



Newly discovered native orchids of Taiwan (XI)

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ABSTRACT: This report presents three new orchids of Taiwan, i.e., *Epipogium meridianus* T.P. Lin, *Liparis monoceros* T.P. Lin, and *Nervilia septemtrionarius* T.P. Lin. *Epipogium meridianus* could be a hybrid between *E. roseum* and *E. kentingensis*.

KEY WORDS: *Epipogium meridianus*, hybrid, *Liparis monoceros*, *Nervilia septemtrionarius*, Orchidaceae, Taiwan.

INTRODUCTION

The present paper is a continuation of efforts to update the orchid flora of Taiwan. A complete list of native orchids and their type information of Taiwan were recently published (Lin *et al.*, 2016). However, the emergence of newly discovered orchids from different locations continues due to ongoing orchid hunting activities. A recent field trip resulted in the discovery of three new orchids in Taiwan. All materials are kept in the herbarium of National Taiwan University (TAI), Taipei, Taiwan

TAXONOMIC TREATMENTS

Epipogium meridianus T.P. Lin, *sp. nov.*

間型上鬚蘭 Figs. 1C, D, 2A, B & 3

Typus: Taiwan: Pingtung Co., Tahan Mt. 1050 m, Mar. 24, 2012, *Shih-Hsien Lin s.n.* (holo TAI281145). Other specimen: Taiwan: Nantou Co., Hsinyi, 1000 m, Apr. 11, 2018. *Po-Neng Shen s.n.* (TAI287419).

Epipogium meridianus is potentially a hybrid between *E. roseum* and *E. kentingensis* because it has features similar to either *E. roseum* or *E. kentingensis*. Comparisons of the features are displayed in Table 1.

The uniqueness of *E. kentingensis* is the relatively long column, the stigmatic surface located at the basal part at a distance to the anther, and a well-developed rostellum that favors outcrossing (Lin and Wu, 2012; see Fig. 1). However, *E. meridianus* and *E. roseum* are characterized by a relatively short column, approximate arrangement between the anther and stigmatic surface, and no visible rostellum existing (Fig. 1); these features favor autogamous. Although neither *E. meridianus* nor *E. roseum* has a rostellum, their columns are not the same. In *E. roseum*, the anther is attached to the column through a short, narrow band, and the anther with slight movement can fall into the space, thus causing contact

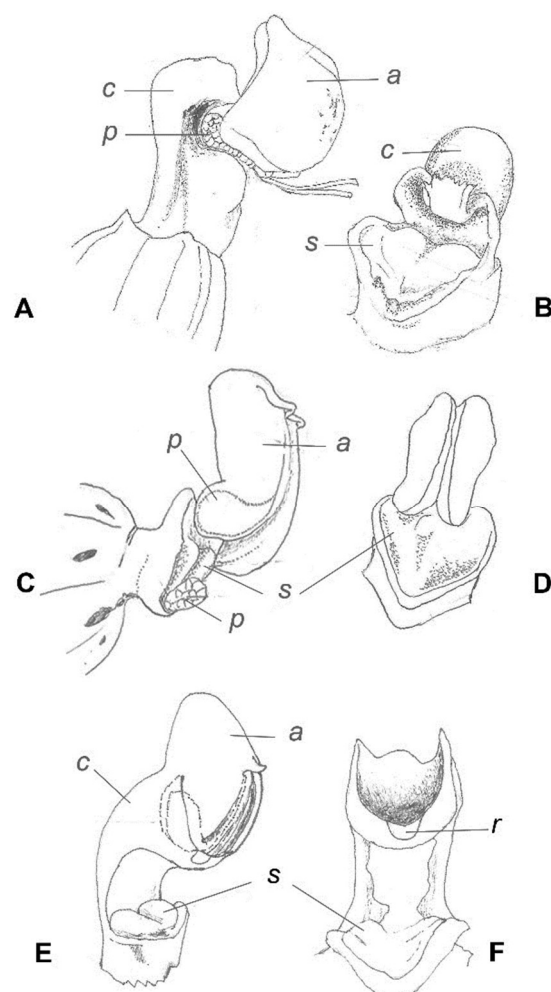
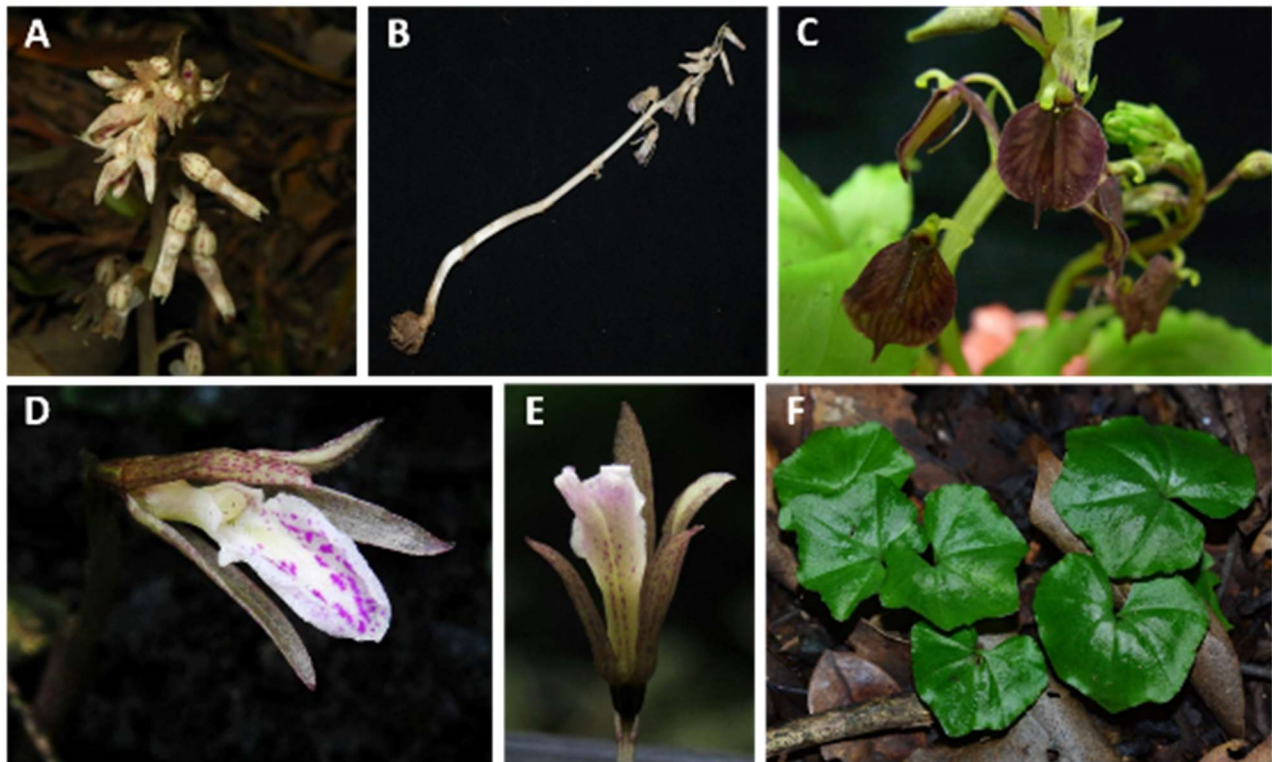


Fig. 1. Column structure of *Epipogium roseum*, *E. meridianus* and *E. kentingensis*. **A** and **B**, *Epipogium roseum*, **A**, side view of column with anther attached; **B**, frontal view of column with anther removed. **C** and **D**, *E. meridianus*, **C**, side view of column with anther attached; **D**, frontal view of column with anther attached. **E** and **F**, *E. kentingensis*, **E**, side view of column with anther attached; **F**, frontal view of column with anther removed. a, anther; c, column; p, pollinia; r, rostellum; s, stigma.

**Table 1.** Features that can be differentiated in *Epipogium meridianus* from either *E. roseum* or *E. kentingensis*.

<i>E. meridianus</i>	<i>E. roseum</i>	<i>E. kentingensis</i>
Flowering plant 15–30 cm tall	Usually large plant up to 50 cm	Small plant usually <15 cm
Few to many flowers	Densely many-flowered	10 flowers or fewer
Lip straight down	Lip straight down	Lip reflexed
Flower not opening widely	Flower not opening widely	Flower spreading
Purple markings everywhere	Light or no purple marking	Purple markings everywhere
Flower pendulous or perpendicular to scape	Flower usually pendulous	Flower perpendicular to scape
Column relatively short	Column short	Column long, curved
Flowers in late March–April	Flowers in late April–May	Flowers in late March–April
Rostellum absent	Rostellum absent	Rostellum well-developed

**Fig. 2.** *Epipogium meridianus*, *Liparis monoceros*, and *Nervilia septemtrionarius* in their native habitats. **A** and **B**: Inflorescence and plant of *Epipogium meridianus*. **C**: Flowering plant of *Liparis monoceros*. **D**, **E**, and **F**: Flower and leaves of *Nervilia septemtrionarius*. (**A** and **B** taken by Shyh-Shiarn Lin; **D** and **E** taken by Yi-Fu Wang; **F** taken by Fang-Mei Hsieh and Ching-Hwang Liu).

between the pollinia and stigma. In *E. meridianus*, the anther is connected to the column through a long, narrow strap, and the anther needs to move a longer distance to touch the more or less vertical stigmatic surface.

Epipogium kentingensis is restricted to the Hengchun Peninsula, southern Taiwan. Recently it was also reported from Jianshi Township, Hsinchu Co. (website information), and Hsinyi, Nantou Co. at 1000 m (*Po-Neng Shen s.n.* Apr. 17, 2018, TAI287418). *Epipogium meridianus* also grows in a zone not restricted to the Hengchun Peninsula. *Epipogium roseum* is widely distributed in Asian countries. In fact, from the internet, *E. kentingensis* and its hybrids are widely distributed in several Asian countries, but all are entitled *E. roseum*. This will become clear if the column morphology is examined.

Here I give a tentative description of *E. meridianus*.

Mycoheterotrophic orchid. Flowering plants 15–30 cm tall. **Tuberoïds** embedded only shallowly in topsoil, consisting of many closely packed internodes, ellipsoid, more or less compressed, ca. 1.5 cm long, dull brownish-yellow. **Inflorescence** nodding until flowers mature when it becomes erect, whitish with purple spots; peduncle with 3 or 4 remote sheath-bracts; rachis bearing 3–20 flowers. Flower bracts ovate, 6–7 × 5 mm. Pedicel ca. 5.5 mm and ovary ca. 4.5 mm long. **Flowers** usu. nodding, pale-yellow with purple markings, not widely spreading; sepals linear, or elliptic-lanceolate, 1.2 × 1.3–2 mm, obtuse; petal also linear, 1.2 × 2.5 mm, acute. **Lip** spurred at base, entire length of lip including spur ca. 1.5 cm; spur oblong, rounded at tip, directed to rear; lip-blade not including spur cordate-ovate, 12–14 × 5 mm, becoming 9 mm wide when spread out, straight, with upcurved side margins; disc with many purple spots or

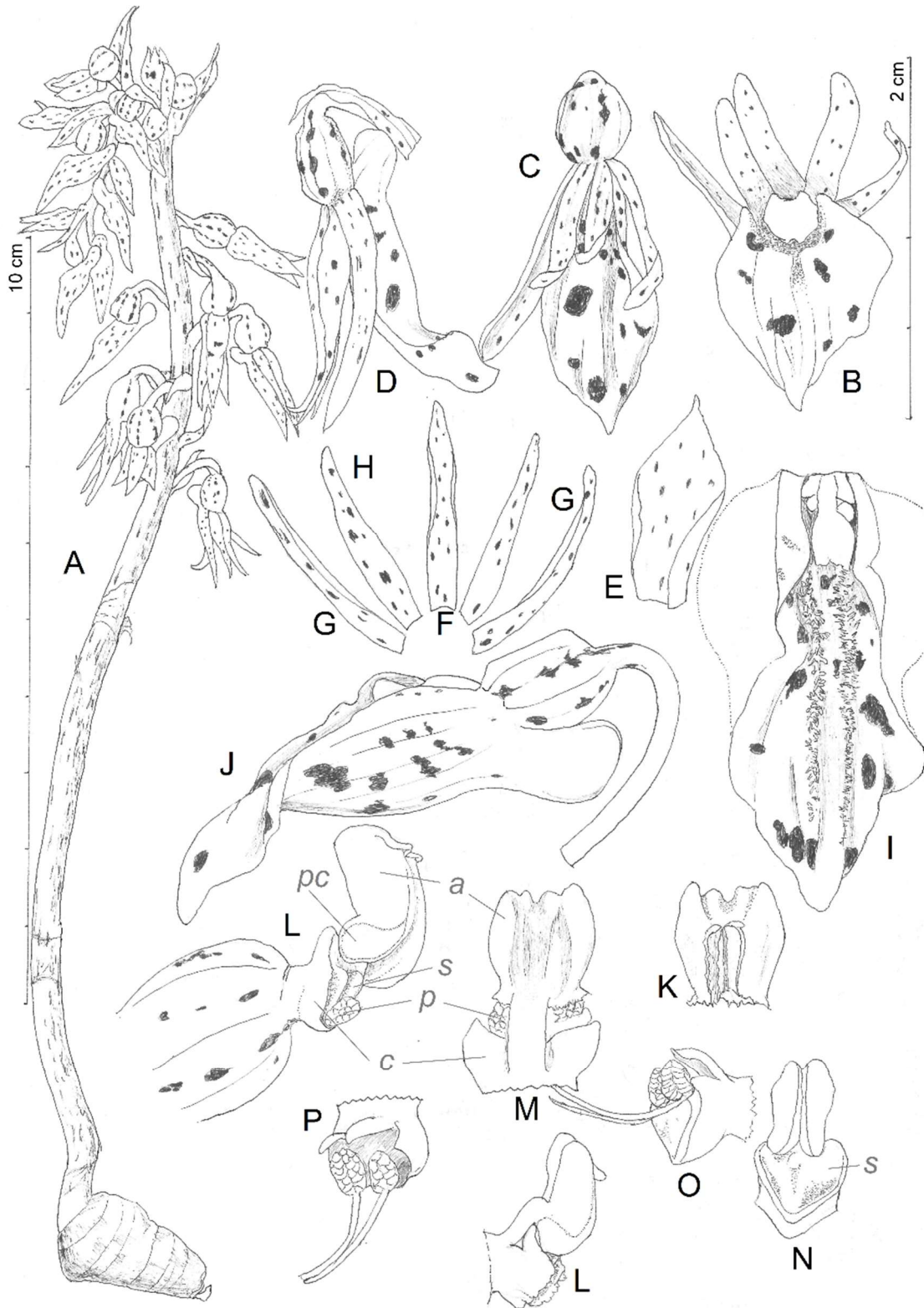


Fig. 3. *Epipogium meridianus* T.P. Lin. **A:** Flowering plant. **B:** Flower, frontal view. **C:** Flower, view from above. **D:** Flower, side view. **E:** Floral bract. **F:** Upper sepal. **G:** Lateral sepals. **H:** Petal. **I:** Lip and column, top view. **J:** Lip and column, side view. **K:** Anther only, frontal view. **L:** Column with anther attached, side view. **M:** Column with anther attached, view from behind. **N:** Column with anther attached, frontal view. **O:** Column with anther cap removed, side view. **P:** Column with anther cap removed, top view. *a*, anther; *b*, clinandrium; *p*, pollinia; *pc*, pollinia chamber in the anther; *r*, rostellum; *s*, stigma.



blotches, papillose, papillae especially dense in 2 linear stripes running entire length. **Column** including anther 4–5 mm long, 2 mm long after removing anther, with purplish blotches. Rostellum absent. **Stigmatic** surface broad, stigma lateral lobes conspicuous. Anther thick and fleshy, firmly attached to column through a strap-like band; pollinia 2, each 2 with sub-equal partitions, powdery, yellowish-white, with long and slender stipe, stipe curved.

Flowering time: Late March to April.

Distribution: Endemic to Taiwan. Taiwan: So far only 2 locations (Tahan Mt. and Nantou Co.) known for *E. × meridianus*. This species grows with low light penetration on the floor of broadleaf forests at elevations of 280–1050 m.

Note: The new specific epithet “meridianus” refers to the southern origin of this new hybrid.

Liparis monoceros T.P. Lin, *sp. nov.*

南投羊耳蘭 Figs. 2C & 4

Typus: Taiwan: Nantou Co., May 7, 2012, 2050 m, *Po-Neng Shen s.n.* (holo TAI281150).

Terrestrial plants, with creeping rhizome. Stem ca. 6.5 cm tall. **Pseudobulbs** arising from rhizome at 4–5-cm intervals, ovoid, strongly compressed, 1.6 × 1.5 cm, enclosed by whitish membranous sheaths, bearing 2 leaves. **Leaves** broadly ovate to orbicular-ovate, 5.4 × 4.4 cm, acute, margin undulate, not articulate, rounded or cordate at base, base narrowing into sheath-like petiole, 4–10 cm long. **Flowering** stem terminal, ca. 13 cm long, greenish, 3-ridged; rachis with 20 or more flowers. Floral bracts lanceolate, erect, shorter than pedicellate ovary. Pedicel and ovary shorter than 5 mm long, green. **Flowers** reddish-purple, ca. 1 cm across, tepals reflexed and curved; upper sepal linear, 9 × 2.5 mm, greenish, purplish-red venations at base, acute, revolute; lateral sepals approximate and hiding behind lip, curved, ovate-lanceolate, 9 × 2.5 mm, greenish, purplish-red venations at base, revolute; petals linear, purplish-red, 9 × 0.5 mm. **Lip** orbicular, reddish-purple, deeper shade of purplish-red along veins, 7–8 mm long and wide, rounded at apex, flat, furnished with a long and sharp point, basal disc with 2 triangular calli. **Column** 2.3 mm long, green, purplish near base, strongly arcuate, compressed, semi-orbicular in cross section, dilated at base; column-wing protruding, well-developed. Rostellum present. Anther cap green, more or less rectangular; pollinia 2, each with 2 partitions, yellow. Capsules ellipsoid, 6–10 × 4–5 mm.

Flowering time: May.

Ecology: Grows on mossy rocks along mountain trails at elevations about 2050 m.

Distribution: Endemic to Taiwan.

Note: The new specific epithet referring the similarity of the pointed labellum to the legendary creature as a beast with a single large, pointed horn

projecting from its forehead. Among the 30 species of *Liparis* in Taiwan, only *L. monoceros* and *L. petiolata* both shows cordate and plicate leaves. *L. petiolata* was wrongly identified as *Liparis auriculata* by Liu & Su (1975). Although *L. petiolata* was listed in our orchid list (Lin *et al.* 2016), the identification of this species in Taiwan is still questionable.

Liparis nepalensis and *L. pulchella* are synonymous of *L. petiolata* based on the Plant List (<http://www.theplantlist.org/>). I checked the type images belonging to these 3 names (listed in Lin *et al.* 2016) including *Liparis petiolata*: Nepal: *N. Wallich 1945* (iso. BM 000088562, E00394087, K001114790 & P00338689), *Liparis pulchella*: India: Khasia, *J.D. Hooker and T.T. 7* (isosyn. GH00243062); India: Khasia, *J.D. Hooker & T. Thomson s.n.* (syn. K000387763, K000387764 & K000943050); India: Naga hills, *D. Prain 58* (syn. K000387765) and *Liparis nepalensis*: *Wallich, N. Cat. no. 1945-690530*; Nepal: Sikkim, *J.D. Hooker* (K000363403, K000363402). Most of them show ovate or elliptic lip with acute apex or pointed tip except GH00243062 (lip broadly ovate with acute tip) and K000387763 (lip ovate-orbicular with acute tip). However, the lips of *L. monoceros* are orbicular with a mucronate apex or ending abruptly in a sharp point. Since only lip morphology of *L. monoceros* shows difference compared with true *L. petiolata*, the status of species of the *L. monoceros* may be subjected readjustment in the future.

Nervilia septemtrionarius T.P. Lin, *sp. nov.*

鋸形脈葉蘭 Figs. 2D–F & 5

Typus: Taiwan: Taoyuan City, Fuxing District, 1100 m, *F.M. Hsieh and C.H. Liu s.n.* leaf plant was collected on Aug. 23, 2017 and cultivated to flower on Mar. 16, 2018 and Apr. 18, 2018 (holo TAI287416).

Flowering plants less than 10 cm tall above corm. Corm globose, 1 × 0.8 cm, white with numerous purple dots. Belowground **stem** ca. 1 cm long, with 2 internodes, covered with wart-like protuberances on surface. **Leaf** green on both surfaces, lustrous, polygonal, ca. 4 × 3.5 cm, with 5–7 main veins, membranous, glabrous, apex acute, basal part approximate or forming an angle of ca. 45°, sinus 1–1.5 cm deep; petiole erect, 4–5 cm long, grayish-brown, with 1 long tubular sheath. **Peduncle** shorter than 8 cm long, pale greenish-brown with purple flecks, with 2 tubular sheath-bracts, 1-flowered; sheath-bracts pale-brownish, 1 cm long, apex acute. Floral bract ovate, 5 × 4 mm, apex acute. Pedicel and ovary pale-brownish with purple flecks, 5–7 mm. **Flower** not opening widely; sepals similar, pale-brownish with purple flecks, oblong-lanceolate, 13–15 × 1.7 mm, acuminate; petals pale-brownish with purple flecks, linear-elliptic, 13–15 × 1.3 mm, acuminate. **Lip** whitish with purplish patches, 11.5–13 × 5.3 mm, spurless, 3-lobed; lateral lobes erect and embracing column,

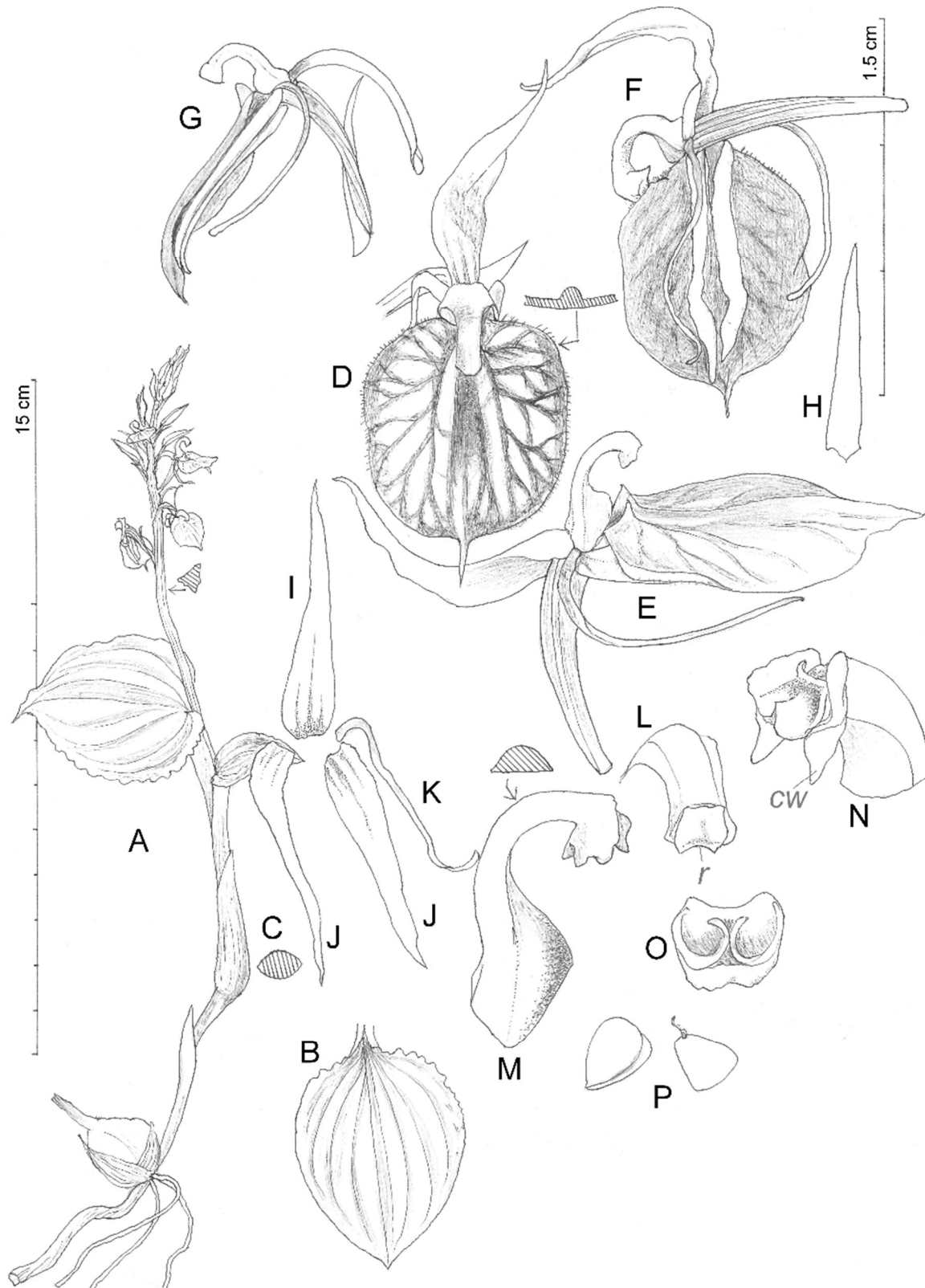


Fig. 4. *Liparis monoceros* T.P. Lin. **A:** Flowering plant. **B:** Leaf. **C:** Pseudobulb, cross section. **D:** Flower, view from above. **E:** Flower, side/oblique view. **F:** Flower, view from behind. **G:** Flower, side view. **H:** Floral bract. **I:** Upper sepal. **J:** Lateral sepal. **K:** Petal. **L:** Column, view from above. **M:** Column, side view. **N:** Column apex, oblique view. **O:** Anther cap, view from below. **P:** Pollinia. cw, column-wing. r, rostellum.

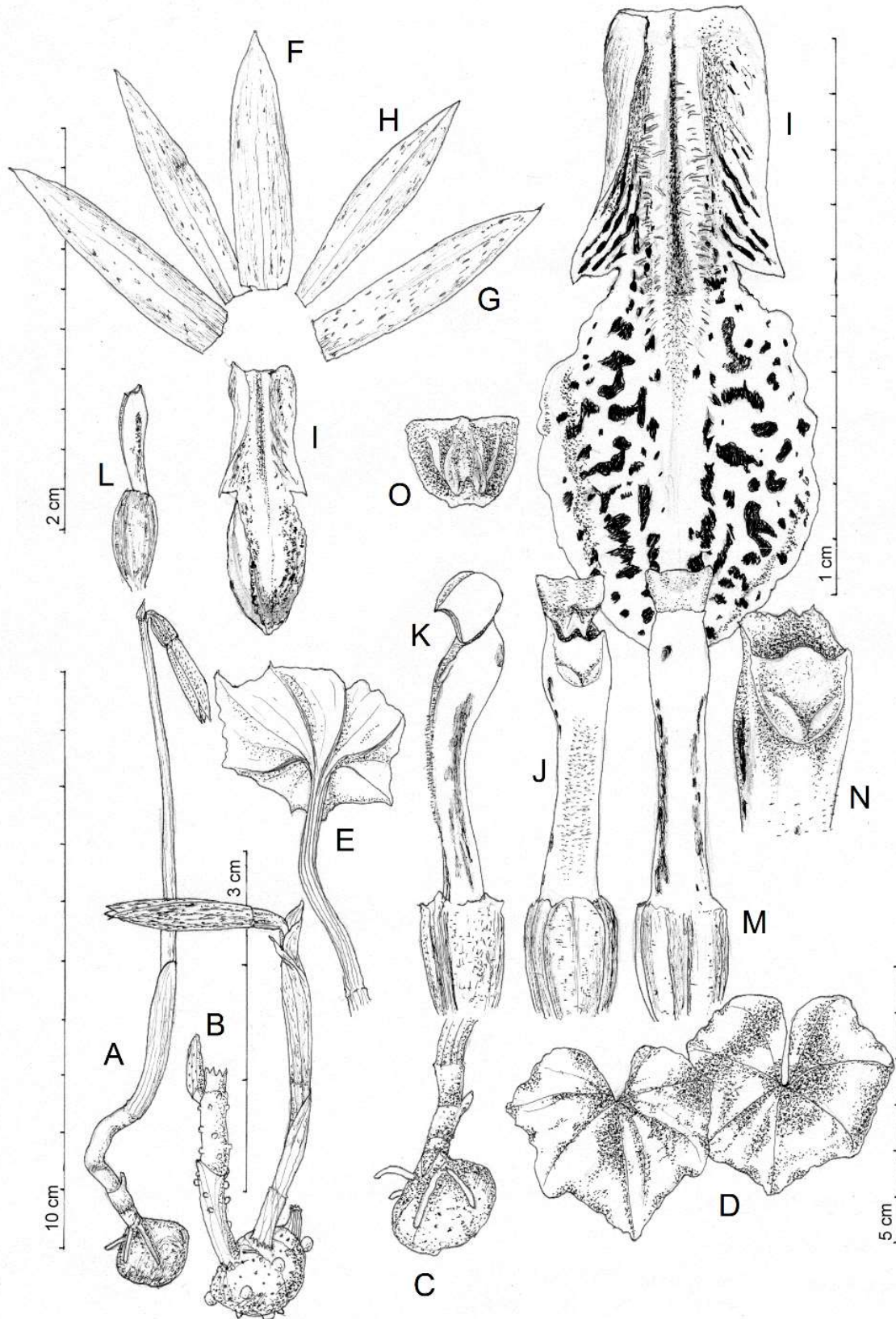


Fig. 5. *Nervilia septemtrionarius* T.P. Lin. **A** and **B**: Flowering plant. **C**: Corm and stem. **D**: Leaves, view from above. **E**: Leaves, view from below. **F**: Upper sepal. **G**: Lateral sepal. **H**: Petal. **I**: Lip. **J**: Column, frontal view. **K**: Column, side view. **L**: Column, side view with anther removed. **M**: Column, view from above. **N**: Column apex to show rostellum. **O**: Anther cap, view from below.

**Table 2.** Differences among *Nervilia septemtrionarius*, *N. lanyuense*, and *N. taiwaniana*.

	<i>N. septemtrionarius</i>	<i>N. lanyuense</i>	<i>N. taiwaniana</i>
Leaf	Green, margin flat	Green, wavy margin	Mixed with different shades of green, margin flat
Flower	Lasts for at least 3 days	Lasts half a day	Lasts for several days
Lip midlobe	Oblong	Orbicular-obovate	Elliptic or obovate
Lip disc	Never ridged	Never ridged	Ridged along midrib
Lip disc	Purple patches irregularly connected	Purple dots	Purple dots
Anther cap	Square	Square	Oblong
Column	Not dilated	Dilated at apex	Dilated at apex

triangular, marked with purple parallel stripes; midlobe dilated from a narrow base, oblong, ca. 7×5.3 mm when folded out, margins entire, slightly undulate, rounded, almost glabrous; disc shallowly grooved along midrib on basal half, with sparsely hirsute, greenish, no visible appendage. **Column** slightly arcuate, white with purple patches along both sides, 6.5 mm long, 1 mm across near base, shortly pubescent on ventral surface. Rostellum hemi-orbicular. **Stigma** U-shaped. Anther-cap rectangular, whitish; pollinia 2, each with 2 partitions, granulose.

Flowering time: May.

Distribution: Endemic to Taiwan. Taiwan: In forests of the Northern Cross-Island Highway at an elevation of about 1100 m.

Note: We have seen fully blossoming flowers under cultivated conditions but not yet in native habitats. In 2017 and 2018, we followed the flowering behavior of *N. septemtrionarius* closely. Unfortunately, we have not seen flowers opening in field conditions. The pollinia were found stuck tightly to the stigmatic surface when we examined the column; this was not because we missed the flowering time which can last for at least 3 days. The only flowering of this plant occurred under cultivated conditions (see Fig. 1). The specific epithet “septemtrionarius” refers to the northern origin of this new species. This is the first species of *Nervilia* found in northern Taiwan. This is rather uncommon because all published species are native to central or southern Taiwan. This species is one member of the *Nervilia taiwaniana* S.S. Ying aggregate (1978) and can be distinguished by the lip without an apparent appendage, and the column without dilation at the apical part, and

with a square anther-cap. For some time, we treated *N. septemtrionarius* as conspecific with *N. taiwaniana* because of the similarities. However, *N. taiwaniana* is characterized by a raised solid ridge along the midrib of the basal disc, and the ridge also extends to the frontal disc. This feature is definitely missing in *N. septemtrionarius* and *N. lanyuense* (Table 2). Intriguingly, *N. taiwaniana* has probably evolved 5 species in Taiwan, indicating adaptability of this species to Taiwan’s environmental conditions. *N. septemtrionarius* is also similar to *N. lanyuense*, a species native to the southern tip of Taiwan. Here, differences among *N. septemtrionarius*, *N. lanyuense* and *N. taiwaniana* are summarized in Table 2.

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