

Novelties of the Genus *Malaxis* to Japan*

By

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橋本 保**：日本産ヤチラン属の新種と新記録種*

The florestic study of Japan has been almost completed in about the last hundred years, although new records or reappraisals of orchid taxa from the southern territories are still occasionally undertaken. The present study was made possible as a result of enthusiastic field trips by Mr. Kiyoshi Kanda, orchid photographer, and Ms. Yoshie Hanei, editor and promoter of Kanda's works.

Malaxis kandae Hashimoto, sp. nov.

Figs. 1 & 2

M. matsudai Hatusima, Fl. Ryukyus 863, 1971.

M. matsudai Nakajima in J. Geobot. **20**: 65, 1972, non *Microstylis matsudai* Yamamoto.

M. matsudai var. *pratensis* Hashimoto in Hashimoto & Kanda, Japan. Indig. Orch. Col. 133, 1981, nom. nud.

M. matsudai var., Hashimoto in Proc. 12th World Orch. Conf. 123, 1987.

Malaxis khasianae (Hook. f.) Kuntze praesertim affinis, foliis haud undulatis autem integris, sepalo dorsali reflexo et revoluto, sepalis lateralibus 5-nervibus, lobo intermedio labelli triangulato-ovato cum lobulis apicis imbricatis.

Erect, glabrous, terrestrial, 20–32 cm tall perennial. Stem fleshy, 5–7.5 cm long, 4×6–6×9 mm thick near the base, subtended by sheathing petioles of the leaf, basally produced fibrous, undulate roots of which up to 7.5 cm long, approximate to a leafless stem of the last year. Leaves ascending, somewhat distichous, 7–8 including 2 basal foliaceous sheaths; blade light green, grayish at back, elliptic to elliptic-ovate, slightly oblique, acute, cuneately narrowed to the petiole, plicate, 5-nerved, with smooth margins, up to 6.5×2.8 cm (wild) or 14×5 cm (in cultivation); petiole dorsally keeled, up to 4.5 cm (wild) or 9 cm (in cultivation) long. Peduncle green or purplish, 5-ribbed, up to 15 cm long except for the raceme, with a patent bract below the middle which is similar to the floral bract. Raceme with 17–40 flowers including a terminal bud, 4–10 cm long. Floral bracts olivaceous, patent and recurved archwise in early flowering and reflexed downwards in late flowering when ovaries are expanded, ovate or narrowly ovate, acuminate, 1-nerved, 3–5 mm long but probably elongate in a certain year (cf. Fig. 2–B). Pedicellate ovaries purplish, ascending, slightly arched, 6-ribbed, 4–6 mm long, elongate to 12 mm long and expanded to an oblique-clavate form with 6 purple

* I thank Ms. Mutsuko Nakajima for her collaboration on the drawings.

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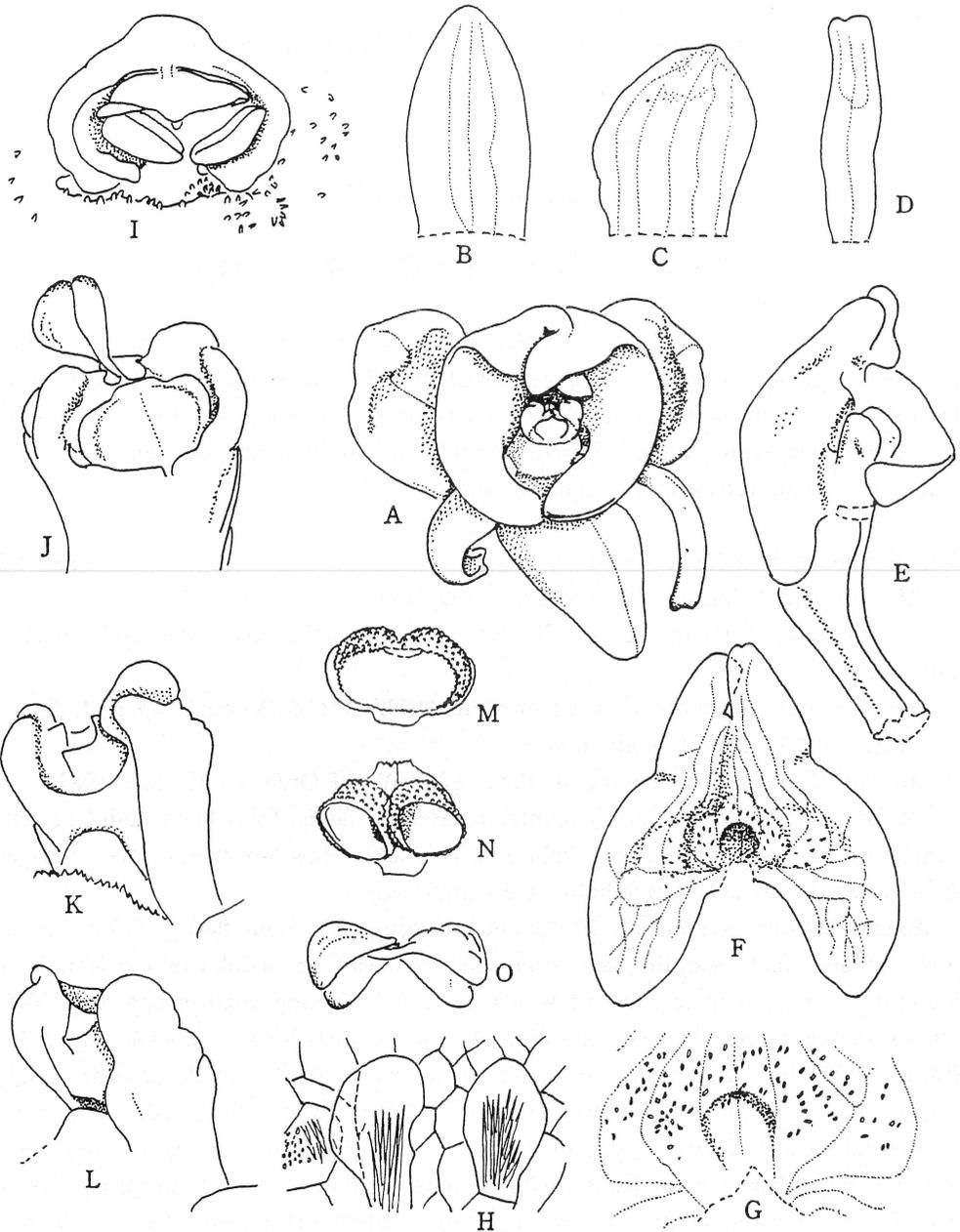


Fig. 1. *Malaxis kandae* Hashimoto. A. Flower from front; B. Dorsal sepal, spread out; C. Lateral sepal, spread out; D. Petal, spread out; E. Lip and column with pedicellate ovary from oblique side, partially expanded; F. Lip, spread out; G. Basal portion of lip, showing the area of dispersed raphide cells; H. Epidermal raphide cells of lip, lightly flattened out; I. Column from above, anther cap apically lifted up; J. Column from dorsal side, a pair of pollinia in a theca pulled out; K. Column with the base of lip from ventral side; L. Column with the base of lip from side; M. Anther cap from outside; N. Anther cap from inside; O. Pollinia from dorsal side, drawn to right and left, then the strap-like tissue between two pairs seen. A-F, $\times 8$; G, $\times 14$; H, $\times 400$; I-O, $\times 25$. Drawn from *Hanei* TNS 9507144. All perianth segments ventrally viewed. Lateral sepal and petal of right side in a flower from front dissected.

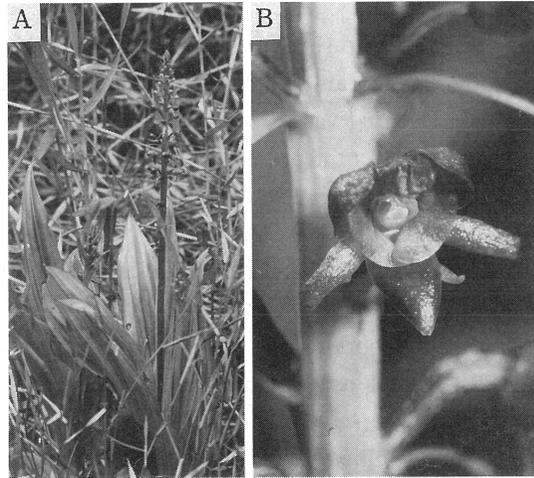


Fig. 2. *Malaxis kandae* Hashimoto in native habitat. A. Plants; B. Flowers on inflorescence. Courtesy of K. Kanda.

wings in late flowering. Flowers purple with somewhat yellowish lip, about 1 cm across, not resupinate. Dorsal sepal ascending, slightly reflexed, with moderately revolute margins, elliptic-ovate, obtuse, 3-nerved, 4 mm long, 2 mm wide when spread out. Lateral sepals suberect, concave, slightly and obliquely reflexed at the apical portion, ovate, obtuse, 5-nerved, 3.2 mm long, 2.6 mm wide when spread out. Petals deflexed archwise, slightly recurved at the margins, linear, subtruncate, slightly retuse, 1-nerved, 3.8 mm long, 0.8 mm wide when spread out. Lip encircles the column, basally concave, with 8 major nerves, triangular-cordate in outline, 6 mm long, 5 mm wide when spread out; disc dispersed unicellular excrescences containing raphide bundles; lateral lobes falcately ovate, obtuse, with overlapping anterior portions, 2.5 mm long from the base of the column, 2 mm wide; midlobe concavely incurved, triangular-ovate, separated by a constriction, deeply bifid with overlapping, obtuse lobules, 2 mm long, 2.2 mm wide when spread out. Column pale greenish yellow with purple tints, transversely elliptic in section, with a pair of carnose, obtuse apical wings, separated by a groove from the lip, 1.2 mm high, slightly narrowed to the base; rostellum membranaceous, truncate. Anther cap pale yellow, transversely elliptic in outline, with thin lateral margins and a depressively subquadrate apex, 0.5 mm long, 0.8 mm wide. Pollinia 4 in two pairs, yellow, obliquely obpyriform, strongly compressed, basally connected each other by the membranaceous, elastic tissue.

ETYMOLOGY: Named in honor of Mr. Kiyoshi Kanda of Shimoda City, Shizuoka Pref., who is devoting his life to the photography of the orchids in Japan, and who kindly allowed the use of photographs of this species for the study.

JAPANESE NAME: Kanda-himeran (カンダヒメラン, 橋本 1991).

TYPE: JAPAN: Okinawa Pref.: Okinawa-hontō; upper area of the Yona River, Ōgimi-son, in sparse wood of *Pinus luchuensis*, together with *Miscanthus sinensis*, Sept. 16, 1991, Y. Hanei (TNS 9507144); *ibid.*, specimen made from the cultivated stock conserved by Shōichi Harui at Tomigusuku-son near Naha City, Sept. 22, 1991

(Holotype: TNS 9507145).

This species was believed by Hatusima (1971: 863) and Nakajima (1972: 65) to be identical with *Microstylis matsudai* Yamamoto from Taiwan. Nakajima (praec.) stated in Japanese that his nomenclature was based on the material from Okinawa-hontō which he had sent to Ohwi for identification. The name given by Hatusima (praec.) probably resulted from Nakajima's communications in consideration of their personal acquaintance. About 10 years later when I set out to prepare the text of a guide book on Japanese orchids, I discovered several detailed differences between this entity and typical *M. matsudai* from excellent colour-photographs taken by K. Kanda in their native habitat, but I lacked the opportunity to study any specimen. Accordingly, I (Hashimoto 1987: 123) listed this as "*Malaxis matsudai* var." I did not study the material until September 1991 when I could examine the living specimens.

This species is most closely allied to *Malaxis khasiana* (Hook. f.) Kuntze from the eastern Himalayas and its adjacent areas, but it differs in the smooth margins of the leaf-blades, the existence of only one sterile bract below the middle of the peduncle, a more or less reflexed dorsal sepal with moderately revolute margins, 5-nerved lateral sepals, and a triangular-ovate midlobe of the lip with deeply bifid lobules which overlap each other.

King and Pantling (1898: 15 & Pl. 17) demonstrated that the flowers of *M. khasiana* were spread and the leaves of it were greyish-green with purple flushes, while in the new species, the lateral sepals and the midlobe of the lip loosely envelope the column and the leaves are light green. In addition, Benerji and Pradhan (1984: 300 & Pl. 138) described and illustrated that *M. khasiana* had a basally dilated (misprinted as "dialted") column while the column of the new species narrows somewhat towards the base.

In general appearance, *Malaxis matsudai* (Yamamoto) Hatusima (= *Microstylis matsudai* Yamamoto) from Taiwan somewhat resembles the new species, and Seidenfaden (1978: 54) suggested its similarity to *M. khasiana*. Although the patent (Yamamoto 1926: 5 & Fig. 2, Lin 1977: Col. pl. 130), 'green or yellowish green' (Ying 1977: 243 & Fig. 105) or 'green or tinged with purple' (Liu & Su 1978: 1058) flowers, the non-constricted lip at both sides with a minute U-shaped cut at the apex (Yamamoto, praec., Lin 1977: 260 & 261) and the 'toothy acute' (Yamamoto, praec.) column-wings of the Taiwanese entity leads me to hold the view that it is a different species from both *M. kandae* and *M. khasiana*.

It might be a remarkable feature of this new species and its (Asian?) allies that the raphide bundles emergent on the surface of the lip. It was able to observe the same feature in *M. acuminata* D. Don of Sect. *Malaxis*, emend. Seidenf. from Nepal (TNS 9507141), as well as in *M. bancanoides* Ames of Sect. *Commelinoides* (Schltr.) Seidenf. from both Ishigaki (TNS 9504252) and Iriomote (TNS 9504251) islands in contrast with the other taxonomic groups in the genus. Few raphide bundles could be observed on the surface of an excavated area and in the inner tissue of the lip in *M. latifolia* J. E. Smith (specimen from Iriomote Isl.-TNS 9507142), but no raphide was seen on any floral segment in *M. cogniauxiana* (Schltr.) Pabst (specimen from Sorata, Bolivia-TNS

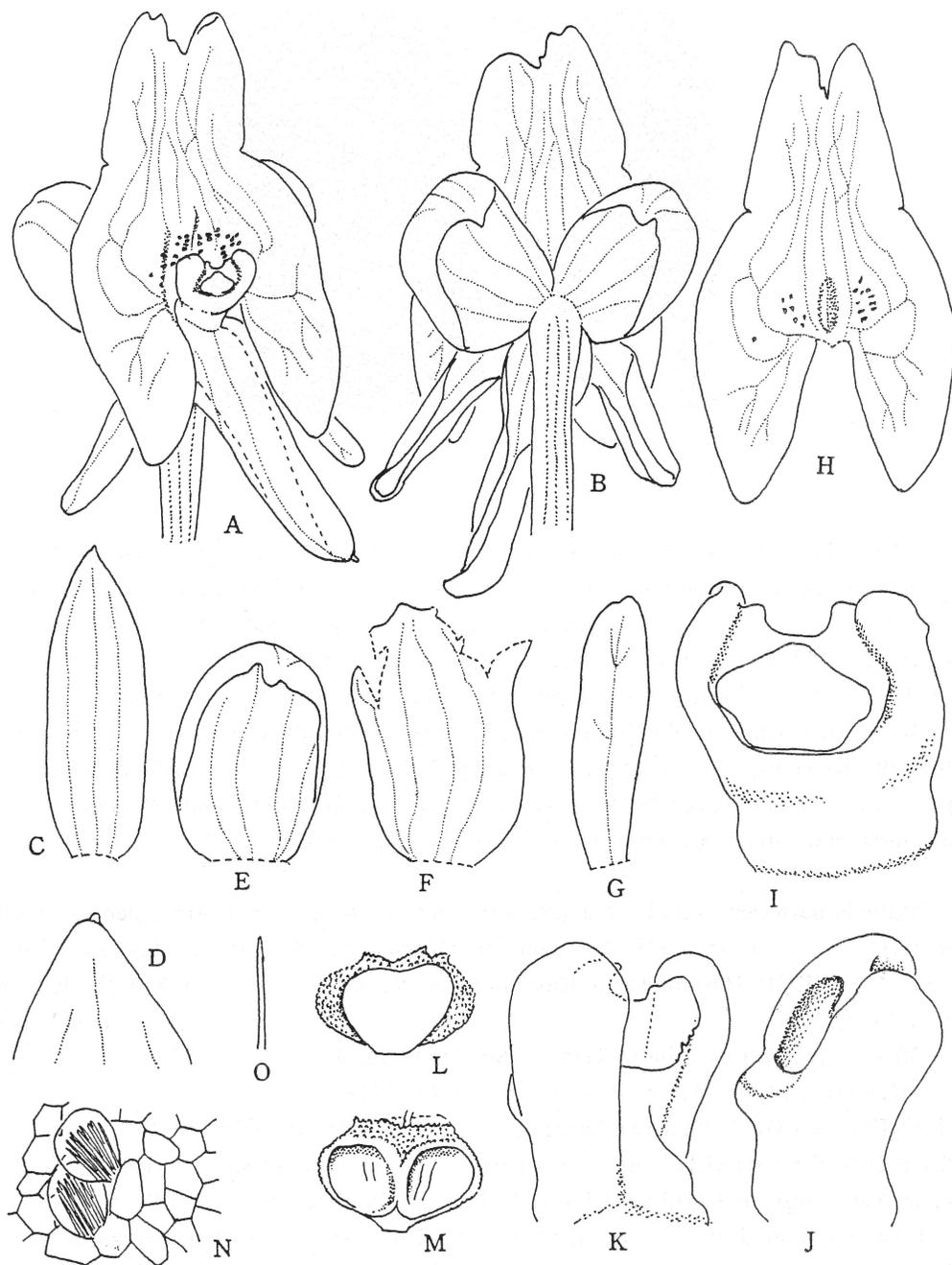


Fig. 3. *Malaxis purpurea* (Lindl.) Kuntze. A. Flower from front; B. Flower from back; C. Dorsal sepal, spread out; D. Anterior portion of dorsal sepal; E. Lateral sepal from dorsal side, natural position; F. Lateral sepal, spread out; G. Petal, spread out; H. Lip, spread out; I. Column from dorsal side; J. Column from side; K. Column from ventral side; L. Anther cap from outside; M. Anther cap from inside; N. Epidermal raphide cell of lip, lightly flattened out; O. Raphide crystal. A-C & E-H, $\times 8$; D, $\times 20$; I-M, $\times 25$; N, $\times 400$; O, $\times 800$. Drawn from *Hanei* TNS 9507143. All perianth segments except E ventrally viewed. Lateral sepals and petal of right side in a flower from front dissected.

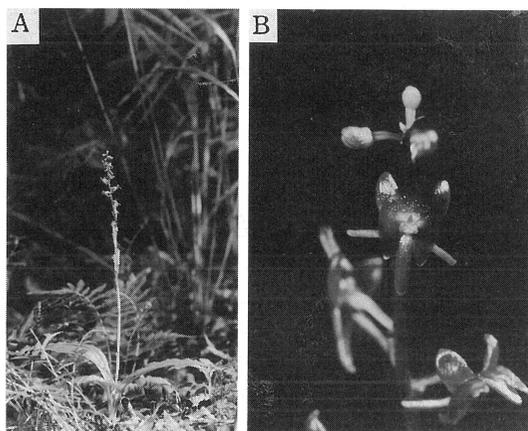


Fig. 4. *Malaxis purpurea* (Lindl.) Kuntze in native habitat. A. Whole plant; B. Flowers on inflorescence. Courtesy of K. Kanda.

9507140). The epidermal raphide cells of the lip in these alliances converge on the encircling areas of the column. The bundle composed of needle-like crystals is enclosed by the frail cell membrane. These facts leads me to suggest that they are functional in protecting pollination against small unserviceable herbivores as pollinium carriers, or to provide a vectorial course to the raphide-free columnar area for pollinators.

M. kandae is not inhabitable under the evergreen broad-leaved forest, but is found rather in the sunny open fields, as noted by Nakajima (praec.). Unfortunately, the type locality was destroyed by the construction of a golf course, and few localities of the limited individuals are known on the island at present.

Malaxis purpurea (Lindl.) Kuntze, Rev. Gen. 2: 673, 1891; Seidenfaden in Dansk Bot. Ark. 33: 63, f. 45, 1978; Jayaweera in Dassanayake & Fosberg, Rev. Fl. Ceylon 2: 39, f. 16, 1981; Hashimoto in Hashimoto *et al.*, Japan. Indig. Orch. Col., Rev. & Enlarg. 178, 1991. Figs. 3 & 4

Microstylis purpurea Lindl., Gen. & Sp. Orch. Pl. 20, 1830.

?*Malaxis rizalensis* Ames, Phil. J. Sci. 6: 46, 1911.

JAPANESE NAME : Okinawa-himeran (オキナワヒメラン, 橋本 1991).

SPECIMEN EXAMINED: Japan: Okinawa Pref.: Okinawa-hontō : Aha, Kunigami-son, in the evergreen broad-leaved forest, July 21, 1989, Y. Hanei (TNS 9507143).

I have hesitated to do this identification. The plant from Okinawa-hontō has a subacute dorsal sepal with 3 nerves, 4-nerved lateral sepals and 1-nerved petals while the plant from the type locality was described as the plant of an obtuse, 5-nerved dorsal sepal (Seidenfaden illustrated as the same feature, 1970: Fig. 6-g), 5-nerved lateral sepals and 3-nerved petals (Jayaweera 1981: 39 & Fig. 16), but illustrated by Seidenfaden as 1-nerved petals (praec. Fig. 6-f), and the numbers of the nerves were applied to key characters of this species by Jayaweera (praec. 38). On the other hand, *Malaxis rizalensis* Ames from the Philippines which I have listed above as a synonym after Seidenfaden (1978: 63) but prefix with a question mark, has a 3-nerved dorsal

sepal, 4-nerved lateral sepals and 3-nerved petals. Since I have not studied the variation in the plants of the whole area, I tentatively refer the plant of Okinawa-hontō to *Malaxis purpurea*. The raphide bundles disperse on the inner surface of the lip around the column. The plants inhabitable in the evergreen broad-leaved forest under a little sunlight (Hanei, personal communication). There are no reports of this species being found in Taiwan.

Abstract

Malaxis kandae Hashimoto is described from Okinawa-hontō (island), Japan. The new species is closely related to *M. khasiana* (Hook. f.) Kuntze but differs in its entire leaf-margins and in many details of the flower. Another species from the same island is tentatively referable to *M. purpurea* (Lindl.) Kuntze; however, it provides a subacute dorsal sepal with 3 nerves and 1-nerved petals. The tubercle-like excrescences by the raphide bundles disperse around the column on the exterior tissue of the lip in both entities.

摘 要

沖縄本島から日本産として新しいヤチラン属 *Malaxis* を 2 種報告する。

新種カンダヒメラン *M. kandae* Hashimoto は東部ヒマラヤおよびその周辺地域に分布する *M. khasiana* (Hook. f.) Kuntze に近縁だが、葉の縁は波打たず、花茎の中程にただ 1 個の苞があり、背萼片は縁を含めて外側へいくらか反っており、側萼片は 5 脈、唇弁の中裂片は三角状卵形で深裂し、各裂片は重なるという違いがある。また King & Pantling によれば *M. khasiana* の葉は、紫色に染まった灰緑色というが、カンダヒメランは浅緑色である。

日本新産種のオキナワヒメランは本文に記したように断定し難いところもあるが、*M. purpurea* (Lindl.) Kuntze と同定した。*M. purpurea* は、これまでスリランカ、シッキム、中国・四川省、インドシナ半島、フィリピンに記録がある。

両種とも Seidenfaden が規定する Sect. *Malaxis* に入り、同節の *M. acuminata* (ネパール産材料) および Sect. *Commelinoides* のイリオモテヒメラン *M. bancanoides* (石垣島、西表島産材料) と同様に、唇弁の萼柱周辺に脆い細胞膜に包まれて突出した針状の束晶が目立つ。唇弁上に突出したこの束晶は、これらの種類の受粉機構とおもわれるが、それぞれ別節であるホザキヒメラン *M. latifolia* (西表島産) ではごく少なく、*M. cogniauxiana* (ポリビア・ソラタ産) では全く観察されなかった。

Literature Cited

- Ames, O., 1911. Notes on Philippine orchids with description of new species III. *Phil. J. Sci.* 6, Sect. C. Bot. : 35-56.
- Benerji, M.L. & P. Pradhan, 1984. The orchids of Nepal Himalaya. 1-534. Cramer, Hirschberg.
- Hashimoto, T. & K. Kanda, 1981. Japanese indigenous orchids in colour. 1-247. Ienohikari Asoc., Tokyo, in Japanese with Latin nomenclature.
- , ——— & H. Murakawa, 1991. Japanese indigenous orchids in colour, revised and enlarged. 1-296. Ienohikari Asoc., Tokyo, in Japanese with Latin nomenclature.
- Hatusima, S., 1971. Flora of Ryukyus. 1-940. Okinawa-seibutsu-kenkyūkai, Naha, in Japanese with Latin nomenclature.

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- Hooker, J.D., 1886-1890. The flora of British India V. 1-910. Reeve, London.
- , 1895. A century of Indian orchids. Ann. Roy. Bot. Gard. Calcutta 5: 1-68, 101 pls.
- Jayaweera, D.M.A., 1981. Orchidaceae. 4-386. In Dassanayake, M.D. & F.R. Fosberg [eds.], A revised handbook to the flora of Ceylon II. Balkema, Rotterdam.
- King, G. & R. Pantling, 1898. The orchids of Sikkim Himalaya. Ann. Roy. Bot. Gard. Calcutta 8: 1-342, pls. 448.
- Lin, T.-p., 1977. Native orchids of Taiwan 2. 1-355. Ji-chi Wang, Chiai, in Chinese & English with Latin nomenclature.
- Liu, T.-s. & H.-g. Su, 1978. Orchidaceae. 859-1137. In Li, H.-l. [ed.], Flora of Taiwan 5. Epoch Publ., Taipei.
- Nakajima, K., 1972. *Malaxis Matsudai* (Yamamoto) Hatusima, new for the Ryukyus. J. Geobot. 20: 65-69.
- Seidenfaden, G., 1970. Contributions to the orchid flora of Thailand II. Dansk Bot. Ark. 65: 313-370.
- , 1978. Orchid genera in Thailand VII/*Oberonia* Lindl. & *Malaxis* Sol. ex Sw. Dansk Bot. Ark. 33: 1-94.
- Yamamoto, Y., 1926. Supplementa iconum plantarum formosanarum II. 1-40, pls. 2. Dept. Forestry, Govt. Res. Inst., Taihoku (Taipei).
- Ying, S.-s., 1977. Coloured illustrations of indigenous orchids of Taiwan I. 1-565. Dept. Forestry, Nation. Taiwan Univ., Taipei, in Chinese & English with Latin nomenclature.
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