

植物分類著作電子叢書 (e-books)

# 新植物及新名稱

(NEW TAXA & NEW NAMES)

(第三卷, volume three)

應紹舜 (Shao-shun Ying) 著



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(NEW TAXA & NEW NAMES)

(第三卷, Volume Three)

應紹舜著

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*Paraprenanthes shaolinchiensis* S.S. Ying



*Arum taiwanianum* S.S. Ying

## Preface

Since childhood I had been interested in natural history which developed into a lifetime work to love of plants of all kinds over a range of Taiwan, visiting coastal, mangroove, plains, outwash terrace, coteau, hill, upland and high mountains of Taiwan, and going through teaching assistant, lecturer, associate professor, professor and emeritus professor of Department of Forestry (School of Forestry and Resource Conservation, now), National Taiwan University. After more than 50- years long time study in plant classification, once or twice a week and more than 50 times of this year (2020) for field collection and study, an e-book of 《New taxa and New names, volume Three, 2020》 will be published. I extend to readers a very warm welcome to the new plants and new names of Taiwan flora and trust that you will enjoy this new experience.

*Juniperus tairokouensis*, A new coniferous shrub I collected at Tairokou area, Hualien county, it was found in Liwu River (立霧溪) limestone cliff reivrine bank with some other shrubs; the plant grows 2.5 meters or more height, possessing unique male cones, it is one of most precious plants of Taiwan, although, some researcher of Taiwan misidentified it as *J. formosana* var. *concolor* Hayata.

Taiwan has an abundance resources of wild orchids throughout the island, as a wild orchid enthusiast and researcher, I had described more than 30 new species and new names of Taiwan wild orchids in past 40 years. 3 new species has been added in this e-book.

*Tainia hohuanshanensis* and *Platanthera hohuanshanensis* are the alpine orchids, they were found at Mt. Hohuanshan at between 3000 and 3200 m elevation, and *Spiranthes pitouchaoensis* was collected at coastal region of northern Taiwan.

*Paraprenanthes shaolinchiensis*, one of nine new specis of asteraceous plants which I described in this e-book, the specific name *shaolinchiensis* is in honour of Mrs. Shao Lin-chi (邵令淇女士, 1917-2013), she brought me up, educated me and help me in many way, my mother. I wish one new species for each coming year of name for her to express my sincere gratitude.

Four generic revision for their scientific names of Taiwan were given in this e-book, there are *Polygala*, *Vigna*, *Ainsliaea* and *Angelica*. Each genus I had proposed a new

species, but in genus *Vigna*, only a new subspecies was described; *Vigna unguiculata* spp. *taiwanianus* grows at Peikuan (北關) coastal regions of northern Taiwan, a dwarf erect plant with rather larger flowers and 10-15 cm long, cylindrical pod. *Angelica hohuanshanensis* is a peculiar plant in Mt. Hohuanshan, it often occurs between the gaps of *Abies* forest, large plant volume and densely rays of flowers, light up the alpine fields.

Starting with volume one of this e-book, readers found the circumscription of some families within the taxa have been modified so they mostly reflect that of the Angiosperm Phylogeny Group [APG] rather than the previously followed Cronquist organizational structure. The groups of families found in this volumes in the series are following E. Haston et al. (2007)

## Shao-shun Ying

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The author on the summit of main peak, Mt.Hohuanshan on his birthday of 79-years old



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1. A New Species of Genus *Juniperus* (Cupressaceae) from Taiwan ----

(*Juniperus tairukouensis* S.S. Ying)

*Juniperus tairukouensis* S.S. Ying, *sp. nov.* 太魯閣圓柏

*Juniperus formosana* var *concolor* Hayata, Icon. Pl. Formosan. 7: 39 (1918).p.p.

TYPE:TAIWAN. Hulien county , Xiulin Township (秀林鄉) , Tairuhou (太魯閣) 360 m alt. S. S. Ying , *s.n.* May 30, 2020 ° (holotype, NTUF) °



*Juniperus tairukouensis* S. S. Ying, the male cones



*Juniperus tairukouensis* S. S. Ying, the branches with male cones



*Juniperus tairukouensis* S. S. Ying, close-up of branches with male cones

**Morphology :** Lithophytic shrubs, about 50-250 cm tall, trunk short, dark gray, smooth, glabrous, much branched; branches erect to ascending, dark red or brown to green, glabrous. Leaves 3-verticillate, rarely alternate to opposite, linear-lanceolate to linear, 0.6-1.2 cm long, 1-1.5 mm wide, acute at apex, truncate and swelled at base, coriaceous, 2 whitish stomatal bands separated by a green midvein surface, lustrous green beneath; midvein slightly elevated on both surfaces.

Male cones axillary, ament-like, cylindric, 4-6 mm long, 1mm in diameter, red-brownish, several bracts at base; bracts triangular, 2-3 mm long, 1.5 mm wide, acute at base, truncate at base; 5-6 pairs of sporophylls, each sporophyll with 6 pollen sacs.



*Juniperus tairukouensis* S. S. Ying, the habitat (1)



*Juniperus tairukouensis* S. S. Ying, the habitat (2)



*Juniperus tairukouensis* S. S. Ying, the habitat (frontier) (3)

Female cones often solitary, axillary. Berry-like fruits globose, 5-6 mm in diameter, with 1-2 protuberance on surface, {人} dent not obvious at apex, green to yellowish when mature.

### Diagnosis.

Hayata (1918) had described a variety of *Juniperus formosana*, (*J. formosana* var *concolor*), in 《Icones Plantarum . Formosanarum》 vol 7, page 39. His description in Latin as follows:

[*Juniperus formosana* HAYATA Fl. Mont. Formosa p.209 var. *concolor* HAYATA n. v.(Fig.25). Frutex erectus, ramis ascendentibus vel pendulis rubro-purpurascens rugosissimis, ramulis gracillibus toto foliatis trigonis ad angulos canalibus resiniferis teretibus instructis facie glabris ad nodos trifoliatis, internodiis 2 mm longis. Folia linearis 17 mm longa 2 mm lata apice acuminata aristata basi haud contracta basi intus callis

*pulviniformibus singulis instructa ad nodos ramulorum ternatim veticillata ascendente vel patente, extus costis elevatis convexis intus leviter concavis, partibus stomatiferis utroque latere costae 2/3 mm latis, partibus non-stomatiferis 1/3 mm latis. Fructus sessilis globosus 9 mm in diametro apice 入-forme striatus. Semina 3 oblique ovata subtrigona 6 mm long 3 mm lata apice obtusa retusa ad centrum summorum brevis apiculata basi rotundata facio 1. vel 2-faveolata, testa ossca.*

*Hab. Busegan-Seisui, leg. B. Hayata et S. Sasaki, Mai. 1917.*

*Differs from the type by the leaves which are not glaucous beneath, and which have broader stomatiferous bands on the under side.]*

Hayata's original description did not mention the male and female cones of the variety (var. *concolor*), therefore, its male and female cones should be same as the type form (var. *formosana*). Here, I give 4 pictures to show the male cones and berry-like fruits of *J. formosana* var. *formosana* as follows:



*Juniperus formosana* Hayata var. *formosana*, the male cones





*Juniperus formosana* Hayata var. *formosana* , close-up of male cones



*Juniperus tairukouensis* S. S. Ying, close-up of male cones



*Juniperus formosana* Hayata var. *formosana* , the berry-like fruits



*Juniperus formosana* Hayata var. *formosana* , the berry-like fruits (2)



*Juniperus tairukouensis* S. S. Ying, the berry-like fruits on branches

Several papers were discussed the chemical composition of *Juniperus formosana* Hayata var. *concolor* Hayata from its bark and heartwood , were published in 《*Phytochemistry*》 and 《*Chemical and Pharmaceutical Bulletin*》 in 1996-1999. these were:

- 1). Kuo, Y.H. & Tsang, Y. M.NG. (1996). Dehydroabietane diterpenes from *Juniperus formosana* Hay. var. *concolor* Hay. *Phytochemistry* **42**(3): 779-781
- 2). Kuo, Y.H. & Tsang, Y. M.NG. (1996). Two new sesquiterpenes, -15-hydroxycalamenene and -1-hydroxy-1,3,5-bisabolatrien-10-one, from the heartwood of *Juniperus formosana* Hay var *concolor* Hay, *Phytochemistry* **42**(3): 779-781
- 3). Kuo, Y.H. & Tsang, Y. M.NG. (1996). Diterpenes from the heartwood of *Juniperus formosana* Hay. var. *concolor* Hay, *Chemical and Pharmaceutical Bulletin* **44**(8): 1431-1435

- 4). Kuo, Y.H. & Tsang, Y. M.NG. (1996). Three labdane-type diterpenes from the bark of *Juniperus formosana* Hay. var. *concolor* Hay., Chemical and Pharmaceutical Bulletin **44**(6): 1242-1244.
- 5). YU, M.-T. & KUO, Y.H.(1997). Junipenonoic acid, a novel C-9,10-secocadinane sesquiterpene, from the heartwood of *Juniperus formosana* Hay. var. *concolor* Hay., Chemical and Pharmaceutical Bulletin **45**(8): 1385-1386.
- 6). YU, M.-T. & KUO, Y.H.(1997). Acid, Novel C9,10-Secocadinane Sesquiterpene, from the Heartwood of *Juniperus formosana* HAY. var. *Concolor* HAY., Chemical & Pharmaceutical Bulletin **45**(8): 1385-1386
- 7). Kuo, Y.H. & Tsang, Y. M.NG. (1999). Four new sesquiterpenes from the heartwood of *Juniperus formosana* var. *concolor*; Chemical and Pharmaceutical Bulletin **47**(7): 1017-1019

There are something wrong for the first and secondary papers list above, there are have same pages, issue and journal, but different titles.

I cannot access and read these paper, I don't know where their samples of *Juniperus formosana* Hay. var. *concolor* Hay. were collected, and who and how the samples to identify these as the variety, so I am no comment that how they recognized the samples is the *Juniperus formosana* Hay. var. *concolor* Hay.

Adams, R. P. (2011) in his 《Juniperus in the World:The genus *Juniperus*, 3rd edition》 give the *Juniperus formosana* Hay. var. *concolor* Hay. a brief comment:[ *Finally, it should be mentioned that we searched the only known location of J. formosana var. concolor Hayata near the seashore (ca. 30 m) and found only one seedling. This seedling shows high affinity to J. formosana from Mt. Chingshui (2200 m) (Fig. 3, solid star in Fig. 4). It appears that Mt. Chingshui is the likely source of the seed that produced that seedling. No plants of J. formosana var. concolor were found and it is presumed that the plant used as the type specimen for var. concolor is now extinct.*].

An online community 《Nature Campus, 自然攝影中心》 from Academia Sinica (中央研究院) provided a web page to prove *Juniperus formosana* Hay. var. *concolor* Hay. is exist. one of members of the online community Chen, Po-hao (陳柏豪) posted 6

photographs to confirmed *Juniperus formosana* Hay. var. *concolor* Hay. is exist. but, he did not say where he took the photographs, he just said the photos were taken the place below 1000meters elevation. Examine Chen's photographs, it reveal that the plant is a shrub, the berry-like fruit smaller than that of *Juniperus formosana* Hay. especially the photograph 6 is showing a male cone of the plant, is conspicuous different from those of *Juniperus formosana* Hay. I conjecture it is not a *Juniperus formosana* Hay. var. *concolor* Hay. Chen made a misidentification of the species.

Another member of the online community Chen, C.F. (陳建帆) posted 5 photographs to show 3 specimens of *Juniperus formosana* Hay. var. *concolor* Hay. which were housed at the herbarium of Taiwan Forestry Research Institute (TAIF). The Chen's photographs are just a local zoom, not a full size specimen, and on his photographs, no label of the specimen displaying to reveal more detail. According to Chen's description, specimen TAIF 345836 was collected at Su-Hua Trail (蘇花古道), TAIF 386695, from Chongde Tunnel (崇德隧道) and TAIF 095216, from Cjmu Bridge, Hualien (花蓮慈母橋), those specimen pictures are without male cones instead of berry-like fruits only, TAIF 386695 specimen picture merely with branchlet and leaves. Although these specimens were identified *Juniperus formosana* Hay. var. *concolor* Hay. by TAIF herbarium staff, I suspect the precise of identification, especially TAIF 095216, one of our specimens of *Juniperus tairukouensis* S. S. Ying was collected just at nearby area.

If you want to read more about these, please visit  
<http://nc.biodiv.tw/bbs/showpost.php?p=786456&postcount=3869>

Our species is similar with *J. formosana* var. *concolor* Hayats in morphological characters, Hayata did not saw the sexual characters of the species. I conjecture, in this case he treated it as a variety of *J. formosana*, if he examined the sexual organs of the species, espically the male one, I am sure he would like to treat it as a new species as I did.

The species (*Juniperus tairukouensis* S. S. Ying) is characterized by:

- 1.It is a shrubs less than 2.5 m tall,
- 2.Leaves mostly 3-verticillate, rarely alternate to opposite. 2 whitish stomatal bands separated by a green midvein (this similarity with Hayata's species), but our species is on leaf surface.

3. Male cones axillary, ament-like, cylindric, 4-6 mm long, 1mm in diameter, red-brownish, it is easily distinguished from other *Juniperus* species in Taiwan.

4. Female cones often solitary, axillary. Berry-like fruits globose, 5-6 mm in diameter, with 1-2 protuberance on surface, {人} dent not obvious at apex.

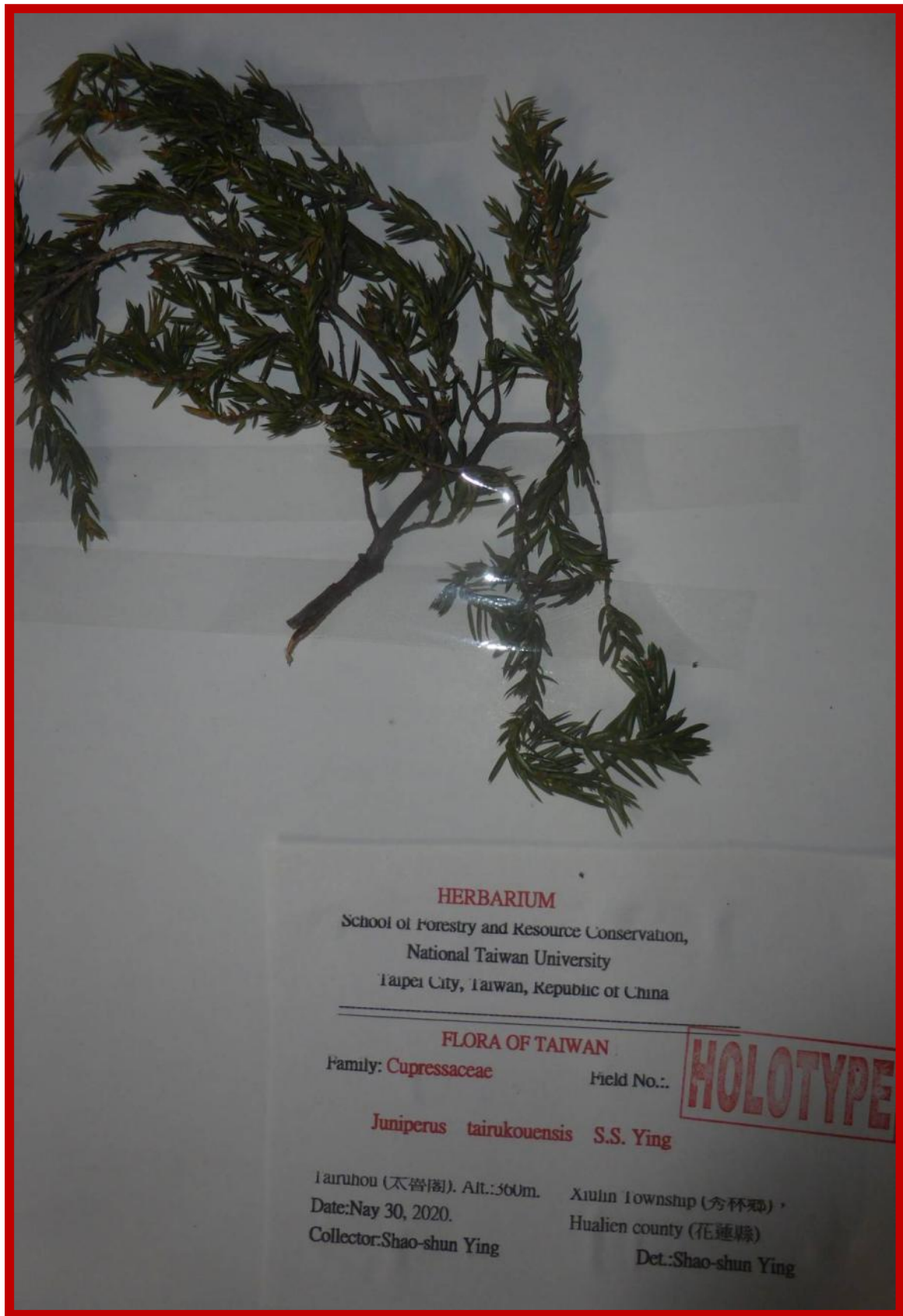
5. In this study, *Juniperus tairukouensis* grows on limestone cliffs along river sides of Li-Wu River (立霧溪), on a distance between 170 and 175 kilometers, Central Cross-Island Highway. It may be extended to other places of eastern Taiwan, further study is desirable.

#### **Distribution and phenology.**

The species is endemic in Taiwan, It is known from limestone cliffs along river sides of Li-Wu River (立霧溪), Hualien county, eastern Taiwan. It was collected on cliffs of river sides, at elevations between 250 and 450 meters. Its flowering time in June.



*Juniperus tairukouensis* S. S. Ying, male cones on holotype



*Juniperus tairukouensis* S. S. Ying, the holotype

## 2. Three New Species of Wild Orchids (Orchidaceae) from Taiwan

### A. *Tainia hohuanshanensis* S.S. Ying

*Tainia hohuanshanensis* S.S. Ying *sp. nov.* 合歡山小杜鵑蘭

TYPE: TAIWAN. Hualien county, Xiulin Township (秀林鄉), Hohuanshan (合歡山) 3150 m alt. *S. S. Ying*, *s.n.* June 4, 2020. (holotype, NTUF).



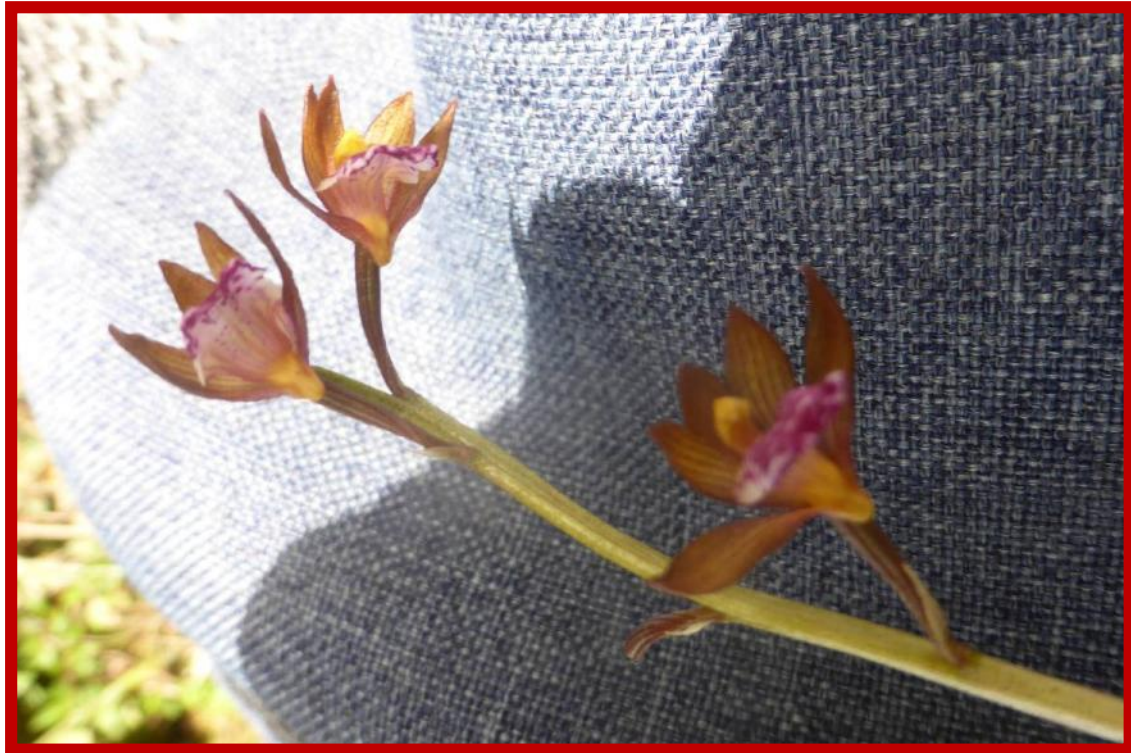
*Tainia hohuanshanensis* S. S. Ying, close-up of flower

**Morphology** : Terrestrials, rhizomes creeping, terete, stiff, 1.5~2 mm in diameter. Pseudobulbs arranged ca. 1.2~1.5 cm apart, ovoid to elongate ovoid, 8-13 mm long, 5-7 mm in diameter, white. Leaves solitary, petioled, linear, chartaceous 8-13 cm long, 5~8





*Tainia hohuanshanensis* S. S. Ying, the habitat



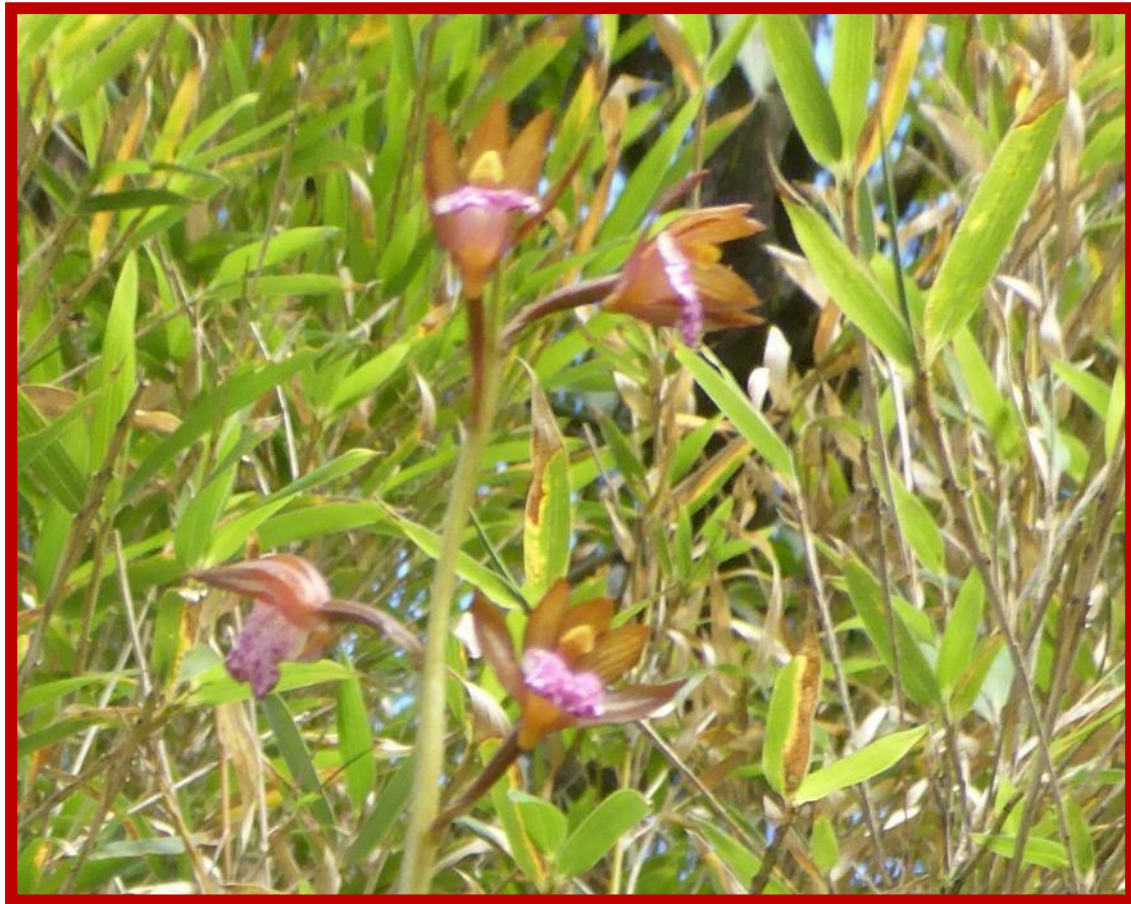
*Tainia hohuanshanensis* S. S. Ying, the inflorescence



*Tainia hohuanshanensis* S. S. Ying, the plant was used as a holotype of the species

mm wide, acuminate at apex, narrowed at base, lustrous green surface and pale green beneath, glabrous on both surfaces; petioles 3-4 cm long, glabrous.

Scape from base of pseudobulb, 30-38 cm long, slender, 3-4 light brownish



*Tainia hohuanshanensis* S. S. Ying, the inflorescence photo in the wild

sheath-like sterile bracts, 4-6 cm long, acute at apex, glabrous; bracts linear, light brownish, 4-6mm long, acuminate at apex; pedicel and ovary 8-12 mm long, glabrous. Flowers 4 in a raceme on the upward of the scape, about 1.5 cm in diameter when opened; dorsal sepals lanceolate, 1-1.5 cm long, 4-5 mm wide, acuminate at apex, brownish in color, 3-5 longitudinal veins running from base to apex; the lateral sepals similar with the dorsal one, but somewhat falcate-like; petals ovate-lanceolate, 1.2-1.6 cm long, 5-7 mm wide, somewhat obtuse at apex, brownish in color, 4-6 longitudinal veins running from base to apex; lip 3-lobed, spurred, curving, 1.3-1.6 cm long, purple with white specked and streaked; lateral lobes erect, triangular, 2.5-3 mm long, 2.5 mm wide, acute at apex; midlobe ovate-rounded, 8-9 mm long, 8.5-9.5 mm wide, somewhat truncate and wavy at apex; disc longitudinal 3-4 ridged, becoming 3-4-crested at throat; spur 3-4 mm long, 2-2.5 mm wide, obtuse at apex; column conspicuous, 1.5-1.8 cm long, 4-5 mm wide, pale yellow, somewhat arcuate.



*Tainia hohuanshanensis* S. S. Ying, the holotype

### Diagnosis.

The species is different from other species of genus *Tainia* in Taiwan, by its 4 flowered on the upward of the scape, lip 3-lobed and the midlobe ovate-rounded , 8-9 mm long, 8.5-9.5 mm wide, somewhat truncate and wavy at apex; disc longitudinal 3-4 ridged, becoming 3-4-crested at throat

### Distribution and phenology.

The species is endemic in Taiwan, It is known from Hohuanshan , Nantou county , central Taiwan . It was discovered in roadside near to Kelanyuan (克難關) Hohuanshan , at elevations of 3150 meters, it is the highest elevations among Taiwan *Tainia* orchids. It grows with *Yushania niitakayamensis* (Hayata) Keng f. and other plants. Its flowering time is June .

### B.*Spiranthes pitouchaoensis* S.S. Ying 鼻頭角盤龍參

#### *Spiranthes pitouchaoensis* S.S. Ying, sp. nov.

TYPE:TAIWAN. New Taipei City , Ruifang District (瑞芳區) , Pitouchao (鼻頭角) 46 m alt. S. S. Ying , s.n. June 28, 2020 . (holotype, NTUF) .

**Morphology** : Terrestrials, roots elongate, fleshy, grayish, 4-6 cm long, 2-3 mm diameter, glabrous to slightly hairy. Leaves radical, 2-5, linear to oblanceolate 5-14 cm long, 5-7 mm wide, acuminate at apex, slightly fleshy, entire, glabrous on both surfaces, midrib and lateral veins inconspicuous, young leaves unfolding from one side, but mature ones gradually attenuating to a sheath-like petiole.

Flowers numerous, resupinate, sessile, spirally arranged on a glabrous spike, 4-5 mm in diameter when opened, white sometimes tinged with pink; the inflorescence robust, 25-45 cm long, ascending to erect, glabrous; flowering rachis 10-16 cm long, glabrous to slightly hairy; bracts 4-6, lanceolate, 3-5 cm long, acute at apex, amplexicaul to sheathed at base; floral bracts cymbiform, 5-7 mm long, acuminate apex, glabrous or nearly so; ovary



*Spiranthes pitouchoensis* S. S. Ying, the inflorescence



*Spiranthes pitouchoensis* S. S. Ying, the habitat (1)



*Spiranthes pitouchoensis* S. S. Ying, the habitat (2)

5-5.5 mm long, glabrous; dorsal sepal oblong, 4-4.5 mm long, 2-3 mm wide, obtuse at apex, white but sometimes tinged with pink upward; lateral sepals spreading, linear-oblong, white, 4-4.8 mm long, 2-2.5 mm wide, white, obtuse at apex; petals narrowed oblong, about 4 mm long, 2-2.6 mm wide, obtuse at apex, white, sometimes tinged with pink upward, closely contracted with dorsal sepal and forming a hood; lip white, slightly 3-lobed, the lateral lobes erect, linear, 2.5-3 mm long, about 1.5 mm wide; midlobe larger, oblong, 4-4.5 mm long, 3-3.5 mm wide, crisped at margins, truncate and emarginate at apex; column short, 1.5 mm long, clavate, somewhat triangular at apex.

#### **Diagnosis.**

The species is different from *Spiranthes sinensis* (Pers.) Ames by its numerous flowers, white flowers and slightly 3-lobed lips; Its flowering time is from June to July, somewhat later than those of *Spiranthes sinensis* (Pers.) Ames.

#### **Distribution and phenology.**

The species is endemic in Taiwan, It is known from Pitouchao (鼻頭角) · Ruifang District (瑞芳區) · New Taipei City · northern Taiwan ° It was discovered at an open sunny meadow along coastal region , at elevations of 46 meters, Its flowering time is from June to July °



*Spiranthes pitouchaoensis* S. S. Ying, flowers wither within 2 days with  
the ovaries enlarging very quickly after anthesis -22-





*Spiranthes pitouchoensis* S. S. Ying, the holotype

*C. Platanthera hohuanshanensis* S.S. Ying

*Platanthera hohuanshanensis* S.S. Ying *sp. nov.* 合歡山粉蝶蘭

TYPE: TAIWAN. Hualien county, Xiulin Township (秀林鄉), Hohuanshan (合歡山) 3050 m alt. S. S. Ying, *s.n.* August 13, 2020. (holotype, NTUF) °



*Platanthera hohuanshanensis* S. S. Ying., close-up of flowers

**Morphology** : Terrestrials, rootstock tubular, ovoid to oblong, 1.5-2 cm long, 5-7 mm wide, fleshy; stem with inflorescence 30-40 cm long, erect, stout, glabrous, slightly angular, with 1 tubular sheath at base; the tubular sheath 2.5-4 cm long, acute at apex, brownish. Leaves



*Platanthera hohuanshanensis* S. S. Ying., the inflorescences



*Platanthera hohuanshanensis* S. S. Ying., plant colony



*Platanthera hohuanshanensis* S. S. Ying., the habitat (1)

3, on the basal of stem, oblong, 4.5-6 cm long, 2-2.5 cm wide, acute at apex, obtuse and slightly cordate forming a short tubular at base, lustrous green surface and pale green beneath, midrib and lateral veins inconspicuous.

Flowers many, ca. 15-25, densely arranged, pale yellow, 3-4 mm in diameter when opened, spicate; the inflorescence 17-25 cm long, with 3-4 bracts from basal to upward; the bracts lanceolate, gradually small upward, acute at apex; floral bracts ovate, 6-8 mm long, 3-4 mm wide, acute at apex; pedicel and ovary cylindrical, 5-8 mm long, glabrous, green; dorsal sepal connivent with petals forming a 3-4 mm wide hood; the dorsal sepal ovate, 3-4 mm long, 2.5-3.5 mm wide, acute at apex; lateral sepals spreading, oblong, 5-6 mm long, 3-4.5 mm wide, obtuse at apex; petals ovate to oblong, 2.5-3 mm long, 3-3.5 mm wide, obtuse at apex; lip pendulous, tongue-like, 3-lobed at base; median lobe tongue-like to lanceolate, 8-10 mm long, 2-3 mm wide, acute at apex; lateral lobes ovate-triangular, 3-4 mm long, 2.5-3.5 mm wide, entire to few dentate at margins; spur pendulous, cylindrical,

10-12 mm long, obtuse at apex; column short, 2-3 mm long.



*Platanthera hohuanshanensis* S. S. Ying., the habitat (2)

#### **Diagnosis.**

The species is characterized by its many pale yellow flowers (ca 15-25), 3-lobed lip; median lobe tongue-like to lanceolate, 8-10 mm long, 2-3 mm wide, acute at apex; the lateral lobes ovate-triangular, 3-4 mm long, 2.5-3.5 mm wide, entire to few dentate at margins

#### **Distribution and phenology.**

The species is endemic in Taiwan, It is known from Hohuanshan , Nantou county , central Taiwan . It was discovered in roadside at elevations of 3050 meters of Mt. Hohuanshan. It grows with *Codonopsis kawakamii* Hayata and other plants. Its flowering time is August .



*Platanthera hohuanshanensis* S. S. Ying., the holotype

### 3. Three New Species of Genus *Rubus* (Rosaceae) from Taiwan ----

#### A. *Rubus hohuanshanensis* S.S. Ying

*Rubus hohuanshanensis* S.S. Ying *sp. nov.* 合歡山懸鈎子

TYPE: TAIWAN. Hualien county, Xiulin Township (秀林鄉), Hohuanshan (合歡山)  
3180 m alt. S. S. Ying, *s.n.* June 4, 2020. (holotype, NTUF).



*Rubus hohuanshanensis* S. S. Ying, the habitat



*Rubus hohuanshanensis* S. S. Ying, the flowering branchlets



*Rubus hohuanshanensis* S. S. Ying, the flowering branchlet



**Morphology** : Lithophytic undershrubs, about 40 cm tall, stem pendulous or horizontal, dark red to red brown, prickled, glabrous, much branches; the branches slender, pendulous to ascending, green to red, prickled, glabrous. Leaves imparipinnate, 3-7-foliolate; petioles 1.5-2.5 cm long, glabrous, prickled; petioles of terminal leaflet 6-12 mm long, lateral leaflets sessile or nearly so; rachis green, loose prickled; stipules linear, slightly pubescent. Leaflets oblong, 1.5-3.5 cm long, 6-9 mm wide, acute at apex, obtuse at base, chartaceous, green surface, pale green beneath, glabrous on both surface, midrib impressed surface and elevated beneath, lateral veins 4-7, impressed surface and elevated beneath, no prickled on midrib and veins, sharply doubly serrate on margins; terminal leaflet same as the lateral ones but somewhat larger.



*Rubus hohuanshanensis* S. S. Ying, the habit



*Rubus hohuanshanensis* S. S. Ying, the plant with fruits



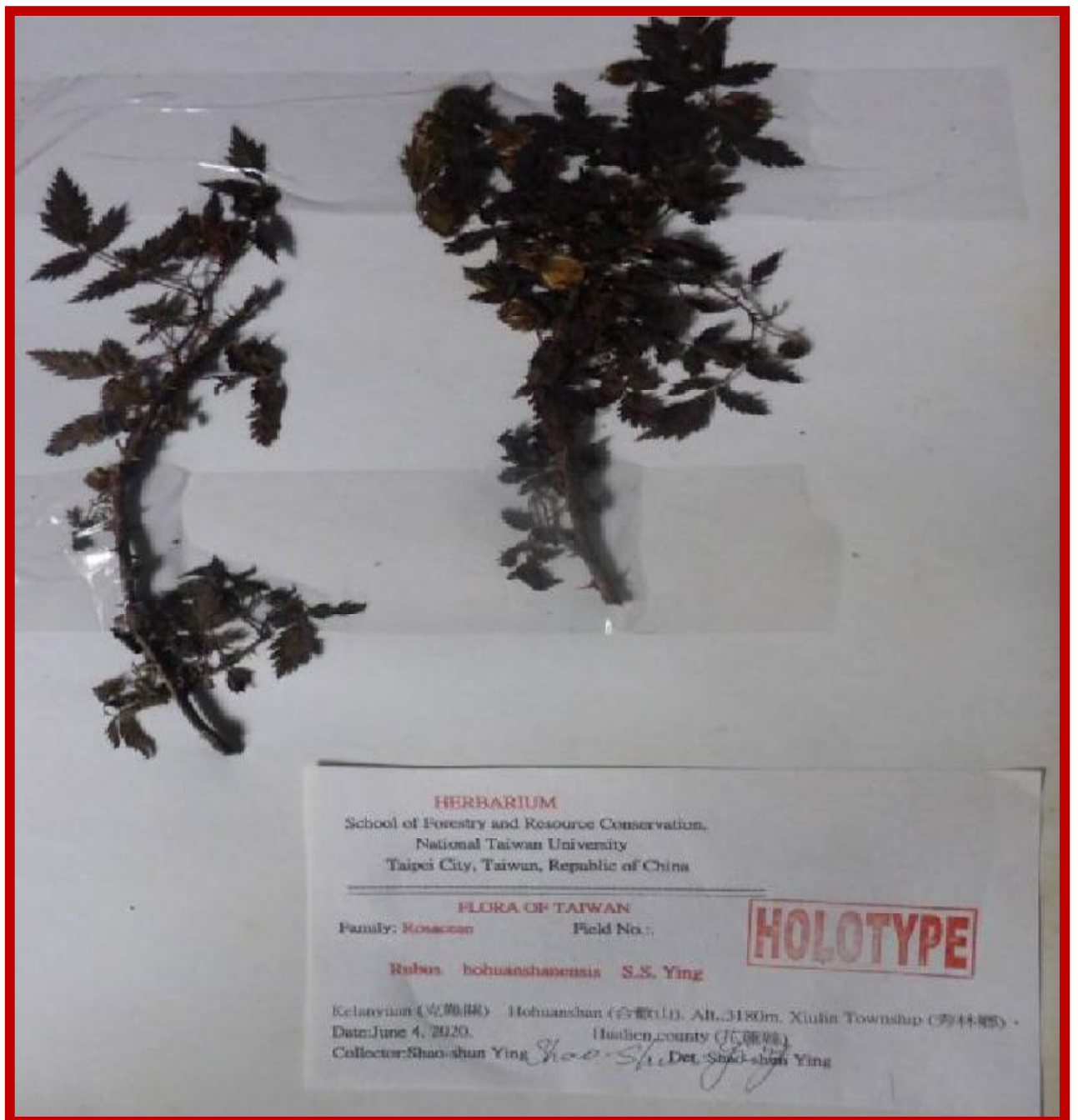
*Rubus hohuanshanensis* S. S. Ying, the fruit with persistent calyx



*Rubus hohuanshanensis* S. S. Ying, at main peak Hohuanshan, flowers pale yellow



*Rubus hohuanshanensis* S. S. Ying, the habitat, at main peak Hohuanshan,



*Rubus hohuanshanensis* S. S. Ying, the holotype

Flowers solitary, terminal on the branchlets, white, 2-3 cm in diameter when opened; pedicels 2-4.5 cm long, loose prickled, white pubescent, sometimes with red glandular hairs upward but finally caudous; calyx with red glandular hairs outside, glabrous inside, 5-lobed; sepals ovate, 1-1.5 cm long, 5-7 mm wide, elongate-caudate at apex, truncate at base; petals ovate-oblong, 1-1.3 cm long, 6-7 mm wide, obtuse at apex, glabrous on both surfaces; stamens numerous, shorter than petals; filaments linear, white, glabrous; anthers small, oblong, versatile, grayish brown, pistils shorter than stamens; carpels many, inserted on convex torus, locule 1; ovules 2, only 1 developing, collateral, pendulous; style filiform, subterminal, 2.5 mm long; stigma simple, capitate. Drupaceous achenes aggregated on semispherical, conical or cylindrical torus, forming an aggregate fruit, separating from torus and aggregate hollow, about 1.5-2 cm in diameter, red when mature.

#### **Diagnosis.**

The species is characterized by its small 3-7 leaflets, being 1.5-3.5 cm long, 6-9 mm wide, and glabrous on both surfaces; its flowers solitary, somewhat larger, white petals and sepals with elongate-caudate at apex ; fruits red when mature; it is a lithophytic plant, grows on the rocky places, somewhat rare in this habitat for Taiwan *Rubus* plants. .

#### **Distribution and phenology.**

The species is endemic in Taiwan, It is known from Hohuanshan , Nantou county , central Taiwan . It was discovered in roadside near to Kelanguan (克難關) and Main peak of Hohuanshan , at elevations of 3180 and 3385 meters. Its flowering time is June to July, and fruiting time is September to October.

### **B.*Rubus siyuanensis* S.S. Ying**

#### ***Rubus siyuanensis* S.S. Ying, Sp. nov. 思源懸鈎子**

TYPE:TAIWAN. I-Lan County,Tatung Township (大同鄉) , Siyuanyakou (思源埡口) 1820 m alt. *S. S. Ying* , *s.n. July 4, 2020* . (holotype , NTUF) .



*Rubus siyuanensis* S. S. Ying, the plants covered the crown of neighbor trees

*Rubus alcaefolius* var. *emigratus* sensu Liu, T. S., Illustr. Nat. & Introd. Lign. Pl  
Taiwan 1;461, pl. 395 (1960). *non. Fockr.*

*Rubus alcaefolius* sensu Huang, J.Y. & Hu, J. M., Taiwania 54(4):287 (2009),  
*non.Poir.*

**Morphology** : Large woody climbers up to 15 m or more tall, stem robust, lignified, elongate, much-branched; the branches ascending to pendulous, 3-6 m long, pale green, sparse prickles, densely brownish villous; villus 4-6 mm long, acute at apex. Leaves simple alternate, ovate to oblong, 8-12 cm long, 9-13cm wide, chactaceous, acute at apex, deeply cordate at base, 3-5 lobed, serrate at margins, lustrous green surface, glaucous beneath, 3-5 nerved, the nerves slightly elevated surface and elevated beneath, glabrous on both surfaces. Petioles slender, 3-5 cm long, densely brownish villous.



*Rubus siyuanensis* S. S. Ying, the branchlets and leaves

Flowers numerous, white, 5-6 mm in diameter when opened, in a terminal compound panicles; the inflorescences pendulous, 40-65 cm long, sparse prickles , densely



*Rubus siyuanensis* S. S. Ying, the inflorescences





*Rubus siyuanensis* S. S. Ying, the flowers



*Rubus siyuanensis* S. S. Ying, the fruits -39-

brownish villous, white villous upward, consists of 15-25 racemes; the racemes 5-15 cm long, sparse prickles, densely brownish villous, 1 bract at base; the bracts lanceolate, 3-5 mm long, 2-3 mm wide, acute at apex, villous; the pedicels 2-5 mm long, villous; bracts linear, 2-3.5 mm long, 1 mm wide acuminate at apex; Calyx 5-7 mm long, 4-5 mm wide, 5-lobed; the lobes ovate, 4-5 mm long, 2.5-3.5 mm wide, acuminate and slightly caudate at apex, villous without and glabrous within; petals 5, white, broadly elliptic, 3-4.6 mm long, 3-4 mm wide, obtuse at apex, shortly clawed at base, glabrous; stamens numerous, inserted at mouth of hypanthium, slightly longer than petals, filaments linear; anthers didymous; carpels numerous, ovoid, 2.5-3.5 mm long, glabrous; style linear, 2-2.5 mm long; stigma capitate.

Aggregate fruits globose, 5-7mm in diameter, persistent calyx usually covered the fruits, exocarps thin, not fleshy, red turn to black when mature.



*Rubus siyuanensis* S. S. Ying, the plants like a monster occupy the crown of neighbor trees

#### Diagnosis.

It is a very extraordinary species in the genus *Rubus* of Taiwan. The characteristics of the species state as follows:



*Rubus siyuanensis* S. S. Ying, the holotype

1. Like the species of *Actinidia chinensis* var. *setosa* H. L. Li in the forests of Taiwan, it is a large woody climber, its branches and branchlets usually take opportunity to amplexant other trees and to extend their growth area, finally, the climber occupy the crown of neighbor trees, to form a dominant group

2. the inflorescences pendulous, 40-65 cm long, sparse prickles, densely brownish villous, white villous upward, consists of 15-25 racemes; the racemes 5-15 cm long, sparse prickles, densely brownish villous; flowers opening one by one, not opening at same time.



*Rubus alceifolius* Poir, the plant with fruits,

<http://tropical.theferns.info/image.php?id=Rubus+alceifolius>



*Rubus alceifolius* Poir, the plant with flowers, Northern Queensland, Australia

<http://www.northqueenslandplants.com/Australian%20Plant%20Families%20N-S/Rosaceae/Rubus/Rubus%20alceifolius.html>



*Rubus alceifolius* Poir, the plant with flowers, Northern Queensland, Australia

<http://www.northqueenslandplants.com/Australian%20Plant%20Families%20N-S/Rosaceae/Rubus/Rubus%20alceifolius.html>

Liu (1960) recoded it as *R. alcerifolius* Poir var. *emigratus* Focke , Huang, J.Y. & Hu, J. M. (2009) treats it as *R. alcerifolius* Poir.. However, from the pictures of *R. alcerifolius* Poir. which posted here, I am sure, our species is conspicuous different from those two taxa which mentioned above.



[A specimen of \*Rubus alcerifolius\* from Kew Herbarium](https://apps.kew.org/herbcat/getImage.do?imageBarcode=K000737728)

<https://apps.kew.org/herbcat/getImage.do?imageBarcode=K000737728>

### Distribution and phenology.

The species is endemic in Taiwan, It is known from Siyuanyakou (思源埡口) Tatung Township (大同鄉), I-Lan County, northern Taiwan. It was discovered in roadside near to 44km. of I-lan branch, Central Cross-Island Highway. (中部橫貫公路宜蘭支線). at elevations of 1820 meters. Its flowering time is July to August, and fruiting time is August to October.

### C.*Rubus cuifengensis* S.S. Ying

*Rubus cuifengensis* S.S. Ying, Sp. nov. 翠峰懸鈎子

TYPE:TAIWAN. Nantou county, Renai Township (仁愛鄉), Cuifeng (翠峰) 2370 m alt.  
*S. S. Ying*, s.n. July 23, 2020 (holotype, NTUF).



*Rubus cuifengensis* S. S. Ying, flowering plant



*Rubus cuifengensis* S. S. Ying, trifoliate leaves

**Morphology :** Erect shrubs up to 2 m high, stem robust, elongate, glabrous or nearly so, much-branched; the branches ascending to erect, 15-35 cm long, pale green, sparse prickles, densely red-brownish pubescent; hairs 3-5 mm long. Leaves trifoliate, alternate; terminal leaflet petiolulate, oblong to narrowly oblong, 3.5-5 cm long, 1.5-2cm wide, chactaceous, acute at apex, obtuse at base, crenated and ciliate at margins, lustrous green surface, pale green beneath, midrib impressed surface and elevated, prickled beneathd, lateral veins 4-6 pairs slightly impressed surface and elevated beneath, scattered red pubescent surface, nearly glabrous beneath; lateral leaflets small, 1.5-2.2 cm long, 8-10 mm wide. Petioles slender, 2-4 cm long, densely brownish villous; the petioules of terminal leaflet 4-6 mm long, pubescent; petioules of lateral leaflets 0 or sessile. .

Flowers solitary or pairs, terminal or axillary, white, 1.5-2 cm in diameter when opened; pedicels 2-5 cm long, ascending to erect, densely scattered with red pubescent , with minute prickles; bracts linear, 5-9 mm long, pubescent; calyx densely red pubescent without and glabrous within; sepals 5, ovate to oblong, 5-7 mm long, 3-4 mm wide, acute and elongate- caudate at apex, truncate at base; petals 5, ovate-triangular, 8-12 mm long,





*Rubus cuihengensis* S. S. Ying, the flowers

5-7 mm wide, acute at apex, short-clawed at base, glabrous on both surfaces; stamens many, 2-seriate around the pistil; filaments white, linear, 4-5 mm long, glabrous; anthers light purplish, didymous; pistils slightly shorter than or nearly as long as stamens; carpels numerous, style filiform, glabrous; stigma capitate. Aggregate fruit red at maturity, globose, 7 – 12 mm in diameter, glabrous; pyrenes distinctly rugose; calyx persistent, enlarged in fruiting stage.



*Rubus cuifengensis* S. S. Ying, the fruit



*Rubus cuifengensis* S. S. Ying, the habitat

### Diagnosis.

*Rubus cuifengensis* grows in the medium altitude of central Taiwan, The characteristics of the species state as follows:

1. A shrub up to 2 m. high, the branches ascending to erect, 15-35 cm long, pale green, sparse prickles, densely red-brownish pubescent.
2. Leaves trifoliate; terminal leaflet petiolulate, lateral leaflets sessile; the blade of terminal leaflet oblong to narrowly oblong, 3.5-5 cm long, 1.5-2cm wide, the lateral one smaller.
3. Flowers solitary or pairs, terminal or axillary, white, 1.5-2 cm in diameter when opened; pedicels densely scattered with red pubescent, with minute prickles; calyx densely red pubescent without and glabrous within; sepals 5, ovate to oblong; petals 5, ovate-triangular, acute at apex, short-clawed at base.
4. Aggregate fruit red at maturity, globose, 7 – 12 mm in diameter, glabrous; pyrenes distinctly rugose; calyx persistent, enlarged in fruiting stage.

### Distribution and phenology.

The species is endemic in Taiwan, It is known from Cuifeng (翠峰), Renai Township (仁愛鄉), Nantou county, central Taiwan. ° It was discovered in roadside at elevations of 2376 meters. Its flowering time is June to August, and fruiting time is July to November.





*Rubus cuifengensis* S. S. Ying, the holotypet      -50-

#### 4. A New Species of Genus *Paris* (Melanthiaceae) from Taiwan ----

(*Paris taiwanensis* S.S. Ying)

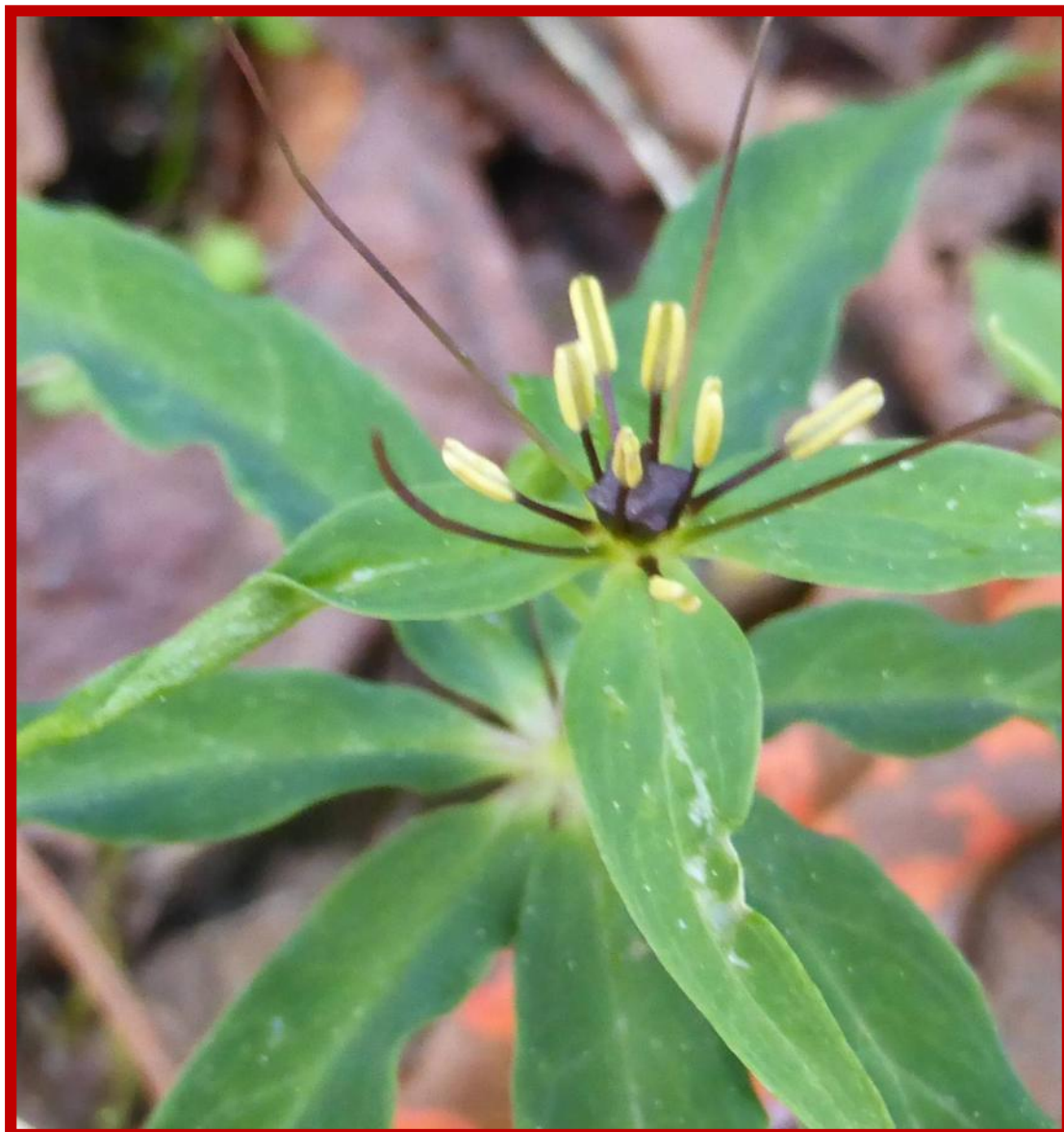
*Paris taiwanensis* S.S. Ying, *sp. nov.* 台灣七葉一枝花

TYPE:TAIWAN. Huien county , Xiulin Township (秀林鄉) , Hohuanshan (合歡山)  
2900 m alt. S. S. Ying , *s.n.* April 29, 2020 ° (holotype, NTUF) °



*Paris taiwanensis* S. S. Ying, flowering plant

**Morphology :** A perennial herb on the roadsides , about 7-10 cm high, rhizome like a corm, ovoid, 1-1.2 cm long, 5-6 mm wide, fleshy; roots numerous, slender, 5-12 cm long; stem simple, erect, 6-9 cm long, purplish, glabrous. Leaves 6-8 terminal on the stem, lanceolate to linear-lanceolate, 4-7 cm long, 5-7 mm wide, coriaceous to slightly fleshy, acuminate and with a 3-4 mm tail at apex, narrowed at base, glabrous at both surface,



*Paris taiwanensis* S. S. Ying, the flower, showing the ovary, stamens and tepals

midrib impressed surface and elevated beneath, lateral veins 5-7 pairs, somewhat inconspicuous. petioles short, 2-3 mm long, glabrous.

Flower solitary, terminal, pedunculate, 2-3 cm in diameter when opened; the peduncles 1-1.5 cm long, glabrous; tepals in 2 series, the outer ones 4, lanceolate to ovate-lanceolate, 2.5-3 cm long, 4-5 mm wide, acuminate at apex, narrowed at base; inner ones 4, linear, purplish in colour, unequal in length, 1.5-4 cm long, 1-1.5 mm wide, purplish in colour; stamens 7-8, filaments purplish, slender, 5-7 mm long; anthers basifixed, yellow, 3-4 mm long, often with convex connective apically; ovary square-like, dark



*Paris taiwanensis* S. S. Ying, the plants



*Paris taiwanensis* S. S. Ying, the flower



*Paris taiwanensis* S. S. Ying, the habitat

purple, 2.5-3 mm long and wide, glabrous. 4-celled, axile placentation; ovules numerous; style short; stigma lobes 4, 3-4 mm long, purplish.

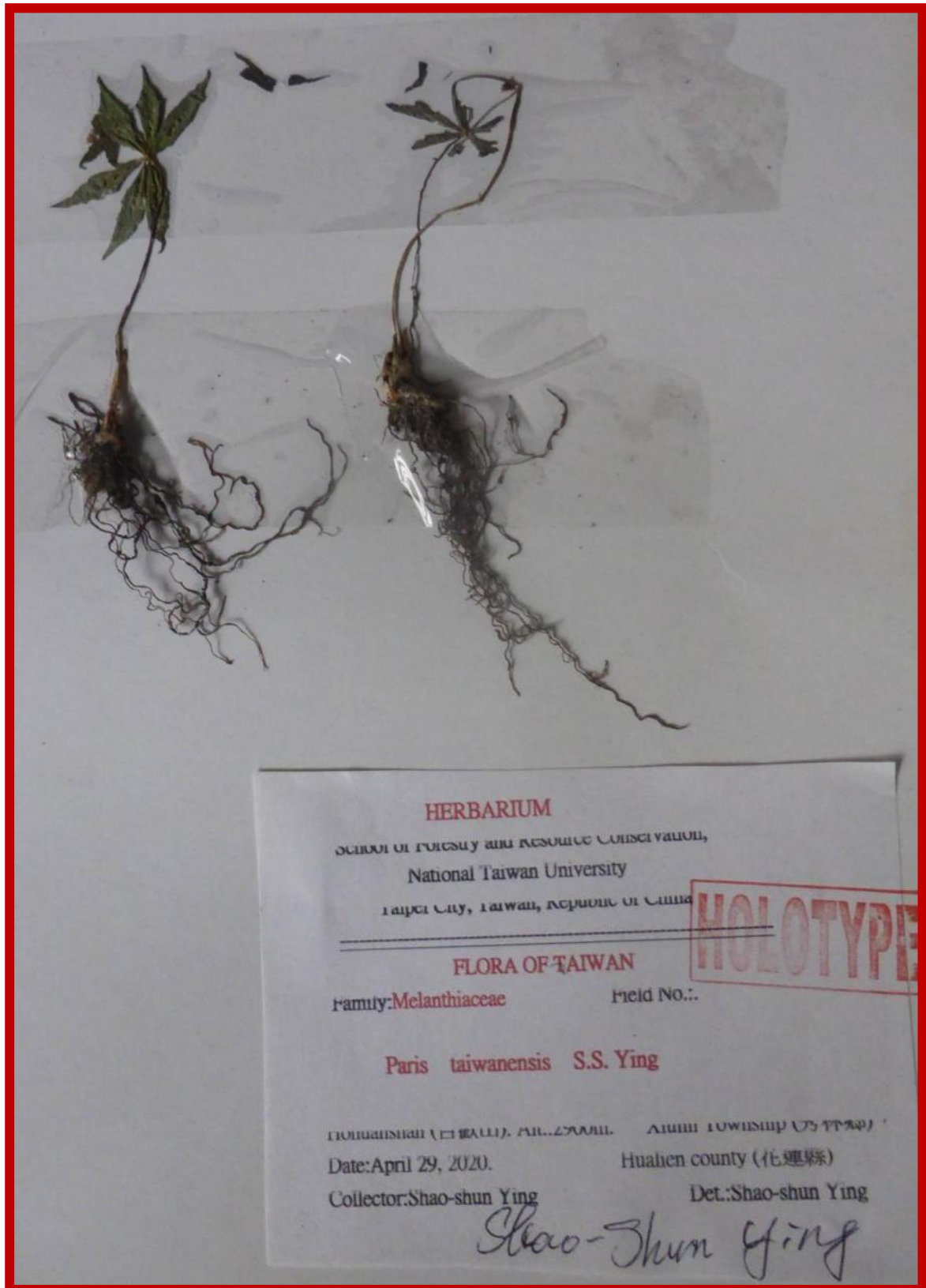
**Diagnosis.**

The species is very different from other species of genus *Paris* in Taiwan, its ovary with 4-celled in square shape, a dwarf plant body about 7-10 cm high with 6-8 lanceolate to linear-lanceolate leaves, are showing its unique characters.

**Distribution and phenology.**

The species is endemic in Taiwan, It is known from Huhuanshan , Nantou county , central Taiwan . It was collected in roadside of mountain forests , at elevations between 2900 and 3000 meters, it is the highest altitude for Taiwan *Paris* plants growing. Its flowering time from April to May .





*Paris taiwanensis* S. S. Ying, the holotype

5. A New Species of Genus *Valeriana* (Valerianaceae ) from Taiwan ----

(*Valeriana* *siyuaniana* S.S. Ying)

*Valeriana* *siyuaniana* S.S. Ying, *sp. nov.* 思源纈草

TYPE:TAIWAN. I-Lan County,Tatung Township (大同鄉) , Siyanyakou (思源埡口)  
1710 m alt. *S. S. Ying* , *s.n. June 13, 2020* ° (holotype , NTUF) °



*Valeriana siyuaniana* S. S. Ying, the habitat

**Morphology** : An annual small herb, about 20-35 cm tall, rhizome short, 2-3 mm , somewhat fleshy, glabrous; roots fibrous, slender. Stem solitary, Stem short, 8-15 cm long,



*Valeriana siyuaniana* S. S. Ying, radical and cauline leaves

ascending to erect, 4-angular, glabrous. Leaves radical and cauline, the radical one 2-3, simple, ovate, 1-1.5 cm long, 1.2-1.6 cm wide, obtuse at apex, truncate at base, chartaceous, midrib impressed surface and slightly elevated beneath, glabrous on both surface, 2-4-crenated, lustrous green surface and pale green beneath; petioles 2-2.5 cm long, slender, glabrous. Cauline ones 1-2 pairs, 3-foliate, the petioles 1-1.5 cm long, somewhat fleshy, glabrous; terminal leaflet ovate to oblong, 1.2-1.6 cm long, 1-1.5 cm wide, acuminate at

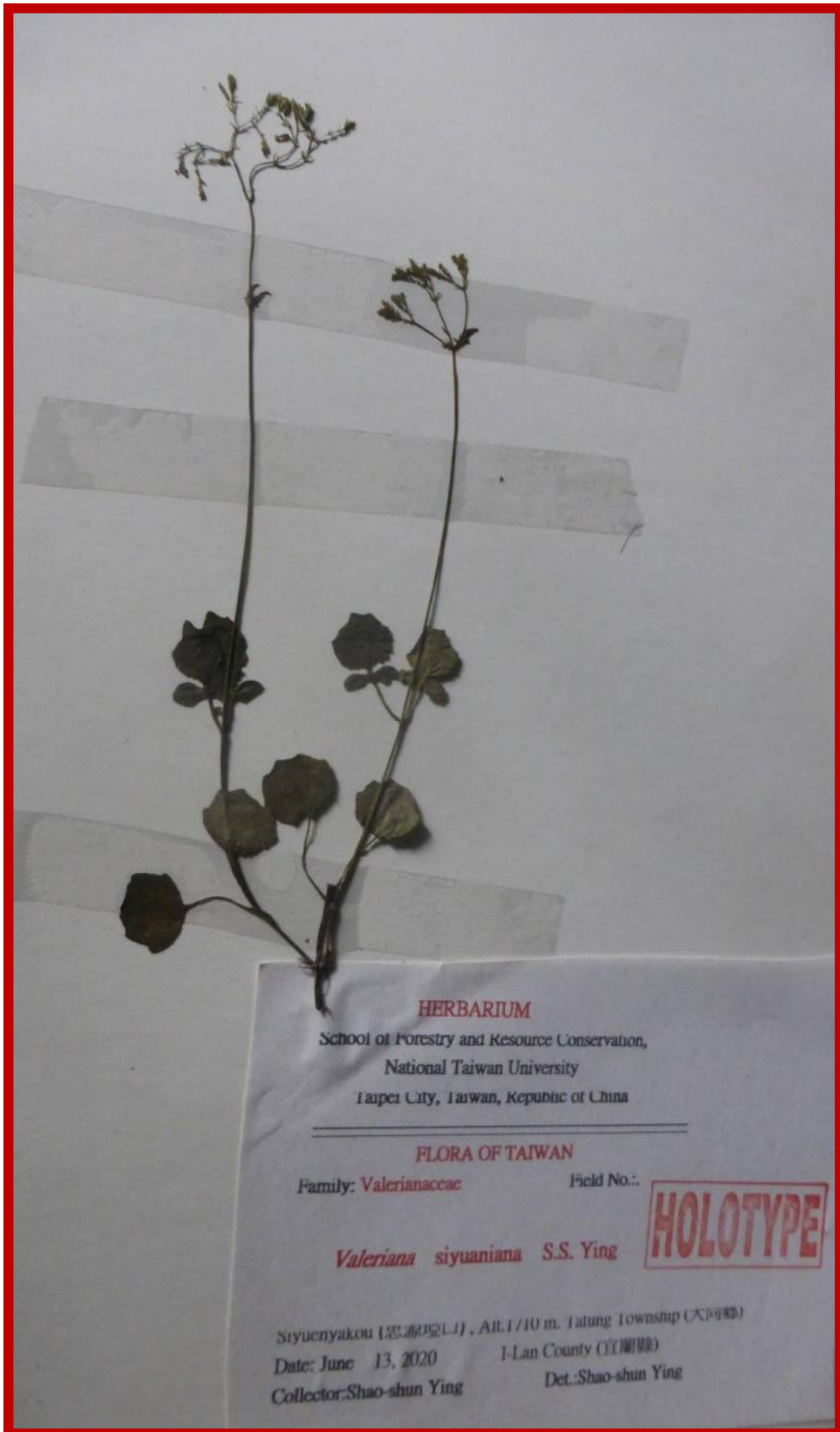
apex, obtuse at base, crenate or shallowly lobed at margins, somewhat fleshy, glabrous on both surfaces; petioles 1.5-2 mm long, glabrous; the lateral leaflets smaller, ovate, 5-6 mm long, 3-4.5 mm wide, obtuse at apex, entire at margins, glabrous, sessile.



*Valeriana siyuaniana* S. S. Ying, inflorescence, flowers and fruits

Flowers white, rather small, 2-3 mm in diameter when opened, in a terminal cymose; the inflorescence 12-16 cm long, ascending to erect, branched upward, slightly 4-angulared, glabrous; bracts linear, 3-4 mm long, 1 mm wide, acuminate at apex; , pedicels 0 or nearly so; calyx a ring at anthesis, green, 2-3 mm in diameter, unfurling into 10-12 pale green plumose segments, 7--9 mm long in mature fruit; corolla rotate, 5-lobed, 3-4 mm long, white, slightly gibbous at base, the lobes rounded, obtuse at apex; stamens 3, included, ovary cylindrical, 4-5 mm long, green, slightly hairy. Immature achenes ovoid, 4-5 mm long, glabrous, crowned by persistent, plumose calyx.

**Diagnosis.**



*Valeriana siyuaniana* S. S. Ying, inflorescence, flowers and fruits

The species is characterized by its small plant, simple radical leaves and trifoliate cauline leaves, flowers are not many, white, in terminal cymes; calyx a ring at anthesis, green, 2-3 mm in diameter, unfurling into 10-12 pale green plumose segments, 7--9 mm long in mature fruit

**Distribution and phenology.**

The species is endemic in Taiwan, It is known from Siyuanakou , I-lan county , northern Taiwan ° It was collected in roadside of mountain forests , at elevations between 1710 meters. Its flowering time in June °



6. A New Species of Genus *Strobilanthes* (Acanthaceae) from Taiwan ----

(*Strobilanthes chihsinlinensis* S.S. Ying)

*Strobilanthes chihsinlinensis* S.S. Ying, *sp. nov.* 七星嶺馬藍

TYPE:TAIWAN. I-Lan County,Su;ao Township (蘇澳鎮) , Chihsinlin (七星嶺) 61 m alt.

S. S. Ying , *s.n.* January 04, 2020 ° (holotype , NTUF) °



*Strobilanthes chihsinlinensis* S. S. Ying, the plant is in flowering

**Morphology** : A perenial herb under forests , about 1.5 m high , with much branched ; branchlets erect or ascending , glabrous ° Leaves simple , opposite , lanceolate to broadly lanceolate , 7-10 cm long , 1.5-3.5 cm wide , acuminate at apex , narrowed at base , entire at margins ; lustrous green surface and pale green beneath ; midrib and lateral veins impressed surface and elevated beneath , glabrous surface (but scattered hair , especially on veins inspected under a microscope) , glabrous beneath ° Petioles 1-1.5 cm long ,



*Strobilanthes chihsinlinensis* S. S. Ying, A close up of the flowers



*Strobilanthes chihsinlinensis* S. S. Ying, the habitat





*Strobilanthes chihsinlinensis* S. S. Ying, calyx persistent after anthesis

glabrous or scattered hairs ◦

Flowers 2-6 clustered on the leaf-axils , light purplish , 1.5 cm in diameter when opened ; inflorescence-peduncle 5-10 mm long , glabrous ; 3-5 leaf-like bracts at base ; bracts 1-1.5 cm long , 5-6 mm wide , acuminate at apex ; pedicels 3-5 mm long ; calyx-lobed 4-5 , green , free each other or nearly so , fan-like , 1.8-2.2 cm long , 8-10 mm wide , acute at apex with a short caudate , short-pedicels about 2-3 mm long at base , long-ciliate at margins , glabrous ; corolla slender , reach to 2.5 cm long , scattered with white hairs outside , 5-lobed at apex ; lobes unequal , the basal one largest , rounded ; the others tongue-like , somewhat small , obtuse at apex ; stamens 4 , 2 longer and 2 shorter ; the long ones extended to the corolla ; filament slender ; anthers reniform , lightly purplish ; style slender , glabrous ; stigma somewhat pink in colour ; ovary ovoid , glabrous or slightly pubescent ◦

#### Diagnosis.

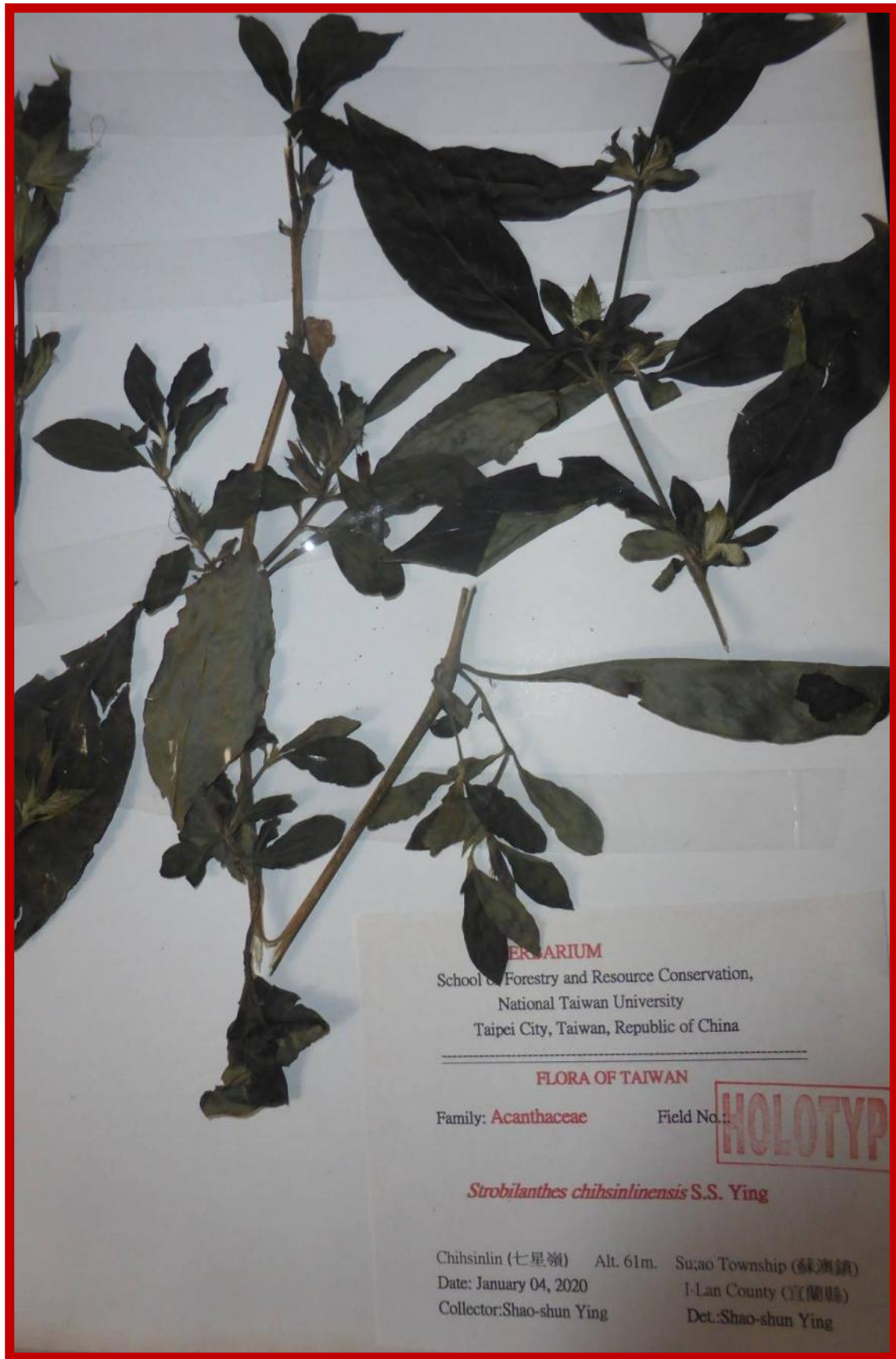
*Strobilanthes chihsinlinensis* S. S. Ying is one of special species of the genus *Strobilanthes* of Taiwan ◦ It is characterized by its small flowers , free or nearly free



*Strobilanthes chihsinlinensis* S. S. Ying, showing in the flowers and flower-buds



*Strobilanthes chihsinlinensis* S. S. Ying, showing in the bracts, calyx and flower-buds



Holotype of *Strobilanthes chihsinlinensis* S. S. Ying, (NTUF)

with long-ciliated calyx-lobed ◦

**Distribution and phenology.**

*Strobilanthes chihsinlinensis* S. S. Ying is endemic to Taiwan ◦ It is known from Chihsinlin, Su,ao township, I-lan county, northern Taiwan ◦ It was collected in shades mountain forests, at elevations between 50 and 70 meters and flowering time from December to January next year ◦



*Strobilanthes chihsinlinensis* S. S. Ying., the habitat

7. A New variety. of species *Talipariti tiliaceum* (Malvaceae) from Taiwan

(*Talipariti tiliaceum* var. *chihsinlinensis* S.S. Ying)

*Talipariti tiliaceum* var. *chihsinlinensis* S.S. Ying, var. nov. 七星嶺木槿

*Hibiscus tiliaceum* var. *chihsinlinensis* S.S. Ying, MMS.

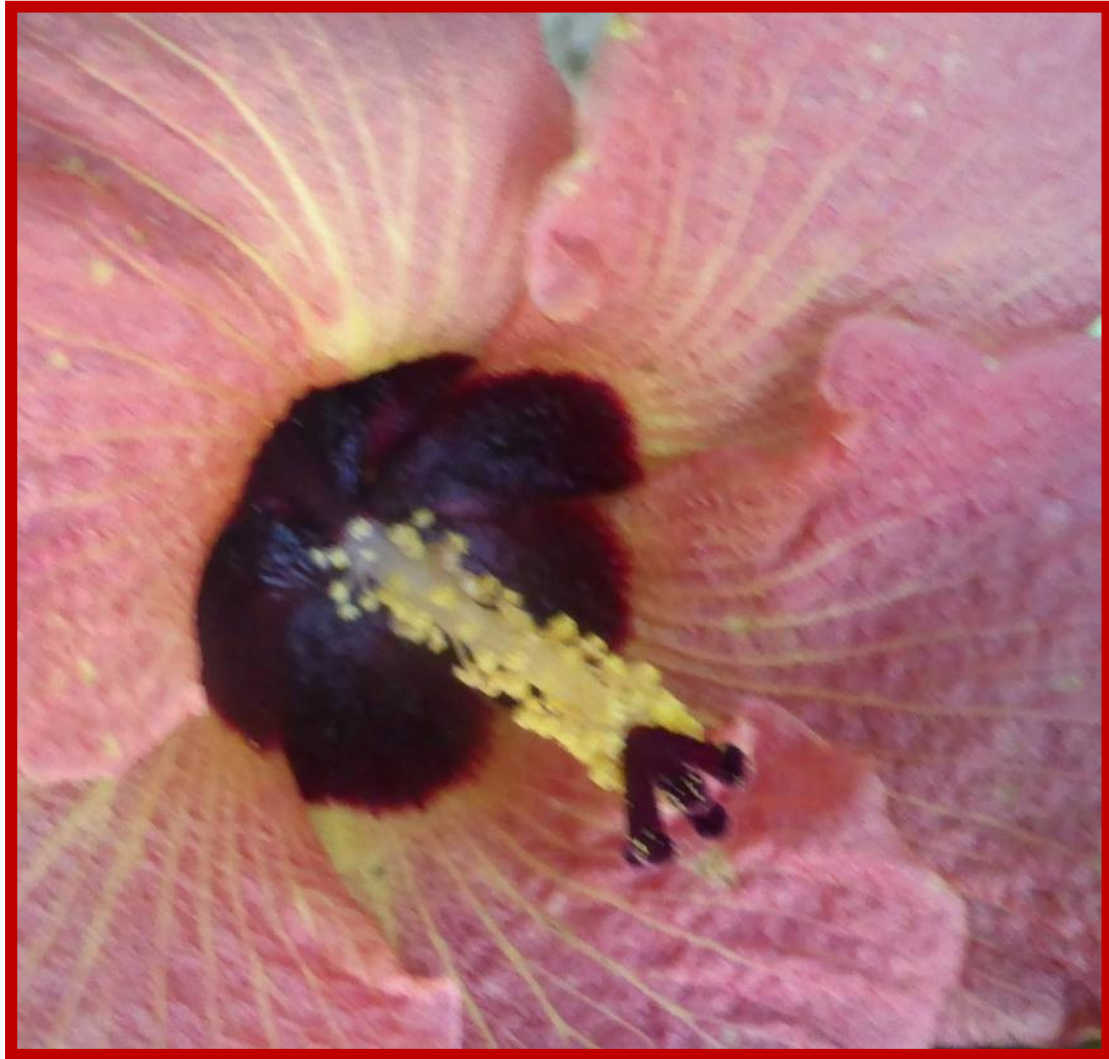
TYPE:TAIWAN. I-Lan County,Su;ao Township (蘇澳鎮), Chihsinlin (七星嶺) 171 m alt.  
S. S. Ying , s.n. January 04, 2020 ° (holotype , NTUF) °



A flower of *Talipariti tiliaceum* var. *chihsinlinensis* S. S. Ying,

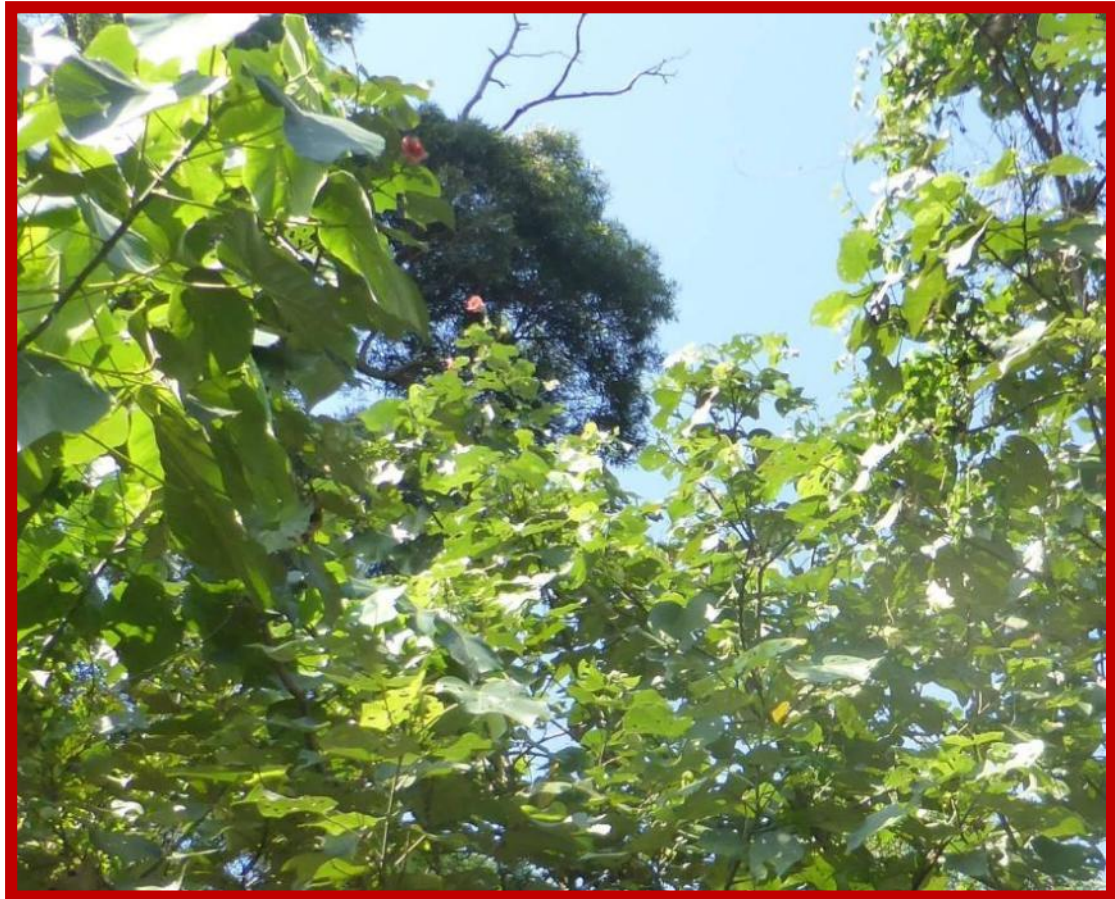
**Morphology** : A evergreen tree about 7 meters high , trunk straight and ascending ; bark smooth , glabrous , gray , with much branches and branchlets ; crown widely opened , somewhat rounded in shape ; branches and branchlets erect to ascending , green , glabrous ° Leaves simple , alternate , ovate-rounded , 8-15 cm long , 7-15 cm wide , acuminate and a caudate at apex , cordate at base , chartaceous to thin coriaceous , serrulate at

margins , lustrous green surface and pale green beneath ; glabrous surface and white pubescent beneath , espically on veins ; 5-7 palmated veins impressed surface and elevated beneath ; stipules opposite , ovate-lanceolate , 1-2.5 cm long , 5-8 mm wide , acuminate at apex and amplexicaul at base , caducous . Petioles 5-10 cm long , glabrous .



A close-up of petal- bases, staminal tube ,style and stigmas

Flowers solitary , orange-red in color , terminal or axillary on leaf-axils , about 5 cm in diameter when opened ; pedicels erect or ascending , 7-13 cm long , glabrous ; the lobes of epicalyx 6-9 , connated at base , lanceolate , 6-9 mm long , 3-4 mm wide , acute at apex ; calyx lobes 5 , ovate , 1.5-2 cm long , 4-5 mm wide , acute at apex ,



Flowering on the top of the branchlets



A tree-crown of *Talipariti tiliaceum* var. *chihsinlinensis* S. S. Ying, -69-



A flower of *Talipariti tiliaceum* var. *chihsinlinensis* S. S. Ying,

with one longitudinal keel in the middle; petals 5, widely opened, orange-red, with a large dark red speck at base, broadly ovate, 4-5 cm long, 3.5-4 cm wide, obtuse at apex, narrowed at base, glabrous; staminal tube 4-5 cm long, with numerous stamens; filaments slender, 3-5 mm long; anthers reniform; styles slender, 5-lobed at apex, dark red; stigmas 5, head-like, hairy, nearly black in color; ovary ovoid, pubescent.

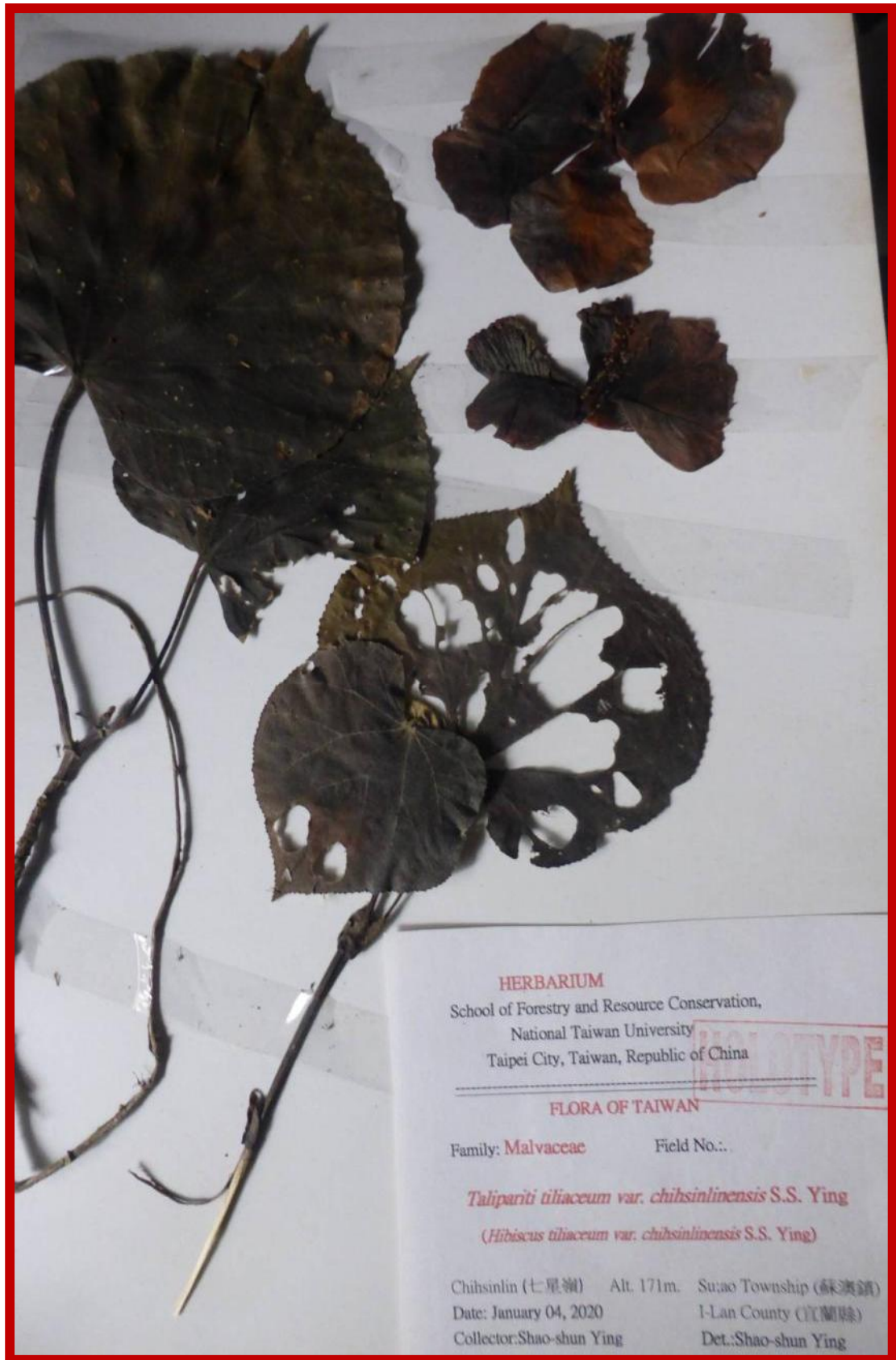
**Diagnosis.**

*Talipariti tiliaceum* var. *chihsinlinensis* S. S. Ying is characterized by its serrulate margins and flowers solitary, orange-red in color; petals free at all, the flowering time from December to January next year; not flowering all year round as the typical variety (var. *tiliaceum*) do.





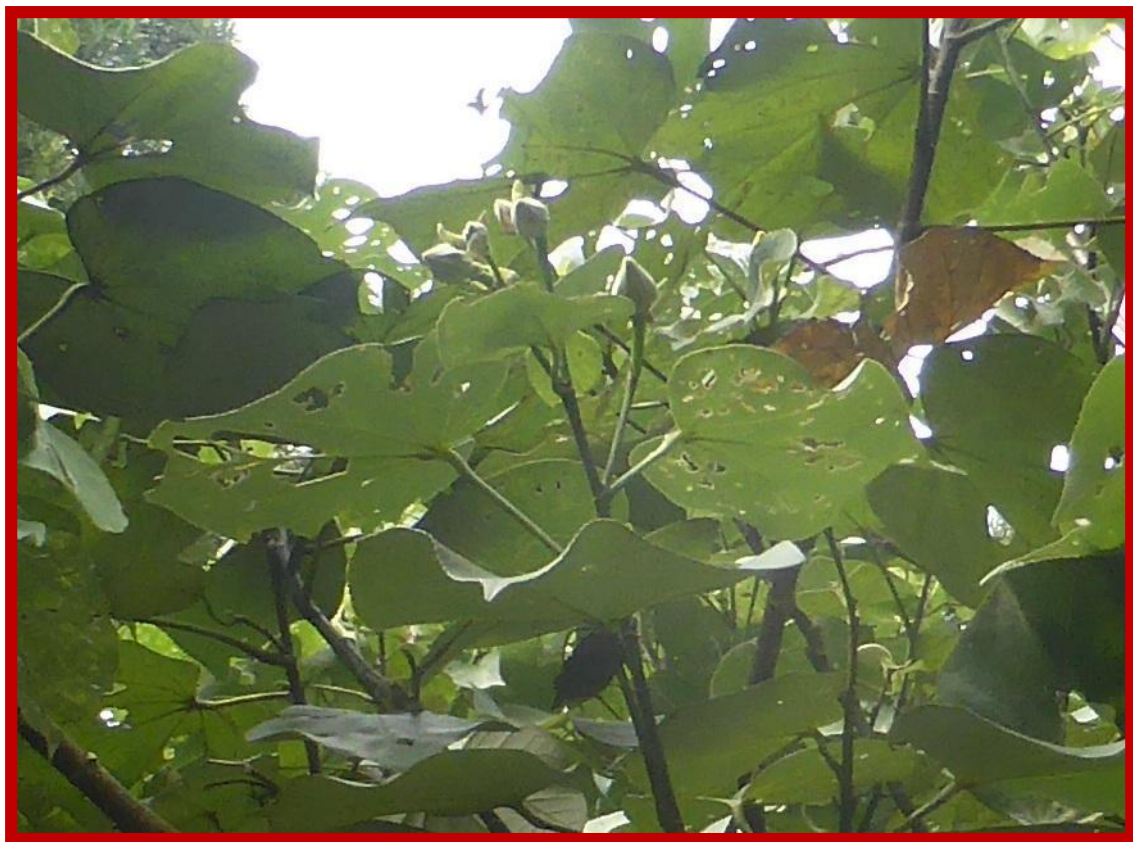
The type tree of *Talipariti tiliaceum* var. *chihsinlinensis* S. S. Ying,



A holotype of *Talipariti tiliaceum* var. *chihsinlinensis* S. S. Ying, (NTUF)

**Distribution and phenology.**

*Talipariti tiliaceum* var. *chihsinlinensis* S.S. Ying is endemic to Taiwan ° It is known from Chihsinlin , Su,ao township , I-lan county , northern Taiwan ° It was collected in the forests , at elevations between 165 and 180 meters and flowering time from December to January next year °



The immature fruits of *Talipariti tiliaceum* var. *chihsinlinensis* S. S. Ying,

8. A New Species of Genus *Hypericum* (Hypericaceae) from Taiwan ----

(*Hypericum eastmostianum* S.S. Ying)

*Hypericum eastmostianum* S.S. Ying , *sp. nov.* 極東金絲桃

TYPE:TAIWAN. New Taipei City,Gongliao Distract (貢寮區) , Sandiaojiao(三貂角) 54 m alt. S. S. Ying, *s.n.* January 30, 2020° (holotype, NTUF)° 25°0´32" N, 122°0´7" E



Close-up of plants with flowers and flower-buds.

**Morphology** : A small herb, about 3-5 cm long, with much branches; the branches slender, tetragonal, green , glabrous. Leaves simple, opposite, oblong, 3-5 mm long, 3-4 mm wide,

acuminate and slightly emarginate at apex, amplexicaul at base, chartaceous, entire, lustrous green surface, pale green beneath, 3-nerved impressed surface and impressed beneath, glabrous on both surfaces. Petioles absent.

Flowers solitary or sometimes two terminal on the branch-top, rather small and inconspicuous; pedicels short, 1.5-2 mm long, glabrous, 1 bract at base; bracts lanceolate, 2-3 mm long, acuminate, glabrous; sepals 5, free, broadly lanceolate, about 3 mm long, green, a red spot on the terminal, glabrous; petals 5, yellow, somewhat short than sepals,



The plants with close-up flowers and immature fruit.



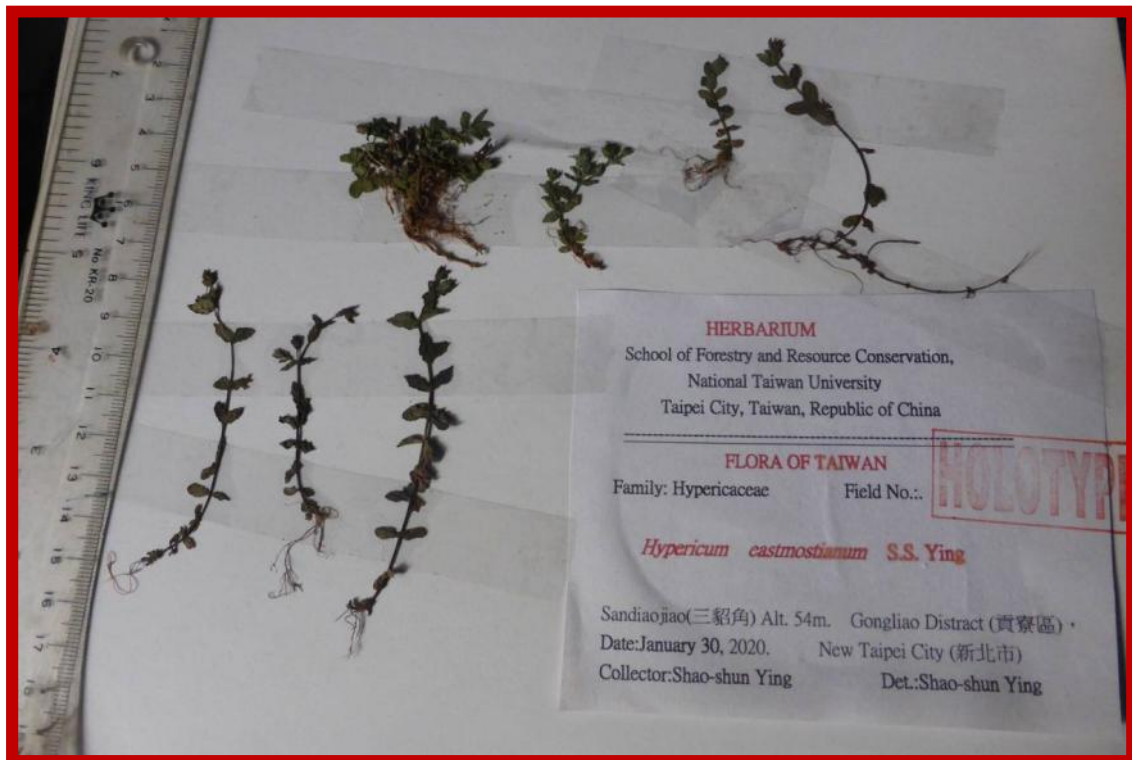
The plants with close-up of fruits.



Close-up of plants with fruits.



The plants was used as a part of the holotype of the species



The holotype of *Hypericum eastmostianum* S.S. Ying



The plants with close-up flower

about 2.5 mm long, reflexed at apex; stamens less than 10, free; filaments slender, pale yellow, slightly short than sepals; anthers small, spot-like; ovary elliptic, glabrous; style short, included; stigma entire, head-like.

Fruit a capsule, rounded, about 4 mm in diameter, red in color, 4-5 valve-dehiscent after mature and turn to brown in color, the sepals persistent.

**Diagnosis.**

*Hypericum eastmostianum* S.S. Ying is characterized by its small plant body, 1 rarely 2 flowers on the terminal of branches; the sepals usually longer than the petals, and globose fruits

**Distribution and phenology.**

*Hypericum eastmostianum* S.S. Ying is endemic to Taiwan ° It is known from Sandiao Cape (三貂角), the eastmost point of Taiwan , Gongliao Distract (貢寮區) , New Taipei City, northern Taiwan ° It was collected on the side of hiking trail , at elevations of 54 meters and flowering time from December to January next year °



9.A New Species of Genus *Arenaria* (*Caryophyllaceae*) from Taiwan ----

*Arenaria fulungensis* S.S. Ying

*Arenaria fulungensis* S.S. Ying, *sp. nov.* 福隆無心菜

TYPE:TAIWAN. New Taipei City, Gongliao Distract (貢寮區), Fulung (福隆) 15 m alt. *S. Ying*, *s.n.* March 2, 2019. (holotype, NTUF).



*Arenaria fulungensis* S.S. Ying, the leaves and flowers

**Morphology** : A small perennial herb, stem slightly prostrate, much brached; braches elongate, 5-25 cm long, scattered with glandular-hairs; Leaves simple, opposite, ovate to ovate-triangular, 4-7 mm long, 3-4.5 mm wide, acuminate at apex, amplexicaul at base,

chartaceous, entire with glandular-hairs at margin, midrib and lateral veins inconspicuous on both surfaces, scattered with glandular-hairs on both surface. petioles absent.

Flowers solitary, axillary, not or rarely widely opened, 3-4 mm long; pedicels from the leaf-axils, slender, erect or ascending, 8-15 mm long, scattered with glandular hairs; sepals 5, green ovate, 3-4 mm long, 1-2 mm wide, acuminate at apex, truncate at base, scattered with glandular-hairs without and glabrous within; petals 5, white, hemisphere, 2.5-3 mm long, 1.2-2 mm wide, usually not longer than sepals, obtuse at apex; stamens 5, filaments slender, 1.5-2 mm long, glabrous; anthers reniform; ovary ovoid, about 1 mm



*Arenaria fulungensis* S.S. Ying, the brachlets, leaves and flowers

long, glabrous, style slender, about 1.5 mm long, 3-lobed at apex.

#### **Diagnosis.**

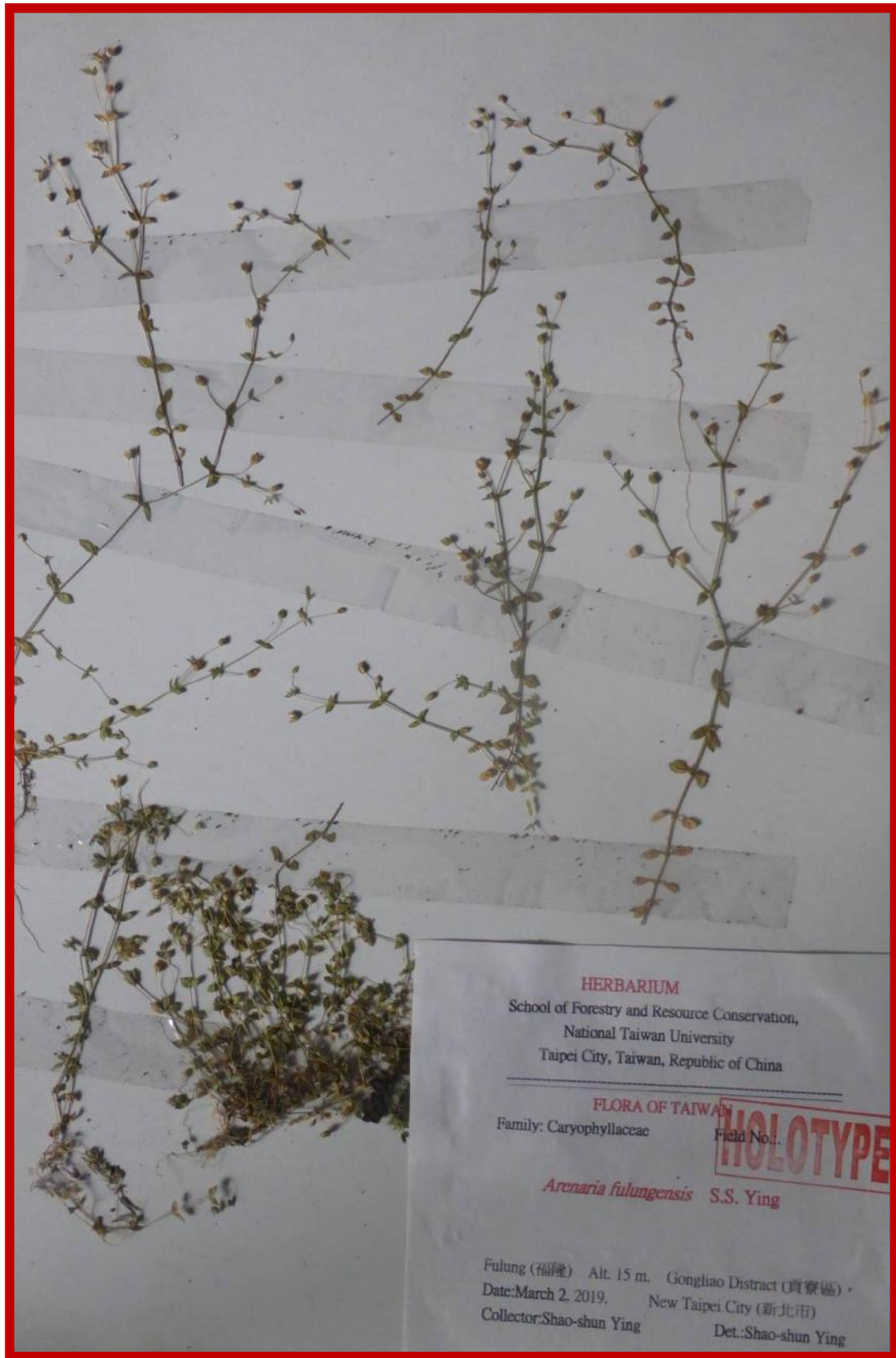
*Arenaria fulungensis* S.S. Ying is characterized by its smaller leaves, flowers not or rarely widely opened, the petals usually shorter than sepals, it always grows at beach sandy places of northern part of the island.



*Arenaria fulungensis* S.S. Ying, the plants on the sandy place of beach



*Arenaria fulungensis* S.S. Ying, the plants on the sandy place of beach



*Arenaria fulungensis* S.S. Ying, the holotype



*Arenaria fulungensis* S.S. Ying, the habitat

**Distribution and phenology.**

*Arenaria fulungensis* S.S. Ying is endemic to Taiwan ° It is known from beach area of Fulung (福隆), Gongliao Distract (貢寮區) · New Taipei City, northern Taiwan ° It was collected on the beaxh area , at elevations between 10 meters and flowering time nearly all year round °

10.A New Combination of *Callicarpa* (Limnaceae) in Taiwan

*Callicarpa tzitanshana* (S. S. Ying) S. S. Ying

*Callicarpa tzitanshaniana* (S. S. Ying) S. S. Ying, comb. nov. 白果杜虹花

*Callicarpa formosana* Rolfe var. *tzitanshana* S. S. Ying. New taxa & New Names  
2:162 (2019).



A part of inflorescence of *Callicarpa tzitanshaniana* (S. S. Ying) S. S. Ying,



A leaf of *Callicarpa tzitanshaniana* (S. S. Ying) S. S. Ying,  
some flowers attached on its surface

**Morphology :** Small shrubs , about 2.5 m high ; trunk short , much branched ; branches erect to ascending , with densely rust hairs first , and then glabrous when old . Leaves simple , opposite , elliptic to elliptic-oblong , 8-19 cm long , 3-8 cm wide , acuminate at apex ,

attenuate to the petioles at base , rough chartaceous , lustrous green surface and pale green with glaucous beneath , lateral veins 6-9 per side , impressed surface and elevated beneath , midrib impressed surface and elevated beneath , glabrous on surfaces, glabrous or slightly pubescent on beneath , especially on veins ; crenulate at margins . Petioles 1-3 cm long , pubescent .

Flowers small , numerous , white, 2-3 mm in diameter when opened , in densely compound- cymose ; main inflorescence peduncle 2-5 cm long , pubescent ; with



The inflorescences of *Callicarpa tzitanshaniana* (S. S. Ying) S. S. Ying,

numerous cymose ; the peduncle 2-3.5 cm long , pubescent , with 10-35 flowered in each cymose ; pedicels 1.4-5 mm long , pubescent ; calyx small , 1-1.5 mm long , 4-lobed at apex , pubescent ; corolla tubular , 2-2.5 mm long , 4-lobed at apex ; the lobes obtuse at apex , slightly reflexed ; stamens 4 , filaments white, 3-4 mm long , glabrous ; anthers round , yellow . ovary ovoid , about 1.5 mm across , green , glabrous ; style slender , white , same length with stamens , glabrous ; stigma disc-like , white .

Fruits small , rounded , 2-2.5 mm in diameter , green at first and then turned to white





The inflorescences of *Callicarpa tzitanshaniana* (S. S. Ying) S. S. Ying,



The fruits of *Callicarpa tzitanshaniana* (S. S. Ying) S. S. Ying,



The syntype of *Callicarpa tzitanshaniana* (S. S. Ying) S. S. Ying,

colour , glabrous , only 1 seed in side ; pedicles 2-4 mm long , pubescent °

### Diagnosis.

The species, the author was treated it as a variety of *Callicarpa formosana* Rolfe, after one year observed in fields, the author give the following reasons and treat it as a distinct species.

1. *Callicarpa tzitanshana* (S. S. Ying) S. S. Ying is a shrub, less than 3 meters high, with much branches at base, without conspicuous trunk; but the *Callicarpa formosana* Rolfe is a small tree, with conspicuous trunk.

2. The leaves of *Callicarpa tzitanshana* (S. S. Ying) S. S. Ying are much longer than those of *Callicarpa formosana* Rolfe

3. The inflorescence of *Callicarpa tzitanshana* (S. S. Ying) S. S. Ying are more compact and like a ball, but the *Callicarpa formosana* Rolfe are not.

4. The flowers of *Callicarpa tzitanshana* (S. S. Ying) S. S. Ying are white, much smaller; but the *Callicarpa formosana* Rolfe are purplish and rahter larger.

5. The fruits of *Callicarpa tzitanshana* (S. S. Ying) S. S. Ying are white in colour; but the *Callicarpa formosana* Rolfe are purplish in colour.



## 11. A Revision to the Scientific Names of Genus *Polygala* (Polygalaceae) in Taiwan



*Polygala sibirica* Linn.

Back to 1906, Professor Hayata, B. described 3 species of genus *Polygala* in his 《Enumeratio Plantarum Formosarum》 these are:

1. *Polygala glomerata* Lour.

2. *Polygala japonica* Houtt.

3. *Polygala tatarinowii*. Reo.

Two years later, Three relative species of the genus *Polygala* were described in his 《Flora Montana Formosae》, among these species, he proposed a new species, as *P. arctata* Hayata, and the two other species were *P. sibirica* Linn. and *P. watterersii* Hance.

In 1911, Hayata published his famous 《Icones Plantarum Formosanarum, Volume. One》, he listed *P. arctata* Hayata, *P. glomerata* Lour., *P. japonica* Houtt., *P. tatarinowii*. Reo. and *P. watterersii* Hance, a total of five species in this volume of book.

*Polygala crassiuscula* Hayata and *P. stenophylla* Hayata, two new species add to Flora of Taiwan, which were described by Hayata in his 《Icones Plantarum Formosanmarum, Vol. 3》 in 1913.

*Polygala shimadae*, a new species of genus *Polygala* was describes by Masamune (1931) in 《*Journal Society Tropical Agriculture*》 volume three, page 144.

Thereafter, the plant taxonomists of Taiwan who studied the genus *Polgala* of Taiwan, were not escape this range.

《Flora of Taiwan, first edition》 was published in 1978, the family Polgalaceae was contributed by Huang, T. C. he described five species in genus *Polygala*, these species are:

1. *Polygala arctata* Hayata
2. *Polygala japonica* Houtt.
3. *Polygala paniculata* Linn. a naturalized species
4. *Polygala polyfolia* Presl.
5. *Polygala tatarinoowiii*. Regel.

A revised and supplementary edition of 《Flora of Taiwan, secondary edition》 was published in 1998. the family Polgalaceae was still wrote by Huang, T. C. he also described five species in genus *Polygala*. However, there is no thing new except he list *P. polyfolia* Presl. as a synonym of *P. glomerata* Lour.

More than 20 years have passed, molecular plant taxonomy grow up, it seeks to provide conceptual as well as technical guidelines to plant taxonomists and geneticists. molecular approaches also provide a better understanding of evolutionary processes, a particularly important issue for some taxonomic complex groups. Therefore, a new milestone for plant taxonomy is coming, definition of genus and specis more clear.

The author tries to revise the genus *Polygala* of Taiwan based on newest information of genus *Polygala*, and tries to establish to a new species, which was discovered at Sandiaojiao, mosteastern area of Taiwan, by the author.

## **Polygala Linn. 遠志屬**

Sp. Pl. 2:701 (1753).

The genus name is an accepted name , about 500 species, worldwide distribution. 6 species in Taiwan.

### **1.Polygala arctata Hayata 巨葉花遠志**

J. Coll. Sci. Imp. Univ. Tokyo 25(19): 54 – 55, *pl. 1*(1908).

**The specific name is an accepted name , the synonym of the species is are list below:**

*Polygala crassiuscula* Hayata, Icon. Pl. Formosan. 3: 32 – 33( 1913).

Endemic to Taiwan, known from medium to high altitudes 1700-2600 m in central and southern parts of the island, under forests, rather common.

### **2.Polygala chinensis Linn. 華南遠志**

Sp. Pl. 2:704 (1753).

**The specific name is an accepted name , the synonym of the species are list below:**

*Polygala glomerata* Lour., Fl. Cochinch. 2: 426 ( 1790).

*Polygala sinensis* J.F.Gmel., Syst. Nat. 1082 (1791).

*Polygala telephioides* Willd., Sp. Pl. 3: 876 (1802).

*Polygala telephioides* Willd., Sp. Pl. 3: 876(1802).

*Polygala tranquebarica* Mart., Denkschr. Königl.-Baier. Bot. Ges.

Regensburg 1(1): 186 (1815).

*Polygala varians* Mart., Denkschr. Königl.-Baier. Bot. Ges.

Regensburg 1(1): 184 (1815).

*Polygala procumbens* Roth, Nov. Pl. Sp. 329 (1821).

*Polygala densiflora* Blume, Bijdr. Fl. Ned. Ind. 59 (1825).

*Polygala rothiana* Wight & Arn., Prodr. Fl. Ind. Orient. 37 (1834).

*Polygala toxoptera* Turcz., Bull. Soc. Imp. Naturalistes Moscou **27**(2): 348  
(1854).

*Polygala exigua* Hassk., Ann. Mus. Bot. Lugduno-Batavi **1**: 173 (1863).

*Polygala thwaitesii* Hassk., Ann. Mus. Bot. Lugduno-Batavi **1**: 169 (1864).

*Polygala socotrana* Chodat, Bull. Herb. Boissier **4**: 236 (1896).

*Polygala chinensis* var. *villosa* (C.Y. Wu & S.K. Chen) S.K. Chen & J.A.N.  
Parnell, Fl. China **11**: 155 (2008).

Vietnam · New Guinea · Indonesia · Thailand · Philippines · India · Malaysia ·  
Cambodia · Laos and Mainland China (Fujian · Guangdong · Guangxi · Hainan · Guizhou ·  
Sichuan · Yunnan · Zhejiang) and Taiwan ° Taiwan, known from lower altitude of 100-500  
meters throughout the island, roadsides and grasslands.

### 3. *Polygala sibirica* Linn. 遠志

Sp. Pl. 702 (1753).

**The specific name is an accepted name, the synonym of the species are list below:**

*Polygala japonica* Houtt., Handl. Pl.-Kruiddk. **10**: 89 (1780).

*Polygala monopetala* Cambess., Voy. Inde **4**: 25 (1841)

*Polygala sibirica* var. *monopetala* (Cambess.) Chodat, Mém. Soc. Phys. Genève  
**31**(2): 349 (1893).

*Polygala sibirica* var. *japonica* (Houtt.) Ito, Tent. Fl. Lutchu. 311 (1899).

*Polygala luzoniensis* Merr., Philipp. J. Sci. **1**(Suppl. 3): 202 (1906).

*Polygala taquetii* H. Lév., *Repert. Spec. Nov. Regni Veg.* **12**(317 – 321): 181 (1913).

*Polygala japonica* var. *angustifolia* Koidz., Fl. Symb. Orient.-Asiat. **8** (1930).

*Polygala sibirica* f. *ciliata* Tamamsch., *Repert. Spec. Nov. Regni Veg.* **39**: 321  
(1936).

*Polygala sibirica* var. *hakobii* Tamamsch., *Repert. Spec. Nov. Regni Veg.* **39**: 321  
(1936).

*Polygala sibirica* f. *latifolia* Tamamsch., *Repert. Spec. Nov. Regni Veg.* **39**: 321

(1936).

*Polygala sibirica* var. *ciliata* (Tamamsch.) Nevski, Fl. URSS 14: 251(1949).

*Polygala hakobii* (Tamamsch.) Nevski, Fl. URSS 14: 251 (1949).

*Polygala japonica* f. *ovatifolia* Chodat, N/W

E. Siberia · Japan · Korea · NE India · Malaysia · Myanmar · New Guinea · Philippines · Sri Lanka · N Vietnam and Mainland China (Fujian · Gansu · Guangdong · Guangxi · Guizhou · Hebei · Henan · Hubei · Hunan · Jiangsu · Jiangxi · Liaoning · Shaanxi · Shandong · Sichuan · Xinjiang · Yunnan · Zhejiang) and Taiwan. Taiwan, known from low to high altitudes of 200-2900m throughout the island, roadsides, opened fields and grasslands.

#### 4. *Polygala paniculata* Linn. 圓錐花遠志

Syst. Nat. ed. 10, 2: 1154 (1759).



*Polygala paniculata* Linn. a naturalized species in Taiwan



The specific name is an accepted name , the synonym of the species are list below:

*Polygala ramosissima* Cav., Anales Ci. Nat. **4**: 53 (1801).

*Polygala brasiliensis senus* Mart., Denkschr. Königl.-Baier. Bot. Ges.

Regensburg **1**(1): 186 (1815). *non* Linn.

*Polygala paniculata* f. *humilis* Chodat, Bull. Soc. Roy. Bot. Belgique **30**(1): 301  
(1891) publ.( 1892).

*Polygala carlotina* E.H.L.Krause, Beih. Bot. Centralbl. **32**(2): 341(1914).

*Polygala paniculata* f. *leucoptera* S.F.Blake, Contr. Gray Herb. **2**(47): 101(1916).

*Polygala paniculata* var. *leucoptera* S.F. Blake, Contr. Gray Herb. **2**(47): 101(1916).

Native to Central and South America , widely naturalized in the tropics and subtropics ° Taiwan , known from plain to medium altitudes of 0-1500m throughout the island. roadsides and grasslands, rather common.

#### 4.Polygala polifolia C. Presl. 小花遠志

Reliq. Haenk. **2**(2): 101(1835)..

The specific name is an accepted name , the synonym of the species are list below:

*Polygala brachystachya* DC., Prodr. **1**: 326(1824).

*Polygala telephioides* A.W. Benn. N/A, (1872), *non*Willd, (1802).

*Polygala chinensis* f. *arvensis* (Willd.) Chodat, Mém. Soc. Phys. Genève **31**(2): 386  
(1893).

*Polygala kinii* Courtois, Mem. Hist. Nat. Emp. Chinois **6**(1): 34 (1920).

*Polygala shimadae* Masam., J. Soc. Trop. Agric. **3**: 144, f. 15(1931).

*Polygala arvensis* Adema, N/A 1966, *non*Willd, (1802).

*Polygala warburgii* Chodat, N/A

Australia 、 Vietnam 、 Sri Lanka 、 Indonesia 、 Bangladesh 、 Thailand 、 Philippines 、 India 、 New Guinea 、 Malaysia 、 Pakistan 、 Cambodia 、 Laos 、 Maniland China (Fujian 、 Anhui 、 Guangxi 、 Guangdong 、 Guizhou 、 Hainan 、 Jiangsu 、 Jiangxi 、 Yunnan 、 Zhejiang)

and Taiwan ° Taiwan , known from lower altitudes of 50-900 m. throughout the island, roadsides and grasslands.

### 5. *Polygala tatarinowii* Regel. 小扁豆

Pl. Radd. 1: 278, *pl. 7, f. 10 - 11* (1861).



*Polygala tatarinowii* Rege . flowering plants

The specific name is an accepted name , the synonym of the species are list below:

*Polygala triphylla* Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. 1: 200 (1825).

*Salomonina martinii* H. Lév., Bull. Soc. Bot. France 51: 290(1904)

*Semeiocardium hamiltonii* Hassk., Ann. Mus. Bot. Lugduno-Batavi 1: 151 (1863).

*Heterosamara tatarinowii* (Regel) Paiva, Fontqueria 50: 130(1998).

*Polygala sieboldiana* Miq., Verslagen Meded. Afd. Natuurk. Kon. Akad. Wetensch. II, 2: 85 (1868).

E. Siberia, Japan, Korea, Kashmir, N Myanmar, Philippines; Malesia, Philippines (Luzon, Mindanao), New Guinea (Sepik), Bhutan, India, Mainland China (Anhui, Fujian,

Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan, Zhejiang) and Taiwan. Taiwan, known from low to high altitudes 500-2500m throughout the island, roadsides and thickets.



#### 6. *Polygala sandiaochiaoensis* S. S. Ying)

*Polygala sandiaochiaoensis* S. S. Ying, sp. nov. 三貂角遠志

TYPE:TAIWAN. New Taipei City, Gongliao Distract (貢寮區), Sandiaojiao(三貂角) 50 m alt. S. S. Ying, s.n. January 30, 2020. (holotype, NTUF).

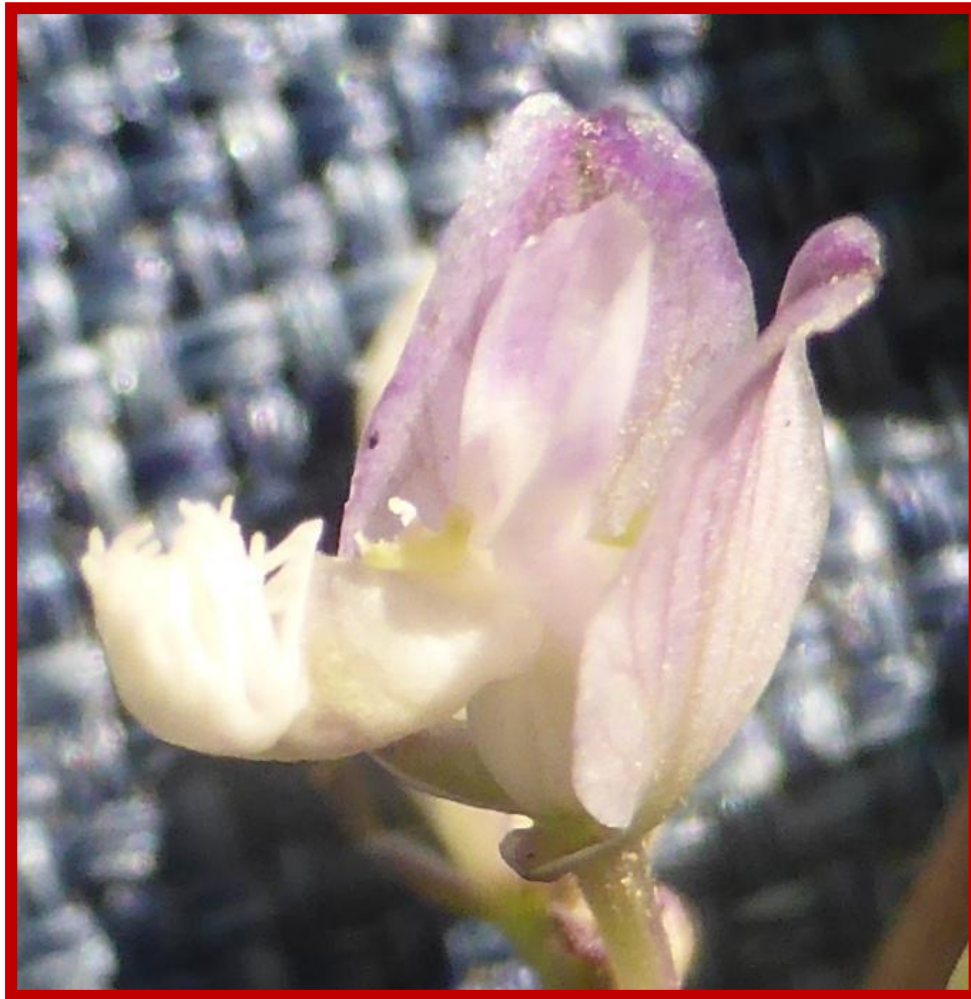
**Morphology** : A small perennial herb, roots somewhat lignification, few fibrous roots; stem short, 1-1.5 cm long, many branched upward; branches slender, 6-15 cm long, somewhat prostrate, slightly hairy, brownish. Leaves simple, alternate, small, ovate to oblong, 5-20



*Polygala sandiaochiaensis* S. S. Ying with flowers and immature fruit

mm long, 4-9 mm wide, obtuse with a mucronate at apex, narrowed at base, coriaceous, entire, lustrous surface and pale green beneath, glabrous, midrib and lateral veins slight elevated surface and elevated beneath. petioles short, 2-3 mm long, glabrous.

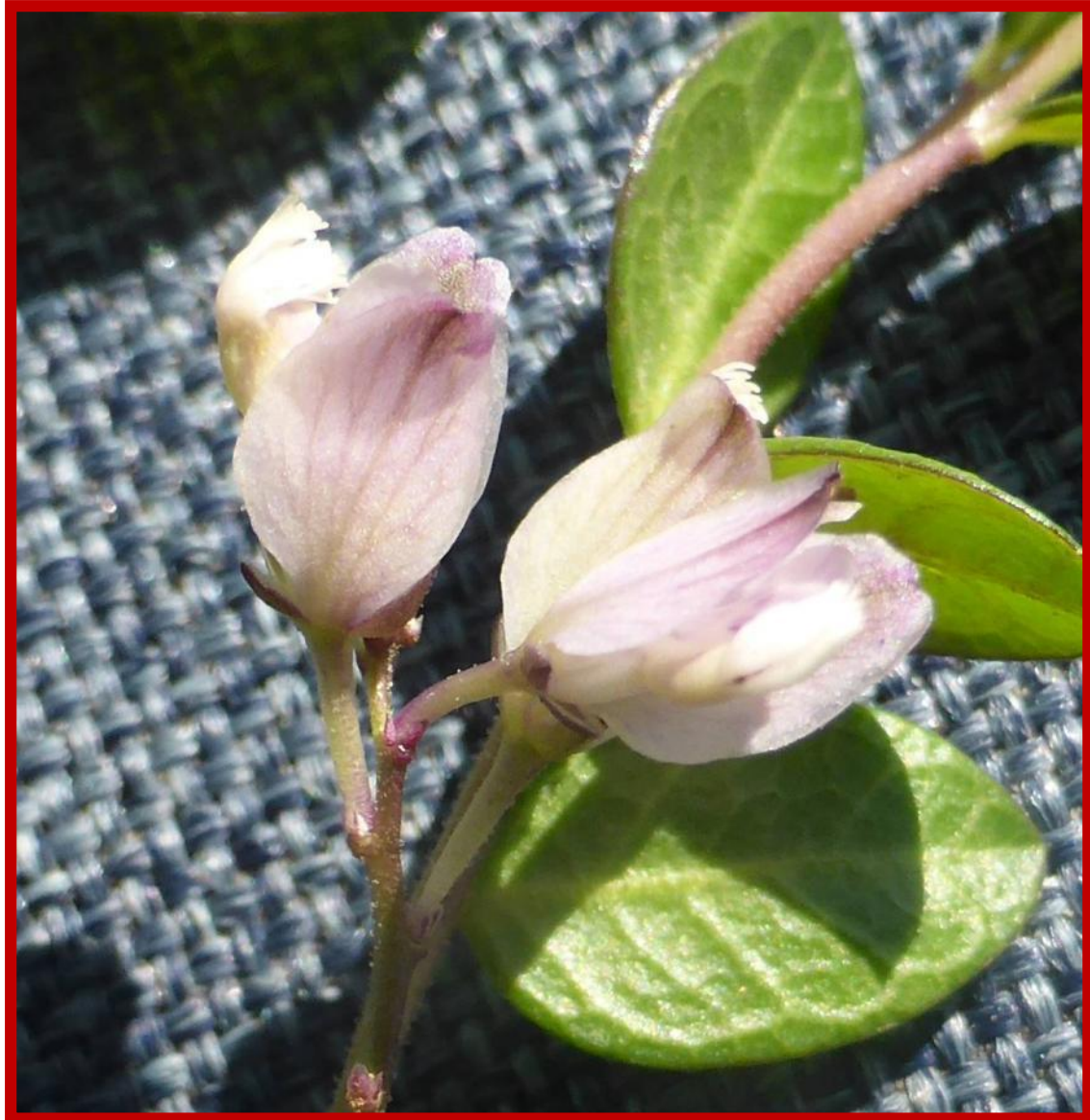
Flowers solitary to 3, terminal to axillary, racemose, 4-5 mm long, red to pink in colour; peduncle 6-9 mm long, hairy; pedicels 4-6 mm long, slight pubescent; bracts 2 at the base of pedicels, minute, about 1 mm long; sepals 5, unequal, the outer 3 small, ovate, 1-2 mm long, acuminate at apex; the inner 2 large, petaloid, oblong, 5-6 mm long, 2.5-3 mm wide, obtuse and slightly reflex at apex, pink; petals 3 connate at base, lateral petals



*Polygala sandiaochiaoensis* S. S. Ying the flower with short spur



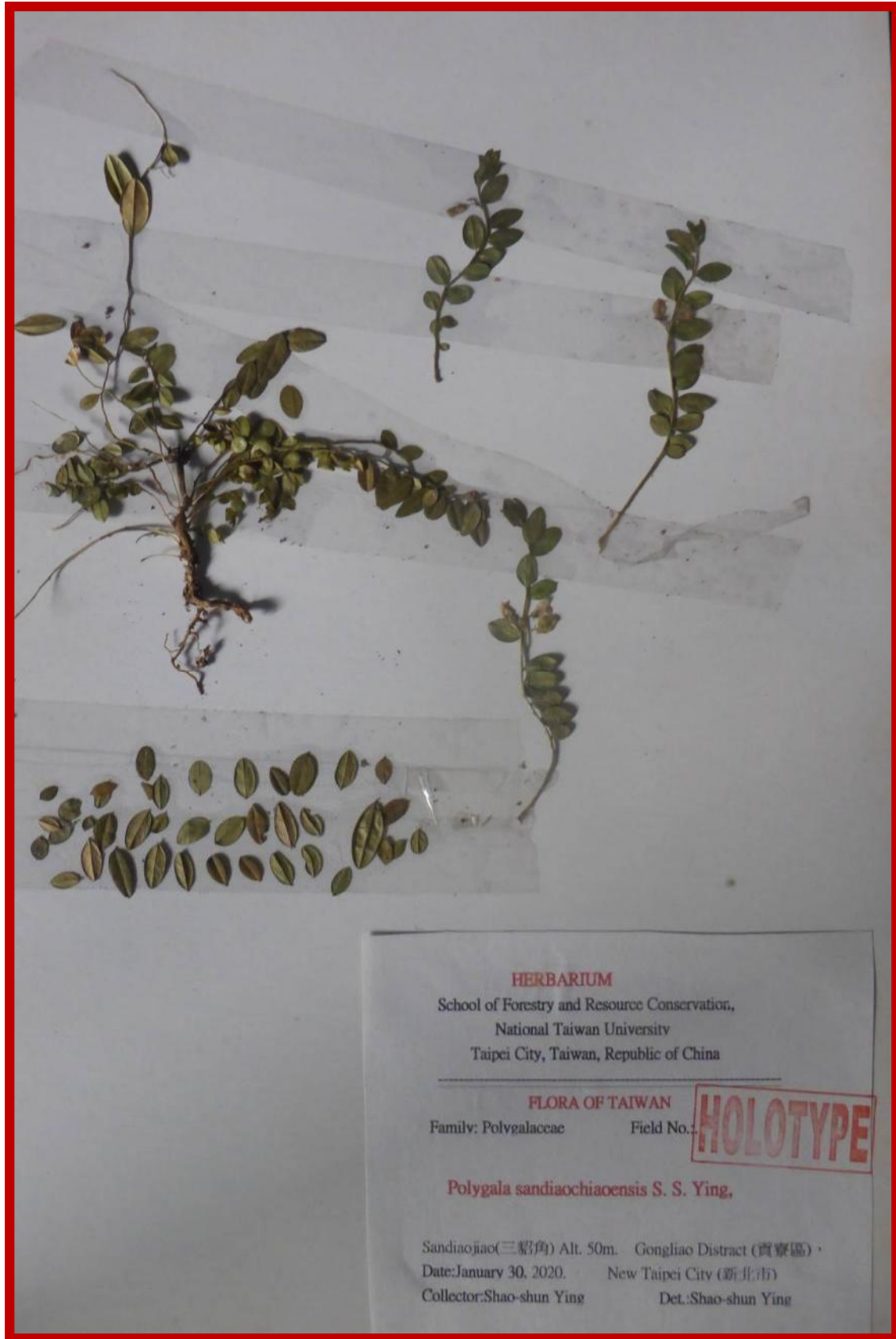
*Polygala sandiaochiaoensis* S. S. Ying the immature fruit with persistent sepals -99-



*Polygala sandiaochiaensis* S. S. Ying the branch with inflorescence

oblong, 5-6 mm long, 2-3 mm wide, obtuse at apex; keel boat-shaped, white, 6-8 mm long, 3-5 mm wide, extended, fimbriate upward, not reflex; spur short, about 1.5 mm long, obtuse at apex; stamens 8, filaments 4-5 mm long, united at base and forming trough-shaped sheath opened one side; anthers basifixed, sessile; ovary ovoid, 2 mm in diameter, glabrous; style slender, included, 3-3.5 mm long; stigma head-like, small.

Immature fruits disciform, 4-5 mm in diameter, winged at margins, emarginate at apex, sepals persistent.



*Polygala sandiaochiaoensis* S. S. Ying, the holotype

**Diagnosis.**

The species is characterized by its smaller leaves, smaller flowers and white lip with fimbriate upward.

**Distribution and phenology.**

*Polygala sandiaochiaoensis* S.S. Ying is endemic to Taiwan ° It is known from Sandiao Cape (三貂角), the eastmost point of Taiwan , Gongliao Distract (貢寮區) ,



*Polygala sandiaochiaoensis* S. S. Ying the branch with inflorescence



New Taipei City, northern Taiwan ◦ It was collected on the side of hiking trail , at elevations between 50 meters above sea level and flowering time from December to February next year ◦



*Polygala sandiaochiaoensis* S. S. Ying the plant with flowers



*Polygala sibirica* Linn.

## 12. Two New Species of Genus *Galium* (*Rubiaceae*) from Taiwan

### A. *Galium hohuanshanense* S.S. Ying

*Galium hohuanshanense* S.S. Ying, *sp. nov.* 合歡山豬殃殃

TYPE: TAIWAN. Hualien county, Xiulin Township (秀林鄉), Hohuanshan (合歡山) 2850 m alt. S. S. Ying, *s.n.* June 4, 2020 (holotype, NTUF) ◦



*Galium hohuanshanense* S. S. Ying the plant with flowers and fruits

**Morphology :** A prostrate to ascending herb, stems elongate, 30-50 cm long, much-branched; the branches 4-angled, 3-4 mm in diameter, villous, often rough when touch. Leaves 6-8, verticillate, oblanceolate to narrowed spatulate, 4-6 cm long, 3-5 mm wide, obtuse and mucronate at apex, narrowed and amplexual at base, chartaceous, ciliate at margins, villous on both surfaces, feeling rough when touch, midrib impressed surface



*Galium hohuanshanense* S. S. Ying the plant with flower-buds



*Galium hohuanshanense* S. S. Ying the habitat



*Galium hohuanshanense* S. S. Ying the plant with flowers and fruits



*Galium hohuanshanense* S. S. Ying the plant with fruits

and elevated beneath, lateral veins inconspicuous. petioles absent.

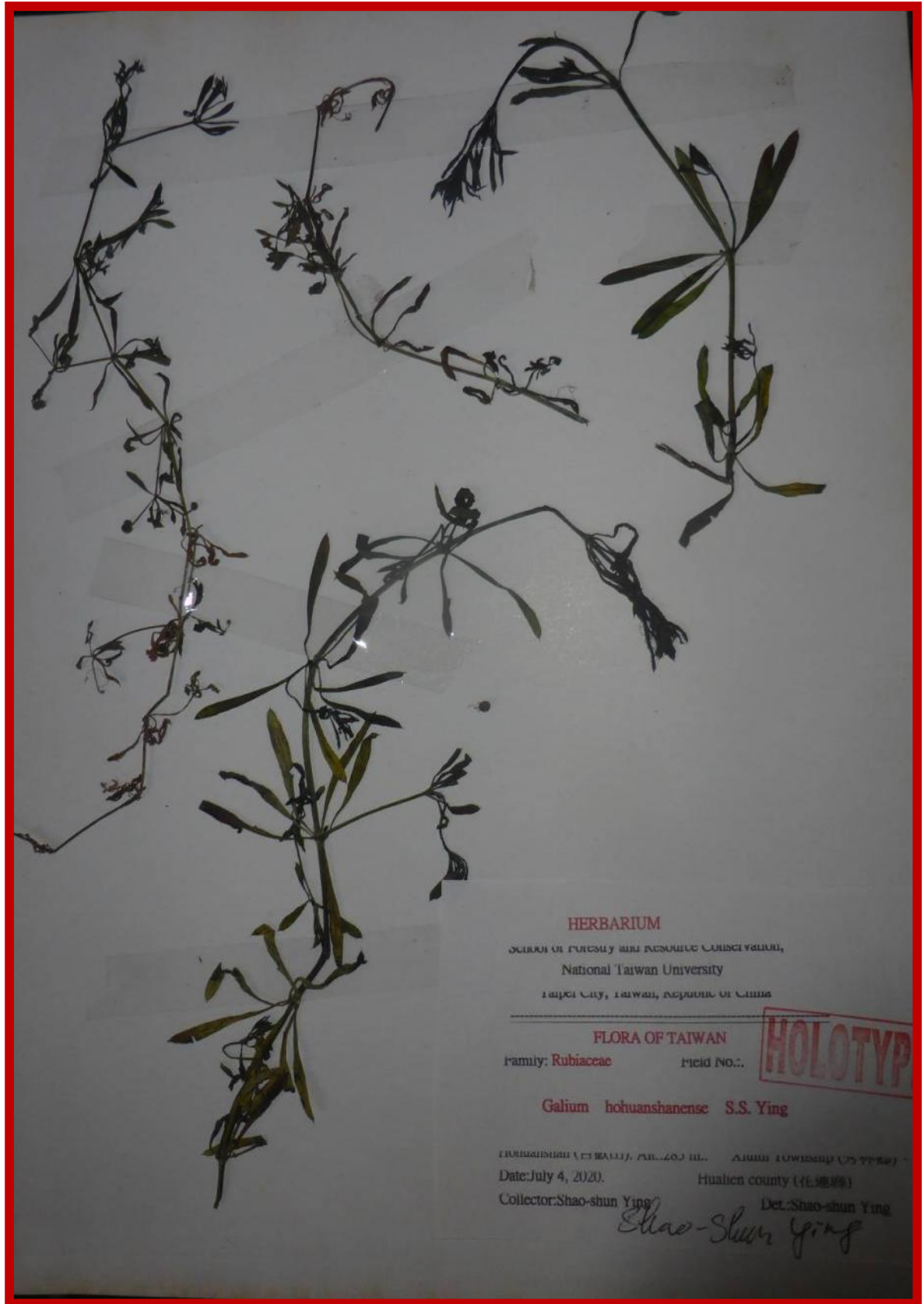
Flowers solitary, terminal to axillary, white, 1.5-2.5 mm in diameter when opened; pedicels 1-2 cm long, slender, hairy; bracts absent or minute; calyx minute, inconspicuous; corolla 2-3 mm long, 4-lobed at apex; the lobes rounded, 1-1.5 mm long and wide, obtuse at apex, glabrous; stamens 4; filaments short, not exerted; anthers dorsifixed; ovary inferior, didymous, compressed ovoid, green, densely covered white trichomes; stigma 2-lobed, caudous.

Immature fruits with 2 mericarps, the mericarps compressed ovoid, 2-3 mm long, 1.5-2 mm wide, with a dense cover of uncinat trichomes 0.4-0.8 mm from swollen base; the pedicels elongate, 2-3.5 cm long, hairy. .

#### **Diagnosis.**

*Galium hohuanshanense* is the species with largest leaves among the Taiwan *Galium* plants, it is characterized by:

1. Leaves 6-8, verticillate, oblanceolate to narrowed spatulate, 4-6 cm long, 3-5 mm wide,



*Galium hohuanshanense* S. S. Ying, the holotype

obtuse and mucronate at apex.

2.Flowers solitary, white, small, 1.5-2.5 mm in diameter when opened.

3.Mericarps compressed ovoid, with a dense cover of uncinat trichomes.

### **Distribution and phenology.**

*Galium hohuanshanense* S.S. Ying is endemic to Taiwan ◦ It is known from Hohuanshan (合歡山) 2850 m alt., Xiulin Township (秀林鄉). Hualien county , eastern Taiwan ◦ It was collected on the roadsides of highway , at elevations about 2850 m. and flowering time is July.

### **B.Galium siyuanianum S.S. Ying**

*Galium siyuanianum* S.S. Ying, *sp. nov.* 思源豬殃殃

TYPE:TAIWAN. I-Lan County,Tatung Township (大同鄉) , Siyuanyakou (思源埡口) 1710 m alt. *S. S. Ying* , *s.n.* July 4, 2020 ◦ (holotype , NTUF) ◦



*Galium siyuanianum* S. S. Ying, the plant with inflorescence



*Galium siyuanianum* S. S. Ying, flowering plant

**Morphology :** A erect herb, stems elongate, 25-60 cm long, much-branched; the branches 4-angled, 2.5-3.5 mm in diameter, villous, often purplish red when young and becoming to green. Leaves 6-7, verticillate, oblong, 1.5-2 cm long, 4-6 mm wide, obtuse and mucronate at apex, narrowed and somewhat cuneate at base, chartaceous, ciliate at margins, lustrous green surface and pale green beneath, glabrous on both surfaces, midrib impressed surface, and elevated beneath, lateral veins inconspicuous. petioles slender, 3-4 mm long, glabrous or nearly so.

Flowers 4-6 in a terminal cymose, white, 2-3.5 mm in diameter when opened;





*Galium siyuanianum* S. S. Ying, the habit



*Galium siyuanianum* S. S. Ying, in immature fruiting stage

inflorescence short, less than 2 cm long, 4-angled, glabrous or nearly so, green, sulcate; bracts opposite, lanceolate, 4-5 mm long, 1.5 mm wide, acuminate at apex, glabrous; pedicels 2-4 mm long, slender, glabrous; bracts absent or minute; calyx minute, inconspicuous; corolla 2.5-3.5 mm long, 4-lobed at apex; the lobes rounded, 1.5-2.5 mm long and wide, obtuse at apex, glabrous; stamens 4; filaments short, not exserted; anthers dorsifixed; ovary inferior, ovoid, 2 mm in diameter, green, densely covered white trichomes; stigma 2-lobed, cauduous.

Immature fruits ovoid, 2-3 mm long, 1.5-2 mm wide, with a dense cover of uncinata trichomes 0.4-0.6 mm from swollen base; the pedicels elongate, 4-6 cm long, glabrous..



*Galium siyuanianum* S. S. Ying, the peduncle of inflorescence very short (upper left corner), but the pedicels of fruits becoming to very elongate)

**Diagnosis.**

*Galium siyuanianum* is a erect herb in northern Taiwan, it is characterized by:



*Galium siyuanianum* S. S. Ying, the holotype

1. Leaves 6-7, verticillate, oblong, 1.5-2 cm long, 4-6 mm wide, obtuse and mucronate at apex; petioles slender, 3-4 mm long. .
2. Peduncles of inflorescence very short, but the pedicels of fruits becoming to elongate, 4-5 times as long as the peduncles.
3. Flowers few in terminal cymose, white, small, 2-3.5 mm in diameter when opened.
3. Fruits ovoid, 2-3 mm long, 1.5-2 mm wide, with a dense cover of uncinata trichomes.

**Distribution and phenology.**

*Galium siyuanianum* S.S. Ying is endemic to Taiwan ° It is known from Siyuanyakou (思源埡口), Tatung Township (大同鄉), I-lan county, northern Taiwan ° It was collected on the roadsides of highway, at elevations about 1710 m.. and flowering time is June to July, Fruiting time is July to September. .



*Galium siyuanianum* S. S. Ying, the inflorescence

## 13.A Revision to the Scientific Names of Genus *Vigna* (Fabaceae) in Taiwan

Based on T.C. Huang & H. Ohashi (1993). *Vigna*, 《Flora of Taiwan, secondary edition》 3:382-393.

Those species were treated by Huang and Ohashi in Flora of Taiwan Vol. 3.

1. *Vigna adenantha* (G. F. Meyer) Marechal, Mash. & Stain. 腺藥豇豆
2. *Vigna angularis* (Willd). Ohwi & Ohashi var. *nipponensis* (Ohwi) Ohwi & Ohashi 野豇豆
3. *Vigna hosei* (Craib.) Backer 和氏豇豆
4. *Vigna luteola* (Jacq.) Benth. 長葉豇豆
5. *Vigna marina* (Burm.) Merr. 濱豇豆
6. *Vigna minima* (Roxb.) Ohwi & Ohashi  
var. *minima* 小豇豆  
var. *minor* (Matsum.) Tateishi. 小葉豇豆
7. *Vigna radiata* (Linn.) Wilczek.  
var. *radiata* 綠豆  
var. *sublobata* (Roxb.) Verdc.. 三裂葉豇豆
8. *Vigna reflexo-pilosa* Hayata 曲毛豇豆
9. *Vigna umbellata* (Thunb.) Ohwi & Ohashi 赤小豆
10. *Vigna vexillata* (Linn) A. Rich. var. *tsuimensis* Matsum. 野豇豆

### **Vigna Savi** 豇豆屬

Nuovo Giorn. Lett. 8: 113 (1824).

The genus name is a accepted name , about 119 species distributed in tropical and subtropical regions of the world. **15 species, 2 subspecies and 3 variety are recognized in Taiwan in this study.**

## 1. *Vigna acuminata* Hayata 狹葉豇豆

Icon. Pl. Form. 9:34 (1920).

The specific name is an **accepted** name,

No synonyms are recorded for this name.

Endemic species, known from northern part of Taiwan, somewhat rare.

## 2. *Vigna adenantha* (G. F. Meyer) Marechal, Mash. & Stain. 腺藥豇豆

Taxon. 27: 202. (1978).

**Basionym:** *Phaseolus adenanthus* G.Mey., Prim. Fl. Esseq. 239 – 240 (1818).

The specific name is an accepted name,

**20 Synonyms are recorded:**

*Phaseolus alatus* Roxb., Hort. Bengal. 54 (1814).

*Phaseolus truxillensis* Kunth. Nov. Gen. Sp. (folio ed.) 6: 353. 1824. (12 Jul 1824)

*Phaseolus cirrosus* Kunth, Nov. Gen. Sp. (folio ed.) 6: 351 (1824).

*Phaseolus amoenus* Macfad., Bot. Misc. 2: 113(1830).

*Phaseolus barbulator* Benth., Comm. Legum. Gen. 74 – 75 (1837).

*Phaseolus brevipes* Benth., Comm. Legum. Gen. 75 (1837).

*Phaseolus caeduorum* Mart. ex Benth., Comm. Legum. Gen. 74 (1837).

*Phaseolus cumingii* Benth., Comm. Legum. Gen. 75 (1837).

*Phaseolus latifolius* Benth., Comm. Legum. Gen. 75 (1837).

*Phaseolus radicans* Benth., Comm. Legum. Gen. 74 (1837).

*Phaseolus subtortus* Benth., Comm. Legum. Gen. 74 (1837).

*Phaseolus macfadyeni* Steud., Nomencl. Bot. (ed. 2) 2(10): 317 (1841).

*Phaseolus surinamensis* Miq., Ann. Mag. Nat. Hist. 11: 14 (1843).

*Phaseolus cuernavacanus* Rose, Contr. U.S. Natl. Herb. 8(4): 311 (1905)

*Phaseolus occidentalis* Rose, Contr. U.S. Natl. Herb. 8(4): 312 (1905)

*Phaseolus adenanthus* var. *caeduorus* (Benth.)Hassl., Candollea 1: 442 (1923).

*Phaseolus adenanthus* var. *radicans* (Benth.)Hassl., Candollea 1: 443 (1923).

*Vigna gentryi* (Standl.) Stainier & F.Horvat, Pollen & Spores 25: 31 (1983).

*Phaseolus rostratus* Wall., Pl. Asiat. Rar. 1: 50, *pl.* 63 (??)

*Phaseolus senegalensis* Guill. & Perr., Fl. Seneg. Tent. 1: 217(??)

Widely distributed in Asia (Cambodia · India · Indonesia · Irian · Laos · Malaysia · Peninsular Malaysia · Philippines · Ryukyu Is · Sri Lanka · Sulawesi · Thailand · Vietnam) Australia · Central America · Northern America (Florida) and South America · Taiwan, known from lower altitudes of southern part of the island, roadsides and wild fields °

### 3. *Vigna angularis* (Willd.) Ohwi & Ohashi 紅豆

J. Jap. Bot. 44(1): 29 (1969).

**Basionym:** *Dolichos angularis* Willd, Sp. Pl. 3(2): 1051.(1802).

The specific name is an **accepted** name,

#### 4 Synonyms are recorded:

*Azuki angularis* (Willd.) Ohwi, Fl. Jap. 691 (1953).

*Phaseolus angularis* (willd.) W. Wight, U.S.D.A. Bur. Pl. Industr. Bull. 137: 17 (1909).

*Phaseolus chrysanthos* Savi, Nuovo Giorn. Bot. Ital. 3: 318 (1821).

*Phaseolus mungo sensu* Wall, Numer. List n.5589C (1831), *non* Linn.

Native in Asia (Mainland China · India · Japan · Nepal and Vietnam), and introduced to Africa and Pacific Ocean. **Taiwan, introduced it from Mainland China, as a crop for its seeds, often cultivated at southern part of island.**

### 3-1. *Vigna angularis* (Willd.) Ohwi & Ohashi var. *nipponensis* (Ohwi) Ohwi & H. Ohashi 野紅豆

J. Jap. Bot. 44(1):30 (1969).

**Basionym:** *Phaseolus nipponensis* Ohwi, J. Jap. Bot. 13:435 (1937).

The variety name is an **accepted** name,

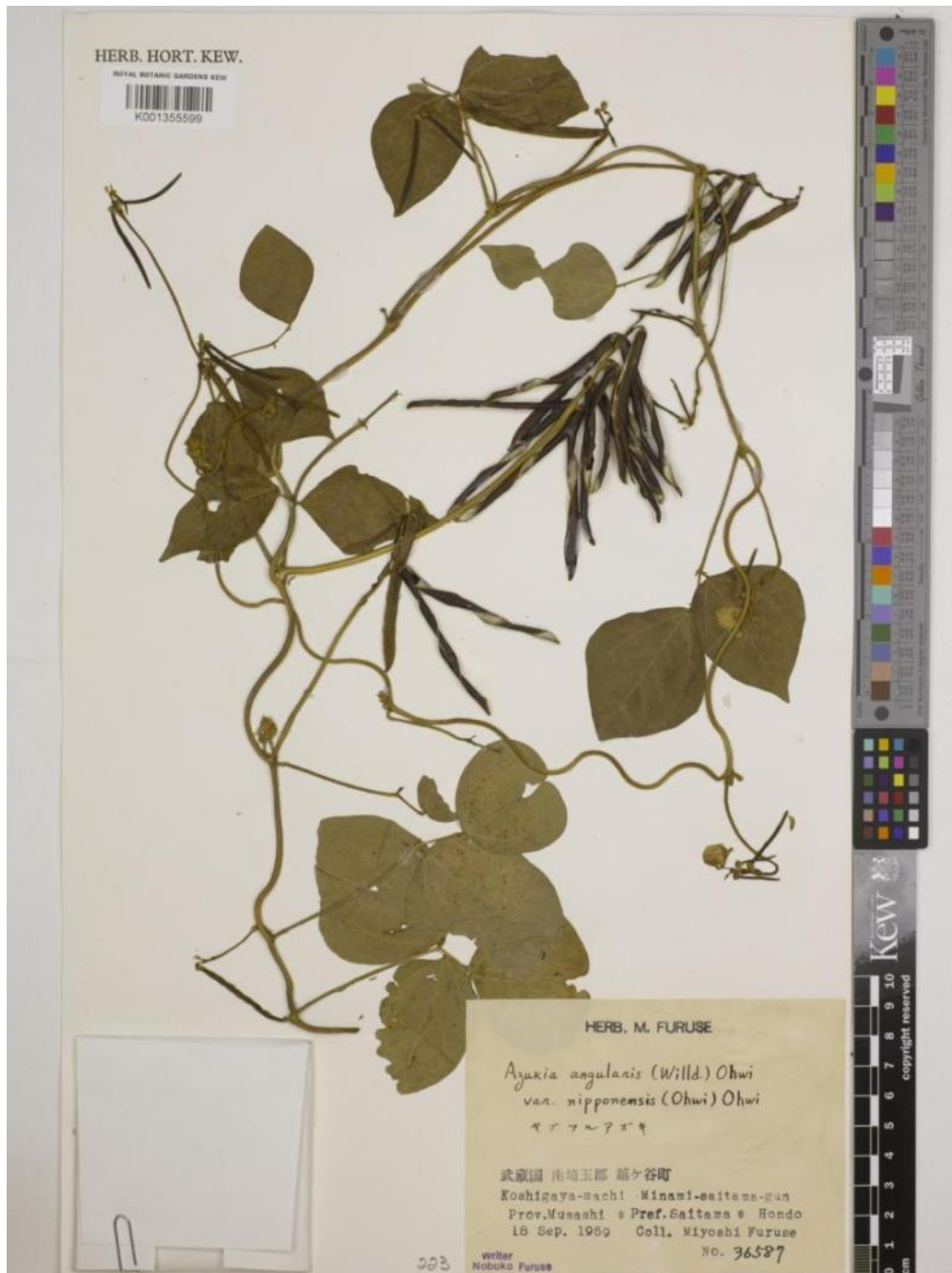
#### 2 Synonyms are recorded:



*Azukiia angularis* var. *nipponensis* (Ohwi) Ohw, Fl. Jap. 691 (1953).

*Phaseolus angularis* var. *nipponensis* (Ohwi) Ohwi

Japan, Korea and Nepal. **Taiwan**, known from central and southern parts of the island



[A specimen of \*Vigna angularis\* var. \*nipponensis\* from Kew Herbarium](http://specimens.kew.org/herbarium/K001355599)

<http://specimens.kew.org/herbarium/K001355599>

at medium altitude of 700-1700 meters above sea level, wild fields and along the thicks.

#### 4. *Vigna gracilicaulis* (Ohwi) Ohwi & H. Ohashi 細莖豇豆

J. Jap. Bot. 44(1):30 (1969).

**Basionym:** *Phaseolus gracilicaulis* Ohwi, Acta Phytotax. Geobot. 12(2): 111 – 112. (1943).

The specific name is an **accepted** name,

**1 Synonyms are recorded: same as the Basionym**

Endemic to Taiwan, known from wild fields in northern part of the island, rare.

#### 5. *Vigna hosei* (Craib) Backer 和氏豇豆

in Backer & Slooten, Geill. Handb. Jav. Theonkr. 153.(1924).

**Basionym:** *Dolichos hosei* Craib, Bull. Misc. Inform. Kew 1914: 76. (1914).



A specimen of *Vigna hosei* from Kew Herbarium (type)

<http://specimens.kew.org/herbarium/K000900686>

The specific name is an **accepted** name,

**3 Synonyms are recorded:**

*Vigna oligosperma* Backer;

*Vigna parkeri* Baker subsp. *acutifoliola* Verdc., Kew Bull. 24(3): 530 (1970),

*Vigna parkeri* subsp. *maranguensis* (Taub. ex Engl.) Verdc., Kew Bull. 24(3):  
530 – 531 (1970), *p.p.*

Asia (India · Indonesia · Japan · Malaysia · Peninsular Malaysia · Ryukyu Is. · Sarawak · Sri Lanka and Taiwan), Africa (Kenya · Rwanda · Tanzania), Australia, North America (Florida) and **South America** (Surinam). **Taiwan, known from lower altitudes of southern part of the island, grasslands, roadside and along thickets, somewhat rare.**

**6. *Vigna luteola* (Jacq.) Benth. 長葉豇豆**

in Martius, Fl. Bras. 15(1): 194. (1859).

**Basionym:** *Dolichos luteolus* Jacquin, Hort. Bot. Vindob. 1: 39. (1770).

The specific name is an **accepted** name,

**31 Synonyms are recorded:**

*Dolichos repens* Linn., Pl. Jamaic. Pug. 19. (1759).

*Phaseolus marinus* Burm., Ind. Alt. Herb. Amboin. 18 (1769).

*Dolichos sinensis* Forssk., Fl. Aegypt.-Arab. 132 (1775).

*Phaseolus violaceus* Moench, Methodus 141 (1794).

*Dolichos gangeticus* Roxb., Hort. Bengal. 55 (1814).

*Dolichos niloticus* Delile, Descr. Égypte, Hist. Nat. 253, *pl.* 38 (1814).

*Vigna glabra* Savi, Oss. Phas. 3: 8 (1822).

*Dolichos glycinoides* Kunth, Nov. Gen. Sp. (quarto ed.) 6: 441 (1823).

*Phaseolus abyssinicus* DC., Hort. ex DC., Prodr. 2: 396 (1825).

*Vigna villosa* Savi, Nuovo Giorn. Lett., Sci. 10: 29 (1825).

*Scytalis helicopus* E. Mey., Comm. Pl. Afr. Austr. 146 (1836).

*Dolichos mexicanus* Schltldl., Linnaea 12(3): 329 – 330 (1838).

*Vigna helicopus* (E. Mey.) Walp., Linnaea 13: 534 (1839).

*Dolichos helicopus* (E.Mey.) Steud., Nomencl. Bot. (ed. 2) 1(5 – 6): 523 (1840).  
*Dolichos abyssinicus* Hort.ex Steud., Nomencl. Bot. (ed. 2) 1(5 – 6): 610(1840).  
*Vigna brachystachys* Benth., Bot. Voy. Sulphur 86 (1844).  
*Vigna nilotica* (Delile) Hook.f., Niger Fl. 311 (1849).  
*Vigna brasiliensis* Mart. ex Benth., Fl. Bras. 15(1B): 194 (1862).  
*Vigna gangetica* Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 43(2): 185 (1874).  
*Vigna repens* (L.) Kuntze, Revis. Gen. Pl. 1: 212 (1891).  
*Vigna repens* var. *glabra* Kuntze, Revis. Gen. Pl. 1: 212 (1891).  
*Vigna repens* var. *luteola* (Jacq.) Kuntze, Revis. Gen. Pl. 1: 212 (1891).  
*Vigna repens* var. *villosa* (Savi) Kuntze, Revis. Gen. Pl. 1: 212 (1891).  
*Orobis trifoliatum* Sesse & Moc., Fl. Mexic. (ed. 2) 167 (1894).  
*Vigna holstii* Harms, Bot. Jahrb. Syst. 26: 311 (1899).  
*Vigna longepedunculata* Taub., Pflanzenw. Ost-Afrikas C 223 (1899).  
*Vigna bukobensis* Harms, Bot. Jahrb. Syst. 30: 92 (1901).  
*Phaseolus luteolus* (Jacq.) Gagnep. Fl. Indo-Chine 2: 229 (1916).  
*Calopogonium pendunculatum* Standl., Publ. Carnegie Inst. Wash. 461(4): 61 – 62  
 (1935).  
*Vigna nigerica* A.Chev., Rev. Bot. Appl. Agric. Trop. 24: 134 (1944).  
*Vigna hirsuta* Feay ex Alph.Wood, Bot. & Fl. 96 (??).

Widely distributed in **Africa** (Angola · Benin · Botswana · Cameroon · Chad · Egypt · Equatorial Guinea · Ethiopia · Gabon · Ghana · Guinea Bissau · Ivory Coast · Kenya · Liberia · Malawi · Niger · Nigeria · Principe · Rwanda · Sao Tome · Senegal · Sierra Leone · Socotra · South Africa · Sudan · Tanzania · Togo · Uganda · Zaire · Zambia · Zimbabwe), **Asia** (Bangladesh · India · Indonesia · Irian Jaya · Laos · Myanmar · Philippines · Ryukyu Is · Sri Lanka · Sumatera · Taiwan · Thailand · Vietnam), Papua New Guinea, Caribbean-TRP, **Central America** (Belize · Costa Rica · Guatemala · Mexico · Nicaragua · Panama), **Indian Ocean** (Andaman Is · Mauritius), **Middle East** (Syria), **North America** (United States: Alabama · Louisiana · Mississippi · North Carolina · South Carolina · Texas), **Pacific Ocean** (Bismarck Archipelago) · **South America** (Argentina · Chile · Colombia · French Guiana ·

Galapagos 、 Peru 、 Venezuela). Taiwan, known from lower altitude throughout the island, somewhat common.

7. *Vigna marina* (Burm.) Merr. 濱豇豆

Interpr. Herb. Amboin. 285 ( 1917).

**Basionym:** *Phaseolus marinus* Burm., Ind. Alt. Herb. Amboin 18 (1769).



*Vigna marina* (Burm.) Merr. A common climbing  
along coastal regions throughout the Taiwan.

The specific name is an **accepted** name,

**8 Synonyms are recorded:**

*Dolichos luteus* Sw. Prodr. 105 (1788).

*Phaseolus obovatus* Gagnep., Numer. List n. 5609 (1831).

*Scytalis anomala* E.Mey., Comm. Pl. Afr. Austr. 147 (1836).

*Scytalis retusa* E.Mey., Comm. Pl. Afr. Austr. 147 (1836).

*Vigna retusa* (E.Mey.) Walp., Linnaea 13: 534 (1839).

*Vigna anomala* Walp., Repert. Bot. Syst. 1(5): 779 (1843).

*Vigna lutea* (Sw.) A.Gray, U.S. Expl. Exped., Phan. 1: 452 (1854).

*Vigna repens* var. *lutea* (Sw.) Kuntze, Revis. Gen. Pl. 1: 212 (1891).

Widely distributed in **Africa** (Equatorial Guinea · Mozambique · Sao Tome & Principe · South Africa · Tanzania), **Asia** (Bangladesh · East Timor · India · Indonesia · Malaysia · Irian Jaya · Japan · Jawa · Moluccas · Peninsular Malaysia · Philippines · Ryukyu Is · Sabah · Sarawak · Singapore · Sri Lanka · Sulawesi · Sumatera · Taiwan · Thailand · Vietna), **Australasia** (Australia · Papua New Guinea), **Indian Ocean** (Aldabra Andaman Is · Laccadive Is · Madagascar · Maldives · Mauritius · Reunion · Seychelles), **North America** (United States), **Pacific Ocean** (Bismarck Archipelago · Fiji · Gilbert Is · Hawaii · Kazan Retto · Niue · Northern Marianas · Ogasawara-Shoto · Society Is · Solomon Is · Tuamotu Is). **Taiwan, known from along beach and coastal regions throughout the island, common.**

## 8. *Vigna minima* (Roxb.) Ohwi & H. Ohashi 小豇豆

J. Jap. Bot. 44(1):30 (1969).

**Basionym:** *Phaseolus minimus* Roxb., Fl. Ind. 3: 290 – 291(1832).

The specific name is an accepted name,

**6 Synonyms are recorded:**

*Phaseolus minimus* f. *heterophyllus* Hosok., J. Soc. Trop. Agric. 5: 289 (1933).

*Phaseolus minimus* f. *linealis* Hosok., J. Soc. Trop. Agric. 5: 289 (1933).

*Phaseolus minimus* f. *rotundifolius* Hosok., J. Soc. Trop. Agric. 5: 289 (1933).

*Azuki minima* (Roxb.) Ohwi, Fl. Jap. 691 (1953).

*Vigna minima* f. *heterophyllus* (Hosok.) Ohwi & H. Ohashi, J. Jap. Bot. 44(1):30 (1969).

*Vigna minima* f. *linealis* (Hosok.) Huang & Ohashi, Fl. Taiwan 3: 413 (1977)

*Vigna minima* f. *dimorphophylla* T.L. Wu, Acta Bot. Austro Sin. 3: 20( 1986).

Distributed in **Asia** (Mainland China (Hainan) 、 India 、 Indonesia 、 Kalimantan 、 Malaysia 、 Peninsular Malaysia 、 Ryukyu Is 、 Philippines 、 Sumatera 、 Taiwan 、 Thailand 、 Vietnam), **Australasia** (Papua New Guinea). **Taiwan, known from lower altitudes of 0-150 meters above sea level, grassland, roadsides and edages of the forests.**

### 8-1. *Vigna minima* (Roxb.) Ohwi & H. Ohashi var. *minor* (Matsum.) Tateishi

#### 小葉豇豆

J. Sci. Rep. Tohoku Univ. 4th (Biol) 38:346 (1983).-

**Basionym:** *Vigna lutea* var. *minor* Matsum. J. Coll. Sci. Imp. Univ. Tokyo 12: 428 (1899).



[A specimen of \*Vigna minima\* var \*minor\* from Kew Herbarium \(type\)](http://specimens.kew.org/herbarium/K001355640)

<http://specimens.kew.org/herbarium/K001355640>

The variety name is an **accepted** name,

**1 Synonym is recorded:same as the basionym.**

Distributed in Ryukiu is. and Taiwan. **Taiwan, known from coastal regions of northern part of the island, somewhat rare.**

### **9.Vigna mungo (Linn.) Hepper 黑吉豆**

Kew Bull. 11(1): 128 (1956).

**Basionym:** *Phaseolus mungo* Linn., Mant. Pl. 1:101 (1767).

The specific name is an accepted name,

**5 Synonyms are recorded:**

*Phaseolus radiatus sensu* Roxb., Hort. Bengal. 55 (1814).

*Phaseolus hernandezii* Savi, Nuovo Giorn. Lett. 3: 310 (1822).



**Seeds of *Vigna mungo* (Linn.) Hepper for foods**

[https://en.wikipedia.org/wiki/Vigna\\_mungo#/media/File:Black\\_gram.jpg](https://en.wikipedia.org/wiki/Vigna_mungo#/media/File:Black_gram.jpg)





Native in India, widely cultivated in tropics and subtropics. Taiwan, known as a crop, somewhat rare.

### 10. *Vigna pilosa* (J.G.Klein ex Willd.) Baker 毛豇豆

Fl. Brit. India 2(4): 207 (1876).

**Basionym:** *Dolichos pilosus* J.G. Klein ex Willd., Sp. Pl. Editio quarta 3(2): 1043. (1802).

The specific name is an accepted name,

**1 Synonym is recorded: same as the basionym.**



A specimen of *Vigna pilosa* (J.G.Klein ex Willd.) Baker from TAI

Distributed in Asia (Bhutan 、India 、Nepal 、Bangladesh 、Burma 、Cambodia 、Philippines 、Taiwan 、Thailand 、Vietnam). Taiwan, known from plains and lower altitudes in southern part of the island

### 11. *Vigna radiata* (Linn.) R. Wilczek 綠豆

Fl. Congo Belge 6: 386 (1954).

**Basionym:** *Phaseolus radiatus* Linn., Sp. Pl. 2: 725. (1753).

The specific name is an accepted name,

**9 Synonyms are recorded:**

*Phaseolus hirtus* Retz., Observ. Bot. 3: 38 (1783).

*Phaseolus aureus* Zuccagni, Obs. Bot., Cent. Cent. I No. D (1806).

*Phaseolus aureus* Roxb., Fl. Ind. 3: 297 – 298 (1832).

*Phaseolus abyssinicus* Savi, Mem. Reale Accad. Sci. Torino, ser. 2 38: 176 (1835).

*Phaseolus mungo* Linn var. *radiatus* ((Linn.) Baker in Hook. f., Fl. Brit. India 2:203 (1876).

*Pueraria chanetii* H.Lev., Bull. Acad. Int. Géogr. Bot. 17(210 – 211): n. p. iii (1907).

*Phaseolus chanetii* (H.Lev.) H.Lev., Bull. Acad. Int. Géogr. Bot. 17(210 – 211): n. p. iii (1907).

*Azukia radiata* (L.) Ohwi, Fl. Jap. 691 (1953).

*Phaseolus aureus* Wall., N/A

Widely cultivated in Tropics and Subtropics of both hemispheres. Taiwan a introduced species as a farm crop, often cultivated at southern part of the island.

#### 11-1. *Vigna radiata* (Linn.) R. Wilczek var. *sublobata* (Roxb.) Verdc. 三裂葉綠豆

Kew Bull. 24(3): 559 (1970).

**Basionym:** *Phaseolus sublobata* Roxb., Fl. Ind. 2: 288. (1832).

The variety name is an accepted name,

### 3 Synonyms are recorded:

*Vigna brachycarpa* Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. **43**(2): 185 (1874).

*Vigna perrieriana* R.Vig., Notul. Syst. (Paris) **14**(3): 177 (1951).

*Vigna sublobata* (Roxb.) Bairig., Panda, B.P. Choudhury & Patnaik, J. Econ. Taxon Bot. **7**(2):274 (1985), (1986). (Illegitimate).

*Vigna stipulata* Hayata, J. Coll. Sci. Imp. Univ. Tokyo **30**(1): 83 – 84 (1911).

Distributed in **Asia** (Indonesia · Mainland China · India · Laos · Taiwan · Thailand), **Indian Ocean** (Madagascar). **Taiwan, in southern part of the island, somewhat rare.**

### 12. *Vigna reflexo-pilosa* Hayata 曲毛豇豆

J. Coll. Sci. Imp. Univ. Tokyo **30**(1): 82 – 83(1911).

The specific name is an accepted name,



[A photo of \*Vigna reflexopilosa\* from the vituol Botanic Garden](https://www.virboga.de/Vigna_reflexopilosa.htm)

[https://www.virboga.de/Vigna\\_reflexopilosa.htm](https://www.virboga.de/Vigna_reflexopilosa.htm)

3 Synonyms are recorded:

*Azuki* *reflexopilosa* (Hayata) Ohwi, Fl. Jap. 691 (1953).

*Phaseolus neocaledonicus* Baker f., J. Linn. Soc., Bot. 45: 294 (1921).

*Phaseolus reflexopilosus* (Hayata) Ohwi, Acta Phytotax. Geobot. 12(1): 67 (1943).



[A specimen of \*Vigna reflexopilosa\* from Kew Herbarium](http://specimens.kew.org/herbarium/K001355659)

<http://specimens.kew.org/herbarium/K001355659>

Distributed in **Asia** (East Timor · Indonesia · Irian Jaya · Jawa · Philippines · Ryukyu Is · Sumatera · Mainland China · Thailand · Taiwan), **Australasia** (Australia · New Caledonia · Papua New Guinea), **Pacific Ocean** (Fiji). **Taiwan, known from plain to medium altitudes up to 1200 meters above sea level, along forests edge, roadsides and grassland.**

**12-1. *Vigna reflexopilosa* Hayata spp. *ryukiensis* (Ohwi) S. S. Ying 琉球豇豆**

***Vigna marina* (Burm.) Merr. spp. *ryukiensis* (Ohwi) S. S. Ying, comb. nov.**

**Basionym:** *Phaseolus ryukiensis* Ohwi, J. Jap. Bot. 13: 437. (1937)

**The subspecific name is new proposal.**

**1 Synonym is recorded:**

*Vigna ryukiensis* (Ohwi) Ohwi & H. Ohashi, J. Jap. Bot. 44: 31. (1969).

Ryukyu is. and Taiwan. Taiwan, known from coastal regions in northern regions, rare.



***Vigna reflexopilosa* spp. *ryukiensis* (Ohwi) S. S. Ying**  
**at iriomote-shima (西表島) Ryukiu (琉球)**

<http://utinatusin.com/okinawasyokubutu/hinaazuki.html>

There are only leaf size and seed shape slight difference between two taxa, the author would like to treat the taxon as a subspecies of *V. reflexopilosa* Hayata

### 13. *Vigna umbellata* (Thunb.) Ohwi & H. Ohashi 赤小豆

J. Jap. Bot. **44**(1):31 (1969).

**Basionym:** *Dolichos umbellatus* Thunb., Trans. Linn. Soc **2**: 339. (1794).

The specific name is an accepted name,

#### 9 Synonyms are recorded:

*Phaseolus torosus* Roxb., Hort. Bengal. 55 (1814).

*Phaseolus pubescens* Blume, Catalogus 93 (1823).

*Phaseolus calcaratus* Roxb., Fl. Ind. **3**: 289 – 290 (1832).

*Phaseolus riccardianus* Ten. (1833).

*Phaseolus ricciardus* Ten.

*Vigna calcarata* (Roxb.) Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 45(2): 247 (1876).

*Vigna brachycalyx* Baker, J. Linn. Soc., Bot. **25**: 310 (1889).

*Vigna papuana* Baker f., Trans. Linn. Soc. London, Bot. 9: 34 (1916).

*Azukia umbellata* (Thunb.) Ohwi, Fl. Jap. 691 (1953).

Distributes in **Africa** (Ghana ∙ Kenya ∙ Sierra Leone ∙ Zaire ∙ Zambia), **Asia** (Bangladesh ∙ Bhutan ∙ Cambodia ∙ Mainland China ∙ India ∙ Indonesia ∙ Irian Jaya ∙ Japan ∙ ; Jawa ∙ Laos ∙ Lesser Sunda Is ∙ Malaysia ∙ Nepal ∙ Pakistan ∙ Peninsular Malaysia ∙ Philippines ∙ Taiwan ∙ Thailand ∙ Sri Lanka ∙ Vietnam), **Australasia** (Australia ∙ Papua New Guinea), **Indian Ocean** (Laccadive Is ∙ Madagascar ∙ Mauritius ∙ Reunion), **Pacific Ocean** (Solomon Is). **Taiwan, known from often cultivated and naturalized in wilds, not common.**

### 14. *Vigna unguiculata* (Linn.) Walp. 豇豆

Repert. Bot. Syst. **1**(5): 779 (1843).

**Basionym:** *Dolichos unguiculatus* Linn., Sp. Pl. **2**: 725 (1753).

The specific name is an accepted name,

#### 23 Synonyms are recorded:

*Dolichos biflorus* Linn., Sp. Pl. **2**: 727 (1753).

*Dolichos sinensis* Linn., Cent. Pl. II 28 (1756).  
*Phaseolus sphaerospermus* Linn., Sp. Pl. (ed. 2) 2: 1018 (1763).  
*Dolichos catjang* Linn., Mant. Pl. 1: 269 (1767).  
*Dolichos catjang* Burm.f., Fl. Indica 161 (1768).  
*Dolichos lubia* Forssk., Fl. Aegypt.-Arab. 133 (1775).  
*Dolichos monachalis* Brot., Fl. Lusit. 2: 125 (1804).  
*Vigna catjang* Savi, Nuovo Giorn. Lett. 8: 113. (1824).  
*Dolichos melanophthalmus* DC., Prodr. 2: 400 (1825).  
*Dolichos melanophthalmus* DC., 2: 400 (1825).  
*Dolichos sphaerospermus* (Linn.) DC., Prodr. 2: 400 (1825).  
*Dolichos hastifolius* Schnizl., Flora 25(1): Beibl. 145 (1842).  
*Dolichos obliquifolius* Schnizl., Flora 25(1): Beibl. 145 (1842).  
*Vigna sinensis* (L.) Savi ex Hausskn., Cat. Hort. Bot. Bogor. 279 (1844).  
*Vigna brachycalyx* Baker f., J. Linn. Soc., Bot. 25: 310 (1889).  
*Vigna sinensis* var. *spontanea* Schweinf., Bull. Herb. Boissier 4(app.2):260 (1896).  
*Liebrechtsia scabra* De Wild., Ann. Mus. Congo Belge, Bot. sér. 4, 75 (1902).  
*Vigna sinensis* var. *catieng* sensu Chiov., Annuario Reale Ist. Bot. Roma 8(3): 438  
 (1908).  
*Vigna scabra* (De Wild.) T.Durand & H.Durand., Syll. Fl. Cong. 152 (1909).  
*Vigna scabrida* Burt Davy, Syll. Fl. Cong. 152 (1909).  
*Phaseolus unguiculatus* (Linn.) Piper, Torreyia 12(8): 190 (1912).  
*Dolichos tranquebaricus* Jacq., Hort. Bot. Vindob. 3: 39, pl. 70(??)  
*Vigna catjang* (Burm.f.) Walp., ??

Believed to have originated in West Africa. and it is an important crop in the semiarid regions across Africa and Asia. **Taiwan, known as a imported crop throughout the island.**

#### **14-1. *Vigna unguiculata* (Linn.) Walp. subsp. taiwanianus S. S. Ying 台灣野豇豆**

***Vigna unguiculata* (Linn.) Walp. subsp. taiwanianus S. S. Ying, . ssp. nov.**

TYPE:TAIWAN. I-Lan County, Toucheng township (頭城鎮) , Pei kuan tidal park (北關潮境公園) 10 m alt. *S. S. Ying* , *s.n. March 21, 2020* ° (holotype, NTUF) °



**Morphology :** A erect annual herb about 20-35 cm high, stem short, branched, glabrous; branches erect or ascending, 15-20 cm long, glabrous, green. Leaves 3-foliolate, 5- 6 cm long; leaflets ovate to ovate-oblong, 4-5 cm long, 1.5-2.5 cm wide, chartaceous,



*Vigna unguiculata* spp. taiwanianus S. S. Ying, close up of flower,

acuminate at apex, oblique at base, entire, glabrous on both surface, lustrous surface and pale green beneath, 3-nerved impressed surface and slight elevated beneath. petioles 3-5 cm long, glabrous; petiouples 0 (lateral leaflets) to 6-12 mm long (terminal leaflet), glabrous.

Flowers yellow, few fascicled on a axillary peduncle, often opened one by one; the peduncles ascending, 2-5 cm long, somewhat robust, glabrous; pedicles 0-2 mm long, glabrous; bracts absent; calyx tubular, 4-6 mm long, glabrous, 5-lobed at apex, the lobes 2-lobuled at apex; standard not extend, covered other petals, yellow tinged with red at



*Vigna unguiculata* spp. taiwanianus S. S. Ying, the plants on the wild



*Vigna unguiculata* spp. taiwanianus S. S. Ying, the plant with pods



*Vigna unguiculata* spp. taiwanianus S. S. Ying, grows on the beach of Tidal Park



*Vigna unguiculata* spp. taiwanianus S. S. Ying, flowering plant



*Vigna unguiculata* spp. taiwanianus S. S. Ying, the pods and seeds



*Vigna unguiculata* spp. taiwanianus S. S. Ying, the pods and seeds



*Vigna unguiculata* spp. *taiwanianus* S. S. Ying, the holotype

apex., 1-1.5 cm long, 7-8 mm wide, obtuse at apex; wings obliquely obovate, 6-8 mm long, 4-5 mm wide, short-claw at base; keel somewhat falcate, 7-9 mm long, 4-6 mm wide; stamens daidelpous (9+1), included, staminal sheath 5-7 mm long, 2-3 mm wide; filaments subequal, up to 4 mm long; ovary terete, 4-6 mm long, glabrous; style slender, upper part beaked.

Pod cylindric, 10-15 cm long, 3-4 mm in diameter, glabrous, 4-10 seeds in each pod; seeds oblong, 4-5 mm long and 3-4 mm wide, pale yellowish, glabrous.

### Diagnosis.

The subspecies is characterized by its erect herbs with oblique base leaflets and not extended standard, the other parts of flower (wings, keels, stamens and pistil) all envelope by the standard.

### Distribution and phenology.

*Vigna unguiculata* spp. *taiwanianus* S.S. Ying is endemic to Taiwan. It is known from Pei kuan tidal park (北關潮境公園), Toucheng township (頭城鎮), I-Lan County, northern Taiwan. It was collected on the beach of the park, at elevations of 10 meters and flowering time from March to April and fruiting time from March to May.

## 15. *Vigna vexillata* (Linn.) A. Rich. 野豇豆

Hist. Fís. Cuba, Bot. 10:191 (1845).

**Basionym:** *Dolichos vexillata* Linn., Sp. Pl. 2: 724 (1753).

The specific name is an accepted name.

### 30 Synonyms are recorded:

*Dolichos cylindricus* Desv. ex Ham., Prodr. Pl. Ind. Occid. 51 (1825).

*Dolichos vexillatus* (L.) Kunth, Nov. Gen. Sp. (quarto ed.) 6: 440 (1823).

*Phaseolus capensis* Thunb., Prodr. Pl. Cap. 130 (1800), *non* Burm.f. 1768.

*Phaseolus glycinaeformis* Weinm., Flora 4(1): 29 (1821).

*Phaseolus humifusus* Savi, Mem. Reale Accad. Sci. Torino, ser. 2 38: 177 (1835).

*Phaseolus pulniensis* Wight, Icon. Pl. Ind. Orient. pl. 202 (??).

*Phaseolus quadriflorus* Hochst. ex A. Rich., Tent. Fl. Abyss. 1: 216 (1847).

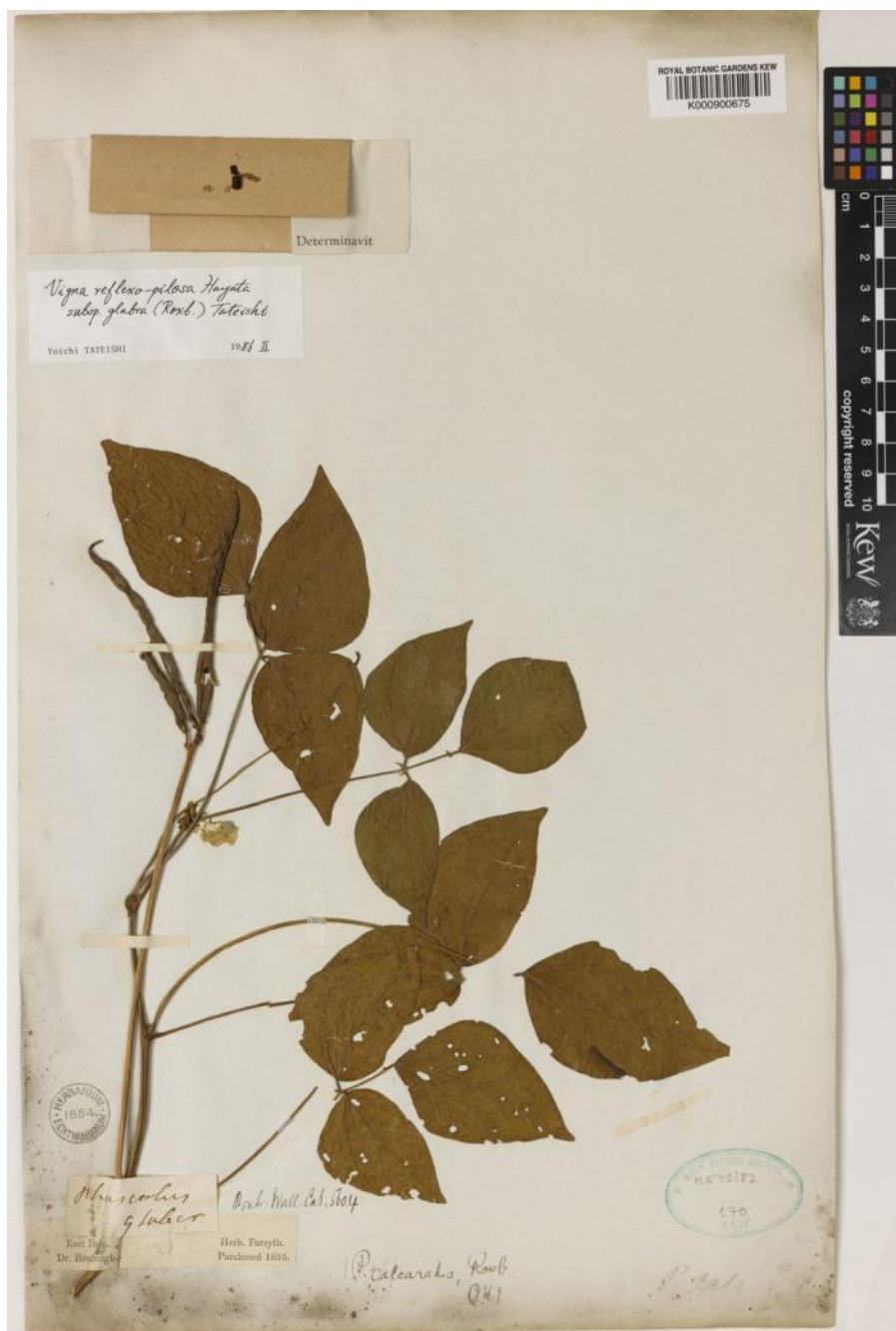
*Phaseolus sepiarius* Dalzell, Hooker's J. Bot. Kew Gard. Misc. 2: 33 (1850).

*Phaseolus vexillatus* L., Sp. Pl. **2**: 724 (1753).  
*Plectrotopis hirsuta* Schum. & Thonn., Beskr. Guin. Pl. 339 (1827).  
*Strophostyles capensis* E.Mey., Comm. Pl. Afr. Austr. 147 (1836).  
*Vigna capensis* (Thunb.) Burt Davy, Man. Pl. Transvaal **2**: xxxiv, 420 (1932)  
*Vigna carinalis* Benth., Bot. Voy. Sulphur 86 (1844).  
*Vigna crinita* A.Rich., Tent. Fl. Abyss. 1: 217 (1847).  
*Vigna davyi* Bolus, Trans. South Africa Philos. Soc. **16**: 382 (1906).  
*Vigna dinteri* Harms, Notizbl. Königl. Bot. Gart. Berlin **5**: 207 (1911).  
*Vigna dolichoneura* Harms, Notizbl. Bot. Gart. Berlin-Dahlem **14**: 113 (1938).  
*Vigna golungensis* Baker, Fl. Trop. Afr. **2**: 199 (1871).  
*Vigna hirta* Hook., Hooker's Icon. Pl. *pl.* 637 (??).  
*Vigna lobatifolia* Baker, Fl. Trop. Afr. **2**: 613 (1871).  
*Vigna phaseoloides* Baker, Fl. Trop. Afr. **2**: 200(1871)..  
*Vigna scabra* Sond., Linnaea **23**: 32 (1850).  
*Vigna senegalensis* A.Chev., Rev. Bot. Appl. Agric. Trop. **24**: 135 (1944).  
*Vigna thonningii* Hook.f., Niger Fl. 311 (1849).  
*Vigna tuberosa* A.Rich., Tent. Fl. Abyss. 1: 217, *pl.* 42 (1847).  
*Vigna vexillata* var. *hirta* (Hook.) Baker f., Legum. Trop. Africa **2**: 413 (1929).  
*Vigna vexillata* var. *pluriflora* Franch., Pl. Delavay. **1**: 183 (1889).  
*Vigna vexillata* var. *thonningii* (Hook.) Baker, Fl. Trop. Afr. **2**: 200 (1871).  
*Vigna vexillata* var. *tsusimensis* Matsum., Bot. Mag. (Tokyo) **16**(183): 93 (1902).  
*Vigna vexillata* var. *yunnanensis* Franch., Pl. Delavay. **1**: 183 (1889).

**Widely distributed in Africa** (Angola · Botswana · Burundi · Cameroon · Equatorial Guinea · Ethiopia · Ivory Coast · Gambia · Ghana · Guinea Bissau · Kenya · Liberia · Malawi · Mali · Mozambique · Niger · Nigeria · Rwanda · Senegal · Sierra Leone · Somalia · South Africa · Sudan · Swaziland · Tanzania · Togo · Uganda · Zaire · Zambia · Zimbabwe), **Asia** (Bangladesh · Bhutan · Cambodia · Mainland China · India · Indonesia · Irian Jaya · Japan · Korea · Laos · Malaysia · Myanmar · Nepal · Pakistan · Ryukyu Is · Sri Lanka · Taiwan · Thailand · Vietnam), **Australasia** (Australia · Papua New Guinea), **Caribbean** (Dominican Republic · Haiti · Jamaica), **Central America** (Belize · Costa Rica · El Salvador · Guatemala · Honduras · Mexico · Nicaragua · Panama), **Indian Ocean** (Madagascar), **Middle East** (Yemen), **Pacific Ocean** (Bismarck Archipelago), **South America** (Brazil · Colombia · Ecuador · French Guiana · Peru · Surinam · Venezuela) ◦ **Taiwan** · **known from low to medium altitudes up to 1200 meters above sea level, road sides · grassland and edges of the forests, somewhat rare.**

## References

1. Tomooka, N. , M.n S. Yoon , K. Doi, A. Kaga & D. Vaughan (2002) AFLP analysis of diploid species in the genus *Vigna* subgenus *Ceratotropis* , Genetic Resources and Crop Evolution **49**: 521 – 530.
2. T. Pullaiah & K. Sri Ramamurthy (2001). Flora of Eastern Ghats 2:353-361.



[A specimen of \*Vigna reflexopilosa\* from Kew Herbarium](http://specimens.kew.org/herbarium/K000900675)

<http://specimens.kew.org/herbarium/K000900675>



14.A New Species of Genus Rosa (Rosaceae) from Taiwan ----

*Rosa hohuanparvifolia* S.S. Ying

*Rosa hohuanlinparvifolia* S.S. Ying , *sp. nov.* 合歡小葉薔薇

TYPE:TAIWAN. Nantou county , Renai Township (仁愛鄉) , Main Peak, Hohuanshan (合歡山主峰) 3370 m alt. *S. S. Ying* , *s.n.* July 23, 2020 ° (holotype, NTUF) °



*Rosa hohuanparvifolia* S.S. Ying , flowers in full bloom, mind the leaves much small

**Morphology:** A prostrate and lower shrub about 20-35 cm high, stem sprawling , prickled, grayish brown, elongate, much branched, glabrous; branches terete, erect or ascending, slight purplish when young, soon turn to green, prickled, glabrous; prickles scattered, single, purplish red when young, turned to grayish white when old, straight, 3-4 mm long, broad at base and acicular at apex. Leaves including petiole 3-4.5 cm long; stipules adnate to the petiole, 3-4 mm long, purplish red, amplexicual at base, caudate at apex, ciliate at margins, sparsely glandular-pubescent; rachis pubescent, purplish red, shortly prickly;



*Rosa hohuanparvifolia* S.S. Ying ,close-up of leaves

leaflets 7, oblong, 7-18 mm long, 4-9 mm wide, chartaceous, obtuse at apex, narrowed at base, remotely serrate and ciliate at margins, lustrous green surface, pale green beneath, glabrous surface and slightly hairy beneath, midrib impressed surface and elevated beneath, lateral veins inconspicuous; the petioles of terminal leaflet 3-4 mm long, red, pubescent; the lateral leaflet sessile.

Flowers solitary or pairs, white, large, 4-5 cm in diameter when opened, terminal on the branchlets; pedicels 1.5-3 cm long, erect to ascending, pulplish red, densely glandular-pubescent; bracts caduous, broadly lanceolate, 5-7 mm long, 2-3 mm wide, red, scattered glandular-pubescent, ciliate at margins, caudate at apex. Hypanthium subglobose, 6-7 mm across, red, densely glandular-pubescent; sepals 5, ovate, 5-7mm long, 3-4 mm wide, caudate apex, truncate at base, pubescent without and subglabrous within, entire and ciliate at margins; petals 5, oblong, 1.5-2 cm long, 1-1.5 cm wide, bilobed at apex, narrowed and truncate at base, glabrous; stamens numerous, in several whorls, inserted at disc; filaments slender, 3-5 mm long, pale yellow, glabrous; anthers slightly brown, versatile; carpels numerous, free, inserted at margin of hypanthium; styles connate into



*Rosa hohuanparvifolia* S.S. Ying , flowers buds



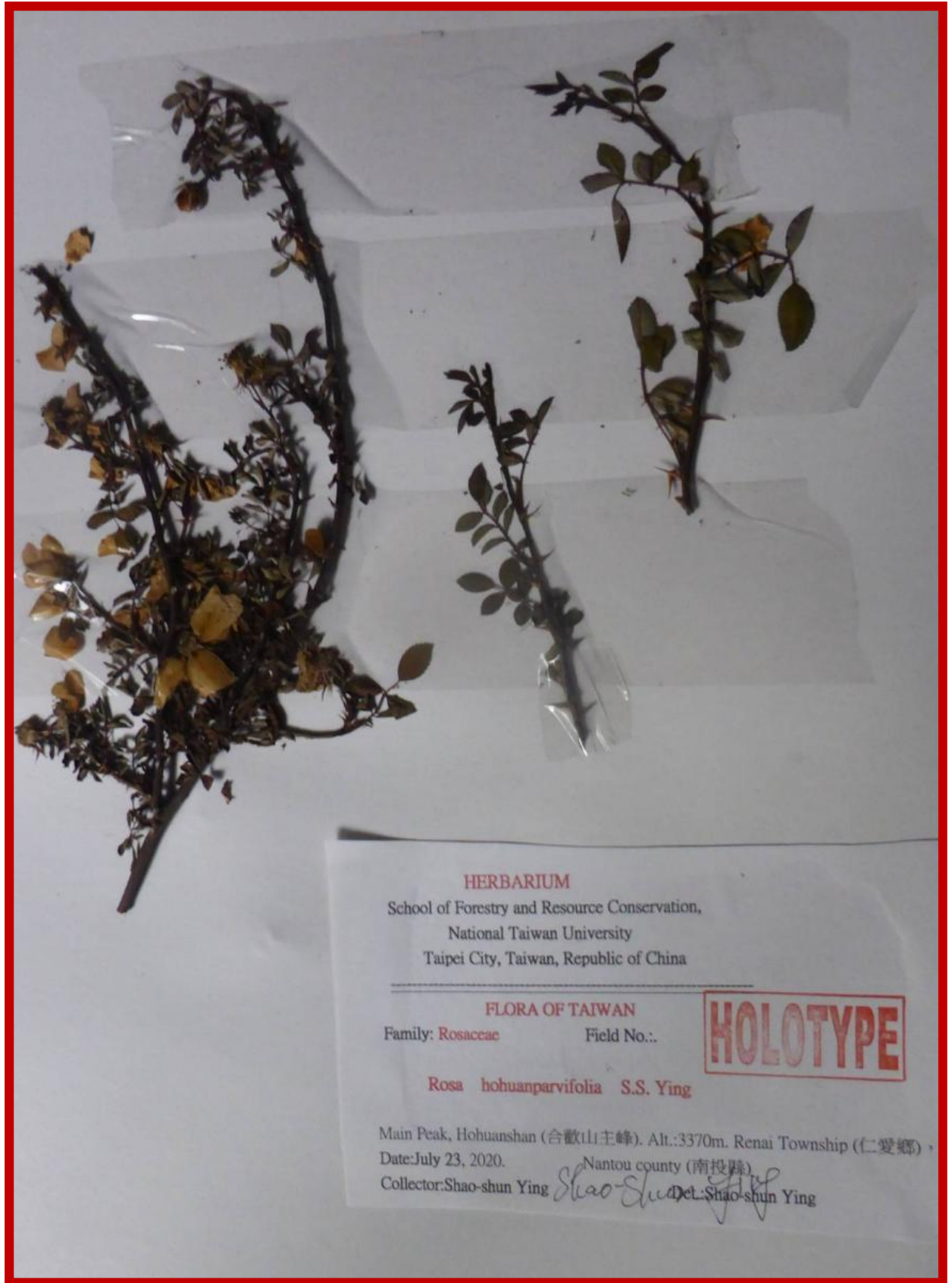
*Rosa hohuanparvifolia* S.S. Ying , flowers



*Rosa hohuanparvifolia* S.S. Ying , close-up of flowers



*Rosa hohuanparvifolia* S.S. Ying , the habitat



*Rosa hohuanparvifolia* S.S. Ying , the holotype

column, exserted, pale yellow, glabrous, shorter than the stamens.

**Diagnosis.**

The species is a lithophytic plant, and is characterized by its prostrate habit, much smaller leaves, flowers solitary to pairs, rather large, white, 4-5 cm in diameter when opened, petals 2-lobed at apex, truncate at base; stamens numerous, filaments slender, pale yellow, anthers versatile .

**Distribution and phenology.**

*Rosa hohuanparvifolia* S.S. Ying is endemic to Taiwan . It is known from Hohuanshan, main peak (合歡山主峰) and on the route between Wulin(武嶺) and Kuanyang (昆陽) , Renai Township (仁愛鄉) , Nantou county , central Taiwan . The holotype was collected on the Hohuanshan, main peak , at elevations of 3370 meters, and flowering time from July to August and fruiting time from August to September.



*Rosa hohuanparvifolia* S.S. Ying , close-up of fruit

15.A New Species of Genus *Clinopodium* (Limiaceae) from Taiwan

*Clinopodium wulinianum* S.S. Ying

*Clinopodium wulinianum* S.S. Ying, *sp. nov.* 武嶺光風輪

TYPE:TAIWAN. Hualien county, Xiulin Township (秀林鄉), Hohuanshan (合歡山)  
3170 m alt. S. S. Ying, *s.n.* August 13, 2020. (holotype, NTUF).



*Clinopodium wulinianum* S.S. Ying, flowering plant

**Morphology:** A annual small herb, often clustered growth on small groups; stem prostrate, 15-25 cm long, slightly angular, densely pubescent, branched. Leaves simple, opposite, ovate to ovate-oblong, 1.5-2.2 cm long, 7-10 mm wide, slightly fleshy, obtuse at apex,



*Clinopodium wulinianum* S.S. Ying, the plant



*Clinopodium wulinianum* S.S. Ying, the plant clustered growth a group



obtuse to cuneate at base, ciliate and remotely dentate at margins, glabrous and lustrous surface, pale green and pubescent especially on veins beneath, midrib impressed surface and elevated beneath; lateral veins 4-6 per side, impressed surface and elevated beneath. Petioles short, 4-7 mm long, pubescent.



*Clinopodium wulinianum* S.S. Ying, the calyx



***Clinopodium wulinianum* S.S. Ying, the flowers**

Flowers 4-6, verticillate, axillary on the leaf-axil, pink, 4-5 mm in diameter when opened, often opened one by one, not opened at same time; the pedicels short, 3-4 mm long, pubescent; bracts linear, 4-5 mm long, green, glabrous, acute at apex; calyx tubular, brown, 6-8 mm long, pubescent without and glabrous within, 5-lobed at apex; 3 upward lobes triangular, 1-2 mm long, acute at apex; 2 lower lobes linear, 2-3 mm long, caudate at apex; corolla 2-labiate, 5-5.5 mm long; upper lip rounded, 2-2.5 mm long, obtuse at apex; lower lobe 3-lobed, middle lobe larger, 2.7-3.2 mm long, obtuse at apex; lateral lobes rounded, 2-2.7 mm long, obtuse at apex; stamens 4, anterior 2 longer than posterior 2, slightly exserted upper corolla lip; posterior stamens included; anther cells 2, divaricate, more or less obliquely inserted on dilated connectives; style slender, just exserted on the upper lip.



*Clinopodium wulinianum* S.S. Ying, the habitat



*Clinopodium wulinianum* S.S. Ying, the plants used as a part of holotype



*Clinopodium wulinianum* S.S. Ying, the holotype

### **Diagnosis.**

The species is characterized by its ovate leaves and smaller flowers which often 4-7 in a ring axillary on the leaf-axils; flowers usually opened one by one, not opened at same time; calyx brownish, 5-lobed to apex, 3 upper lobes triangular, shorter; 2 lower lobes linear, longer, caudate at apex; corolla pink, 2-labiate; upper lip shorter than lower lip.

The habitats of the species 1. on the lithophytic places between the elevations of 3100 and 3200 meters. 2. rocky places along the water pipes which provided water for local inhabitants between the elevations 3100 and 3200 meters.

### **Distribution and phenology.**

The species is endemic in Taiwan, It is known from Hohuanshan , Nantou county , central Taiwan . It was discovered in roadside at elevations of 3170 meters of Mt. Hohuanshan. It grows in clusterd with a smal group at lithophytic places. Its flowering time is August .



16. Two New Species of Genus *Salvia* (Lamiaceae) from Taiwan

A. *Salvia siyuanensis* S.S. Ying

*Salvia siyuanensis* S.S. Ying, *sp. nov.* 思源鼠尾草

TYPE: TAIWAN. I-Lan County, Tatung Township (大同鄉), Siyuanyakou (思源埡口)  
1720 m alt. S. S. Ying, *s.n.* July 4, 2020. (holotype, NTUF).



*Salvia siyuanensis* S.S. Ying, the part of inflorescence

**Morphology:** A perennial herb, with inflorescence 25-40 cm tall; stem short, 2-5 cm long, pubescent, slightly angular. Leaves nearly radical, verticillate, trifoliate, with petioles



*Salvia siyuanensis* S.S. Ying, the habit

8-10 cm long; terminal leaflet ovate to oblong, 3.5-5.5 cm long, 1.5-2.5 cm wide, chartaceous, acuminate at apex and cuneate at base, serrate at margins, lustrous green surface and pale green beneath, glabrous on both surfaces, dentate at margins, midrib and lateral veins impressed surface and elevated beneath; petioles 1-2 cm long, glabrous; the lateral leaflets oblong, 2-3 cm long, 1-1.5 cm wide, acuminate at apex, sometimes 2-lobed at base; the petioles short 3-4 mm long or sessile; the petioles 4-6 cm long, glabrous or nearly so.



*Salvia siyuanensis* S.S. Ying, the habitat, mind trifolite

Flowers many, 2-labiate, dark purplish, 6-7 mm in diameter when opened, 5-8-flowered in a verticillate, 8-12 verticillate on the inflorescence; the inflorescence terminal, 25-30 cm long, densely glandular hairs; bracts linear to lanceolate, 3-4 mm long, 1-1.5 mm wide, acute at apex, pubescent; calyx campanulate, 6-8 mm long, 4-5 mm wide, 2-lipped, greenish, densely glandular hairs outside and glabrous inside; upper lip 3-lobed; the lobes triangular, 2-3 mm long, acute at apex; lower lip entire; corolla 2-lipped, tube horizontal, 1.5-1.8 cm long, densely glandular hairs outside, upper lip straight, oblong, 5-7



mm long, obtuse at apex; lower lip 3-lobed, somewhat longer than upper lip, 7-8 mm long, 5-6 mm wide upward; the lateral lobes erect, slightly rounded, spreading, 3-4 mm wide, obtuse at apex; middle lobe dilated upward, 3.5-4 mm long, 6-7 mm wide, pendulous, dark purple with 2 large white specks in the center; stamens 2, filaments exerted out the



*Salvia siyuanensis* S.S. Ying, the flowers, mind calyx and corolla

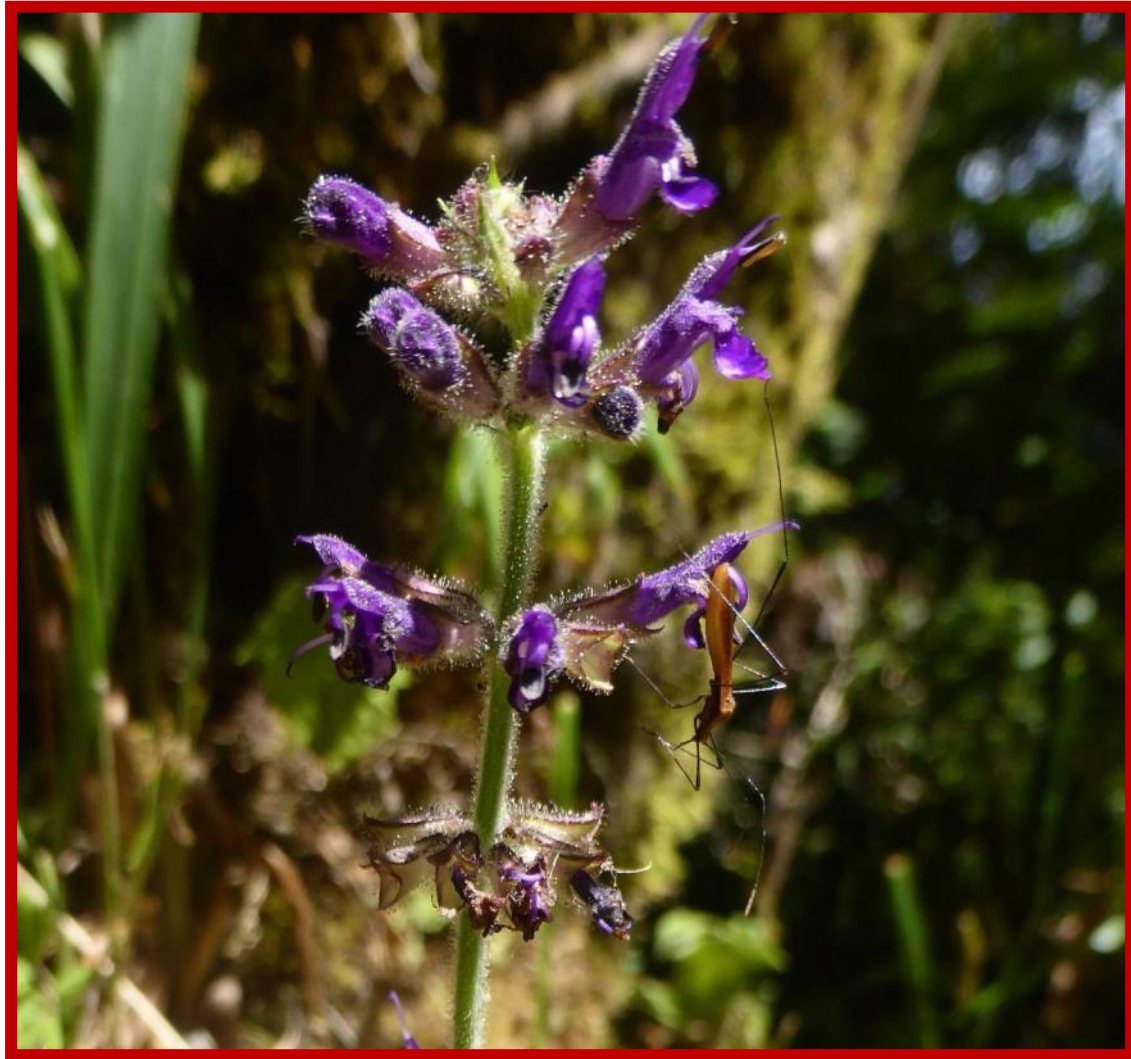


*Salvia siyuanensis* S.S. Ying, mind corolla, stamen and style

an ant enter the corolla,

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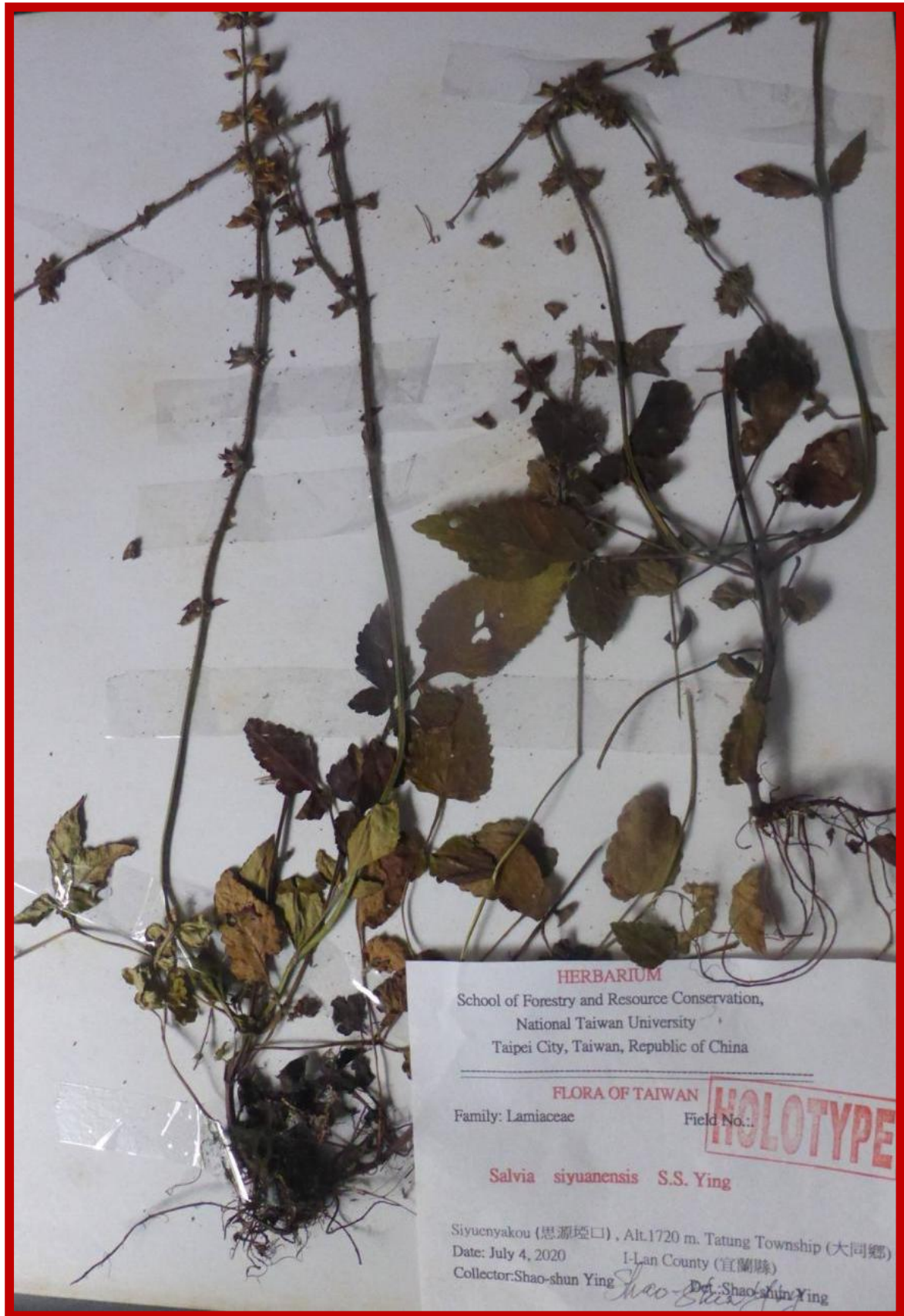
corolla, erect, connectives prolonged, linear, T-shaped; upper arms with fertile elliptic or linear anther cells; lower arms robust or slender, with fertile or sterile anther cells; staminodes 2, small; style slender, exserted out the corolla, 2-cleft, the lobes linear, unequal.



*Salvia siyuanensis* S.S. Ying, the part of inflorescence

**Diagnosis.**

The species is characterized by its trifoliate leaves and purplish flowers; 5-8-flowered in a verticillate, 8-12 verticillate on the inflorescence; calyx campanulate, 2-lipped, densely glandular hairs outside and glabrous in side; upper lip 3-lobed, lower lip entire; corolla



*Salvia siyuanensis* S.S. Ying, the holotype

2-lipped, tube horizontal, densely glandular hairs outside, upper lip straight, lower lip 3-lobed, somewhat longer than upper lip, the lateral lobes erect, slightly rounded, spreading, , obtuse at apex; middle lobe dilated upward, 3.5-4 mm long, 6-7 mm wide, pendulous, dark purple with 2 large white specks in the center.

**Distribution and phenology.**

The species is endemic in Taiwan, It is known from Siyuenyakou (思源埡口) Tatung Township (大同鄉) I-Lan County, northern Taiwan. It was discovered in roadside near to 42km. of I-lan branch, Central Cross-Island Highway. (中部橫貫公路宜蘭支線). at elevations of 1720 meters. Its flowering time is July to August.

*A.Salvia shaofengkouensis* S.S. Ying

*Salvia shaofengkouensis* S.S. Ying , *sp. nov.* 小風口鼠尾草



*Salvia shaofengkouensis* S.S. Ying, the habit

TYPE:TAIWAN. Hualien county , Xiulin Township (秀林鄉) , Hohuanshan (合歡山)  
2950 m alt. *S. S. Ying* , *s.n.* September 03 , 2020 ° (holotype, NTUF) °



*Salvia shaofengkouensis* S.S. Ying, the leaves, inflorescence in bud

**Morphology :** Annual herb, with inflorescence 15-25 cm tall; stem absent. Leaves radical, fascicled, pinnate, with petioles 4.5-5.5 cm long, 1.5-1.8 cm wide; the petioles 1.2-1.6 cm long, pubescent; leaflets 7, the terminal one largest, oblong, 2-3 cm long, 1.2-1.6 cm wide, slightly fleshy, obtuse at apex, slightly cordate at base, pubescent then to glabrous, midrib and lateral veins deeply impressed surface and elevated beneath, lustrous green surface and pale green beneath; petioles 3-4 mm long, pubescent; rachis 3-4.5 cm long, pubescent, purple; lateral leaflets 6, smaller, somewhat close each other, ovate to oblong, 1-1.5 cm long, 5-7 mm wide, obtuse at apex, obtuse to slightly cordate at base, dentate at margins, pubescent then to glabrous, midrib and lateral veins deeply impressed surface and elevated beneath, lustrous green surface and pale green beneath. sessile.

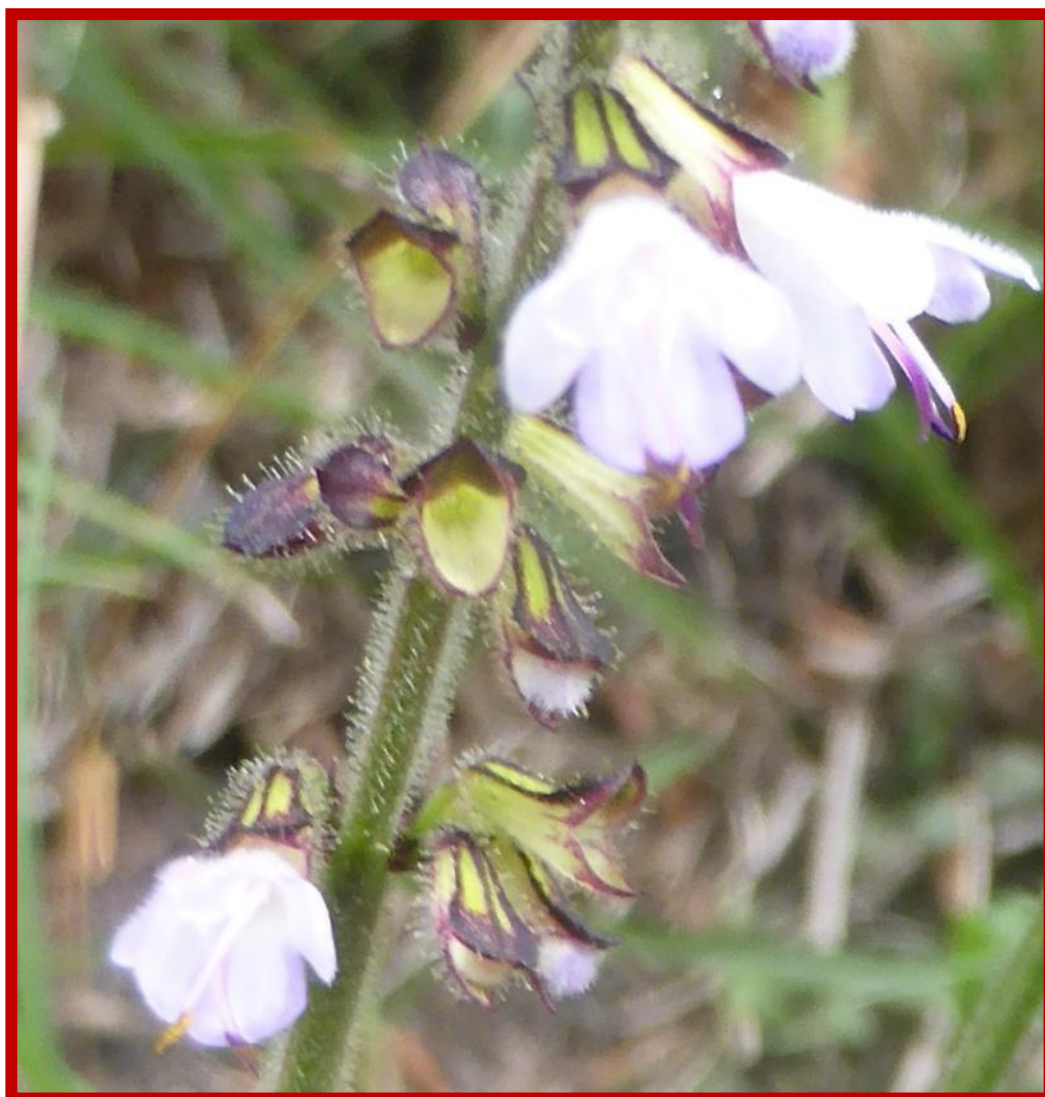
Flowers slightly 2-labiate, white to light violet, 5-6 mm in diameter when opened, 3-7 flowers in a verticillate; 6-8 verticillate on the inflorescence; inflorescences produced



*Salvia shaofengkouensis* S.S. Ying, the leaves,



*Salvia shaofengkouensis* S.S. Ying, the branched inflorescences -164-



*Salvia shaofengkouensis* S.S. Ying, the calyx and corolla,

from fascicled leaves, erect to ascending, 12-19 cm long, pubescent, often with branches; bracts triangular, 2-3.5 mm long, 1-1.5 mm wide, acute at apex, pubescent; calyx campanulate, 4-5 mm long, 3-4 mm wide, 2-lipped, greenish tinged with purple upward, densely glandular hairs outside and glabrous in side; upper lip entire, about 2.5 mm long, acute at apex; lower lip also entire, slightly longer than upper one, acute at apex; corolla 2-lipped, tube nodding or nearly so, 9-15 mm long, densely glandular hairs outside, upper lip straight, oblong, 4-6 mm long, entire, emarginate at apex; lower lip 3-lobed; the median lobe longer, oblong, 5-6 mm long, obtuse at apex; lateral lobes rounded, 3-4 mm long, obtuse at apex; stamens 2, filaments exerted out the corolla, pendulous, connectives



*Salvia shaofengkouensis* S.S. Ying, the corolla, stamens and style,

prolonged, linear, T-shaped; upper arms with fertile linear anther cells; lower arms slender, with fertile or sterile anther cells; staminodes 2, small; style slender, exerted out the corolla, 2-cleft, the lobes linear, unequal.

**Diagnosis.**

The species is characterized by its a small tufted plant; stem absent, with pinnate leaves, the lateral leaflets sessile; inflorescences with branches; flowers white to light violet, calyx 2-lipped, the upper lip and lower lip all entire; corolla 2-lipped, upper lip straight, oblong, entire, emarginate at apex; lower lip 3-lobed; the median lobe longer, oblong, lateral lobes rounded, 3-4 mm long, obtuse at apex.

**Distribution and phenology.**

The species is endemic in Taiwan, It is known from Hohuanshan, Nantou county, central Taiwan. It was discovered in roadside at elevations of 2980 meters of Mt. Hohuanshan. It grows at lithophytic places. Its flowering time is August to September.





*Salvia shaofengkouensis* S.S. Ying, the holotype

## **17.A Revision to the Scientific Names of Genus *Angelica* (Apiaceae) in Taiwan**

Based on Kao, M. T. (1993). *Angelica*, 《Flora of Taiwan, secondary edition》3:1011-1015.

Those species were treated by Kao, M.T. in Flora of Taiwan Vol. 3.

1. *Angelica dahurica* (Fischer ex Hoffmann) Benth. & Hook. f. ex Franchet & Savatier, var. *formosana* (Boiss.) Yen.
2. *Angelica hirsutiflora* Liu, T. S., C. Y. Chao & T.I. Chuang
3. *Angelica morii* Hayata
4. *Angelica morrisonicola* Hayata
- 4A. *Angelica morrisonicola* Hayata var. *nanhutashanensis* Liu, T. S., C. Y. Chao & T.I. Chuang
5. *Angelica tarokoensis* Hayata

### **Angelica Linn. 當歸屬**

Sp. Pl. 1: 250. (1753).

The genus name is an accepted name, about 118 species distributed in temperate and subarctic regions of the Northern Hemisphere, reaching as far north as Iceland, Lapland and Greenland. **8 species and 1 variety are recognized in Taiwan in this study.**

#### **1. *Angelica dahurica* (Fischer ex Hoffmann) Benth. & Hook. f. ex Franchet & Savatier, var. *formosana* (Boiss.) Yen. 台灣野當歸**

J. Taiwan Pharm. Assoc. 17(2): 68. (1963).

The variety name is an accepted name, the synonym of the variety are listed below:

*Angelica formosana* H. Boissieu, Bull. Soc. Bot. France 56: 354 (1909).

*Angelica dahurica* (Fischer ex Hoffmann) Bentham & J. D. Hooker ex Franchet & Savatier, var. *formosana* (H. Boissieu) Shan & Yuan, ?? 7:35 (1979).

Species in Mainland China (Heilongjiang, Jilin, Liaoning, Shaanxi), Japan, Korea and Russia (Siberia). The variety endemic to Taiwan, known from lower elevations of 200-900 m. in northern part of the island, roadsides or opened fields.

## 2. *Angelica hirsutifolia* Liu, T. S., Chao, C. Y. & Chuang, T. I 台灣濱當歸

Quart. J. Taiwan Mus. 14: 19 (1961).

The specific name is an accepted name, the synonyms of the species are list below:

*Angelica japonica* A. Grey var. *hirsutiflora* (Liu, T. S., Chao, C. Y. & Chuang, T.I.) T. Yamaz., J. Jap. Bot. 65:222 (1990).

*Peucedanum decursivum sensu* Matsum. & Hayata, J. Coll. Sci. Univ. Tokyo 22:173 (1906), *non* Maxim.

*Angelica kiusiana sensu* Hayata, Gen. Ind. Fl. Form. 32 (1917); Masamune, List Vasc. Pl. Taiwan 92 (1954). *non* Maxim.

Endemic, known from coastal regions of northern part of the island, somewhat common.

## 3. *Angelica morii* Hayata 森氏當歸

Icon. Pl. Formosan. 10: 24 (1921).

The specific name is an accepted name, No synonyms are recorded for this name.

Eedemic, known from medium to high altitudes from 2200-3000 m throughout, opened fields and edages of the forests.



[A specimen of \*A. morii\* Hayata from HAST](#)

[http://img.hast.biodiv.tw/SpecimenSmall/2/018/S\\_018518\\_1.jpg](http://img.hast.biodiv.tw/SpecimenSmall/2/018/S_018518_1.jpg)

4. *Angelica morrisonicola* Hayata 玉山當歸

J. Coll. Sci. Imp. Univ. Tokyo **30**(1): 129 (1911).

The specific name is an accepted name, the synonym of the species is list below:

*Peucedanum morrisonicola* (Hayata) M. Hiroe, Umbell. Asia **1**: 180, *f. 214* (1958)..

Eedemic, known from high altitudes from 3000-3800 m throughout, opened fields and edages of the forests.



*Angelica morrisonicola* Hayata , Mt. Hohuanshan

4A. *Angelica morrisonicola* Hayata var. *nanhutashanensis* Liu, T. S. , Chao, C.

Y. & Chuang, T. I 南湖大山當歸

Quart. J. Taiwan Mus. **14**: 21 (1961).

The variety name is an accepted name, No synonyms are recorded for this name.

Endemic, known from high altitudes from 3000-3700 m in northern part of the island, mixed with *Juniperus morrisonicol* Hayata, somewhat rare.

### 5. *Angelica pubescens* Maxim. 獨活

Bull. Acad. Imp. Sci. Saint-Petersbourg III, **24**: 34 (1878).

The specific name is an accepted name, the synonym of the species is list below:

*Angelica polyclada* Franch., Bull. Soc. Bot. France **26**: 86(1879).

*Angelica myriostachys* Koidz., Bot. Mag. (Tokyo) **33**: 122 (1919).

*Angelica schishiudo* Koidz., Fl. Symb. Orient.-Asiat. 45 (1930).

Mainland China, Japan and Taiwan. Taiwan, known from medium altitudes of 2200-2800 m in northern and central parts of the island, somewhat rare.

### Diagnosis.

2008, A master thesis (台灣產當歸屬植物之分類研究, A Taxonomic Study of *Angelica* L. (Apiaceae) in Taiwan) was written by Chen, Hung-hsin (陳宏信), In this thesis, he described *A. pubescens* Maxim. as a new record species of Taiwan, according to his description the species were collected only at Nantou county (Mt.Nengkao (能高山)) and I-lan county (Mt.Xiangben (香本山, 標高僅 1755m.)) at the elevations between 2000m and 2800meters, at the edges of the forests.

A specimen of *A. pubescens* was collected by Hsu Tien-chuan (許天詮) at Mt.Xiangben (香本山), at the elevations of 1300m. TAIIF304227, however, the specimen displayed a pinnate leaf only, no inflorescence and flowers.

*A. pubescens* Maxim is used in traditional Chinese medicine. Japanese common name is shishiudo and the Chinese common name is 獨活. However, the name of *Angelica pubescens* Maximowicz f. *biserrata* R. H. Shan & C. Q. Yuan is used in 《Chinese Medicine Specimen Database, 中藥材圖像資料庫》, which established by School Chinese medicine, Hong Kong Baptist University (香港浸信大學中醫學院). No description of *A. pubescens* Maxim. in 《Flora of China》, they described the species

*Angelica biserrata* (R. H. Shan & C. Q. Yuan) C. Q. Yuan & R. H. Shan, & R. H. Shan (重齒當歸) in stead of, and treated *Angelica pubescens* Maxim. f. *biserrata* R. H. Shan & C. Q. Yuan as a synonym of the species.



[A specimen of \*A. pubescens\* Maxim. was collected by Hsu \(TAIF304277\)](https://catalog.digitalarchives.tw/item/00/5e/9e/f1.html)

<https://catalog.digitalarchives.tw/item/00/5e/9e/f1.html>



[A specimen of \*A. pubescens\* Maxim. from Kew Herbarium](http://specimens.kew.org/herbarium/K001097183)

<http://specimens.kew.org/herbarium/K001097183>



6. *Angelica taiwaniana* S. S. Ying 台灣當歸

Quart. J. Chin. Forest. 8(4): 125 (1975).



Holotype of *A. taiwaniana* S.S. Ying from TAI Herbarium

<https://tai2.ntu.edu.tw/Specimen/specimen.php?taiid=082909>

The specific name is an accepted name. Accepted by

The Plants List

Plants of the world on line, Kew Science



*A. taiwaniana* S.S. Ying , A young plant was collected at Mt. Hohuanshan (合歡山)

No synonyms are recorded for this name.

Endemic, known from medium to high altitudes from 2800-3200m in southern parts of the island, roadsides and edges of the forests, somewhat rare.

Holotype: Daikwanzan (大關山) to kwanzan (關山),” 2800 m, *N.Fukuyama s.n.*, July 24, 1935 (TAI).

**Morphology :** A perennial herb, stem robust, simple, 40-60 cm high. Leaves 2-3-pinnate, 15-20 cm long, 10-14 cm wide; petioles 3-5 cm long; sheaths 4-7 cm long; pinules linear, 3-5 lobed, 1.5-3 cm long, 1-1.5 cm wide, glabrous, serrate at margins, sessile.

Umbels 30-40, terminal, rays subequal, 5-7 cm long, pubescent; involucral bracts linear, deflexed, cauduous; calyx denate-like, inconspicuous; petals white, ovate, 1-1.5 mm

long, about 1 mm wide, emarginate or shallowly 1- 2-lobed at apex, shortly claw at base;  
stamens 5, filaments filifor, 7-8 mm long, style short.

**7. *Angelica tarokoensis* Hayata 太魯閣當歸**

Icon. Pl. Formosan. **10**: 27 (1921).



A specimen of *A. tarokoensis* Hayata. from TAI Herbarium

<https://catalog.digitalarchives.tw/item/00/14/81/45.html>

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The specific name is an accepted name.

No synonyms are recorded for this name.

Endemic, known from medium altitudes of 1000-1800 m in eastern part of the islands, somewhat rare.

The holotype was collected inter Buntankan (巴達社) and Neitaroku (內太魯閣) by S. Sasaki and H. Hayata.

### 8. *Angelica hohuanshanensis* S.S. Ying 合歡山當歸

*Angelica hohuanshanensis* S.S. Ying, sp. nov.

TYPE: TAIWAN. Hualien county, Xiulin Township (秀林鄉), Hohuanshan (合歡山) 3010 m alt. S. S. Ying, s.n. July 10, 2020 (holotype, NTUF).

**Morphology**: A perennial herb with a huge plant body about 2.5 m high and 2-3 m cubage,



*Angelica hohuanshanensis* S. S. Ying, the plant habitat

the plant body often wither and fall, reminded rootstock under ground; rootstock stout, oblong, 6-8.5 cm long, 5-6 cm across, aromatic; stem robust, often branched upward, 2-2.5 m high, glabrous, green to purplish green; branches erect to ascending, 25-30 cm long, purplish, glabrous, smooth or slightly ribbed. Leaves 2-pinnate, 40-60 cm long, 30-45 cm wide; petioles 15-22 cm long, glabrous, green tinged with purplish; pinules 30-36 cm long, 15-17 cm wide, glabrous, petioles 7-10 cm long, glabrous; leadlets 5-7, blade ovate to ovate-oblong, 10-15 cm long, 7-9 cm wide, chartaceous, double-errate at margins, acute at apex, truncate at base, glabrous on both surfaces, midrib impressed surface and elevated



*Angelica.hohuanshanensis* S. S. Ying, glabrous branches  
with opened and buding inflorescences



*Angelica.hohuanshanensis* S. S. Ying, mind leaflets often 3-lobed at base



*Angelica.hohuanshanensis* S. S. Ying, each plant with 7-10 compound umbels



*Angelica.hohuanshanensis* S. S. Ying, a single compound umbels

beneath, the lateral veins 5-7 per side, with 2-4 cm long petioles; the terminal leaflet often 3-lobed at base; the lateral leaflets 3-lobed at base or not; upper leaves reduced; sheaths saccate-inflated.

Flowers numerous, small, white, 5-6 mm in diameter when open, about 80-100 flowers to form a umbel, nearly 70-90 umbels to form a compound umbel; 7-10 compound umbels produced from a plant, 25-35 cm in diameter, terminal; peduncles 15-35 cm long, glabrous, purplish; involucre bracts ovate, 6-9 cm long, 5-6 cm wide, acute at apex, amplexicaul at base, green, glabrous, caudous; ray white tinged purplish, 10-15 cm long, glabrous or sometimes pubescence; pedicels slender, white, 1.5-3 cm long, glabrous; bracts caudous; calyx teeth-like, obsolete; petals oblong, 2.5-3.5 mm long, about 1.5 mm wide, acute and reflexed at apex, truncate at apex, glabrous; stamens 5, filaments slender, filiform, white, longer than petals; anthers basifixed, black; ovary globose or nearly so, 2-3 mm across, brownish; stylopodium conic, white; style 2, erect, 2-3 mm long, white, stigma head-like.



*Angelica.hohuanshanensis* S. S. Ying, a single umbel



*Angelica.hohuanshanensis* S. S. Ying, pedicels and flowers

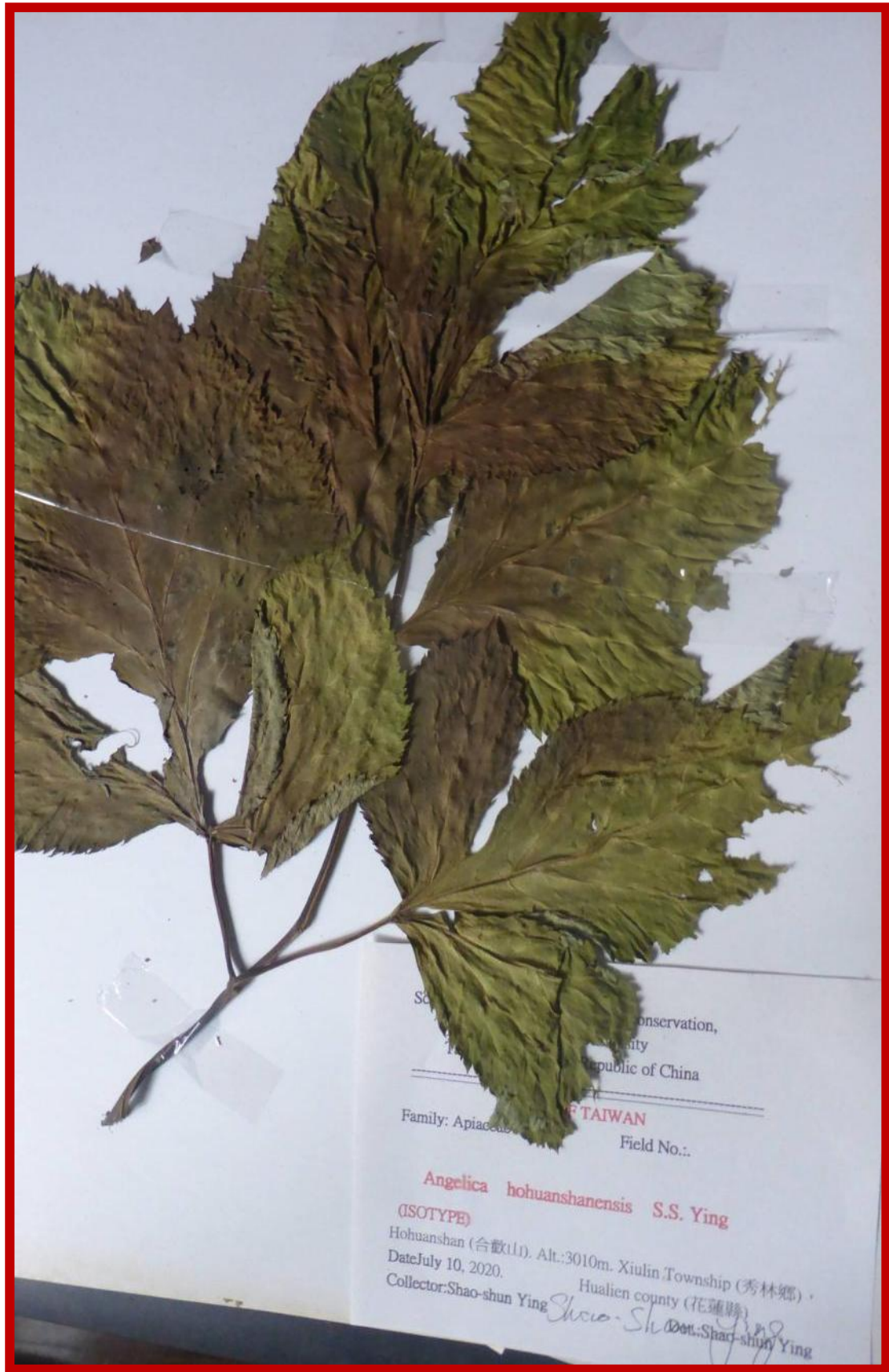




*Angelica hohuanshanensis* S. S. Ying, the holotype



*Angelica.hohuanshanensis* S. S. Ying, the isotype(1)



*Angelica.hohuanshanensis* S. S. Ying, the isotype(2)

### Diagnosis.

The species is characterized by its robust plant volume, with larger 2-pinnate leaves, leaflets 5-7, blade ovate to ovate-oblong, 10-15 cm long, often 3-lobed at base; 7-10 compound umbels in the plants, nearly 70-90 umbels to form a compound umbel, about 80-100 flowers to form a umbel, flowers numerous, small, white, ovary globose or nearly so, 2-3 mm across, brownish; stylopodium conic, white; style 2, erect.

### Distribution and phenology.

The species is endemic in Taiwan, It is known from Hohuanshan , Nantou county , central Taiwan . It was found at roadsides and the gaps between *Abies* forests at elevations of 2900-3200 meters of Mt. Hohuanshan. Its flowering time is June to July .

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18.A New Species of Genus *Anthriscus* (Apiaceae) from Taiwan

*Anthriscus taiwanensis* S.S. Ying

*Anthriscus taiwanensis* S.S. Ying, *sp. nov.* 台灣峨參

*Anthriscus caucalis sensu* Hsieh, T.W J. of Biodivers. 21(4): 167-172, (2019), *non*  
M. Bieh.

TYPE:TAIWAN. Hualien county, Xiulin Township (秀林鄉), Hohuanshan (合歡山)  
2780 m alt. S. S. Ying, *s.n.* September 03, 2020. (holotype, NTUF).



*Anthriscus taiwanensis* S. S. Ying, a flowering plant

**Morphology** : An annual herb. stem feeble, 30-45 cm long, hollow, single or branched upward, glabrous, green. Leaves 3-pinnate, 15-25 cm long, 8-12 cm wide, with 9-11 pinnules; petioles 8-14 cm long, green, hollow, glabrous; pinnules 5-7 cm long, 3-4.5 cm



*Anthriscus taiwanensis* S. S. Ying, a 3-pinnated leaves



*Anthriscus cerefolium* (Linn.) Hoffman., a specimen from CONN Herbarium

<https://gobotany.nativeplanttrust.org/species/anthriscus/cerefolium/>

wide, with 5-9 leaflets, rachis green, pubescent; petioles 1-1.8 cm long, pubescent, green; leaflets 1.5-2.8 cm long, 1.5-2 cm wide, chartaceous, pinnatisected, obtuse at apex, green surface and pale green beneath, glabrous on both surfaces; petioles 6-13 mm long, glabrous.



*Anthriscus taiwanensis* S. S. Ying, flowering plant

Flowers small, white, 2-3 mm in diameter when opened; 6 flowers to forming a

umbel; 3-4 umbels produced from stem (axillary) ; peduncles 3-4 cm long, slender, glabrous, green; involucre bracts absent; bracts linear, 4-5 mm long, caudate apex, green,



*Anthriscus taiwanensis* S. S. Ying, umbels fascicled on the stem

pubescent; rays unequal, 6-8 mm long, glabrous or slightly pubescent ; calyx teeth-like, obsolete; petals oblong, 1.5-2 mm long, about 1.5 mm wide, obtuse at apex, petals 5, 1.5-2 mm long, 1.5 mm wide, obtuse at apex, glabrous; stamens 5, exserted; filaments slender, white, 1.5 mm long; anther ovoid, slightly brown, basifixed; ovary conic or cylindrical, 1-1.5 mm long, bristly; stylopodium conic, nearly same length or short than ovary, pubescent; styles 2, column-like, about 0.3 mm long, green, glabrous.

Immature fruits cylindrical, 4-5 mm long, flattened laterally and often constricted at





*Anthriscus taiwanensis* S. S. Ying, close-up of flowers



*Anthriscus taiwanensis* S. S. Ying, close-up of fruits -191



*Anthriscus taiwanensis* S. S. Ying, the holotype

the commissure, densely with hooked bristle; ribs obsolete.

### **Diagnosis.**

The species was treated as *A. caucalis* M. Bieb. , a naturalized plant of Taiwan, by Hsieh (2019). However, our plant is different from *A. caucalis* by its feeble 30-45 cm long plant body, fewer umbels (without peduncles) fascicled on the stem, rays unequal; 6 flowers in a ray; petals oblong, obtuse at apex; stamens exerted, stylopodium conic, nearly same length or short than ovary, pubescent; styles 2, column-like, about 0.3 mm long, green, glabrous.

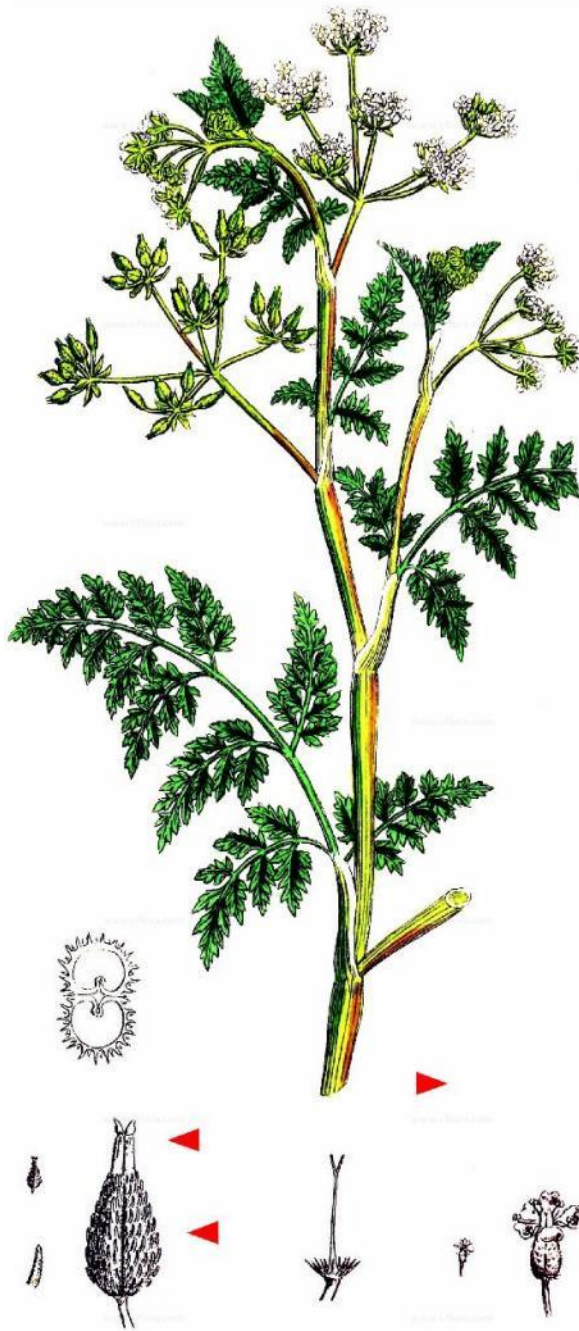
### **Distribution and phenology.**

The species is endemic in Taiwan, It is known from Hohuanshan , Huli county , central Taiwan ° It was found at roadsides at elevation of 2700 meters of Mt. Hohuanshan. Its flowering time is September °



*Anthriscus caucalis* M. Bieb. flowering plant

<https://www.calflora.org/cgi-bin/viewphoto.cgi?arg=/app/up/entry/78/23491.jpg>



*Anthriscus caucalis* M. Bieb. flowering plant

<http://www.i-flora.com/en/fact-sheets/phylogenetic-tree/art/show/anthriscus-caucalis.html>

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19.A New Species of Genus *Lysionotus* (Gesneriaceae) from Taiwan

*Lysionotus tairukouensis* S.S. Ying

*Lysionotus tairukouensis* S.S. Ying, *sp. nov.* 太魯閣石吊蘭

TYPE:TAIWAN. Huien county, Xiulin Township (秀林鄉), Kuyuan, Tairuhou (谷圓, 太魯閣) 520 m alt. S. S. Ying, *s.n.* August 20, 2020. (holotype, NTUF).



*Lysionotus tairukouensis* S. S. Ying, the flowering plant

**Morphology** : Subshrubs, stem 30-55 cm long, simple, suberect to prostrate, woody, glabrous. Leaves simple, opposite to 3-verticillate, rhombic-oblong, 3-5 cm long, 1.5-2.5 cm wide, coriaceous, acute to obtuse at apex, obtuse at base, dentate at margins, lustrous green surface and pale green beneath, glabrous on both surfaces, midrib impressed surface, lateral veins inconspicuous. Petioles 4-7 mm long, glabrous.

Flowers 2-4 in a simple raceme, larger, 3-3.5 cm in diameter when open, light



*Lysionotus tairukouensis* S. S. Ying, the leaves



*Lysionotus tairukouensis* S. S. Ying, inflorescences and calyx, mind a tube at calyx base

violet; 2-3 racemes on the terminal of stem; racemes 1.5-2.5 cm long, glabrous, erect to ascending, glabrous, 3-4 flowered; bracts triangular to ovate-triangular, 2-3 mm long, acute at apex; pedicels 3-6 mm long, glabrous, green; calyx tube 3-4.5 mm long, green, glabrous, 5-lobed at apex; the lobes linear, 4-6 mm long, 1-1.5 mm wide, acute at apex, glabrous ;

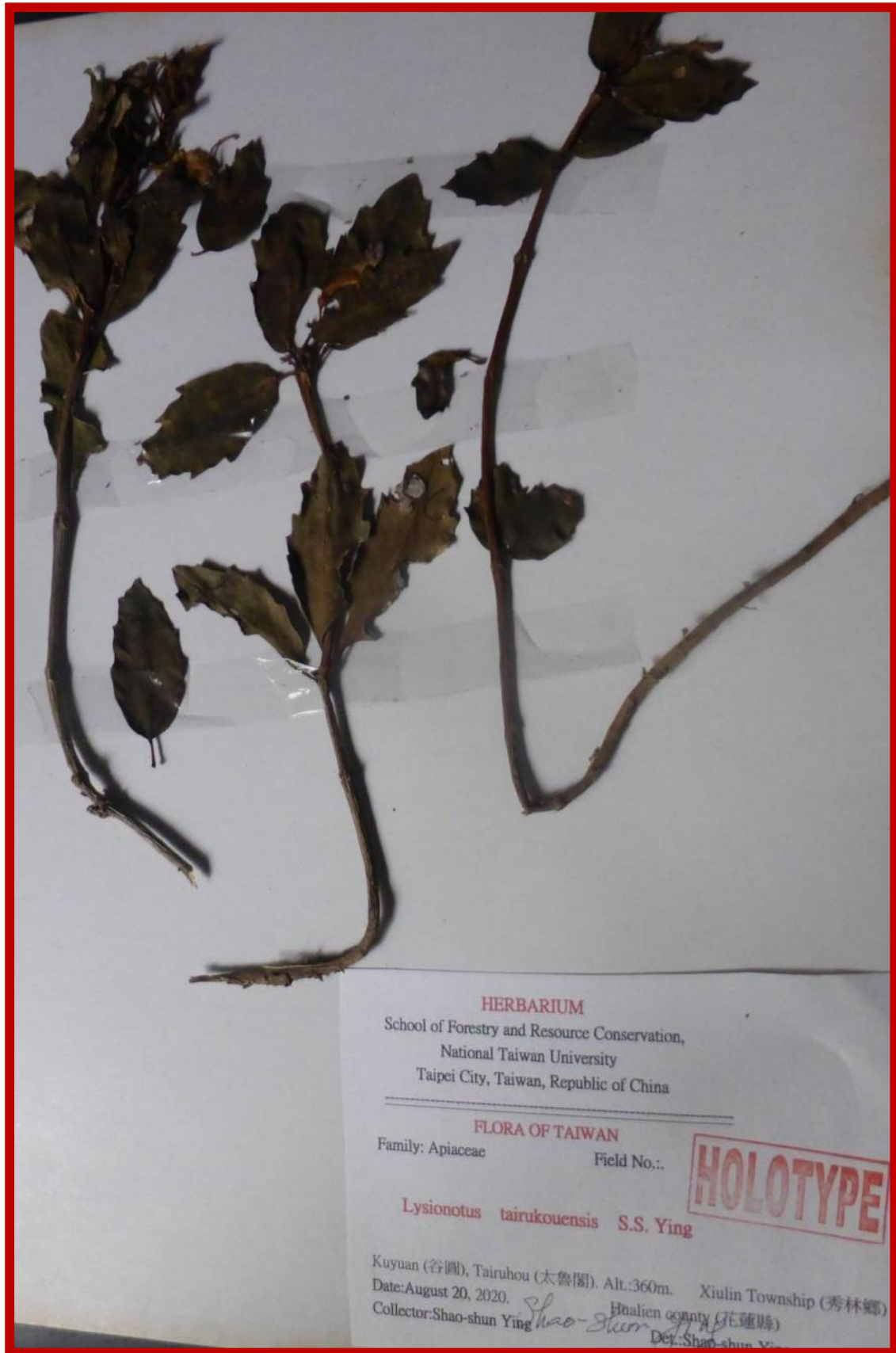


*Lysionotus tairukouensis* S. S. Ying, close-up of corolla

corolla funnellform, 2-labiate, light violet outside and white inside, 3-4 cm long, glabrous; adaxial lip 2-lobed at apex; the lobes rounded, 5-6 mm long, 5-5.5 mm wide, obtuse at apex; abaxial lip 7-9 mm long, 8-10 mm wide, 3-lobed at apex; lateral lobes overlapping the median one, 2 yellowish longitudinal ridges from base to apex, and its terminal with a light brown tumour; stamens 2, included; filaments slender, 8-9 mm long; anthers oblate, basifixed, 2-parallel celled; connective appendages hornlike, 0.5-1 mm long; staminodes 2-3; disc ring-like; ovary linear, 2.5-3.5 cm long, glabrous, pale green, 1-locular; style short, 3-4 mm long; stigma depressed globose.

#### Diagnosis.

The species is characterized by its rather larger leaves, 2-3 flowers in raceme, 2-3



*Lysionotus tairukouensis* S. S. Ying, the holotype



racemes terminal on the stem, corolla 2-labiate, light violet outside and white inside, adaxial lip 2-lobed at apex, abaxial lip 3-lobed at apex; lateral lobes overlapping the median one, 2 yellowish longitudinal ridges from base to apex, and its terminal with a light brown tumour.

**Distribution and phenology.**

The species is endemic in Taiwan, It is known from limestone cliffs along river sides of Li-Wu River (立霧溪) or rocky places , Hualien county , eastern Taiwan . It was collected on cliffs of river sides , at elevation between 350 and 550 meters. Its flowering time in August to September.



*Lysionotus tairukouensis* S. S. Ying, the habitat

20.A New Species of genus *Fragaria* (Rosaceae) from Taiwan

*Fragaria tayulinensis* S.S. Ying

*Fragaria tayulinensis* S.S. Ying, *sp. nov.* 大禹嶺草莓

TYPE:TAIWAN. Hualien county, Xiulin Township (秀林鄉), Hohuanshan (合歡山)  
2750 m alt. S. S. Ying, *s.n.* September 03, 2020. (holotype, NTUF) °



*Fragaria tayulinensis* S. S. Ying, the habitat

**Morphology** : Annual herbs, without stolon, stem absent or very short. Leaves 3-foliolate, alternate, fascicled; blade equal or subequal, the terminal one oblong, 1.5-2.5 cm long, 1-3 cm wide, slightly fleshy, dentate at margins, lustrous green surface, glaucous beneath, glabrous surface and white hairs, especially along veins beneath, midrib and lateral veins

(6-7 pairs) impressed surface and elevated beneath; petioles 1-2 mm long; lateral leaflets opposite, somewhat smaller than the terminal one, sessile. Petioles 4-7 cm long, slender, dark red, pubescent.

Flowers 1-4, in remotely racemose, yellow, 1.4-2 cm in diameter when opened,



*Fragaria tayulinensis* S. S. Ying, the leaves

peduncles from fascicled leaves, slender, 14-24 cm long, pubescent; pedicels 5-12 cm long, pubescent; bracts pairs, one pair at the base of pedicels, linear to oblong, 6-10 mm long, 2-5 mm wide, dentate at margins; the others pair on the middle of pedicel, linear, 4-6 mm

long, 1-1.5 mm wide; hypanthium obconic, 3-4 mm long; calyx connate at base, 10-lobed in two series; the outer lobes (epicalyx) lanceolate, 5-6 mm long, 2-3 mm wide, acute at apex, pubescent outside, the inner lobes(sepal) linear to linear-lanceolate, 5-6 mm long, 1.5-2 mm long, acute at apex, pubescent; petals 5, yellow, ovate-oblong, 7-9 mm long, 8-9 mm wide, emarginate at apex, slightly attenuate at base, glabrous; stamens numerous,



*Fragaria tayulinensis* S. S. Ying, the flower

filaments filiform, pale yellow, 3-5 mm long; anthers 2-locular, about 2 mm long, yellow, basifixed; carpels numerous, free, ovoid, 1-2 mm long, style striaght, 1 mm long, pale yellow, stigma minute.

Immature aggregate fruits formed from enlarged receptacle, berry-like, globose, 8-10 mm long, 6-8 mm wide, persistent sepals appressed to aggregate fruit; achenes



*Fragaria tayulinensis* S. S. Ying, the immature fruits

numerous, seated in pits on surface of aggregate fruit, ovoid, 2mm long, 1.5 mm wide, glabrous .

**Diagnosis.**

*Fragaria tayulinensis* is characterized by:

1. Plant without stolon, stem absent or very short.
2. Leaves 3-foliolate, alternate, fascicled; blade equal or subequal, the terminal one oblong, dentate at margins; lateral leaflets opposite, somewhat smaller than the terminal one, sessile.
3. Petioles 4-7 cm long, slender, dark red, pubescent; petioles 1-2 mm long
4. Flowers 1-4, in remotely racemose, yellow, 1.4-2 cm in diameter when opened.
5. Petals 5, yellow, ovate-oblong, emarginate at apex, slightly attenuate at base.

**Distribution and phenology.**

The species is endemic in Taiwan, It is known from Hohuanshan , Huli county , central Taiwan ° It was found at roadsides at elevations of 2750 meters of Mt. Hohuanshan. Its flowering time is September to October °



*Fragaria tayulinensis* S. S. Ying, the holotype

21.A New Species of Genus *Arum* (Araceae) from Taiwan ----

*Arum taiwanianum* S.S. Ying

*Arum taiwanianum* S.S. Ying, *sp. nov.* 台灣疆南星

TYPE:TAIWAN. I-Lan County,Tatung Township (大同鄉), Siyuanyakou (思源埡口)  
1850 m alt. *S. S. Ying*, *s.n.* October 15, 2020. (holotype, NTUF).



*Arum taiwanianum* S. S. Ying, fruiting plant

**Morphology** : Perennial herbs; tubers ovoid, 2.5-4 cm across, with numerous fibrous roots. Leaves with elongate petioles, sagittate to hastate, 10-18 cm long, 6-8 cm wide, acute at apex, cordate to hastate at base, entire to wavy at margins, lustrous green surface and pale green beneath, glabrous on both surfaces. Petioles 8-15 cm long, terete, green, glabrous or nearly so.



*Arum taiwanianum* S. S. Ying, fruits and one female floret

Inflorescence slightly aromatic, peduncle 14-19 cm long, erect to ascending, fleshy, pale green to white, glabrous; spathe wither, not see; fruiting peduncle 4-10 cm long, 2.5-3





*Arum taiwanianum* S. S. Ying, pale yellow fruiting peduncle



*Arum taiwanianum* S. S. Ying, 4-6 bracts at base of fruiting peduncle

cm across, fleshy, pale yellow; bracts 4-6, at base of fruiting peduncle, lanceolate, 3-5 cm long, 1.5-3 cm wide, acute at apex, dark brown, glabrous; fruits in 7-9 series, globose to ovoid, 5-7 mm long, 3-4 across, yellow turn to red, obtuse and slightly emarginate at apex, fleshy, opened regularly at top; seed 3 in each fruit, reniform, 2-3 mm long, pale yellow.



*Arum taiwanianum* S. S. Ying, another fruiting plant



*Arum taiwanianum* S. S. Ying, the holotype

### Diagnosis.

The genus *Arum* is new to Flora of Taiwan.

*Arum taiwanianum* is a peculiar plant, it was collected in fruiting stage with some dilapidated leaves residual on ground; the spathe, female and male florets are not described here, I will sustained to study this species.

*Arum taiwanianum* is different from other species of the genus *Arum* by its more sturdy and fatter infructescence.

More than 15 individuals were found along roadsides on a distance between 1700 and 1950 meters elevation at Siyuanakou (思源埡口), it may be have more individuals distributed under the forests or other places.

It is not a parasitic plant, the only genus *Arum* of Araceae is match characters of the species. further study of the species is desirable.

### Distribution and phenology.

*Arum taiwanianum* S.S. Ying is endemic to Taiwan ° It is known from Siyuanyakou (思源埡口), Tatung Township (大同鄉), I-lan county, northern Taiwan ° It was collected on the roadsides of highway, at elevations about 1850 m.. and fruiting time is October .



*Arum taiwanianum* S. S. Ying, another individual -210

22.A New Species of Genus *Circaea*. (Onagraceae) from Taiwan ----

*Circaea cireniana* S.S. Ying

*Circaea cireniana* S.S. Ying *sp. nov.* 慈恩露珠草

TYPE:TAIWAN. Hualien county, Xiulin Township (秀林鄉), Ciren (慈恩) 1995 m alt. *S. Ying*, *s.n.* October 24, 2020. (holotype, NTUF).



*Circaea cireniana* S. S. Ying, flowering plant

**Morphology** : Perennial herbs; taproot somewhat lignifous, 10-15 cm long, fibrous roots numerous, slender, rhizome absent. Stem prostrate to ascending, 15-30 cm long, branched upward, pubescent; branchlets 10-16 cm long, ascending, pubescent. Leaves opposite, simple, ovate to oblong, 3.5-5 cm long, 1.5-2.5 cm wide, chartaceous, acuminate at apex, slightly cordate to truncate at base, entire to inconspicuous dentate and ciliate at margins, pale green on both surfaces, scattered with villous hairs on both surfaces, midrib and lateral veins (7-9 per side) impressed surface and elevated beneath; cauline ones often smaller



*Circaea cireniana* S. S. Ying, leaves

gradually upward. petioles 8-15 cm long, slender, pubescent. Stipules paired, at base of petioles, ovate to oblong, 6-7 mm long, 3-5 mm wide, acuminate at base, cauduous or persistent.

Flowers small, many, green, 3-4 mm in diameter when opened, in a closely aggregating short raceme.; the inflorescence 1-2.5 cm long, terminal or on the axil of upper leaf, ascending, densely scattered with glandular hairs; bracts solitary, at base of inflorescence, lanceolate, 6-8 mm long, 3-3.5 mm wide, acute at apex, glandular-hais all over; pedicels in flowering very short, inconspicuous; bracteole absent; sepals 2, opposite, oblong, 3-3.5 mm long, about 2.5 mm wide, widely opened, green, obtuse at apex, somewhat concave, glandular-hairs outside and glabrous inside; petals 2, alternate to sepals, much smaller than sepals, obtriangular, 0.5-1 mm long, about 1 mm wide, white, notched at apex, glabrous; stamens 2, shorter than style, filaments slender, 1-2 mm long, white; anthers 2-celled, oblong, about 2 mm long, pale brown; style slender, filiform 3-3.5 mm



*Circaea cireniana* S. S. Ying, inflorescences



*Circaea cireniana* S. S. Ying, close-up of flowers (1)



*Circaea cireniana* S. S. Ying, close-up of flowers (2)



*Circaea cireniana* S. S. Ying, close-up of flowers (3) -214-





*Circaea cireniana* S. S. Ying, infructescences

long, white, glabrous; stigma didymous, 2 mm wide, 0.5 mm long, pink; ovary ovoid, 1-2 mm in diameter, densely scattered with glandular hairs.

Fruits many in each infructescence, globose, 3-3.5 mm in diameter, green, densely scattered with glandular hairs, without prominent ribs and deep sulci; infructescence 8-18 cm long, ascending, pubescent; fruiting pedicels 4-6 mm long, pubescent; locule 1, but with trace of a second locule in cross-section; seed 1, globose, 2-3 mm in diameter, smooth, glabrous.

**Diagnosis.**

*Circaea cireniana* grows at a lowest elevation of 1995 meters elevations among Taiwan *Ciracea* plants.

Stems prostrate to ascending, pubescent.

Flowers small, many, green, 3-4 mm in diameter when opened, in a closely aggregating short raceme.; the inflorescence 1-2.5 cm long;but in infructescence elongate to 8-18 cm long, ascending, pubescent.



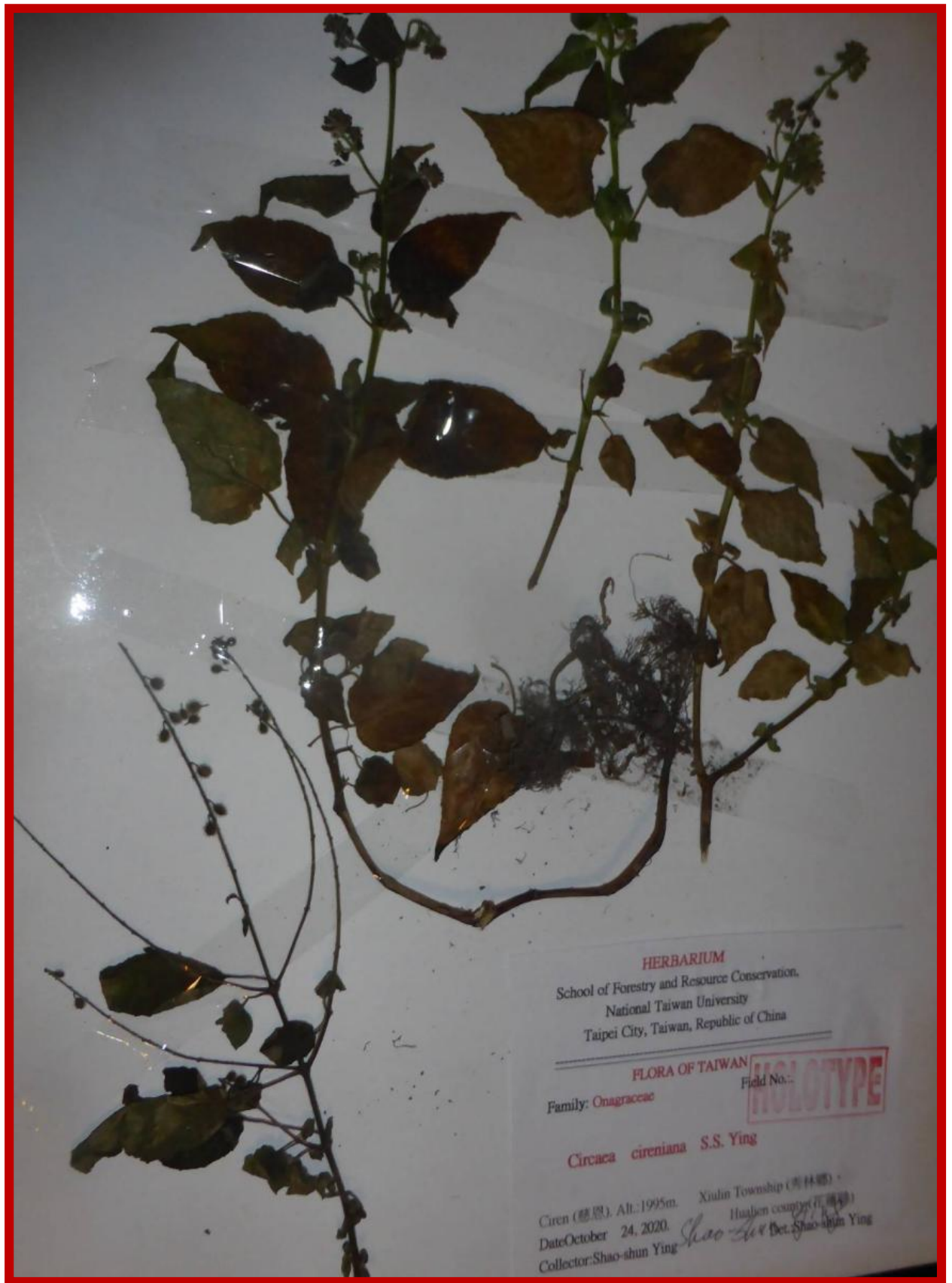
*Circaea cireniana* S. S. Ying, close-up of fruits

Sepals oblong, 3-3.5 mm long, about 2.5 mm wide, widely opened, green, obtuse at apex, somewhat concave, glandular-hairs outside and glabrous inside; petals 2, alternate to sepals, much smaller than sepals, obtriangular, 0.5-1 mm long, about 1 mm wide, white, notched at apex, glabrous.

Fruits many in each infructescence, globose, 3-3.5 mm in diameter, green, densely scattered with glandular hairs, without prominent ribs and deep sulci.

**Distribution and phenology.**

The species is endemic in Taiwan, It is known from Ciren (慈恩) Hualien county, eastern Taiwan. It was collected at fields along roadsides, on a distance between 1995 and 2100



*Circaea cireniana* S. S. Ying, the holotype

meters elevation. Its flowering time in October, and fruiting times October to November.



*Circaea cireniana* S. S. Ying, habitat



## 23. Taxonomic Notes on the Family Asteraceae in Taiwan

### A. Nine New Species of Asteraceae in Taiwan

#### 1. *Ixeridium sandaiolingwaterfallense* S.S. Ying

*Ixeridium sandaiolingwaterfallense* S.S. Ying, sp.nov. 三貂嶺瀑布刀傷草

TYPE: TAIWAN. New Taipei City, Gongliao District (貢寮區), Sandiaoling (三貂嶺) 285 m alt. S. S. Ying, s.n. March 07, 2020. (holotype, NTUF).



*Ixeridium sandaiolingwaterfallense* S. S. Ying, the habit

**Morphology :** A perennial herb, with scape about 15-20 cm high, stemless. Leaves basal, radical, 8-19 in a rosulate arrangement, lanceolate to broadly lanceolate in outline, with petioles 5-8 cm long, 1.5-2.5 cm wide, acuminate at apex, narrowed at base, lyrate or pinnatisect, lateral lobes 3-5 on each side of midvein, irregularly triangular, 8-12 mm long, 1-1.5 cm wide, acuminate at apex, scattered arista-serrate at margin, glabrous on both surface, lustrous green surface and pale green beneath. Petioles 1.5-2 cm long, without winged, green, glabrous, scattered arista-serrate at margin.



*Ixeridium sandaiolingwaterfallense* S. S. Ying, the plant with inflorescence bud

Synflorescence from the top of leaf-clustered, 8-12 cm long, erect to ascending, green, glabrous, 2-4 branched; each branches with 6-9 capitula in a corymbiform; capitula with 8-12 florets; peduncle slender, 1.5-4 cm long, green, glabrous; the pedicels 1.2-2.5 cm long, slender, glabrous; involucre cylindric, green, 7-9 mm long, outer phyllaries small, 1-1.5 mm long, deciduous; inner phyllaries 7-10, lanceolate, 5-7 mm long, 1.5 mm wide,



*Ixeridium sandaiolingwaterfallense* S. S. Ying, the plant with inflorescence bud



*Ixeridium sandaiolingwaterfallense* S. S. Ying, the habitat (1)



*Ixeridium sandaiolingwaterfallense* S. S. Ying, the capitula



*Ixeridium sandaiolingwaterfallense* S. S. Ying, the habitat (2)





*Ixeridium sandaiolingwaterfallense* S. S. Ying, the holotype

acuminate at apex, glabrous; corolla yellow, 8-12 mm long, 2-4 mm wide, opened one side, 4 toothed at apex; anthers tube 4-6 mm long, brownish, style slender, 6-7.5 mm long,

### **Diagnosis.**

*Ixeridium sandaiolingwaterfallense* grows on the wet and mossy rocks, and is characterized by its smaller habit, with scape about 15-20 cm high, stemless. Leaves basal, radical, 8-19 in a rosulate arrangement, synflorescence from the top of leaf-clustered, 8-12 cm long; capitula with 8-12 florets; corolla yellow, 8-12 mm long, 2-4 mm wide, opened one side, 4 toothed at apex.

### **Distribution and phenology.**

*Ixeridium sandaiolingwaterfallense* S.S. Ying is endemic to Taiwan. It is known from Sandiaolin waterfalls (三貂嶺瀑布群), and is confined to 50 meters circle around the waterfalls. Gongliao Distract (貢寮區), New Taipei City, Northern Taiwan. It was collected on the wet and mossy rocks, at elevation of 285 meters. and flowering time from March to April.



*Ixeridium sandaiolingwaterfallense* S. S. Ying, the habitat (3)

2. *Melanthera taiwanensis* S.S. Ying 台灣鹵地菊

*Melanthera taiwanensis* S.S. Ying, sp.nov. 台灣鹵地菊

TYPE:TAIWAN. Taipei City,Peitou Distract (北投區), Lengshuikeng (冷水坑) 755 m alt. *S. S. Ying*, *s.n.* November 30, 2019. (holotype, NTUF) .



*Melanthera taiwanensis* S. S. Ying, the capital

**Morphology :** A perennial herb, stem elongate, erect or ascending, glabrous. Leaves simple, opposite, lanceolate, 3-4.5 cm long, 7-9 mm wide, acuminate at apex, narrowed at base, chartaceous to thin coriaceous, entire to remotely dentate at margins, midrib impressed surface and elevated beneath, lustrous green surface and pale green beneath; glabrous on both surface. Petioles short, 1-3 mm long, glabrous.

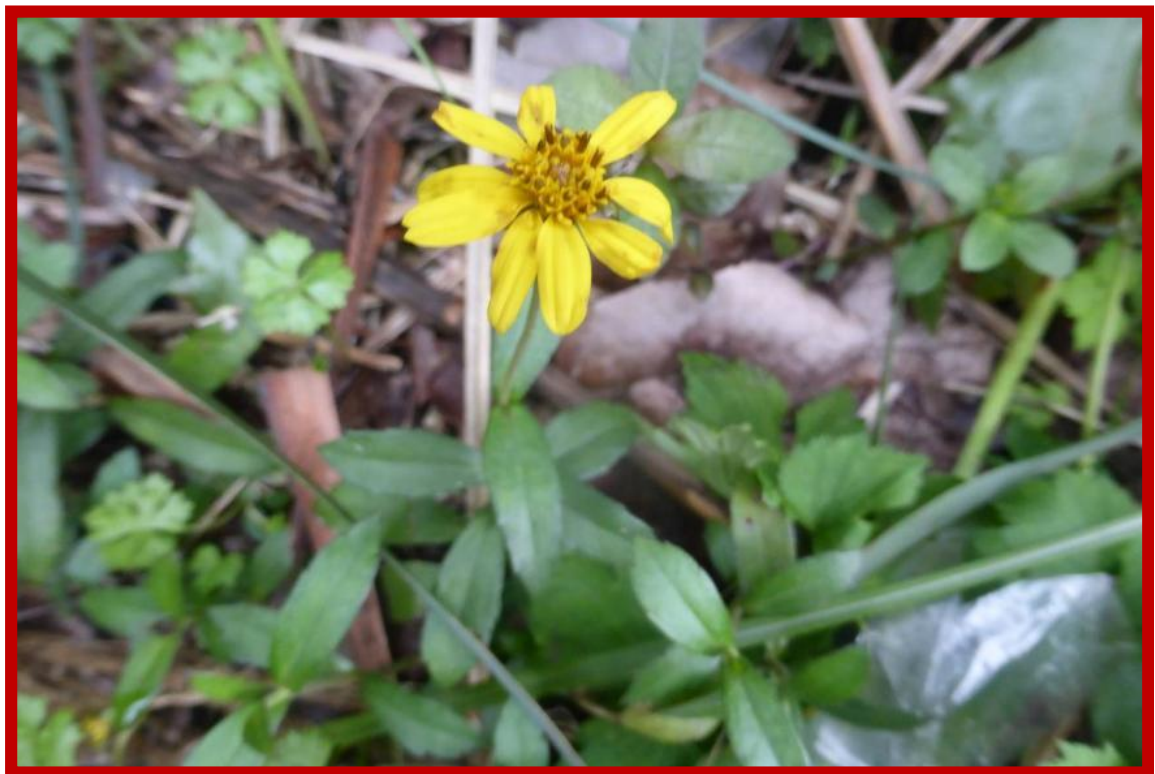


*Melanthera taiwanensis* S. S. Ying, the habitat

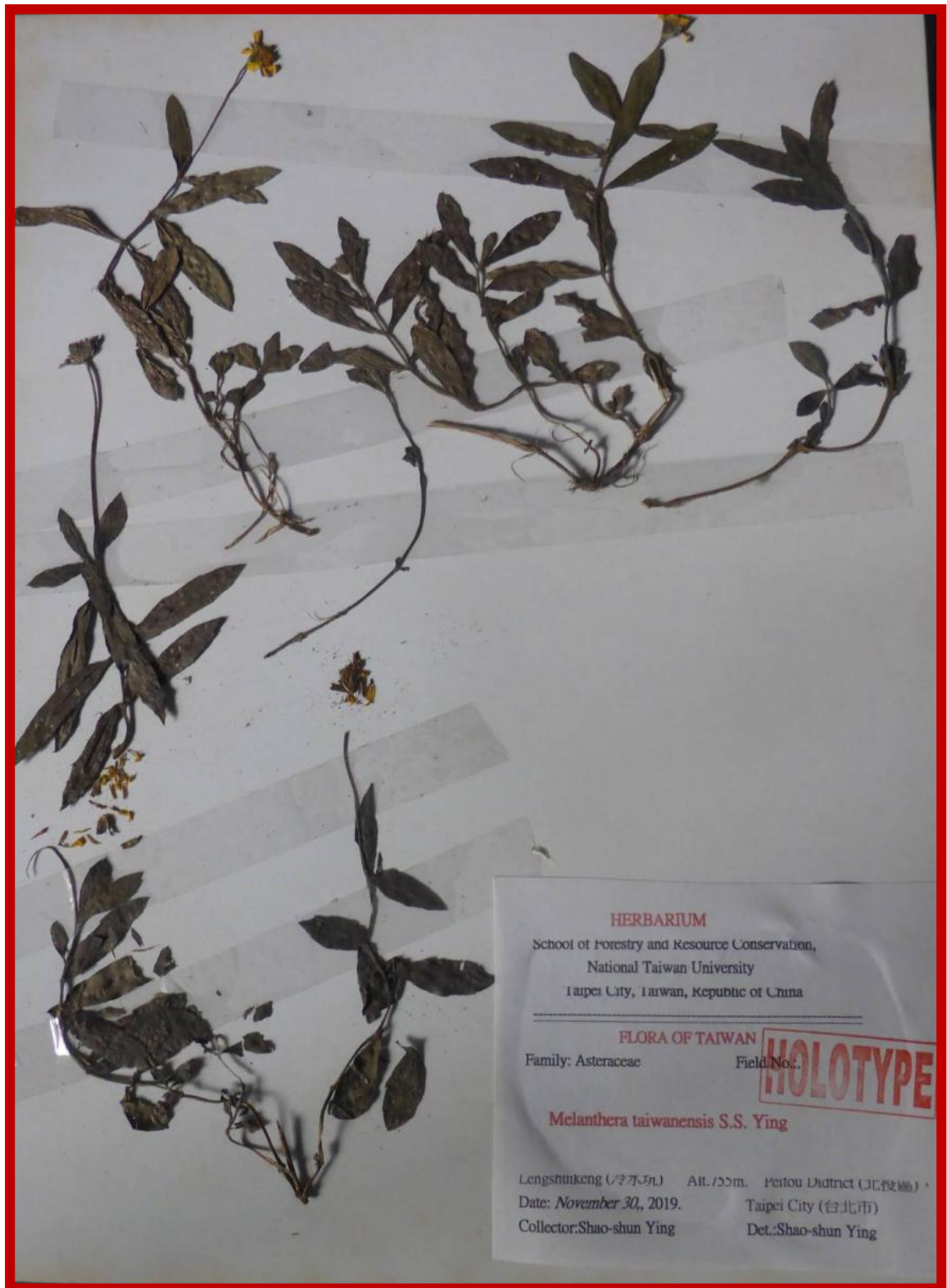
Capitula yellow, solitary, terminal, 1.2-1.5 cm in diameter when opened; peduncles 5-7 cm long, glabrous; involucre hemisphere, 6-8 mm long, 10-12 mm wide, glabrous; phyllaries 6-9 in 1-seriate, oblong, 3-4 mm long, obtuse to acuminate at apex, glabrous; ray florets 7-9, 1-seriate, corolla (ligule) oblong to lanceolate, 6-7 mm long, 2-4 mm wide, obtuse at apex; disc florets numerous, corolla tubular, 4-6 mm long, 5-lobed at apex, glabrous; paleae lanceolate, 5-7 mm long, 1.5 mm wide, acuminate and ciliate at apex, anther cylinder 5-7 mm long, brownish in colour.



*Melanthera taiwanensis* S. S. Ying, the habitat (2)



*Melanthera taiwanensis* S. S. Ying, the habitat (3)



*Melanthera taiwanensis* S. S. Ying, the holotype



*Melanthera taiwanensis* S. S. Ying, the plants with capituls

#### Diagnosis.

*Melanthera taiwanensis* grows mixed with *Miscanthus floridulus* (Labill.) Warb. ex K. Schum. & Lauterb. and other plants; it is characterized by its lanceolate, entire or few remote dentate at margins, 1-nerved leaves and few ray florets, the apex of corolla of ray florets entire, without any dentate.

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#### Distribution and phenology.

*Melanthera taiwanensis* S.S. Ying is endemic to Taiwan. It is known from Lengshuikeng (冷水坑), Peitou District (北投區), Taipei City, northern Taiwan. It was collected at 755 m. elevation, and flowering time 1. April to May; 2. November.

### 3. *Paraprenanthes shaolinchiensis* S.S. Ying 邵氏假福王菊

*Paraprenanthes shaolinchiensis* S.S. Ying, *sp. nov.* 邵氏假福王菊

TYPE: TAIWAN. Hualien county, Xiulin Township (秀林鄉), Hohuanshan (合歡山) 2850 m alt. S. S. Ying, *s.n.* September 3, 2020. (holotype, NTUF). -229-



*Paraprenanthes shaolinchiensis* S. S. Ying, the habitat (1)

**Morphology** : A annual herb, root rhizome-like, slightly fleshy, 1-3 cm long, creeping; stem simple, not branched, 45-75cm long, erect to ascending, glabrous, green. Leaves



*Paraprenanthes shaolinchiensis* S. S. Ying, 3-foliate of basal leaves



dimorphic, the basal ones (2-3) 3-foliolate, the upstem leaves lanceolate to linear; the petioles 4-5.5 cm long, glabrous; terminal leaflet triangular, 6-8 cm long, 4-5.5 cm wide, chartaceous, aristate-serrulate at margins, acuminate at apex, cordate to truncate at base, palmate veins impressed surface and elevated beneath, glabrous on both surfaces; petioles 8-12 mm long, glabrous; lateral leaflets alternate to opposite, oblong, 3-4 cm long, 2-2.5 cm wide, acute at apex, narrowed at base; petioles 0 or sessile; upstem leaves simple, lanceolate to linear, 3-7 cm long, 4-10 mm wide, acuminate at apex, narrowed at base, entire at margins, sessile or nearly so.



*Paraprenanthes shaolinchiensis* S. S. Ying, the inflorescence

Synflorescence 35-45 cm long, green, glabrous or nearly so, narrowly paniculiform, often with 8-15 racemes, each raceme 8-12 cm long, green, glabrous, with 8-12 single or pair pendent capitula; pedicels slender, 1-2.5 cm long, green tinged with purple; bracts minute, purplish; involucre cylindric, 9-12 mm long, 3-4 mm wide, purple, glabrous; outer



*Paraprenanthes shaolinchiensis* S. S. Ying, the capitula

bracts smaller, 2-3 seriate, triangular, 1.5-2.4 mm long, acute at apex; inner bracts 5-6 in one seriae, oblong-lanceolate, 5-6 mm long, glabrous, purple, somewhat obtuse at apex; florets 5-6, corolla open one side, 7-8 mm long, 1.5-2.5 mm wide, truncate and toothed at apex; stamens 5, style 2-lobed, the lobes unequal; ovary ovoid, 2-3 mm long, glabrous; papus numerous, white, 4-5 mm long.



*Paraprenanthes shaolinchiensis* S. S. Ying, the habitat (2)

### Diagnosis.

*Paraprenanthes shaolinchiensis* is characterized by:

1. Basal leaves ternate, terminal leaflet triangular, largest; lateral leaflets alternate to opposite, smaller, oblong; cauline leaves lanceolate to linear. , es
2. Synflorescence 35-45 cm long, green, glabrous or nearly so, narrowly paniculiform.
3. Racemes 8-15, each raceme with 8-12 single or pair pendent capitula.
4. Capitula with 5-6 florets, corolla open one side, 7-8 mm long, 1.5-2.5 mm wide, truncate and toothed at apex.

### Distribution and phenology.

*Paraprenanthes shaolinchiensis* is endemic in Taiwan, It is known from Hohuanshan , Nantou county , central Taiwan . It was collected en route from Shaofengkou (小風口) to Tayulin (大禹嶺) about 2850 m. elevation. Its flowering time from September . -233-



*Paraprenanthes shaolinchiensis* S. S. Ying, the holotype



*Paraprenanthes shaolinchiensis* S. S. Ying, the isotype

#### 4. *Cirsium pitouchaoense* S.S. Ying 鼻頭角薊

*Cirsium pitouchaoense* S.S. Ying, *sp. nov.* 鼻頭角薊

TYPE:TAIWAN. New Taipei City, Ruifang District (瑞芳區), Pitouchao (鼻頭角) 34 m alt. S. S. Ying, *s.n.* April 11, 2020. (holotype, NTUF).



*Cirsium pitouchaoense* S. S. Ying, the male capitulum

**Morphology** : Annual herbs, stems erect or ascending, simple, 40-65 cm long, unwinged, with densely white appressed hairs. Leaves simple, alternate, oblong in outline, 15-25 cm long, 5-8 cm wide, pinnatisect at margins, lustrous green surface and pale green beneath, midrib impressed surface and elevated beneath, glabrous on both surfaces; pinna 6-8 pairs, ovate-triangular, 3-4.5 cm long, 1.5-2 cm wide, spinulate-serrated at margins; spines 4-5



*Cirsium pitouchoense* S. S. Ying, the leaves

mm long; upper cauline leaves gradually smaller.

Capitulum dioecious, pink, solitary to 3, racemose array, often terminal on the peduncles, 3.5-5cm in diameter; peduncles 4-7 cm long, erect to ascending, white-tomentose; involucre campanulate, 3-4 cm long, 2.5-3.2 cm wide, contracted at apex;



*Cirsium pitouchaense* S. S. Ying, the capitula in bud, showing phyllaries



*Cirsium pitouchaense* S. S. Ying, the young male capitula, showing corolla,  
anther tube (light violet), anther (purple)





*Cirsium pitouchaoense* S. S. Ying, the adult male capitula, showing corolla,  
anther tube ( light purple) and anther (purple), pollens spurt out

phyllaries 4-5 series, imbricate, uniform, the inner ones smaller, lanceolate, 1.3-1.8 cm long, 3-4 mm wide, acute and reflexed tinged with purple at apex, obtuse at base, glabrous, with membranous winged and scarious appendage; male florets: corolla pink to light violet, 25-32 mm long, 3-3.5 mm wide, 5-lobed at apex, the lobes linear, 7-9 mm long, 1-1.5 mm wide, obtuse at apex; anthers tube 2.5-3mm long, 5-toothed at apex, anthers exerted the



*Cirsium pitouchoense* S. S. Ying, the female capitula,  
just flowering (left) and after anthesis,

tube, cylindrical, about 3 mm long, purple, opened on terminal, pollens white, usually spout out. female florets: corolla pink, 3-3.5 mm long, 5-lobed at apex; the lobes linear, 2-3 mm long, 1-1.5 mm wide, obtuse at apex; ovary obovoid, 1-1.5 mm long, papus numerous, 3-3.5 mm long, slender, villous; style elongate, 4-6 mm long, white, glabrous; stigma 2, minute, 0.2 mm long.

Achenes obovoid, 3-4 mm long, about 1.5 mm wide, laterally compressed, with 4 longitudinal ribs; apical rim forming a smooth-margined upright crown; pappus 8-12 mm long, with plumose bristles, usually forming basal ring, often shed.

**Diagnosis.**



*Cirsium pitouchoense* S. S. Ying, the fruits



*Cirsium pitouchoense* S. S. Ying, the female capitula and fruits



*Cirsium pitouchaoense* S. S. Ying, the anchenes

*Cirsium pitouchaoense* is characterized by:

1. Plant erect, 45-60 cm long, stem simple.
2. Capitula dioecious; involucre campanulate, contracted at apex; phyllaries 4-5 series, imbricate, uniform, the inner ones smaller. ,
3. Male florets: corolla pink to light violet, 5-lobed at apex, the lobes linear, 7-9 mm long, 1-1.5 mm wide, obtuse at apex; anthers tube, 5-toothed at apex, anthers exerted the tube, cylindrical, about 3 mm long, purple
4. Female florets: corolla pink, 5-lobed at apex; ovary obovoid, papus numerous, slender, villous; style elongate, 4-6 mm long, white, glabrous; stigma 2, minute, 0.2 mm long.
5. The plant is ephemeral, it was found in February, Flowering time is March to April, and soon wither, you cannot see the plant after June at Pitouchao (鼻頭角) area.

**Distribution and phenology.**



*Cirsium pitouchoense* S. S. Ying, the habitat (1)



*Cirsium pitouchoense* S. S. Ying, the habitat (2)



*Cirsium pitouchaoense* S. S. Ying, the holotype

The species is endemic in Taiwan, It is known from Pitouchao (鼻頭角) , Ruifang District (瑞芳區) , New Taipei City , northern Taiwan . It was discovered at an open sunny meadow along coastal region , at elevation between 40 and 52 meters, Its flowering time is from March to April .



*Cirsium pitouchaoense* S. S. Ying, the male plant

5. *Cirsium chilaishanense* S.S. Ying 奇萊山薊

*Cirsium chilaishanense* S.S. Ying, *sp. nov.* 奇萊山薊

TYPE:TAIWAN. Hualien county , Xiulin Township (秀林鄉) , en the route to Chilaishan (奇萊山) 3180 m alt. *S. S. Ying* , *s.n. October 8, 2020* ° (holotype, NTUF) °



*Cirsium chilaishanense* S. S. Ying, the capitula

**Morphology** : Annual herbs, stems erect or ascending, simple, 200-265 cm tall, unwinged, glabrous, green to grayish green. Leaves simple, alternate, lanceolate to oblong in outline,

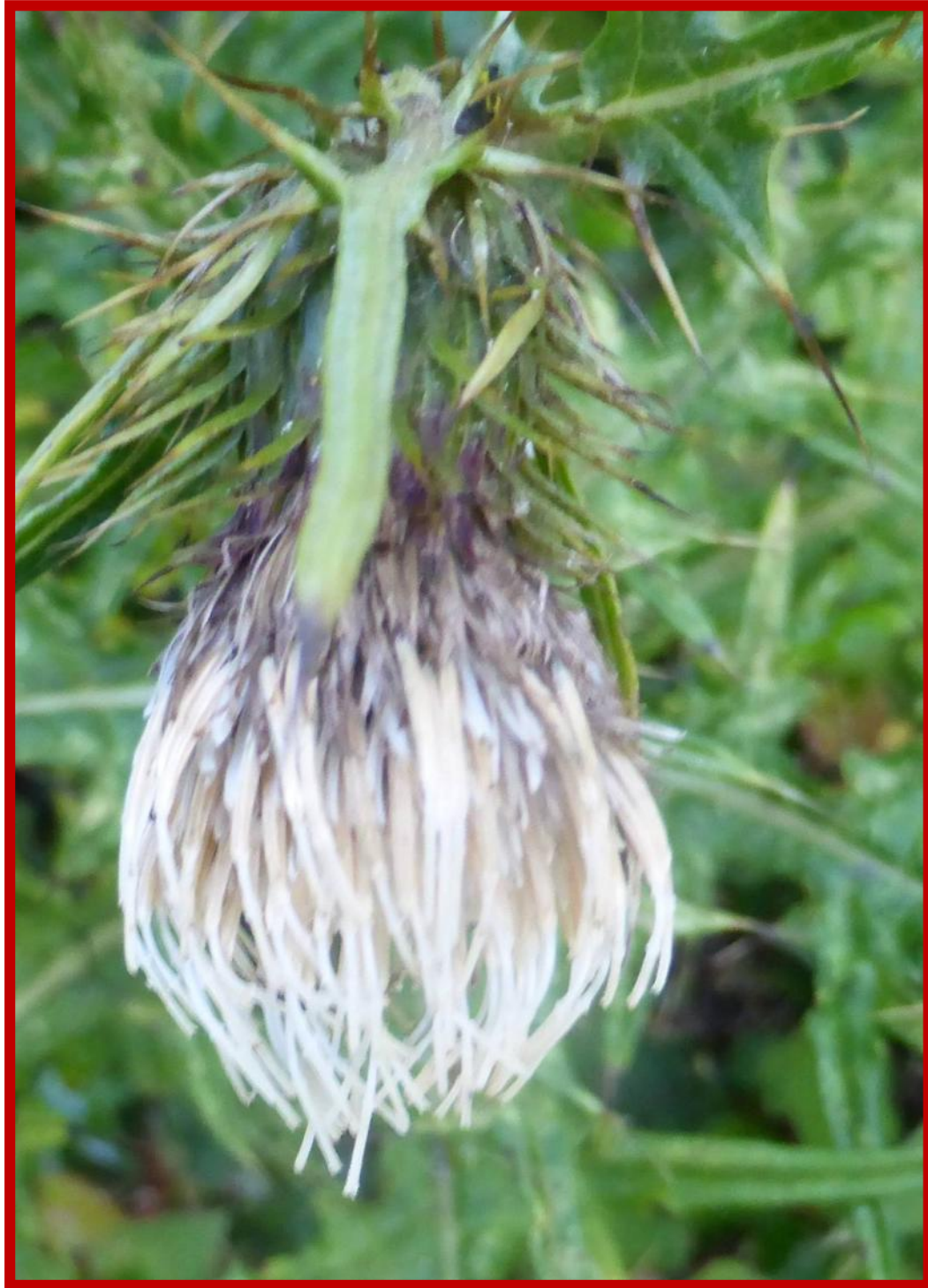




*Cirsium chilaishanense* S. S. Ying, the stem and leaves

20-35 cm long, 5-7 cm wide, coriaceous, deeply pinnatisect at margins, green surface and slightly pale green beneath, longate caudate at apex, amplexicual at base, midrib impressed surface and elevated beneath, glabrous on both surfaces; pinna 5-9 per side, alternate, linear, 1-6 cm long, 3-6 cm wide, spinulate-serrated at margins; spines 5-9 mm long, caudate at apex ; upper cauline leaves gradually smaller.

Capitulum white, solitary on the axils of upward leaves, 3.5-5 cm in diameter; peduncles 2-12 cm long, erect to ascending, green, glabrous; bracts 1-3, linear, 1.5-2.5 cm long, about 3 mm wide, serrate at margins; involucre campanulate, 2-3 cm long, 1.5-2.5 cm wide, contracted at apex; phyllaries 7-9 series, imbricate, uniform, lanceolate, 1-1.8 cm long, about 2 mm wide, green, spreading, acute and dark red at apex, somewhat reflexed, the inner ones smaller, truncate at base, glabrous, without membranous winged and



*Cirsium chilaishanense* S. S. Ying, the bract, phyllaries, corolla and style

scarios appendage; corolla creamy white, 2-2.5 cm long, about 3 mm wide, 5-lobed at apex; the lobes minute, triangular, 1-2.5 mm long, about 1.5 mm wide, acute at apex; anthers tube 2.5-3mm long, 5-toothed at apex, included the corolla tube, anther cylindrical,



*Cirsium chilaishanense* S. S. Ying, the corolla (dark colour) and style

about 3 mm long, opened on terminal; ovary cylindrical, 1.5-2.5 mm long, papus numerous, 3-4.5 mm long, slender, villous; style elongate, 1.4-2 cm long, white, exserted to the corolla, glabrous; stigma not branched, minute, 0.3 mm long.

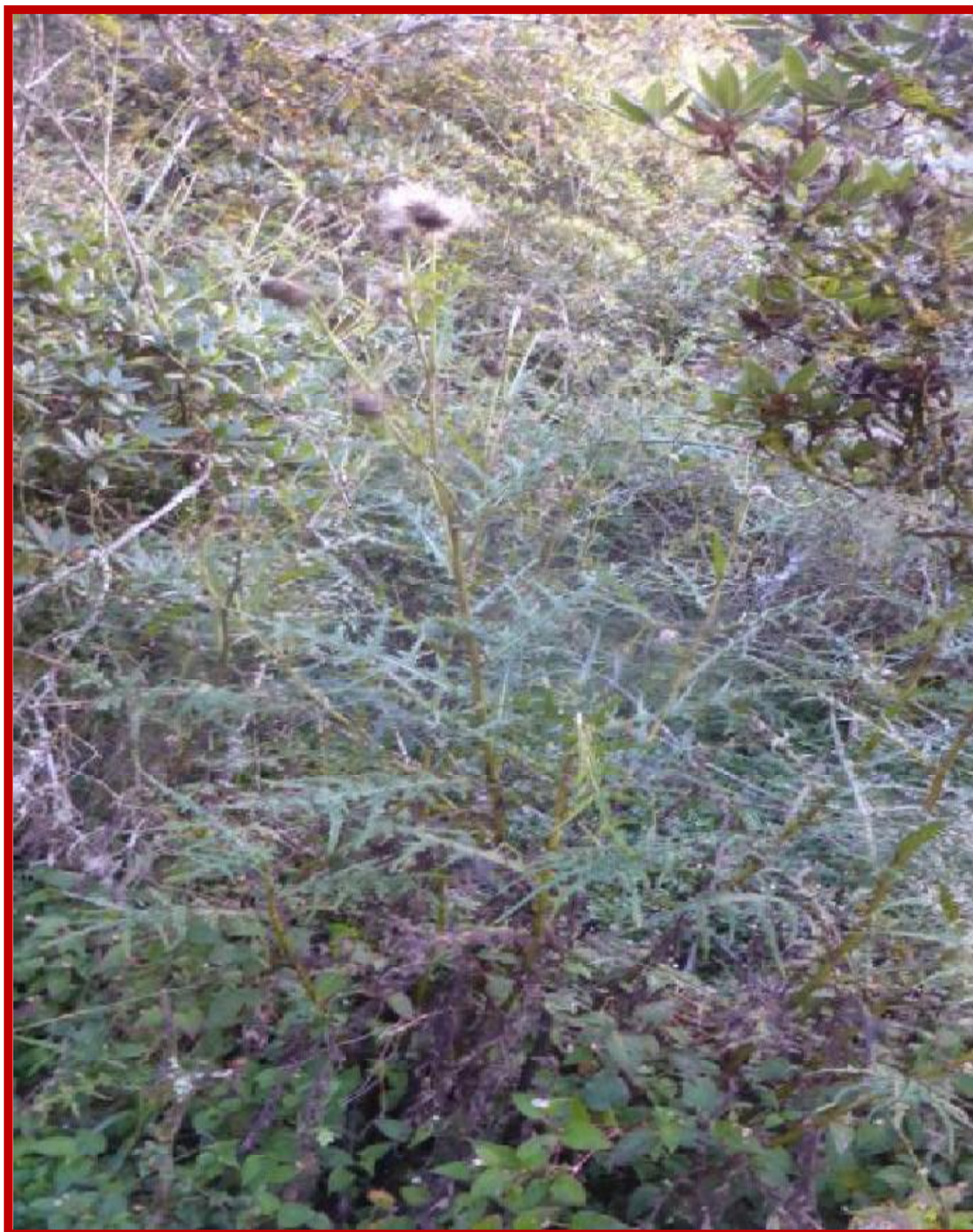
Achenes black, obovoid to cylindrical, 3-4.5 mm long, about 2.5 mm wide, laterally compressed, with 4 longitudinal ribs; apical rim forming a smooth-margined upright



*Cirsium chilaishanense* S. S. Ying, the fruit



*Cirsium chilaishanense* S. S. Ying, the achenes and pappus



*Cirsium chilaishanense* S. S. Ying, the habit

*Rhododendron pseudochrysanthum* Hayata on upper corner

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*Cirsium chilaishanense* S. S. Ying, the plant colony

crown; pappus 8-12 mm long, with minute plumose bristles, usually forming basal ring, often shed.

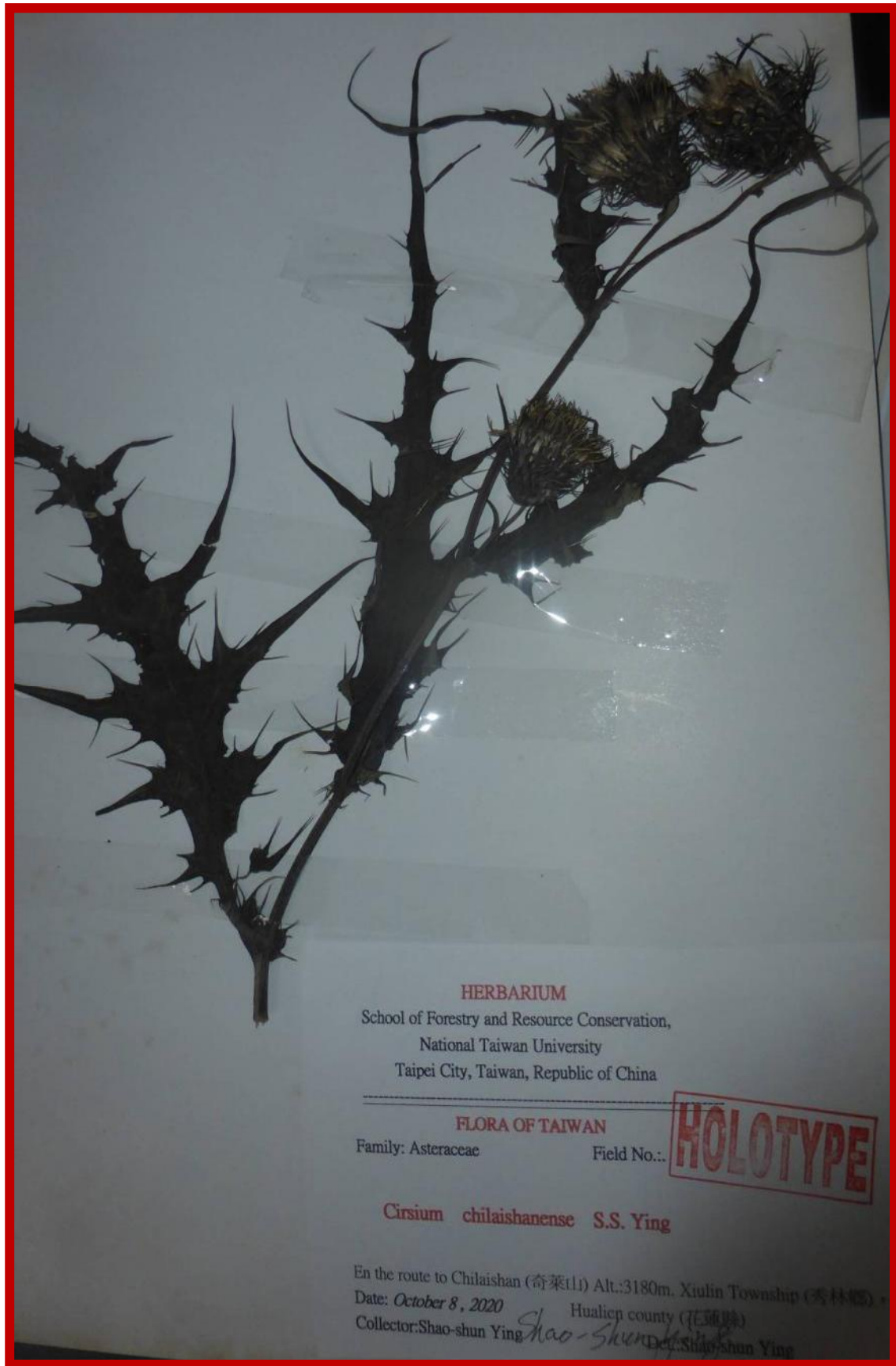
**Diagnosis.**

*Cirsium chilaishanense* is characterized by:

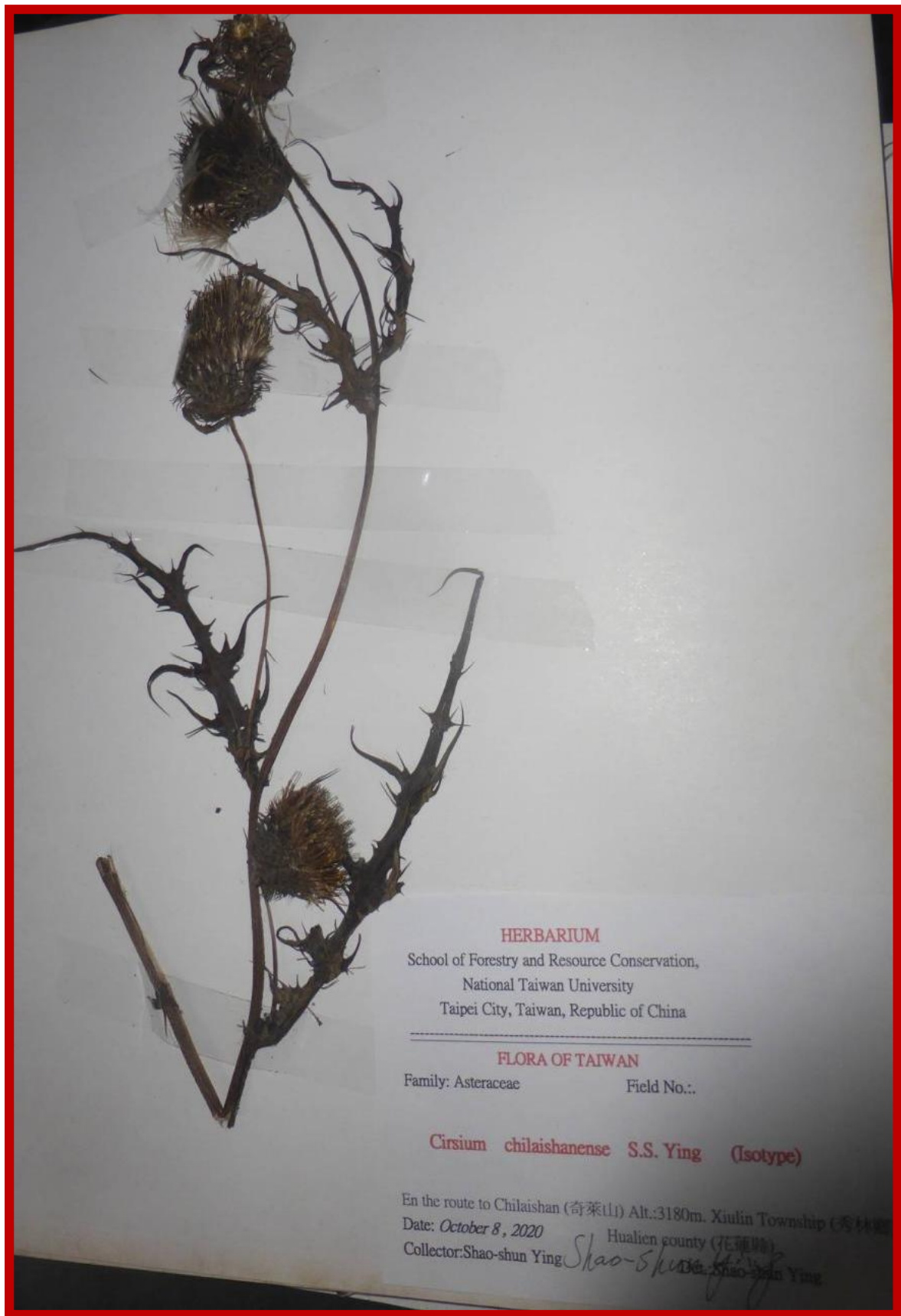
1. Plant erect, 200-250 cm tall, stem simple, usually colony a group, may be the plant has highest height among the Taiwan *Cirsium*.

2. Leaves coriaceous, deeply pinnatisect at margins, pinna 5-9 per side, alternate, linear, spinulate-serrated at margins; spines 5-9 mm long, caudate at apex

3. Capitulum white, solitary on the axils of upward leaves, 3.5-5 cm in diameter; peduncles 2-12 cm long, erect to ascending, green, glabrous.



*Cirsium chilaishanense* S. S. Ying, the holotype



*Cirsium chilaishanense* S. S. Ying, the isotype



4. Phyllaries 7-9 series, imbricate, uniform, lanceolate, green, spreading, acute and dark red at apex, somewhat reflexed, the inner ones smaller, truncate at base, glabrous,

5. Corolla creamy white, 5-lobed at apex; the lobes minute, triangular, acute at apex;

6. Achenes black, obovoid to cylindrical, laterally compressed, with 4 longitudinal ribs; apical rim forming a smooth-margined upright; pappus 8-12 mm long, with minute plumose bristles

**PS. *Veronica wulingensis* S.S. Ying was found on the way to Chilaishan (奇萊山) Distribution and phenology.**

The species is endemic in Taiwan, It is known from en route to Chilaishan (奇萊山), Xiulin Township (秀林鄉), Hualien county, central Taiwan. It was discovered at roadsides en route to Chilaishan, at elevations between 3180 meters, Its flowering time is from September to October.

### Reference

1. Chang, Chih-Yi & Y. H. Tseng (2019). *Cirsium japonicum* DC. var. *fukienense* Kitam. (Compositae), a newly recorded taxon of Taiwan and its western outlying islands, 林業研究季刊 41(2):165-176.



*Cirsium chilaishanense* S. S. Ying, the fruits

## 6. *Aster siyuanensis* S.S. Ying 思源紫苑

*Aster siyuanensis* S.S. Ying, *sp. nov.* 思源紫苑

TYPE: TAIWAN. I-Lan County, Tatung Township (大同鄉), Siyuanyakou (思源埡口)  
1850 m alt. S. S. Ying, *s.n.* October 15, 2020. (holotype, NTUF).



*Aster siyuanensis* S. S. Ying, the plants

**Morphology** : Perennial herbs, rhizome corm-like, ovoid, 1.5-2.5 cm long, 4-5 mm across, somewhat fleshy; stems erect or ascending, simple, 25-50 cm tall, unwinged, glabrous, red-purple at base, pale purplish to green upward. Leaves simple, alternate, the radical ones 5-7, ovate, 4-7 cm long, 3.5-5.5 cm wide, chartaceous, acute at apex, cordate at base, lustrous green surface, pale green beneath, glabrous on both surfaces, dentate at margins, pamentally nerved impressed surface and elevated beneath, midrib on the beneath tinged with pale purple; petioles 8-12 cm long, glabrous, dark purple in colour. the cauline ones

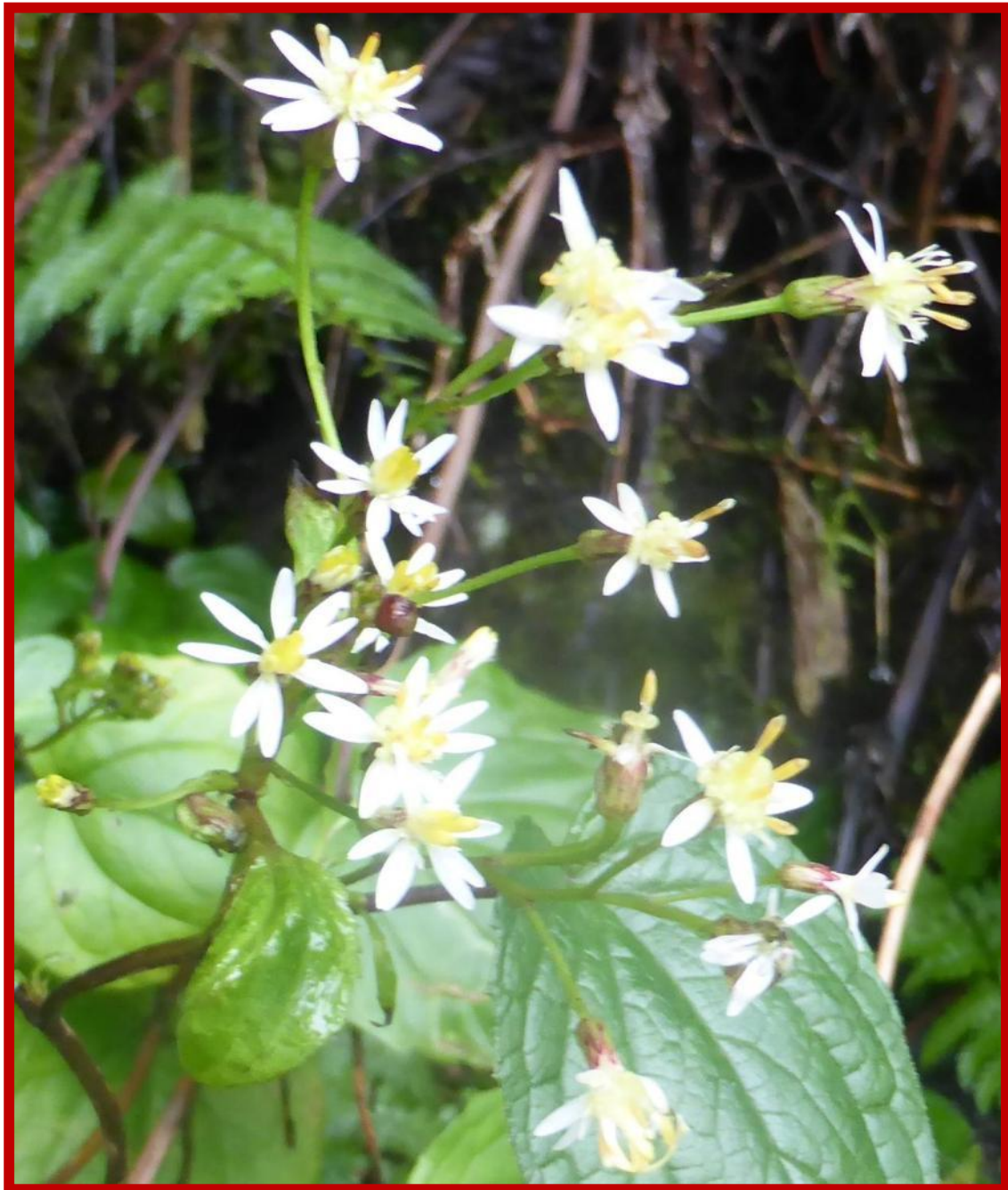


*Aster siyuanensis* S. S. Ying, the rhizome and radical leaves



*Aster siyuanensis* S. S. Ying, the radical and cauline leaves -257-

5-8, ovate, 6-9 cm long, 5.5-7.5 cm wide, other features like the radical ones; petioles 3-5 cm long, glabrous, dark purple.



*Aster siyuanensis* S. S. Ying, close-up of inflorescences

Capitula 5-8 in cymose, terminal and on axil of upward leaf, 8-10 mm in diameter, peduncles 4-6 cm long, green, glabrous; pedicels 1.5-2.5 cm long, green, glabrous;

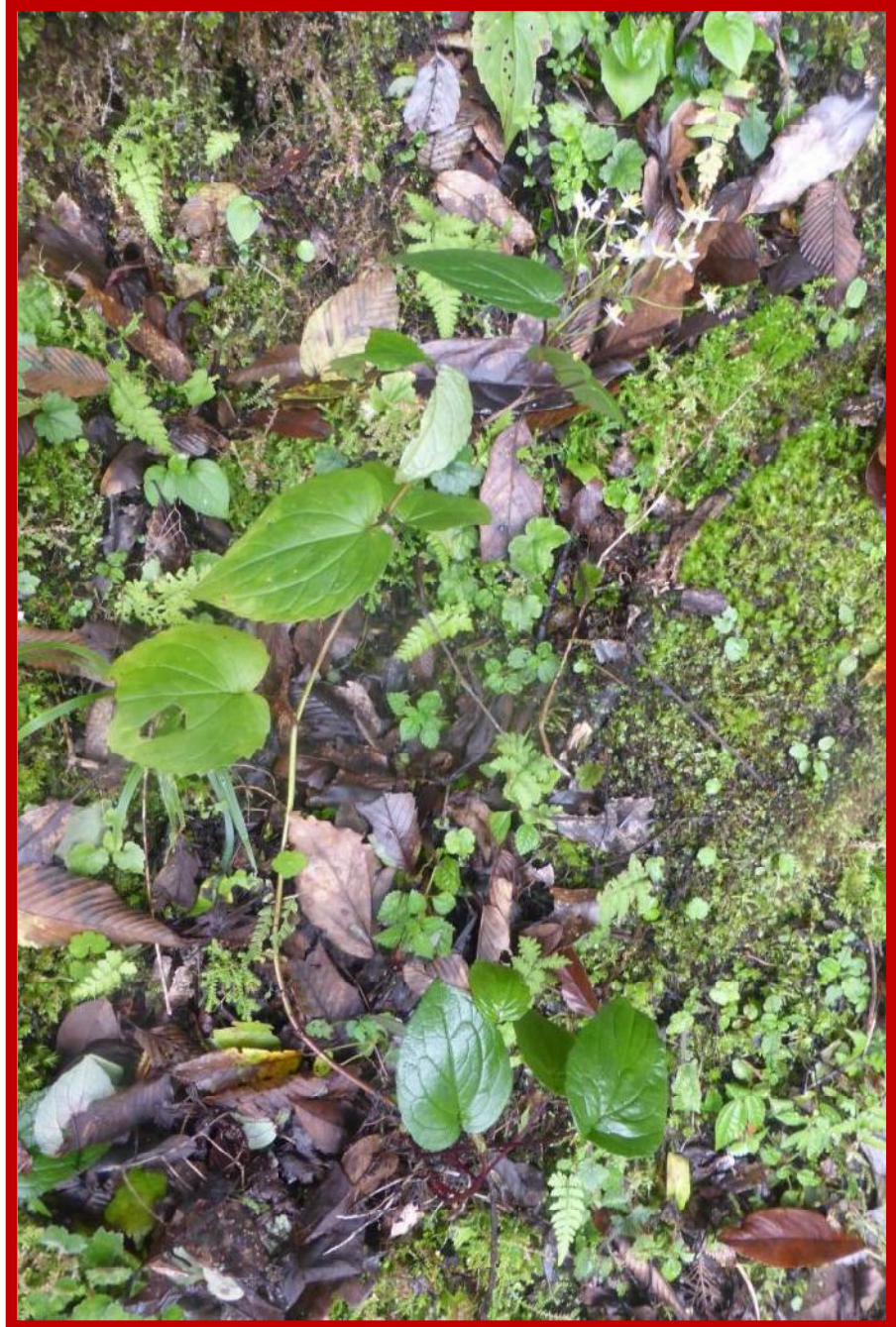


*Aster siyuanensis* S. S. Ying, close-up of capitula

involucres tubular, 5-7 mm long, green, glabrous; phyllaries 3-4 series, imbricate, lanceolate, 2.5-4.5 mm long, about 1.5 mm wide, acute and tinged with purple at apex, the basal ones short and upward ones longer; receptacles convex, 3-4 mm long, 4-5 mm wide; ray florets 6-8 in 1-series, white, tube and basal lamina glabrous, eglandular, lamina lanceolate, 6-6.5 mm long, 1-1.5 mm wide, obtuse at apex, glabrous; disk florets less than 20, bisexual, fertile, yellow, limb campanulate, 4-5 mm long, 5-lobed at apex; lobes erect, triangular, 0.4-0.5 mm long, acute at apex; ovary ovoid, 2-3 mm long, white; style elongate, 6-7 mm long, pale green, glabrous; stigma 2-lobed, the lobes linear, 1.5 mm long, white.

Achenes obovoid, 4-5 mm long, 2-2.5 mm wide, glabrous, 3-4-ribbed, eglandular; pappus 2-seriate, white, outer series of short slender bristles; inner series of numerous

subequal, barbellate or barbellulate bristles; bristles slender, 3.5-4.5 mm long, acute at apex.



*Aster siyuanensis* S. S. Ying, the habit

**Diagnosis.**

*Aster siyuanensis* is characterized by:

1. Plant erect to ascending, 25-50 cm tall, stem simple, usually colony a group. .
2. Leaves radical and cauline, chartaceous, ovate, acute at apex, cordate at base, lustrous green surface, pale green beneath, glabrous on both surfaces, dentate at margins.
3. Capitula 5-8 in a cymose, terminal and on axil of upward leaf, 8-10 mm in diameter, may the smallest capitula of genus *Aster* in Taiwan.
4. Involucres tubular, 5-7 mm long, green , glabrous; phyllaries 3-4 series, imbricate, lanceolate, acute and tinged with purple at apex
5. Ray florets 6-8 in 1-series, white, tube and basal lamina glabrous, eglandular, lamina lanceolate, obtuse at apex, glabrous.
6. Disk florets less than 20, bisexual, fertile, yellow, limb campanulate, 5-lobed at apex; lobes erect, triangular,; ovary ovoid, 2-3 mm long, white; style elongate, 6-7 mm long, pale green, glabrous; stigma 2-lobed.



*Aster siyuanensis* S. S. Ying, the habitat

#### **Distribution and phenology.**

*Aster siyuanensis* S.S. Ying is endemic to Taiwan ◦ It is known from Siyuanyakou (思源埡口), Tatung Township (大同鄉), I-lan county, northern Taiwan ◦ It was

collected on the roadsides of highway , at elevations about 1850 m.. and flowering time is October to November, Fruiting time is November .



*Aster siyuanensis* S. S. Ying, the isotype





*Aster siyuanensis* S. S. Ying, the holotype



*Aster siyuanensis* S. S. Ying, was also found en the route  
between Pilushenmu (碧綠神木) and Cien (慈恩)

7. *Senecio bilushenmulatus* S.S. Ying 碧綠神木千里光

*Senecio bilushenmulatus* S.S. Ying, *sp. nov.* 碧綠神木千里光

TYPE:TAIWAN. Hualien county , Xiulin Township (秀林鄉) , Bilushenmu (碧綠神木)  
2065 m alt. *S. S. Ying* , *s.n.* October 24 , 2020 ° (holotype, NTUF) °



*Senecio bilushenmulatus* S. S. Ying, the inflorescences (1)

**Morphology** : Perennial herbs about 2 m tall; stems erect or ascending, branched upward; branchlets ascending, glabrous, green, but pale purple upward . Leaves simple, alternate, lanceolate to narrowed lanceolate, 5-8 cm long, 8-12 mm wide, thickly chartaceous to thinly coriaceous, acuminate at apex, attenuate at base, lustrous dark green surface, pale green beneath, glabrous on both surfaces, serrate at margins, midrib and lateral veins (9-12 per side) impressed surface and elevated beneath; petioles 4-6 mm long, glabrous, green to pale purple in colour.



*Senecio bilushenmulatus* S. S. Ying, the stem, branches and leaves



*Senecio bilushenmulatus* S. S. Ying, the inflorescences (2)

Capitula 5-8 in cymose, terminal and on axil of upward leaf, 14-21 mm in diameter,

5-10 cymoses often forming a compound cymose; peduncles 3-6 cm long, slender, green, glabrous; pedicels 8.5-15 mm long, green, glabrous; bracts and bracteoles absent; involucre tubular, 6-8 mm long, green, glabrous; phyllaries 1-2 series, imbricate, lanceolate to linear-lanceolate, 3.5-4.5 mm long, about 1.5 mm wide, acute, green;



*Senecio bilushenmulatus* S. S. Ying, the capitula

receptacles convex, 3-4.5 mm long, 4-5 mm wide; ray florets 5-6 in 1-series, yellow, tube (about 2mm long) and basal lamina glabrous, eglandular, lamina oblong, 7.5-8.5 mm long, 3-4 mm wide, obtuse and 2-dentate at apex, glabrous; disk florets less than 20, bisexual, fertile, yellow, limb tubular, 3-4 mm long, 5-lobed at apex; lobes erect, triangular, 0.4-0.5 mm long, acute at apex; ovary ovoid, 2-3 mm long; style elongate, 6-7 mm long, yellow, glabrous; stigma 2-lobed, the lobes linear, 1.5 mm long, yellow, reflexed.

Achenes cylindrical, 2.5-3.5 mm long, 2 mm wide, glabrous, 2-4-ribbed, eglandular; pappus numerous, 8-10 mm long, white, uniform.

**Diagnosis.**

*Senecio bilushenmulatus* is similar to *Senecio morrisonensis* Hayata in general appearance, but it is easily distinguished from the latter by its few and larger capitula and ray florets 5-6 in 1-series, yellow, tube (about 2mm long) and basal lamina glabrous, eglandular, lamina oblong, 7.5-8.5 mm long, 3-4 mm wide, obtuse and 2-dentate at apex, glabrous .



*Senecio morrisonensis* Hayata. Striking flowered

**Distribution and phenology.**

The species is endemic in Taiwan, It is known from Bilushenmu (碧綠神木) Hualien county , eastern Taiwan . It was collected at fields along roadsides , on the distance between 2050 and 2100 elevations. Its flowering time in November, and fruiting times November.



*Senecio bilushenmulatus* S. S. Ying, the habitat



*Senecio morrisonensis* Hayata the habitat



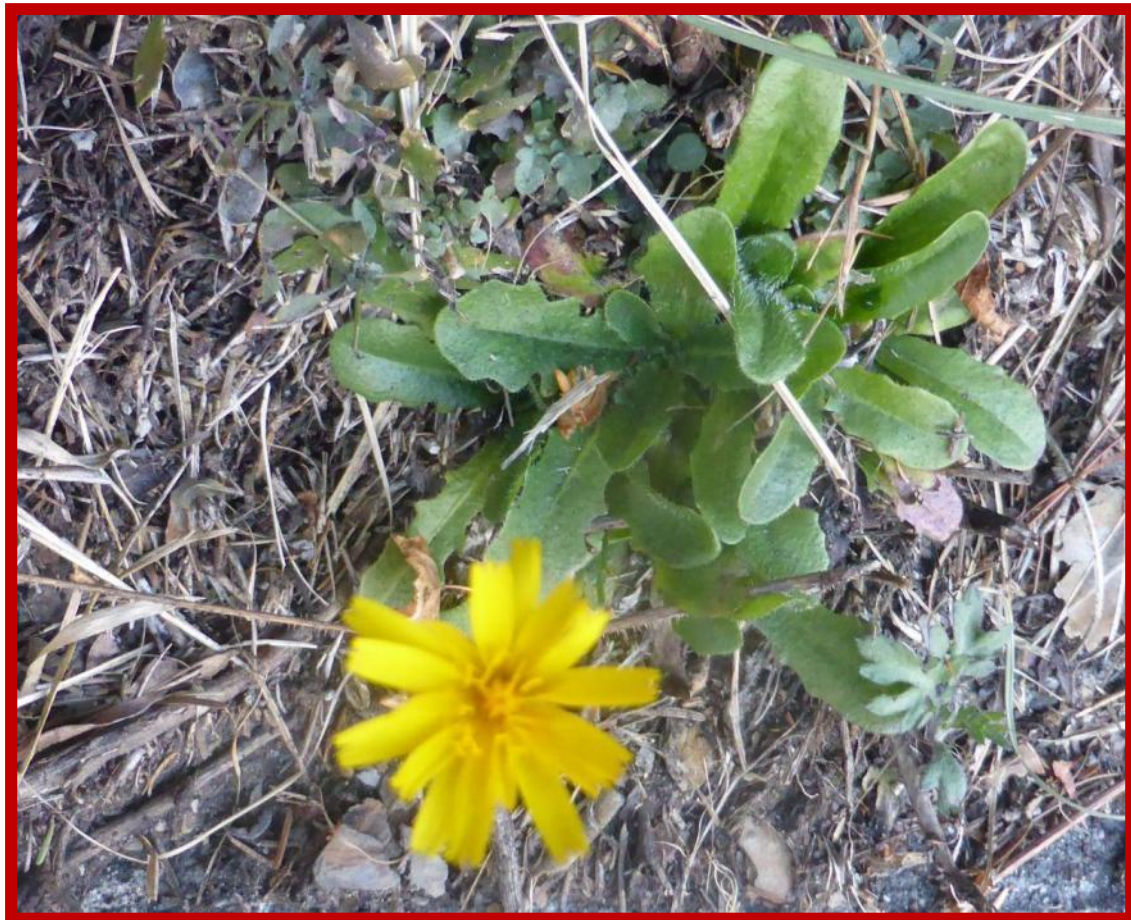
*Senecio bilushenmulatus* S. S. Ying, the holotype



8. *Crepidiastrum hualienianum* S.S. Ying 花蓮假黃鵪菜

*Crepidiastrum hualienianum* S.S. Ying, *sp. nov.* 花蓮假黃鵪菜

TYPE: TAIWAN. Hualien county, Xiulin Township (秀林鄉), Hohuanshan (合歡山)  
2950 m alt. *S. S. Ying, s.n. November 05, 2020*. (holotype, NTUF) °



*Crepidiastrum hualienianum* S.S. Ying flowering plant

**Morphology** : Perennial herbs often a rosulate; taproot elongate, 7-12 cm long, fibrous root few; stemless. Leaves simple, basal, fasciculate like a rosulate or nearly so, obovate, 4-6 cm long, 8-12 mm wide, chartaceous to thickly chartaceous, obtuse at apex, attenuate at base, lustrous green surface, pale green beneath, white villous on both surfaces, entire to



Crepidiastrum hualienianum S.S. Ying, leaves fascicled like a rosulate

3-4 shallowly lobed and ciliate at margins, midrib impressed surface and elevated beneath; lateral veins inconspicuous. Petioles very short, 3-4 mm long, pubescent.



Crepidiastrum hualienianum S.S. Ying, capitula single

Capitula solitary, yellow, terminal on the scape, 1.2-1.5 cm in diameter when opened ; scape from base of leaves, 10-14 cm long, erect or ascending, green, glabrous;



Crepidiastrum hualienianum S.S. Ying, capitula

bracts and bracteoles absent; involucre tubular, 6-7 mm long, green, glabrous; phyllaries 2 series, imbricate, outer series minute, triangular, 2-4 mm long, about 2 mm wide, acute at apex; inner series lanceolate to linear-lanceolate, 8.5-10 mm long, about 2-3 mm wide, acute, green, pubescence outside and glabrous inside; receptacle naked; ray florets 15-20 in 2-3 series, yellow, tube (about 2 mm long) and basal lamina glabrous, eglandular, lamina unequal, oblong, 8-8.5 mm long, 3-4 mm wide, obtuse and 3-6-dentate at apex, glabrous; anthers tubes 3-4 mm long, inconspicuous; style elongate, slender, incurved, 2-lobed at apex; with a 8-angular appendage in center; disk florets absent.



*Crepidiastrum hualienianum* S.S. Ying, anther tube, style and 8-angular appendage

Achene ellipsoid, 2.5-3 mm long, slightly compressed, 5-6 ribs, attenuate at apex; pappus 3-4 mm long, white, often caducous.

**Diagnosis.**

*Crepidiastrum hualienianum* has the highest elevation among the Taiwan *Crepidiastrum* plants, It is characterized by its only one capitula in erect to ascending scape; ray florets 15-20 in 2-3 series, yellow, lamina unequal, oblong, 8-8.5 mm long, 3-4 mm wide, obtuse and 3-6-dentate at apex, glabrous; anthers tubes 3-4 mm long, inconspicuous; style elongate, slender, incurved, 2-lobed at apex; with a 8-angular appendage in center

**Distribution and phenology.**

The species is endemic in Taiwan, It is known from Hohuanshan , Hulien county ,

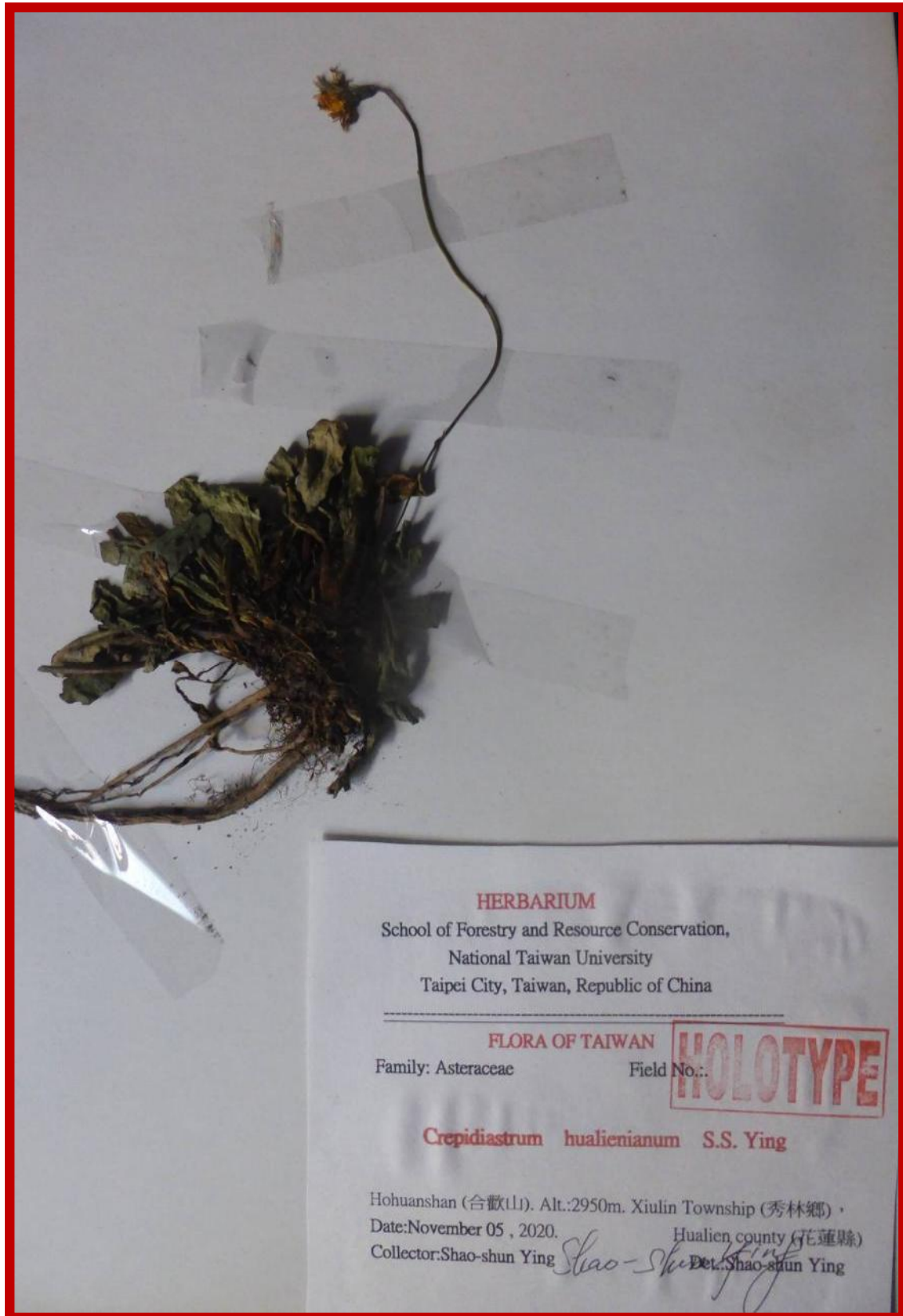
eastern Taiwan ° It was found at sunny roadsides at elevations of 2950 meters of Mt. Hohuanshan. Its flowering time is November °



*Crepidiastrum hualienianum* S.S. Ying, another tussock plant (1)



*Crepidiastrum hualienianum* S.S. Ying, another tussock plant (2)



*Crepidiastrum hualienianum* S.S. Ying, the holotype

9. *Senecio shaoakoulatus* S.S. Ying 小埡口千里光

*Senecio shaoakoulatus* S.S. Ying, *sp. nov.* 小埡口千里光

TYPE:TAIWAN. Taichung City,Hoping District (和平區) , Shaoakou (小埡口) 1750 m alt. *S. S. Ying* , *s.n.* November 12, 2020 ° (holotype , NTUF) °



*Senecio shaoakoulatus* S.S. Ying, flowering plant

**Morphology** : Perennial small herbs about 20-30 cm tall; stems erect or ascending, few branched at base; branchlets ascending, glabrous, purplish, angular . Leaves simple, alternate, triangular, 8-25 mm long, 5-10 mm wide, chartaceous , acuminate at apex, truncate at base, lustrous green tinged with purple surface, pale green and tinged with purplish beneath, glabrous on both surfaces, dentate at margins, midrib and lateral veins (4-6 per side) impressed surface and elevated beneath; upward ones often smaller gradually petioles 3-6 mm long, glabrous, green to purple in colour.



*Senecio shaoakoulatus* S.S. Ying, close-up of branchlet and leaves



*Senecio shaoakoulatus* S.S. Ying, inflorescence





*Senecio shaoakoulatus* S.S. Ying, capitula

Capitula yellow, solitary to pairs, terminal and on axil of upward leaf, 15-20 mm in diameter; peduncles 5-15 mm long (if have), slender, green tinged with purplish, glabrous; pedicels 8-20 mm long, green tinged with purplish, glabrous; bracts and bracteoles absent; involucre tubular, 5-7 mm long, green, glabrous; phyllaries 2 series, imbricate, outer series smaller, triangular, 2-3 mm long, about 2 mm wide, acute at apex; inner series lanceolate to linear-lanceolate, 5-6.5 mm long, about 1.5 mm wide, acute, green; receptacles convex, 3-4 mm long, 4 mm wide; ray florets 6-8 in 1-series, yellow, tube (about 2.5 mm long) and basal lamina glabrous, eglandular, lamina lanceolate, 5.5-6.5 mm long, 2-2.5 mm wide, obtuse and sometimes minutely 2-dentate at apex, glabrous; disk florets 14-16, bisexual, fertile, yellow, limb tubular, 4-5 mm long, 5-lobed at apex; lobes erect, triangular, 0.3-0.4 mm long, acute at apex; ovary ovoid, 2-3 mm long; style elongate, 5-6 mm long, yellow, glabrous; stigma 2-lobed, the lobes linear, 1.5 mm long, yellow, reflexed.

Achenes cylindrical, 4-5 mm long, 2 mm wide, black, glabrous, 2-4-ribbed, eglandular; pappus numerous, 6-8 mm long, white, uniform.



*Senecio shaoakoulatus* S.S. Ying, close-up of a capitula

**Diagnosis.**

*Senecio shaoakoulatus* is a very extraordinary species among Taiwan *Senecio* plants. It is easily distinguished from the other *Senecio* plants of Taiwan by its a smaller herb, capitula solitary to pairs in terminal of branchlet or at axil of upward leaf-axil. Ray florets 6-8 in 1-series, yellow, lamina lanceolate, 5.5-6.5 mm long, 2-2.5 mm wide, obtuse and sometimes minutely 2-dentate at apex.

**Distribution and phenology.**

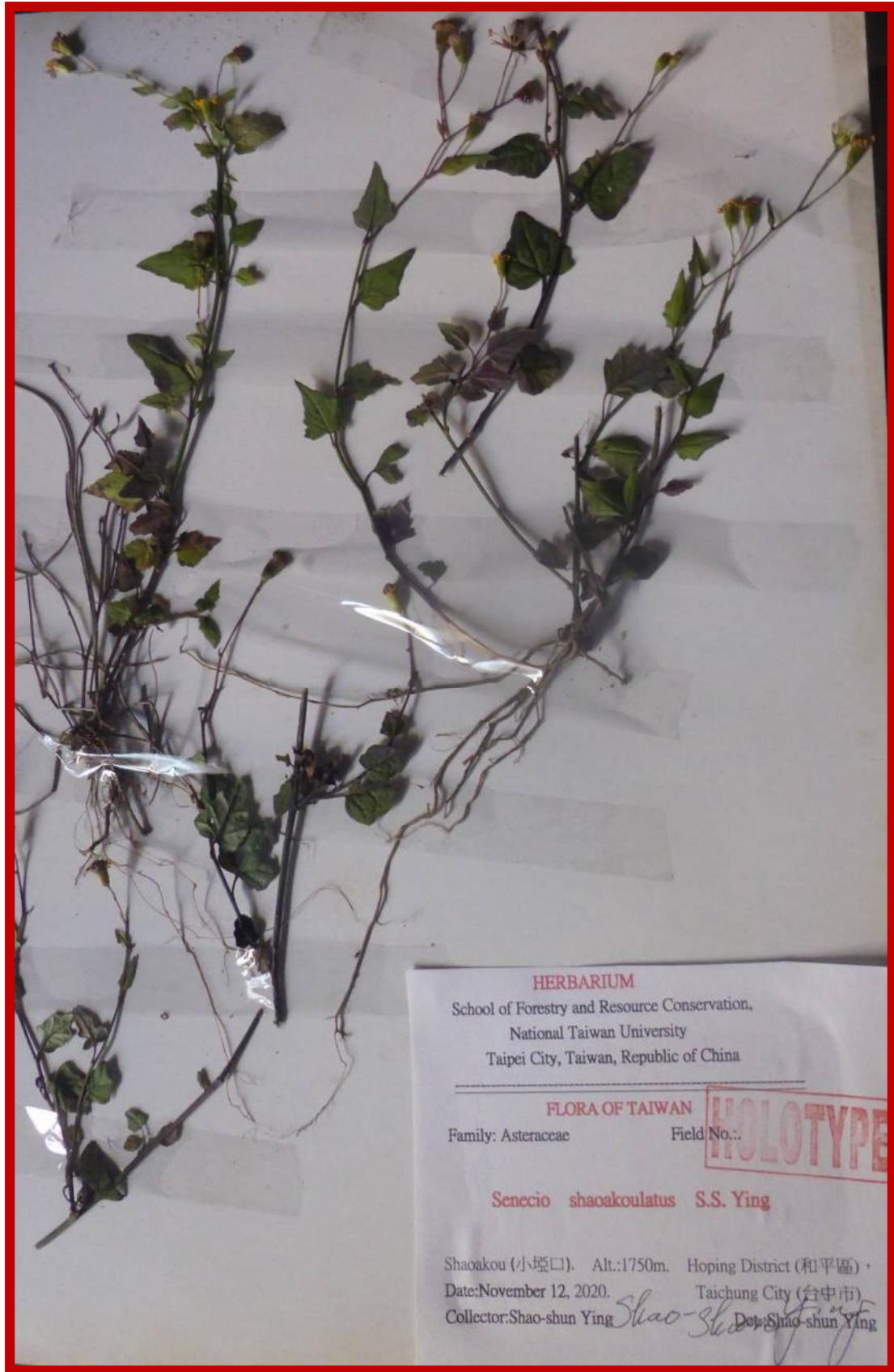
The species is endemic in Taiwan, It is known from Shaoakou (小埤口) , Hoping

District (和平區)Taichung City, 'central Taiwan°. It was found at sunny lithophytic rocky places at elevations of 1750 meters . Its flowering and fruiting time is November °



*Senecio shaoakoulatus* S.S. Ying, habitat (1)





*Senecio shaoakoulatus* S.S. Ying, the holotype



*Senecio shaoakoulatus* S.S. Ying, the habit



*Senecio shaoakoulatus* S.S. Ying, another habitat, Ciren (慈恩)

## **B.A Revision to the Scientific Names of Genus *Ainsliaea* in Taiwan**

There are no completed revision, merely enumerated a list and described some new species, in Genus *Ainsliaea* in Taiwan, excepted 《台灣植物誌第一版 (Flora of Taiwan, volume 4, first edition)》 was published in 1978. The family Asteraceae was contributed by Dr. Li, H. L. in the genus *Ainsliaea*, he described 4 species and 2 varieties, as follows:

1. *Ainsliaea fragrans* Champ.
2. *Ainsliaea macroclinidioides* Hayata
- 2a. *Ainsliaea macroclinidioides* Hayata var. *scundiflora* (Hayata) Kitamura
3. *Ainsliaea paucicapitata* Hayata
4. *Ainsliaea reflexa* Merr.
- 4a. *Ainsliaea reflexa* Merr. var. *nimborum* Hand.-Mazz.

Peng, C.I. follow up Li's step, and treated 3 species and 1 variety in genus *Ainsliaea* in 《台灣植物誌第二版, Flora of Taiwan, vol. 4, second edition》 which was published in 1998. Peng's descriptions of the species and variety are listed as below:

1. *Ainsliaea fragrans* Champ.ex Benth.
2. *Ainsliaea latifolia* subsp.*henryi* (Diels.)H. Koyama
3. *Ainsliaea macroclinidioides* Hayata
4. *Ainsliaea scundiflora* Hayata

He also lists *Ainsliaea paucicapitata* Hayata as an uncertain species.

2007, An Argentine plant taxonomist Freire, S. E. published her (Systematic revision and phylogeny of *Ainsliaea* DC. (Asteraceae, Mutisieae) in 《Ann. Missouri Bot. Gard.》 volume 94, pages 79-191. It is a monograph to study whole plants of genus *Ainsliaea* of the world, In her treatment, 7 species and 2 varieties are related to Taiwan. those are:

1. *Ainsliaea fragrans* Champ.ex Benth.
2. *Ainsliaea henryi* Diels.

- 2a. *Ainsliaea henryi* Diels. var. *subalpina* (Hand.-Mazz.) S.E. Freire
3. *Ainsliaea kawakamii* Hayata
4. *Ainsliaea latifolia* var. *taiwanensis* S.E. Freire
5. *Ainsliaea macroclinidioides* Hayata
6. *Ainsliaea paucicapitata* Hayata
7. *Ainsliaea reflexa* Merr.
8. *Ainsliaea scundiflora* Hayata

*Ainsliaea henryi* Diels. var. *subalpina* (Hand.-Mazz.) S.E. Freire is a new combination, base on the *Ainsliaea reflexa* Merr. var. *subalpina* which was described by the Austrian botanist Heinrich von Handel-Mazzetti (1882-1940), she tranferred it to the variety of species *Ainsliaea henryi* Diels.

*Ainsliaea latifolia* var. *taiwanensis* S.E. Freire, a new variety was described by S.E. Freire, base on a holotype specimen which was collected by W.L. Wagner (*specimen no.* 6516) at Mt. Nanhutashan, northern Taiwan.

2012, a master thesis (台灣鬼督郵屬 (菊科) 植物之系統分類學研究, Systematics Study on *Ainsliaea* DC. (Asteraceae) in Taiwan) was wrote by An, Bow-Han (安柏翰), 7 species, 1 variety and 1 uncertain species were recognized in his thesis; of which he proposed *A. kitamurae* and *A. nanaoensis* as new species, However, his master thesis was wrote in Chinese and not officially published.

In this study, the author tries to revise present thesis which listed above, related information about genus *Ainsliaea* DC. of nearby regions are also considerable, A total of 6 species and 3 varieties are recognized in this study.

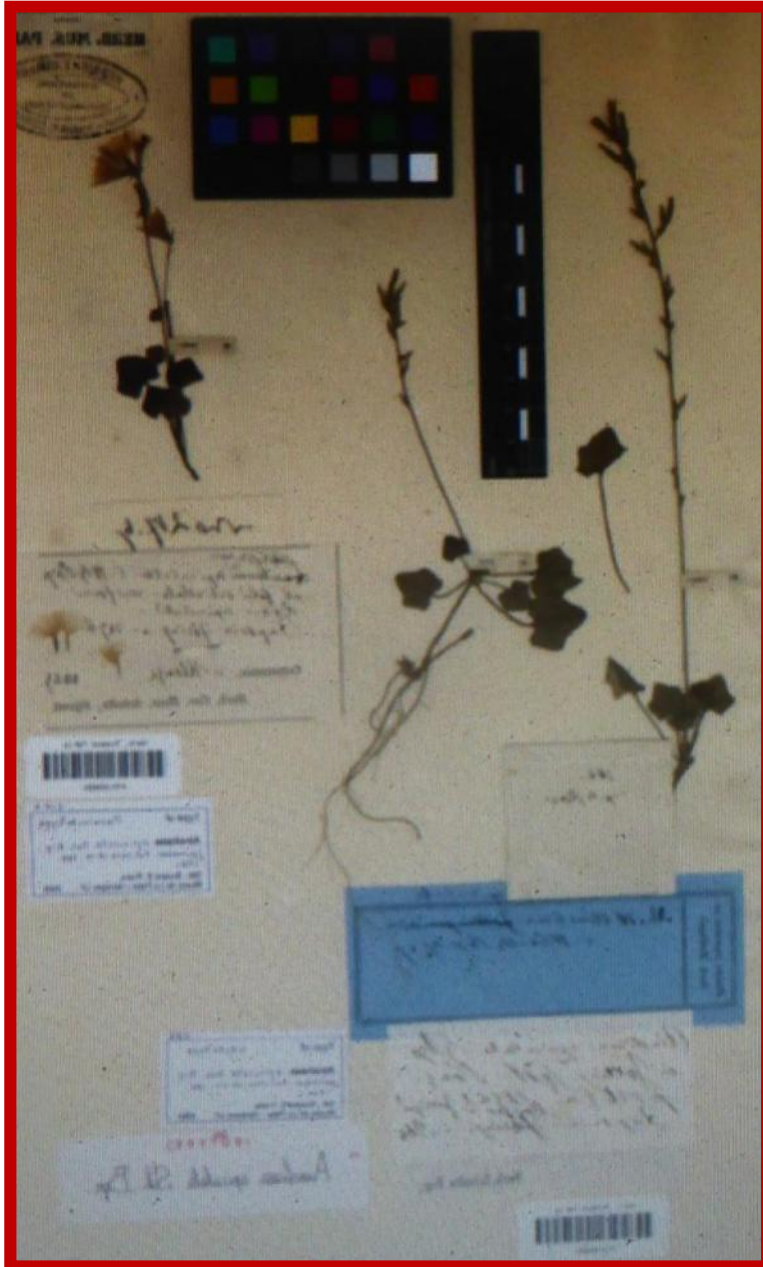
### **Ainsliaea DC. 鬼督郵屬**

Podr.7(1):13 (1838).

The genus name is an accepted name, about 68 species, mainly in Bangladesh, Bhutan, China, India, Indonesia, Japan, Korea, Myanmar, Nepal, Pakistan, Philippines, Afghanistan, Thailand, Vietnam and Taiwan. Six species and three varieties are recognized in Taiwan.

1. *Ainsliaea apiculata* Sch.Bip var. *acerifolia* Masamune 楓葉鬼督郵

Mem. Fac. Sci. Taihoku Imp. Univ. 11(4): 455. (1934).



A Isotype of *Ainsliaea apiculata* Sch.Bip from PE Herbarium

The variety name is an accepted name , the synonym of the species are list below:

*Ainsliaea liukiensis* Beauverd, Bull. Soc. Bot. Genève, Sér.2, 1: 382. (1909).

*Ainsliaea secundiflora* Hayata, J. Coll. Sci. Imp. Univ. Tokyo 30: 162. (1911).



*Ainsliaea macroclinidioides* var. *secundiflora* (Hayata) Kitam., J. Jap. Bot. 14: 307.  
(1938).

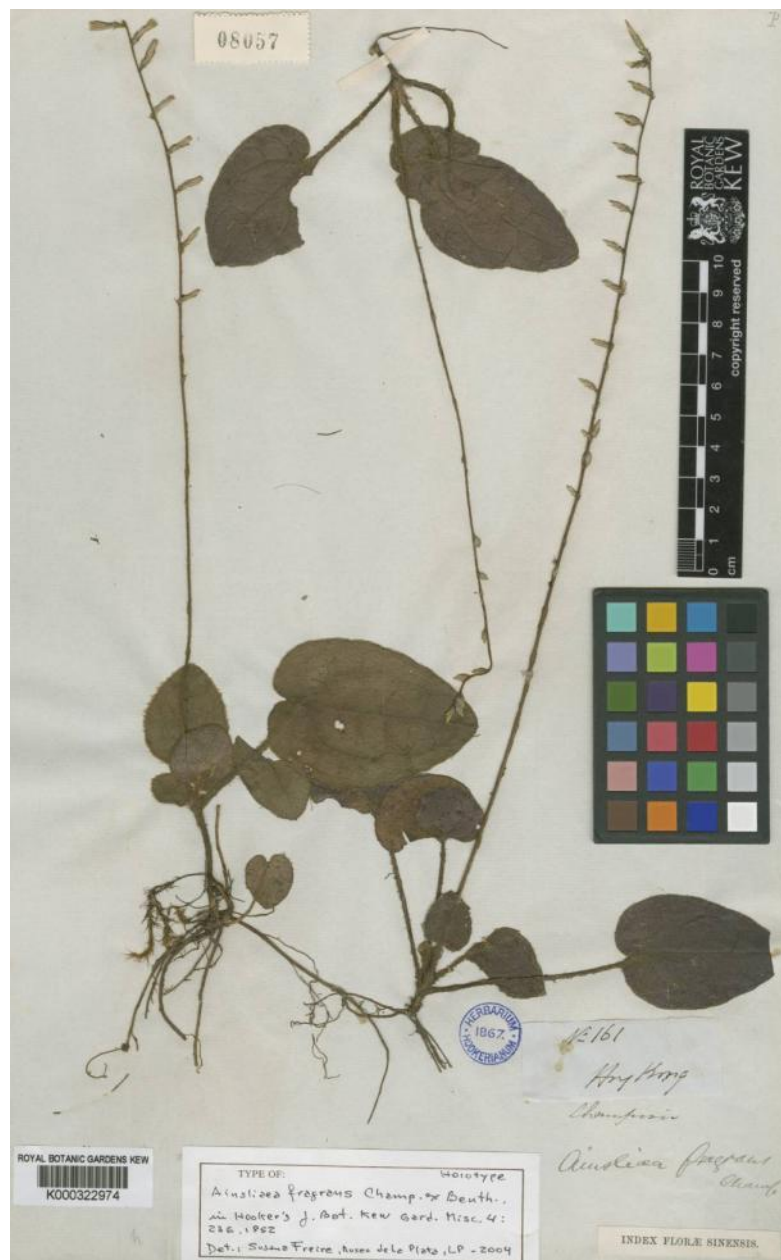


A holotype of *Ainsliaea scundifolia* Hayata from TAIH Herbarium

Japan (Ryukyu) and Taiwan. Taiwan, known from lower elevations of 450-900 m. in southern part of the island, wild fields, roadsides and edge of the thickets, somewhat rare.

## 2. *Ainsliaea frarrans* Champ. ex Benth. 香鬼督郵

Hooker's J. Bot. Kew Gard. Misc. 4: 236(1852).



[A isotype of \*Ainsliaea frarrans\* Champ. ex Benth. from Kew Herbarium](http://specimens.kew.org/herbarium/K000322974)

<http://specimens.kew.org/herbarium/K000322974>

-288-

The specific name is an accepted species , the synonym of the species are list below:

*Ainsliaea cordifolia* Franch. & Savat. var. *integrifolia* Maxim., Bot. Jahrb. Syst. **6**: 69. (1885).

*Ainsliaea rubrifolia* Franch., J. Bot. (Morat) **8**: 296. (1894).

*Ainsliaea integrifolia* (Maxim.) Makino, Bot. Mag. (Tokyo) **22**:167. (1908).

*Ainsliaea ningpoensis* Matsuda, Bot. Mag. (Tokyo) **27**: 236. (1913).

*Ainsliaea asarifolia* Hayata, Icon. Pl. Formosan. **8**: 71( 1919).

*Ainsliaea fragrans* var. *integrifolia* (Maxim.)Kitam., Acta Phytotax. Geobot. **8**(1): 67. (1939).

Japan, Mainland China ( Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Yunnan, Zhejiang) and Taiwan. Taiwan, known from low altitudes of 150-800m. in northern and eastern parts of the island, wild fields, roadsides and edges of the forests, somewhat rare.

### 3. *Ainsliaea henryi* Diels. 亨利氏鬼督郵

Bot. Jahrb. Syst. **29**:628. (1901).

The specific name is an accepted species , the synonym of the species are list below:

*Ainsliaea undulata* Diels, Bot. Jahrb. Syst. **29**: 629. (1901).

*Ainsliaea latifolia* subsp. *henryi* (Diels) H. Koyama, Acta Phytotax. Geobot. **32** (1 – 4): 60. (1981).

*Ainsliaea henryi* var. *daguanensis* H.Chuang, Fl. Yunnan. **13**: 835, 648.( 2004).

Mainland China (Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Sichuan, Yunnan) and Taiwan. Taiwan, known from medium to high altitudes of 1500-2900m. throughout the island, edges of the forests and roadsides, somewhat rare.

#### 3-1. *Ainsliaea henryi* Diels. var. *subalpina* (Hand.-Mazz.) S. E. Freire

玉山鬼督郵

Ann. Missouri Bot. Gard. 94(1):129. (2007).



**A holotype of *Ainsliaea henryi* Diel. from US Herbarium**

The variety name is an accepted name , the synonym of the variety are list below:

*Ainsliaea reflexa* Merr. var. *subalpina* Hand.-Mazz., Akad. Wiss. Wien,  
Math.-Naturwiss. Kl., Denkschr. **63**(1): 12. (1926).



**A isotype of *Ainsliaea latifolia* var. *taiwanensis* S. E. Freire from US Herbarium**

*Ainsliaea elegans* Hayata, Bot. Mag. (Tokyo) **20**(229): 14. (1906), non *Ainsliaea elegans* Hemsley,

- Ainsliaea morrisonicola* Hayata, J. Coll. Agric. Imp. Univ. Tokyo **25**(19): 142.  
(1908).
- Ainsliaea reflexa* Merr. var. *nimborum* Hand.-Mazz., Akad. Wiss. Wien,  
Math.-Naturwiss. Kl., Denkschr. **63**(1): 12. (1926).
- Ainsliaea reflexa* f. *morrisonicola* (Hayata) Suzuki, Annual Rep. Taihoku Bot. Gard.  
1:180.( 1931).
- Ainsliaea henryi* var. *ovatifolia* C. C. Chang, Sinensia **4**(8):227.( 1934).
- Ainsliaea reflexa* var. *morrisonicola* (Hayata) Yamam., J. Soc. Trop. Agric. **8**: 264.  
(1936).
- Ainsliaea latifolia* var. *nimborum* (Hand.-Mazz.) Kitam., Acta Phytotax. Geobot.  
**19**(1): 14.(1961).
- Ainsliaea latifolia* var. *taiwanensis* S. E. Freire, Ann. Missouri Bot. Gard. **94**(1):136.  
(2007). *syn. nov.*

Mainland China (Yunnan) and Taiwan. Taiwan, known from high altitudes of 2500-3500 m throughout the island, often grows under *Abies* and *Tsuga* forests, rather common.

After examining Taiwan specimens, and compared with S.E.Freire's isotype of *A. latifolia* var. *taiwanensis*, the author concluded that while the Taiwan specimens which identified as *Ainsliaea morrisonicola* Hayata differed from S.E.Freire's isotype of *A. latifolia* var. *taiwanensis*, it lay within acceptable range the the variety (var. *subalpina*) and could be considered of regional variation.

#### 4. *Ainsliaea macroclinidioides* Hayatta 阿里山兔兒風

J. Coll. Sci. Imp. Univ. Tokyo. **25**(19): 141.(1908).

The specific name is an accepted name , the synonym of the species are list below:

*Ainsliaea okinawensis* Hayata, J. Coll. Sci. Imp. Univ. Tokyo **30**: 161.(1911).

*Ainsliaea dentata* Koidzumi, Bot. Mag. **28**: 149.(1914).

*Ainsliaea ovata* Koidz., Bot. Mag. **28**: 150. (1914).



192 (1944)

Japan (Ryukyu) and Taiwan. Taiwan, known from medium altitudes of 1300-2500 m. in southern part of the island, often see under *Tsuga* Forests and its edges.

**4-1. *Ainsliaea macroclinidioides* Hayatta var. *kawakamii* (Hayatta) S.S. Ying**

**燈台兔兒風**

***Ainsliaea macroclinidioides* Hayatta var. *kawakamii* (Hayatta) S.S. Ying,**

**comb. nov.**

*Ainsliaea kawakamii* Hayata, Icon. Pl. Formosan. **8**: 72. (1919).

The variety name is an accepted name , the synonym of the variety are list below:

*Ainsliaea hui* Diels ex Mattfeld., Notizbl. Bot. Gart. Berlin-Dahlem **11**: 109(1931).

Mainland China (Fujian, Guangdong, Anhui, Hunan, Zhejiang) and Taiwan °  
Taiwan, known from high altitudes of 2500-3500m. throughout the island, often grows under *Abies* and *Tsuga* forests and their edges.

The author made this combination base on careful read the genus *Ainsliaea*, Flora of China and F. E. Freire (2007) A Revision of *Ainsliaea*, There are few difference between two varieties. It is better to treat *A. kawakamii* as a variety of *A. macroclinidioides*.

**5. *Ainsliaea paucicapitata* Hayata 能高山兔兒風**

Icon. Pl. Formosan. **8**: 71. (1919).

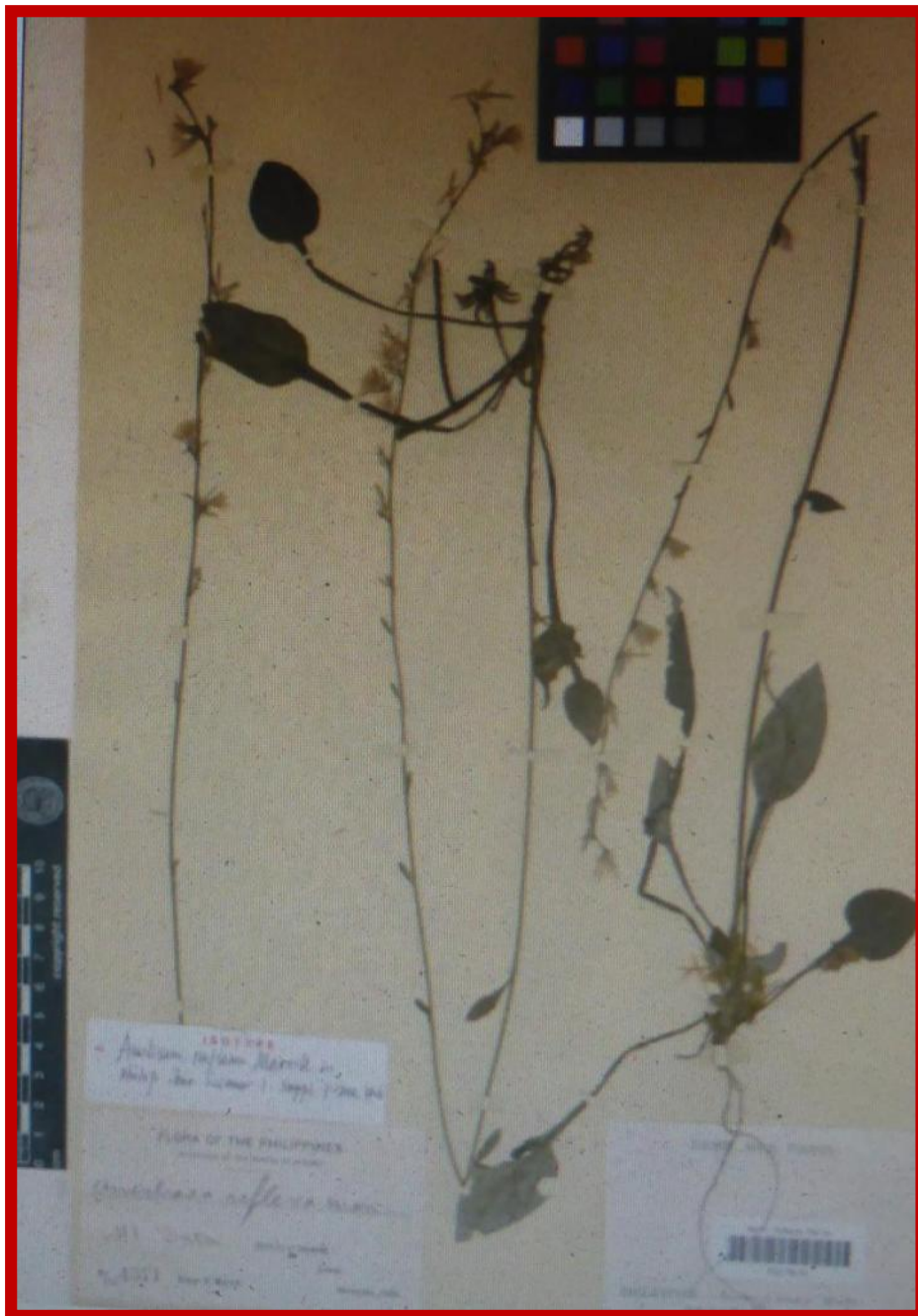
The specific name is an accepted name; no synonyms are recorded for this name.

Endemic species , known from only for holotype collection, at the elevations of 2900-3100 m at Mt. Nengkao (能高山), under forests, very rare.



6. *Ainsliaea reflexa* Merr. 反捲兔兒風

Philipp. J. Sci. 1, suppl. 3: 242. (1906)



A isotype of *Ainsliaea reflexa* Merr. from PI Herbarium

The specific name is an accepted name , the synonym of the species are list below:

*Ainsliaea longipetiolata* Merr., Pap. Michigan Acad. Sci. **24**: 91. (1939).



**A specimen of of *Ainsliaea reflexa* Merr. from Kew Herbarium**

<http://specimens.kew.org/herbarium/K000768835>

*Ainsliaea reflexa* var. *lobbiana* Beauverd, Bull. Soc. Bot. Gene`ve, Se´r. 2, 2: 37.  
(1910).

*Ainsliaea tonkinensis* Merr., Univ. Calif. Publ. Bot. 13: 142. (1926).

*Ainsliaea angustifolia* var. *luchunensis* H. Chuang, Fl. Yunnanica 13:834-35, 645 (2004).

Mainland China (Guangdong, Yunnan), Indonesia (Sumatra), Phillipenes, Southern Vietnan And Taiwan. Taiwan, known fom medium altitudes of 1150-2800 m. in central part of the island, under forest or at edage of the forests, not common .

### 7. *Ainsliaea chaochiei* S.S. Ying 礁溪兔兒風

*Ainsliaea chaochiei* S.S. Ying, sp.nov. 礁溪兔兒風

TYPE:TAIWAN. I-Lan County,Chaochi Township (礁溪鄉) , Meilin Trait (美林步道) 121 m alt. *S. S. Ying* , *s.n. January 04, 2020* ° (holotype , NTUF) °



*The capitula of Ainsliaea chaochiei* S.S. Ying (1)

**Morphology :** A perennial herb, with scape about 30-50 cm high; Stem short, 3-6 cm long, densely villous. Leaves 4-6 in a rosulate, ovate to ovate-triangular, 5-9 cm long, 4-5 cm wide, obtuse and with a puncta at apex, cordate at base, thinly fleshy, entire or nearly so, lustrous green surface, lightly brownish beneath, 3-nerved impressed surface and elevated beneath, glabrous surface and villous on nerved beneath; petioles 3-6 cm long, somewhat robust. villous.



**The capitula of *Ainsliaea chaochiei* S.S. Ying (2)**

Scape from leaf-clusterous, erect or ascending, 25-45 cm long, hairy, with 15-25 capitula in a racemose arrangement; pedicels 7-11 mm long, glabrous or nearly so, without bracts; involucre cylindrical , 1-1.5 cm long; phyllaries numerous , in 5-seriate, green, slightly hairy, the lowest one smaller, ovate, 1-2.5 mm long, acute at apex, the upper ones oblong, 8-10 mm long, obtuse at apex; Florets 3, hermaphrodite, cleistogamy, corolla



The fruits of *Ainsliaea chaochiei* S.S. Ying



The habitat of *Ainsliaea chaochiei* S.S. Ying

8-12 mm long, white, deeply 4-5-lobed; the lobes linear, 4-5 mm long, 1-1.5 mm wide, somewhat reflexed at apex; stamens extend, 3-4 mm long, anthers rounded, pink, 2-2.5 mm long, apical anther appendages ovoid, obtuse at apex, about 1 mm long; style 1-1.2 cm long, 2-branched at apex. Achenes ellipse, flat, 5-6 mm long, brownish, 9-10 nerved, pilose; pappus bristles ca. 35, 1-1.2 cm long.



*Ainsliaea chaochiei* S.S. Ying, the leaf beneath



*Ainsliaea chaochiei* S.S. Ying, the holotype

### Diagnosis.

The species is characterized by its cordate leaves, 15-25 capitula on a scape and brownish with villous hair at leaf beneath.

### Distribution and phenology.

*Ainsliaea chaochiei* S.S. Ying is endemic to Taiwan. It is known from Meilin Trait (林美國家步道), Chaochi Township (礁溪鄉), I-Lan County, Eastern northern Taiwan. It was collected on the roadsides of hiking trail, at between 121 and 150 m elevation and flowering time from November to February.

### References

1. Freire, S. E. (2007). Systematic revision and phylogeny of *Ainsliaea* DC. (Asteraceae, Mutisieae), Ann. Missouri Bot. Gard. **94**(Spr.):79-191.
2. 安柏翰撰寫, 曾彥學, 曾喜育指導 (2012). 台灣鬼督郵屬 (菊科)植物之系統分類學之研究 (碩士論文) 1-138 頁, (未正式發表, not official published)



*Ainsliaea chaochiei* S.S. Ying, the habitat







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# 新植物及新名稱 (第三卷)

(NEW TAXA AND NEW NAMES)

(VOLUME THREE )

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