. Phytotax. Sin. 16(4): 128, f.3. 1978; S.W. Chung and T.C. Hsu, Taiwania 54(2): 175-177, f.1 & 2. 2009. **Type:** China: Xizang: Tang-mai, 2000 m, Jul. 22, 1965, *Y.T. Chang & K.Y. Lang* 858. Specimen: Hsinchu: Jianshih, Jun. 20, 2007, *T.C. Hsu* 849 (TAIF). **波密斑葉蘭**

Goodyera daibuzanensis Yamam., J. Soc. Trop. Agric. 4(3): 305. 1932. **Type:** Taiwan: Mt. Daibu, Nov. [20], 1918, *E. Matsuda* 123 (holo. TAI118721). **●大武斑葉蘭**

Goodyera foliosa (Lindl.) Benth. ex C.B. Clarke, J. Linn. Soc., Bot. 25: 73. 1889. *Georchis foliosa* Lindl., Gen. Sp. Orchid. Pl. 496. 1840. *Goodyera foliosa* (Lindl.) Hook. f., Fl. Brit. Ind. 6: 113. 1890; Lin, Native Orch. Taiwan 1: 172, photo 103-106. 1975; Seidenf., Dansk Bot. Ark. 32(2): 29, f.12. 1978. **Type:** Myanmar: *Griffith s.n.* (holo. K000364606). Specimen: Taiwan: Peichatienshan 1000-1500 m, Jul. 3, 1974, *T.P. Lin* 54 (TAIF155358); Taoyuan: Lalashan, 2031 m, Aug. 1, 1974, *T.P. Lin* 119 (TAIF122362). **高嶺斑葉蘭**

Goodyera pachyglossa Hayata, Icon. Pl. Formos. 4: 117. 1914. **Type:** Taiwan: Rinkihō, 5000 ped., Aug. 1911, *H. Inaba s.n.* (holo. TI, photo T00980 in PoT)

Goodyera commelinoides Fukuy., Trans. Nat. Hist. Soc. Taiwan 32: 298. 1942. **Type:** Ryukyu: Mt. Taniu-take, Sept. 4, 1938, *Fukuyama* 7226 (holo.); *T. Kanashiro* 1043 (para.).

Goodyera chilansensis S.S. Ying, Col. Ill. Fl. Taiwan 5: 592-593, pl.85. 1992. **Type:** Taiwan: Yilan: Chilanshan, S.S. *Ying* 9618 (holo. NTUF, photo F00000142 in PoT; para. Yilan: Taipingshan, *Ying* 9230, 9519, NTUF). Note: Three white veins are present at the leaf apex.

Goodyera fumata Thwaites, Enum. Pl. Zeyl. 314. 1864; Seidenf., Dansk Bot. Tidsskrift 65: 108. 1969; Seidenf., Dansk Bot. Ark. 32(2): 31, f.7. 1978; Garay & Sweet, Orch. S. Ryukyu Isl. 66, f.41. 1974; Liu & Su, Fl. Taiwan 5: 1010. 1978. **Type:** Sri Lanka: Central Province. *Ceylon Plant no.* 3668 (holo. K000387610). Specimen: Herb. H.G. Reichenbach 26422. **尾唇斑葉蘭**

Goodyera formosana Rolfe ex Hemsl., Ann. Bot. (Oxford) 9(33): 159. 1895; Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 93. 1896. **Type:** Formosa: Bankinsing, A. Henry 409 (holo. K000079090; iso. NY8856).

Goodyera caudatilabella Hayata, Icon. Pl. Formosan. 4: 112. 1914. **Type:** Okinawa: Mar. 1887, *Y. Tashiro s.n.*

Goodyera cyrtoglossa Hayata, Icon. Pl. Formos. 4: 113, f.60. 1914. **Type:** Taiwan: Kappanzan, Mar. 1910, *U. Mori et Y. Shimada s.n.* Type not found. Specimen: Tainan, Aug. 1908, *U. Mori et Y. Shimada s.n.* (TAIF6752).

Goodyera hachijoensis Yatabe var. *matsumurana* (Schltr.) Ohwi ex Hatusima & Amano, Fl. Okinawa Isl. 150. 1958. *Goodyera matsumurana* Schltr., Bull. Herb. Boissier, sér. 2, 6(4): 298. 1906; Matsumura & Hayata, J. Coll. Sci. Univ. Tokyo 22: 417. 1906; Lin, Native Orch. Taiwan 1: 174, photo 107-108. 1975. **Type:** Ryukyu:

Insel Oshima. Dec. 1900, *T. Utsiyama s.n.* (B, destroyed, Lectotype in TI). Note: This variety differs from var. *hachijoensis* Yatabe (Yatabe 1891) based on the network of white vein on leaf upper surface. **假金線蓮/銀線蓮**

Goodyera alboreticulata Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 342-343. 1911. **Type:** Taiwan: Taito: Botansha, Jan. 1906, *T. Kawakami et G. Nakahara s.n.* (holo. TI, photo T00972 in PoT).

Note: *G. matsumurana* may be conspecific with *G. reticulata* (Blume) Blume. The flower, particularly the labellum of *G. reticulata* depicted in Blume (1858, p229) is highly consistent with that of Taiwan's plants.

Goodyera henryi Rolfe, Bull. Misc. Inform. Kew 1896: 201. 1896; K. Lang *et al.*, Fl. Reipvsl. Popul. Sinic. 17: 143, f.19, 5-7. 1999. **Type:** China: Hupeh: Ichang. Mar. 1885-1888, *A. Henry* 6878, (holo. K000079088-89; iso. GH00090579, NY 8857) allied to the Indian *G. foliosa* Lindl. **童山白蘭**

Goodyera maximowicziana Makino, Bot. Mag. (Tokyo) 23: 137. 1909; Lin, Native Orch. Taiwan 1: 176, photo 109. 1975. *Goodyera bifida* auct. non (Blume) Blume: Maxim., Mel. Biol. XII p. 926. 1888; Makino, Ill. Fl. Jap. I: 6, tab. 37 a, b. 1890. *Peranium maximowiczianum* (Makino) Makino, J. Jap. Bot. 6: 36. 1929. *Goodyera foliosa* (Lindl.) Benth. ex C.B. Clarke var. *maximowicziana* (Makino) S.S. Ying, Col. Ill. Orch. Taiwan 2: 535. 1990. **Type:** Japan: Tosa, T. *Makino s.n.* Taiwan: Hsinchu, Yufeng 尖石, Oct. 25, 1928, *S. Suzuki s.n.* (TAI115390).

Goodyera kwangtungensis C.L. Tso, Sunyatsenia 1: 134. 1933; Lin, Native Orch. Taiwan 2: 168, photo 78-79. 1977. **Type:** China: Kwangtung: Lochong, Tatung, Nov. 16, 1931, *N.K. Chun* 42963. Specimen: Taiwan: Hsinchu, Kuanwu, 2200 m, Jun. 1975? *T.P. Lin* 127.

花格斑葉蘭

Goodyera rontabunensis T. Chow., Taiwan Orchids 68. 1968. *nom. nud.*

Goodyera nankoensis Fukuy., Bot. Mag. (Tokyo) 48(571): 432. 1934. **Type:** Taiwan: Nankotaizan, inter Kirittoi et Bunakkei. Jul. 1933, *N. Fukuyama* 4125. **●南湖斑葉蘭**

Goodyera nantoensis Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 343-344. 1911. **Type:** Taiwan: Toyen: Yuhonsha [有木社], Mart. 1907, *T. Kawakami et U. Mori* 5932 (TAIF6757 lectotype designed here); Horisha, Hinokiyama, Feb. 1907, *G. Nakahara s.n.* (isosyn. TI, photo T00979 in PoT, & K000942764).

●袖珍斑葉蘭/阿里山斑葉蘭

Goodyera arisanensis Hayata, Icon. Pl. Formos. 6: 91-92. 1916; C.S. Leou, Fl. Taiwan 5: 899, pl. 382. 2000. *Peranium arisanense* (Hayata) Makino, J. Jap. Bot. 6: 34. 1929. **Type:** Taiwan: Arisan, 2500 m, Dec. 1914, *U. Faurie s.n.* (holo. TI, photo T00974 in PoT). *Goodyera repens* auct. non (L.) R. Br.: T.P. Lin, Native Orch. Taiwan 1: 182. 1975.

Note: *G. nantoensis* differs from *G. repens* because this species has glabrous sepals, and is almost glabrous or has hair sparsely distributed on the ovary and floral bracts, and obvious reflex of the upper sepal-petal-mentum.

Goodyera pendula Maxim., Bull. Acad. Imp. Sci. Saint-Petersbourg III. 32: 623. 1888; Masam., Sci. Rep. Kanazawa Univ. 9: 128. 1964; Chung, Taiwania 47 (4): 259-263, f.1 & 2. 2002. **Type:** Japan: insulae Sikoku provincial Tosa. *T. Makino s.n.* Specimen: Taiwan: Yilan: Shihyuanyakou 1800-900 m, Jul. 1, 2001, *S.W. Chung & H.H. Kuo* 5700 (TAIF). **垂葉斑葉蘭**

Note: *G. pendula* of Japan is similar to the *G. recurva* Lindl. (J. Proc. Linn. Soc., Bot. 1: 183. 1857) but can be distinguished by the short rostellum, whereas *G. recurva* has a pair of long linear rostellum even longer than the column (see type of *G. recurva* of India, K000387613).



Goodyera procera (Ker Gawl.) Hook. f., Exot. Fl. t.39. 1823; A. Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 93. 1896; Lin, Native Orch. Taiwan 1: 180, photo 111-112. 1975. *Neottia procera* Ker Gawl., Bot. Reg. 8: t. 639. 1822. **Type:** Nepal: *N. Wallich s. n.* (MPU017698); Nepal: 1821, *N. Wallich 7393* (possible syntypes K001127281 & K000639686). Specimen: Taiwan: Tamsui, *Oldham 558*; Bankinsing, A. Henry 165 & 1826.

穗花斑葉蘭

Goodyera pusilla Blume, Coll. Orch. Arch. Ind. 36, t.96. 1858. **Type:** Java: Mt. Pangarangu, *Blume s.n.* (holo. L0061425).

小小斑葉蘭

Goodyera yangmeishanensis T.P. Lin, Native Orch. Taiwan 2: 173-174, photo 80- 81. 1977. **Type:** Taiwan: Miaoli: Mt. Yangmei, 1000 m. Aug. 20, 1975, *T.P. Lin 185* (holo. TAIIF).

Goodyera robusta J.D. Hooker, Fl. Brit. India 6: 113. 1890; X. Chen *et al.* Fl China 25: 49. 2009. **Type:** India: Khasia, 1219 m. *J.D. Hooker and T. Thomson 328* (holo. K000387615).

長葉斑葉蘭

Goodyera bilamellata Hayata, Icon. Pl. Formos. 4: 111, f.58. 1914. *Peramium bilamellatum* (Hayata) Makino, J. Jap. Bot. 6: 34. 1929. **Type:** Taiwan: Arisan, Jan. 1912, *B. Hayata et S. Sasaki s.n.* (holo. TI, photo T00975 in PoT). Note: *G. bilamellata* has narrowly elliptic leaves whereas *G. robusta* of Type has broadly elliptic leaves.

Goodyera rubicunda (Blume) Lindl., Bot. Reg. 25: 61, misc. 92. 1839. *Neottia rubicunda* Blume, Bijdr. Fl. Ned. Ind. 408. 1825. **Types:** Java: Mt. Salak and Mt. Gede. *C.L. Blume s.n.* (syn. L. & P00137123). **長苞斑葉蘭**

Goodyera grandis King & Prantl, Ann. Roy. Bot. Gard. Calc. 8:284, t.379. 1898. *non* (Blume) Lindl. ex D. Dietr., Syn. Pl. 5: 165. 1852. *Goodyera clavata* Pearce & Cribb., Edinb. J. Bot. 58, 1:116, 2001; Ormerod, Taiwania 48(2):90. 2003. **Type:** Sikkim: Valley of the Teesta, 1219 m. Aug. 24, 1896, *R. Pantling 460* (holo. CAL, iso. BM000077584 & K000387616). Note: The drawing of *G. grandis* in 1898 is the plants found in Taiwan.

Goodyera grandis auct. non (Blume) Lindl. ex D. Dietr.:Masam. in J. Geobot. 18(2): pl.161. 1970; Lin in Nat. Orch. Taiwan 1:184, photo 114, fl. diss. 43. 1975.

Goodyera longibracteata Hayata, Icon. Pl. Formos. 4: 114, pl. 61(a-h). 1914. **Type:** Taiwan: Pingtung: Kusukusu [高士佛], Jan. 1913, *Y. Tashiro s.n.* (holo. TI, photo T00976 in PoT).

Goodyera longicolumna Hayata, Icon. Pl. Formos. 6: 92-93. 1916. **Type:** Taiwan: Urai, Aug. 1910, *S. Sasaki s.n.* (holo. TI, photo T00977 in PoT).

Goodyera schlechtendaliana Rchb. f., Linnaea 22: 861. 1849; Hayata, J. Coll. Sci. Univ. Tokyo 25(19): 344. 1908; T.P. Lin, Native Orch. Taiwan 1: 186, photo 115. 1975; Seidenf., Dansk Bot. Ark. 32(2): 26. f.11. 1978. *Peramium schlechtendalianum* (Rchb. f.) Makino, J. Jap. Bot. 6(12): 37. 1929. **Type:** Japan: *Görling s.n.* (W, Herb. H.G. Reichenbach 37474). Specimen: Japan: Kino Ahosima. Oct. 1861, *R. Oldham 358* (K000363096) stored under *Goodyera japonica* Blume. Taiwan: Mt. Nanhu, Aug. 15, 1975, *T.P. Lin 237* (TAIF183944).

斑葉蘭

Note: The nomenclature of this species has a complex history, as discussed by Seidenfaden (1978). *G. schlechtendalianum* is typified by a collection by Goring from Japan (Seidenfaden 1978). Although the reproductive part of *G. schlechtendalianum* is similar, the leaves

exhibit 2 marking patterns in Blume (1858). The decoration pattern of one of them is identical to that of plants from Taiwan.

Goodyera seikoomontana Yamam., J. Soc. Trop. Agric. 4(2): 187. 1932. *Goodyera viridiflora* var. *seikoomontana* (Yamam.) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 198. 1977. **Type:** Taiwan: Taitung: Mt. Seikoo [成廣澳山], 4000 ped. Jul. 1931, *Yamamoto s.n.* (holo. TAI118722).

歌綠懷蘭

Goodyera similis Blume, Coll. Orch. 39, pl. 9, f. 2 & pl. 11, f. D. 1858. **Type:** Japan (possible iso. K000942762). Specimen: Herb. H.G. Reichenbach 37473.

鳥嘴蓮

Goodyera velutina Maximowicz ex Regel, Gartenflora 16:36. pl.533, f.1. 1-13. 1867; T. P. Lin, Native Orch. Taiwan 1: 190, photo 118-119. 1975. **Type:** Japan: Yokohama, cult. Yedo, Aug-Sep 1862, *C.J. Maximowicz s.n.* (lecto.? LE). Specimen: Herb. H.G. Reichenbach 1067.

Goodyera morrisonicola Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 343. 1911; Masam., J. Geobot. 17(3): pl.153. 1969.

Type: Taiwan: Mt. Morrison, 6500 ped. Oct. 1906, *T. Kawakami et U. Mori 2323*. Type not found.

Note: The notion that *G. velutina* and *G. morrisonicola* are conspecific with *G. similis* originated from Ormerod's letter. Checking the color plate in Blume (1858), I conclude that the labellum and rostellum of *G. similis* differ from those of *G. schlechtendaliana*, but are highly consistent with those of *G. morrisonicola*. Ormerod also indicated in his letter that Blume's drawing of the leaves was incorrect; an isotype in Kew has a white stripe on the leaves. The voucher specimen *G. velutina* (K000942763, Sept. 15, 1896) collected in Mt. Kiyosumi, Prov. Boshu, Japan in the RBG Kew was identified as *G. similis* by M.A. Clements on Feb. 24, 2003.

Goodyera similis Blume var. *albonervosa* (T.P. Lin & Y.N. Chang) T.P. Lin, **comb. nov.** ●斑紋鳥嘴蓮

Goodyera velutina Maxim. Ex Regel var. *albonervosa* T.P. Lin & Y.N. Chang, Taiwania 58(4): 263-266, f.7. 2013. **Type:** Taiwan: Taitung: Xiang-Yang, Southern Cross-Island Highway, 1900 m. Sept. 4, 2013, *Shen-Kun Yu s.n.* (holo. TAI283131)

Goodyera viridiflora (Blume) Lindl. ex D. Dietr., Syn. Pl. 5: 165. 1852; T.P. Lin, Native Orch. Taiwan 1: 192, photo 120-121. 1975. *Neottia viridiflora* Blume, Bijdr. Fl. Ned. Ind. 408. 1825. **Type:** Java: Bogor, Gunung Salak. *C.L. Blume s.n.* (holo. L; iso. P00137122).

鳥喙斑葉蘭

Goodyera carnea (Blume) Schltr., Bot. Jahrb. Syst. 39: 56. 1906.

Eucosia carnea Blume, Bijdr. Fl. Ned. Ind. 415. 1825. **Type:** Java: Salak. Jun-Aug. *C.L. Blume s.n.*

Goodyera cordata (Lindl.) G. Nicholson, Ill. Dict. Gard. 2: 81. 1885. *Georchis cordata* Lindl. Gen. Sp. Orchid. Pl. 496 1840.

Type: Khasia Hills, 3-4000 ft, *J.D. Hooker & T. T. s.n.*

Goodyera longirostrata Hayata, Icon. Pl. Formos. 4: 115, f.61(i-j). 1914. **Type:** Taiwan: Akocho: Buisan, 7000 ped., [Mar. 24, 1910], *S. Sasaki s.n.* (holo. TI, photo T00978 in PoT)

Goodyera ogatai Yamam., Icon. Pl. Formosan. Suppl. 3: 9, f.3. 1927.

Type: Taiwan: Mt. Sozan, anno 1925, *M. Ogata s.n.* not found.

Goodyera yamiana Fukuy., Bot. Mag. (Tokyo) 50(589): 18. 1936; Masam., J. Geobot. 20(1): pl.175. 1972. **Type:** Taiwan: insl. Koto-syo, monte Sadaki-rei, 200 m. Oct. 28, 1934, *N. Fukuyama 4804* (holo. KPM-NA0105543, photo T00054; iso. KPM-NA 0105544 & 5).

●蘭嶼金銀草

Note: *G. yamiana* is similar to *G. boninensis*, which is native to the Ryukyu islands, but differs in labellum morphology. In *G. yamiana*, the labellum is ovate or elliptic with an acute apex, but the labellum is slightly 3-lobed, orbicular with a denticulate margin in *G. boninensis*. Further observation is required for evaluation.



Habenaria ciliolaris Kraenzl., Bot. Jahrb. Syst. 16: 169. 1892; Lin, Native Orch. Taiwan 2: 176, photo 82. 1977; Seidenf., Dansk Bot. Arkiv 31(3): 95, f.56. 1977 & Opera Bot. 114: 60, f.29. 1992. **Type:** Hong Kong, Aberdeen, Aug. 14, 1884, *C. Ford 95* (holo. K000796942). Specimen: Taiwan: Nantou: Hoshe, Jul. 1907, *Kawakamii & Mori s.n.* (TAIF?).

玉峰蘭

Note: Our plant is similar to but differs from *C. Ford 95*, the type of *Habenaria ciliolaris* by a strongly curved spur which has an abruptly dilated apex.

Habenaria dentata (Sw.) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 125. 1919; Seidenf., Dansk Bot. Arkiv 31(3): 98, f.60. 1977; Lin, Native Orch. Taiwan 2: 192, photo 85-86. 1977. *Orchis dentata* Sw., Vet. Acad. Handl. Stochh. 21: 207. 1800. **Type:** E. China, Swartz *s.n.* (S, S-G-7390).

白鳳蘭

Habenaria miersiana Champ. ex Benth., Hook., J. Bot. Kew Gard. Misc. 7: 37. 1855; Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 93. 1896. **Type:** Hong Kong: Victoria Peak, Sep 1847. Specimen: Taiwan: Bankinsing, *Henry 1212 & 1607*.

Habenaria tohoensis Hayata, Icon. Pl. Formos. 4: 128, f.67. 1914. *Habenaria dentata* var. *tohoensis* (Hayata) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 464. 1977. **Type:** Taiwan: Tohozan, 6500 ped. Oct. [6], 1909, *S. Sasaki s.n.* (holo. TI, photo T00984 in PoT).

Habenaria iyoensis Ohwi, J. Jap. Bot. 12: 382. 1936; Hashim., Jap. Indig. Orch. Col. 1991. *Peristylus iyoensis* Ohwi, J. Jap. Bot. 12: 382. 1936. **Type:** Japan: Shikoku: Tachikawa in Iyo, *K. Yamashita s.n.* (KYO).

岩坡玉鳳蘭

Habenaria minor Fukuy. ex Masam., J. Geobot. 21(3): 9, pl.51. 1974. *nom. nud.* Specimen: Pingtung: Daizyurin. 大樹林, Oct. 23, 1934, *K. Segawa s.n.* (KPM, photo G00436 in PoT).

Habenaria rupestris T.P. Lin & T.W. Hu, Quart. J. Chin. Forest. 9(1): 52, pl. 1976, *non* Poepp. & Endl. 1836. *Habenaria taiwaniana* T.P. Lin, Man. Taiwan Vasc. Pl. 5: 258. 2001. **Type:** Taiwan: Pingtung: Peitawushan, 700 m. Aug. 30, 1973, *T.P. Lin 67* (TAIF105688).

Habenaria longiracema Fukuy., Bot. Mag. (Tokyo) 49(587): 758. 1935. **Type:** Taiwan: Pingtung: Tyosyu-gun, Kinariman, collected by K. Segawa, Oct. 20, 1934, *N. Fukuyama 4725* (holo. KPM-NA0105547 without Fukuyama's no., photo T00056 in PoT. iso. *K. Segawa s.n.*, KPM-NA0105546, photo T00055, & KPM with photo T00057 in PoT).

● 翹唇玉鳳蘭

Hetaeria taiwaniana S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1: 210. 1977. **Type:** Taiwan: Nantou: Shouchentashan, Jul. 16, 1972, *S.S. Ying 1203* (NTUF), not found.

Habenaria lucida auct. *non* Wallich ex Lindl.: T.P. Lin, Native Orch. Taiwan 2: 198, photo 89-90. 1977.

Habenaria pantlingiana Kraenzl., Orchid. Gen. Sp. 1: 892. 1900; Su, Fl Taiwan 5: 916. 2000. **Type:** Assam: Namgarh, Aug. 1895, *Pantling 415* (holo. K000247416).

冠毛玉鳳蘭

Habenaria stenopetala Lindl. var. *polytricha* Hook.f., Ann. Roy. Bot. Gard. (Calcutta) 5: 64. 1895. **Type:** Sikkim, Choongtam, *J. D. Hooker s.n.*; Naga Hills, *Prain s.n.*

Habenaria longitentaculata Hayata, Icon. Pl. Formos. 4: 127, pl.24. 1914. **Type:** Taiwan: Nantoucho, 1909, *U. Mori s.n.* (holo. TI, photo T00982 in PoT).

Habenaria cirrhifera Ohwi, Acta Phytotax. Geobot. 1: 141. 1932. **Type:** Ryukyu: Kunchanin: ins. Utchina, *S. Sakaguchi s.n.*

Habenaria petelotii Gagnep., Bull. Soc. Bot. France 78:73. 1931; Seidenf., Dansk Bot. Arkiv 31(3): 81, f.45. 1977; Su, Quart. J. Chin. Forest. 22 (2): 28, pl.7. 1989. **Type:** Northern Vietnam: Tonkin, Cha-pa, Jan. 1928, *Petelot 5157* (holo. P00439664).

毛唇玉鳳蘭

Habenaria hosokawae Fukuy., Bot. Mag. (Tokyo) 48(569): 297.

1934. **Type:** Taiwan: Taitoo, Tippon-zan, inter Han-no-ki et Budai, 4000 ped. Aug. 23, 1932, *T. Hosokawa 3975*.

Habenaria polytricha Rolfe, Hooker's Icon. Pl. 25, pl.2496. 1896; A. Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 93. 1896; T.P. Lin, Native Orch. Taiwan 2: 200, photo 87. 1977. **Type:** Taiwan: South Cape, A. *Henry 1246* (holo. K000796938, iso. NY8925!).

裂瓣玉鳳蘭

Habenaria stenopetala Lindl., Gen. Sp. Orchid. Pl. 319. 1835; Seidenf., Dansk Bot. Arkiv 31(3): 70, f.37. 1977. **Type:** N. India: Kashmir. *J.F. Royle s.n.* (holo. K000873755).

線瓣玉鳳蘭

Habenaria linearipetala Hayata, Icon. Pl. Formos. 4: 126, pl.23.

1914. **Type:** Taiwan: Mt. Morrison, 8500 ped., Oct. [7], 1909, *S. Sasaki s.n.* (holo. TI, photo T00983 in PoT).

Habenaria tsaiana T.P. Lin, Taiwania 59(4): 363-364. 2014. **Type:** Taiwan: Hsinchu: Jianshi, 500 m, Sept. 14, 2013, *X.Q. Tsai s.n.* (holo. TAI283132).

● 蔡氏玉鳳蘭

Note: possibly a hybrid origin between *H. delessertiana* and *H. polytricha*.

Hancockia uniflora Rolfe, J. Linn. Soc., Bot. 36 (249): 20, f.1E. 1903; T.P. Lin & W.M. Lin, Taiwania 56(4): 320, fig.1E. 2011. **Type:** China: Yunnan, Mengtze, 1524 m, A. *Henry 11112* (holo. K000943495; iso. NY8939). Specimen: Taoyuan: Fu-Hsing Township, 900-1000 m, July 30, 2010, *L.Z. Chang s.n.* (TAI274629).

漢考克蘭

Haraella retrocalla (Hayata) Kudo, J. Soc. Trop. Agric. 2:27. 1930. *Saccolabium retrocallum* Hayata, Icon. Pl. Formos. 4: 92, f.47. 1914. *Gastrochilus retrocallus* (Hayata) Hayata, Icon. Pl. Formosan. 6(Suppl.): 79. 1917. *Gastrochilus retrocallosus* (Hayata) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 289. 1919. **Type:** Taiwan: Location not indicated, Jun, 1912, *B. Hayata s.n.* (holo. TI, photo T01189 in PoT).

香蘭

Note: *Haraella* Kudô was included in *Gastrochilus* by Chase *et al.* (2015). I prefer considering *Haraella* as an independent genus because the labellum is very different from that of *Gastrochilus*. *Haraella*, a monotypic genus, is allied with *Gastrochilus*. The ITS analysis supported the inclusion of *Haraella retrocalla* in *Pomatocalpa*, but the cpDNA analysis indicated that *Haraella* is sister to *Gastrochilus* (Zou 2015). My conclusion from this study is that *Haraella retrocalla* can not be just consider as a member of the *Gastrochilus* genus.

Hayata tabiyahanensis (Hayata) Aver., Taiwania 54(4): 311-316. 2009. *Zeuxine tabiyahanensis* Hayata, Icon. Pl. Formos. 6: 89-90. 1916. *Adenostylis tabiyahanensis* Hayata *nom. nud.* in sched. *Cheirostylis tabiyahanensis* (Hayata) N. Pearce & P.J. Cribb, Edinburgh J. Bot. 56: 278. 1999. **Type:** Taiwan: Tabiyahanzan, May [14], 1916, *B. Hayata s.n.* (holo. TI, photo T01216 in PoT).

● 裂唇線柱蘭



Cheirostylis nemorosa Fukuy., Bot. Mag. (Tokyo) 49(587): 760. 1935; Masam., J. Geobot. 19(1-2): pl.167. 1971. *Zeuxine nemorosa* (Fukuy.) T.P. Lin, Native Orch. Taiwan 2: 69. 1977; 3: 232, photos 160-161. 1987. **Type:** Taiwan: Taihoku: Agyoku, collected by Suzuki-T, Mar. 29, 1932, *N. Fukuyama 4723* (holo. KPM-NA0105518, photo T00022 in PoT; iso. KPM-NA0105519).

Note: *Hayata* Aver. was established in 2009, and is closely related to *Cheirostylis*. This genus differs from *Cheirostylis* with its larger flowers with completely free sepals, bunches of capitate glands on the lateral walls of the hypochile, and the absence of a swollen succulent rhizome, but the formation of normal adventitious roots was observed.

Hayata tabiyahanensis* var. *merrillii (Ames & Quisumb.) T.P. Lin, *com. nov.* *Adenostylis merrillii* Ames & Quisumb., Philipp. J. Sci. 44: 370. 1931. *Hayata merrillii* (Ames & Quisumb.) T.C. Hsu & S.W. Chung, Taiwania 55(4): 365-366, f.4. 2010. *Cheirostylis merrillii* (Ames & Quisumb.) Ormerod, Austral. Orch. Rev. 63(4): 10. 1998. **Type:** Philippines: Mar. 12, 1930, *E. Quisumbing 6040* (holo. PNH, destroyed; iso. AMES0000082). Specimens: Nantou: Sinyi Township, Shuanglong, *T.C. Hsu 2588* (TAIF).

全唇早田蘭

Note: A peloric flower of *Cheirostylis tabiyahanensis*.

Hemipilia cordifolia Lindley, Gen. Sp. Orchid. Pl. 296. 1835; Liu & Su, Fl. Taiwan 5: 1029, pl.392. 1978; Banerji & Pradhan, Orch. Nepal Himal. 64. 1984. **Type:** Nepal: Gosain Than, *N. Wallich 7049* (holo. K000873808).

玉山一葉蘭

Hemipilia cruciata Finet, Bull. Soc. Bot. France 44: 421, t. 14, f. H-I. 1897. **Type:** China: Yunnan, Meng-hou-Tin, south of Dali-fu. *H. d'Orléans s.n.* (holo. P00259955).

Hemipilia formosana Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30: 354. 1911; Lin, Native Orch. Taiwan 1: 200, photo 124-125, 161. 1975. **Type:** Taiwan: Morrison, 8500 ped. Oct. [18], 1906, *T. Kawakami et U. Mori 2331* (iso. TAIF6805).

Note: *Hemipilia* appears well-circumscribed florally by its protruding rostellum, and a single flat, basally inserted leaf.

Herminium lanceum (Thunb. ex Sw.) Vujjk var. *longicrure* (C. Wight ex A. Gray) Hara, J. Jap. Bot. 44: 60. 1969; Liu & Su, Fl. Taiwan 5: 1029, pl.1611. 1978. *Aceras longicrure* C. Wright ex A. Gray, Mem. Amer. Acad. Arts n.s., 6: 411. 1859. *Herminium angustifolium* Benth. & Hook. f. var. *longicrure* (C. Wight) Makino, Bot. Mag. (Tokyo) 10: 109. 1896; Matsum. & Hayata, J. Coll. Sci. Imp. Univ. Tokyo 22: 418. 1906. **Type:** Ryukyu: Kutomasima, Loo-choo Islands, Apr. 30, 1855, *C. Wright 338* (holo. GH00000015).

腳根蘭

Note: This variety can be distinguished based on the long sidelobes of the lip and the long staminodes compared with var. *lanceum*.

Hetaeria anomala (Lindl.) Rchb.f., Trans. Linn. Soc., Bot. 30: 142. 1874; Opera Bot. 124. 1995; X. Chen *et al.*, Fl. China 25: 66. 2009. *Aetheria anomala* Lindl., J. Proc. Linn. Soc., Bot. 1: 185. 1857. **Type:** NE India: Assam: Tigrei. *Griffith 10* (holo. K000364640).

圓唇伴蘭

Hetaeria rotundiloba J.J. Sm., Svensk Bot. Tidskr. 20: 470. 1926; Seidenf., Dansk Bot. Arkiv 32 (2): 96, f.58. 1978; Leou, Quart. J. Exp. Forest. NTU 3: 81-86, f.1-3. 1989. Specimen: Taiwan: Pintung: Lilunshan 900-1000 m, Oct. 10, 1988, *T.Y. Chen s.n.* (NTUF)

Hetaeria oblongifolia auct. non Blume: S.S. Ying in Col. Ill. Ind. Orch. Taiwan 1: 469. 1977.

Hetaeria biloba (Ridley) Seidenf. & J. J. Wood, Orchids Pen. Malaysia 95. 1992. *Zeuxine biloba* Ridl., J. Fed. Malay States Mus. 4: 73. 1909. **Type:** Malaysia: Pahang, Telom, Nov. 1908, *H.N. Ridley s.n.* (holo. SING0056427).

Hetaeria oblongifolia Blume, Bijdr. Fl. Ned. Ind. 410. 1825; Seidenf., Dansk Bot. Arkiv 32 (2): 96, f.60. 1978; Yeh *et al.*, Taiwan J. For. Sci. 20(4): 355-359. 2005. **Type:** Java: Solassie Provinciae Tjanjor. (holo. L0061395). Specimen: Philippines: 1841, *H. Cuming 2109* (BM000076670); Taiwan: Lanyu 200 m, Mar. 19, 2005, *C.L. Yeh & C.R. Yeh s.n.* (PPI).

長橢圓葉伴蘭

Holcoglossum pumilum (Hayata) X.H. Jin, PLoS ONE 7(12): e52050. 2012. *Saccolabium pumilum* Hayata, Bot. Mag. (Tokyo) 20(236): 77. 1906. *Ascocentrum pumilum* (Hayata) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 285. 1919; Masam., J. Geobot. 14(3): pl.114. 1966. *Ascolabium pumilum* (Hayata) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 54. 1977. *Holcoglossum pumilum* (Hayata) L.J. Chen, X.J. Xiao et G.Q. Zhang, PLoS ONE 8(4): e60097. 2013. **Type:** Taiwan: Bioritsu [苗栗], Jan. 1906, *K. Fujii s.n.* (holo. TI, Photo T01191 in PoT). Note: One specimen was named *Ascocentrum priceanum*, collected from S. mountains, Koarong-Shiusuisei, 4000 ft, May 24, 1912, *W.R. Price 551* (K000891627).

●小鹿角蘭

Vanda hayatae J.M.H. Shaw, Orchid Rev. Suppl., 121(1301): 15. 2013. [Mar 2013]. Quarterly Supplement to the International Register and Checklist of Orchid Hybrids (Sander's List). From *Saccolabium pumilum* Hayata *non* *Vanda pumila* J.D. Hooker, Fl. Brit. India 6: 53. 1890. Note: *Vanda* now has a broad generic concept that includes *Ascocentrum* (Chase *et al.* 2015).

Note: This species is phylogenetically related to *H. quasipinifolium*.

Holcoglossum quasipinifolium (Hayata) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 285. 1919; Masam., J. Geobot. 16(1): pl.135. 1968. *Saccolabium quasipinifolium* Hayata, Icon. Pl. Formos. 2: 144. 1912. **Type:** Taiwan: Arisan, Jan. 23, 1912, *B. Hayata et S. Sasaki s.n.* (holo. TI, photo T01188 in PoT; iso. TI, photo T01187 in PoT & TAIF6747). **橈唇蘭/松葉蘭**
Hylophila nipponica (Fukuy.) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1: 469. Jul. 1977. *Dicerostylis nipponica* Fukuy., Bot. Mag. (Tokyo) 50(589): 19. 1936. *Hylophila nipponica* (Fukuy.) T.P. Lin, Native Orch. Taiwan 2: 206, photo 94-96. Nov. 1977. **Type:** Taiwan: insl. Koto-syo, monte Koto-zan [紅頭山] 400 m, Jul. 17, 1934, *N. Fukuyama 4793* (holo. KPM-NA0105532 without Fukuyama's no., photo T00027 in PoT; iso. KPM-NA 0105533-5); Monte Sadaki-rei, 200 m, Jul. 3, 1934, *N. Fukuyama 4797* (para. KPM without Fukuyama's no., photo G00337 in PoT). **蘭嶼光唇蘭**

Note: *H. nipponica* is closely related to the *H. lanceolata* (Fl. Thai. 170. 2011).

Lecanorchis albidus (T.P. Lin) T.P. Lin, *comb. nov.* *Lecanorchis cerina* Fukuy. var. *albidus* T.P. Lin, Native Orch. Taiwan 3: 147, photo 85-88. 1987. *Lecanorchis cerina* f. *albida* (T.P. Lin) S.S. Ying, Col. Ill. Orch. Taiwan 2: 562. 1990. **Type:** Taiwan: Taipei: Mt. Pataoerh. 1100 m, Apr. 1, 1979, *Lin 439* (holo. TAIF 74168), *T.P. Lin 414* (para. TAIF 127050). **●白皿柱蘭**



?*Lecanorchis ohwii* Masam., Trans. Nat. Hist. Soc. Taiwan 23(126): 208. 1933. **Type:** Inter Takomi et Rarasan, [達觀山-札亞孔]. Apr. 12, 1933, *J. Ohwi 847* (KYO, possible type, photo T01668 in PoT). Note: The type of *L. ohwii* is less than 20 cm tall aboveground, and is probably conspecific with *L. taiwaniana* or *L. albidus* but not *L. cerina*, which is usually 35 cm or more, as in the type, KPM-NA0105552, photo T00063! The flowering season is between Aug. and Sept., and altitudinal range is between 600-950 m of *L. taiwaniana*, whereas the flowering season is between Mar. and Apr., and altitudinal range is between 900-1300 m of *L. albidus*. Based on above information, *L. ohwii* is most probably conspecific with *L. albidus*.

Note: *L. albidus* and *L. cerina* can be separated based on the plant height, flower color and labellum morphology. Hashimoto (1990) was the first to propose that *L. cerina* var. *albidus* and *L. kiusiana* Tuyama (native to the Ryukyu islands) may be conspecific because of the general similarities in gross morphology. This concept was followed by Chung (2008a). Based on the line drawing of Hashimoto (1990) and Nakajima (2012), *L. kiusiana* is characterized by the sidelobe that are relatively rounded and a denticulate margin and branched hairs in anterior part of the midlobe, and the shape of the midlobe differs from that of *L. albidus*.

Lecanorchis bihuensis T.P. Lin & S.H. Wu, *Taiwania* 57(4): 381. 2012. **Type:** Taiwan: Hsinbei City: Pinglin, Feb. 17, 1980, *T.P. Lin 455* (holo. TAI122114) ●全唇皿柱蘭

Note: I proposed this species is *Lecanorchis nigricans* Honda in 1975. The flower of *L. bihuensis* is a peloric form of *L. nigricans* related species.

Lecanorchis cerina Fukuy., *Bot. Mag. (Tokyo)* 49(581): 291. 1935. **Type:** Taiwan: Taihoku, Shinten, Daitoozan [大桶山], Apr. 11, 1934, *N. Fukuyama 4534* (holo. KPM-NA0105552, photo T00063 in PoT)

●紫皿柱蘭/黃皿柱蘭

Lecanorchis micrantha Fukuy. ex A.T. Hsieh, *Quart. J. Taiwan Mus.* 8(3): 276. 1955. *nom. nud.* Specimen: Suao: Mt. Oobi (Aowei) [澳尾山]. Apr. 27, 1938, G. Masamune s.n. (TAI118725-118727). These plants have long stems and no flower but with fruits!

Note: The diagnostic feature of 40 to 50 cm tall aboveground, as obtained from the original publication (Fukuyama 1935) is useful for confirming *L. cerina*. This is because in Daitoozan only *L. cerina* and *L. albidus* have been found. *L. albidus* is usually between 12 and 27 cm tall.

L. cerina is morphologically similar to *L. japonica* but can be distinguished by the larger flower size; tapels are sometimes twisted; lip adnate about 1/5-1/3 length to column, taller plant 40-60 cm; lip lightly purplish all the way to the tips but much deeper violet on the side lobes and in the center of midlobe; hairs of lip purplish or whitish on disc and sometimes yellow; column purplish and much deeper at the anther part.

Lecanorchis flavicans Fukuy. var. *acutiloba* T. Hashim, *Ann. Tsukuba Bot. Gard.* 8: 8, fig. 3. 1989; T.C. Hsu, C.L. Hsieh and Y.C. Chou, *Taiwan J. Biodiversity* 18(2): 115-121, figs. 2-3. 2016. **Type:** Japan: Yakushima Island, Mt. Motchomu, Jul. 24, 1979, *Y. Hanei s.n.* (holo. TNS9504531). Specimen: Taiwan: New Taipei City: Mt. Tatao (大刀山), 500 m, *T.C. Hsu 6577* (TAIF); Mt. Chichouliao (紀州寮山), 500-700 m, *T.C. Hsu 6822* (TAIF). Yilan: Songlohu trail, 800-1000 m, *T.C. Hsu 6726* (TAIF). 白髭皿蘭

Lecanorchis latens T.P. Lin & W.M. Lin, *Taiwania* 56(4): 315. 2011. **Type:** Taiwan: Pingtung: Shuangliou, Mar. 6, 2010, *Shyh-Shiarn Lin s.n.* (holo. TAI274551).

●士賢皿柱蘭

Lecanorchis nigricans Honda var. *yakushimensis* T. Hashim., *Ann. Tsukuba Bot. Gard.* 9: 31, f.23, 24. 1990; Hsu and Chung, *Taiwania* 55(4): 366, f.1G & 1H. 2010. **Type:** Japan: Kyushu: Kagoshima, along the Hanaage River, Yaku-shima (Isl.), Jul. 21-27, 1986, *Y. Hanei s.n.* (holo. TNS). Specimen: Taiwan: Taoyuan: Peichatianshan, Aug. 26, 2009, *T.C. Hsu 2267* (TAIF); Taitung: Taimali, Kueinashan (規那山) *S.W. Chung et al. 8077* (TAIF).

●星久全唇皿蘭

Lecanorchis subpelorica T.C. Hsu & S.W. Chung, *Taiwania* 55(4): 363, f.1C, 1D & 3. 2010. **Type:** Taiwan: Pingtung: Shouka 400 m, Jul. 4, 2008, *T.C. Hsu 1438* (holo. TAIF).

●亞幅射皿蘭

Note: This species is similar to but differs from *L. latens* by a bunch of dense to sparse multicellular hairs on the midlobe of the labellum.

Lecanorchis suginoana (Tuyama) T. Hashim. *Ann. Tsukuba Bot. Gard.* 9: 18. 1990; S.W. Chung and T.C. Hsu, *Taiwania* 54(1): 83. 2009. ***Lecanorchis japonica*** var. *suginoana* Tuyama, *J. Jap. Bot.* 57: 211. 1982. ***Lecanorchis kiusiana*** var. *suginoana* (Tuyama) T. Hashim. *Ann. Tsukuba Bot. Gard.* 9: 18. 1990. ***Lecanorchis suginoana*** (Tuyama) Serizawa, *Bunrui* 5(1): 38. 2005. **Type:** Japan: Houshu, Totomi: Sugi in oppido Haruno-cho, *Tuyama s.n.*, Jun. 8, 1980 (holo. TI). Specimen: Taiwan: Nantou: Luqushan 1900 m, May 12, 2007, *T.C. Hsu 791, 792* (TAIF); Shanlinxi, 1700 m, Jul. 20, 2007, *T. C. Hsu 890* (TAIF).

●杉野氏皿蘭

Lecanorchis taiwaniana S.S. Ying, *Quart. J. Chin. Forest.* 20(4): 133, f.5. 1987. **Type:** Taiwan: Taipei: Chia-chiu-Lin (加九嶺) to Chia-chiu-Liao (加九寮). Aug. 2, 1987, *S.S. Ying s.n.* (holo. NTUF, photo F0000200 in PoT; iso. NTUF, photo F00008292 in PoT)

●台灣皿蘭

Lecanorchis nigricans auct. non Honda, *Bot. Mag. (Tokyo)* 45: 470. 1931; Liu & Su, *Fl. Taiwan* 5: 1036. 1978.

Note: Su (2000, p936) indicated that the type of *L. taiwaniana* has a barbate disc, which was unclear in Ying's original publication. I do not think *L. taiwaniana* is conspecific with any varieties of Japanese *L. nigricans*, which has been discussed extensively by Hashimoto (1990). *L. nigricans* has wider tapels (3 to 3.8 mm), and a trilobed anther cap, and only half the length of the column is fused with the labellum; this species is hairless at the base of the column with 70°-90° between the capsule and the inflorescence stem. By contrast, *L. taiwaniana* has narrow tapels (2-2.5 mm), M-shaped anther cap, two third the length of the column is fused with the labellum; this species has a pubescent column base with 45° or less between the capsule and the inflorescence axis. However because of the similar flower morphology, *L. taiwaniana* should be viewed as a member of the *L. nigricans* Honda complex. This species was identified as *L. amethystea* Y. Sawa, H. Fukunaga & S. Sawa by Hsu and Chung (2010).

Lecanorchis thalassica T.P. Lin, *Native Orch. Taiwan* 3: 153, photo 89. 1987. **Type:** Taiwan: Nantou: Chitou, May. 21, 1976, *Lin 330* (holo. TAIF).

●紋皿柱蘭

Note: *L. thalassica* can be considered as a member of the *L. japonica* complex, and is characterized peculiar column head which is relatively wide than its length.

Lecanorchis trachycaula Ohwi, *Fl. Jap., rev. ed.* 1438. 1965; T.C. Hsu and S.W. Chung, *Taiwania* 55(4): 367, f.1E & 1F. fig.5. 2010. **Type:** Japan: Shikoku, Awa: Shishikui-cho, Jun. 18, 1964, *C. Abe 15387* (holo. TNS 381701). Specimen: Taipei: Wulai, Polushan, *T.C. Hsu 2236* (TAIF); Sanshia, Jiajouling, *T.C. Hsu 2266* (TAIF); Taoyuan: Fuhsing, Sileng (四稜), *T.C. Hsu 2191, 2791* (TAIF). 糙莖皿蘭



Lecanorchis triloba J.J. Sm., Bull. Dep. Agric. Indes Neerl. 19: 26. 1908; T. Hashim., Ann. Tsukuba Bot. Gard. 8: 35, fig. 25 & 26. 1990; S.W. Chung and T.C. Hsu, *Taiwania* 54(1): 82-87. 2009. **Type:** New Guinea: Irian Jaya, 'Resi-rucken an dem Steen-Bach, am Boden im Urwalde, 300 m, Meereshöhe', Aug. 1907, *G.M. Versteeg 1676* (?BO). Specimen: Pingtung: Shouka, 400 m, Dec. 5, 2006, *T.C. Hsu 682, 684*, (TAIF). **三裂耳蘭**

Note: This is not conspecific with *L. javanica*.

Lecanorchis virella T. Hashim., Ann. Tsukuba Bot. Gard., 8: 1. 1989; S.W. Chung and T.C. Hsu, *Taiwania* 54(1): 83. 2009. **Type:** Japan: Yakushima Isl., near Hirano, along the Hanaage River, 100 m, May 6, *Yoshie Hanei s.n.* (holo. TNS9504705). Specimen: Taoyuan: Beichatianshan, 1000 m. May 4, 2007, *T.C. Hsu 785* (TAIF).

綠耳蘭/彩虹皿柱蘭

Liparis amabilis Fukuy., Bot. Mag. (Tokyo) 52(617): 245. 1938; Masam., J. Geobot. 18(3-4): pl.165. 1970. **Type:** Taiwan: Taihoku: Kaposan, 900m., Apr. 13, 1935, *Suzuki-Tokio 6397*. (not found); Specimen: Taiwan: Hsinchu: Chulushan, 1300 m. Mar. 7, 2008, W.M. Lin s.n. (TAI266274). **●卡保山羊耳蘭**

Liparis barbata Lindl., Gen. Sp. Orchid. Pl. 27. 1830; S. Chen *et al.*, Fl. Reipubl. Popularis Sin. 18: 77, pl.12, 1-2. 1999. **Type:** Ceylon: Nov. *Macrae s.n.* **鬚唇羊耳蘭**

Liparis wrayi J.D. Hooker, Fl. Brit. India 6: 181. 1890; Seidenf., Dansk Bot. Ark. 31(1): 15. f.5. 1976; Su, Quart. J. Chin. Forest. 23(3): 46, pl.1. 1990. **Type:** Malaysia: Upper Perak, 300 ft, *Wray 3713* (iso. K000363406). Specimen: Nantou: Chingshuikou, 500 m. *Su & Chung 9059*.

Liparis pectinifera Ridl., J. Bot. 36: 210. 1898; Sm., Orch. Java 265, f.203. 1905. **Type:** Malaysia: Southern Perak, G. Tunggal, Mar. 1896, *Ridley, H.N. s.n.* (SING0047500).

Liparis fimbriata Kerr., Kew Bull. 215. 1927. **Type:** Thailand: Doi Sutep, 580-660 m, Jul. 26, 1914, *A.F.G. Kerr 351* (holo.), *Kerr 351a* (para. K000596257).

Liparis bootanensis Griffith, Not. Pl. Asiat. 3: 278. 1851; Seidenf., Dansk Bot. Arkiv 31(1): 50. f.27. 1976; Lin, Native Orch. Taiwan 2: 212, photo 98-99. 1977. **Type:** Bhutan-Skkim: E. Himalaya. *Griffith 1460* (syn. K000943030 & K000873778). Specimen: Indonesia: SE Java, 1880-1882, *H.O. Forbes 1153a* (BM000088727). **摺疊羊耳蘭**

Liparis plicata Franch. & Sav., Enum. Pl. Jap. 2: 509. 1879; A. Henry, Trans. Asia. Soc. Jpn. 24 (Suppl): 91. 1896; Liu & Su, Fl. Taiwan 5: 1041, pl.1617. 1978. **Type:** Japan: No source material cited in protologue. Specimen: Taiwan: Pingtung, Bankingsing, 1895, *A. Henry 138, 1627*; Arisan, in rupibus, Dec. 1914, *U.J. Faurie 1606* (P00327990).

Liparis uchiyamae Schltr., Bull. Herb. Boiss ser. 2. 6: 308. 1906; Hayata, Icon. Pl. Formos. 4: 35, f.11. 1914. **Lectotype:** Ryukyu: Isle Oshima, Dec. 1900, *T. Uchiyama s.n.* (reduced to synonym by Seidenf. 1976)

Liparis campylostalix Rchb. f., Linnaea 41: 45. 1877; Seidenf., Dansk Bot. Arkiv 31(1): 22. f.11. 1976 & Opera Bot. 114:131, f.78. 1992; Su, Quart. J. Chin. Forest. 23(3): 47, pl.2. 1990. **Type:** India orientalis, Herb. H.G. Reichenbach 39742 (W). Specimen: Taiwan: Nantou: Yungchai to Tienchi, 2200-2600 m. *Su & Chen 9098*. **彎柱羊耳蘭**

Liparis kumokiri F. Maek., J. Jap. Bot. 12: 91. 1936; Hashim. & Kanda, Jap. Indig. Orch. Col. 144. 1981. **Type:** Japan: Hondo: Hitachi prov., Mt. Tsukuba, Jul. 13, 1895, *C. Owatari s.n.*

Note: Japan and Taiwan's plants have a wavy leaf margin and hence, may differ from the type of *L. campylostalix*.

Liparis cespitosa (Thouars) Lindl., Bot. Reg. 11: Sub. t.882. 1825; Matsum. & Hayata, J. Coll. Sci. Univ. Tokyo 22: 408. 1906. *Malaxis cespitosa* Thouars, Orch. III. Afr. t. 89. 1822. *Stichorkis cespitosa* (Lam.) Thouars ex Marg., Orchid. Tahiti 61. 2010. **Type:** No source material cited in protologue. Specimen: Taiwan: anno 1899. *K. Miyake s.n.* **桶後羊耳蘭/叢生羊耳蘭**

Liparis auriculata Rchb.f., Flora 55: 277. 1872. **Type:** India: Meghalaya, Mont Khasia, 1219 m, *J. D. Hooker & T. Thomson 16* (iso. AMES00100963 & GH00243071).

Note: Some authors considered the basionym of Lindley's name to be *Epidendrum caespitosum* Lam. (1783).

Liparis condylobulbon Rchb. f., Hamburger Garten-Blumenzeitung 18: 34. 1862; Seidenf., Dansk Bot. Arkiv 31(1): 70. f.44. 1976; T.P. Lin, Native Orch. Taiwan 2: 217, photo 101-103. 1976. **Type:** Java: sine loc., Feb. 1862, *Schiller s.n.* (Herb. Reichenbach 46205 p.p.). **長耳蘭**

Liparis dolichopoda Hayata, Icon. Pl. Formos. 4: 27, pl. 5. 1914.

Cestichis dolichopoda Hayata, *nom. nud.* in sched. **Type:** Taiwan: Location not indicated, Jan. 1912, *B. Hayata s.n.* not found. Specimen: Taipei: Urai, Oct. 2, 1914, *T. Ito s.n.* (TAIF6822); Nov. 2, 1914, *E. Matsuda s.n.* (TAIF 6824).

Liparis cordifolia Hook. f., Hooker's Icon. Pl. 19: t.1811. 1889; Fl. Brit. India 5: 692. 1890; T.P. Lin, Native Orch. Taiwan 2: 220, photo 105-106. 1977. **Type:** NE. India: Kala Panee: Khasia Hills, Oct. 28, 1850, 1524-1829 m, *J.D. Hooker and T. Thomson s.n.* (lecto. K000387757, designated by X. H. Jin in Novon 20: 282. 2010 as *Hooker and Thomson 8*; isolecto. K000873771, & LE), *C.B. Clarke 25184* (isolecto. K000387842), *C.B. Clarke 15224* (isolecto. K000387756). **銀鈴蕙蘭**

Liparis keitaoensis Hayata, Icon. Pl. Formos. 7: 40, pl.13. 1918.

Type: Taiwan: Keitao, Apr. 1916, *B. Hayata s.n.* (holo. TI, photo T00992 in PoT).

Liparis derchiensis S.S. Ying, Mem. Coll. Agric. Natl. Taiwan Univ. 31(1): 21, photo 3-4. 1991. **Type:** Taiwan: Taichung: Derchi Dam, 1360 m, Apr. 4, 1991, *S.S. Ying s.n.* (iso. NTUF, photo F00008291 in PoT)

●德基羊耳蘭

Liparis elliptica Wight, Icon. Pl. Ind. Orient. 5: 17, t.1735. 1852; T.P. Lin, Native Orch. Taiwan 2: 226, photo109-110. 1977. **Type:** S. India: Neilgheri hills. *Wight s.n.* (syn. K000387823); India: Khasia: Mamloo, Nov. 13, 1850, *J.D. Hooker and T. Thomson 17* (syn. K000387825). **扁球羊耳蘭**

Liparis platybolba Hayata, Icon. Pl. Formos. 4: 30, f.8. 1914.

Cestichis platybolba Hayata, *nom. nud.* in sched.; Masam., J. Geobot. 20(1): pl.176. 1972. **Type:** Taiwan: Arisan, inter Funkiko et Taroyen, Mar. 1914, *B. Hayata et T. Ito s.n.* (holo. TI, photo T00994 in PoT).

Liparis elongata Fukuy., Annual Rep. Taihoku Bot. Gard. 3: 82. 1933. **Type:** Taiwan: Taihei-zan, monte Mururoahu, inter Kyanraha et Saukan, Jul. 1933. *N. Fukuyama 4110* (holo. not found); Nankotaizan, inter Kirittoi 基力亭 et Bunakkei Jul. 1933, *N. Fukuyama 4111* (para. KPM without Fukuyama's no., photo G00575 in PoT); Karenkoo, monte Taroko-taizan, 1800-2000 m. Jun. 14, 1933, *T. Suzuki 9516*. **●長穗羊耳蘭**



Liparis japonica auct. non (Miq.) Maxim.: Su in Quart. J. Chin. Forest. 22(2): 28. pl.8. 1989. Specimen: Nanhutashan, Jun. 17, 1988, H.J. Su 8317 (HAST104405).

Liparis ferruginea Lindl., Gard. Chron. 1848: 55. **Type:** Malaysia: Penang. *Loddiges s.n.* (K-LINDL). Widespread in China and South East Asia. **明潭羊耳蒜**

Liparis hensoaensis Kudô, J. Soc. Trop. Agric. 2: 237. 1930. *syn. nov.* *Liparis nigra* var. *hensoaensis* (Kudô) S.S. Ying, Col. Ill. Orch. Taiwan 2: 579. 1990. **Type:** Taiwan: Nichigaetsutan [石印(日月潭水庫下)] Sept. 22, 1929, *Kudo et Sasaki 15635* (holo. TAI118729); Prope Sekiin ad Nichigaetsutan, Sept. 19, 1929, *Kudo et Sasaki 15391* (para. TAI033085); Sept. 20, 1929, *Kudo et Sasaki 15503* (para. TAI 033088). Note: This species is assumed to be extinct in Taiwan.

Liparis formosana Rchb. f., Gard. Chron. n.s. 13: 394. 1880; Lin, Native Orch. Taiwan 2: 228, photo 111-112. 1977. *Liparis bituberculata* (Hook.) Lindl. var. *formosana* (Rchb. f.) Ridl., J. Linn. Soc. Bot. 22: 263. 1887; T. Hashim., Proc. 12th. Orch. Conf. 123. 1987. **Type:** Collected in Formosa by Mr. Maries. It has flowered in the Royal Exotic Nursery of Messrs. Veitch & Sons (Mar. 7).

寶島羊耳蘭

Note: This plant is characterized by an elongate cylindrical pseudobulb, oblong and acute leaves, and arrow-like (sagittatum) oblong and acute labellum. One specimen found in the Herb. H.G. Reichenbach 28510, 1880.

Liparis gigantea C.L. Tso, Sunyatsenia 1: 136. 1933; X. Chen *et al.*, Fl. China 25: 219. 2009. **Type:** China: Kwangtung: Sunyi. Mar. 31, 1931, *S.P. Ko 51255* (SYS).

羊耳草/大花羊耳蘭

Note: The original description indicated that the plants can reach a height of 82 cm, and that the flowers are 4 cm wide, the upper sepals are 2.3 cm long 3.5 mm wide, and the lip is yellowish with a deep purple center, margin fimbriate, column greenish white, and broadly winged at the apex. *L. macrantha* in Taiwan has flowers that are approximately 1.5-cm wide, upper sepals are 1.8 cm long 3.2 mm wide, and the lip is red-purple, the margin minutely denticulate but not fimbriate, column red-purple, and wingless at the apex. However, the characteristics of *L. gigantea* mentioned in Fl. China (Chen *et al.* 2009, p 219) are highly consistent with those of *L. macrantha* in Taiwan. I am unaware of whether they are conspecific.

Liparis macrantha Rolfe ex Hemsl., Ann. Bot. (Oxford) 9(33): 156. 1895, non Hook.f. 1889; A. Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 91. 1896; Masam., J. Geobot. 17(3): pl.151. 1969. **Type:** Taiwan: Taipei: Tamsui, 1895, *A. Henry 1695* (holo. K000078912). Specimen: S. Formosa, Mar. 1912, *H.J. Elwes s.n.* (K000943051)

Liparis nigra Seidenf., Bot. Tidsskr. 65: 129. 1969; Dansk Bot. Ark. 31(1): 18, f.7. 1976; T.P. Lin, Native Orch. Taiwan 2: 233, photo113-116. 1977. **Type:** Thailand: Ban Langka, NW. Lomsak, Doi Inthanond 12-1300 m, *GT 5401* (holo. C vial 2465 & 2466).

Liparis grossa Rchb. f., Gard. Chron., n.s., 19: 110. 1883; Seidenf., Dansk Bot. Arkiv 31(1): 63. f.41. 1976; H.J. Su, Quart. J. Chin. Forest. 21(1): 119, pl.2. 1988. **Type:** Burma: imported to England by Low & Co., Jan. 18, 1882 (Herb. Reichenbach 46236).

紅鈴蟲蘭

Liparis tateishii Kudô, J. Soc. Trop. Agric. 3: 16. 1931. **Type:** Taiwan: Kusukusu, Jan 1930. *Tateishi s.n.*

Liparis rizalensis Ames, Orch. 6: 295. 1920; A. Hsieh, Bot. Mag. Tokyo 50: 21. 1936; T.P. Lin, Native Orch. Taiwan 2: 236, photo 118-119. 1977. **Type:** Philippines: Luzon Island, Dec. 1915, *M. Ramos BS 24070* (holo. AMES00100970, AMES00083750). Specimen: Taiwan: Lanyu, Nov. 15, 1934, *Fukuyama 4830, 4831.*

Note: One specimen, *S. Sasaki s.n.*, Nov. 10, 1934 (TAI031855), from Lanyu is probably the earliest one. A. Hsieh is the first author to use the name *L. rizalensis*.

Liparis henryi Rolfe, Bull. Misc. Inform. Kew 1896(119): 193. 1896; A. Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 91. 1896; Su, Quart. J. Chin. Forest. 20(4): 103, pl.3. 1987. **Type:** Taiwan: South Cape, *A. Henry 2074* (holo. K000078911). **●齒唇羊耳蘭**

Liparis shaoshunia S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 230. 1977. **Type:** Taiwan: Pingtung Nanjenshan, 300 m. Jan. 24, 1976, *S.S. Ying s.n.* (holotype NTUF, photo F00000319 in PoT).

Liparis kawakamii Hayata, Icon. Pl. Formos. 4: 28, f.5. 1914. **Type:** Taiwan: Location unknown, *T. Kawakami s.n.* (iso. TAI6835). **●川上氏羊耳蘭**

Liparis laurilvatica Fukuy., Ann. Rep. Taihoku Bot. Gard. 3: 83. 1933; Masam., J. Geobot. 18(2): pl.160. 1970. **Type:** Taiwan: Yilan: Mt. Bonbongoe [繡繡山], inter Tamaru et Taishoo prope Dakusui, ad 3000 ped. alt., Oct. 1933 *N. Fukuyama. 4101* (holo. KPM-NA0105556 without Fukuyama's no., photo T00064 in PoT); Shinchiku, Nanshoo mt. Rokujoo-taizan, 5000 ped. Oct. 1932, *N. Fukuyama 4108* (para.); Taichu: Mt. Hassen-zan, Oct. 1931, *N. Fukuyama 4109* (para.).

●小花羊耳蘭

Liparis cespitosa auct. non (Thouars) Lindl.: T.P. Lin, Native Orchid Taiwan 2: 215, photo 99-100. 1977.

Liparis liangzuensis T.P. Lin & W.M. Lin, Taiwania 56(4): 315-316. 2011. **Type:** Taiwan: Taipei: Fushan, Mar. 18, 2011, *L.Z. Chang s.n.* (holo. TAI276924).

●良如羊耳蘭

Note: Our species shows some similarity to *Liparis mannii* Rchb.f. (Flora 55: 275. 1872) of Assam.

Liparis nakaharae Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 310-311. 1911. **Type:** Taiwan: Taito, Manchosha, Jan. 1906, *T. Kawakami et G. Nakahara 766* (holo. TI, photo T00993 in PoT; iso. K000364663, TAI6852, 6853, & 6854). **●虎頭石**

Liparis taiwaniana Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 311-312. 1911. **Type:** Taiwan: Nantou: Randaizan, Jan. 1908, *T. Kawakami et U. Mori 6309.*

Liparis distans auct. non Clarke: Lin, Nat. Orch. Taiwan 2: 222. 1977.

Liparis nervosa (Thunb.) Lindl., Gen. Sp. Orchid. Pl. 26. 1830; Matsum. & Hayata, J. Coll. Sci. Univ. Tokyo 22: 406. 1906. *Ophrys nervosa* Thunb., Syst. Veg. ed. 14, 814. 1784. **Type:** Japan: between Osaka and Yedo. *Thunberg s.n.* (S). Specimen: Taiwan: Taipei: Tamsui, *R. Oldham 555, 1864*; Ariko-banti [阿里港番地], Jan. 1917, *E. Matuda 585* (TAI031853) **脈羊耳蘭**

Liparis odorata auct. non Lindl.: A. Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 91. 1896. Specimen: A. Henry 896. South cape: Bankinsing.

Note: I believe that this specimen is *L. nervosa*. Seidenfaden (1976, p38. f.22.) listed *A. Henry 896* as *Liparis paradoxa* (Lindl.) Rchb.f. This probably is because that *L. paradoxa* has flower similar to those as *L. nervosa*. *L. nervosa* has a short, broad floral bract, and *L. paradoxa* has a slender lanceolate bract.

Liparis nokoensis Fukuy., Bot. Mag. (Tokyo) 48(571): 435. 1934. **Type:** Taiwan: Taichu, Nookoo-goe [能高鞍部], Jul. 1930, *N. Fukuyama 4129* (holo. KPM-NA0105557 without Fukuyama's no., photo T00065 in PoT). **●能高羊耳蘭**



Liparis petiolata (D. Don) P.F. Hunt et Summerh., Kew Bull. 20: 52. 1966; Seidenf., Dansk Bot. Ark., 31, 1: 12, fig. 3. 1976; Averyanov, Turczaninowia 16 (1): 82. 2013. *Acianthus petiolatus* D. Don, 1825, Prodr. Fl. Nepal.: 29. **Type:** Nepal: *N. Wallich 1945* (iso. BM 000088562, E00394087, K001114790, & P00338689).

玉簪羊耳蘭

Liparis auriculata auct. non Blume ex Miq. Ann. Mus. Bot. Lugduno-Batavi 2: 203. 1866; Liu & Su, Quart. J. Taiwan Mus. 28: 270, f.2. 1975; T.P. Lin, Native Orch. Taiwan 3: 210, photo 97. 1987. **Type:** Ryukyu: *H. Buerger s.n.* (L0062291). Specimen: Yilan: Taipingshan, Aug. 1928, *S. Suzuki s.n.* (TAI31827); Hualien: Mt. Shiao-Hsin, 2000 m, *H.J. Su 2003* (NTUF). Note: No labellum description in the original publication. To designate Taiwan's plant as *Liparis auriculata* (Liu & Su 1975) probably is wrong because the labellum of Taiwan's plant is different from Japan's (*M. Nakajima 2012*, p229).

Liparis pulchella Hook. f., Hooker's Icon. Plantarum 19: t.1810. 1889. **Type:** India: Khasia Hills, 5000-6000 ft, 1828, *J.D. Hooker and T.T. 7* (isosyn. GH00243062); India: Khasia, 1829-2134 m, Jun. 27, 1850, *J.D. Hooker & T. Thomson s.n.* (syn. K000387763, K000387764 & K000943050); India: Naga hills, 1886, *D. Prain 58* (syn. K000387765). Note: This name was used by Chung (2008). Based on the original publication, our plant may be conspecific with *L. pulchella*. This Khasia plant has round-cordate leaves, a slender, incurved column, a purple orbicular-ovate labellum with an obscure callus, and a margin with minute erose. These properties are highly consistent with those of Taiwanese plants.

Liparis yakusimensis Masam., Bot. Mag. (Tokyo) 43(509): 250. 1929. **Type:** Ryukyu: Yakusima. [屋久島]. Jul. 10, 1928, *G. Masam. s.n.* (holo. TAI118731).

Liparis reckoniana T.C. Hsu, Taiwania 58(1): 1-4, f.1A-C & 2. 2013. **Type:** Taiwan: Pingtung: Chingshuiying, 1300-1600 m, Apr. 16, 2012, *T.C. Hsu 5600* (holo. TAIIF). Specimen: between Mt. Peitawu (Pingtung)-Mt. Payusen (把字森山, Taitung), 2000-2300 m, Jun. 2, 2014, *T.C. Hsu 7142* (TAIF456880).

●雲頂羊耳蘭

Liparis rubrotincta T.C. Hsu, Taiwania 58(1): 4, f.1D-F & 3. 2013. **Type:** Taiwan: Taichung: Heping, Mt. Tochiatun 2000-2500 m. Jun. 20, 2006, *T.C. Hsu 527* (holo. TAIIF; iso. HAST)

●絳唇羊耳蘭

Liparis sasakii Hayata, Icon. Pl. Formos. 4: 32, f.9. 1914. *Liparis kurameri* Franch. & Sav. var. *sasakii* (Hayata) T. Hashim, Bull. Nat. Sci. Mus. Tokyo ser. B. 13 (1): 39. 1987; Su, Quart. J. Chin. Forest. 22(2): 29, pl.9. 1989. **Type:** Taiwan: Arisan 6700 ped. May [13], 1913, *S. Sasaki s.n.* (holo. TI, photo T00995 in PoT; iso. 阿里山二萬平, TAIIF6866). ●紫鈴蟲蘭/尾唇羊耳蘭

Liparis somae Hayata, Icon. Pl. Formos. 4: 33, f.6. 1914. *Cestichis somai* Hayata *nom. nud.* in sched. **Type:** Taiwan: Pingtung: Kuskusu, Jan. 1912, *T. Soma s.n.* (holo. TI, photo T00996 in PoT). Specimen: Pingtung: Luliaosi, Dec. 24, 1985, *H.J. Su 6844* (HAST105096).

高士佛羊耳蘭

Note: This species may possibly occur in India (*Liparis sikkimensis* Lucksom & S.Kumar, J. Indian Bot. Soc. 73: 159 1994).

Liparis sootenzanensis Fukuy., Ann. Rep. Taihoku Bot. Gard. 3: 84. 1933; T.P. Lin, Native Orch. Taiwan 2: 238, photo 120-121. 1977. **Type:** Taiwan: Shinchiku, minami-sootenzan [南插天山], May 1933, *N. Fukuyama 4104* (holo. KPM-NA0105558, photo T00066 in PoT).

黃花羊耳蘭/插天山羊耳蘭

Liparis viridiflora (Blume) Lindl., Gen. Sp. Orchid. Pl. 31. 1830; Seidenf., Dansk Bot. Arkiv 31(1): 82, f.55. 1976; T.P. Lin, Native Orch. Taiwan 2: 240, photo 117. 1977. *Malaxis viridiflora* Blume, Bijdr. Fl. Ned. Ind. 392. 1825. **Type:** Java: *Blume s.n.* (holo. L0061587).

長腳羊耳蘭

Liparis longipes Lindl. in Wall., Pl. Asiat. Rar. 1: 31, t.35. 1830; A. Henry, Trans. Asia. Soc. Jpn. 24 (Suppl): 91. 1896; A. Hsieh, Quart. J. Taiwan Mus. 8(3): 253. 1955. **Types:** India: *M.R. Smith s.n.*; Sri Lanka: Nov. *Macrae s.n.* Specimen: Bankinsing, 1895, *A. Henry 1592*; South cape, *A. Henry 1979*.

Liparis sp. Taiwania 59(4): 366, f.1D and 6. 2014.

●環山羊耳蘭

Liparis sp. An epiphytic plant characterized by linear tapels and purplish venations on rounded labellum was misidentified as *Liparis amabilis* Fukuy. by Chung (2008a, p56). This is a distinct species and certainly has not been reported. Specimen: Taiwan: Yilan: Taipingshan, 1600 m, Apr. 18, 2007, *T.C. Hsu 767* (TAIF303574).

●太平山羊耳蘭

Luisia lui T.C. Hsu & S.W. Chung, Taiwania 55(4): 363, f.1A, 1B & 2. 2010. **Type:** Taiwan: Pingtung: Shuangliu, 2-300 m, Mar. 26, 2010, *T.C. Hsu 2600* (holo. TAIIF).

●呂氏金釵蘭

Luisia megasepala Hayata, Icon. Pl. Formos. 4: 85, f.41. 1914. **Type:** Taiwan: Taipei, cult. Apr. [Mar. 22], 1914, *B. Hayata s.n.* (holo. TI, photo T01151 in PoT).

●台灣釵子股

Luisia teres (Thunb. ex J.A. Murray) Blume, Rumphia 4: 50 1849. *Epidendrum teres* Thunb. ex J.A. Murray, Syst. Veg. ed. 14: 818. 1784 (Jul.). **Type:** Japan. 牡丹金釵蘭

Luisia teres (Thunb.) Blume var. *botanensis* (Fukuy.) T.P. Lin, Native Orch. Taiwan 2: 261, photo 124-125. 1977. *Luisia botanensis* Fukuy., Bot. Mag. (Tokyo) 49(583): 442, f.5. 1935. **Type:** Taiwan: Takao, Botan-ike [牡丹池], May 29, 1934, *N. Fukuyama 4550* (holo. KPM-NA0105563, photo T00070 in PoT). Specimen: Kuskusu, May 28, 1934, *N. Fukuyama 4549*.

Luisia tristis (G. Forst.) Hook. f., Curtis's Botanical Magazine pl. 3648. 1839. *Epidendrum triste* G. Forst., Forst. Prodr. N.314. 1786. **Type:** New Caledonia, *J.R. Forster s.n.* (holo. K000891532). Note: This color drawing is highly consistent with descriptions of the Taiwanese plant.

心唇金釵蘭

Luisia teretifolia Gaudich., Voy. Uranie, Bot. 426, t.37. 1829; A. Henry, Trans. Asia. Soc. Jpn. 24 (Suppl): 92. 1896. **Type:** Guam, *C. Gaudichaud-Beaupré 37* (holo. P00364564; iso. G-G-178191/1). Specimen: Taiwan: South Cape, *A. Henry 695*.

Luisia cordata Fukuy., Bot. Mag. (Tokyo) 48(569): 306. 1934. **Type:** Taiwan: Taitung: Aroei, [大武(巴壟衛)], Daibu (Paroo), collected in Jan. 1933 and flowering May 1933, *N. Fukuyama 3984* (holo. KPM-NA0105564, photo T00071 in PoT).

Malaxis bancanoides Ames, please see *Crepidium bancanoides*

Malaxis matsudai (Yamam.) Hatus., please see *Crepidium matsudae*

Malaxis microtatantha (Schltr.) T. Tang & F.T. Wang, see *Oberonioides pusillus*

Malaxis monophyllos (L.) Sw., Kongl. Vetensk. Acad. Nya Handl. 21: 234. 1800; T.P. Lin, Native Orch. Taiwan 2: 262, photo 131. 1977. *Ophrys monophyllos* L., Sp. Pl. 947. 1753. **Type:** Unknown location (lecto. LINN no. 1056.17, left specimen). 阿里山小柱蘭



- Microstylis arisanensis* Hayata, Icon. Pl. Formos. 6: 68, pl.11, f.10. 1916. **Type:** Taiwan: Arisan, 8000 ped. Jun. 1914, *U. Faurie* 924 (holo. TI, photo T01154 in PoT).
- Malaxis taiwaniana* S.S. Ying, Quart. J. Chin. Forest. 8(4): 143. 1975. **Type:** Taiwan: Kuan-Kao, (觀高) 2700 m, Jul. 26, 1974, S.S. Ying 2920, not found. Note: The name *Malaxis taiwanensis* S.S. Ying was used by the same author in his 1990 book: Col. III. Indig. Orch. Taiwan vol. 2.
- Malaxis ophrydis* (J.G. König) Ormerod, please see *Dienia ophrydis*
- Malaxis purpurea* (Lindl.) Kuntze, Please see *Crepidium purpureum*
- Malaxis ramosii* Ames, please see *Pseudoliparis moluccana*
- Malaxis roohutuensis* (Fukuy.) S. Y. Hu, please see *Crepidium roohutuensis*
- Malaxis shuicae* S.S. Ying, please see *Dienia shuicae*
- Microtis unifolia** (G. Forst.) H.G. Reichb., Beitr. Syst. Pflanzenk. 62. 1871; Sasaki, List Pl. Formos. 134. 1928; T.P. Lin, Native Orch. Taiwan 1: 210, photo 132. 1975.
- Ophrys unifolia* G. Forst, Fl. Ins. Austr. 59. 1786. **Type:** New Zealand (holo. BM000051414). **韭菜蘭**
- Microtis parviflora* R. Br., Prodr. Fl. Nov. Holl. 321. 1810. **Type:** Australia: Sydney, Port Jackson, Sep. 22, *R. Brown* 5594 (lecto. BM000051371; syn. BM000051370, G-G-178138/1, & P00333005). Taiwan: Tamsuy, 1864, *R. Oldham* 561 (MNHN-P-P00364018).
- Microtis formosana* Schltr., Bot. Jahrb. Syst. 45(1): 382, in obs. 1911. *nom. nud.* Masam., Sci. Rep. Kanazawa Univ., Biol. 9: 122. 1964. Specimen: Taiwan: Taipei, Mar. 27, 1927, *S. Sasaki s.n.* (TAI147621). Note: Masamune (1964) only listed this name without any nomenclatural action, and *Microtis formosana* Schltr. ex Masam. is not used.
- Myrmecis drymoglossifolia** Hayata, Icon. Pl. Formos. 6: 90, f.20. 1916. **Type:** Taiwan: Arisan, 8000 ped, Jun. 1914, *U. Faurie* 929 (holo. TI, photo T01156 in PoT). **●阿里山全唇蘭**
- Myrmecis sasaki* Yamam., Icon. Pl. Formos., Suppl. 2: 1, f.1. 1926. **Type:** Taiwan: Nankotaizan, 8000-9000 ped. Jul. [23], 1922, *S. Sasaki s.n.* (holo. TI, photo T01157 in PoT).
- Myrmecis nankotaisanensis* Yamamoto ex A.T. Hsieh, Quart. J. Taiwan Mus. 8(3): 276. 1955. *invalid name.* **Type:** Taiwan: Nanhutashan. *S. Sasaki* 1796, not found. Note: One specimen: Tataka, Mt. Niitaka, *G. Masamune* 3797, Mar. 28, 1943 (TAI115458 fruit only) is the only *M. nankotaisanensis* in TAI.
- Neottia acuminata** Schltr., Acta Horti. Gothob. 1: 141. 1924; Yang *et al.*, Manu. Taiwan Vas. Pl. 5: 271. 2002.
- Neottia asiatica** Ohwi, Bot. Mag. (Tokyo) 45: 384. 1931. **Type:** China: Szechuan, Dongrergo, *K.A.H. Smith* 3859 (holo. UPS:BOT:V-140218). Specimen: Taiwan: Ilan: Chiliting (Kirittoi) Jan. 2, 1938, *K. Segawa s.n.* (KPM, photo G00638 in PoT). Not being formally published. Plant about 16 cm tall above the tuberoid. **鳥巢蘭**
- Neottia parviflora* (King & Pantl.) Schltr., Acta Horti Gothob. 1: 142. 1924, *nom. illeg.* *Aphyllorchis parviflora* King & Pantl., J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 65: 128. 1896. **Type:** India: Lachen & Chumbi, 11000 ft., Jun. 15, 1895, *R. Pantling* 383 (syn. 000387559 & K000387587; isosyn. E00394237, GH00000197, & GH00000198).
- Neottia deltoidea** (Fukuy.) Szlach., Fragm. Florist. Geobot., Suppl. 3: 117. 1995. *Listera deltoidea* Fukuy., Bot. Mag. (Tokyo) 49(587): 759. 1935. **Type:** Taiwan: Sintiku, monte Soten-zan, 1000 m [插天山], collected by *K. Segawa*, Feb. 15, 1935, *N. Fukuyama* 4730 (holo. KPM-NA0105559, without Fukuyama's no., photo T00006 in PoT). **●三角雙葉蘭**
- Listera suzukii* Masam., Trop. Hort. 3: 42. 1933; Masam., J. Geobot. 19(4): pl.174. 1971. *nom. nud.* *Neottia suzukii* (Masam.) Szlach., Fragm. Florist. Geobot., Suppl. 3: 119. 1995, *nom. illeg.* Taiwan: Taiheizan, *S. Suzuki s.n.*; Taito, Kaimosu, *Segawa s.n.* Both not found. Specimen: Taitung: Chimu 吉木(海端), Kaimosu. Mar. 5, 1933, *Masamune s.n.* (KPM, photo G00583 in PoT).
- Listera uraiensis* S.S. Ying, Col. III. Indig. Orch. Taiwan 1(2): 240. 1977. **Type:** Taiwan: Urai, Patouershan, 1000 m, Apr. 13, 1975, S.S. Ying 3582 (syn. NTUF F00008218 & F00008219 in PoT).
- Neottia fukuyamae** T.C. Hsu & S.W. Chung, Taiwan J. Forest Sci. 24(1): 77. 2009. *Listera macrantha* Fukuy., Annual Rep. Taihoku Bot. Gard. 3: 86. 1933 *non Neottia macrantha* Sweet 1830; Masam., J. Geobot. 14(4): pl.116. 1966; *Neottia formosana* S.C. Chen, S.W. Gale & P.J. Cribb, Fl. China 25: 192. 2009, *nom. superfl.* (Date of publication of the printed volume: Sept. 28, 2009). **Type:** Taiwan: Nankotaizan, inter Kirittoi et Bunakkei, Jul. 1933, *Fukuyama* 4140 (holo. KPM-NA0105560 without Fukuyama's no., photo T00067 in PoT). **●大花雙葉蘭**
- Neottia hohuanshanensis** T.P. Lin & S.H. Wu, Taiwania 57(4): 381, f.1D & 4. 2012. **Type:** Taiwan: Mt. Hohuan, Jul. 23, 2012, *T.P. Lin s.n.* (holo. TAI281320). **●合歡山雙葉蘭**
- Neottia japonica** (Blume) Szlach., Fragm. Florist. Geobot., Suppl. 3: 117. 1995. *Listera japonica* Blume, Coll. Orchid. 136. seite 294, fig.2, & seite 314. 1859; Masam., Pl. Japan 8: 200. 1969, indicated occurring in Taiwan. **Type:** Japan. **小雙葉蘭**
- Listera shaoii* S.S. Ying, Col. III. Indig. Orch. Taiwan 1(2): 236. 1977. **Type:** Taiwan: Ssuyuanakou [思源啞口], 1400-1600 m, Apr. 2, 1977, S.S. Ying 5910 (holo. NTUF, photo F00008214 in PoT); S.S. Ying 5925.
- Neottia kuanshanensis** (H.J. Su) T.C. Hsu & S.W. Chung, Taiwania 54(1): 83. 2009. *Listera kuanshanensis* H.J. Su, Quart. J. Exp. Forest, NTU. 13(3): 206. 1999. **Type:** Taiwan: Kaohsiung: Kuanshan 2650 m. Aug. 19, 1998, *C.C. Chen s.n.* (holo. HAST106478). **●關山雙葉蘭**
- Neottia meifongensis** (H.J. Su & C.Y. Hu) T.C. Hsu & S.W. Chung, Taiwania 54(1): 83. 2009. *Listera meifongensis* H.J. Su & C.Y. Hu, Taiwania 45(3): 240, pl.1. 2000. **Type:** Taiwan: Nantou: Meifong, 2700 m, Jun. 27, 1999, *C.Y. Hu* 226 (holo. HAST105322); Hualien: Mt. Hohuan, 3000 m. Jul. 25, 1999, *H.J. Su & C.Y. Hu* 9592 (para. NTUF). **●梅峰雙葉蘭**
- Neottia morrisonicola** (Hayata) Szlach., Fragm. Florist. Geobot., Suppl. 3: 118. 1995. *Listera morrisonicola* Hayata, Icon. Pl. Formos. 2: 140. 1912; Masam., J. Geobot. 14(4): pl.117. 1966. **Type:** Taiwan: Mt. Morrison, 11000 ped., Oct. 9, 1909, *T. Kawakami et S. Sasaki s.n.* (holo. TI, photo T00998 in PoT; iso. TAI6867). **●玉山雙葉蘭**
- Listera taiwaniana* S.S. Ying, Tech. Bull. Exp. For. Natl. Taiwan Univ. 114: 156. 1974; Col. III. Indig. Orch. Taiwan 1(2): 238-240. 1977. **Type:** Taiwan: Mabalaseshan, 3650 m, Jul. 23, 1974, S.S. Ying 2732 (holo. NTUF, photo F00006908 in PoT).
- Neottia nankomontana** (Fukuy.) Szlach., Fragm. Florist. Geobot., Suppl. 3: 118. 1995. *Listera nankomontana* Fukuy., Bot. Mag. (Tokyo) 49(581): 291. 1935. **Type:** Taiwan: Nanko-taizan, inter Kirittoi (2570 m) et Bunakkei (3500 m), Jul. 1933, collected by *J. Ohwi*, *N. Fukuyama* 4139 (holo. KPM-NA0105561 without Fukuyama's no., photo T00068 in PoT). Specimen: Taichu, inter Matsumine at Hakka. Jul. 12, 1930, *S. Suzuki* 5600. **●南湖雙葉蘭**



Neottia piluchiensis T.P. Lin, *Taiwania* 60(4): 169, f.3 & 4A. 2015. **Type:** Taiwan: Nantou: Piluchi, 2400 m, Jun. 22, 2011, T.P. Lin s.n. (holo. TAI277369).

●碧綠溪雙葉蘭

Neottia pseudonipponica (Fukuy.) Szlach., *Fragm. Florist. Geobot., Suppl.* 3: 118. 1995. *Listera pseudonipponica* Fukuy., *Bot. Mag. (Tokyo)* 49(586): 665. 1935. **Type:** Taiwan: Tosei-gun [東勢]: Seki-heki-ko [石壁坑]. Jan. 1934, *Nakazawa 4686* (holo. TAI118732).

●假日本雙葉蘭

Neottia taizanensis (Fukuy.) Szlach., *Fragm. Florist. Geobot., Suppl.* 3: 119. 1995. *Listera taizanensis* Fukuy., *Bot. Mag. (Tokyo)* 48(571): 431. 1934. **Type:** Taiwan: Nankotaizan, inter Kiritto et Bunakkei [南湖園谷-基力亭], Jul. 1933, *N. Fukuyama 4123* (holo. KPM-NA0105562 without Fukuyama's no., photo T00069 in PoT).

●大山雙葉蘭

Nervilia alishanensis T.C. Hsu, S.W. Chung & C.M. Kuo, *Taiwania* 57(3): 274, f.1E-H & 3. 2012. **Type:** Taiwan: Chiayi: Alishan Township, Fushan Tribe, 1200-1400 m, Mar. 21, 2012, T.C. Hsu 5497 (holo. TAI435426); Shihtzulu [十字路] 1400-1500 m, Oct. 12, 2011, T.C. Hsu 4838 (para. TAI435427); Shihtzulu, Apr. 12, 2012, T.C. Hsu 5567 (para. TAI435428).

●阿里山脈葉蘭

Nervilia brevilibata C.S. Leou, C.L. Yeh & S.W. Gale, *Nordic J. Bot.* 31: 403-407. 2013. **Type:** Taiwan: Pingtung: Lilungshan, 600 m, Mar 10, 2012, S.I. Hsieh 001 (holo. PPI).

●短梗脈葉蘭

Nervilia concolor (Blume) Schltr., *Bot. Jahrb. Syst.* 45: 404. 1911. *Cordyla concolor* Blume, *Bijdr. Fl. Ned. Ind.* 416. 1825. *Roprostemon concolor* (Blume) Lindl., *Gen. Sp. Orchid. Pl.* 453. 1840. *Pogonia concolor* (Blume) Blume, *Mus. Bot.* 1: 32. 1849. **Type:** Java: Mt. Salak. Blume s.n.

東亞脈葉蘭/一點癩

Nervilia aragoana Gaudich., Freye, *Voy. Uranie, Bot.* 422, f.35. 1829; Matsumra & Hayata, *J. Coll. Sci. Univ. Tokyo* 22: 421. 1906; Seidenf., *Dansk Bot. Ark.* 32(2): 164, f.103-105. 1978. *Pogonia flabelliformis* Lindl., *Gen. Sp. Orchid. Pl.* 415. 1840. *nom. superfl. Aplostellis flabelliformis* (Lindl.) Ridl., *Fl. Malay. Penin.* 4: 203. 1924, *nom. illeg. Nervilia flabelliformis* (Lindl.) Tang & F.T. Wang, *Acta Phytotax. Sin.* 1(1): 68. 1951, *nom. illeg. Pogonia nervilia* Blume, *Ann. Mus. Bot. Lugduno-Batavum* 1: 32. 1849. *nom. superfl. Type:* Guam: Mariana Islands, C. *Gaudichaud s.n.* (holo. P00315127). Taiwan: Kaohsiung, Jul. 1906, *Kawakami 5159*; Pingtung: Chuanfanshih 船帆石 to Oluanpi, Dec. 27, 1931, *Fukuyama 611* (TAI115459).

Nervilia yaeyamensis Hayata, *Icon. Pl. Formosan.* 2: 140. 1912. **Type:** Taiwan: Yaeyama: Ishigakishima, Jul. 1910.

Nervilia crociformis (Zoll. & Moritzi) Seidenf., *Dansk Bot. Ark.* 32(2): 151, f.92. 1978; T.P. Lin, *Taiwania* 52(4): 281-286, f.2C & 3. 2007. *Bolborchis crociformis* Zoll. & Moritzi, *Syst. Verz.* 89. 1846. **Type:** Java: Tjikoya, Oct. 11, 1842, *Zollinger 762* (holo. P00337729; iso. P00337728, LE). Specimen: Taiwan: Pingtung: Syhchurngshi and Chechen, May 16, 2006, W. Lin s.n. (TAI259404).

四重溪脈葉蘭

Note: This is a highly variable species. Taiwanese plants are characterized by glabrous leaves that are green, with fine white reticulate venation on the upper surface, a shiny white and nonlobed lip, and a lip disk with 3 longitudinal low ridges ornamented by lanate hairs, which are in contrast with leaf that are sparsely setulose above and dull green without white veneration; lips that are white flushed with pink, lavender, or magenta at the apex; a trilobed lip; a lip disk ornamented by sparse lanate hairs with no clear ridges (see figures in Seidenfaden 1978, p.151; Pedersen *et al.* 2014, p.558). These features probably represent 2 extremes within the species variations.

Nervilia cumberlegei Seidenf. & Smitinand, *Orch. Thail.* 4(2): 729, f.541. 1965; Leou, *Quart. J. Expt. Forest Natl. Taiwan Univ.* 11(2): 75, f.2, 4. 1997. **Type:** Thailand: Khao Yai, 750 m. *Cumberlege 1190* (holo. C713, spirit; K spirit, 25605.000 & 27652.000). Specimen: Taiwan: Nantou, 800 m, grassland. May 1996. C.S. Leou 6164 & 6337.

古氏脈葉蘭

Note: Leou indicated that in the Taiwanese plant, the papillae are distributed widely on the disc, whereas in Thailand's plant, they are restricted to 3 keels.

Nervilia dilatata (Blume) Schltr., *Bot. Jahrb. Syst.* 45: 402. 1911; S.W. Chung, *Orch. Taiwan* 2: 109 photo. 2008. *Pogonia dilatata* Blume, *Coll. Orchid. t.* 10. 1858.

寬唇脈葉蘭

Note: This plants found in Kenting area differ from Blume's *N. dilatata*. Further investigation is required.

Nervilia falcata (King & Pantl.) Schltr., in *Engl., Bot. Jahrb.* 45: 402. 1911; Seidenf., *Dansk Bot. Ark.* 32, 2:153. 1978; C.L. Yeh *et al.*, *BioFormosa* 45(1): 39-44. 2010. *Pogonia falcata* King & Pantl., *J. Asiat. Soc. Bengal* 65(2): 129. 1896; *Orch. Sikkim Himalaya* 268, pl. 357. 1898. **Type:** Sikkim: Western Dooar of Bhotan, East of the Jaldacca River. *Pantling 439*. Specimen: Taiwan: Pingtung: Mt. Laofou, 300 m, May 16, 2010, C.R. Yeh s.n.

鑷唇脈葉蘭

Nervilia lanyuense S.S. Ying, *Mem. Coll. Agric. Natl. Taiwan Univ.* 29(2): 55. 1989. **Type:** Taiwan: Lanyu: Tungching 300 m, Nov. 14, 1987, S.S. Ying s.n. (holo. NTUF, photo F00006907 in PoT; iso. NTUF, photo F00000170-171 in PoT).

●蘭嶼脈葉蘭

Nervilia linearilabia T.P. Lin, *Taiwania* 59(4): 363, figs. 1E, F & 5. 2014. **Type:** Taiwan: Pingtung: Tahanshan, 900 m, Apr. 13, 2014, S.S. Lin s.n. (holo. TAI284097).

●小麥脈葉蘭

Nervilia plicata (Andrews) Schltr., *Bot. Jahrb. Syst.* 45: 403. 1911; Seidenf., *Dansk Bot. Ark.* 32(2): 156, f.100. 1978; Su, *Quart. J. Chin. Forest.* 21(1): 122, pl.4. 1988. *Arethusa plicata* Andrews, *Bot. Repos.* 5: 321. 1803. *Pogonia plicata* (Andrews) Lindl., *Gen. Sp. Orchid. Pl.* 415. 1840. **Type:** E. India. received by A.B. Lambert, cultivated in London, specimen not found. One specimen under this name: Herb. H.G. Reichenbach 23311, Jun. 22, 1884.

紫背一點癩/紫花脈葉蘭

Pogonia purpurea Hayata, *J. Coll. Sci. Imp. Univ. Tokyo* 30(1): 345-346. 1911. *Nervilia purpurea* (Hayata) Schltr., *Repert. Spec. Nov. Regni Veg.* 10: 6. 1911. *Nervilia discolor* var. *purpurea*



(Hayata) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 253. 1977. *Nervilia plicata* var. *purpurea* (Hayata) S.S. Ying, Col. Ill. Orch. Taiwan 2: 276. 1990. **Type:** Taiwan: Hengchun, Jul. 1906, *T. Kawakami 5150* (holo. TI, photo T01185 in PoT).

Nervilia ratis T.P. Lin & Y.N. Chang, *Taiwania* 58(4): 260–264, f.2GH & 5. 2013. **Type:** Taiwan: Pingtung: Tahanshan, 900m, Apr., 2013, S.S. Lin s.n. (holo. TAI282381).

●三伯脈葉蘭

Nervilia taiwaniana S.S. Ying, Quart. J. Chin. Forest. 11(2): 104. 1978. **Type:** Taiwan: Nantou: Tungpu, Yuan-lung fall [雲龍瀑布]. Jul. 5, 1973, S.S. Ying 1915 (holo. NTUF, photo F00006905 in PoT).

●單花脈葉蘭

Nervilia punctata (Blume) Schltr. var. *nipponica* auct. non (Makino) F. Maek.: T.P. Lin, Native Orch. Taiwan 3: 174, photo 99. 1987. Specimen: Mt. Tashueh, Aug. 23, 1973, Lin 49 (TAIF); Miaoli: Tapin, Mar. 20, 1978, Lin 413 (TAIF).

Nervilia taiwaniana S.S. Ying var. *tahanshanensis* (T.P. Lin & W.M. Lin) T.P. Lin, *comb. nov.* *Nervilia tahanshanensis* T.P. Lin & W.M. Lin, *Taiwania* 54: 329–330, f.2H. 2009. **Type:** Taiwan: Pingtung: Tahanshan, 1000 m, Jul. 20, 2009, *Weimin Lin s.n.* (holo. TAI269081). Note: This variety has similar flower features, but differs from var. *taiwaniana* because it has green leaves that are not patterned with white veins at population level.

●大山脈葉蘭

Oberonia arisanensis Hayata, Icon. Pl. Formos. 4: 23, f.3(a–e, h). 1914. *Oberonia anthropophora* Lindl. var. *arisanensis* (Hayata) T. Hashim., Proc. 12th. Orch. Conf. 122. 1987. **Type:** Taiwan: Arisan: inter Taroyen et Funkiko [奮起湖–哆羅焉], 6000 ped. Mar. [29], 1914, *B. Hayata et T. Ito s.n.* (holo. TI, photo T01153 in PoT).

●阿里山莖白蘭/細葉莖白蘭

Note: A variable species in Taiwan, *O. arisanensis* is characterized by a reddish lip, erose-fimbriate margin of the lateral lobes, and oblong-rectangular midlobe (Hayata 1914).

Oberonia caulescens Lindl., Gen. Sp. Orchid. Pl. 15. 1830; Seidenf., Dansk Bot. Ark. 25 (3): 36. 1968; Liu & Su, Fl. Taiwan 5: 1070. 1978. **Type:** Nepal. *Wallich 1950* (holo. K001114800).

二裂唇莖白蘭

Oberonia bilobatolabella Hayata, Icon. Pl. Formos. 4: 24–25, f.4. 1914. **Type:** Taiwan: Arisan, Jan. 1912. *B. Hayata et S. Sasaki s.n.* Specimen: *S. Sasaki s.n.* (TAIF6889).

Oberonia formosana Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 309–310. 1911 & Icon. Pl. Formos. 4: 25, f.3(f, g). 1914; Masamune, J. Geobot. 19(3): pl.169. 1971. **Type:** Taiwan: Nantou: Randaizan, Jun. [Jul. 30], 1907, *T. Kawakami et U. Mori 3474* (holo. TI, photo T01160 in PoT; iso. TAIF22343; K000943012).

●台灣莖白蘭

Oberonia falcata auct. non King & Pantling: Lin, Native Orch. Taiwan 3: 191, photo 104. Note: The plants presented in my earlier work (Lin 1987) were not *O. falcata*, because the features are inconsistent with those in the original description, in which the lip is 2 times longer than sepals, and the midlobe of lip is twice as long as wide (Averyanov 2013, p135). These plants of p.192 (Lin 1987) grow in a tuft and produce various shapes of

vegetative growth and flower representing a combination of *O. formosana*, *O. arisanensis* and *O. kusukusensis*.

Note: Garay & Sweet (1974, p.127) indicated that *O. formosana* is conspecific with *O. japonica*. However, their plant morphologies differ. Plants of the *Kawakami et Mori 3474* are between 4 and 6 cm long, and have narrow long lanceolate leaves, which the length is at least 5 times greater than the width, whereas *O. japonica* has relatively wider succulent leaves, which the length is usually 2 to 4 times greater than the width. The flowers of *O. formosana* is characterized by relatively short/square midlobes when compared with *O. arisanensis* and *O. kusukusensis* (Hayata 1914).

Oberonia gigantean Fukuy., Bot. Mag. (Tokyo) 49(581): 295. 1935. **Type:** Taiwan: Taihoku, Shooagyoku-san [小阿玉山], collected in Aug. 1933 & flowering Dec. 1933, *Fukuyama 4543*, not found. Note: The KPM specimen NA0105567 (photo T00030 in PoT) was made at different time and could not regarded as the same specimen or duplicate.

●大莖白蘭

Oberonia insularis Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 310. 1911. **Type:** Taiwan: Nokoan, Jan. [14], 1907, *T. Kawakami et U. Mori 6278* (holo. TI, photo T01161 in PoT). Note: Hayata stated that this is similar to *O. japonica* in habit. The most crucial feature is the rhizome creeping with small scales.

●小騎士蘭

Hippeophyllum pumilum Fukuy. in Masam., A List Vascular Plants of Taiwan, 1954; Masam., J of Geobot. 20(4): t.196. 1974. *nom. nud.* *Hippeophyllum pumilum* Fukuy. ex T.P. Lin, Native Orch. Taiwan 3: 141, photo 81. 1987. *nom. invalid.* as two specimens *Lin 467* (TAIF) and *Suzuki 9714* (TAI 033040) were included but no type was designated. *Oberonia pumila* (Fukuy. ex T.P. Lin) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 2: 610. 1990. *nom. invalid.* *Hippeophyllum pumilum* Fukuy. ex S.C. Chen & K.Y. Lang, Acta Phytotax. Sin. 36: 72. 1998. *nom. invalid.* Note: A lectotype (*Suzuki s.n. 9714*, TAI 033040) was designed in this literature. Because the term “lectotype” was used, this name was not validly published as ICN required the terms “typus” or “holotypus” after 1990. *Oberonia pumila* (Fukuy. ex S.C. Chen & K.Y. Lang) S.S. Ying ex Ormerod, *Taiwania* 47(4): 242. 2002. *nom. invalid.*

Oberonia insularis Hayata var. *rotundum* (T.P. Lin & W.M. Lin) T.P. Lin, *comb. nov.* *Oberonia pumila* (S.C. Chen & K.Y. Lang) S.S. Ying ex Ormerod var. *rotundum* T.P. Lin & W.M. Lin, *Taiwania* 54(4): 330, f.4 & 5, t.1. 2009. **Type:** Taiwan: Hualien: between Lungshi and Lungchien, 900 m, May 2009, *W.M. Lin s.n.* (holo. TAI268956).

●圓唇小騎士蘭

Oberonia kusukusensis Hayata, Icon. Pl. Formos. 4: 26, f. 3(i–k). 1914. **Type:** Taiwan: Kusukusu, Jul. 1912, *B. Hayata et S. Sasaki s.n.* (holo. TI, photo T01162 in PoT; Iso. TAIF 6896).

●高士佛莖白蘭

Note: This may be conspecific with *O. arisanensis* but has larger plant and leaf size. From the line drawings on the label of type specimen and figures provided by Hayata, *O. kusukusensis* has 2 triangular lobules of the midlobe and U-shaped triangular and recurved sidelobes.

Oberonia linguae T.P. Lin & Y.N. Chang, *Taiwania* 58(4): 263–265, f.2C & 6. 2013. **Type:** Taiwan: Nantou: Shanlinshi, 1500–1600 m, cult. flowering Aug. 2013. Aug. 23, 2013, *Wu-Si Wei s.n.* (holo. TAI283129)

●圓唇莖白蘭



Oberonia rosea J.D. Hooker, Hooker's Icon. Pl. 21: ad t.2005. 1892; Seidenf., Dansk. Bot. Ark. 25(3): 83. f.53. 1968 & Opera Bot. 114: 159, f.101. 1992; Su, Quart. J. Chin. For. 20(4): 104, pl.5. 1987. **Type:** Malay Peninsula, W. Norris *s.n.* (syn. K000943000); Perak, L. Wray, Jr. 1246 (syn. K000943001), Dr. King's Collector 2664 (syn. K000943002). Specimen: Taiwan: Pingtung: Nanjenshan, Luliaoyueh, May 24, 1987, *Su 7020, 7880* (HAST104811). **裂瓣莖白蘭**

Oberonia segawae T.C. Hsu & S.W. Chung, Taiwania 53(2): 165-169, f.1-3. 2008. **Type:** Taiwan: Pingtung: Chaozhoujun. Aug. 1937, *K. Segawa s. n.* (holo. TAI117872)

●齒唇莖白蘭

Oberonia seidenfadenii (H.J. Su) Ormerod, Taiwania 47: 242. 2002. ***Hippeophyllum seidenfadenii*** H.J. Su, Quart. J. Exp. Forest, NTU. 13(3): 204. 1999. **Type:** Taiwan: Kaohsiung: Liukuei, Douna logging road 1400 m (多納林道), Nov. 11, 1986, *H.J. Su 7525* (holo. HAST106477; iso. NTUF, photo F00009171 in PoT). Specimen: Koashung: Taoyuan District: Laonunghsi river bank (荖濃溪畔), near Chinho (勤和村) 600 m. Nov. 29, 1987, *Su 8114* (NTUF)

●密花小騎士蘭

Oberonioides pusillus (Rolfe) H.B. Marg. & D.L. Szlach., Annalen des Naturhistorischen Museums in Wien, B, 112: 507. 2010. ***Microstylis minutiflora*** Rolfe, in Dunn, J. Linn. Soc., Bot. 38: 367. 1908, *non* Schltr. 1899. ***Microstylis pusilla*** Rolfe, Orch. Rev. 19: 229. 1911. ***Microstylis microtatantha*** Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 192. 1919. *nom. superfl.* ***Malaxis microtatantha*** (Schltr.) T. Tang & F.T. Wang, Icon. Cormoph. Sin. 5:670, f. 8170. 1976. *nom. illeg.*; S.H. Chen, Ann. Rep. Hualien Normal Coll. 11: 1-4. 1979. Specimen: Mar. 29, 1978, *S.H. Chen 1867, 1868, 1869* (NHLUE ?). ***Oberonioides microtatantha*** (Schltr.) Szlach., Fragm. Florist. Geobot., Suppl. 3: 135. 1995. *nom. illeg.* **Type:** China: Fukien, Yuen Fu Gorges, 600 m. May 1, 1905, *Dunn 3545* [holo. HK0027165]. The lectotypification made by Margonska and Szlachetko in 2010 is questionable as Rolfe indicated the type was in Hong Kong herbarium instead of Kew.

●小軟葉蘭

Malaxis tairukouensis S.S. Ying, Col. Ill. Indig. Orch. Taiwan 2: 268-270. 1990. **Type:** Taiwan: Tienhsiang, Nov. 24, 1989, *S.S. Ying s.n.* (holo. NTUF, photo F00008209 in PoT; iso. NTUF, photo F00008210 in PoT).

Odontochilus bisaccatus (Hayata) Hayata ex T.P. Lin, Native Orch. Taiwan 1: 214, photo 135. 1975. ***Anoectochilus bisaccatus*** Hayata, Icon. Pl. Formos. 4: 99, pl.15. 1914. ***Odontochilus bisaccatus*** Hayata, Icon. Pl. Formos. 4: 99, pl.15. 1914. *nom. nud.*, in sched. **Type:** Taiwan: Rinkihō [林杞埔(竹山)], 5000 ped., Aug. 19, 1911, collector unknown (holo. TI, photo T00872 in PoT).

●二囊齒唇蘭

Note: A drawing of *Odontochilus lanceolatus* (Lindl.) Blume (Blume 1858, pl 29 & 36) by King & Pantling (1891, 8: t.392) showed that the shape of the lip limb and column attributes are different from those of *O. bisaccatus*, and such difference can be observed in Pedersen (2011, p. 190). *O. lanceolatus* does not have 2 flesh

appendages on either side of the column, shows a substantially narrower angle of the 2 lobes of the labellum, and has a bifid rostellum instead of a twisted rostellum (Lin 1975, p215).

Odontochilus brevistylus Hook. f. subsp. ***candidus*** (T.P. Lin & C.C. Hsu) T.P. Lin, **comb. nov.** ***Odontochilus candidus*** T.P. Lin & C.C. Hsu, Taiwania 21(2): 234, f.2. 1976. ***Anoectochilus inabae*** var. ***candidus*** (T.P. Lin & C.C. Hsu) S.S. Ying, Col. Ill. Orch. Taiwan 1: 62 1996. ***Odontochilus inabai*** Hayata var. ***candidus*** (T.P. Lin et C.C. Hsu) Ying, Quart. J. Chin. For. 21(2): 116. 1988. **Type:** Taiwan: Kaohsiung: Nanfenshan, *T.P. Lin 167* (holo. TAI); Nantou: Hsin-sheng (新生), *T.P. Lin 80* (para. TAI).

●白齒唇蘭

Note: *O. candidus* differs from *O. brevistylis* (Pedersen 2011, p.185; Su 2000, pl.419) by the longer fringes in the mesochile of the labellum, and a twisted comb-like gland on each side of the hypochile compared with short irregular teeth in the mesochile, and one compressed falcate gland on either side of the lip base of the latter species.

Odontochilus elwesii C.B. Clarke ex J.D. Hooker, Fl. Brit. India 6: 100. 1890. **Types:** India: Rishap: Darjeeling, Khasia Hills, Jul. 28, 1870, 1219 m, *C.B. Clarke 12251* (syn. K000387710); India: Shillong, 1859 m, Jun. 9, 1886, *Clarke 44609* (syn. K000387638); India: Kohima, Naga Hills, 1886, *Prairie 17* (syn. K000387709)

●紫葉齒唇蘭

Odontochilus purpureus C.S. Leou, Quart. J. Exp. Forest, NTU. 6(3): 68, f.1-2. 1992. **Type:** Taiwan: Nantou: Chitou, 1200 m, Aug. 1991, *Leou 4415* (holo. NTUF). Note: A drawing by King & Pantling (1898, t.394) is identical to descriptions of *O. purpureus*.

Odontochilus inabae (Hayata) Hayata ex T.P. Lin, Native Orch. Taiwan 1: 216, col. photo 136-137. 1975. ***Anoectochilus inabae*** Hayata, Icon. Pl. Formos. 4: 102, pl. 16. 1914. ***Odontochilus inabae*** Hayata, Icon. Pl. Formos. 4: 104. 1914. *pro syn.* **Type:** Taiwan: Nantou: Rinkihō [林杞埔] 5000 ped., Aug. 19, 1911, *H. Inaba s.n.* (holo. TI, photo T00870 in PoT).

●單囊齒唇蘭

Note: Averyanov (2011, p.96) listed *Odontochilus inabae* as a synonym of *O. tortus* King et Pantl. (1896, p.125). The vegetative features of *O. inabae* resemble *O. tortus*, but differs in deep-green or brownish-green tessellation and the pinnate venation of the sepals and petals. Tessellation and the pinnate venation of tapels also present in *O. tortus* but they are much weaker or inconspicuous (King and Pantling 1898). The mesochile laterally has much shorter fringes in the type of *O. tortus* (K000387643) when compared with *O. inabae*. Sac of hypochile contains one compressed subpalmar appendage on either side, and column base has a pair of protuberance appendage of *O. tortus* are also very different from that of *O. inabae*.

Odontochilus nanlingensis (L.P. Siu & K.Y. Lang) Ormerod, Taiwania 48(2): 91. 2003; T.C. Hsu and S.W. Chung, Taiwania 54(1): 83. f.1 & 2. 2009. ***Anoectochilus nanlingensis*** L.P. Siu & K.Y. Lang, Acta Phytotax. Sin. 40: 164. 2002. **Type:** China: Guangdong: Nanling National Nature Reserve, Mt. Tianjing, 1560 m, Jun. 30, 2000, *L.P. Siu Gs-16-2000* (holo. PE). Specimen: Taiwan: Taipei: Dadaoshan. 600 m, Apr. 6, 2002, *T.C. Hsu 69* (TAIF); Lapushan, 600 m, May 3, 2006, *T.C. Hsu s.n.* (TAIF); Badaoershan, 900 m, May 5, 2007, *T.C. Hsu 1370* (TAIF).

●南嶺齒唇蘭



Odontochilus poilanei (Gagnep.) Ormerod, Lindleyana 17(4): 225. 2002; Yang *et al.*, Taiwan J. Forest Sci. 29(1): 79-84. 2014. *Evrardia poilanei* Gagnep., Bull. Mus. Nat. Hist. (Paris) 2, ser. 4, 5: 596. 1932; Seidenf., Dansk Bot. Arkiv 32(2): 59, f.33. 1978. *Chamaegastrodia poilanei* (Gagnep.) Seidenf. & A.N. Rao, Nordic J. Bot. 14: 297. 1994. **Type:** Vietnam: Annam: Dalat, Nov. 15, 1924, *F. Evrard 1807* (syn. P00345030); Vietnam: Annam: Kontum, montagne Mam Ray, Sept. 2, 1930, *E. Poilane 18204* (syn. P00345029). Specimen: Taiwan: Nantou: Lugu township, 700 m. Aug. 19, 2013, C.K. Yang & H.T. Yeh 1890 (TNU).

齒爪齒唇蘭

Oreorchis bilamellata Fukuy., Bot. Mag. (Tokyo) 48(571): 436. 1934. **Type:** Taiwan: Shinchiku, Taihansenzan, 8000 ped. Jul. 1932, *N. Fukuyama 4132*.

●大霸山蘭

Oreorchis fargesii Finet, Bull. Soc. Bot. France 43: 697, t.13. 1896; Ying, Col. Ill. Ingidn. Orch. Taiwan 1: 487. 1977. **Type:** China: Sichuen oriental, 2000 m, *A. Farges 416* (syn. P00420888-P00420891; isosyn. AMES00102655, AMES00102656, E00383633, K000891160 & MPU018137-MPU018139).

密花山蘭

Oreorchis fargesii Finet var. *subcapitata* Hayata, Icon. Pl. Formos. 2: 142-143. 1912. *Oreorchis subcapitata* (Hayata) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 225. 1919. **Type:** Taiwan: Mt. Rontabum, Apr. [17], 1910, *U. Mori s.n.* (holo. TI, photo T01166 in PoT; iso. TAI6904). Note: Hayata (1912) indicated that this variety is similar to *O. fargesii* but differs in lips with a long midlobe, a substantially shorter column, and punctate petals.

Oreorchis indica (Lindl.) Hook. f., Fl. Brit. Ind. 5: 709. 1890; T. Yukawa *et al.*, Bot. Bull. Acad. Sin. 44: 345-351. 2003. *Corallorhiza indica* Lindl., J. Linn. Soc. Bot. 3: 26. 1859. *Oreorchis foliosa* Lindl. var. *indica* (Lindl.) N. Pearce & P. J. Cribb, Edinburgh J. Bot. 54: 307. 1997. **Type:** India: Upper part of [Hattum], Western Himalaya, Bor. Occ. Aug. 5, 1847, *T. Thomson 1724* (holo. K000891157).

印度山蘭

Tainia gokanzanensis Masam., Humbert, Notul. Syst. (Paris) 6: 38. 1937. **Type:** Taiwan: Mt. Gokanzan (Hohuanshan) 3300 m, Jul., *G. Masamune s.n.* (TAD). Type not found!
Note: *O. indica* and *O. foliosa* are easily distinguished by the presence or absence of a mentum and the raised lamellae between the lateral lobes of the labellum. These variations are not continuous and reflect different reproductive strategies.

Oreorchis micrantha Lindl., J. Proc. Linn. Soc., Bot. 3: 27. 1858. **Type:** N.W. Himalaya, 2438-3048 m, *T. Thomson 214* (holo. K000891156).

南湖山蘭

Oreorchis ohwii Fukuy., Bot. Mag. (Tokyo) 49(581): 296. 1935. **Type:** Taiwan: Nanko-taizan, collected by J. Ohwi, Jun. 1, 1933, *N. Fukuyama 4547* (holo. KPM-NA0105571, photo T00034 in PoT; iso. KYO).

Oreorchis patens (Lindl.) Lindl., J. Proc. Linn. Soc., Bot. 3: 27. 1858; Su, Fl. Taiwan, 2nd edit. 5: 991. pl. 421. 2000. *Corallorhiza patens* Lindl., Gen. Sp. Orchid. Pl. 535. 1840. **Type:** Russia: Siberia, 1826, *J.D. Prescott s.n.* (holo. K000885699).

細花山蘭

Oreorchis gracilis Franch. & Sav. var. *gracillima* Hayata, Icon. Pl. Formos. 2: 141-142. 1912. *Oreorchis gracillima* (Hayata) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 223. 1919. *Oreorchis*

patens (Lindl.) Lindl. var. *gracillima* (Hayata) Ying, Quart. J. Chin. For. 21(2): 116. 1988. **Type:** Taiwan: Rontabunzan, Apr. 17, 1910, *U. Mori s.n.* (holo. TI, photo T01168 in PoT; iso. TAI6903).

Note: It is surprising that this species can also occur at low altitudes [Pingtung: Kueitsuchia [墾丁公園], May. 13, 1932, *S. Sasaki s.n.* (TAI033421)].

Pachystoma pubescens Blume, Bijdr. Fl. Ned. Ind. 376. t.29. 1825; Liu & Su, Fl. Taiwan 5: 1079. 1978. **Type:** Java: Tijradjas, Krawang. *Blume s.n.* (holo. L0061831).

粉口蘭

Apaturia chinensis Lindl., Gen. Sp. Orchid. Pl. 131. 1831. *Pachystoma chinensis* (Lindl.) Rchb. f., Bonplandia 3: 251. 1855; Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 92. 1896. **Type:** China: Macao, *G.H. Vachel s.n.* Specimen: Bankingsing, 1895, *A. Henry 384*.

Apaturia montana Lindl., Gen. Sp. Orchid. Pl. 131. 1831. **Type:** Sri Lanka, Mt. Nuera Ellia, *Macrae s.n.*, Wall. Cat. no. 3738 (K001119918). Note: The image of K001119918 showed *Pachystoma pubescens* but not *Aphyllorchis montana*.

Pachystoma formosanum Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 245. 1919. *Pachystoma chinense auct. non* (Lindl.) Rchb. f.: Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30: 321. 1911. **Type:** Taiwan: Nantou: Shashizan, Mar. [26], 1908, *T. Kawakamii et U. Mori 3735* (holo. TI, photo T01169 in PoT).

Pachystoma ludaense S.C. Chen & Y.B. Luo, Acta Phytotax. Sin. 40: 140. 2002. *Eulophia hirsute* T.P. Lin, Native Orch. Taiwan 3: 68, photo 38. 1987. *non* Joseph & Vajravelu, 1975. **Type:** Taiwan: Is. Luta, 200 m, Jul. 8, 1980, *C.M. Kou 11642* (holo. TAI6).

Papilionanthe taiwaniana (S.S. Ying) Ormerod, Taiwania 47: 242. 2002. *Vanda taiwaniana* S.S. Ying, Mem. Coll. Agric. Natl. Taiwan Univ. 29(2): 65. 1989. *x Papilisia taiwaniana* (S.S. Ying) J.M.H. Shaw, Orchid Rev. 112 (1257, Suppl.): 47, 2004. **Type:** Taiwan: Pintung: Sche-Tzou-Chi to Shih-men. Dec. 26, 1987, *S.S. Ying s.n.* (iso. NTUF, photo F00000323 in PoT).

●台灣萬代蘭

Note: The existence of this species is questionable.

Paraphaius flavus (Blume) J. W. Zhai, Z. J. Liu et F. W. Xing, Mol. Phylogenet. Evol. 77: 221. 2014. *Limodorum flavum* Blume, Bijdr. Fl. Ned. Ind. 8: 375. 1825. *Phaius flavus* (Blume) Lindley, Gen. Sp. Orchid. Pl. 128. 1831; Garay & Sweet, Orch. S. Ryukyu Isl. 126. 1974; Lin, Native Orch. Taiwan 1: 226, photo 140-141. 1975. **Type:** Java: Mount Gede. *Blume s.n.* (syn. L0061867 & L0061868).

黃花鶴頂蘭

Phaius undulatomarginata Hayata, Icon. Pl. Formos. 4: 59, f.27. 1914. **Type:** Taiwan: Koshun: Botansha, Dec. 1906, *G. Nakahara 788* (syn. TI, photo T01173, T01174, & T01175 in PoT with Hayata hand writing; isosyn. TAI6913).

Phaius somai Hayata, Icon. Pl. Formos. 6: 74-75. 1916. **Type:** Taiwan: Urai, May [6], 1916, *B. Hayata et T. Soma s.n.* (syn. TI, photo T01171 & T01172 in PoT).

Note: A new genus, *Paraphaius*, was proposed to encompass *P. takeoi*, *P. columnaris*, and *P. flavus* based on the combined nrDNA ITS and cpDNA data and morphological characteristics (Zhai *et al.* 2014). This new genus is characterized by the leaves and flower bracts persistent, and labellum separate from the column wing. The flower bracts caducous is observed in the *Phaius*.

Paraphaius takeoi (Hayata) J.W. Zhai, Z.J. Liu et F.W. Xing, Mol. Phylogenet. Evol. 77: 221. 2014. *Calanthe takeoi* Hayata, Icon. Pl. Formosan. 9: 111. 1920. *Phaius takeoi* (Hayata) H.J. Su, Quart. J. Exp. Forest. Natl. Taiwan Univ. 3(4): 77. 1989. **Type:** Taiwan: Taipei: Urai. Oct. [24], 1917, *I. Takeo s.n.* (holo. TI, photo T00905 in PoT).

粗莖鶴頂蘭



Phaius longicruris Z.H. Tsi, Acta Phytotax. Sin. 19: 505. 1981.

Type: Yunnan: Jinghong, C.W. Wang 79184 (holo. PE).

Note: This species was once considered as endemic, but is currently also found in Yunnan, China, and Thailand (Pedersen *et al.* 2014).

Peristylus formosanus (Schltr.) T.P. Lin, Native Orch. Taiwan 2: 274, photo 138-139. 1977. *Habenaria formosana* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 127. 1919. *Coeloglossum formosanum* Makino & Hayata ex Hayata, J. Coll. Sci. Imp. Univ. Tokyo 22: 420. 1906. *nom. nud.* *Habenaria tentaculata* Rchb. f. var. *acutifolia* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 354. 1911. **Type:** Taiwan: Shintengai, Jan. 1904, S. Nagasawa 309, not found. Specimen: Taitung: Kwasyoto, Jan. 1, 1929, S. Sasaki 40013 (TAI032948); Pingtung: Nanjenshan, Dec. 15, 1975, T.P. Lin 126 (TAIF183950).

台灣驚草

Habenaria brevicealcarata Fukuy., Trans. Nat. Hist. Soc. Taiwan 22: 42. 1932. **Type:** Taiwan: Taihoku, Sendyosan [蟾蜍山] 100 m, Oct. 1931, G. Masam. *s.n.* not found.

Peristylus tentaculatus auct. non (Lindl.) J.J. Sm.: Ormerod, Taiwania 56(1): 46. 2011.

Note: Garay and Sweet (1974, p.37) considered this species to be conspecific with *Peristylus lacertifer*. Ormerod (2011) then considered this species to be conspecific with *P. tentaculatus* (Lindl.) J.J. Sm. *P. tentaculatus* has a green or light-green lip, a thinner long filiform sidelobe (to 2.8 cm), and globular bifid spur (Seidenfaden 1977, f.18), and *P. formosanum* has a white lip and a shorter attenuating sidelobe approximately 5 mm long. In addition, *P. tentaculatus* grows on open grassy bank, on wet hillsides, and in shady areas under trees (Barretto *et al.* 2011, p.237) while *P. formosanum* grows on grasslands and never in the woods. The color of lip usually reflects the openness or shaded condition.

Peristylus goodyeroides (D. Don) Lindl. Gen. Sp. Orchid. Pl. 299. 1835; Forbes & Hemsley, Ind. Fl. Sin. 54. 1903; Matsum. & Hayata, J. Coll. Sci. Univ. Tokyo 22:418. 1906; Mat. Fl. Formos. 353. 1911; Seidenf., Dansk Bot. Arkiv 31(3): 53, f.25. 1977; T.P. Lin, Native Orch. Taiwan 2: 278. 1977. *Habenaria goodyeroides* D. Don, Prodr. Fl. Nepal 25. 1825; A. Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 93.1896; Hayata, Mater. Fl. Formos. 353. 1911. **Types:** Nepal: 1819, N. Wallich (BM000038925); Paspulnath, 1821, N. Wallich, Cat. 7066A (CAL; K001126680, isolecto.).

南投玉鳳蘭

Habenaria goodyeroides D. Don var. *formosana* Hayata, Icon. Pl. Formos. 4: 126, pl. 22. 1914. *Habenaria hayataeana* Schltr. Fedde, Repert. Beih. 4: 129. 1919. **Type:** Taiwan: Nantou: Bunsan-ryo [分山寮], Jul. 31, 1907, T. Kawakami & U. Mori *s.n.* (isosyn. TAI06779); Nantou: Risekizan [埋石山], Jul. 10, 1907, T. Kawakami & U. Mori 3471 (isosyn. TAI032963). Specimen: Takow. Jul. 1888, G. Platfair 154.

Note: Hayata (1914) indicated that this variety differs from the type because it has narrower leaves and lamellate discs. A specimen collected in 1909 by U. Mori (TI, photo T00981 in PoT) is with Hayata's handwriting and the line drawing under the name: *Platanthera goodyeroides* var. *formosana* Hayata.

Peristylus gracilis Blume, Bijdr. Fl. Ned. Ind. 8: 404. 1825; T.C. Hsu *et al.*, Taiwania 54(4): 381-382, f.1 & 2. 2009. **Type:** Java: G. Seribu. *Blume s.n.* (holo. L0061851; iso. P00352834). One specimen in Herb. H.G. Reichenbach 19441. Specimen: Lanyu: Tienchih, 150 m, Nov. 14, 2004, Hsu 132 (TAIF220072).

纖細闊蕊蘭

Peristylus intrudens (Ames) Ormerod, Taiwania 56(1): 46. 2011. *Habenaria intrudens* Ames, Schedul. Orch. 6:1, f.1. 1923. **Type:** Phillipines: Luzon, Rizal, Antpolo. Oct. 1913, M. Ramos BS 21999 (holo. AMES000099883).

短裂闊蕊蘭

Peristylus spiranthes (Schauer) S.Y. Hu var. *taipoensis* S.Y. Hu & Barretto, Chung Chi Journal 13(2): 2. 1976. *Peristylus lacertifer* (Lindl.) J.J. Sm. var. *taipoensis* (S.Y. Hu & Barretto) S.C. Chen, S.W. Gale & P.J. Cribb, Fl. China 25: 143. 2009. *Peristylus taipoensis* (S.Y. Hu & G. Barretto) T.C. Hsu & S.W. Chung, Taiwania 54(1): 84-85, f.3 & 4. 2009. **Type:** Hong Kong: New Territories, Taipo, collected by G. Barretto, 25 Aug. 1970, S.Y. Hu 10944 (holo. K000827047; iso. AMES00102885 & 00083716). Specimen: Nantou: Sun Moon Lake, 800 m., Aug. 15, 2007, T.C. Hsu 925 (TAIF333999).

Peristylus lacertifer (Lindl.) J.J. Sm., Bull. Jard. Bot. Buitenzorg, sér. 3, 9: 23. 1927; Seidenf., Dansk Bot. Arkiv 31(3): 58, f.29. 1977; T.P. Lin, Native Orch. Taiwan 2: 272, photo 137. 1977. *Coeloglossum lacertiferum* Lindl., Gen. Sp. Orchid. Pl. 302. 1835. **Type:** Myanmar: Tavoy, collected by W. Gomez, Wallich Cat. 7055 (syn. K000974269 & K000974210). Specimen: Taiwan: Nantou: Lienhwachi, 700 m, Aug. 1, 1975, T.P. Lin 128 (TAIF 127660).

細花玉鳳蘭

Peristylus chloranthus Lindl. In Hook., Kew J. Bot. 7: 37. 1855; Rolfe in Forbes & Hemsley, J. Linn. Soc. Bot. 36: 53. 1903; Matsumuta & Hayata, Enum. Pl. Formosan. 419. 1906. **Type:** Hong Kong, common on top of Victoria Peak. Specimen: Bankinsing, 1895, A. Henry 895 & 1572.

Peristylus monticola (Ridl.) Seidenf., Dansk Bot. Ark. 31: 35, fig.13. 1977; Averyanov, Turczaninowia 13(2): 34, Figs. 18b-d and 33d-f. 2010. *Habenaria monticola* Ridl., J. Linn. Soc. Bot. 32: 413. 1896. **Type:** Malaysia: Malacca: Mt. Ophir, Padang Batu, 3000 ft, Jun. 1892, H.N. Ridley *s.n.* (syn. K000827042); Kedah, Kedah Peak, Haniff 605 (syn. K000827043). Ridley had collected another specimen Ridley 9994 (K000827041) in 1898.

貓鬚蘭

Glossula calcarata Rolfe, Bull. Misc. Inform. Kew 1913: 145. 1913. *Peristylus calcaratus* (Rolfe) S.Y. Hu, Quart. J. Taiwan Mus. 26: 398. 1973; T.P. Lin, Native Orch. Taiwan 2: 270, photo 135-136. 1977; Seidenf., Opera Bot. 114: 48, f.22. 1992. **Type:** China: Gongtong, Lo Fau Shan. Ford in HK 9620 (syn. K000827049, HK). Hong Kong: Voretzsch *s.n.* Taiwan: Nantou: Hsitou, 850 m, Sept. 18, 1975, T.P. Lin 222 (TAI122085).

Platanthera pricei Hayata, Icon. Pl. Formos. 4: 125, f. 66. 1914.

Type: Taiwan: Kappanzan, Jul. 1912, W.R. Price *s.n.* not found!

Habenaria lilungshania S.S. Ying, Col. Ill. Fl. Taiwan 4: 801, photo 988. 1992. **Type:** Taiwan: Pingtung: Lilungshan. Jul. 19, 1992, S.S. Ying *s.n.* (holo. NTUF F00000336 in PoT).

Phaius mishmensis (Lindl. & Paxt.) Rchb. f., Bonplandia 5: 43. 1857; Garay & Sweet, Orch. S. Ryukyu Isl. 127. 1974; T.P. Lin, Native Orch. Taiwan 1: 228, photo 142. 1975. *Limatodes mishmensis* Lindl. & Paxt., Fl. Gard. 3: 36. 1852. **Type:** NE. India: Mishmee Hills. Griffith *s.n.* (holo. K000974169).

細距鶴頂蘭

Phaius gracilis Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 322-323. 1911. **Type:** Taiwan: Koshun: Botansha [恆春牡丹社], Dec. 1906, T. Kawakami & G. Nakahara 788 (iso. TAI06913). Specimen: Byoho, Mar. 22, 1914 (TI, photo T01170 in PoT); Pingtung: Wuweishan [武威山], Dec. 30, 1918, E. Matuda 312 (TAI033203).



Phaius tankervilleae (Banks) Blume, Mus. Bot. 2: 177 1856. *Limodorum tankervilleae* Banks, *Limodorum Tankervilleae* [plate] June 1788; Masam., List Vasc. Pl. Taiwan 164. 1954. **Type:** J. Sowerby, 'Limodorum Tankervilleae', engraving by MacKenzie from Sowerby's original drawing dated 1787 and now at BM, later published in W. Aiton, Hort. Kewensis 3: t. 12 [Aug.-Oct. 1789] (lecto. BM, designated by Mabberley in Kew Bull. 66(3): 476 in 2011). Specimen: Wulai, Nov. 2, 1914, *T. Ito* & *S. Ito s.n.* (TAI031789); Lanyu, May 5, 1924, *S. Sasaki s.n.* (TAI033260). **鶴頂蘭**

Phaius tanakervilleae f. *albo-florens* S.S. Ying, Col. Ill. Fl. Taiwan 4: 798, photo 986. 1992. **Type:** Taiwan: Hualien: Yuli 300m [玉里山區], Jun. 1992, *S.S. Ying s.n.*

Phalaenopsis aphrodite Rchb. f. subsp. *formosana* E.A. Christenson, *Phalaenopsis Monogr.* 197. 2001. *Phalaenopsis formosana* Miwa, Pract. Hort. 27: 115. 1941. *nom. illeg.* **Type:** Taiwan: South Cape, Jun. 16, 1893-4, *A. Henry 1705* (holo. NY468394; iso. K); Specimen: Taiwan: Lanyu 1897, *S. Yano s.n.* Annotated by E.A. Christenson (2001) **•台灣蝴蝶蘭**

Note: This species was identified as *Phalaenopsis aphrodite* Rchb. f. by A. Henry in Trans. Asia. Soc. Jpn. 24(Suppl): 92. 1896. *P. aphrodite* ssp. *aphrodite* is distributed throughout the Philippines, and *P. aphrodite* ssp. *formosana* occurs only in Southern Taiwan and Lanyu, and can be distinguished from ssp. *aphrodite* by its apple-green leaves with no trace of anthocyanin pigments, its relatively smaller flowers, and multibranching panicles (Christenson 2001). Both subspecies are characterized by the calli of labellum have a posterior edge dividing into four teeth, unlike the two-toothed calli of *P. amabilis* (Christenson 2001). Phylogenetically, ssp. *formosana* and ssp. *aphrodite* are indistinguishable based on the nuclear *ITS* gene and the chloroplast *trnH-psbA* spacer (Tsai *et al.* 2015).

Phalaenopsis equestris (Schauer) Rchb. f., Linnaea 22: 864. 1849. *Stauroglottis equestris* Schauer, Nov. Actorum Acad. Caes. Leop.-Carol. Nat. Cur. 19 (Suppl. 1): 432. 1843. **Type:** Philippines: Luzon Island, Manila, *F.J.F. Meyen s.n.* (iso. AMES00102918). **桃紅蝴蝶蘭**

Phalaenopsis riteiwanensis Masam., Trans. Nat. Hist. Soc. Taiwan 24: 213. 1934. *Stauroglottis riteiwanensis* Masam. *nom. nud.*; J. Geobot. 15: vi 1966. **Type:** Taiwan: Syokotosyo [小紅頭嶼] Apr. 1934, cult. *K. Segawa s.n.* (lecto. TAI115006; isolecto. TAI115007, TAI115008, & KPM-NA0105598).

Pholidota cantonensis Rolfe, Bull. Misc. Inform. Kew 1896: 196. 1896; Su, Fl. Taiwan 5: 1005. 2000. **Type:** China: Guangdong, North River. collected by native collector. *C. Ford 139* (holo. K000943708). **烏來石山桃**

Pholidota uraiensis Hayata, Icon. Pl. Formos. 4: 64, f. 29. 1914. **Type:** Taiwan: Uraisha, Jan. 1913, *S. Sasaki s.n.* (holo. TI, photo T01176 in PoT).

Phreatia caulescens Ames, Orchidaceae 2: 200. 1908; T.P. Lin, Native Orch. Taiwan 3: 213-214, photo 113. 1987. **Type:** Philippines: Luzon, Lepanto, Mt. Data, 7000 ft., Oct. 19, 1905, *E.D. Merrill 4587* (syn. AMES00103013; isosyn. K000891192 & US00093977); Luzon Island, Benguet, Mt. Santo Tomas, *R.S. Williams 1949* (syn. NY9166), *H.M. Curran 4993, 5016*; Mindanao, *E.B. Copeland 1180*. Specimen: Mt. Peitawu, Aug. 30, 1973, *T.P. Lin 65* (TAIF). **垂莖芙樂蘭**

Phreatia formosana Rolfe ex Hemsl., Ann. Bot. (Oxford) 9(33): 156. 1895; A. Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 91. 1896. **Type:** Taiwan: South Cape, Apr. 1893, *A. Henry 1349* (holo. K000891216, iso. AMES00103023, MO, NY9163). **•蓬萊芙樂蘭**

Phreatia kotoinsularis Fukuy., Bot. Mag. (Tokyo) 50(589): 23. 1936. **Type:** Taiwan: insl. Koto-syo, Zitaui-kei, Aug. 3, 1934, *N. Fukuyama 4816* (holo. KPM-NA0105572 without Fukuyama's no., photo T00035 in PoT).

Phreatia morii Hayata, Icon. Pl. Formos. 4: 58, f.25. 1914. **Type:** Taiwan: no location, 1910, *U. Mori s.n.* not found. Neotype designed here: Chinsuiying, Dec. 1914, *U. Mori s.n.* (TAIF 6918). **大芙樂蘭**

Phreatia taiwaniana Fukuy., Bot. Mag. (Tokyo) 49(583): 441. 1935. **Type:** Taiwan: Taihoku, Bonbon-geo, inter Tamaru et Dakusui, Oct. 1932, [flowering Apr.], *N. Fukuyama 4520* (holo. KPM-NA0105573 without Fukuyama's no., photo T00036 in PoT); Takao, Mt. Niinai-san prope Botan-sha, Mai. 6, 1934, *N. Fukuyama 4571* (para. KPM without Fukuyama's no., photo G00740 in PoT). **•白芙樂蘭/台灣芙樂蘭**

Pinalia amica (Rchb.f.) Kuntze, Revis. Gen. Pl. 2: 679. 1891. *Eria amica* Reichb. f., Xenia Orchid. 2: 162. 1874; T.P. Lin, Nat. Orch. Taiwan 2: 151, photo 70-71. 1977. **Type:** NE India: Assam, sine loc. (commercial import by Day). **小腳筒**

Eria hypomelana Hayata, Icon. Pl. Formos. 4: 54, f.22. 1914. **Type:** Taiwan: Arisan, inter Funkiko [奮起湖] et Taroyen, 5000 ped. Mar. 1914, *B. Hayata et T. Ito s.n.* (holo. TI, photo T00952 in PoT).

Pinalia formosana (Rolfe) T.P. Lin *comb. nov.* *Eria formosana* Rolfe, Bull. Misc. Inform. Kew 1896 (119): 194. 1896; A. Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 91.1896. **Type:** Taiwan: South Cape, *A. Henry 1978* (holo. K000827416). Note: The type from Kew is precisely *E. tomentosiflora*. **赤色毛花蘭/樹絨蘭**

Pinalia copelandii (Leav.) W. Suarez & Cootes, Orchideen J. 16(2): 70. 2009. *Eria copelandii* Leav., Philipp. J. Sci., C 4: 203. 1909. **Type:** Philippines: Mindanao: Dist. Davao, Mt. Apo, *Copeland 1423* (syn. AMES00099174).

Eria tomentosiflora Hayata, Icon. Pl. Formos. 2: 137-138. 1912. **Type:** Taiwan: Koshun, Hieranzan, Feb. 16, 1911, *T. Kawakami et S. Sasaki s.n.* (holo. TI, photo T00959 in PoT; iso. TAI16725).

Eria plicatilabella Hayata, Icon. Pl. Formos. 4: 55, f.23. 1914. **Type:** Taiwan: Location not indicated. cult. flowering Mar. 24, 1914, *B. Hayata s.n.* (holo. TI-photo T00955 in PoT).

Pinalia japonica (Maxim.) Ormerod, Taiwania 57(2): 124. 2012. *Eria japonica* Maxim., Bull. Acad. Imp. Sci. Saint-Pétersbourg 31: 103. 1887. *Dendrobium reptans* Franch. & Sav., Enum. Pl. Jap. 2: 510. 1878. illegitimate later than *D. reptans* (Sw.) Sw. 1805, Neues J. Bot. 1: 96. 1805 (= *Bulbophyllum nutans* (Thouars) Thouars). *Callista reptans* Kuntze, Revis. Gen. Pl. 2: 655 1891. *Eria reptans* (Kuntze) Makino, Bot. Mag. (Tokyo) 15: 128. 1901; T.P. Lin, Native Orch. Taiwan 2: 162, photo 75. 1977. *Conchidium japonicum* (Maxim.) S.C. Chen & J.J. Wood, X. Chen *et al.*, Fl. China 25: 348. 2009. **Type:** Japan: cult. Tokyo, *P.A.L. Savatier 1427* (holo. P00403666; iso. P00403667). **高山絨蘭**

Eria arisanensis Hayata, Icon. Pl. Formos. 4: 54, pl.12. 1914. **Type:** Taiwan: Arisan, Jan. 1912, *B. Hayata et S. Sasaki s.n.* (holo. TI, photo T00951 in PoT).



- Eria matsudai* Hayata, Icon. Pl. Formos. 9: 110–111. 1920. *Eria reptans* var. *matsudae* (Hayata) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 453. 1977. **Type:** Taiwan: Rarazan, Jul. [27], 1918, *T. Matsuda* [414] (holo. TI, photo T00953 in PoT).
- Pinalia ovata*** (Lindl.) W. Suarez & Cootes, Orchideen J. 16(2): 71. 2009. *Eria ovata* Lindl., Edwards's Bot. Reg. 30: ad t. 29. 1844; A. Hsieh, Quart. J. Taiwan Mus. 8: 243. 1955. **Type:** Philippines, 1841, *Cuming s.n.* (iso. L0059912) **大脚筒兰**
- Eria nudicaulis* Hayata, Icon. Pl. Formos. 2: 138–139. 1912. **Type:** Taiwan: Urai, Jul. 1910, *T. Soma s.n.* (syn. TI, photo T00954 in PoT); Aug. 1912, *B. Hayata et S. Sasaki s.n.* not found.
- Platanthera brevicarata*** Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 350. 1911. **Type:** Taiwan: Mt. Morrison. [Oct. 18, 1906], *T. Kawakami et U. Mori* 2332 (holo. TI, photo T01178 in PoT) **短距粉蝶兰**
- Platanthera devolii*** (T.P. Lin & T.W. Hu) T.P. Lin & K. Inoue, J. Phytogeogr. Taxon. 28: 5. 1980. *Tulotis devolii* T.P. Lin & T.W. Hu, Quart. J. Chin. Forest. 9(1): 53, pl.2. 1976. **Type:** Taiwan: Chiayi: Alishan, 1900 m. Sept. 19, 1974, *T.P. Lin* 147 (holo. TAI110064-110067, 122238, 155405-155408). **●长葉蜻蛉兰**
- Platanthera longicalcarata* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 350-351. *pro parte*. Specimen: Taiwan: Ganzan, in Mt. Morrison, ad 9141 ped. Oct. 1905, alt., *S. Nagasawa* 697 (TI, photo T01179 in PoT, this plant was separated from T01181 by K. Inoue in Nov. 1980).
- Platanthera longicalcarata*** Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 350-351. 1911; Inoue & Lin, J. Phytogeogr. & Taxon. 28(1): 4, f.3. 1980. **Type:** Taiwan: Randaizan [巒大山], Aug. [9], 1908, *B. Hayata et U. Mori s.n.* [lecto. TI, photo T01181 in PoT, Inoue (1980) has excluded the plant from Ganzan, in Mt. Morrison, *S. Nagasawa* 697 which is *P. devolii*; iso. TAI16931]. **长距粉蝶兰**
- Platanthera mandarinorum*** Rchb. f. subsp. *formosana* T.P. Lin & K. Inoue, J. Phytogeogr. Taxon. 28(1): 12, f.10. 1980. **Type:** Taiwan: Mt. Chilan, 1200 m (棲蘭山), May. 7, 1975, *Lin* 223 (syn. TAI105796 & 122237). Specimen: Mt. Peichia-tien-shan. Jul. 2, 1974, *Lin* 145 (TAIF). **●惠粉蝶兰**
- Platanthera mandarinorum*** Rchb. f. subsp. *ophrydioides* (F. Schmidt) K. Inoue, J. Fac. Sci. Univ. Tokyo, Sect. 3, Bot. 13: 184. 1982; S.W. Chung, Orch. Taiwan 2: 156, photo. 2008. *Platanthera ophrydioides* F. Schmidt, Reis. Amur-Land., Bot. 182. 1868. **Type:** Russia: Sakhalin, Jul. 15, 1860, *F. Schmidt s.n.* (isosyn. K000796982). Insula Sachalin, *F. Schmidr s.n.*; 1861, *Glehn s.n.* (Siberian and Far East section of the Komarov Botanical Institute Herbarium). Specimen: Taiwan: Yilan: Taipinshan 1900 m, Jun. 4, 2014, *T.P. Lin s.n.* (TAI 284123). **千鳥粉蝶兰**
- Platanthera mandarinorum*** Rchb. f. subsp. *pachyglossa* (Hayata) T.P. Lin & K. Inoue, J. Phytogeogr. Taxon. 28(1): 10. 1980. *Platanthera pachyglossa* Hayata, Icon. Pl. Formos. 4: 123, pl.21. 1914. **Type:** Formosa: Rantashan, Aug. 9, 1907, *Kawakami et Mori s.n.* (TAIF); Litungshan, Jul. 15, 1913, *Kawakami s.n.* (TAIF). **●厚唇粉蝶兰**
- Platanthera angustata* auct. non (Blume) Lindl.: Garay et Sweet Orch. S. Ryukyu Isl. 32:1974.
- Platanthera minor*** (Miq.) Rchb. f., Bot. Zeitung (Berlin) 36: 75. 1878; Inoue & Lin, J. Phytogeogr. & Taxon. 28(1): 8, f.5. 1980. *Habenaria japonica* var. *minor* Miq., Ann. Mus. Bot. Lugduno-Batavi 2: 207. 1866. **Type:** Japan: near Hokkaido, *Siebold and Buerger s.n.*, *Pierot s.n.*, & *Wright s.n.* (U); near Jedo, *R. Oldham* 842 (U). **卵唇粉蝶兰**
- Platanthera sigeyosii* Masam., Bot. Mag. (Tokyo) 46(552): 773. 1932. **Type:** Taiwan: Sikayo-taizan [志佳陽大山], Jul. 9, 1930, *S. Suzuki* 5470 (holo. TAI118746).
- Platanthera nantoualpestris*** T.P. Lin, Taiwania 60(4): 173, f.2E-G & 5. 2015. **Type:** Taiwan: Nantou: 2900 m. Jul. 22, 2015, *Po-Neng Shen s.n.* (holo. TAI285859). **●南投蜻蛉兰**
- Platanthera peichiatieniana*** S.S. Ying, Col. Ill. Fl. Taiwan 2: 691, photo 405. [Feb 1987]. **Type:** Taiwan: Peichatienshan, 1100 m [山毛櫸林下], Oct. 11, 1985, *S.S. Ying s.n.* **●北插天粉蝶兰**
- Note: This species has a 1.5- to 2-cm-long lip, but only an 8-mm-long spur.
- Platanthera sachalinensis*** F. Schmidt, Reis. Amur-Land. 181. 1868; T.P. Lin, Native Orch. Taiwan 2: 20. 1977; Inoue & Lin, J. Phytogeogr. & Taxon. 28(1): 6, f. 5. 1980. **Type:** Russia: Sakhalin, Truotoga, Aug 4, 1861. *Glehn s.n.* (Herb. H.G. Reichenbach 20538); *F. Schmidt s.n.* (GH00103224). 1861, 1860, *F. Schmidt s.n.* (Siberian and Far East section of the Komarov Botanical Institute Herbarium). **高山粉蝶兰**
- Platanthera longibracteata* Hayata, Icon. Pl. Formos. 4: 122–123. 1914. non Lindl. 1835. **Type:** Taiwan: Mt. Morrison, 8500 ped. [*T. Kawakami* &] *S. Sasaki s.n.* (iso. TAI16929).
- Platanthera transnokoensis* Ohwi & Fukuy., Bot. Mag. (Tokyo) 48(569): 297. 1934. **Type:** Taiwan: Nokogoe: monte Kirai-shu-nampoo [能高越嶺], collected by J. Ohwi, Jun. 13-15, 1933, *N. Fukuyama* 3971 (holo. KPM-NA0105615, photo T00037; iso. KYO).
- Platanthera sonoharae*** Masam., Sci. Rep. Kanazawa Univ. 9(1): 12. 1964; S.W. Chung, Orch. Taiwan. 2: 160. 2008. *Tulotis sonoharae* (Masam.) K. Nakaj., Enum. Orchids Ryukyus 1: 31 1971; Biol. Mag. (Okinawa) 9: 43. 1972. **Type:** Okinawa Kunigami, *Sonohara s.n.* (KANA). Specimen: Nantou: Shanlinhsi, 1800 m. Sept. 7, 2006, *T.C. Hsu* 578 (TAIF297359). **琉球蜻蛉兰**
- Platanthera stenoglossa*** Hayata, Icon. Pl. Formos. 4: 123-124. 1914; Inoue & Lin, J. Phytogeogr. & Taxon. 28(1): 9, f.8. 1980. **Type:** Taiwan: Shichiseitonzan, Jul. [2], 1910[1911], *T. Kawakami et Y. Shimada s.n.* (holo. TI, photo T01182 in PoT). **狭瓣粉蝶兰**
- Platanthera stenosepala* Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 44-45. 1919. **Type:** Taiwan: Taipei: Taitum 600 m. [大屯山] May 1903. *U. Faurie s.n.*
- Platanthera chingshuishania* S.S. Ying, Mem. Coll. Agric. Natl. Taiwan Univ. 28 (2): 36. 1988. **Type:** Taiwan: Chingshuishan 1200-1500 m., Apr. 4, 1988, *S.S. Ying s.n.* (holo. NTUF, photo F00000309 in PoT).



Platanthera taiwanensis (S.S. Ying) S.C. Chen, S.W. Gale & P.J. Cribb, Fl. China 25: 114. 2009. *Tulotis taiwanensis* S.S. Ying, Quart. J. Chin. Forest. 8(4): 144. 1975. *Platanthera taiwaniana* (S.S. Ying) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 294. 1977. *nom. invalid.* **Type:** Taiwan: Ta-shui-ku-shan, 3450 m. Jul. 24, 1974, S.S. Ying 2811 (holo. NTUF, photo F00000388 in PoT).

●臺灣蜻蛉蘭

Note: This species grows in alpine meadows at heights of between 3200 m and 3600 m. The flower size is 6 to 7 mm long and has a 4- to 5-mm-long lip, with no observable sidelobes.

Platanthera yangmeiensis T.P. Lin, J. Phytogeogr. Taxon. 28(1): 7, f.6. 1980. **Type:** Taiwan: Miaoli: Mt. Yangmei, Jul. 13, 1975, 1200 m. *Lin 280* (holo. TAIIF). Specimens: Ra-ra-shan, 1200 m, Aug. 30, 1974, *Lin 287* (TAIF); Jur-lu-shan, 1000 m, July 18, 1976, *Lin 375* (TAIF); Nan-chia-tien-shan 1400-1700 m, Oct. 1979, *Lin 449* (TAIF).

●陰粉蝶蘭

Platanthera lalashaniana S.S. Ying, Col. Ill. Indig. Orch. Taiwan 2: 311-313, f. 37. 1990. **Type:** Taiwan: Taoyuen: Lalashan, 1700 m. Jul. 11, 1988, S.S. Ying s.n. (holo. NTUF, photo F00000389 in PoT; iso. F000008288 in PoT).

Pleione formosana Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 326-327. 1911; P.F. Hunt, Curtis's Bot. Mag. 174: t.421. 1962. **Type:** Taiwan: Yilan: Nano [南澳], Hyahosha [Pyahosha (比亞毫社), Igriris, ad 6000 ped., Apr. [11], 1909, *U. Mori 16* (iso. TAIIF6949).

台灣一葉蘭

Pleione pricei Rolfe, Orch. Rev. 1916: 126; Curtis's Bot. Mag. 143: t. 8729. 1917. **Type:** Taiwan: Giran, Bonbonsan, collected and sent to Kew by W.R. Price s.n. in 1914, flowered in Apr. 1917 (holo. K000079207). There are two more possible type specimens K000079208 and K000079209 in Kew. The specimen K000079209 was made in 1918 from the type plant still in cultivation and was not the same gathering of K000079207, and is not regarded as types. K000079208 has no collection date indicating could be a part of type specimen.

Pleione formosana Hayata f. *nivea* Fukuy., Trans. Nat. Hist. Soc. Taiwan 22: 415. 1932. *Pleione formosana* Hayata var. *nivea* (Fukuy.) Masam., Trop. Hort. 3: 48. 1933. *Pleione bulbocodioides* (Franch.) Rolfe var. *nivea* (Fukuy.) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1: 494. 1977. **Type:** Taiwan: Takao, Roohutu-San prope Koosyun, 1000 ped. Dec. 31, 1931, flowering Oct. 1932, *N. Fukuyama 3553*.

Pleione bulbocodioides auct. non (Franch.) Rolfe: Lin, Native Orch. Taiwan 1: 238, photo 149-152. 1976.

Pleione formosana f. *alba* Torelli & Riccaboni, Caesiana 14: 55. 2000.

Pogonia minor (Makino) Makino, Bot. Mag. (Tokyo) 23:137. 1909; Fukuy., Bot. Mag. (Tokyo). 52: 244. 1938. *Pogonia japonica* Rehb.f. var. *minor* Makino, Bot. Mag. (Tokyo) 12: 103. 1898. **Types:** Japan: Kadzusa, Jun. 14, 1882 (syn. TI); Buxen, Mt. Innadake, Jul. 18, 1882, *Matsumura s.n.* (syn. TI); Idzu, Omuro, Jun. 4, 1883 (syn. TI); Tosa, Nanokawa, Jun. 10, 1889, *Watanabe s.n.* (syn.); Enomura, Aug. 5, 1889, *Makino s.n.* (syn.); Sakawa, Jun. 1893, *Makino s.n.* (syn.). Specimen: Kaohsiung: Guanshan, 2300 m, Jul. 2, 1935. *N. Fukuy. 5731*.

小鬚唇蘭

Pomatocalpa undulatum (Lindl.) J.J. Sm. subsp. *acuminatum* (Rolfe) S. Watthana & S.W. Chung, Harvard Pap. Bot. 11: 249. 2007. *Cleisostoma acuminatum* Rolfe, Bull. Misc. Inform. Kew 1913: 144.

1913. *Pomatocalpa acuminata* (Rolfe) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 290. 1919; Liu & Su, Fl. Taiwan 5: 1098. 1978. **Type:** H.J. Elwes brought from Formosa, flowering Feb. 1913 (holo. K).

黃繡球蘭

Cleisostoma brachybotryum Hayata, Icon. Pl. Formos. 4: 95-96, f.49. 1914. *Pomatocalpa brachybotryum* (Hayata) Hayata, Gen. In. Fl. Formosa 81. 1917; Masam., J. Geobot. 16(3): pl.141. 1968; Lin, Native Orch. Taiwan 1: 240, photo 153-154. 1975. **Type:** Taiwan: Location not indicated, Mar. 1914, *B. Hayata s.n.* (holo. TI, photo T00909 in PoT; iso. TAIIF 22327 & 22328)

Ponerorchis kiraishiensis (Hayata) Ohwi, Acta Phytotax. Geobot. 5: 146. 1936; Lin, Native Orch. Taiwan 3: 254, photo 141. 1987. *Orchis kiraishiensis* Hayata, Icon. Pl. Formos. 9: 116, f.41. 1920; Masam., J. Geobot. 16(1): pl.133. 1968. *Chusua kiraishiensis* (Hayata) P.F. Hunt, Kew Bull. 26: 175. 1971. *Hemipilia kiraishiensis* (Hayata) Y. Tang & H. Peng, in Tang *et al.* BMC Evol. Biol. 15: 96, 27. 2015. **Type:** Taiwan: Kiraishizan 10000 ped. [奇萊南峰] Aug. [8], 1918, *S. Ohashi [大橋捨三郎] s.n.* (holo. TI, photo T01165 in PoT; iso. TAIIF6901).

●奇萊紅蘭/紅小蝶蘭

Orchis nanhutashanensis S.S. Ying, Col. Ill. Indig. Orch. Taiwan 2: 297-298. 1990. **Type:** Taiwan: Nanhutashan, Jun. 26, 1985, S.S. Ying s.n. (NTUF). Not found!

Note: Recently, Tang *et al.* (2015) confirmed that East Asian *Amitostigma* alliance species have a monophyly origin, but highly complex phylogenetic relationships are observed among *Amitostigma* alliance genera (*Amitostigma*, *Hemipilia*, *Hemipiliopsis*, *Neottianthe*, *Ponerorchis* and *Tsaiorchis*). They had all been treated as a single supergenus under *Hemipilia*. Here, I still accept the conventional concept to treat them as separate genera. *Ponerorchis* species differ from *Amitostigma* in that each of its 2 viscidia is partly enclosed in a separate bursicle, rather than completely enclosed.

Ponerorchis taiwanensis (Fukuy.) Ohwi, Acta Phytotax. Geobot. 5: 146. 1936; Lin, Native Orch. Taiwan 3: 258, photo 144-146. 1987. *Orchis taiwanensis* Fukuy., Bot. Mag. (Tokyo) 49(581): 290. 1935. *Chusua taiwanensis* (Fukuy.) P.F. Hunt, Kew Bull. 26: 176 1971. *Hemipilia taiwanensis* (Fukuy.) Y. Tang & H. Peng, in Tang *et al.* BMC Evol. Biol. 15: 96. 2015. **Type:** Taiwan: Karenkoo, Gookan-zan [合歡山], Jul.[19], 1929, *N. Fukuy. 4526* (holo. KPM-NA0105570, photo T00033 in PoT); Specimen: Taiwan: Taichu, Hattukwan-Tonpo [八通關-東埔], Aug. 1934, *M. Tagawa 4529, 4530* (KPM-photo G00661 in PoT).

●台灣小蝶蘭

Orchis taitungensis S.S. Ying, Col. Ill. Fl. Taiwan 1: 497. 1985.

Type: Taiwan: S. Cross Highway, Ya-kou, 2700 m. Aug. 23, 1983, S.S. Ying s.n. (holo. NTUF, photo F00000139 in PoT).

Orchis taitungensis S.S. Ying var. *alboflorens* S.S. Ying, Col. Ill. Fl. Taiwan 1: 498. 1985. **Type:** Taiwan: S. Cross Highway, Ya-kou, 2500 m. Aug. 23, 1983, S.S. Ying s.n. (NTUF).

Ponerorchis takasago-montana (Masam.) Ohwi, Acta Phytotax. Geobot. 5:146. 1936. *Orchis takasago-montana* Masam., Trop. Hort. 3: 45. 1933; Masm., Trans. Nat. Hist. Soc. Taiwan 24(132): 206. 1934; Masam., J. Geobot. 19 (3): pl.170. 1971. *Hemipilia takasago-montana* (Masam.) Y. Tang & H. Peng, in Tang *et al.* BMC Evol. Biol. 15: 96, 28. 2015. **Type:** Taiwan: Noko, Feb. 1933, *Masamune et Onuma s.n.* (not found).

●高山小蝶蘭



Orchis chingshuishania S.S. Ying, Mem. Coll. Agric. Natl. Taiwan Univ. 28(2): 34, pl. 1, photo 1-2. 1988. **Type:** Taiwan: Chingshuishan 1600 m, Apr. 4, 1988, S.S. Ying *s.n.* (NTUF, photos F00008289 & F00008290 in PoT). Note: This species is similar to *P. takasago-montana* but differs with a larger lip (1.4 to 1.8 cm in length and 1.2 to 1.5 cm in width) and the rectangular, 7-mm-long truncate midlobe.

Ponerorchis tominagae (Hayata) H.J. Su & J.J. Chen, Fl. Taiwan 5: 1029, pl.439. 2000. *Gymnadenia tominagai* Hayata, Icon. Pl. Formos. 6: 93–94. 1916. *Hemipilia tominagai* (Hayata) Y. Tang & H. Peng, in Tang *et al.* BMC Evol. Biol. 15:96, 28. 2015. **Type:** Taiwan: Nantoch: Gundaizan. Aug. 1916, *T. Tominaga s.n.* (holo. TI, photo T00869 in PoT).

●紅斑蘭

Orchis kiraishiensis Hayata f. *leucantha* Masam., J. Soc. Trop. Agric. 3(3): 246. 1931. *Orchis kiraishiensis* Hayata var. *leucantha* Masam., Trop. Hort. 3: 45. 1933. **Type:** Taiwan: Monte Daisuikutu, Jul. 3, 1931, *K. Mori et G. Masamune s.n.*

Orchis kunihikoana Masam. & Fukuy., Bot. Mag. (Tokyo) 49(586): 663-664. 1935; Masam., J. Geobot. 19(3): pl.171. 1971.

Ponerorchis kunihikoana (Masam. & Fukuy.) Soó, Acta Bot. Acad. Sci. Hungar. 12: 353. 1966; *Chusua kunihikoana* (Masam. & Fukuy.) P.F. Hunt, Kew Bull. 26: 175 1971. T.P. Lin, Native Orch. Taiwan 3: 256, photo 142-143. 1987. **Type:** Taiwan: Taityu; Taisuikutsan. [大水窟山], collected by D. Orimoto, Jul. 1934, N. Fukuyama 4704 (holo. KPM-NA0105568, photo T00031 in PoT; iso. KPM-NA0105569, photo T00032 in PoT).

Amitostigma taolii S.S. Ying, Alp. Pl. Taiwan 1: 75, pl.102. 1975; Quart. J. Exp. Forest. 10(4):74. 1975. *nom. nud.* *Orchis taolii* S.S. Ying, Alp. Pl. Taiwan 1: 75, pl.102. 1975. **Type:** Taiwan: Maioli: Tapachinshan 3480- 3500 m, S.S. Ying 4121 (holo. NTUF, F00008212 in PoT)

Orchis kuanshanensis S.S. Ying, Col. Ill. Fl. Taiwan 1: 494, f.162. 1985. **Type:** Taiwan: Mt. Kuan-shan-ling, 3000 m (關山嶺), Aug. 22, 1983, S.S. Ying *s.n.* (NTUF).

Pseudoliparis moluccana (J.J. Sm.) H.B. Marg., Ann. Bot. Fennici 40: 363, f.4. 2003 (first indication that this species occurred in Taiwan is based on *T.P. Lin 46*). *Microstylis moluccana* J.J. Sm., Bull. Inst. Bot. Buitenz. 7: 2. 1900. **Type:** Indonesia: *A. Zippellius s.n.* (isosyn. L0281779). *Malaxis moluccana* (J.J. Sm.) Ames & C. Schweinf., Orchidaceae 6: 73. 1920.

圓唇小柱蘭

Malaxis ramosii Ames, Philipp. J. Sci., C, 6: 45. 1911; Lin & Hu, Quart. J. Chin. Forest. 9(1): 53. pl.3. 1976. *Crepidium ramosii* (Ames) Szlachetko, Fragm. Florist. Geobot., Suppl. 3: 131. 1995. **Type:** Philippines: Bosoboso, Luzon Island, Aug. 12, 1907, *M. Ramos BS 4567* (holo. AMES 00101163). Specimen: Lanyu. 300-400 m, Aug. 1972, *T.P. Lin 46, 216* (TAIF).

Rhomboda tokioi (Fukuy.) Ormerod, Taiwania 47(4): 243. 2002. *Hetaeria tokioi* Fukuy., Bot. Mag. (Tokyo) 48(571): 434. 1934; Lin, Native Orch. Taiwan 1: 204, photo 127-129. 1975. **Type:** Taiwan: Taihoku: Urai, Syo-agyku-san, collected by Suzuki-Tokio, Sept. 1932, *N. Fukuyama 4128* (holo. KPM-NA0105549, photo T00059 in PoT).

白肋角唇蘭

Note: *Rhomboda cristata* (Blume) Ormerod is a distinct species (Ormerod 2002). *R. cristata* differs from *R. tokioi* in that *R. cristata* has a labellum in which the internal appendages or glands are each large and circular, and the median keel is also large and fleshier. In *R. tokioi*, the internal appendages are relatively oblong, and the median keel is not highly prominent.

Saccolabiopsis viridiflora Aver., Rheede 15(2): 97. 2005; E.A. Christenson, Orchideenj. May. 2008. **Type:** Vietnam: Nam Dong Distr., 300 m. Mar. 29, 2005, *L. Averyanov et al.* (holo. HN; iso. LE).

假囊唇蘭

Saccolabiopsis wulaokenensis W.M. Lin, L.L.K. Huang & T.P. Lin, Taiwania 51(3): 165, f.3. 2006. **Type:** Taiwan: Yilan: Wulaokenchi 300 m. Apr. 2006, *Wei-Min Lin s.n.* (TAI258035).

Saccolabiopsis taiwaniana S.W. Chung, T.C. Hsu & T. Yukawa, Taiwan Quart. J. For. Res. 28(3): 25-28, f.1 & 2. 2006. **Type:** Taiwan: Pingtung: Manzhouxiang 400-450 m. Apr. 11, 2006, *Chung & Hsu 10099* (holo. TAI273333).

Schoenorchis vanoverberghii Ames, Orchidaceae 5: 242. 1915; Liu & Su, Fl. Taiwan 5: 1101. 1978. **Type:** Philippines: Luzon, 1750 m. Sept.-Nov. 1913, *M. Vanoverbergh 3644* (holo. AMES00287724; iso. AMES00083877).

羞花蘭

Schoenorchis paniculata auct. non Blume: T.S. Liu & H.J. Su, Quart. J. Taiwan Mus. 25(1, 2): 150, f.3-5. 1972. Specimen: Taitung: Chin-shui-ying, 1200 m. May 11, 1972, *H.J. Su 1097*.

Spathoglottis plicata Blume, Bijdr. Fl. Ned. Ind. 6: pl.76; 8: 401. 1825; Hayata, J. Coll. Sci. Univ. Tokyo 30: 322. 1911. **Type:** Java. *Blume s.n.* (holo. L0061677; iso. P-P00339512). Specimen: Taiwan: Kotosho. Apr. 15, 1907, *T. Kawakami and U. Mori 2451* (TAI033919).

紫苞舌蘭

Spiranthes hongkongensis S.Y. Hu and Baretto, Chung Chi J. 13(2): 2. 1976; Hsu & Chung, Taiwan J. Biodivers. 16(4): 405-408. 2014. **Type:** Hong Kong: Tai Po, Apr. 4, 1975, *S.Y. Hu 13658* (holo. K000942682; iso. A, CUHK). Specimen: Taiwan: New Taipei City: Xichi, Chepingliao, 300-400 m. Apr. 20, 2014, *T.C. Hsu 7079* (TAIF).

香港綬草

Spiranthes sinensis (Pers.) Ames, Orchidaceae 2: 53. 1908; Sasaki, List Pl. Formos. 137. 1928; T.P. Lin, Native Orch. Taiwan 1: 244, photo 156-157. 1975. *Neottia sinensis* Pers., Syn. Pl. 2: 511 1807. *Aristotelea spiralis* Lour., Fl. Cochinch. 522. 1790. *Spiranthes spiralis* (Lour.) Makino, J. Jap. Bot. 3: 25 1926. *nom. illeg. non Spiranthes spiralis* (L.) Chevall. 1836; *non Neottia spiralis* (L.) Sw. 1800. **Type:** S. China: 1790, *J. de Loureiro 5221* (holo. P00150857).

綬草

Neottia australis R.Br., Prodr. Fl. Nov. Holl. 319. 1810. *Spiranthes australis* (R. Br.) Lindl., Bot. Reg. 10: sub t.823. 1824; Henry, List Pl. Formos. 92. 1896. **Type:** Australia: Port Jackson, May 1802, *R. Brown 5541*; Sydney, Jan/Feb 1805, *R. Brown 5541 & s.n.* (syn. BM000990505 & BM000074698. One specimen of *R. Brown 5541* was labeled as (a) and indicated as lectotype on the herbarium sheet). Specimens: Takow, *Playfair & Henry s.n.*; Bankinsing *A. Henry s.n.*, 1892-1895.

Spiranthes suishaensis (Hayata) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 4: 161. 1919. *Spiranthes australis* (R. Br.) Lindl. var. *suishaensis* Hayata, Icon. Pl. Formos. 6: 86–87. 1916. **Type:** Taiwan: Suisha [水社] 2500 ped. Apr. [28] 1916, *B. Hayata s.n.* (holo. TI, photo T01195 in PoT).

●義富綬草

Note: Hayata (1916) indicated that this variety differs from *S. australis*, because it has a perfectly white flower with 2 rounded protuberances at the base of the lips. The protuberances are hooked and bent downwards.

Spiranthes nivea T.P. Lin & W.M. Lin, Taiwania 56(4): 320. 2011. **Type:** Taiwan: Pingtung: Tahanshan, 1500 m. May 20, 2009, *Y.F. Wang s.n.* (holo. TAI 270634).



Stereosandra javanica Blume, Ann. Mus. Bot. Lugduno-Batavum 2:176. 1856; Seidenf., Dansk Bot. Ark. 32(2): 173, f.107. 1978; Su, Quart. J. Chin. Forest. 20(4): 104. 1987. **Type:** Java: Bantam. *Kuhl & Hasselt s.n.* (holo. L0062625). Specimen: Taiwan: Pingtung: Lanjen cross path. *Su* 7164.

肉藥蘭

Stigmatodactylus sikokianus Maximowicz ex Makino, Ill. Fl. Japan 1(7): 70, t.43. 1891. *Pantlingia sikokiana* (Maxim. ex Makino) Rauschert, Feddes Repert. 94: 434. 1983. **Type:** Japan: Tosa, Mt. Yohogura, Sept. 4, 1859, *T. Makino*. Specimen: Miaoli: Mt. Lu, 1200-1600 m., Sept. 7, 2010, *T.C. Hsu* 3169 (TAIF391638).

絲柱蘭

Note: The first time indicating this plant occurs in Taiwan was done by Masamune (1969).

Styloglossum angustifolium (Blume) T. Yukawa & P.J. Cribb, Bull. Natl. Mus. Nat. Sci., Ser. B, 40(4): 147. 2014. *Amblyglottis angustifolia* Blume, Bijdr. Fl. New. Ind. 369. 1825. *Calanthe angustifolia* (Blume) Lindl., Gen. Sp. Orchid. Pl. 251. 1833; Su, Quart. J. Expt. Forest. Natl. Taiwan Univ. 4(3): 85, pl. 1. 1990. **Type:** Java: Crescit, in umbrosis montium Provinciae Buitenzorg. *Blume s.n.* not found.

矮根節蘭

Calanthe pumila Fukuy., Bot. Mag. (Tokyo) 49(583): 438. 1935.

Calanthe striata var. *pumila* (Fukuy.) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1: 430. 1977. **Type:** Taiwan: Taitung: Chipon-goe [知本越嶺], prope Matsuyama, 6000 ped. S. Sasaki Oct. 10, 1934, *Fukuyama* 4553 (holo. KPM-NA 0105516, photo T00021 in PoT).

Note: *Styloglossum* was reestablished as an independent genus based on combined nrDNA ITS and cpDNA data, and molecular analysis also placed sect. *Styloglossum* near *Cephalantheropsis* rather than *Calanthe* (Zhai et al. 2014). *Styloglossum* is characterized by caducous floral bracts that droop before or soon after flowers open, and an unlobed rostellum.

Styloglossum clavatum (Lindl.) T. Yukawa & P.J. Cribb, Bull. Natl. Mus. Nat. Sci., Ser. B, 40(4): 148. 2014. *Calanthe clavata* Lindl., Gen. Sp. Orchid. Pl. 251. 1833; Seidenf., Dan. Bot. Ark. 29(3-4): 22, t.7. 1975; Su, Quart. J. Expt. Forest. Natl. Taiwan Univ. 4(3): 86, pl.2. 1990. **Type:** Bangladesh: Sylhet. *Wallich* 7343, collected by F. De Silva (holo. K001127202). Specimen: Taiwan: Pingtung: Lilungshan, 1000 m. Oct. ? *Su & Chen* 8585.

棒距根節蘭

Note: This species has a clavate, relatively curved spur which inflates at the apex. *C. clavata* and *C. densiflora* are highly similar in morphology. However, they can be distinguished based on the gynostemium that is fused with the lip only at the basal part in the *C. densiflora*, and a fairly extensive fusion with the lip, so that the top gynostemium is free in the *C. clavata*.

Styloglossum densiflorum (Lindl.) T. Yukawa & P.J. Cribb, Bull. Natl. Mus. Nat. Sci., Ser. B, 40(4): 148. 2014. *Calanthe densiflora* Lindl., Gen. Sp. Orchid. Pl. 250. 1833; Masam., J. Geobot. 19(4): pl.173. 1971; Liu & Su, Fl. Taiwan 5: 908. 1978. **Type:** Bangladesh: Sylhet, 4000 ft, *Wallich* 7344 collected by F. De Silva (holo. K001127203).

竹葉根節蘭

Calanthe kazuoi Yamam., Trans. Nat. Hist. Soc. Taiwan 20(106): 38-39. 1930. **Type:** Taiwan: Taoyuan: Rarasan. Oct. 1, 1929, *Kazuo Goto s.n.* (holo. TAI118703).

Styloglossum formosanum (Rolfe) T.P. Lin, **comb. nov.** *Calanthe formosana* Rolfe, Ann. Bot. (Oxford) 9(33): 157. 1895. **Type:** Taiwan: South Cape, A. *Henry* 1347 (holo. K000810932; iso. MO, NY8614).

台灣根節蘭

Calanthe yushuni K. Mori & Yamam., J. Soc. Trop. Agric. 4(2):

188. 1932. **Type:** Taiwan: Taitung: Shussuiha [出水坡(達仁)], Dec. 27[29], 1930, *Y. Kudo et K. Mori s.n.* (holo. TAI118706).

Note: Ormerod indicated that this species is not *Calanthe speciosa* (Blume) Lindl. (Gen. Sp. Orchid. pl.250. 1833)

Styloglossum formosanum var. *actinomorphum* (Fukuy.) T.P. Lin, **com. nov.** *Calanthe actinomorpha* Fukuy., Bot. Mag. (Tokyo) 49(586): 668. 1935. **Type:** Taiwan: Taipei: Syoagyokusan. Jan. 17, 1935, *N. Fukuyama* 4690 (holo. KPM-NA0105508 without Fukuyama's no., photo T00017 in PoT). *Calanthe lyroglossa* var. *actinomorpha* (Fukuy.) P.J. Cribb & D.A. Clayton, The Genus *Calanthe*: 85. 2013. *Styloglossum lyroglossum* (Rchb.f.) T. Yukawa & P.J. Cribb var. *actinomorphum* (Fukuy.) T. Yukawa & P.J. Cribb, Bull. Natl. Mus. Nat. Sci., Ser. B, 40(4): 149. 2014.

●輻射根節蘭

Note: A peloric flower of *Styloglossum formosanum*.

Styloglossum lyroglossum (Rchb.f.) T. Yukawa & P.J. Cribb, Bull. Natl. Mus. Nat. Sci., Ser. B, 40(4): 149. 2014. *Calanthe lyroglossa* Rchb. f., Otia Bot. Hamburg. 1: 53. 1878; Seidenf., Dansk Bot. Arkiv 29(1): 22, f.8. 1973; T.P. Lin, Native Orch. Taiwan 1: 88, photo 41. 1975. **Type:** Philippines: Mt. Mahahai Luconiae, 1838, *Wilkes Expedition s.n.* (GH00106341, possible type).

黃苞根節蘭/達連根節蘭

Calanthe forsythiiflora Hayata, Icon. Pl. Formos. 4: 67, pl.14.

1914. *Calanthe lyroglossa* var. *forsythiiflora* (Hayata) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1: 88. 1977. **Type:** Taiwan: Koshun, Jun. 1909, *T. Kawakami et T. Ito s.n.* (TAIF 6570).

Specimen: Pingtung: Wangkingsun [萬金庄(萬巒)], Mar. 25, 1910, *T. Kawakami & S. Sasaki s.n.* (TI, photo T00900 in PoT with hand-drawn figure on the label).

Sunipia andersonii (King & Pantl.) P.F. Hunt, Kew Bull. 26: 183. 1971; Seidenf., Opera Bot. 89: 172, f. 113. 1986. *Ione andersonii* King & Pantl., Ann. Roy. Bot. Gard. (Calcutta) 8: 159. Pl. 217. 1898. **Type:** Bhutan: Above Buxa, *Anderson s.n.*, not found.

綠花寶石蘭

Ione sasakii Hayata, Icon. Pl. Formos. 2: 139-140. 1912. **Type:**

Taiwan: Chiayi: Arisan, Jan., 1912, *Hayata et S. Sasaki s.n.* (holo. TI, photo T00987 in PoT).

Note: Genus *Sunipia* is independent from the *Bulbophyllum* (Li et al. 2015).

Ione bifurcatoflorens Fukuy., Bot. Mag. (Tokyo) 49(583): 440. 1935.

Type: Taiwan: Takao, Naihonroku-goe, in silvis prope Fujieda, 1300 m. [藤枝] Oct. 21, 1934, *Fukuyama* 4560 (holo. KPM-NA0105550, photo T00060 in PoT; iso. KPM-NA0105551, photo T00061 in PoT).

Taeniophyllum compactum Ames, Orchidaceae 2: 247. 1908. *Microtatorchis compacta* (Ames) Schltr., Repert. Spec. Nov. Regni Veg. 10: 209. 1911; Liu & Su, Fl. Taiwan 5: 1060, pl.1622. 1978. **Type:** Philippines: Baguio, Luzon Island, Sept. 15, 1904, *R. S. Williams* 1937 (holo. NY; iso. AMES00101780).

假蜘蛛蘭



Microtatorchis taiwanianum S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 248. 1977. **Type:** Taiwan: Nantou: Chitou, 1260 m. Jul. 30, 1976, *Ying 4970* (holo. NTUF, F00008220).

Note: According to Chase *et al.* (2015), *Microtatorchis* Schltr. is a synonym of *Taeniophyllum*. The main difference between these 2 genera is that the former genus has leaves, whereas *Taeniophyllum* does not. *Taeniophyllum compactum* should be used here.

Taeniophyllum complanatum Fukuy., Bot. Mag. (Tokyo) 49(583): 443. 1935. **Type:** Taiwan: Pintung: prope Botansha [牡丹社] May 30, 1934, *N. Fukuyama 4551* (holo. KPM-NA0105578 without Fukuyama's no., photo T00041 in PoT). Note: The plant of *Fukuyama 4551* has a wider and longer root than that of *T. crassipes*.

●長腳蜘蛛蘭

Taeniophyllum crassipes Fukuy., Bot. Mag. (Tokyo) 52(617): 247. 1938. **Type:** Taiwan: Sintiku: Inoue [清泉(五峰)] 600 m. collected in Jan. 1, 1936 & flowering May 1936, *N. Fukuyama 6396* (holo. KPM-NA0105579 without Fukuyama's no., photo T00007 in PoT).

Note: Fukuyama indicated that the present species resembles *T. complanatum*, but the plant is smaller and more condensed. However, the details of the labellum of these 2 entities are not provided; thus, the differentiation of this species from *T. aphyllum* is unclear. Lin (1987: 262) further observed that, in addition to the upturned spine, the basal part of the labellum of *T. complanatum* has a small septum.

Taeniophyllum glandulosum Blume, Bijdr. Fl. Ned. Ind. 8: 356. 1825; Garay & Sweet, Orch. S. Ryukyu Isl. 159. 1974; Seidenf., Opera Bot. 95: 23. 1988. **Type:** Java: Gunung Gede Pangrango, Flowering in Apr. not found. One specimen collected from Java 1826 (Herb. H.G. Reichenbach 41555). Specimen: Taiwan: Nantou: Lienhuachih, 700 m, Apr. 20, 1980, *T.P. Lin 465* (TAIF121975).

蜘蛛蘭

Sarcophilus aphyllus Makino, Bot. Mag. (Tokyo) 6: 48. 1892.

Taeniophyllum aphyllum (Makino) Makino, Phan. Pter. Japon. Icon. 1: t. 11. 1899; Masam., List Vasc. Pl. Taiwan 169. 1954. **Type:** Japan: Tosa: Sakawa, Ikenouchi, *T. Makino s.n.* Note: Makino's fine drawing showed an upturned spine at the terminal part of labellum, and another 2 septa inserted at the basal part of the lip. This feature is precisely what I have demonstrated in the line drawing of *T. aphyllum* (Lin 1987). *Taeniophyllum aphyllum* Makino var. *sawadae* nom. nud. in sched. Specimen: Pingtung: Kaosufu. collector and date unknown (TAI18752, line drawing on the label).

Taeniophyllum chitouensis S.S. Ying, Col. Ill. Fl. Taiwan 4: 799, photo 987. 1992. **Type:** Taiwan: Nantou: Chitou, Mar. 21, 1992, *S.S. Ying s.n.* (NTUF). Not found!

Taeniophyllum radiatum J.J. Sm., Bull. Jard. Bot. Buitenzorg II, 26: 127. 1918; W.M. Lin, Wild Orch. Taiwan, Ill. Guide 812 & photo 2014. **Type:** Java: Priangan, Tjisokan bei Tjibeber, 750 m. Oct. 1916, *R.C. Bakhuizen van den Brink s.n.*

大扁根蜘蛛蘭

Note: No detailed information on this species in Taiwan is available.

Tainia cordifolia Hook. f., Hooker's Icon. Pl. 19, pl.1861. 1889. *Mischobulbum cordifolium* (Hook. f.) Schltr., Orch. Deutsch. New-Guin. 87. 1911; Masam., List Vasc. Pl. Taiwan 165. 1954; T.P. Lin, Native Orch. Taiwan 1: 212, photo 133-134. 1975. **Type:** Taiwan: Kelung, Jun. 1884, *C. Ford s.n.* (holo. K000943516).

葵蘭

Tainia fauriei Schltr., Repert. Spec. Nov. Regni Veg. 9: 282. 1911. **Type:** Formosa: Auf den Kushaku-Bergen, Jun. 6, 1903.

A. Faurie 539 (iso. P-P00387135; TI, photo T01197 in PoT).

Note: Pridgeon *et al.* (2005) considered *Mischobulbum* Schltr. to be conspecific with *Tainia*, which was supported by Xiang *et al.* (2014) based on combined *rbcl*, *matK* and *psaB* plastid data.

Tainia dunnii Rolfe, J. Linn. Soc. Bot. 38: 368. 1908; S. Chen *et al.*, Fl. Reipubl. Popularis Sin. 237, pl. 40. 1999. **Type:** China: Fujian, Buong Kang, May 30, 1905, *S.T. Dunn* in HK 3542 (holo. K000943514).

長葉杜鵑蘭

Tainia shimadai Hayata, Icon. Pl. Formos. 6: 75, pl.7, f.11. 1916.

Tainia laxiflora var. *shimadae* (Hayata) M.Hiroe, Orchid Flowers 2: 89. 1971. **Type:** Taiwan: Taihoku: Tikushizan [竹仔山], Apr. [28], 1915, *Y. Shimada s.n.* (holo. TI, photo T01198 in PoT). Specimen: Taihoku: Tikushizan. Mar. 21, 1915. fl., *Y. Shimada s.n.* (TAIF6985 & 6986).

Tainia piyananensis Fukuy., Bot. Mag. (Tokyo) 49(581): 294. 1935. *Tainia laxiflora* var. *piyananensis* (Fukuy.) Masam., J. Geobot. 21(4): xiv. 1974. **Type:** Taiwan: Piyanan-anbu [思源啞口], Jul. 1930, *N. Fukuyama 4148* (holo. KPM-NA0105583, photo T00044 in PoT).

Note: Ying (1977, p.503) considered *T. shimadai* to be conspecific with *T. laxiflora* Makino (Bot. Mag. Tokyo 23: 138. 1909). In fact, they have different vegetative growth. *T. laxiflora* has smaller leaves that are only 4 to 13 cm long and 1 to 2.5 cm wide, with white markings between veins; hence, the leaves are highly variegated. Moreover, these plants have a raceme carrying only 3-5 smaller flowers.

Tainia dunnii from Hong Kong has very short petiole, whereas *T. shimadai* from Taiwan usually has long petiole.

Tainia dunnii Rolfe var. ***caterva*** (T.P. Lin & W.M. Lin) Lin, *comb. nov.* *Tainia caterva* T.P. Lin & W.M. Lin, Taiwania 54(4): 330-331, f.2I. 2009. **Type:** Taiwan: Taipei: Jurluhshan, 600 m. May 25, 2009, *L.R. Chang s.n.* (holo. TAI268957).

●密花杜鵑蘭

Note: *T. caterva* has slightly different feature for the inflorescence and flowers, and should be preferably classified as a variety of *T. dunnii*.

Tainia elliptica Fukuy., Bot. Mag. (Tokyo) 49(581): 293. 1935; Masam., J. Geobot. 18(3-4): pl.164. 1970. **Type:** Taiwan: Shinchiku: Chikutoo [竹東], Jan. 7, 1932, *N. Fukuyama 4540* (Lectotype designed here: KPM-NA0105581 without Fukuyama's no., photo T00042 in PoT).

●橢圓杜鵑蘭

Tainia latifolia auct. non (Lindl.) Rchb. f.: Su, Fl. Taiwan 5: 1045.

2000; H.A. Pedersen *et al.*, Flora of Thailand 12, 2: 637. 2014.

Note: The earliest record in Taiwan: Pingtung: Laiyi, Apr. 8, 1916, *E. Matuda s.n.* (TAI118754).

Tainia hualienia S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 321, f.146. 1977. **Type:** Taiwan: Hualien: Taipalung 600 m. Feb. 2-4, 1975, *S.S. Ying 3509*.

●黃花小杜鵑蘭
Note: Based on the figure in the original publication, this plant resembles *T. shimadai* in every aspect, except for the yellow flowers and smaller plant and flowers. Further investigation is required.

Thelasis pygmaea (Griff.) Blume, Fl. Javae Nov. Ser. 1: 19. 1858-1859; Seidenf., Opera Bot. 89: 156, f.101. 1986. *Euproboscis pygmaea* Griff., Calcutta J. Nat. Hist. 5: 372. 1845. **Type:** Nepal: cult. in H.C. Botanic Garden at Calcutta, flowered in Apr. 1844, *Lawrence s.n.* (CALC)

闊花八粉蘭

Thelasis clausa Fukuy., Bot. Mag. (Tokyo) 49(583): 440. 1935.

Type: Taiwan: Karenkoo, Kenkai-shichoo [研海支廳], Taroko-chaya, collected by K. Segawa, Aug. 15, 1934, *N. Fukuyama 4562* (holo. KPM-NA 0105585, photo T00045 in PoT; iso. KPM, photo T01199).

Thrixspermum annamense (Guillaumin) Garay, Bot. Mus. Leafl. Harv. Univ. 23: 206. 1972; Seidenf., Opera Bot. 95: 167, f.102. 1988. *Ascochilus annamensis* Guillaumin, Bull. Mus. Natl. Hist. Nat. II, 33: 333. 1961. **Type:** Vietnam: Blao, 1960, *P. Tixier12/60* (holo. P-P00324328 with line drawing on specimen).

鈎唇風鈴蘭



Thrixspermum devolium T.P. Lin & C.C. Hsu, *Taiwania* 22(1): 69, f.12. 1977. **Type:** Taiwan: Nantou: Lienhuachi, 750 m. Mar. 29, 1976, *Lin* 325 (holo. TAD).

Thrixspermum eximium L.O. Williams, *Bot. Mus. Leafl. Harv. Univ.* 6: 87. 1938; Lin & Hu, *Quart. J. Chin. Forest.* 9(1): 54, pl.4. 1976. **Type:** Philippines: Luzon, Jan. 1911, *M. Vanoverbergh s.n.* (holo. AMES13654, left side of specimen). Specimen: Lilungshan 1100 m., Apr. 1975, *T.P. Lin* 188. **異色瓣**

Thrixspermum fantasticum L.O. Williams, *Bot. Mus. Leafl. Har. Univ.* 6: 82. 1938; Garay & Sweet, *Orch. S. Ryukyu Isl.* 148. 1974. **Type:** Philippines: Jaro, Buenavista, 500 m. Jul. 14, 1914, *Wenzel* 496 (AMES43896). Specimen: Taiwan: Lanyu: Tienchih 300 m, cult. flowering Apr. 28, 1976, *T.P. Lin* 350; Taitung: Mt. Nantawu 700 m, Apr. 28, 1976, *T.P. Lin* 380. **金唇風鈴蘭**

Thrixspermum neglectum Fukuy., *Trans. Nat. Hist. Soc. Formosa* 32: 269. 1942; *Acta Phytotax. Geobot.* 14(5): 136.1952; Masam., *J. Geobot.* 18(2): pl.162. 1970. **Type:** Taiwan: Taipei: Agyoku, collected in Dec. 28, 1935, flowering May 1936, *N. Fukuyama* 7447, holo. not found.; Ryukyus: Ins. Iriomote, Jun. 5, 1938. *N. Fukuyama* 7448 (para. not found).

Thrixspermum formosanum (Hayata) Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 4: 273. 1919; Lin, *Native Orch. Taiwan* 2: 306, photo 149-151. 1977. *Sarcochilus formosanus* Hayata, *J. Coll. Sci. Imp. Univ. Tokyo* 30(1): 336. 1911. **Type:** Taiwan: *T. Kawakami et U. Mori s.n.* not found. A specimen collected by Kawakami and Mori in 1907 from Banchoryo and determined as *T. formosanum* is found in the herbarium of G. Masamune (KPM, photo G00905 in PoT).

●台灣風鈴蘭

Dendrocolla pricei Rolfe, *Bull. Misc. Inform. Kew* 1913: 144. 1913. *Thrixspermum pricei* (Rolfe) Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 4: 274. 1919. **Type:** Taiwan: E. coast plain: Matouan, Savage village, Sept. 5, 1912, flowering Feb. 1913, *W.R. Price* 453 (K000891325). Note: This type does not resemble *T. formosanum* because of the shorter leaves (2-3 cm long) and a longer stem. It would resemble *Schoenorchis vanoverberghii* Ames.

Thrixspermum sasaoi Masam., *Trans. Nat. Hist. Soc. Taiwan* 24(133): 280. 1934. **Type:** Taiwan: Nantou: Horisya [埔里社], Mar. 22, 1934, *Masamune s.n.* (syn. TAI118755; KPM-NA0105610, photo T00082 in PoT).

Thrixspermum laurisilvaticum (Fukuy.) Garay, *Bot. Mus. Leafl. Harv. Univ.* 23: 207. 1972; Lin, *Native Orch. Taiwan* 2: 312, photo 154-155. 1977. *Sarcochilus laurisilvaticus* Fukuy., *Bot. Mag. (Tokyo)* 52(617): 246. 1938; Lin, *Taiwania* 22(1): 62, f.5. 1977. *Thrixspermum laurisilvaticum* (Fukuy.) T.S. Liu & H.J. Su, *Encycl. Nat. Sci. Bot.* 8: 898. 1972. *Thrixspermum laurisilvaticum* (Fukuy.) S.S. Ying, *Bull. Expert. Forest Nat. Taiwan Univ.* 114: 157. 1974. *Thrixspermum laurisilvaticum* (Fukuy.) S.Y. Hu, *Quart. J. Taiwan Mus.* 28(1-2): 171. 1975. **Type:** Taiwan: Sintiku: propr Inoue 600 m. collected Jan. 1, 1936 & flowering Apr. 1936. *N. Fukuyama* 6106. not found. **●黃娥蘭**

Thrixspermum xanthanthum Tuyama, *J. Jap. Bot.* 16: 523. 1940. **Type:** Taiwan: Taihiku, Taiheizan, Apr. 2, 1940, *Y. Kobayashi* [小林義雄] *s.n.* (holo. TI, photo T01200 in PoT).

Thrixspermum merguense (Hook. f.) Kuntze, *Revis. Gen. Pl.* 2: 682. 1891; Seidenf., *Opera Bot.* 95: 159. 1988; Su, *Fl. Taiwan* 5: 1051. 2000. *Sarcochilus merguensis* Hook. f.,

Fl. Brit. India 6: 40. 1894. **Type:** Burma: Tenasserim, Mergui, *Griffith s.n.* (holo. K-LINDL). **高士佛風鈴蘭**
Sarcochilus kusukusensis Hayata, *Icon. Pl. Formos.* 6: 83-84. 1916. **Type:** Taiwan: Kusukusu, Aug. 1914, *B. Hayata s.n.*

Thrixspermum pensile Schltr., *Bot. Jahrb. Syst.* 45 (Beibl. 104): 59. 1911; Seidenf., *Opera Bot.* 95: 187, f.103. 1988. **Type:** Sumatra: Auf Baumen, 1000 m., Jan. 22, 1907, *R. Schlechter* 15928. **懸垂風鈴蘭**

Dendrobium pendulicaule Hayata, *Icon. Pl. Formos.* 4: 44, f.16. 1914; *Aporum pendulicaule* Hayata, *nom.nud.* in sched. *Thrixspermum pendulicaule* (Hayata) Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 4: 274. 1919; Lin & Hsu, *Taiwania* 22(1): 65, f.6. 1977. **Type:** Taiwan: Kusukusu, Jul., 1912, *B. Hayata et S. Sasaki s.n.* (holo. TI-photo T00943 in PoT).

Thrixspermum saruwatarii (Hayata) Schltr., *Repert. Spec. Nov. Regni Veg. Beih.* 4: 275. 1919; Lin, *Native Orch. Taiwan* 2: 317, photo 157-159. 1977. *Sarcochilus saruwatarii* Hayata, *Icon. Pl. Formos.* 6: 84, f.18. 1916; Lin & Hsu, *Taiwania* 22(1): 62, f.5. 1977. **Type:** Taiwan: Keitao, Apr. [8], 1916, *B. Hayata s.n.* (holo. TI, photo T01201 in PoT). **小白蛾蘭/溪頭風蘭**

Thrixspermum subulatum (Blume) Rchb.f., *Xenia Orchid.* 2: 122. 1867; Liu & Su, *Quart. J. Taiwan Mus.* 28: 270, f.3. 1975. *Dendrocolla subulata* Blume, *Bijdr.* 291. 1825. Flower Jul.-Aug. **Type:** Java: Mt. Salak, *Blume s.n.* (syn. L); Seribu, *Blume s.n.* (syn. L). Specimen: Taiwan: Taitung: Tawuchi, 100 m, *H.J. Su* 143, 229, 224, 1037 (NTUF). **厚葉風蘭/肥垂蘭**

Tipularia cunninghamii (King & Prain) S.C. Chen, S.W. Gale & P.J. Cribb, *Fl. China* 25: 251. 2009. *Didiciea cunninghamii* King & Prain, *J. As. Soc. Beng.* 65: 119. 1896; Seidenf. & Arora, *Nord. J. Bot.* 2: 14. 1982; Su, *Taiwania* 47(3): 232-238. 2002. **Type:** India: Sikkim Himalaya: Lachen Valley, 12000 ft., Jul. 1895, *R. Pantling* 396 (syn. BM, BR 0000008578761, K000387845, & P00420867). Specimen: southern slope of Mt. Yangtuo, 2800 m, May 23, 1994, *H.J. Su* 9521 (NTUF); southeastern slope of Mt. North Hohuan, 2850 m, *S.H. Lin s.n.* (NTUF). **細花軟葉蘭**

Tipularia odorata Fukuy., *Bot. Mag. (Tokyo)* 52(617): 243. 1938; Masam., *J. Geobot.* 19(1-2): pl.168. 1971. **Type:** Taiwan: Taihoku: Nanko-taizan, inter Bunakke et Kiritto 2400 m. [Jul. 13, 1937], *N. Fukuyama* 6114 (holo. KPM-NA0105586, photo T0008 in PoT; iso. KPM, photo G00908 in PoT). **●南湖蠅蘭**

Trichoglottis luchuensis (Rolfe) L.A. Garay & H.R. Sweet, *Bot. Mus. Leafl. Harv. Univ.* 23: 209. 1972. *Stauropsis luchuensis* Rolfe, *Bull. Misc. Inform. Kew* 1907: 131. 1907. *Cleisostoma ionosma* f. *luchuensis* Makino, *Bot. Mag. Tokyo* 21: 60. 1907. *Vandopsis luchuensis* (Rolfe) Schltr., *Repert. Spec. Nov. Regni Veg.* 10: 196. 1911. *Staurochilus luchuensis* (Rolfe) Fukuy., *Trans. Nat. Hist. Soc. Formosa* 32: 270. 1942. **Type:** Ryukyu: Isl. Iriomote, cultivated in the greenhouse in Tokyo and presented by J. Matsumura to Kew in 1906 (holo. K000364420). The figure in the *Somoku Zuzetsu* (草木図說前編 18: t.23. 1856) was cited in Rolfe's original description. Specimen: Taiwan: Taipei: Wulai, Mar. 22, 1933, *S. Sasaki s.n.* (TAI033805). **屈子花/豹紋蘭**



Cleisostoma ionosma auct. non Lindl.: Hayata, Icon. Pl. Formosan. 2: 134. 1912. Specimens: location not indicated, Jan., 1912, R.W. Irwin *s.n.*; Koshun: Terasoyama, Aug., 1912, B. Hayata et S. Sasaki *s.n.* *Trichoglottis ionosmum* auct. non (Ridl.) J.J. Sm.: Hayata, Gen. Ind. Fl. Formosa 82. 1917.

Note: *Staurochilus* Ridl. was considered as a synonym of *Trichoglottis* (Chase *et al.* 2015).

Trichoglottis rosea (Lindl.) Ames in E. D. Merrill, Enum. Philipp. Fl. Pl. 1: 440. 1925. *Cleisostoma roseum* Lindl., Edwards's Bot. Reg. 24(Misc.): 80. 1838. **Type:** Philippines: Manila, *Cuming s.n.* (holo. K-LINDL). Note: Ames has made a comment of Lindley's type on the drawing of Lindley's herbarium sheet (AMES00139071) and his opinion is followed here. **鳳尾蘭**

Cleisostoma breviracema Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 338. 1911. *Trichoglottis rosea* (Lindl.) Ames var. *breviracema* (Hayata) T.S. Liu & H.J. Su, Fl. Taiwan 5: 1120, pl.1648. 1978. **Type:** Taiwan: 1899, *T. Uchiyama s.n.* (holo. TI, photo T00910 in PoT; iso. K000364421).

Cleisostoma oblongisepala Hayata, Icon. Pl. Formos. 2: 134. 1912. **Type:** Taiwan: Pingtung: Botansha [社丹社], Mar. 1898, [flowering Apr. 1912] *C. Owatari s.n.* (holo. TI, photo T01204 in PoT).

Tropidia angustifolia C.L. Yeh & C.S. Leou, Taiwania 54(2): 140–144, f.1–3. 2009. **Type:** Taiwan: Pingtung: Mt. Lilung, 600–700 m, Jul. 19, 2008, *C.R. Yeh s.n.* (holo. PPI). **●狹葉摺唇蘭**

Tropidia curculigoides Lindl., Gen. Sp. Orchid. Pl. 497. 1840; Liu & Su, Quart. J. Taiwan Mus. 28: 217. 1975 & Fl. Taiwan 5: 1122, pl.1649. 1978. **Type:** Bangladesh: Sylhet, 1827, collected by F. De Silva, *N. Wallchi 7386* (syn. K001127268 & K001127269), and collected by N. Wallchi in Attran River, Myanmar (syn. K000079515 & K001127270).

仙茅摺唇蘭

Tropidia formosana Rolfe ex Hemsl., Ann. Bot. (Oxford) 9(33): 158. 1895; A. Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 92. 1896. **Type:** Taiwan: Bankingsing, *A. Henry 1573* (holo. K000942870). Specimen: Takow: Ape's Hill, *A. Henry 1905*. Under "*Tropidia angulosa* Blume". Note: This is not *Tropidia angulosa*. Based on Kew's website, P. Ormerod (letter of Dec. 28, 2015) considered that *T. formosana* has nothing to do with *T. curculigoides*, and *T. nanhuae* is a synonym of *T. formosana*.

●南化摺唇蘭

Tropidia nanhuae W.M. Lin, L.L.K. Huang & T.P. Lin, Taiwania 51(3): 165–168, f. 4, 5c, 6. 2006. **Type:** Tainan: Nan-Hua Dam, 150 m. *W.M. Lin s.n.* (holo. TAI256769).

Note: Our plant is similar to *T. territorialis* D.L. Jones et M.A. Clem. which is native to Australia. Chung (2008) was the first author to propose that they are conspecific. However, the labellum and column details are unavailable for *T. territorialis* in Jones work (2006).

Tropidia namasiae C.K. Liao, T.P. Lin & M.S. Tang, Novon 22 (4): 424–427, f.1 & 2. 2013. **Type:** Taiwan: Kaohsiung: Namasia 1380 m, May 5, 2009, *C.K. Liao 3594* (holo. TAI271855).

●拉瑪夏摺唇蘭

Tropidia nipponica Masamune, Bot. Mag. (Tokyo) 43: 249. 1929 & Col. Ill. Fl. Japan 8: 219, f. 1969; Su, Quart. J. Chin. Forest. 20(4): 104, pl.6. 1987. **Type:** Ryukyu: Insula Yakusima, collected in 1923 and flowering in 1928, *G. Masamune s.n.* Specimen: Pingtung: Nanjenshan, *Su 7762*; Nanjenhu, *Su 6729*. **日本摺唇蘭**

Tropidia somae Hayata, Icon. Pl. Formos. 6: 85, pl.13. 1916. **Type:** Taiwan: Ako: Datestu, Jul. 1912, *T. Soma s.n.* (holo. TI, photo T01208 in PoT).

相馬氏摺唇蘭

Tropidia angulosa auct. non (Lindl.) Blume: A. Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 92. 1896; Matsum. et Hayata, J. Coll. Sci. Univ. Tokyo 22: 414. 1906; Garay & Sweet, Orch. S. Ryukyu Isl. 92. 1974; Liu & Su., Fl. Taiwan 5: 1122. 1978. Specimen: Ape's Hill, *A. Henry 1905*. Note: Seidenfaden (1978, f.67) indicated that *T. somae* is different from *T. angulosa*.

Tuberolabium kotoense Yamam., Bot. Mag. (Tokyo) 38: 209. 1924. **Type:** Taiwan: Kotosho, [collected Feb. 7, 1920] flowering Mar, 1920, *S. Sasaki s.n.* (Lectotype designed here, TI, photo T01209 in PoT); May, 1927, *S. Sasaki s.n.* (syntype not found). **●紅頭蘭**

Vanda lamellata Lindl., Edwards's Bot. Reg. 24 (Misc.): 66. 1838; Liu & Su, Fl. Taiwan 5: 1126. 1978. **Type:** Philippines: Manilla. *Loddiges s.n.*

雅美萬代蘭

Vanda amiensis Masam. & Segawa, Trans. Nat. Hist. Soc. Taiwan 24(132): 212. 1934. **Type:** Taiwan: Kotosyo, Apr. 1934, *Sagawa s.n.* (holo. TAI033846; iso. KPM-NA0105604, photo T00083 in PoT).

Vanda yamiensis Masam., *nom. nud.* J. Geobot. 15: 12. 1966; Col. Illus. Fl. Nippon 8: 277. 1969. Found in Kotosyo and Uoturi-zima in Ryukyu. Only figure no description.

Vanilla somae Hayata, Icon. Pl. Formos. 6: 88, pl. 14. 1916. *Miguelia somae* (Hayata) Aver., Turczaninowia 14, 2: 49, fig. 20a-d; 21; 24i; 27a,b. 2011; L.V. Averyanov and T.B. Vuong, Taiwania 60(1): 34. 2015. **Type:** Taiwan: Remogan [林望眼=烏來福山], May [6], 1916, *B. Hayata et T. Soma s.n.* (holo. TI-photo T01211 in PoT). Note: *A. Henry 479*, collected in Bankingsing (1896, p.92) was *V. somae*. **●台灣梵尼蘭**

Vanilla griffithii Rchb. f. var. *formosana* T. Ito, Icones Pl. Japonicarum 1(4): 1, pl.1. 1911. **Type:** Formosa: Kagi, 2000 ft, Apr. 1909, *T. Kawakami s.n.* not found!

Vanilla ronoensis Hayata, Icon. Pl. Formos. 9: 114. 1920. **Type:** Taiwan: Inter Rono et Kosenpo [老濃-甲仙埔], Apr. [8], 1917, *B. Hayata s.n.* (holo. TI, photo T01212 in PoT).

Vanilla albida auct. non Blume: Su, Quart. J. Chin. Forest. 21(1): 123. 1988. Taiwan: Pingtung: Kaoshifushan, Dec. 26, 1987, *H.J. Su 8141* (HAST104728). Note: *V. albida* Blume (Cat. Hort. Buitenz. 100. 1823) is a distinct species.

Note: *Miguelia* was established by Averyanov (2011), and is closely related to *Vanilla* but differs strikingly in the inflorescence structure, inflorescence bracts, and the carinate disk of the lip. However, this small genus has not yet been studied using molecular tools.

Vexillabium integrum (Fukuy.) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1: 509. 1977. *Pristiglottis integra* Fukuy., Bot. Mag. (Tokyo) 50: 20. 1936; Masam., J. Geobot. 17(2): pl.150. 1969. *Kuhlhasseltia integra* (Fukuy.) T.C. Hsu & S.W. Chung, Taiwania 54(1): 82–87. 2009. **Type:** Taiwan: Lanyu: insl. Koto-syo, inter I'yayu et summum montem Koto-zan, 400m, Aug. 3, 1934, *Fukuyama 4779* (holo. KPM-NA0105574 without Fukuyama's no., photo T00038 in PoT; iso. KPM-NA0105575, photo T00039 in PoT). **●綠葉旗唇蘭**

Vexillabium yakushimense auct. non Maekawa: T.P. Lin, Native Orch. Taiwan 2: 332, photo 170. 1997.

Note: Ormerod: The genus *Vexillabium* has a twisted column, whereas *Kuhlhasseltia* does not have one (pers. comm.).



Vexillabium yakushimense (Yamam.) Maek., J. Jap. Bot 11: 459. 1935; Su, Fl. Taiwan 5:1067, pl.459. 2000. *Anoectochilus yakushimensis* Yamam., Bot. Mag. (Tokyo) 38: 131. 1924. *Pristiglottis yakushimensis* (Yamam.) Masam., Col. Ill. Fl. Nippon 8: 218. 1970. *Kuhlhasseltia yakushimensis* (Yamam.) Ormerod, Lindleyana 17 (4): 209. 2002. **Type:** Japan: Kiusiu: Oosumi, Isl. Yakushima, 1000 m., Aug. 1922, A. Kimura *s.n.* (holo. TI). **旗唇蘭**

Cystopus humilis Fukuy., Bot. Mag. (Tokyo) 48(569): 307. 1934. *Pristiglottis humilis* (Fukuy.) Fukuy., Bot. Mag. (Tokyo) 39: 666. 1935. *Vexillabium humilis* (Fukuy.) S.S.Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 509 1977. **Type:** Taiwan: Shinchu: inter Sensui et Kaminoshima, prope Taiko [上島 (泰安溫泉)], Jul. 1932, *Fukuyama 3986*. (holo. KPM-NA0105531 without Fukuyama's no., photo T00026 in PoT). Note: *C. humilis* is characterized by a hirsute pedicel and ovary, and the mesophile (claw) of labellum has minute tooth-like edges.

Vexillabium nakaianum auct. non Maekawa: T.P. Lin, Taiwania, 54(4): 323-333, f.2J. 2009. Note: This probably a miniature plant of *V. yakushimensis* and features a sparsely hairy ovary and tooth-free mesophile.

Note: The leaf color is the prominent difference in the gross morphology of *V. integrum* and *V. yakushimensis* (*V. humilis*). *V. integrum* has a smooth mesophile, whereas *V. humilis* has a tooth-like mesophile. A smooth mesophile of *V. integrum* can be observed in Fl. Taiwan 5: pl. 458. 2000, while a minutely toothed mesophile immediately after the epichile can be found in Japanese *V. yakushimensis* (Nakajima, 2012). *V. integrum* has 2 flat subrectangular papillae in the hypochile sac, whereas *V. humilis* has bilobed/forked appendages in the sac. These 2 species can be differentiated based on these observations.

Vrydagzynea formosana Hayata, Icon. Pl. Formos. 6: 88-89. 1916. *Vrydagzynea albida* (Blume) Blume var. *formosana* (Hayata) T. Hashim., Proc. World Orchid Conf. 12: 122 1987. **Type:** Taiwan: Inter Urai et Agioku. May [6], 1916, *B. Hayata s.n.* (holo. TI, photo T01213 in PoT; iso. TAIF7007). **●二尾蘭**

Vrydagzynea nuda auct. non Blume, Coll. Orch. Archip. Ind. 74, t.20, f.3. 1858: T.P. Lin, Native Orch. Taiwan 3: 277, photo 157. 1987.

Note: Ormerod indicated that *V. formosana* is not conspecific with *V. nuda* Blume (pers. comm.). The gross morphology of *V. nuda* is similar to that of *V. formosana*, but differs in having yellow or green-yellow flowers and an oblong labellum compared with the white and rhombate labellum of the latter species (Drawing in the Blume 1858).

Yoania amagiensis Nakai & F. Maekawa var. *squamipes* (Fukuy.) Yeh et Leou, Quart. J. Forest Sci. 28(3): 17-24. 2006. *Yoania japonica* Maxim. var. *squamipes* Fukuy., Bot. Mag. (Tokyo) 52(617): 244. 1938. **Type:** Taiwan: Chiayi: Arisan, prope Nyautina 1500 m. [里佳] collected by K. Segawa, May 8, 1937, *Fukuyama 6400* (holo. KPM, photo T00086 in PoT; iso. TAIF117050). **●密鱗長花柄蘭**

Yoania japonica Maxim., Bull. Acad. Imp. Sci. Saint-Petersbourg 18: 69-70. 1873; Chang & Lin, Bull. Taiwan Forest Res. Inst. new ser. 5(4): 259-262, pl.1. 1990. **Type:** Japan: 1864, *Tschonoski Sukawa s.n.* (holo. LE). Specimen: Taiwan: Hualien: Hoping forest trail between 38 and 39 Km, 1900 m. June. 11, 1990. *Chang 001* (TAIF). **長花柄蘭**

Zeuxine affinis (Lindl.) Benth. ex Hook. f., Fl. Brit. India 6: 108. 1890; W.J. Hooker & J.D. Hooker, Icones Plantarum 22: t.2177. 1894. *Monochilus affinis* Lindl., Gen. Sp. Orchid. Pl. 487. 1840. **Type:** Burma: Taong Dong, *Wallich 7383* (syn. K001127266); India: Courtallam, *Wight 1030*. **白花線柱蘭**

Zeuxine leucochila auct. non Schltr., in Fedde, Repert. 3: 46. 1907: Lin, Native Orch. Taiwan 2: 20. 1977. Specimen: Lanyu: Tashenshan 200 m. Apr. 2, 1975, *T.P. Lin 202* (TAIF127674).

Zeuxine parvifolia auct. non (Ridley) Seidenf.: Lin, Native Orch. Taiwan 3: 289, photo 168-169. 1987. The basionym of *Zeuxine parvifolia* is *Hetaeria parvifolia* Ridl. with type from Government Hill, Pulau Pinang, Malaysia.

Note: *Zeuxine affinis* of Taiwan is similar to *Z. parvifolia*. *Z. parvifolia* is characterized by linear-rectangular lobules of the lip, and devoid of ornaments on the column (Pedersen *et al.* 2011, p295), compared with round- to wedge-like lobules and ornaments on the column of Taiwan's plant.

The present species is closely related to *Z. arisanensis*, and can be distinguished mainly by light green tapels compared with dark greenish brown to dark reddish brown tapels in *Z. arisanensis*. Moreover, these two species exhibit different shape of epichile of the labellum. The epichile of *Z. affinis* dilates from a narrow base to form two round to obovate or cuneate-orbicular lobes (see Fig. 55, Seidenfaden 1978), and *Z. arisanensis* shows rectangular or linear lobes, and doesn't show constriction at base.

Zeuxine agyokuana Fukuy., Bot. Mag. (Tokyo) 48(571): 433. 1934; Lin, Native Orch. Taiwan 1 (2nd ed.): 202, photo 126. 1976. *Hetaeria agyokuana* (Fukuy.) Nackejima, Enum. Orch. Ryukyus 1: 16, 43. 1971; Lin, Native Orch. Taiwan 1: 202, photo 126. 1975. **Type:** Taiwan: Taihoku, Syo-agyoku-san, prope Urai, Aug. 1933, *N. Fukuyama 4127* (not found). Specimen: Taiwan: Taoyuan: Mt. Nachieh, 1000-1500 m. Aug. 28, 2010. *T.C. Hsu 3124* (neo. TAIF387687, designated by Tian *et al.* in 2014). Specimen: Kareizan. [加里山], Jan. 15, 1916, *S. Sasaki s.n.* (TAI 033781). **綠葉角唇蘭/阿玉線柱蘭**

Zeuxine arisanensis Hayata, Icon. Pl. Formos. 4: 106, f. 55. 1914. *Adenostylis arisanensis* (Hayata) Hayata, Icon. Pl. Formosan. 4: Add. & Corr. 1915. **Type:** Taiwan: Arisan, Mar. 1911, *S. Sasaki s.n.* (holo. TI, photo T01214 in PoT) **阿里山線柱蘭**

Note: Our plants are similar to *Z. reflexa* King & Pantl. (1898, p.291, t.388.), which has a single laminar (a thin plate) gland (not hook-like) on each side inside the lip sac. Moreover, *Z. reflexa* has green sepals, white petals and yellow limb of the lip. These features can be used to differentiate this species easily from *Z. arisanensis*, which has one curved or hook-like gland (not plate-like) on each side of the lip sac, and the limb of lip is white.

Z. arisanensis was thought to be *Z. gracilis* (Breda) Blume by Barretto *et al.* (2011), but *Z. gracilis* has different leaf features and a bright yellow throat in the lip. *Z. arisanensis* has larger flower than *Z. tenuifolia* has. Based on study of C.S. Liu (1991), the epichile of *Z. tenuifolia* could be rounded, or rectangular, whereas *Z. arisanensis* could be rectangular, rhombic-oblong or linear. The petiole has a ciliate margin in *Z. tenuifolia* but absent in *Z. arisanensis*.

Zeuxine flava (Wall. ex Lindl.) Trimen, Syst. Cat. Fl. Pl. Ceylon 90. 1885. *Monochilus flavus* Wall. ex Lindl., Gen. Sp. Orchid. Pl. 487. 1840. *Zeuxine flava* (Wall. ex Lindl.) Benth. ex Hook.f., Fl. Bri. India 6: 108. 1890; T.P. Lin, Manual of Taiwan Vascular Plants 5: 292. 2001. **Type:** Nepal: 1821, *N. Wallich 7380A* (holo. K000718636; iso. K000942795). **寬葉線柱蘭/黃花線柱蘭**



- Zeuxine sakagutii* Tuyama, Bot. Mag. (Tokyo) 50: 26, f.19-20. 1936; Su, Fl. Taiwan 5: 1080, pl.465. 2000. **Type:** Ryukyus: Ins. Isigakizima, Aug. 4, 1922, *S. Sakaguti s.n.* (holo. TI).
Zeuxine affinis auct. non Benth. ex Hook. f.: T.P. Lin, Native Orch. Taiwan 3: 280, photo 158-159. 1987. Taiwan: Pingtung : Kengting, Mar. 1, 1980, *T.P. Lin 459* (TAIF)
Zeuxine taiwaniana S.S. Ying, Quart. J. Chin. Forest. 20(2): 57. 1987. **Type:** Taiwan: Taitung: Chi-pen (知本), Apr. 1, 1987, *S.S. Ying s.n.* (holo. NTUF, photo F00000324 in PoT, fruit only).
Zeuxine uraiensis S.S. Ying, Col. Ill. Fl. Taiwan 3: 620, f.927. 1988. **Type:** Taiwan: Taipei: Urai (烏來), Apr. 10, 1988, *S.S. Ying s.n.* (holo. NTUF).

Note: A drawing of *Z. flava* by Pantling (1898, t.392) showed that the column & lip attributes are identical to those of the plant appeared in Lin (1987, under the name "*Zeuxine affinis*"). I consider *Z. sakagutii* to be conspecific with *Z. flava*. This combination is also supported by Nakajima (2012, P334).

It is difficult to differentiate *Z. flava* from *Z. affinis*. The main difference is that the color of labellum of *Z. affinis* is white, and the labellum of *Z. flava* is bright yellow.

- Zeuxine integrilabella* C.S. Leou, Quart. J. Exp. Forest, NTU. 8(4): 1-2, f.1-2. 1994. **Type:** Taiwan: Nantou: Hoshe, *Leou 5269-1* (holo. Experimental Forest, NTU); Nantou: Mt. Biishyr [筆石山]. *Leou 5139* (para.).

●全唇線柱蘭

- Zeuxine nervosa* (Wall. ex Lindl.) Trimen, J. Ceylon Branch Roy. Asiat. Soc. 9: 90. 1885. *Monochilus nervosum* Wall. ex Lindl., Gen. Sp. Orch. Pl. 487. 1840.
Zeuxine nervosa (Wall. ex Lindl.) Benth. ex Clarke, J. Linn. Soc., Bot. 25: 73. 1889; Garay & Sweet, Orch. S. Ryukyu Isl. 83: 1974. **Type:** Bangladesh: Derwani, Mar. 11, 1809, *F. Buchanan-Hamilton s.n.* also known as Wall. Cat. Numer. List no. 7381a (lecto. K-LINDL, designated by Seidenfaden in 1978; isolecto. K001127263); Bangladesh, Derwani, Mar. 12, 1809, *Buchanan-Hamilton s.n.*, Wall. Cat. Numer. List no. 7381a (paralecto. CAL); Bangladesh, Sylhet, F. de Silva, Wall. Numer. List 7381b (paralecto. CAL & K001127264).

芳線柱蘭

- Zeuxine formosana* Rolfe, Ann. Bot. (Oxford) 9(33): 158. 1895; Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 92. 1896. **Type:** Taiwan: South Cape, 1893-4, coll. by Schmurer, A. *Henry 644* (holo. K000942800; iso. NY00009454).
Zeuxine fluvida Fukuy., Annual Rep. Taihoku Bot. Gard. 3: 81. 1933; Masam., J. Geobot. 20(1): pl.175. 1977. **Type:** Taiwan: Taitoo, Riran-shichoo, Onsen, collected by K. Segawa, [Jan. 22, 1932], *N. Fukuyama 4112* (holo. KPM-NA0105587, photo T00046 in PoT). Note: *Z. fluvida* differs from the *Z. nervosa* by the broad whitish midrib of leaves.
Zeuxine somai Tuyama, Bot. Mag. (Tokyo) 50: 27, f. 20-21. 1936. **Type:** Taiwan: Kaohsiung: Rokuki [六龜], [Sept. 1916], *Soma 927* (TI-photo T01215 in PoT).
Zeuxine hengchuanense S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 342. 1977. **Type:** Taiwan: Pingtung: Nanjenshan, Jan. 24, 1976, *S.S. Ying s.n.* (holo. NTUF, photo F00000198 in PoT).

- Zeuxine odorata* Fukuy., Bot. Mag. (Tokyo) 50(589): 20. 1936. *Heterozeuxine odorata* (Fukuy.) T. Hashim., Ann. Tsukuba Bot. Gard. 5: 21. 1986. **Type:** Taiwan: insl. Koto-syo, Koto-zan 300 m. collected Aug. 3, 1934 & cult. and flowering Apr. 1935. *N. Fukuyama 4808* (holo. KPM-NA0105588 without Fukuyama's no., photo T00047 in PoT; iso. KPM-NA0105589-92).

香線柱蘭

- Zeuxine philippinensis* (Ames) Ames, Schedul. Orch., Corrig. 37. 1938; Ormerod, Taiwania 49(3): 179, 2004; C.L. Yeh, C.R. Yeh et C.S. Leou, Taiwania, 50(4): 284-289, f.2 & 3. 2005. *Adenostylis philippinensis* Ames, Schedul. Orch. 6: 9. 1923. **Type:** Philippines: Leyte, Dagami, Puguajaan, 60 m, Jul. 31, 1913, *C.A. Wenzel 0224* (holo. AMES00000084); Leyte, Dagami, 60 m, Mar. 28, 1913, *C.A. Wenzel 0375* (para. AMES00000083). Specimen: Lanyu 200 m., Feb. 15, 2005, *C.L. Yeh & C.R. Yeh 4021* (PPI).

菲律賓線柱蘭

- Zeuxine strateumatica* (L.) Schltr. in Engl., Bot. Jahrb. Syst. 45: 394. 1911; Masam., List Vasc. Pl. Taiwan 161. 1954. *Orchis strateumatica* L., Sp. Pl. 943 1753. **Type:** Sri Lanka, based on Herb. Hermann 2: 35, no: 319 (lecto. BM-000621635, designated by Cribb in Taxon 48: 49. 1999).

線柱蘭

- Zeuxine sulcata* (Roxb.) Lindl., Coll. Bot. 18. 1826; Gen. Sp. Orch. 485. 1840; Henry, Trans. Asia. Soc. Jpn. 24(Suppl): 92. 1896. *Pterygodium sulcatum* Roxb., Fl. Ind. ed. 2, 3: 452, 1832. *Adenostylis sulcata* (Roxb.) Hayata, Gen. Ind. Fl. Formos. 75. 1917. **Type:** Bangladesh, *Wallich s.n.* not found. Specimens: Taiwan: Ape's Hill, *Playfar 64*; Banksing plain, 1892-1895, *Henry s.n.*

- Zeuxine strateumatica* var. *rupicola* (Fukuy.) S.S. Ying, Col. Ill. Indig. Orch. Taiwan 1(2): 512. 1977. *Zeuxine rupicola* Fukuy., Bot. Mag. (Tokyo) 49(581): 292. 1935. *Zeuxine strateumatica* f. *rupicola* (Fukuy.) T. Hashim., Ann. Tsukuba Bot. Gard. 5: 27. 1986. **Type:** Taiwan: Taihoku, inter Chikushiko [竹仔湖] et Shirin [士林], Mar. 1934, *N. Fukuyama 4600* (holo. KPM-NA0105593 without Fukuyama's no., photo T00048 in PoT).

岩線柱蘭

- Note: Fukuyama (1935) indicated that the present species is closely related to *Z. strateumatica*, and can be distinguished mainly by ovate-oblong lips. Moreover, these 2 species exhibit very different modes of ecological adaptation. The present species has been found only on the surface of andesite in mountainous region, whereas *Z. strateumatica* is a common and widely distributed species growing in grassland at a lower altitude.

- Zeuxine tenuifolia* Tuyama, Bot. Mag. (Tokyo) 50: 427. 1936. *Zeuxine gracilis* var. *tenuifolia* (Tuyama) T. Hashim., Ann. Tsukuba Bot. Gard. 5: 28. 1986. **Types:** Ryukyus: Ins. Utina, Kunikamigun monte Nagodake, May 1935, *S. Murata s.n.* (holo. TI; iso. AMES00084549).

毛鞘線柱蘭

- Zeuxine shuishiehense* S.S. Ying, Mem. Coll. Agric. Natl. Taiwan Univ. 29(2): 57. 1989. **Type:** Nantou: Shuishiehta-shan, 800 m, Apr. 6, 1989, *S.S. Ying s.n.* (holo. NTUF, photo F00000197 in PoT). Only fruit, 12-13 cm tall.
Zeuxine leucochila auct. non Schltr.: T. S. Liu & H. J. Su, Fl. Taiwan 5: 1133, pl. 1653. 1978.

Doubtful and excluded names

- Acampe hayatae* Szlach., Ann. Bot. Fennici 40: 67. 2003. from *Sarcanthus taiwanianus* Hayata
Sarcophyton taiwanianum (Hayata) Garay, Bot. Mus. Leaf. Harv. Univ. 23: 202. 1972.
Sarcanthus taiwanianus Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 337-338. 1911. **Type:** [Hayata mounted, flowering Apr.



20, 1912, collected by J. T. Uchiyama 1899 (TI, photo T01193 in PoT; iso. K000942454 only one flower)

Cleisostoma taiwaniana (Hayata) Hayata, Icon. Pl. Formosan 4: 98, f.51. 1914. Note: The original description indicated that the stem is 25 cm long and that the leaves are 30 cm long and 4 cm wide; thus, this species may be *C. paniculatum*. However, the figure showed a flower similar to that of *Gastrochilus*, but with a large callosity in the front wall of spur. Basically, no plant similar to this one has been reported. This species should be excluded.

Calanthe brevicolumna Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 328.1911. **Type:** Hualien: Bataian [馬太鞍(光復)], Apr. 5, 1907, *T. Kawakami s.n.* (TI-photo T00891 in PoT).

短柱根節蘭

Note: *C. brevicolumna* has a 6-mm short spur, 3-mm-long column, and 8-mm-long labellum which are substantially smaller than those of *C. triplicata*, and *C. brevicolumna* is not conspecific with the latter species. Ormerod considered (letter) that *C. brevicolumna* should be combined with *C. odorata* Griff. Unknown species.

Eulophia bicallosa (D. Don) P. F. Hunt & Summerhayes, Kew Bull. 20: 60, 1966; Seidenf., Opera Bot.72:38, f.22. 1983; Ormerod, *Taiwania* 49(3): 176. 2004.

Note: This is probably a mistake. Seidenfaden (1983) appears to have been the first to consider *Cyrtopera formosana* conspecific with *Eulophia bicallosa*. Ormerod (2004) indicated that the type of *Cyrtopera formosana* shows it is not *E. bicallosa* but belongs instead in the synonymy of *E. zollingeri*.

Flickingeria pallens (Ridl.) Hawkes, Orch. Weekly 2, 46:457.1961; *Dendrobium pallens* Ridl., J. Linn. Soc., Bot. 32: 241. 1896; A.T. Hsieh, Quart. J. Taiwan Mus. 8(3): 239. 1955.

Note: A doubtful species. See Seidenfaden (1980) for further information about this species. Taiwan do not have this species.

Nervilia taitoensis (Hayata) Schltr., Repert. Spec. Nov. Regni Veg. 10: 6. 1911. *Pogonia taitoensis* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30(1): 346. 1911. **Type:** Taito. Rino, *T. Kawakami s.n.* Type not found.

臺東脈葉蘭

Note: This species is characterized by: scape 1.3 cm long, raceme producing 2-3 purplish flowers, tepals 1.5-1.8 cm long and 1-1.5 mm wide, labellum hairy and 3-lobed, midlobe oblong-triangular and somewhat toothed, column 7 mm long. Unknown species.

Renanthera coccinea Lour., Fl. Cochinch. 521 1790; Seidenf., Opera Botanica 95: 58. 1988. (Oldham 557, AMES, only fruit!). Ormerod (*Taiwania* 47: 241. 2002): this is not a *Renanthera* but could be *Cleisostoma paniculatum* or a related species.

Taeniophyllum formosanum Hayata, Icon. Pl. Formosan. 6(Suppl.): 81. 1917. *nom. nud.* Specimen: Banchoryo: Koryohei, Nov. 1907, *T. Kawakami et U. Mori 5505* (TI, photo T01196 in PoT!); Taiwan: Nantou: Sun Moon Lake, *G. Masamune 1373* (TAII15495) No flowers, indeterminable.

Zeuxine affinis (Lindl.) Benth. ex Hook. f., Fl. Brit. Ind. 6: 108. 1890; Su, Quart. J. Chin. Forest. 20 (4): 109, pl. 7. 1987. Please see the note of the *Zeuxine flava*.

Zeuxine kantokeiensis Tatew. & Masam., Bot. Mag. (Tokyo) 46(552): 772. 1932. **Type:** Kantokei, Taityusyu, Apr. 9, 1932, *Tatewaki 18663*. Type not found! Unknown species.

關刀溪線柱蘭

Zeuxine nijimae Tatew. & Masam., Bot. Mag. (Tokyo) 46(552): 772. 1932. **Type:** Taityu, Nogo, Baibara Apr. 5, 1932, *Tatewaki 18662*. Type not found! Unknown species.

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LITERATURE CITED

- Averyanov, L. V. 2010. The Orchids of Vietnam Illustrated Surver Part 2. Subfamily Orchidoideae. *Turczaninowia* 13 (2): 5–98.
- Averyanov, L. V. 2011. The Orchids of Vietnam Illustrated Surver Part 3. Subfamily Epidendroideae (primitive tribes-Neottieae, Vanillaee, Gastrodieae, Nervilieae). *Turczaninowia* 14 (2): 15–100.
- Averyanov, L.V. 2013. The Orchids of Vietnam Illustrated Surver Part 4. Subfamily Epidendroideae (tribes Arethuseae and Malaxideae). *Turczaninowia* 16 (1) : 5–163.
- Barretto, G. D. A., P. Cribb, S. W. Gale, K. Barretto, R. Barretto, M. L. Isaac-Williams and J. Eyre. 2011. The Wild Orchids of Hong Kong. Natural History Publications (Borneo).
- Blume, Karl Ludwig von 1858. Collection des Orchidées les plus remarquables de l'archipel Indien et du Japon.
- Bone R. E., P. J. Cribb and S. Buerki 2015. Phylogenetics of Eulophiinae (Orchidaceae: Epidendroideae): evolutionary patterns and implications for generic delimitation. *Bot J Linn Soc* 179(1): 43–56.
- Chase, M. W., K. M. Cameron, J. V. Freudenstein, A. M. Pridgeon, G. Salazar, C. van den Berg and A. Schuiteman. 2015. An updated classification of Orchidaceae. *Bot J Linn Soc* 177 (2): 151–174.
- Chen, S. *et al.* 1999. Orchidaceae 2. Flora Reipublicae Popularis Sinicae vol. 18. 463 pages.
- Chen, X. *et al.*, 2009. Orchidaceae. Flora of China Vol. 25.
- Christenson, E. A. 2001. *Phalaenopsis*: a Monograph. 197. Timber Press. 330pp.
- Chung, S. W. 2008. Orchids of Taiwan 1. Taiwan Forest Bureau. 190 pages.
- Chung, S.W. 2008a. Orchids of Taiwan 2. Taiwan Forest Bureau. 222 pages.
- Chung, S. W. and T. C. Hsu. 2008. *Corybas himalaicus* (King & Pantl.) Schltr. (Orchidaceae): A newly recorded species in Taiwan. *Taiwan J. For. Sci* 23: 99–103.
- Finet, M.E.A. 1897. Orchidees nouvelles de la Chine. Bulletin de la Société botanique des France 44(5): 421.
- Fukuyama, N. 1942. Orchidaceae Liulienses Novae Vel Minus Cognitae. I. Trans. Nat. History Soc. Formosa 32: 241–244.
- Fukuyama, N. 1934. Studia Orchidacearum Japonicarum III. The Botanical Magazine (Tokyo) 48(571): 429–442.
- Fukuyama, N. 1935. Studia Orchidacearum Japonicarum IV. The Botanical Magazine (Tokyo) 49(581): 290–297.
- Garay, L. A. 1986. Olim Vanillaceae. *Bot Mus Lealf Harv Univ.* 30(4): 223–237.
- Garay, L. A. & H. R. Sweet. 1974. Orchids of Southern Ryukyu Islands. Botanical Museum, Harvard University. Cambridge, Massachusetts.



- Hashimoto, T.** 1990. A taxonomic review of the Japanese *Lecanorchis* (Orchidaceae). *Ann. Tsukuba Bot. Gard* **9**: 1–40.
- Hayakawa, H., N. Kakimoto, K. Matsuyama, K. Ohga, K. Ito, S. Tebayashi, H. Ikeda, R. Arakawa, J. Yokoyama and T. Fukuda.** 2014. Local variation of leaf morphology in *Bulbophyllum drymoglossum* (Orchidaceae). *Environ. Control Biol.* **52** (4): 241–247.
- Hayata, B.** 1912. *Icones Plantarum Formosanarum*. **2**: 142–143. Taihoku.
- Hayata, B.** 1914. *Icones Plantarum Formosanarum*. **4**: 23, f.3(a–e, h). Taihoku.
- Hayata, B.** 1920. *Icones Plantarum Formosanarum*. **9**: 109, f.37. Taihoku.
- Henry, A.** 1896. A List of plants from Formosa. *Trans. Asia. Soc. Jpn.* **24**(Suppl): 1–118
- Hook. J. D.** 1890. The flora of British India. **5**: 767.
- Hsu, T. C. and S. W. Chung.** 2010. Supplements to the Orchid Flora of Taiwan (V). *Taiwania* **55** (4): 363–369
- Hsu, T. C., S. W. Chung and C. M. Kuo.** 2012. Supplements to the orchid flora of Taiwan (VI). *Taiwania* **57** (3): 271–277.
- Hu, A. Q., S. W. Gale, P. Kumar, G. Fischer and K. S. Pang.** 2014. Taxonomic notes on *Didymoplexiella siamensis* and *Gastrodia peichatieniana*, two fully mycoheterotrophic orchids new to the flora of Hong Kong. *Ann. Bot. Fenn.* **51** (3): 177–184.
- Inoue, K., T. Katsuyama, H. Takahashi and M. Akiyama.** 1998. Recently rediscovered type materials of orchids described by Dr. Fukuyama and Dr. Masamune. *J. Jap. Bot* **73** (4): 199–230.
- Jin, X., S. Chen and Y. Luo.** 2009. Taxonomic revision of *Dendrobium moniliforme* complex (Orchidaceae). *Sci. Hortic.* **120** (2009) 143–145.
- Jin, W.-T., X.-H. Jin, A. Schuiteman, D.-Z. Li, X.-G. Xiang, W.-C. Huang, J.-W. Li and L.-Q. Huang.** 2014. Molecular systematics of subtribe Orchidinae and Asian taxa of Habenariinae (Orchideae, Orchidaceae) based on plastid *matK*, *rbcL* and nuclear *ITS*. *Mol. Phylogenet. Evol.* **77**: 41–53.
- Jin, X., X. Zhao and X. Shi.** 2009. Native Orchids from Gaoligongshan Mountains China. Science Press, Beijing, China. 483pp.
- Jones, D. L.** 2006. A Complete Guide to Native Orchids of Australia Including the Island Territories. Reed New Holland. Australia. 496 pages.
- King, G. and R. Pantling.** 1898. The orchids of Sikkim Himalaya. *Ann. Roy. Bot. Gard. Calcutta* **8**: 1–342.
- King, G. and R. Pantling.** 1896. New orchids from Sikkim. *J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist.* **65**: 128.
- Kobayashi, S. and T. Yukawa.** 2001. Rediscovery of *Gastrodia shimizuana* Tuyama (Orchidaceae) on Iriomote Island, Japan. *APG: Acta Phytotax. Geobot.* **52** (1): 49–55.
- Kumar, P., S.W. Gale, A. Kocyan, G.A. Fischer, L. Averyanov, R. Borosova, A. Bhattacharjee, J. Li & K.S. Pang** 2014 *Gastrochilus kadooriei* (Orchidaceae), a new species from Hong Kong, with notes on allied taxa in section Microphyllae found in the region. *Phytotaxa* **164** (2): 091–103.
- Kuntze, O.** 1891. *Orchidaceae in Revisio generum plantarum* 2. A. Felix, Leipzig. 1011 pp.
- Kurzweil, H.** 2005. Taxonomic studies in the genus *Disperis* (Orchidaceae) in southeast Asia. *Blumea-Biodiversity, Evolution and Biogeography of Plants* **50** (1): 143–152.
- Lang, K. et al.** 1999. *Orchidaceae* 1. *Flora Reipublicae Popularis Sinicae* vol. 17. 551 pages.
- Li, M.-H., G.-Q. Zhang, S.-R. Lan, Z.-J. Liu and the China Phylogeny Consortium.** 2016. A molecular phylogeny of Chinese orchids. *J. Syst. Evol.* DOI: 10.1111/jse.12187.
- Liu, C. S.** 1991. Systematic studies on the Spiranthoideae (Orchidaceae) in Taiwan. Dissertation, Graduate Institute of Forestry, Taiwan University. 220 pages.
- Lin, T. P.** 1975. Native Orchids of Taiwan. Vol. 1. Published by Ji-Chyi Wang, Chiayi, Taiwan.
- Lin, T. P.** 1976. Native Orchids of Taiwan. Vol. 2. Southern Materials Center, INC. Taipei.
- Lin, T. P.** 1987. Native Orchids of Taiwan. Vol. 3. Southern Materials Center, INC. Taipei.
- Liu, T. S. & H. J. Su.** 1978. *Orchidaceae*. In: Li, H. L. *et al.* (eds.). *Flora of Taiwan* 5, Epoch Pub. Co. Taipei. p859–1113.
- Lindley, J.** 1803–1840. *Genera and species of Orchidaceous plants*. Ridgways, London.
- Lindley, J.** 1859. Contributions to the orchidology of India. no. II. *J. Proc. Linn. Soc., Bot.* **3**(9): 1–63.
- Maekawa, F.** 1971. *The Wild Orchid of Japan in Color*. Seibundo-Shinkosha, Tokyo, p395, pl160.
- Masamune, G.** 1954. A List of Vascular Plant of Taiwan. p159.
- Masamune, G.** 1969. *Illustrated Flora of Nippon*. **8**: 176 & figure.
- Margonska, H.B. & A. Kowalkowska.** 2008. Taxonomic revision of *Dienia* (Maalxidinae, Orchidaceae). *Ann. Bot. Fennici* **45**(2): 97–104.
- Nakajima, C.** 1973. Preliminary notes on the noteworthy Orchidaceae from Formosa, Ryukyus, Bonin Islands and Southern Japan (3). *Biol. Mag. Okinawa* **10**: 26–36.
- Nakajima, M.** 2012. *Illustration of Japanese Orchids*. Bun-ichi Sogo Shuppan Co. Japan. 395 pages.
- Ohwi, J.** 1984. *Flora of Japan*. Smithsonian Institution, Washington DC.
- Ormerod, P.** 2002. Taxonomic changes in Goodyerinae (Orchidaceae: Orchidoideae). *Lindleyana* **17**(4): 189–238.
- Ormerod, P.** 2002a. Some Brief Notes on Taiwanese Orchids 1. *Taiwania* **47**(4): 239–245.
- Ormerod, P.** 2002b. Taxonomic changes in Goodyerinae (Orchidoideae). *Lindleyana* **17**: 49.
- Ormerod, P.** 2003. Orchidaceous additions to the floras of China and Taiwan. *Taiwania* **48** (2): 87–93.
- Ormerod, P.** 2011. Orchidaceous additions to the flora of China. *Taiwania* **56**(1): 42–49.
- Ormerod, P.** 2012. Studies of West Malesian *Agrostophyllum* Blume (Orchidaceae). *Taiwania* **57**(3): 251–262.
- Pedersen, H. Æ., H. Kurzweil, S. Suddee & P. J. Cribb.** 2011. *Flora of Thailand, Volume 12, Part 1: Orchidaceae 1* (Cyripedioideae, Orchidoideae, Vanilloideae). 302 pages. The Forest Herbarium, Department of National Parks, Wildlife and Plant Conservation, Bangkok.
- Pedersen, H. Æ., H. Kurzweil, S. Suddee, E. F. de Vogel, P. J. Cribb, S. Watthana, S. W. Gale, T. Seelanan & C. Suwanphakdee.** 2014. *Flora of Thailand, Volume 12, Part 2: Orchidaceae 2* (Epidendroideae). 670 pages. The Forest Herbarium, Department of National Parks, Wildlife and Plant Conservation, Bangkok.
- Pridgeon, A. M., P. J. Cribb, M. W. Chase & F. N. Rasmussen.** (eds.) 1999–2009. *Genera Orchidacearum* 1–5. Oxford: Oxford University Press.
- Raskoti, B.B., W. T. Jina, X. G. Xiang, A. Schuitemanc, D. Z. Li, J. W. Lie, W. C. Huang, X. H. Jin and L. Q. Huang.** 2015. A phylogenetic analysis of molecular and morphological characters of *Herminium* (Orchidaceae, Orchideae): evolutionary relationships, taxonomy, and patterns of character evolution. *Cladistics* **2015**: 1–13.



- Rolfe, R. A.** 1896. New orchids. Bulletin of Miscellaneous Information. (Royal Gardens, Kew) 1896: 193–204.
- Schuiteman, A. A., P.B.** 2011. New combinations in *Dendrobium* (Orchidaceae). *Muelleria* **29**: 62–68.
- Seidenfaden, G.** 1973. Notes on *Cirrhopetalum* Lindl. . *Dansk. Bot. Arkiv* **29** (1): 1–260.
- Seidenfaden, G.** 1976. Orchid genera in Thailand 4. *Liparis* A.C. Rich. *Dansk. Bot. Arkiv.* **31**(1): 1–105.
- Seidenfaden, G.** 1977. Orchid genera in Thailand 5. *Dansk Bot. Arkiv* **31**(2):1–149.
- Seidenfaden, G.** 1977b. *Thalia maravara* and the rigid air-blossom. Notes on some species of *Acampe* (Orchidaceae). *Bot Mus Leaf Harv Univ.* **25**(2): 49–69.
- Seidenfaden, G.** 1978. Orchid genera in Thailand 6. Neottioideae Lindl. *Dansk Bot. Arkiv* **32**(2): 1–195.
- Seidenfaden, G.** 1979. Orchid genera in Thailand 8. *Bulbophyllum* Thou. *Dansk Bot. Arkiv* **33**(3): 1–228.
- Seidenfaden, G.** 1980. Orchid genera in Thailand 7. *Oberonia* Lindl. & *Malaxis* Sol. Ex Sw. *Dansk Bot. Arkiv* **33**(1): 1–94.
- Seidenfaden, G.** 1980. Orchid genera in Thailand 9. *Flickingeria* Hawkes & *Epigeneium* Gabnep. *Dansk Bot. Arkiv* **34**: 1–104.
- Seidenfaden, G.** 1992. The orchids of Indochina. *Opera Botanica* **114**: 502.
- Seidenfaden, G.** 1995. Contributions to the orchid flora of Thailand XII. *Opera Botanica.* **124**: 1–90.
- Schuiteman, A. and P.B. Adams.** 2011. New combinations in *Dendrobium* (Orchidaceae). *Muelleria* **29**(1): 62–68.
- Su, H. J.** 1989. Contribution to the revised orchid flora of Taiwan (1). *Quarterly Journal of Chinese Forestry* **22**. 19–40.
- Su, H. J.** 1990. Taxonomical and ecological studies on the native species of *Calanthe* and *Phaius* (Orchidaceae) in Taiwan II. *Calanthe* sect. *Styloglossum*, *Phaius* and *Cephalantheropsis*. *Quarterly Journal of the Experimental Forest, National Taiwan University* **4**(3): 81–96.
- Su, H. J.** 2000. Orchidaceae. In: Huang, T. C. (ed.). *Flora of Taiwan 2nd*. Edition, vol. 5. Taipei. Pp729–1086.
- Suetsugu, K.** 2014. *Gastrodia flexistylodes* (Orchidaceae), a new mycoheterotrophic plant with complete cleistogamy from Japan. *Phytotaxa* **175** (5): 270–274. 2014.
- Swinhoe, R.** 2010. List of Plants from the Island of Formosa, or Taiwan. The British Library Historical Collection. 24 pages. (the earliest version: Chelsea : F. Bell, 1860)
- Tang, Y., T. Yukawa, R. M. Bateman, H. Jiang and H. Peng.** 2015. Phylogeny and classification of the East Asian *Amitostigma* alliance (Orchidaceae: Orchidaceae) based on six DNA markers. *BMC evolutionary biology* **15** (1): 96.
- Thomas, S. A.** 1997. Taxonomic revision of the genus *Acanthephippium*. In: de Vogel, E. F. (eds.) *Orchid Monograph*. Vol. 8. Rijksherbarium/Hortus Botanicus, Leiden, Netherlands. **8**: 119–134.
- Tian, H.-Z., A. Bhattacharjee, P. Kumar, T.-C. Hsu and H. Æ. Pedersen.** 2014. Neotypification of *Zeuxine agyokuana* (Goodyerinae, Orchidoideae, Orchidaceae) with a new synonym. *Ann. Bot. Fenn.* **51**(1-2): 101–105.
- Tsai, C.-C., C.-H. Chou, H.-V. Wang, Y.-Z. Ko, T.-Y. Chiang and Y.-C. Chiang.** 2015. Biogeography of the *Phalaenopsis amabilis* species complex inferred from nuclear and plastid DNAs. *BMC plant biology* **15** (1): 202.
- Tuyama, T.** 1936. *Plantae boninenses novae vel criticae*. IV. The Botanical Magazine, Tokyo. **50**(589): 427–428.
- Vaddhanaphuti, N.** 2005. A field guide to the wild orchids of Thailand. Chiang Mai, Thailand. 4th ed. Silkworm Books 158p.
- Xiang, X.-G., W.-T. Jin, D.-Z. Li, A. Schuiteman, W.-C. Huang, J.-W. Li, X.-H. Jin and Z.-Y. Li.** 2014. Phylogenetics of tribe Collabieae (Orchidaceae, Epidendroideae) based on four chloroplast genes with morphological appraisal. *PLoS one* **9**(1): e87625.
- Xiang, X.-G., A. Schuiteman, D.-Z. Li, W.-C. Huang, S.-W. Chung, J.-W. Li.** 2013. Molecular systematics of *Dendrobium* (Orchidaceae, Dendrobieae) from mainland Asia based on plastid and nuclear sequences. *Mol. Phylogenet. Evol.* **69** (3): 950–960.
- Yatabe, R.** 1891. A new Japanese *Goodyera*. *Bot. Mag. Tokyo* **5**(47): 1, pLXIX. 1891.
- Ye M, B. Hou, J. Luo, W. Yan, W. Liu and X. Ding.** 2015. Genetic diversity and conservation of the endangered herb *Dendrobium moniliforme* based on amplified fragment length polymorphism markers. *Scientia Horticulture* **189**: 51–58.
- Ying, S. S.** 1977. Coloured illustrations of Indigenous Orchid of Taiwan vol. 1. 510 pp.
- Ying, S. S.** 1987. Miscellaneous notes on the flora of Taiwan (II). *Quarterly Journal of the Experimental Forest, National Taiwan University.* **1**(1): 85–92.
- Ying, S.S.** 1987a. Miscellaneous notes on the flora of Taiwan (III). *Quarterly Journal of the Chinese Forest.* **20**(2): 53–61.
- Ying, S. S.** 1987b. Miscellaneous notes on the flora of Taiwan (IV). *Quarterly Journal of the Experimental Forest, National Taiwan University* **1**(3): 105–111. 1987.
- Yukawa, T. and H. Ohba.** 1995. Typification of Schlechter's East Asian Orchidaceae held at the Herbarium, University of Tokyo. *Lindleyana* **10** (1): 29–32.
- Zhai, J.-W., G.-Q. Zhang, L. Li, M. Wang, L.-J. Chen, S.-W. Chung, F. J. Rodríguez, J. Francisco-Ortega, S.-R. Lan and F.-W. Xing.** 2014. A new phylogenetic analysis sheds new light on the relationships in the *Calanthe* alliance (Orchidaceae) in China. *Molecular phylogenetics and evolution* **77**: 216–222.
- Zou, L.-H., J.-X. Huang, G.-Qi. Zhang, Z.-J. Liu, X.-Y. Zhuang.** 2015. A molecular phylogeny of Aeridinae (Orchidaceae: Epidendroideae) inferred from multiple nuclear and chloroplast regions. *Molecular phylogenetics and evolution* **85**: 247–254.