



New addition of *Taeniophyllum* and *Lecanorchis* (Orchidaceae) in Taiwan

Tsan-Piao LIN*

Institute of Plant Biology, National Taiwan University, 1 Roosevelt Rd., Sec. 4, Taipei 106, Taiwan. *Corresponding author's email: tpl@ntu.edu.tw

(Manuscript received 1 August 2024; Accepted 27 August 2024; Online published August 2024)

ABSTRACT: This report presents one new orchid of Taiwan, viz., *Taeniophyllum daxueshanensis* T.P. Lin. *Taeniophyllum taiwanensis* T.P. Lin is a new name for a species misidentified as *T. radiatum*. Also, a new and rare actinomorphic variety of *Lecanorchis purpurea* is presented.

KEY WORDS: *Lecanorchis purpurea* var. *actinomorpha*, *Taeniophyllum daxueshanensis*, *Taeniophyllum taiwanensis*, new species.

INTRODUCTION

According to the POWO (2024) the native range of *Taeniophyllum* Blume is Ghana to Zimbabwe, Australia, and tropical and subtropical Asia to the Pacific. It includes 247 accepted names. In the phylogenetic tree, *Taeniophyllum* is nested in the Epidendroideae subfamily, Vandaeae tribe, and Aeridinae subtribe (Zhang *et al.* 2023). Based on Pridgeon *et al.* (2014), the genus is characterized by: leaf absent or rudimentary or with few basal blades; stem inconspicuous; roots flattened to subterete, chlorophyllous, appressed on tree branches or bark; inflorescence racemose, glabrous or muricate, bearing flowers in succession; flowers distichously arranged, pale-greenish to yellowish-white; the sepals and petals free and spreading or connate at about middle into a perianth tube; lips entire or 3-lobed, rigidly attached to base of column, spurred or saccate; lip disc naked or with a single callus; lip apex provided with a reflexed tooth or bristle-like appendage or not appendaged; column with 2 lobes or arms on opposite sides, foot absent; pollinia 2 or 4, borne on a common stipe and to a viscidium. In East Asia, only a few species of *Taeniophyllum* are known to the world. There are only six species listed in China (Zhou *et al.*, 2016; Li *et al.*, 2021; Li *et al.*, 2023), two species known from Japan (Suetsugu and Hsu, 2023b), and eight species reported from Taiwan (Lin and Zhu, 2024). This is because they are rather insignificant plants, especially in the vegetative stages, and many of them grow high on trunks, such that they may be overlooked by most taxonomists.

Comprehensive surveys of native orchids in Taiwan have been promoted by orchid researchers and hobbyists, and different website platforms were established using Facebook, a social medium and social networking service, such as the “Taiwan Native Orchids Ecological Group”. This and other platforms have been publishing photos taken by hobbyists daily for years. Recently, we found several unknown species of *Taeniophyllum* from websites and from our collections. Many unknown *Taeniophyllum*

are likely waiting for further investigation. At present, the species number of *Taeniophyllum* in Taiwan becomes a moderate epiphytic genus only after *Bulbophyllum*, *Dendrobium*, and *Liparis*. I just reported 2 new species of *Taeniophyllum* (Lin and Zhu 2024) which blossom in the spring, and in this article, one more species with summer flowers is introduced.

TAXONOMIC TREATMENT

Taeniophyllum daxueshanensis T.P. Lin, *sp. nov.*

大雪山蜘蛛蘭 Fig. 1

Type: Taiwan: Taichung Co., Daxueshan, 1945 m, Jun. 26, 2024, S.K. Yu *s.n.* (TAI0289921).

Diagnosis: Among the 8 species of *Taeniophyllum* in Taiwan, *T. daxueshanensis* is uniquely characterized by the extremely short and relatively stout inflorescence usually < 3 mm long carrying 1–3 flowers, longitudinal parallel linear cells with raised cell wall on the root surface, and short root length 1–3 cm long. *T. daxueshanensis* is similar to some extent to *T. aphyllum* but can be distinguished by the oblong root cross-section (vs. rounded cross-section near the stem base), a short stout inflorescence (vs. slender curving inflorescence) and a glabrous peduncle and rachis (vs. glabrous to dense papillate).

Description: Aphyllous and stem-reduced epiphyte. **Roots** thick, flattened, elliptic to oblong in cross-section (Fig. 1E), adpressed onto trunk surface, forming small clumps with 6 or more roots, surface with parallel observable lines because raised longitudinal cell wall (Fig. 1D), usually 1–2 cm long (Fig. 1A), up to 3 cm long, 1.5–2 mm across, dark-green. **Inflorescences** to 4 mm long; peduncle stout, glabrous (Fig. 1F), with no bracts; rachis sessile or very short, carrying 1–3 flowers, always carrying an underdeveloped flower bud (Fig. 1F). Ovary and pedicel 2.3–3.2 mm long. Floral bracts ca. 0.7 mm long, acute. **Flowers** light green, facing upwards (Fig. 1A, C), 3.4–4.5 mm long including spur (Fig. 1F, H, I) and 2.8–3.2 mm across when open (Fig. 1G); sepals and petals

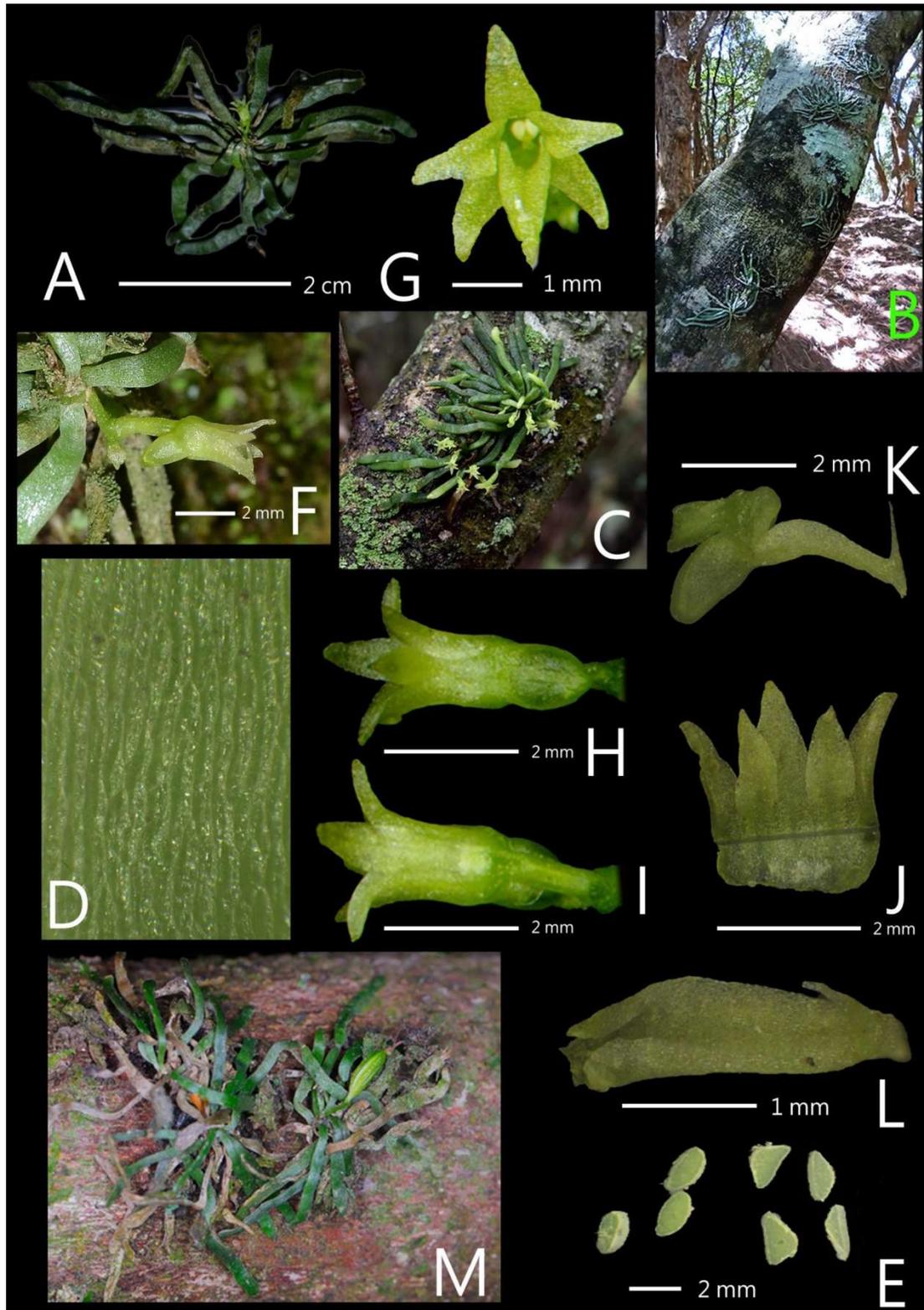


Fig. 1. *Taeniophyllum daxueshanensis* T.P. Lin. **A.** Flowering plant. **B & C.** Habitat of the patch of *T. daxueshanensis*. **D.** Parallel longitudinal cells on the root surface. **E.** Cross-section of root. The left section is close to the stem base, and the right distal part of the root. **F.** Short inflorescence with a single flower, and the root system. The parallel longitudinal cells on the surface are visible. **G.** Frontal view of a flower. **H.** Ventral view of a flower. **I.** Dorsal view of flower. **J.** Spread out of the perianth tube. **K.** Side view of column and lip including spur. **L.** Upper/oblique view of a lip. **M.** *T. daxueshanensis* with capsule. A, taken by C.H. Liu. B, taken by K.C. Yueh. C, taken by Hsin-Yuan Tseng. D, E, taken by K.H. Wang. F, taken by S.K. Yu. G, H, I, taken by Y.I. Lee. M, taken by Y.H. Liao.



connate at base into a tube ca. 40–50% of length of perianth tube (Fig. 1J); perianth 3.1–3.4 mm long; free part of sepals ovate-triangular, ca. 2 × 1 mm, obtuse; free part of petals wide-triangular, ca. 1.5–1.7 × 0.9 mm, apex acute. **Lip** blade oblong or elongate-triangular (Fig. 1L), but ovate-triangular when stretched out, ca. 2.0–2.5 × 0.6–0.7 mm, with incurved lobes at base, apex acute with a whitish inflexed process ca. 1 mm long, no visible septum on lip disc; spur conical to oblong, ca. 1.2–1.7 mm long (Fig. 1F, H, K), elliptic when viewed from below, bend down at least 45° from flower axis. **Column** domed, with 2 arms facing forward, apex of arm rounded. Anther-cap with 2 prominent humps with rounded apex. Pollinia 4 in 2 pairs, curved ovate, yellow, attached to wide & white stipe, with viscidium. **Capsules** slightly curved, elliptic to oblongoid (Fig. 1M), 8 × 2.1 mm, usually one per plant, glabrous.

Flowering time: June–July.

Distribution: Endemic. Taiwan: It grows on tree trunks about 1–3 m above the ground in forests of Hsinchu Co., Miaoli Co., Nantou Co., and Taichung Co. at elevations of 1200–1950 m. Not being intermingled together, *Taeniophyllum daxueshanensis* tends to be growing independently with some distances between them (Fig. 1B, C).

Etymology: The specific epithet “daxueshanensis” refers to the locality where this species was first found.

Notes: *Taeniophyllum daxueshanensis* was found in many localities in central Taiwan by orchid hobbyists. Under low magnification, the root surface is covered with parallel linear cells with tapering ends (Fig. 1D) which differ from the checker-like cells of *T. complanatum* and *T. tumulusum*. Also, it differs from the *T. lishanianum* (Lin and Zhu, 2024) by raised longitudinal cell wall vs. the sunken cell wall of the latter. *T. daxueshanensis* is a species of this genus in Taiwan that can grow in the temperate region in addition to *T. aphyllum* (Suetsugu and Hsu, 2023a) and *T. lishanensis*. Based on the plants collected from the Daxueshan and Kuanwu, the life span of flower is at least 5 days. Interestingly, the root systems' appearance from round to flattened can vary with the water availability in the environment. Thus, description of species should always follow the plant in its native status but not under cultivated conditions.

Other specimen examined: Taiwan: Hsinchu Co., Dahunshan, 1400m, Jul. 25, 2024, S.K. Yu s.n. (TAI0289920).

***Taeniophyllum taiwanensis* T.P. Lin, sp. nov.**

大烏根蜘蛛蘭 Fig. 2

Taeniophyllum radiatum auct. non J.J. Sm.: W.M. Lin in Wild Orch.

Taiwan, Ill. Guide 812 & photo. 2014.

Taeniophyllum sp. T.C. Hsu, Ill. Fl. Taiwan 2: 197 ph. 2016.

Type: Taiwan: Taoyuan Co., Fuxin Township, Xiayunping, 300–400 m, Jul. 26, 2024, T.P. Lin s.n. (TAI289922).

Diagnosis: *T. taiwanensis* is uniquely characterized by a wider, smooth and flattened root system, a filiform long peduncle, and a short loose rachis carrying 3–4 flowers. *T. taiwanensis* is similar to *T. crassipes* in having a long inflorescence but can be distinguished by a wider root width, 2–4 mm wide (vs. narrow root width, 1.5–2.5 mm wide), a flattened and smooth root (vs. thick and longitudinal grooved), and a short rachis with loose internodes (vs. a long rachis with dense internodes).

Description: Aphyllous and stem-reduced epiphyte. **Roots** well-developed, highly flattened (Fig. 2A, B), oblong in cross-section, flexuous, dark green, 5–10 cm long, 2–4 mm wide (Fig. 2D). **Inflorescences** straight or curving, green, 2.5–5 cm long, filiform; rachis bearing 2–4 loosely arranged flowers (Fig. 2A, B, C), blossom in succession; peduncle and rachis covered with mini-papillae. Floral bracts ovate-triangular, cymbiform, to 1 mm long. Pedicel and ovary ca. 1.5–2.5 mm long. **Flowers** light green, not widely opening to spreading, 4.5–5.2 mm long (Fig. 1F, G), 2.5–4.5 mm across (Fig. 1E); tepals 3–3.7 mm long, joined ca. 1/3 of their length into a tube (Fig. 2H); free parts of sepals spreading, elongate-triangular, 2.2–2.8 cm long, acute; free part of petals elongate-triangular, shorter than sepals, 1.7–2.2 mm, acute. **Lip** elongate-triangular (Fig. 2I), 3.7–4.5 mm long, including spur about 1 mm long (Fig. 1J), faintly 3-lobed; side-lobe erect; midlobe elongate-triangular, acuminate, at apex with an inflexed process, basally with a short rounded spur; disc with 2 septa; basal one located between lip and spur; middle one near base of lip, with a deep sinus (Fig. 2I). **Column** round in outline, with 2 arms on front. Anther-cap bilobed, with another 2 round appendages, lobes round; pollinia 4, subovate, yellow, two larger and 2 smaller, in 2 pairs, attached to a narrow stipe, then connected to a narrow viscidium (Fig. 2K). Capsules oblongoid or terete, 1 cm long, 4 mm in diameter (Fig. 2L, M).

Flowering time: July–Oct.

Distribution: Endemic. Taiwan: from Yilan Co. of northern Taiwan extending southwards to Pingtung Co. of southern Taiwan. *Taeniophyllum taiwanensis* grows on small branch or trunk of tree 1 to 3 m above the ground preferring in humid forests along the creek bank at elevations of 300–700 m.

Etymology: The specific epithet “taiwanensis” refers to this species that is endemic to Taiwan.

Note: *Taeniophyllum taiwanensis* is similar to *T. radiata* J.J. Smith of Java in appearance and can be distinguished by only a few flowers loosely arranged on the rachis in contrast to the long-zigzagged rachis carrying many dense distichous flowers of the latter (Smith, 1918). Based on the plants collected from the Xiayunping, the life span of flower is at least 3 days.

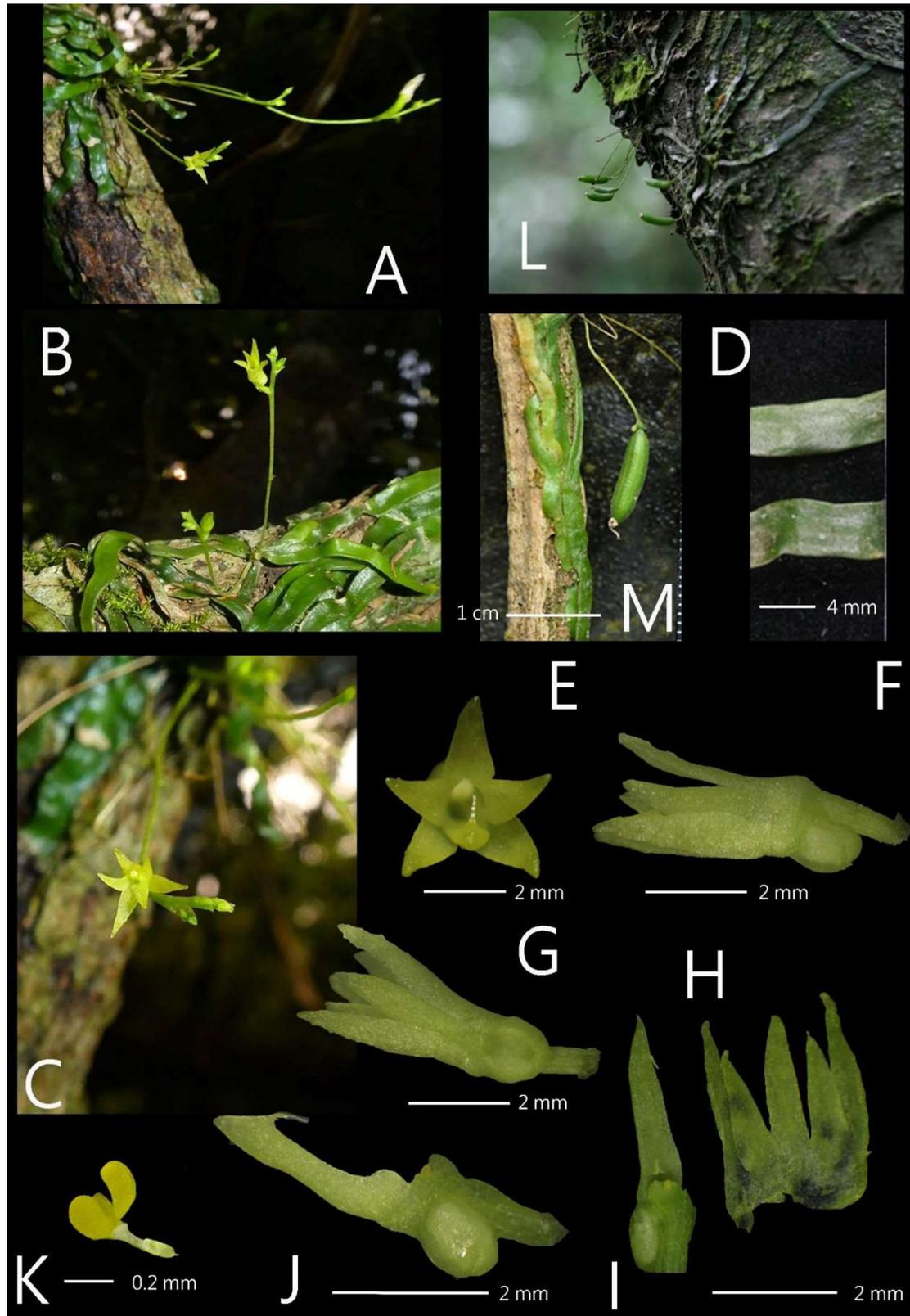


Fig. 2. *Taeniophyllum taiwanensis* T.P. Lin. **A, B & C.** Flowering plants. **D.** Enlargement of the flattened roots. **E.** Frontal view of flower. **F.** Side view of flower. **G.** Bottom view of flower. **H.** Spread out of perianth tube. **I.** Upper view of a column and lip including the spur. **H & I** share the same scale. **J.** Side view of column and lip including the spur. **K.** Pollinia with stipe and viscidium. **A, B, C, L,** taken by D.M. Huang. **M,** taken by G.X. Zhu.



Fig. 3. *Lecanorchis purpurea* var. *actinomorpha* T.P. Lin. Right panel, flowering plant (taken by H.C. Tsai). Left panel, dissected flower (taken by K.H. Wang). The triangle indicates the lip.

Key to *Taeniophyllum* species of Taiwan (only apply to native not cultivated conditions)

1. Leafy plant; floral bract large, longer than pedicellate ovary *T. compactum*
1. Leafless plant; floral bract small, shorter than pedicellate ovary 2
2. Root rounded, hemispheric or thick in cross-section, ≤ 1.5 mm wide 3
2. Root flattened, 1–4 mm broad 6
3. Fruit ellipsoid *T. aphyllum*
3. Fruit terete 4
4. Rachis loose; root polygonal in cross-section; inflorescence 1.2–3.7 cm long *T. crassipes*
4. Rachis dense, root rounded or hemispheric in cross-section; inflorescence ≤ 1.5 cm long 5
5. Capsules terete, straight or curved facing away from the rachis; free part of upper sepal elongate ovate *T. chitouensis*
5. Capsules terete, curved towards rachis axis; free part of upper sepal ovate *T. lishanianum*
6. Root 3–4 mm wide; inflorescence 3–5 cm long; free part of upper sepal triangular-lanceolate *T. taiwanensis*
6. Root < 2.5 mm wide; inflorescence < 3 cm long; free part of upper sepal ovate to elongate triangular 7
7. Root usually ≤ 2 cm long, 1.5–2 mm across, surface marked with parallel visible lines *T. daxueshanensis*
7. Root 3–9 cm long, 1–3 mm wide, surface not marked with parallel visible lines 8
8. Root ≤ 1.5 mm wide, flattened, surface smooth, forming a mound near stem base; free part of upper sepal elongate triangular *T. tumulusum*
8. Root 2–3 mm wide, rugous or longitudinal grooved, not forming a mound near stem base; free part of upper sepal ovate ... *T. complanatum*

***Lecanorchis purpurea* var. *actinomorpha* T.P. Lin, var. nov.** 輻射糙莖皿柱蘭 Fig. 3

Type: Taiwan: Taoyuan Co., Fuxin Township, Balung, Lalashan, c. 1400 m, Jul. 14, 2024, H.C. Tsai s.n. (TAI289923).

Diagnosis: *Lecanorchis purpurea* var. *actinomorpha* is uniquely characterized by a petalized lip, otherwise identical to *L. purpurea*.

Note: The record of *Lecanorchis trachycaula* Ohwi, a synonym of *L. purpurea*, in Taiwan (Suetsugu *et al.*,

2018), was made by Hsu and Chung (2010). The lip-petalized plants consist of about 10 individuals and were found at Lalashan on Jun. 24, 2023 by Mei-Shao Yeh, and again on Jul. 14, 2024. The life span of flower is only half a day just identical to a normal plant. The measurements of plant and inflorescence agree well with those reported by Hsu and Chung (2010) and Lin (2019).

ACKNOWLEDGMENTS

The author is deeply indebted to Sheng-Kun Yu for the materials of *Taeniophyllum daxueshanensis*, Ching-Hwang Liu for the *T. taiwanensis*, Hsi-Chi Tsai for the *Lecanorchis purpurea* var. *actinomorpha* and Yu-Xuan Li for the edited images with photoshop. I am also grateful for the photos provided by Sheng-Kun Yu, Ching-Hwang Liu, Kuo-Hsiung Wang, Kuo-Chu Yueh, Da-Ming Huang, Yu-Huei Liao, Hsi-Chi Tsai, Yubg-I Lee, Geng-Xi Zhu, Hsin-Yuan Tseng and Mei-Shao Yeh.

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