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Two New *Bulbophyllum* (Orchidaceae) Species in Taiwan: *B. brevipedunculatum* and *B. ciliisepalum*

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ABSTRACT: *Bulbophyllum* (Orchidaceae) is the largest orchid genus in Taiwan. It is taxonomically problematic due to difficulty of field collection and morphological similarities between some species. In this study, we recognized two new *Bulbophyllum* species, *B. brevipedunculatum* and *B. ciliisepalum*, from eastern and central Taiwan. Descriptions, illustrations, and comparisons among related species were also presented.

KEY WORDS: New species, *Bulbophyllum brevipedunculatum*, *Bulbophyllum ciliisepalum*, Orchidaceae, Taiwan.

INTRODUCTION

Bulbophyllum is the largest genus of Orchidaceae. With more than 1800 species pantropically distributed, it is also one of the largest genera within vascular plants. The great amount of species and their variety makes systematic study difficult. More than 100 subgenera and sections have been offered in this genus, which still lacks a general review.

Bulbophyllum is also the largest genus of Orchidaceae in Taiwan. At least 24 species and 1 variety had been recognized until 2007 (Su, 2000; Boufford et al., 2003; Lin and Huang, 2005; Chung and Hsu, 2006; Lin et al., 2006). All the species in Taiwan are epiphytic, with some of them growing mainly on canopies of primitive forests and thus difficult to be found. In addition, vegetative parts generally lack diagnostic characters and some species can be identified only through floral morphology. Therefore, many *Bulbophyllum* species in Taiwan were rarely collected and may not have been described properly.

In our recent botanical survey, several *Bulbophyllum* species were found in the forests of mid-altitude mountainous region. Some of them differ from all the species that were previously described in Taiwan. After careful examination, literature consulting and comparisons with herbarium specimens, we are convinced that there are two new taxa in Taiwan, which are described and illustrated here.

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TAXONOMIC TREATMENTS

Bulbophyllum brevipedunculatum T.-C. Hsu & S.-W. Chung, *sp. nov*. —TYPE: TAIWAN. Ilan County, Tatung Hsiang, Taipingshan Forest Recreation Area, ca. 1800 m, 18 Apr 2007, *Hsu & Chung 766* (holotype, TAIF; isotype, TAI), here designated. 短梗豆蘭 Figs. 1, 2A-C & 3

Species *B. albociliatum* (Liu & Su) Nakejima affinis, sed scapus brevis, 5-7 mm longa, et sepalum brevis, 5-6 mm longa differens.

Epiphytic perennial herb. Rhizomes creeping, slender, 0.6-0.8 mm in diam. Pseudobulbs 1-2 cm apart, elongate ovoid, often oblique, 7-10 mm long, 3-5 mm wide. Leaves sessile, oblong to linear-oblong, 1-7 cm long, 0.7-0.8 cm wide, apex obtuse to retuse, base cuneate. Peduncles short, arise from base of pseudobulb, 5-7 mm long, enclosed by 3 sheaths in the lower part; sheath brownish, tubular or cup-shaped, 1.5-2 mm long; bracts elongate triangular, 3 mm long, ca. 1.5 mm wide at base. Flowers (1-)2-3, in condensed raceme, ca. 3 mm long; dorsal sepal reddish, strongly concave, elliptic, ca. 3.5 mm long, 2 mm wide, rounded at apex, truncate at base, short white ciliate; lateral sepals red to reddish yellow, near rectangular when expanded, 5-7 mm long, 2-3 mm wide, incurved, apex mucronate, slightly concave, upper margin connate at apex or separate; petals rubescent, elliptic, ca. 2

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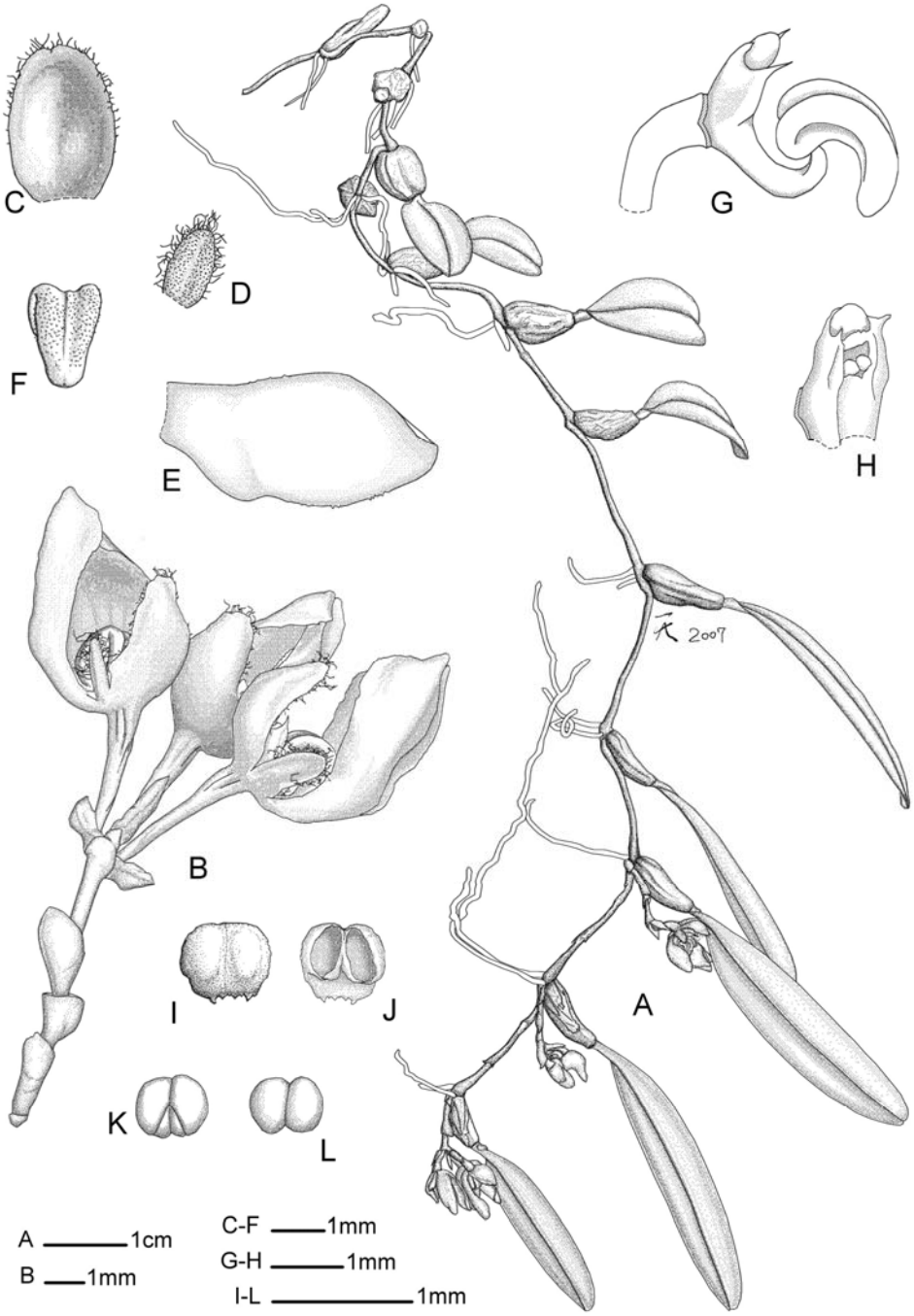


Fig. 1. *Bulbophyllum brevipedunculatum* T.-C. Hsu & S.-W. Chung. A: Habit. B: Inflorescence. C: Dorsal sepal. D: Petal, ventral view. E: Lateral sepal. F: Lip, front view. G: Lip and column, side view. H: Column. I-J: Anther cap, varied views. K-L: Pollinia, varied views.

mm long, 1.2 mm wide, rounded at apex, truncate at base, white ciliate; lip rubescent, horn-like, 2 mm long, recurved; column pale yellow, semiterete, 1.5 mm long, with 2 stylids at apex, base developed into a foot; anther operculate, cordate; pollinia 4, ovoid, in two collateral pairs.

Additional specimens examined: TAIWAN. Ilan County, Tatung Hsiang, Taipingshan Forest Recreation Area, ca. 1800 m, 15 Feb 2005, *Chung & Hsu 10000* (TAIF); Hualien County, Sioulin Hsiang, Tianchangshan, 2000-2100 m, 2 Apr 2006, *Hsu 422* (TAIF).

Distribution: Taiwan (Ilan and Hualien).

Ecology: Epiphyte on low to middle tree trunks in broadleaf evergreen forests at elevation from 1800 to 2100 m.

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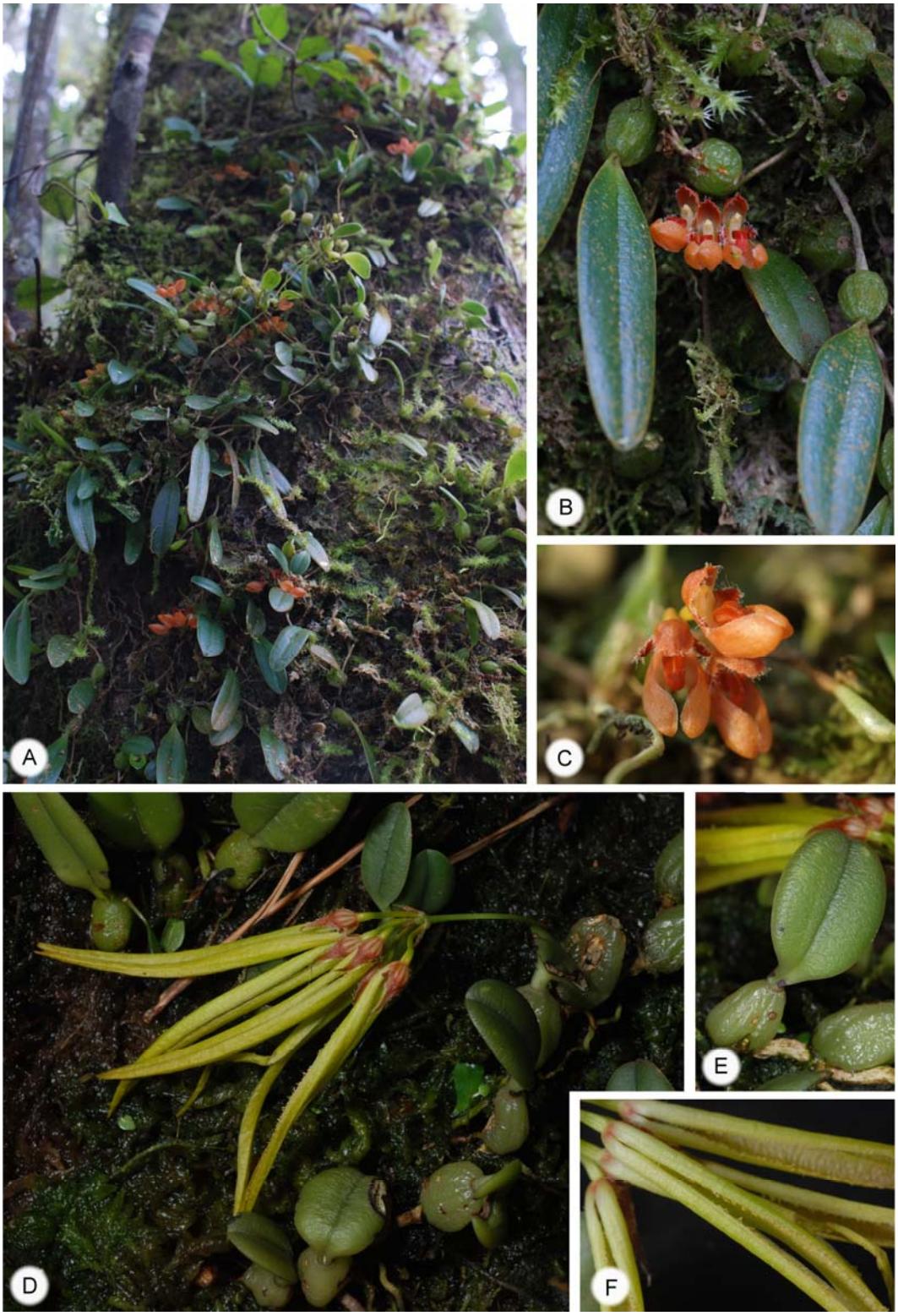


Fig. 2. New *Bulbophyllum* species from Taiwan. A-C: *Bulbophyllum brevipedunculatum* T.-C. Hsu & S.-W. Chung. A: Habitat. B: Habit. C: Flower. D-F: *Bulbophyllum ciliisepalum* T.-C. Hsu & S.-W. Chung. D: Habit. E: Leaf and pseudobulb. F: Flower, ventral view.

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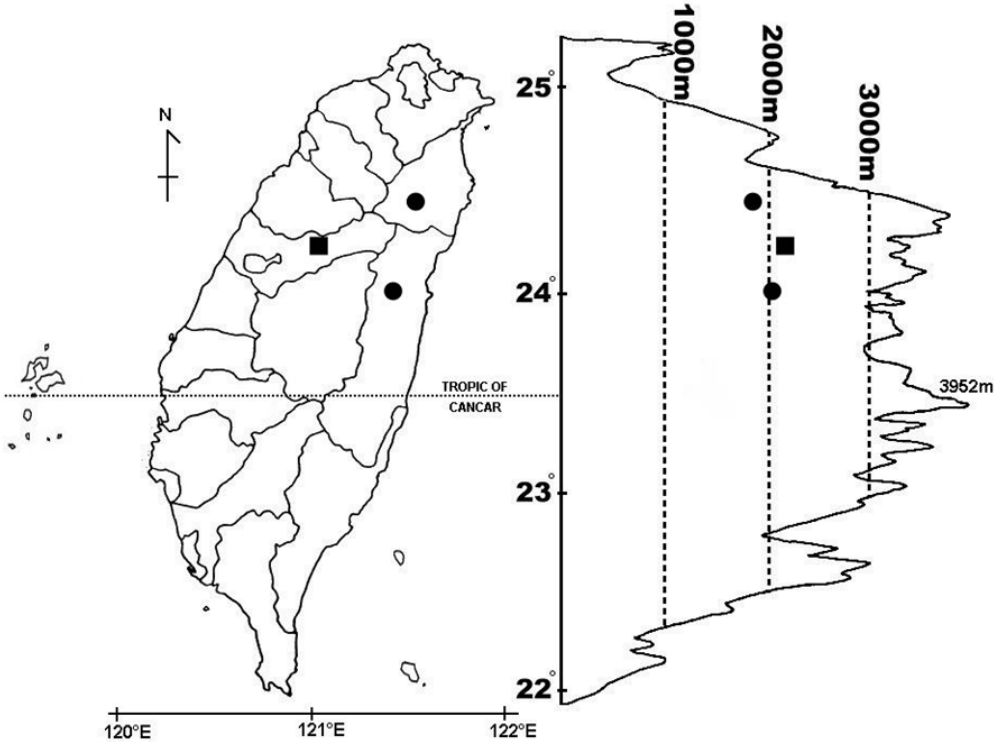


Fig. 3. Distribution of *Bulbophyllum brevipedunculatum* (solid circles "●") and *B. ciliisepalum* (solid square "■") in Taiwan.

Table 1. Characters observed from fresh materials and previous descriptions (Liu and Su, 1971; Lin, 1987; Su, 2000; Lin and Huang, 2005), distinguishing *Bulbophyllum brevipedunculatum* from related taxa.

Name	*B. brevipedunculatum*	*B. albociliatum* var. *albociliatum*	*B. albociliatum* var. *weiminianum*
Pseudobulb	3-5 mm wide	5-7 mm wide	5-7 mm wide
Leaf	1-7 cm long, 7-8 mm wide	2-6 cm long, 8-11 mm wide	3-6 cm long, 8-12 mm wide
Inflorescence	Scape 0.5-0.7cm, 1-3 flowered	Scape 4-6cm, 2-6 flowered	Scape 4-7cm, 3-7 flowered
Lateral sepal	5-7 mm long, connate part less then 2 mm long	8-16 mm long, connate part 4-6 mm long	10-12 mm long, connate part 4-5 mm long
Flowering season	March to April	Late May to early July	Early May to middle June

Phenology: Flowers were mainly observed from March to April in the field; earlier when cultivated at low-altitude places.

Etymology: The specific epithet is derived from its inflorescence character.

Note: This species is noticeable at its dwarf peduncles and short lateral sepals. The connate part of lateral sepals is very short and sometimes separated naturally. Though the plant shape and some floral characters are similar to another endemic species, *Bulbophyllum albociliatum* (Liu & Su) Nakejima and its variety *B. albociliatum* (Liu & Su) Nakejima var. *weiminianum* Lin & Huang, they are different in several points, which are listed in Table 1. In the type locality of *B. brevipedunculatum* we also found some *B. albociliatum* var. *albociliatum* populations growing in the same forest. According to our field investigation during 2005-2007 in Taipingshan area, the two species had different flowering seasons that never overlapped. Flowers of *B. albociliatum* var. *albociliatum* were observed from late May to early July while those of *B. brevipedunculatum* from March to April.

Bulbophyllum ciliisepalum T.-C. Hsu & S.-W. Chung *sp. nov.* ─TYPE: TAIWAN. Taichung County, Hoping Hsiang, Daxueshan Forest Recreation Area, ca. 2100 m, 30 Jun 2007, *Hsu 874* (holotype, TAIF), here designated.

毛緣萼豆蘭 Figs. 2D-F, 3 & 4

Species *B. setaceum* Lin affinis, sed folium brevis, 1-2.5 cm longa, scapus brevis, 2-3 cm longa, et sepalis lateralibus ciliatis differens.

Epiphytic perennial herb. Rhizomes creeping,

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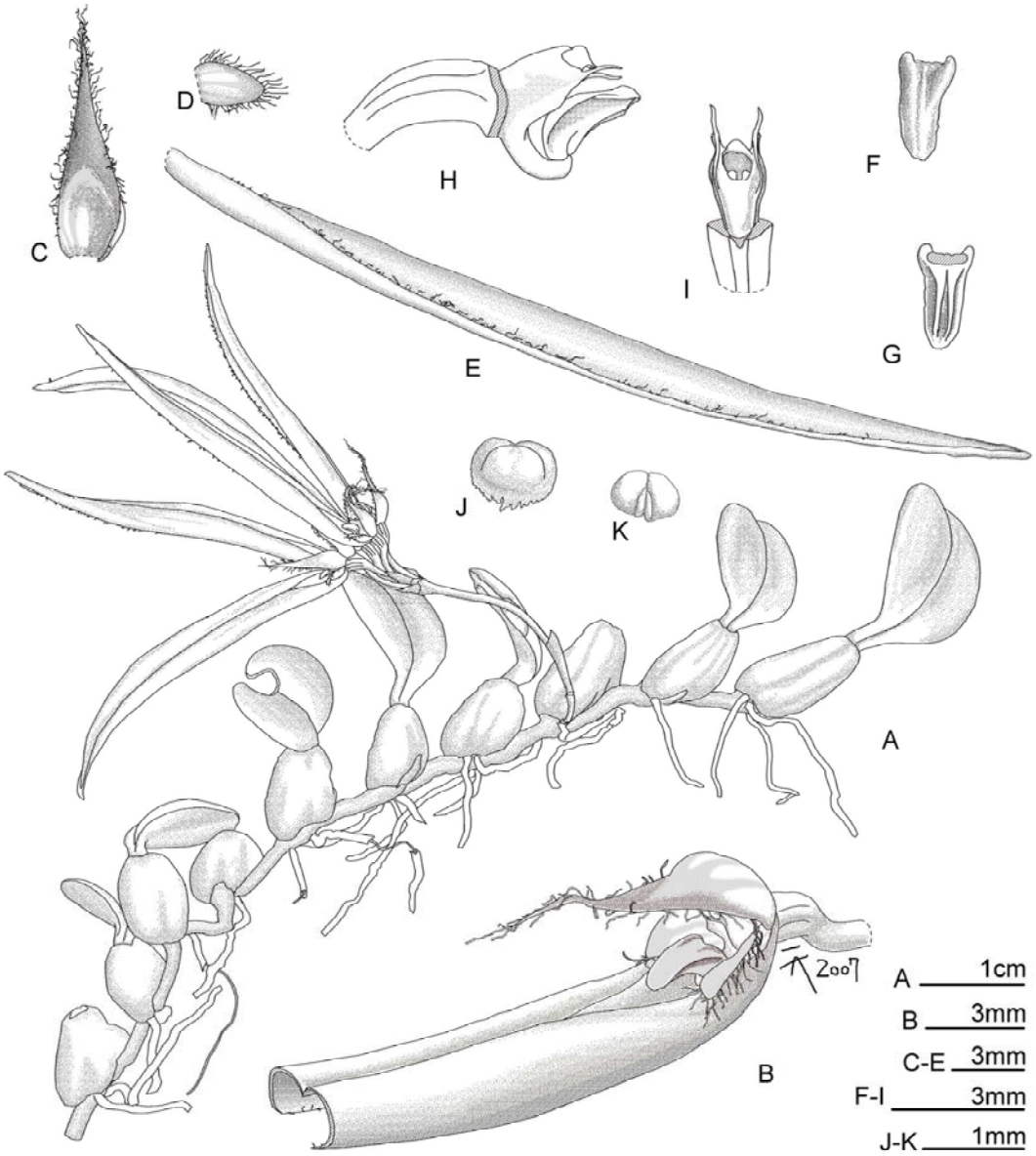


Fig. 4. *Bulbophyllum ciliisepalum* T.-C. Hsu & S.-W. Chung. A: Habit. B: Flower. C: Dorsal sepal, ventral view. D: Petal, ventral view. E: Lateral sepal. F: Lip, dorsal view. G: Lip, ventral view. H: Lip and column, side view. I: Column, ventral view. J: Anther, dorsal view. K: Pollinia.

slender, ca. 1.5 mm in diam. Pseudobulbs 0.5-1.2 cm apart, globoid to ovoid, 7-13 mm long, 7-8 mm wide. Leaves sessile, elliptic to oblong, 1-2.5 cm long, 0.8-1.5 cm wide, apex obtuse, base cuneate, thickly coriaceous. Peduncles arise from base of pseudobulb, 2.5-4 cm long, enclosed by 3 sheaths basally, sheath brownish, tubular or cup-shaped, 1.5-2.5 mm long; bracts lanceolate, 3-4 mm long, ca. 1.5 mm wide at base. Flowers 4-6, in condensed raceme; pedicels and ovary 6-7 mm long; dorsal sepal elongate ovate, 5-nerved, strongly concave from middle to base part, whitish tinged with reddish veins, brownish-red toward apex, 7-8 mm long, 2-3 mm wide, apex acuminate, base contracted, long white ciliate especially toward apex; lateral sepals yellow, often slightly connate except at base and apex part, obliquely linear-lanceolate, 3.5-4 cm long, ca. 2.5 mm wide when expanded, acuminate and incurved toward apex, yellow ciliate on lower margin except at base; petals whitish tinged with reddish veins, obliquely ovate, 3-4 mm long, ca. 2.5 mm wide, rounded at apex, truncate at base, long white ciliate; lip orange-red, horn-like, ca. 3 mm long, recurved; column whitish, semiterete, 2 mm long, with 2

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Table 2. Characters based on previous discriptions (Liu and Su, 1971; Lin, 1975; Su, 1989; Su, 2000; Lin et al., 2006) and diservation of fresh materials, distinguishing *Bulbophyllum ciliisepalum* Hsu & Chung from related species.

Name	*B. ciliisepalum*	*B. setaceum*	*B. pectenveneris*	*B. electrinum*	*B. fimbriperianthium*
Leaf	1-2.5 cm long	2.5-6 cm long	4-6 cm long	2.5-4 cm long	4-8.5 cm long
Inflorescence	Peduncle 2.5-4 cm long; 4-6 flowered	Peduncle 14-25 cm long; 9-16 flowered	Peduncle 7-12 cm long; 4-10 flowered	Peduncle 8-15 cm long; 4-7 flowered	Peduncle 6-8 cm long; 4-8 flowered
Dorsal sepal	Acuminate at apex	Acuminate at apex	Acuminate at apex	Acuminate at apex	Obtuse at apex
Lateral sepal	3.5-4 cm long; acuminate at apex, almost connate	3.5-5 cm long, distinctly long caudate toward apex, connate only at base or from middle to base part	2.5-4 cm long, distinctly long caudate toward apex, free or slightly connate toward base	1.5-2 cm long, acuminate at apex, almost connate	2.3-3.3 cm long, obtuse at apex, almost connate
Marginal cilia of lateral sepal	Distinct on lower margin; absent or sparse on upper margin	Absent or sparse on both margin	Absent on both margin	Distinct on both margin	Distinct on lower margin; absent or sparse on upper margin

slender stylids at apex, base developed into a foot; anther cap pale yellowish, semi-globose, 0.8 mm long, slightly denticulate on lower margin; pollinia 2, each with connate unequal partitions.

Distribution: Taiwan (Taichung).

Ecology: Epiphyte on upper tree trunks of coniferous trees such as *Chamaecyparis* spp., *Tsuga formosana* Hayata and *Pinus morrisonicola* Hayata in mixed evergreen forests at elevation ca. 2000 m. The plants are hardly observed or collected unless the tree trunks they adhere to falling down.

Phenology: Flowers observed from June to July.

Etymology: The specific epithet is derived from the distinctly ciliate sepals of the new species.

Note: The flower shape of this new species is somewhat similar to *Bulbophyllum setaceum* Lin and *B. pectenveneris* (Gagnep.) Seidenf. but differs in shorter leaves and peduncles, lateral sepal acuminate toward apex, and distinctly ciliate along lower margin of lateral sepal. Only two known *Bulbophyllum* species in Taiwan, *B. electrinum* Seidenf. and *B. fimbriperianthium* Lin , Huang & Lin, have distinctly ciliate lateral sepals (Su, 2000; Lin et al., 2006). *B. ciliisepalum* can be distinguished from either species by the combination of peduncle length, sepal shape, and the presentation of marginal cilia. Detailed comparisons between these related species can be found in Table 2.

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臺灣豆蘭屬(蘭科)二新種：短梗豆蘭與毛緣萼豆蘭

許天銓[1]、鐘詩文[2,3]

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摘　　要

豆蘭是臺灣蘭科植物中種類最多的一屬。其採集上的不便與部分種類間相近的型態往往造成分類研究的困難。本研究中我們確認於臺灣東部與中部發現的豆蘭屬(蘭科)兩新種：短梗豆蘭 *Bulbophyllum brevipedunculatum* 與毛緣萼豆蘭 *B. ciliisepalum*，並提供敘述、圖片，以及近似種間的比較。

關鍵詞：新種、短梗豆蘭、毛緣萼豆蘭、蘭科、臺灣。

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