



Parasenecio sylviaensis (Asteraceae, Senecioneae), a long misidentified new species from Taiwan

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ABSTRACT: *Parasenecio sylviaensis* S.W. Chung & T.C. Hsu (Asteraceae, Senecioneae), a new species from Taiwan, is described and illustrated. The new species has long been misidentified as *P. hwangshanicus* (Y. Ling) C. I Peng & S. W. Chung but is indeed distinct in having wingless petioles and capitula with 4–7 florets. It is also similar to *P. petasitoides* (H. Lév.) Y. L. Chen but distinguishable in having much smaller habit, paniculate synflorescence and shorter puberulent phyllaries. *P. sylviaensis* is endemic to Taiwan where it is restricted to the high-altitude *Abies* forests around the Xueshan region.

KEY WORDS: Asteraceae (Compositae), New species, *Parasenecio sylviaensis*, Taiwan, Taxonomy

INTRODUCTION

Parasenecio W. W. Sm. & J. Small (1922), belonging to the tribe Senecioneae, is an Asteraceae genus comprising about 70 species which are mostly distributed in eastern Asia, particularly the Sino-Himalayan region; a few reach eastern Europe and northern America (Ren *et al.*, 2017; Grant, 1993; Czerepanov, 1995). *Parasenecio* is characterized by its caudate or sagittate anther tails, cylindrical filament collars and discoid capitula, $x = 30$. During recent years, a few new species of *Parasenecio* were described (Chen 2011a, 2011b; Xu and Chen, 2016), and Chen *et al.* (2017), based on evidence from morphology, karyology and molecular phylogenetics, proposed a new circumscription of *Parasenecio*, involving transferring *Sinacalia caroli* to *Parasenecio* as *P. caroli* *comb. nov.* and segregating *P. sect. Delphiniifolii* *s.s.* and *P. sect. Taimingasa* as new genera *Japonicalia* *gen. nov.* and *Taimingasa* *gen. nov.*, respectively.

In Taiwan, the genus is represented by three species, i.e., *Parasenecio hwangshanicus* (Y. Ling) C. I Peng & S.W. Chung, *P. morrisonensis* Y. Liu, C. I Peng & Q.E. Yang and *P. nokoensis* (Masam. & Suzuki) C. I Peng & S.W. Chung (Peng and Chung, 1998; Liu *et al.*, 2007). During our recent field and herbaria investigation, we noticed that the identity of *P. hwangshanicus*, which is first recorded by Koyama (1969) and followed in Flora of Taiwan (Peng and Chung, 1998), is somewhat controversial. Based on our examination of types (Fig1. holotype: PE-00029986!; isotype: PE-00846663!) and other collections in PE, *P. hwangshanicus* has narrowly winged petioles and capitulate with 7 or 8 florets as described in the protologue (Ling, 1937) and Flora of China (Chen *et al.*, 2011). However, all specimens previously identified as *P. hwangshanicus* in Taiwan bear wingless petioles and capitula with 4–7 florets.

Hence, the Taiwanese populations actually represent an unknown species distinct from *P. hwangshanicus*. As the morphology of this unknown species could not match any other known *Parasenecio* taxa, it is herein described as a new species *P. sylviaensis*. Furthermore, since no specimens collected from Taiwan could fully match *P. hwangshanicus*, this species should be excluded from the Flora of Taiwan.

Key to the *Parasenecio* species in Taiwan

- 1a. Leaf blade hastate-triangular, puberulent abaxially; leaf axils usually with buds *P. nokoensis*
- 1b. Leaf blade cordate-reniform, arachnoid abaxially; leaf axils without buds 2
- 2a. Phyllaries 2 or 3; florets 1 or 2 *P. morrisonensis*
- 2b. Phyllaries 5; florets 4–7 *P. sylviaensis*

TAXONOMIC TREATMENT

Parasenecio sylviaensis S.W. Chung & T.C. Hsu, *sp. nov.*

雪山蟹甲草 Figs. 2 & 3

Type: TAIWAN. Taichung City (臺中市), Heping District (和平區), Black Forest (黑森林), 3350 m, 19 September 2017, T.C. Hsu 9734 (holotype: TAIF; isotypes: TAI, PE, HAST).

Diagnosis: *Parasenecio sylviaensis* is similar to *P. hwangshanicus*, and *P. petasitoides* but could be distinguished by the combination of several morphological features. *P. sylviaensis* has 20–50 cm tall stems (100–150 cm in *P. petasitoides*), wingless petioles (narrowly winged and wings basally expanded and subamplexicaul in *P. hwangshanicus*), laxly narrowly paniculate synflorescences (spicate-racemose in *P. petasitoides*), capitula with 4–7 florets (5–8 in *P. petasitoides* and 7–8 in *P. hwangshanicus*), and 8–12 mm long, puberulent phyllaries (12–14 mm long, glabrous in *P. petasitoides*). *P. farfarifolius* (Siebold et Zucc.) H. Koyama of Japan is



Fig. 1. A. Holotype of *Parasenecio hwangshanicus* (Y. Ling) C. I. Peng & S. W. Chung. B. Closeup of stem and petioles. C-D Closeup of base of petiole, showing expanded wing.



Table 1. Morphological comparison of *Parasenecio sylviaensis*, *P. petasitoides*, *P. hwangshanicus* and *P. farfarifolius*. Data of *P. petasitoides* and *P. hwangshanicus* were gathered from Flora of China (Chen *et al.*, 2011) and specimens preserved in PE. Data of *P. farfarifolius* were gathered from Flora of Japan (Koyama *et al.*, 1995).

	<i>P. sylviaensis</i>	<i>P. petasitoides</i>	<i>P. hwangshanicus</i>	<i>P. farfarifolius</i>
Habit	30–50 cm tall	100–150 cm tall	25–50 cm tall	50–140 cm tall
Petioles	Wingless	Wingless	Narrowly winged; wings basally expanded and subamplexicaul	Wingless
Leaves	7–12 × 8–14 cm	9–16 × 12–20 cm	6–12(–15) × 8–15 cm	11–15 × 13–21 cm
Leaf axils	Without globose bulbils	Without globose bulbils	Without globose bulbils	With globose bulbils
Synflorescence	Laxly narrowly paniculate	Crowded spiculate-racemose	Laxly narrowly paniculate	Laxly narrowly paniculate
Involucre	8–12 mm, puberulent	12–14 mm, glabrous	ca. 10 mm, puberulent	9–10 mm, puberulent
Number of florets in each capitula	4–7	5–8	7–8	5–6
Geographic distribution	Taiwan	SW China (Guizhou and Sichuan provinces)	SE China (Anhui, Jiangxi and Zhejiang provinces)	Japan

also similar to *P. sylviaensis* but distinguishable in having small globose bulbils in axils. A detailed comparison of the four species is presented in Table 1.

Morphology: Plants perennial, summer-green, 30–60 cm tall. Rhizomes procumbent or ascending, with many fibrous roots, 0.8–1.5 cm in diam. Stem solitary, erect, 15–45 cm tall, slightly striate, simple, sparsely arachnoid, gradually glabrescent. Leaves usually 3–5, remotely arranged, long petiolate (uppermost one shortly petiolate), papery; petioles up to 8 cm, wingless, sparsely puberulous and arachnoid; blades of lower and median leaves cordate-reniform, 7–14 × 8–14 cm, adaxially green, sparsely hirsute, densely hirsute on veins, abaxially pale green, white arachnoid, palmately 5–7-veined, veins slightly impressed adaxially, prominent abaxially, base deeply cordate, margin coarsely undulate-dentate, teeth mucronulate, apex acute to rounded-obtuse; uppermost leaf usually much reduced in size. Synflorescence terminal, laxly narrowly paniculate, 10–25 × 4–10 cm; rachis arachnoid and sparsely puberulous. Capitula laxly arranged, nodding; peduncles ca. 2–9 mm or subsessile, usually with 3 subulate bractlets, arachnoid. Involucre tubular, 8–12 × 2–3 mm; phyllaries 5, in one series, oblong-lanceolate, puberulent, margin scarious, rounded-obtuse and slightly papillate at apex. Florets 4–7, bisexual; corolla yellow, ca. 8 mm long, tube slender, ca. 3 mm long, limb narrowly campanulate, ca. 5 mm long, lobes narrowly triangular, ca. 1 mm long, apex puberulent. Stamens ca. 9 mm long. Anthers exerted from corolla, ca. 3.5 mm long, anther apical appendages narrowly triangular, anther collars typically cylindrical, ca. 0.5 mm long, anther base tails ca. 0.7 mm long. Styles ca. 14 mm long, stylearms excurved, apically truncate, penicillate, papillose. Achenes brown, cylindrical, 3–5 mm long, glabrous, longitudinally ribbed. Pappus of capillary bristles, white, ca. 7 mm long.

Distribution & habitat: *Parasenecio sylviaensis* is known from Xueshan (also known as Syue Mountain, Mt. Hsueh and Mt. Sylvia) and its nearby region. Plants were found on shaded, moist, humus-rich slopes in dense

Abies kawakamii (Hayata) T. Ito forest. Common accompanied ground vegetation includes *Cystopteris moupinensis* Franch., *Dryopteris zayuensis* Ching & S. K. Wu, *Anemone stolonifera* Maxim., *Carex fernaldiana* H. Lév. & Vaniot, *Chaerophyllum involucreatum* (Hayata) K. F. Chung, *Festuca parvigluma* Steud., *Galium chinocarpum* Hayata, *Ribes formosanum* Hayata, *Senecio nemorensis* L. and *Veronica oligosperma* Hayata.

Phenology: Flowers of *Parasenecio sylviaensis* were observed from mid-August to late September, and mature fruits from late September to October.

Etymology: The specific epithet of *Parasenecio sylviaensis* is derived from Mt. Sylvia, former name of Xueshan, the type locality and main habitat of this new species. We select the former name instead of modern name because the other two *Parasenecio* species in Taiwan, *P. morrisonensis* Y. Liu, C. I Peng & Q. E. Yang and *P. nokoensis* (Masam. & Suzuki) C. I Peng & S. W. Chung, are coincidentally named by the former names of type localities (Mt. Morrison, currently known as Yushan, and Mt. Noko, currently known as Nenggaoshan). It is thus more harmonious if the new species is also named in the same way.

Additional specimens examined: TAIWAN. Taichung City: 369 to Mt. Sylvia, 31 August 1973, Huang & Hsieh 7196 (TAI); 369 Shelter to Mt. Hsueh Main Peak, 19 August 2005, Hung *et al.* 459 (TAIF); Black Forest, 15 September 1993, Yang *et al.* 6156 (TAIF); Chika, 31 August 1973, Huang 7087 (TAI); en route from '369 Lodge' to Hsuehshan, 3300 m, 17 June 1985, Peng 7950 (HAST); en route from "369 Lodge" to the cirque of Mt. Hsuehshan, 3200–3550 m, 7 August 1986, Peng 9669 (HAST); en route from 369 lodge to Hsuehshan, 11 July 2006, Lu 12118 (HAST); en route from 369 lodge to Hsuehshan peak, 2 August 1991, Hsu 735 (HAST); Hsueh-shan, 1 Sep 1973, Kuo 3989 (TAI); Hsuehshan Black Forest, ca. 3300 m, 12 September 2002, Huang 1269 (HAST); Mt. Hsueh, 12 September 1986, Lu 20018 (TAIF); Mt. Hsueh, 3100–3200 m, 25 Aug 2005, Chung & Hsu 8772 (TAIF); Mt. Tugitaka, 15 July 1931, Hosokawa 2330 (TAI), Shueshan, 3400 m, September 1994, T. H. Hsieh s.n. (TAI); Shueshan, 23 August 1995, Chen & Hung 1385 (TNM); Smutta, prope Mt. Kotenzan, 15 July 1931, Hosokawa 2259 (TAI). Miaoli County, Hsishihshan Tunnel to Huoshihshan, 18 September 1995, Wang 1734 (HAST, TAIF, TNM); Hsuehshan, 18 July 1977, Jeng 1484 (TAI).

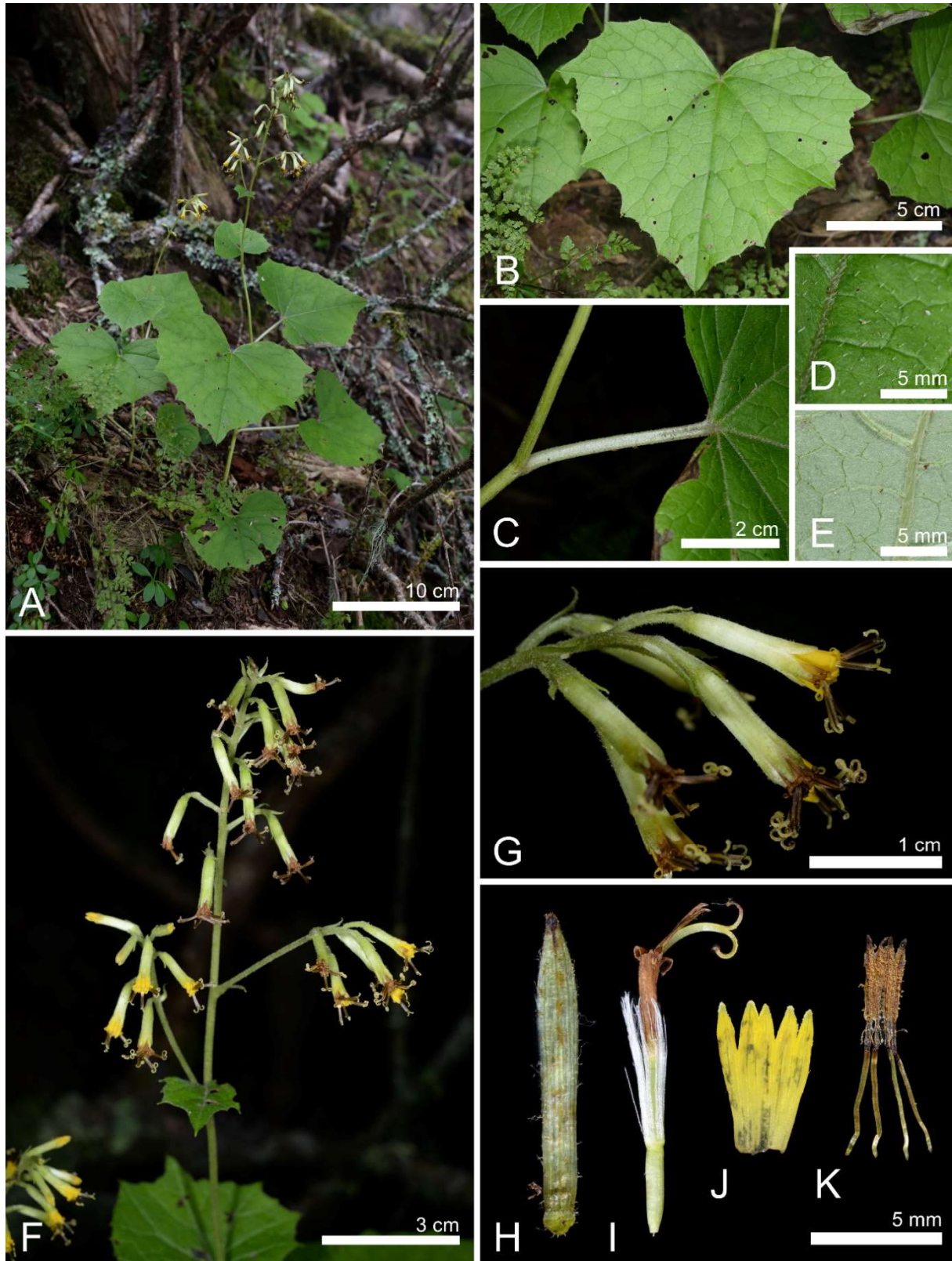


Fig. 2. Morphology of *Parasenecio sylviaensis* S.W. Chung & T.C. Hsu (from holotype). **A.** Habitat and habit. **B.** Leaf. **C.** Stipe. **D.** Adaxial surface of leaf. **E.** Abaxial surface of leaf. **F.** Synflorescence. **G.** Capitula. **H.** Phyllary. **I.** Floret. **J.** Expanded corolla. **K.** Stamens. Photographed and designed by T. C. Hsu.

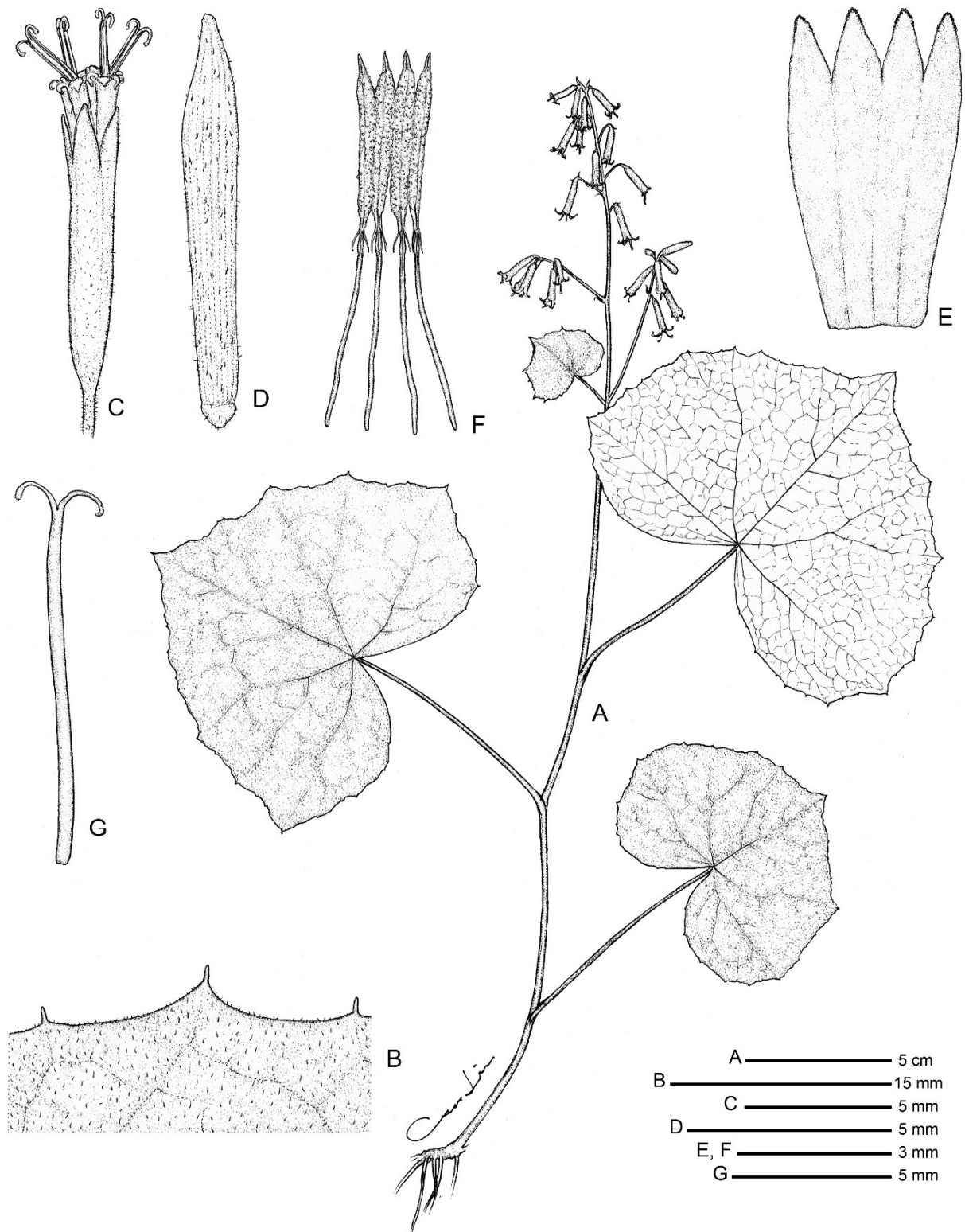


Fig. 3. Line drawing of *Parasenecio sylviaensis* S.W. Chung & T.C. Hsu (from holotype). **A.** Habit. **B.** Adaxial surface and margin of leaf. **C.** Capitula. **D.** Phyllary. **E.** Expanded corolla. **F.** Stamens. **G.** Style. Illustrated by Che-Wei Lin.



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