Taiwania, 58(4): 257–267, 2013
DOI: 10.6165/tai.2013.58.257

RESEARCH ARTICLE

Newly Discovered Native Orchids of Taiwan (VI)

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(Manuscript received 27 August 2013; accepted 06 November 2013)

ABSTRACT: In this report six new orchids to Taiwan, i.e., *Bulbophyllum confragosum*, *Bulbophyllum hirundinis* var. *puniceum, Bulbophyllum albociliatum* var. *shanlinshiense, Nervilia ratis*, *Oberonia linguae* and *Goodyera velutina* var. *albo-nervosa* are presented.

KEY WORDS: *Bulbophyllum, Nervilia,* native orchids, *Oberonia, Goodyera,* Taiwan.

TAXONOMIC TREATMENTS

Bulbophyllum confragosum sp. nov.
斷尾捲瓣蘭 Figs. 1 & 2A

Typus: Wei-Min Lin *s.n.* (holo TAI283130, Forest above the Te-Chi Reservoir, Taichung County).

Epiphytic. Rhizome 2 mm in diameter. Pseudobulbs 1~3 mm apart, ovoid, usually 8~12 mm long, 5~7 mm in diameter, usually with ridges when mature. Leaves solitary at apex of pseudobulbs, oblong or elliptic, obtuse, cuneate at base, thick-coriaceous, 2.3~3.5 cm long, 9~11 mm wide. Inflorescence arising from base of pseudobulbs, about 10~15 cm long, ca. 2 mm thick, stiff; bracts ovate-lanceolate; pedicel and ovary 7~8 mm long, green. Flowers 2~3, green to greenish yellow, 1.2~1.6 cm long, similar to the flower morphology of *B. setaceum* but with much shorter lateral sepals. Perianths bearing curved white hairs; upper sepal greenish yellow but with green stripes, concave, ovate, 5.3 mm long, 4 mm wide in nature condition not including hair length, acuminate, with long cilia especially towards apex; lateral sepals meeting along their length, about 3.6 mm across at base, green, obliquely linear-lanceolate, 1.2~1.6 cm long, 2.3 mm wide at base, bearing extremely short hairs on upper and lower margins, tips always come to an abrupt brownish ends; petals obliquely oblong, greenish but deep red at ends, with red stripes, 3.8 mm long, 2 mm wide, obtuse at apex, bearing long white cilia on margins; lip attached to tip of column foot, deep red, thickly hornlike, ca. 2.5 mm long, recurved, disc glabrous, grooved centrally. Column whitish, 2 mm long, with 2 short stylids at apex; pollinia 2, each with unequal connate partitions.

Flowering time: April.

Ecology: This unique *Bulbophyllum* was originally collected from trees growing along the mountain trail at about 1900 m from where one could overlook the Te-Chi Reservoir in 2008. The type specimen was cultivated until August 2013. In the same branch where *Bulbophyllum confragosum* sp. nov. was growing, *B. setaceum* was also found. The *B. setaceum* has pseudobulb about 2 cm long and leaf of 4 cm long and 1.5~1.8 cm wide which is larger than the new species has (Fig. 1K). *B. confragosum* sp. nov. was also found by Mr. Bor-Neng Shen (沈伯能) in Shanlinshi area bearing flower at an elevation of 2400 m in August in 2011 (Fig. 2B) indicating that *B. confragosum* sp. nov. has more widespread distribution then we thought.

Note: The epithet "*confragosum*" describes the broken/rough ends of the lateral sepal. The new species has similar morphology when compared to the *B. setaceum*, especially the flower except the new species has much shorter lateral sepals. It is easy to consider that the shorter lateral sepals result from insect damage because the ends of lateral sepals come to abrupt stops and brow in color.

Bulbophyllum hirundinis var. ***puniceum var. nov.***
張氏捲瓣蘭 Figs. 2D, E & 3

Typus: Liangzu Chang *s.n.* (holo TAI283127, Xicun, Northern Cross-Island Highway, Taoyun County).

Epiphytic. Pseudobulbs about 1 cm apart, elongate-ovoid, usually 8 mm long, 3.5 mm in diameter. Leaves solitary at apex of pseudobulbs, elliptic to oblong, obtuse, cuneate at base, thick-coriaceous, up to 3.7 cm long, 8.5 mm wide. Scapes arising from base of pseudobulbs, about 10 cm long, ca. 0.5 mm thick, slender; bracts ovate-lanceolate; pedicel and ovary 6 mm long, orangish-red. Flowers 5~7, umbellate,

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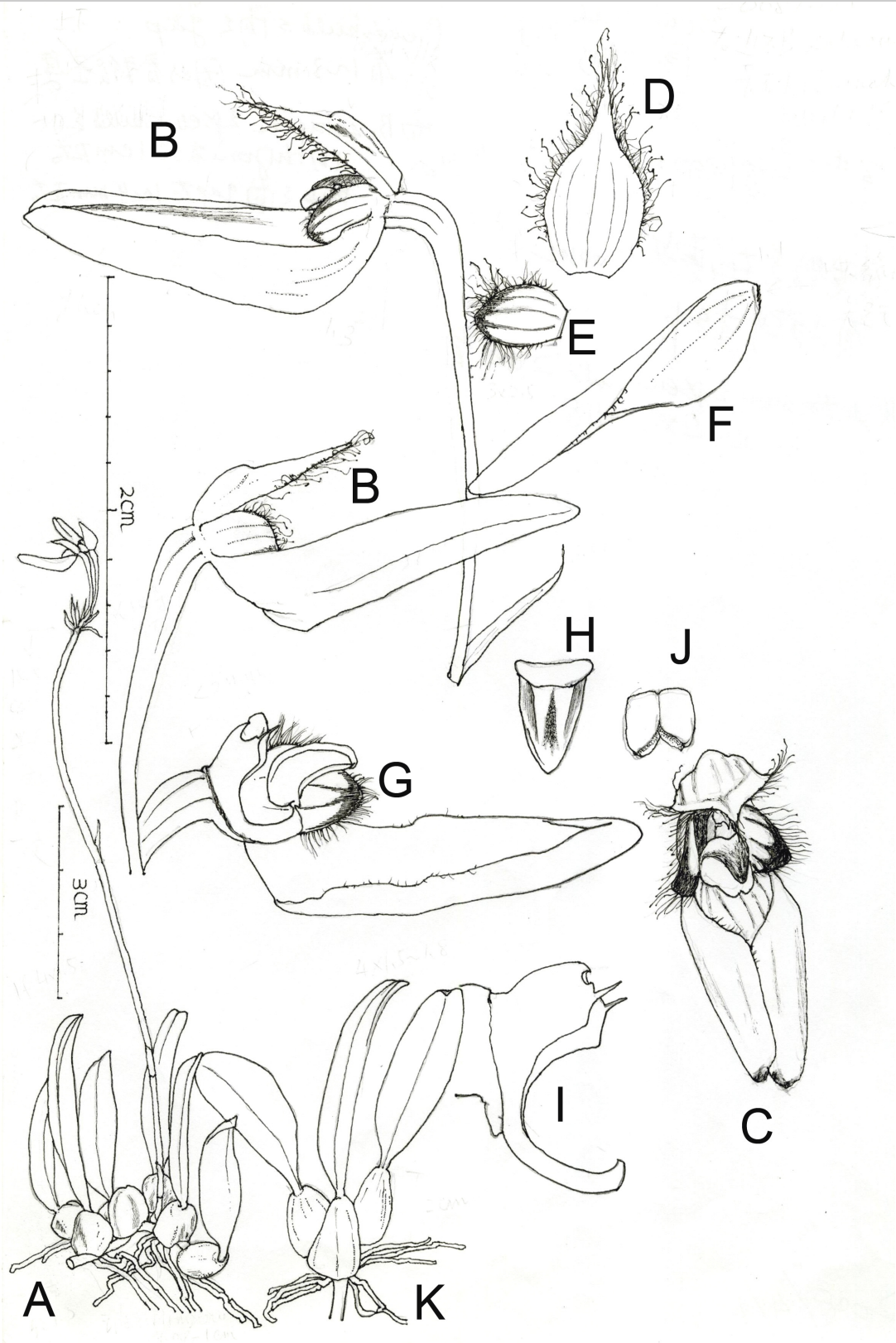


Fig. 1. *Bulbophyllum confragosum* T.P. Lin & Y.N. Chang. A: Plant body and inflorescence. B: Side view of flower. C: Front view of flower. D: Upper sepal. E: Petal. F: Lateral sepal. G: Side view of ovary, column and lip. H: Ventral view of lip. I: Side view of column and column-foot. J: Anther cap. K: *B. setaceum* was found growing on the same branch.

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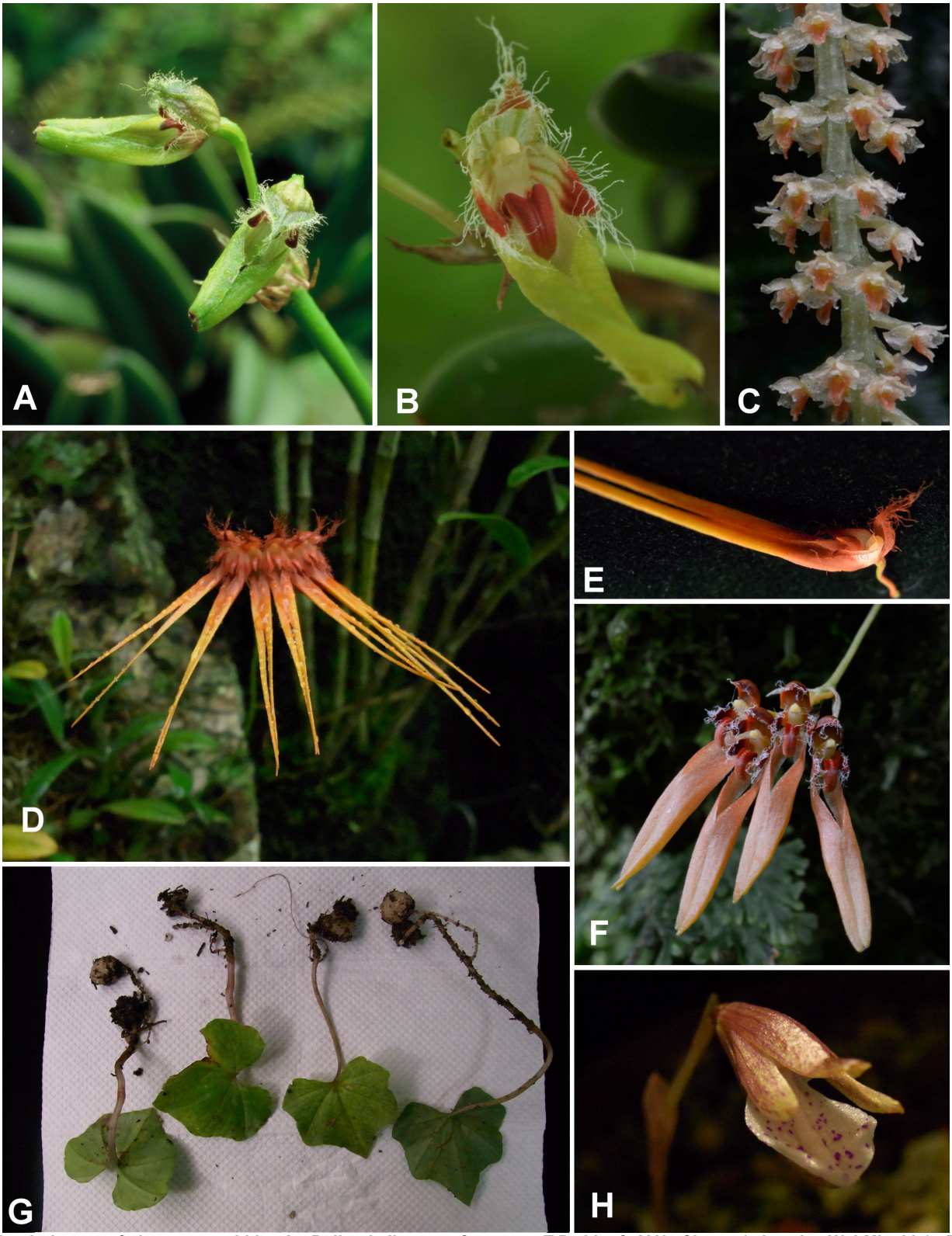


Fig. 2. Image of the new orchids. A: *Bulbophyllum confragosum* T.P. Lin & Y.N. Chang (taken by Wei-Min Lin). B: *Bulbophyllum confragosum* T.P. Lin & Y.N. Chang collected from Shanlinshi area (taken by Bor-Neng Shen). C: *Oberonia linguae* T.P. Lin & Y.N. Chang (taken by Bor-Neng Shen). D & E: *Bulbophyllum hirundinis* var. *puniceum* T.P. Lin & Y.N. Chang. F: *Bulbophyllum albociliatum* var. *shanlinshiense* T.P. Lin & Y.N. Chang (taken by Bor-Neng Shen). G: *Nervilia ratis* T.P. Lin & Y.N. Chang (left two plants) and *N. tahanshanensis* (right two plants). H: *Nervilia ratis* T.P. Lin & Y.N.

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orangish-red, 2.9~3.5 cm long, perienths bearing curved orangish-red hairs; upper sepal orangish-red but whitish near base, concave, ovate, 6 mm long, 2.3 mm wide in nature condition, acuminate, with long cilia especially towards apex; lateral sepals meeting along their length or separate, about 2.5 mm wide at base, orangish-red, obliquely linear-lanceolate, 2.9~3.5 cm long, acuminate, sparely hirsute on upper margin near base, glabrous on lower margin; petals obliquely ovate, whitish but orangish-red near tips, 3.5 mm long, 2.5 mm wide, acute at apex, contracted at base, long ciliate; lip attached to tip of column foot, orangish-red but white on lower side, thickly hornlike, ca. 2 mm long, recurved from erect base, disc glabrous with 2 whitish patches, grooved, with a narrow groove on lower side. Column whitish, 1.5 mm long, with 2 slender stylids at apex; anther cap semiglobose; pollinia 2, each with unequal connate partitions.

Flowering time: June.

Ecology: This plant was originally found in broad-leaf forests of Xicub (西村), Taoyuan Co. at an elevation of 800 m by Mr. Liangzu Chang in 2010, and was cultivated to flower in June 2013. From numerous field trips made by Mr. Chang, this new variety has been located in many places of low elevations in northern Taiwan.

Note: The epithet "*puniceum*" refers to the crimson flower. Both *hirundinis* var. *hirundinis* and var. *puniceum* var. nov. are characterized by the long needle-like lateral sepals but differ in flower color. We list this species as a variety of *B. hirundinis* is because the flower of var. *puniceum* var. nov. has orangish-red lateral sepals but var. *hirundinis* showing yellow for most of the length. The pseudobulb is ovoid and the leaves elliptic in var. *hirundinis* while the pseudobulb narrow ovoid and the leaves oblong in var. *puniceum* var. nov. This new species is also similar to *B. electrinum* var. *calvum* (Lin and Lin, 2009) which has shorter and hairless lateral sepals.

Bulbophyllum albociliatum* var. *shanlinshiense var. nov.

杉林溪捲瓣蘭 Figs. 2F & 4

Typus: Bor-Neng Shen *s.n.* (holo TAI283128, Shanlinshi, Nantou County).

Epiphytic. Rhizome slender, 1 mm in diameter. Pseudobulbs 3~4 cm apart, elongate ovoid, usually 8~12 mm long, 4.5~6.0 mm in diameter. Leaves solitary at apex of pseudobulbs, oblong or elliptic, obtuse, cuneate at base, thick-coriaceous, 2.2~3.1 cm long, 11 mm wide, but some individuals may go up to 6 cm long. Inflorescence arising from base of pseudobulbs, about 8~10 cm long, ca. 0.5 mm thick, slender; bracts ovate-lanceolate; pedicel and ovary 7~8 mm long, orange. Flowers 3~5, umbellate, orangish-red, 1.6 cm long, perianths bearing curved white hairs; upper sepal orangish-red but whitish near base, concave, ovate, 3.5 mm long, 2.5 mm wide in nature condition, obtuse, with long cilia especially towards apex; lateral sepals meeting along their length, about 2.5 mm across at base, orangish-red, obliquely linear-lanceolate, 1.4~1.6 cm long, 2.7 mm wide, acuminate, glabrous on upper and lower margins; petals obliquely oblong, deep red, 2.3 mm long, obtuse at apex, bearing long white cilia; lip attached to tip of column foot, deep red, thickly hornlike, ca. 2.5 mm long, recurved, disc glabrous with 2 deep red patches slightly elevated, grooved slightly, with a narrow groove on lower side. Column whitish, 2 mm long, with 2 slender stylids at apex; anther cap triangular; pollinia 2, each with unequal connate partitions.

Flowering time: June.

Ecology: The type specimen was collected by Mr. Bor-Neng Shen (沈伯能) in broad-leaf forests of Shanlinshi, Nantou Co. between 1600 m and 1800 m on June 2013. Moderate population still exists in the native habitat.

Note: *B. albociliatum* (Liu & Su) Nakejima var. *albociliatum* is very similar in many aspects to the *B. albociliatum* var. *shanlinshiense* var. nov. except the lateral sepals are much shorter and round. In fact, var. *shanlinshiense* var. nov. was considered as a flower variation of *B. albociliatum* Lin and Kuo Huang (2005) and Lin (2006) bur was not given a new name. Also *B. albociliatum* (Liu & Su) Nakejima var. *weiminianum* Lin & Huang is similar to the var. *shanlinshiense* var. nov. but differs in the morphology of lateral sepals.

Nervilia ratis sp. nov.

三伯脈葉蘭 Figs. 2GH & 5

Typus: Shyh-Shiarn Lin s. n. (holo TAI 282381, Tahanshan, Pingtung County).

Inflorescence aboveground about 7 cm tall. Corms ovoid or nearly so, 1~2 cm across. Stem short. Leaves petiolate, polygonal-ovate, up to 6.2 cm wide and 5.4 cm long, acute, cordate at base, 5- or 7-veined, shiny and dark-green on upper surface, pale-green on lower surface, leaf emerges only after anthesis; petiole reddish-brown, about 5 cm long. Peduncle slender, with reddish-brown markings, with several tubular sheaths; pedicel and ovary 4.5 mm long. Flowers solitary or two, perianths not very spreading, 1.6 cm long, anthesis lasting for several days; sepals reddish-brown which is resulting from many reddish-brown tiny line markings, lanceolate, upper sepal 16 mm long, 4 mm wide in nature condition, acute, while the lateral sepal fused

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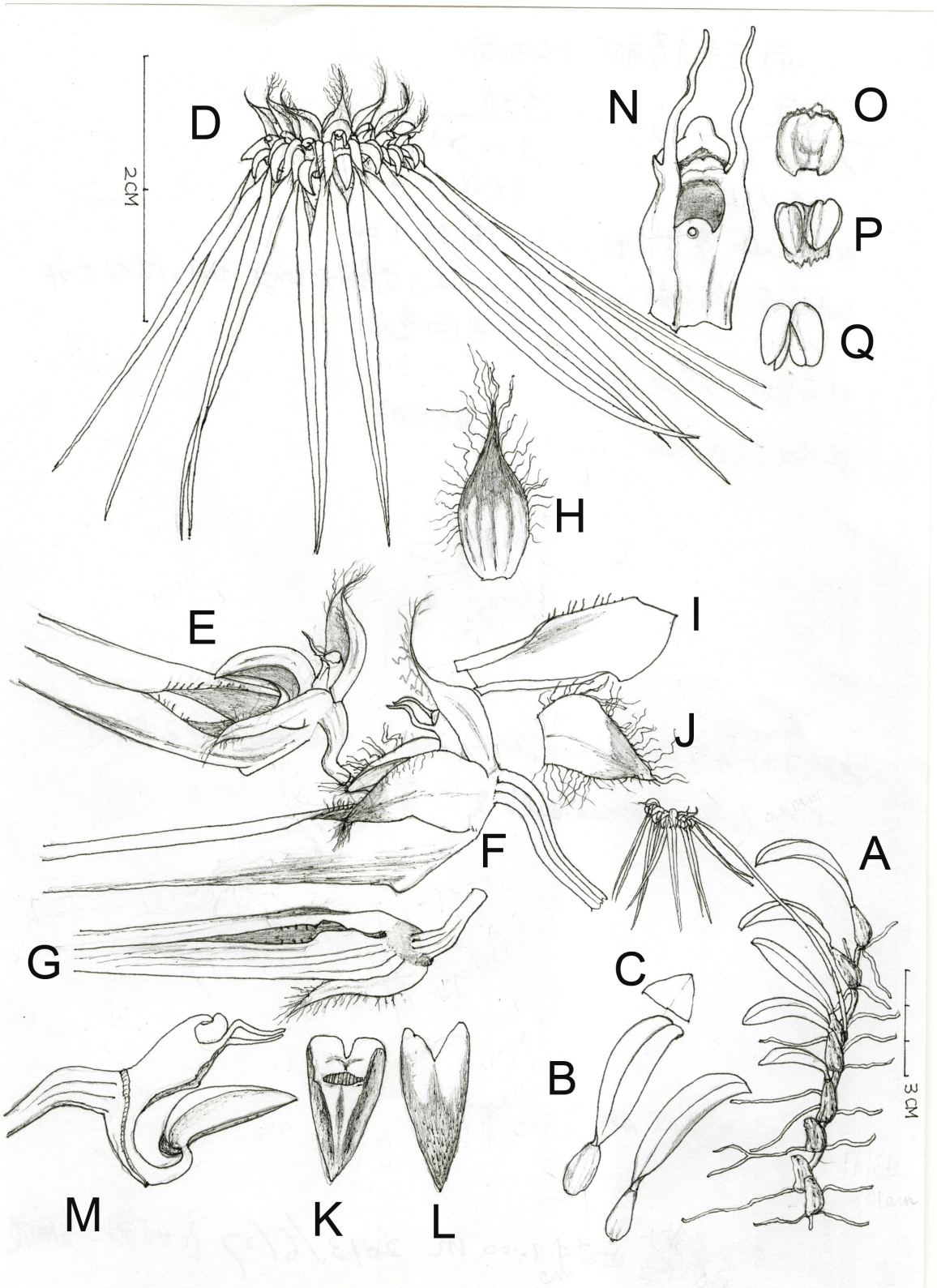


Fig. 3. ***Bulbophyllum hirundinis*** **var.** ***puniceum*** **T.P. Lin & Y.N. Chang. A: Plant body and inflorescence. B: Leaves and pseudobulbs. C: Acute leaf apex. D: inflorescence. E & F: Side view of flower. G: Bottom view of flower. H: Upper sepal. I: Lateral sepal. J: Petal. K: Bottom view of lip. L: Top view of lip. M: Side view of ovary, lip and column. N: Ventral view of column showing the stigma and anther cap. O: Dorsal view of anther cap. P: Ventral view of anther cap. Q: Pollinia.**

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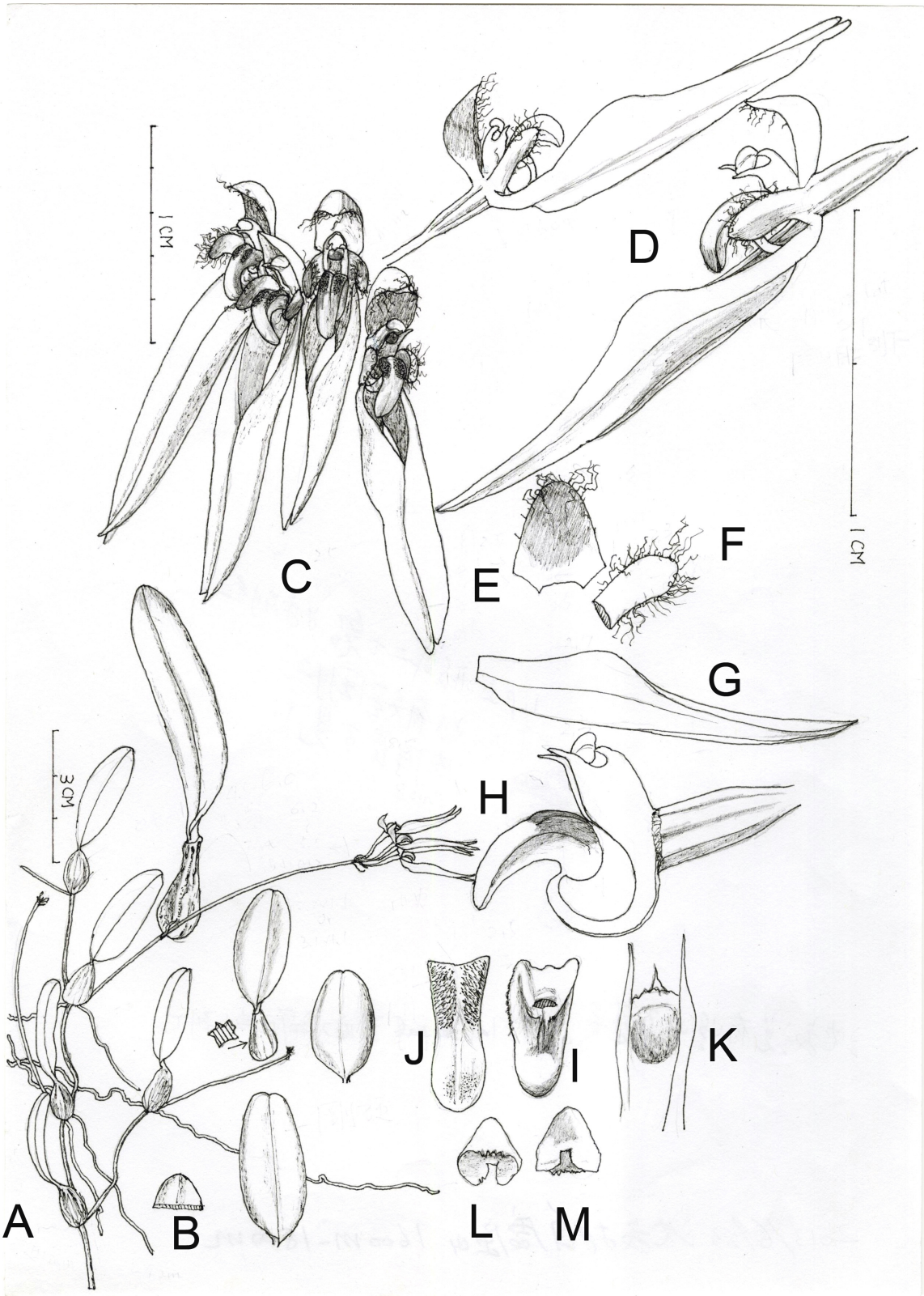


Fig. 4. *Bulbophyllum albociliatum* var. *shanlinshiense* T.P. Lin & Y.N. Chang. A: Plant body and inflorescence. B: Apex of leaf. C: Inflorescence. D: Side view of flower. E: Upper sepal. F: Petal. G: Lateral sepal. H: Side view of ovary, lip and column. I: Bottom view of lip. J: Top view of lip disc showing 2 deep red patches slightly elevated. K: Ventral view of column showing the stigma. L: Ventral view of anther cap. M: Dorsal view of anther cap.

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together, 16 mm long, 5 mm wide; petals similar to sepals but slightly narrower, 16 mm long, 2.5 mm wide. Lip white with purple markings, 16.5 mm long, 3-lobed; side lobes erect, small; mid-lobe rhombic, 1 mm long and 7.6 mm wide when spread out, not curving downwards, boat-like, margins in front more or less undulate, obtuse, disc with 1 longitudinal white low keel, basal part of lip with 2 parallel purple markings, hairy. Column slender, white, 6.5 mm long, not dilated, lower side covered with white hairs; anther cucullate; pollinia 4, without viscidium; stigma semiorbicular.

Flowering Season: March-April.

Ecology: The type specimen was originally collected by Mr. Shyh-Shiarn Lin in October 2012 and he noticed that the leaf morphology of *Nervilia ratis* sp. nov. was different from *N. tahanshanensis* which was now known common in this area. The cultivated plants came to flower in April, 2013. This species is restricted to Tahanshan, Pingtung Co., at an elevation of about 900 m. So far only a small population has been located.

Note: Epithet of species name indicates boat-like lip blade. We noticed under cultivation condition, leaves of *Nervilia ratis* sp. nov. are much lightly green in developmental stage when compared with *N. tahanshanensis*, but the color does not show any difference at mature stage. Flowers of *N. ratis* are similar to the *N. tahanshanensis* and *N. taiwaniana* but differ in having much wider lip blade and fused lateral sepals. The fused lateral sepal (Fig. 5F) has never been found in other Taiwanese species of *Nervilia*. Leaves of the *N. tahanshanensis* usually have relatively acuminate apex and a sinus about 90º in the basal part of the leaf, while *N. ratis* is characterized by the relatively wider leaves and a U-shaped opening in the basal part of the leaf (Fig. 2G).

Oberonia linguae sp. nov.

圓唇莪白蘭 Figs. 2C & 6

Typus: Wu-Si Wei *s.n.* (holo TAI283129, Shanlinshi, Nantou County)

Epiphytes. Plants tufted, upside down. Individual plant or stem usually not longer than 5 cm and about 2.7 cm wide, flattened. Leaves linear, usually smaller than 2.2 cm long, 4 mm wide, acute, greenish tinged with reddish-brown, very laterally flattened, the lower ones sheath-like, without visible joint at base. Flowering stems slender, up to 7.7 cm long, densely many-flowered. Bracts ovate, as long as pedicel and ovary. Flowers about 1.3 mm across, transparent or very light orange except orangish-red lip; perianths round, subacute, about 0.6~0.7 mm in diameter. Lip orangish-red, 0.8 mm long, 1.3 mm wide when spread out, 3-lobed; side-lobes basal, irregular erose on margins; mid-lobe cuneate at base, not bilobed, usually tongue-like. Column short, white; pollinia 4?. The middle flowers open first, and the basal flowers usually last of all.

Flowering time: August.

Ecology: The type specimen was collected by Mr. Wu-Si Wei (魏武錫) from Shanlinshi area at elevations between 1500 m and 1600 m in 2012, and was cultivated to flowering in August 2013. In fact, another independent collection was made by Ms. Shu-Ying Huang (黃素英) in the same area on 2012. Moderate population still exists in the native habitat. According to Mr Bor-Neng Shen (沈伯能), *Oberonia linguae* sp. nov. grows pendently in a tuft containing about 10~20 stems on trunk about 6 meter height of broad-leaved tree.

Note: This species is very similar in vegetative part to the *O. falcata* and *O. arisanensis* but differs from them in the tongue-shaped mid-lobe of lip. No obvious bifurcation of the mid-lobe occurs to every flower in an inflorescence. The credit of discovery of *Oberonia linguae* sp. nov. is attributed to Bor-Neng Shen because he was able to see the entire mid-lobe with his eyes and professional knowledge of native orchids. *O. linguae* sp. nov. is also characterized by the very light orange color of sepal and petal which sometimes look like white, and only lips are orangish-red (Fig. 2C). This is very different from other Taiwanese *Oberonia* species that all perianth parts are greenish or orangish-red.

Goodyera velutina* var. *albo-nervosa var. nov.

斑紋鳥嘴蓮 Fig. 7

Typus: Shen-Kun Yu *s.n.* (holo TAI283131, Xiang-Yang, Southern Cross-Island Highway, Taitung County).

This new variety is identical with *Goodyera velutina* var. *velutina* except the net-like markings on upper leaf surface. Leave usually do not larger than 2 cm long 9 mm wide in nature condition.

Flowering time: August–September.

Ecology: The type specimen was collected by Mr. Shen-Kun Yu (余勝焜) from Xiang-Yang area, Southern Cross-Island Highway at an elevation about 1900 m in September 4, 2013. However, *G. velutina* var. *albo-nervosa* var. nov**.** was discovered by Jianhua Huang. Dozens of plants were observed in the native habitat. Population of var. *velutina* was found from a distance about 100 m away from the var. *albo-nervosa* var. nov.

Note: This variety is identical in flower morphology to the var. *velutina* but differs from it in the leaf markings.

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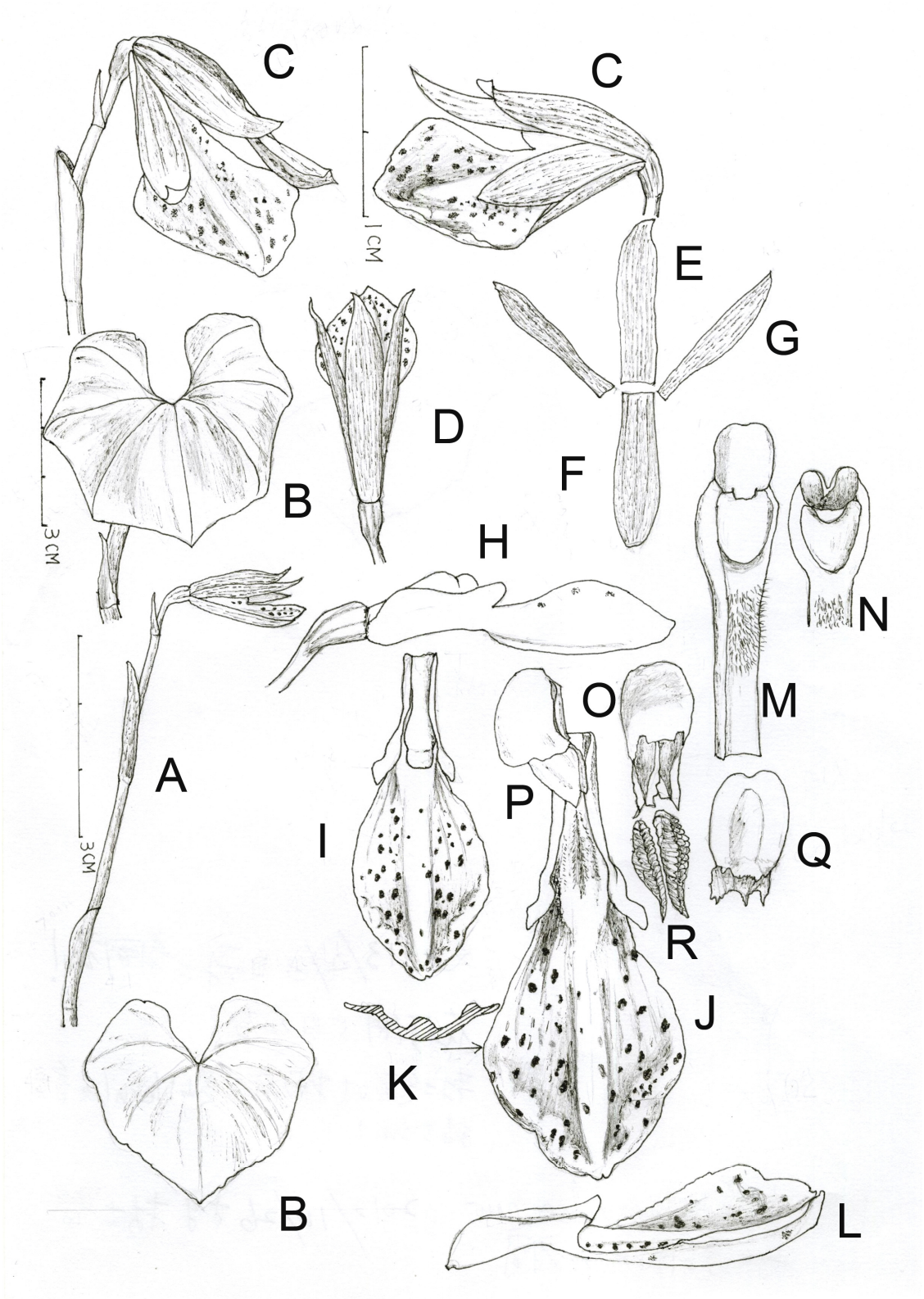


Fig. 5. ***Nervilia ratis*** **T.P. Lin & Y.N. Chang. A: Inflorescence. B: Leaf. C: Flower. D: Top view of flower. E: Upper sepal. F: Fused Lateral sepals. G: Petal. H: Side view of column, lip and ovary. I: Top view of column and lip. J: Lip in nature condition. K: Cross-section of lip. L: Side view of lip in nature condition. M: Ventral view of column and anther cap. N: Ventral view of column after removing the anther cap. O: Ventral view of anther cap. P: Side view of anther cap. Q: Dorsal view of anther cap.**

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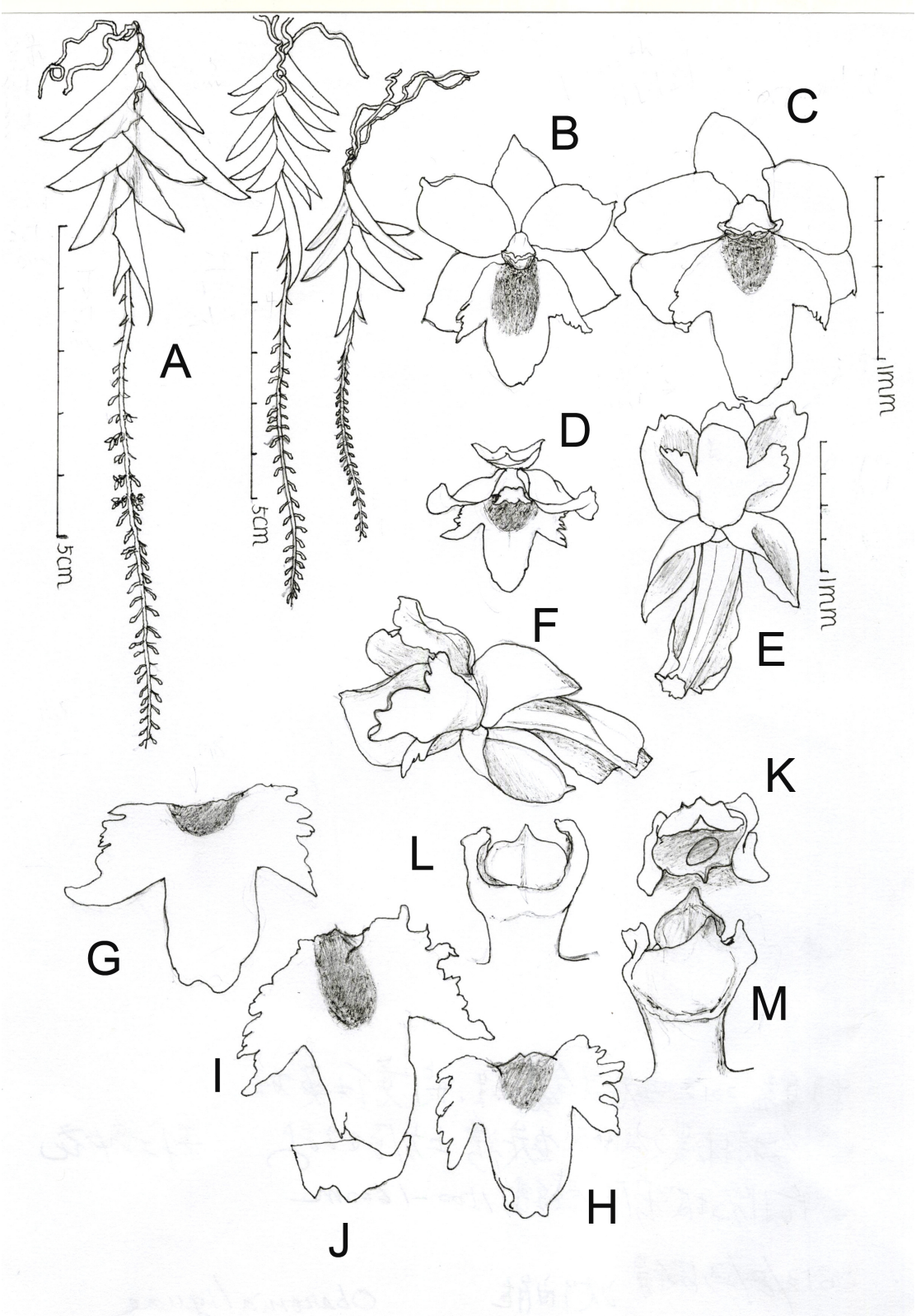


Fig. 6. *Oberonia linguae* T.P. Lin & Y.N. Chang. A: Plant bodies and inflorescences. B & C: Front view of flower. D: Top view of flower. E & F: Bottom view of flower. G & H: Lip after spread out. I: Lip in nature state. J: Lip apex of I after spread out. K: Front view of column to show anther cap and pollinium. L: Top view of column and anther cap. M: Dorsal view of column to show the stigma.

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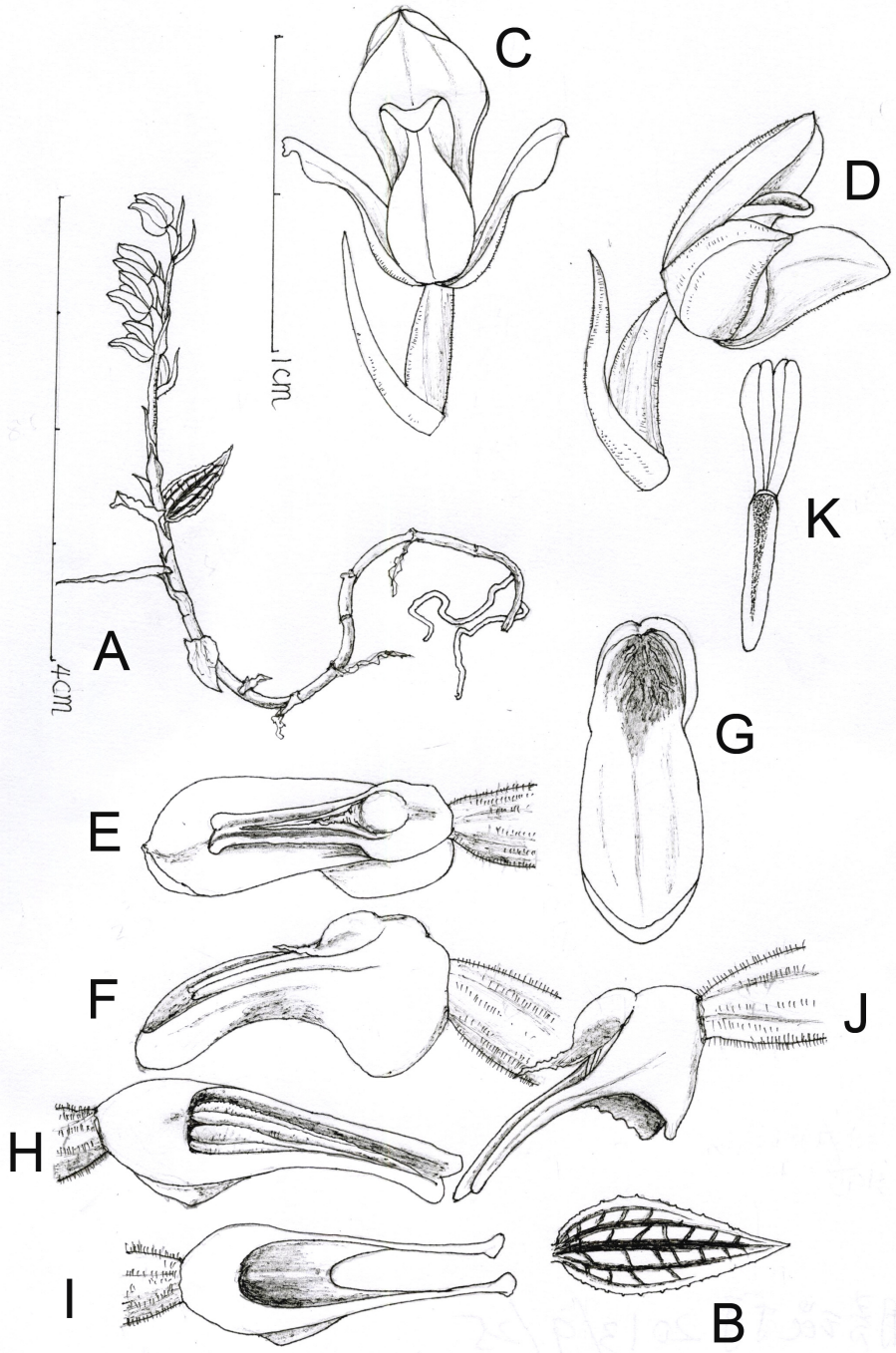


Fig. 7. ***Goodyera velutina*** **var.** ***albo-nervosa*** **T.P. Lin & Y.N. Chang. A: Plant body and inflorescence. B: Leaf with net-like markings. C: Ventral view of flower. D: Side view of flower. E: Top view of lip, column and anther cap. F: Side view of lip, column and anther cap n. G: Lip. H: Top view of column and pollinia. I: Top view of column and slender rostellum without anther cap. J: Side view of column and anther cap. K: Pollinia attaching on a long visic disc.**

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ACKNOWLEDGEMENTS

We wish to express our thanks to Bor -Neng Shen, Nantou Forest District Office for his dedication to native orchid hunting. Without his efforts the discovery of many orchid species in central Taiwan was impossible.

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臺灣新發現的野生蘭（VI）

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(收稿日期：2013年08月27日；接受日期：2013年11月06日)

摘要：本文介紹6種臺灣新發現的野生蘭（斷尾捲瓣蘭、張氏捲瓣蘭、杉林溪捲瓣蘭、三伯脈葉蘭、圓唇莪白蘭、斑紋鳥嘴蓮）。

關鍵詞：豆蘭屬、脈葉蘭屬、野生蘭、莪白蘭屬、斑葉蘭蘭屬、臺灣。

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