

The Systematic Position of Genus *Didiciea* (Orchidaceae) and Its Occurrence in Taiwan

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ABSTRACT: A Himalayan species of Orchidaceae, *Didiciea cunninghami* is recorded from Taiwan. This plant represents the type species of genus *Didiciea* whose taxonomic position remains uncertain due to insufficient study of flower structure. Basing on the fresh materials collected in central Taiwan, the detailed structures of flower, especially the character of lip and pollinia are carefully observed and illustrated. It is concluded that *Didiciea* should be included in tribe Malaxideae of Dressler's classification system of Orchidaceae, rather than in the proposed tribe Calypsoeae. The distinction between genera *Didiciea* and *Malaxis* is also discussed and exemplified by the comparison of two native species.

KEY WORDS: Orchidaceae, Malaxideae, *Didiciea cunninghami*.

INTRODUCTION

Didiciea is a small genus of Orchidaceae established in 1896 by King and Prain. The type species *Didiciea cunninghami* was collected from Sikkim of eastern Himalaya, and was later found in Garhwal of northwestern Himalaya. It is probably rather rare in the Himalayas, since few specimens have been cited in taxonomic works (King & Pantling 1898, Deva & Naithani, 1986). Another species of this genus was described some 40 years later in Japan (*D. japonica* Hara). The Japanese species seldom appeared in recent orchid literatures, and was considered very rare by Ohwi (1965). Obviously, the genus *Didiciea* has not been well known by orchid taxonomists. The tiny flowers of these plants are better examined in fresh materials. Both the field populations and herbarium materials are limited for further taxonomic study. Thus the genus has been treated with uncertainty in the system of orchid classification by Dressler (1993). Maekawa (1971) even considered it not valid for a distinct genus, only representing a peloric form of another genus, namely *Tipularia*. He speculated that *Didiciea* is an abnormal mutant of *Tipularia* species with the lip simplified like a petal. Accordingly, collections of new materials and examination on the details of flower structure are essential for further evaluation of its systematic affinity.

It seems that *Didiciea* may be an element of Eastern Asiatic floristic region, which extends from the Himalayas through China to Japan (Takhtajan, 1986). The flora of this region is extremely rich and distinctive, as characterized by many endemic genera and species listed by Takhtajan. Taiwan is a floristic province within this region, and shares some common plant taxa with the Himalayas, as evidenced by the new record of *Didiciea cunninghami* in Taiwan. The plant was first discovered in 1994 during our investigation on the native orchids of Taroko National Park (Su, 1994). We collected plants with rudimentary inflorescence under a Hemlock forest near Mt. Yangtou at about 2800 m altitude. Due to lack of flowers, the specimens were identified and documented as *Tipularia odorata* Fukuyama as

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they resembled the named species vegetatively. Two years later, Mr. Shin-Hsiung Lin, a specialist working in the Experimental Montane Farm of National Taiwan University at Meifong, collected a flowering specimen from Mt. Hohuan, which is located to the west of Mt. Yangtzu. He sent it to me for identification. The characters of pseudobulb, leaf and peduncle of this plant are indeed much like those of *Tipularia odorata*. However, the flowers are much smaller than and different from the later species. The lip of this plant is nearly unlobed, and the basal spur is very short, unlike the 3-lobed and long-spurred lip of *Tipularia*. Basing on the dry specimen, the anther and pollinia cannot be clearly examined. Neglecting the character of pollinia, the plant is nearly identical with *Didiciea cunninghami* formerly described from the Himalayas.

Recently we collected more fresh plants and made close observations on these materials, with special attention to the character of pollinia. The conspecificity with *Didiciea cunninghami* is confirmed. Here I report this new recorded species, as an addition to the flora of Taiwan, and evaluate the diagnostic character and systematic affinity of the genus *Didiciea* within Orchidaceae.

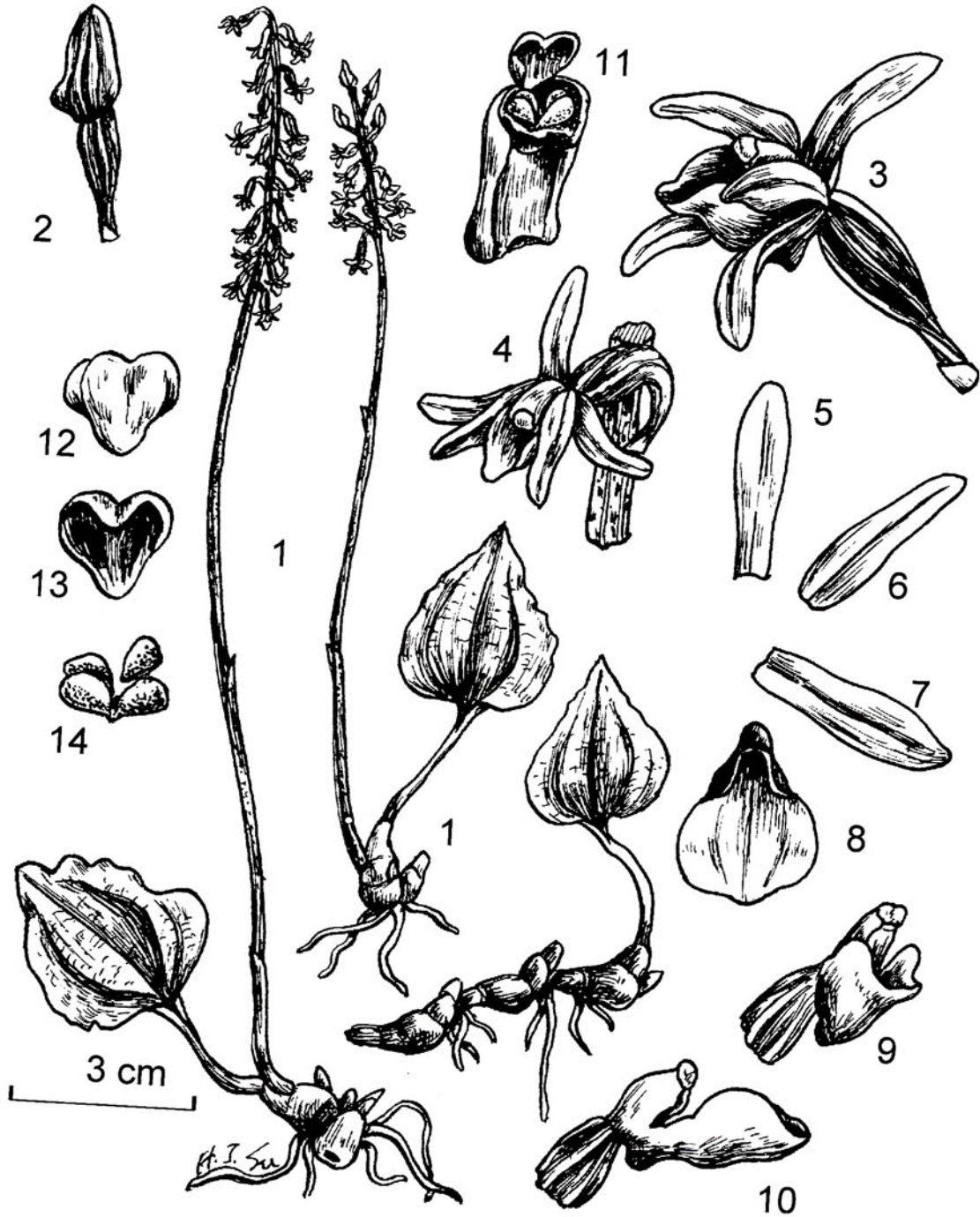
New Record of *Didiciea cunninghami* in Taiwan

Didiciea cunninghami King & Prain in J. As. Soc. Beng. **65**: 119. 1896; King & Pantl. in Ann. Roy. Bot. Gard. Calcutta **8**: 38. *pl.* 50. 1898; Seidenfaden & Arora in Nord. J. Bot. **2**: 14. 1982; Deva & Naithani, Orch. Fl. N. W. Himalaya. 275. 1986. Figs. 1-14.

Terrestrial herbs with underground corm-like pseudobulbs. Pseudobulbs often prostrate and closely arranged in one row, whitish, ovoid or obliquely short clavate, 10-20 mm long, 5-8 mm wide, with 2-4 internodes. Leaves solitary, petiolate, arising from the top of pseudobulb, broadly ovate to nearly triangular, 2.5-4 cm long, 1.7-3 cm wide, acute at apex, truncate to slightly cordate at base, greenish above, brownish purple and punctate beneath, mainly 3-nerved, more or less undulate along the margins; petioles 2-3.5 cm long, sulcate. Inflorescence producing from the upper node of pseudobulb; peduncle slender, 10-20 cm long, 1.5 mm in diameter, with 2-3 tubular sheaths about 2 cm long near the base; raceme 2.5-5 cm long, loosely 8-15-flowered; bracts ovate-deltoid, 0.5 mm long, acute; pedicel and ovary 3.5-4 mm long, the pedicel elongating in fruit. Flowers not widely opening, yellowish green or slightly tinged with purple along the midrib of sepals and petals, ca. 2.5 mm in diameter; dorsal sepal narrowly oblong, 1.8-2 mm long, 0.5-0.6 mm wide, obtuse; lateral sepals similar to the dorsal one or slightly longer; petals linear-lanceolate, 2 mm long, 0.6 mm wide, obtuse at apex, narrowed at base; lip sessile on the base of column, fleshy, concave, obovate, 1.5-1.8 mm long, 1.6-1.9 mm wide, the apex obtuse or indistinctly 3-lobed, the basal sides connate with the base of column, the base narrowed into a short conic spur about 0.3 mm long; column stout, semiterete, about 1 mm long, without distinct wing or appendage near the top; anther terminal, opercular, broadly ovate, 2-celled; pollinia 4, ovoid-clavate, waxy, free or slightly connected at base by viscid material, without distinct stipe or viscidium; stigma entire; rostellum short and indistinct.

Distribution and habitat: The species was formerly collected in the Himalayas (Sikkim and Garhwal) at 2000-2500 m altitudes. Recently it was found in coniferous forests in mountainous regions of central Taiwan, at about 2700-2900 m altitudes.

Specimens examined: Hualien County, Hsiou-lin Hsiang: southern slope of Mt. Yangtuo, forest of *Tsuga chinensis* var. *formosana*, ca. 2800 m in elevation, May 23, 1994, *H. J. Su* 9521 (NTUF); eastern slope of Mt. Hohuan, forest of *Tsuga chinensis* var. *formosana* ca. 2780 m, July 2, 1996; *S. H. Lin* s. n.; southeastern slope of Mt. North Hohuan, mixed forest of *Tsuga chinensis* var. *formosana* and *Abies kawakami*, ca. 2850 m, *H. J. Su* & *S. H. Lin* 9615 (NTUF).



Figs. 1-14. *Didicicia cunninghami* King & Prain. 1. habit; 2. flower bud; 3 & 4. flowers from different views; 5. dorsal sepal; 6. petal; 7. lateral sepal; 8. lip; 9 & 10. different views of column and lip; 11. column and anther; 12 & 13. external and inside views of anther; 14. pollinia.

Taxonomic problem and systematic position of *Didicicia*

King and Pantling (1898) originally recognized the genus *Didicicia* in tribe Malaxideae within family Orchidaceae. This tribe consists mainly of genera *Oberonia*, *Liparis* and *Microstylis* (*Malaxis*), and is characterized by the cap-like anther on the top of column and the 4 waxy pollinia without any appendages. The pollinia may be free, or superposed in two pairs, or rarely attached by their bases to a small translucent matter, but they are not connected to a distinct stipe or viscidium. *Didicicia* is distinguished from those genera in the same tribe for its solitary petiolate leaf, tiny flowers with a short-spurred lip and short column without appendage. This generic diagnosis was derived from the characters of type species, *D. cunninghami*. Concerning the delimitation of this genus, a problem raised with the publication of another species, *D. japonica*. According to the original description, the lip of this Japanese species is completely spurless, and is quite similar to the petals. Due to the reduced and simplified lip and close resemblance of vegetative character to the genus *Tipularia*, Maekawa (1971) regarded that *Didicicia* is just a peloric variation of *Tipularia* species, although he made no observation of the pollinia. Whether this proposal is justified would depend on further observation of Japanese materials.

With regards to the habit and external appearance, *Didicicia* closely resembles *Tipularia*, as already pointed out by King and Pantling (1898). Both genera have corm-like pseudobulbs with few internodes, solitary petiolate ovate leaf producing from the top of pseudobulb. However, the flowers of these two plants are quite different, as evidenced by the comparison between two native species of Taiwan, namely, *Didicicia cunninghami* (plate 1) and *Tipularia odorata* (Su, 2000, plate 451). The size of sepals and petals in the former are less than half of those in the latter. The lip of *Didicicia* may be equal in length to the petals, but its shape is completely different from the petals. The lip is a fleshy concave obovate structure, while the petals are flat linear-lanceolate blades. King & Pantling (1898) noted that the lip of *Didicicia* is actually a small straight pouch, with a spur attaching to its base. Such characters are clearly observed in Taiwan plants. Apparently, the lip is not a reduced form simulating the petals. Hence *Didicicia cunninghami* is not a peloric variation of *Tipularia* species.

In his earlier work on orchid classification, Dressler (1981) placed *Didicicia* in the subtribe Corallorhizinae under tribe Maxillarieae. The subtribe is remarkable for a corm or pseudobulb of several internodes, the lateral inflorescence and the 4 waxy pollinia with a distinct viscidium and sometimes a small stipe. Included under this subtribe are related genera such as *Cremastra*, *Oreorchis*, *Dactilostalix*, *Corallorhiza* and *Tipularia*. After further revision, Dressler (1993) moved these genera together with *Didicicia* and lumped with *Calypso* and other related genera under the tribe Calypsoeae. However, Dressler placed an equal and question mark (=?) beside the name of *Didicicia*, indicating the uncertainty of its systematic affinity. I wonder if Dressler was influenced by the opinion of Maekawa. Dressler also recognized the tribe Malaxideae (genera such as *Liparis*, *Malaxis*, *Oberonia*, *Hippeophyllum*) under a complex group called Cymbidioid phyla which contains Calypsoeae and other tribes in subfamily Epidendroideae. He maintains the separation of Calypsoeae from Malaxideae mainly on the character of pollinia. Prominent viscidium and stipe are present in the pollinia of Calypsoeae, while absent in those of Malaxideae. If pollinia are emphasized in the taxonomy of Orchidaceae, as in the system of Dressler (1993), *Didicicia* should be placed in the tribe Malaxideae.

Within the tribe Malaxideae, *Didicicia* somewhat resembles a few species of the genus *Malaxis*. However, *Malaxis* is characterized by distinctly ridged peduncle and rachis,

non-resupinate flowers and the spurless lip with basal auricles. *Didiciea* differs from *Malaxis* by terete peduncle, resupinate flowers and short-spurred lip without basal auricle. Among the native species of *Malaxis*, *M. microtatantha* is most similar to *Didiciea cunninghami* in external appearance. Both species have terminal solitary broad leaves on a pseudobulb and tiny racemose flowers not easily observed by naked eyes. Upon close inspection, both vegetative and flower structure of these two species show many distinctions as indicated in table 1. The underground pseudobulb of *Didiciea* consists of many internodes, a character shared with the member of tribe Calypsoeae, while the flower structure, especially the naked pollinia, agrees with the diagnosis of tribe Malaxideae. According to Chen (1979), the plant of *M. microtatantha* is lithophytic, growing on limestone rocks near Taroko Gorge below 500 m elevation. Thus its habitat is quite different from *D. cunninghami* which is a terrestrial plant in subalpine coniferous forests above 2500 m elevation.

Table 1. Comparison on the characters between *Malaxis microtatantha* and *Didiciea cunninghami*.

	<i>Malaxis microtatantha</i>	<i>Didiciea cunninghami</i>
pseudobulb	ovoid or compressed globose, without evident internodes.	oblique ovoid or short clavate, with 2-4 internodes.
petiole	sheath like, 1-1.5 cm long.	slightly sulcate, 2-3.5 cm long.
leaf blade	fleshy, cordate.	membranous, ovate to triangular.
flowering time	December to February	late June to early July.
peduncle	terminal on pseudobulb, ridged, 6-8 cm long, without tubular sheath.	lateral from the upper node of pseudobulb, terete, 10-20 cm long, with 2-3 tubular sheaths
flower posture	non resupinate, perianth spreading	resupinate, perianth not widely opening
dorsal sepal	ovate-triangular, 1.2 x 1 mm	oblong, 1.8-2 x 0.5 mm
lip	triangular, with basal lateral lobes (auricles), spurless.	shallow saccate, without basal auricles, shortly spurred at base.
column	with apical wing or tooth on both sides.	without wings or distinct appendages

LITERATURE CITED

- Chen, S.-H. 1979. *Malaxis microtatantha*, a new orchid to the flora of Taiwan. Bull. Hualien Normal Coll. **11**: 1-4. (in Chinese).
- Deva, S. and H. B. Naithani. 1986. The Orchid Flora of North West Himalaya. Print & Media Associates, New Delhi, India. 459 pp.
- Dressler, R. L. 1981. The Orchids: Natural History and Classification. Harvard Univ. Press, Massachusetts. 332 pp.
- Dressler, R. L. 1993. Phylogeny and Classification of the Orchid Family. Dioscorides Press, Portland, Oregon. 314 pp.
- King, G. and R. Pantling. 1898. The Orchids of Sikkim Himalaya. Ann. Roy. Bot. Gard. Calcutta **8**: 1-342.

- Maekawa, F. 1971. The Wild Orchids of Japan in Color. Seibundo Shinkosha, Tokyo.
- Ohwi, J. 1965. Flora of Japan. Smithsonian Institution, Washington D. C.
- Seidenfaden, G. and C. M. Arora. 1982. An enumeration of the orchids of North-western Himalaya. Nord. J. Bot. **2**: 7-27.
- Su, H.-J. 1994. Floristic and Synecological Investigation of Native Orchids in Taroko National Park. Headquarter of Taroko National Park, Taiwan. 146 pp.
- Su, H.-J. 2000. Orchidaceae. In: Flora of Taiwan. 2nd ed. **5**: 729-1086.
- Takhtajan, A. 1986. Floristic Regions of the World. University of California Press. 522 pp.

細花軟葉蘭屬(蘭科)之分類地位及其在台灣之新紀錄

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摘 要

細花軟葉蘭為一種原產於喜馬拉雅山區之蘭科植物，本文報導其最近在台灣發現之新分布紀錄。本種係細花軟葉蘭屬之模式種，由於材料不足及花部構造欠詳，該屬之分類地位尚存有若干疑點。台灣之新鮮材料經仔細觀察與描繪，已確認本屬之唇瓣與花粉塊特徵，根據此特性及 Dressler 氏之蘭科分類系統，細花軟葉蘭屬宜置入樹蘭亞科之軟葉蘭族，而非原先所提議歸屬之布袋蘭族。本文亦探討細花軟葉蘭屬與軟葉蘭屬之差異，並舉兩種台灣原生種之區別特徵加以比較。

關鍵詞：蘭科、軟葉蘭族、細花軟葉蘭。

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