NOTE

Rhododendron farrerae Tate ex Sweet (Ericaceae), a Reconfirmed Species in Taiwan

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ABSTRACT: *Rhododendron farrerae* Tate ex Sweet was first recorded in Taiwan by Kawakami in 1910. Since then, this species has been grouped with *R. tashiroi* Maxim. due to insufficient reports and specimens, and was eliminated from Flora of Taiwan in 1998. By examining all the specimens preserved in Taiwan herbaria and documents, we confirm that the native population of *R. farrerae* is actually distributed in southern Taiwan, ranging from Peitawushan to Tajen Township, in the southern part of the Central Mountain Range. The diagnostic character distinguishing *R. farrerae* from *R. tashiroi* and *R. mariesii* Hemsl. & E. H. Wils. is that *R. tashiroi* and *R. mariesii* bear 2-3 flowers from each bud at anthesis; in contrast, *R. farrerae* bears only one flower during the flowering period. We provide in this paper a detailed taxonomic treatment, morphological description, distribution map, line drawing, and a comparison table of these three species of Taiwan, together with photographs.

KEY WORDS: Dahanshan, Ericaceae, *Rhododendron farrerae*, *R. mariesii, R. tashiroi*, Taiwan.

INTRODUCTION

The genus *Rhododendron* L. is one of the best known and valuable genera in horticulture, comprising ca. 750-850 species, mostly distributed in north temperate zones of SE Asia, Malaysia and NE Australia (Stevens, 2004). Thirteen species with two varieties of this genus have been recorded in Taiwan (Li et al., 1998).

According to the classification of Ericaceae by Chamberlain et al. (1996) and Goetsch et al. (2005), eight and five subgenera, respectively were treated in this family. Among them, the subgenus Tsutsusi included two species in Taiwan, *Rhododendron mariesii* Hemsl. & E. H. Wils. and *R. farrerae* Tate ex Sweet. Based on the specimen no. 1742, collected in Taiwushan, southern Taiwan, by Ohwi and preserved in KYO herbarium, Kanehira (1936) was first treated as *R. tashiroi* Maxim. Li (1963, 1978) adopted this name and noted that no Taiwan specimens had been collected, as a result, *R. tashiroi* was excluded from the Flora of Taiwan (Li et al., 1998). However, the first record of *R. farrerae* was Kawakami (1910), published in "A list of Plants of Formosa". Recently, Yamazaki (1996) revised the genus *Rhododendron* in Japan, Taiwan, Korea and Sakhalin and identified specimen no. 1742 of Ohwi as *R. farrerae*. Thus, the wild population and scientific name of this species had been neglected in the Flora of Taiwan for ten years.

During our investigation of vegetation ecology in the region between Dahanshan (old name as Dashulinshan) and Chachayaliashan in 1991 to 2008 (Yang and Chen, 2005), we found an unknown species of *Rhododendron*. After comparing the specimens deposited in PPI and TAI herbaria and the literature (Yamazaki, 1996), we confirmed this unknown specimen is truly consistent with *R. farrerae*. We suggest that the population of *R. farrerae* is actually distributed in southern Taiwan and it is also a record species of *Rhododendron* of Taiwan. To add more information about this species, we provide the taxonomic treatment, synonym, morphological descriptions, distribution, photographs and line-drawing. We also present a table of the comparative characteristics of leaves and flowers between *R. farrerae*, *R. mariesii* and *R. tashiroi* to distinguish these three species.

TAXONOMIC TREATMENTS

Rhododendron farrerae Tate ex Sweet in Brit. Fl. Gard. Ser. 2, 1: pl. 95. 1831; Kawakami, List Pl. Form. 64. 1910; Hu & Fang in Fl. China. 371. 1994. Yamazaki in Tsumura Laboratory, Tokyo. pp. 73-85. 1996.
丁香杜鵑 Figs. 1, 3A-G

Rhododendron tashiroi auct. non Maxim.: Kanehira, Formos. Tr. ed. 2: 551, *t.* 509. 1936; Li, Woody Fl. Taiwan 694. 1963; Li, Fl. Taiwan 4: 38. 1978.

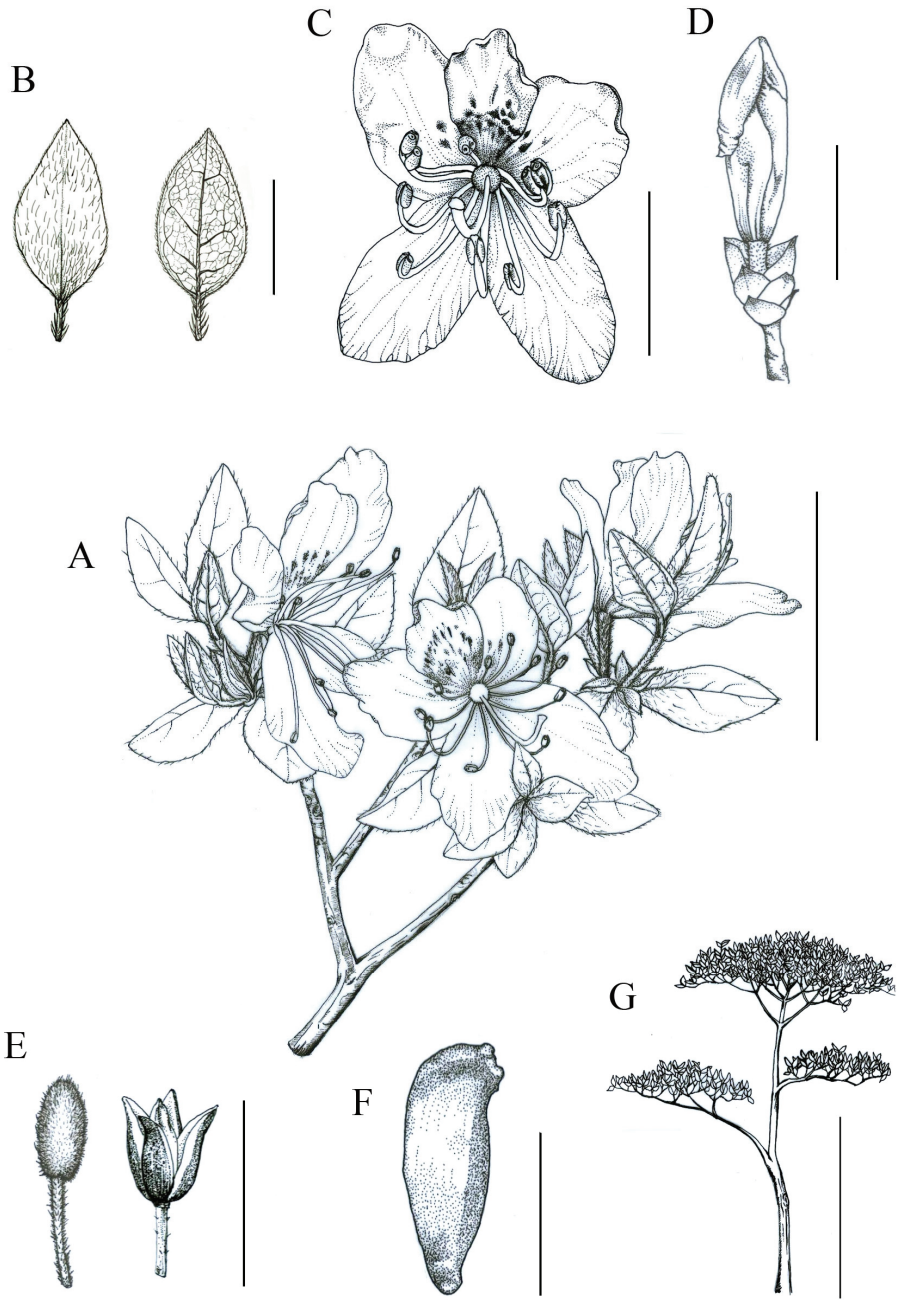

Fig. 1. The habit of *Rhododendron farrerae*. A: Flowering branches. B: Leaf upper surface (left) and lower surface (right). C: Flower. D: Flower bud terminal and solitary. E: Fruit. F: Seed. G: 3 layers of horizontal branches. Scale bars A = 5 cm; B, C, E = 2 cm; D = 1 cm; F = 1 mm; G = 2 m. Line drawing by Mr. C. K. Fu.

Evergreen shrubs (?), 3-5 m tall, many branches, slightly horizontal, 2-4 layers. Young branchlets with shining brown-pilose or strigose hairs, and glabrous with age; winter buds brown-villous. Leaves crowded at ends of branches, opposite or 3 verticillate, coriaceous; blades elliptic-ovate, 2-4.5 cm long, 1-2 cm wide, the apex acute to acuminate and terminating into a gland or an awn, cuneate at the base, the margins entire, young leaf ciliate; mid-vein concave on the surface and promote at the lower surface, upper surface glabrous, lower surface with reticulate nervulets, glabrous except sparsely hirsute on midrib; young leaves clothed with brown pilose or strigose, glaucenscent; petiole 3-5 mm long, pilose, grooved on upper surface. Flower-bud terminal, single, scales orbicular, ovate, ciliate and densely brown pilose on the middle of outside; flower terminal, solitary,

bloom and sprout at the same time; pedicels densely brown pilose, 10-12 mm long at fruiting; calyx pilose; corolla pale rose-purple, widely funnel-shaped, 2-2.5 cm long and 3-3.5 cm in diam., corolla lobe oblanceolate to obovate, with a line-like spot at the upper three corolla-lobe; stamens 10, filaments flattened, glabrous, irregular, shorter than corolla; anthers oblong, porus dehiscence, introrse; ovary ovate, densely clothed with pilose; style 2-2.5 cm long, equal or slightly longer than corolla, glabrous; stigma capitates, slightly lobed. Capsules narrowly ovoid, ovate, 8-10 mm long, 5-6 mm wide, clothed with appressed brown hairs. Seed elliptic to spindled, ca. 1.5 mm long, 0.5 mm wide, acute to acuminate on both sides.

Ecology: *Rhododendron farrerae* was distributed amongst the *Machilus*- *Castanopsis* zone, ranging from 750-2,400 m altitude, dominated by *Litsea acutivena* (Bl.) Kurata (Lauraceae), *Machilus japonica* Sieb. & Zucc. *var. kusanoi* (Hayata) Liao (Lauraceae), and *Machilus thunbergii* Sieb. & Zucc. (Lauraceae); other associated plants included *Barthea barthei* (Hance) Krass (Melastomataceae), *Cleyera japonica* Thunb. var. *morii* (Masamune & Yamamoto) Kobuski (Theaceae), *Cyathea loheri* Christ (Cyatheaceae), *Dendropanax dentiger* (Harms ex Diels) Merr. (Araliaceae), *Elaeocarpus japonicus* Sieb. & Zucc. (Elaeocarpaceae), *Prunus phaeosticta* (Hance) Maxim. (Rosaceae), *Trochodendron aralioides* Sieb. & Zucc. (Trochodendraceae), *Yushania niitakayamensis* (Hayata) Keng f. (Poaceae).

Distribution: Southwest China (Jiangxi, Fujian, Hunan, Guangdong, Guangxi, Hongkong) and Taiwan, only in southern Central Mountain (Fig. 2).

Specimen examined: TAIWAN. Pingtung County: Taiwu Township, Peitawushan, elev. 2,400-2,500 m, 21 March, 2005, C. H. Liao 45 (flower, PPI); Chunri Township, Guzilunshan, elev. 1,600 m, 23 May 1990, S. Z. Yang & C. G. Lin 22267 (leaf, PPI); the same location, 23 October, 1994, S. K. Chuang 283 (fruit, PPI); Rimushan, 17 March, 1991. S. Z. Yang 24547 (flower, PPI); South part of Dahanshan, elev. 1,500 m, 16 March, 2005, C. F. Chen 1303 (flower, PPI); the same location, 1 May 2005, C. F. Chen 1351 (fruit, PPI); Tashulinshan (Dahanshan), 20 Jul. 1920, S. Sasaki (TAI 86088). Taitung County: Tajen Township, Tajen Experimental Forest Station, elev. 750 m, Y. J. Lin 637 (leaf, PPI).

Phenology: Flowering period from March to April; Fruiting period from April to October.

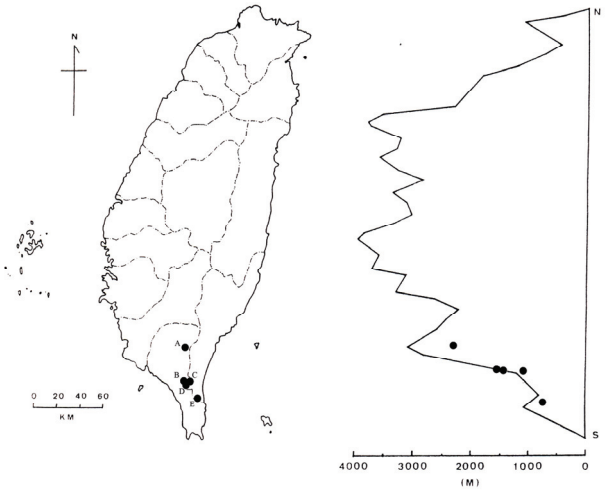

Fig. 2. Five locations of southern Taiwan where *Rhododendron farrerae* were found. A: Peitawushan. B: Rimushan. C: Guzilunshan. D: Dahanshan. E: Tajen Experimental Forest Station.

RESULTS AND DISCUSSION

Rhododendron farrerae is closely related to the species *R. tashiroi* and *R. mariesii* which were assigned to subgenus Tsutsusi, section Brachycalyx by Chamberlain et al. (1996). Several diagnostically important characters distinguish *R. farrerae* from *R. tashiroi* and *R. mariesii* (Table 1). The flowers of both *R. tashiroi* (Figs. 3H-I) and *R. mariesii* (Figs. 4A-D) bear 2-3 flowers on short shoots at anthesis (Yamazaki, 1996); in contrast, *R. farrerae* bears only one flower during the flowering period (Figs. 3A-G). There are also differences in blade size and shape; the blade length of *R. tashiroi* and *R. mariesii* (Yamazaki, 1996) is greater than that of *R. farrerae*; the widest part of the blade of *R. farrerae* and *R. mariesii* is half of the blade and that of *R. tashiroi* is two-thirds of the blade. *R. mariesii* is clearly distinct since the leaf has a chartaceous texture and deciduous, whereas it is coriaceous and evergreen in both *R. tashiroi* and *R. farrerae*.

The population habits of *R. farrerae* observed in Taiwan are evergreen, and the flowers bloom and sprout at the same time. These characteristics are opposite from China population in which the habits are deciduous and

Table 1. Comparative characteristics of leaves and flowers between *Rhododendron farrerae*, *R. mariesii* and *R. tashiroi*.

	R. farrerae	*R. mariesii*	*R. tashiroi*
Leaf			
habit	evergreen (?)	deciduous	evergreen
texture	coriaceous	chartaceous	coriaceous
shape of blade	elliptic-ovate, oblanceolate	ovate-rhombic	narrowly oblong to elliptic
widest part of blade	1/2	1/2	2/3
length and width (cm)	2-4.5 × 1-2	3-6 × 2.5-3.5	3-6 × 1-2
Flower			
color	pale rose-purple, purplish red	white-pink, pale purple	pink
number of each bud	1, (2)	(1), 2-4, mostly 2-3	2-3, mostly 3

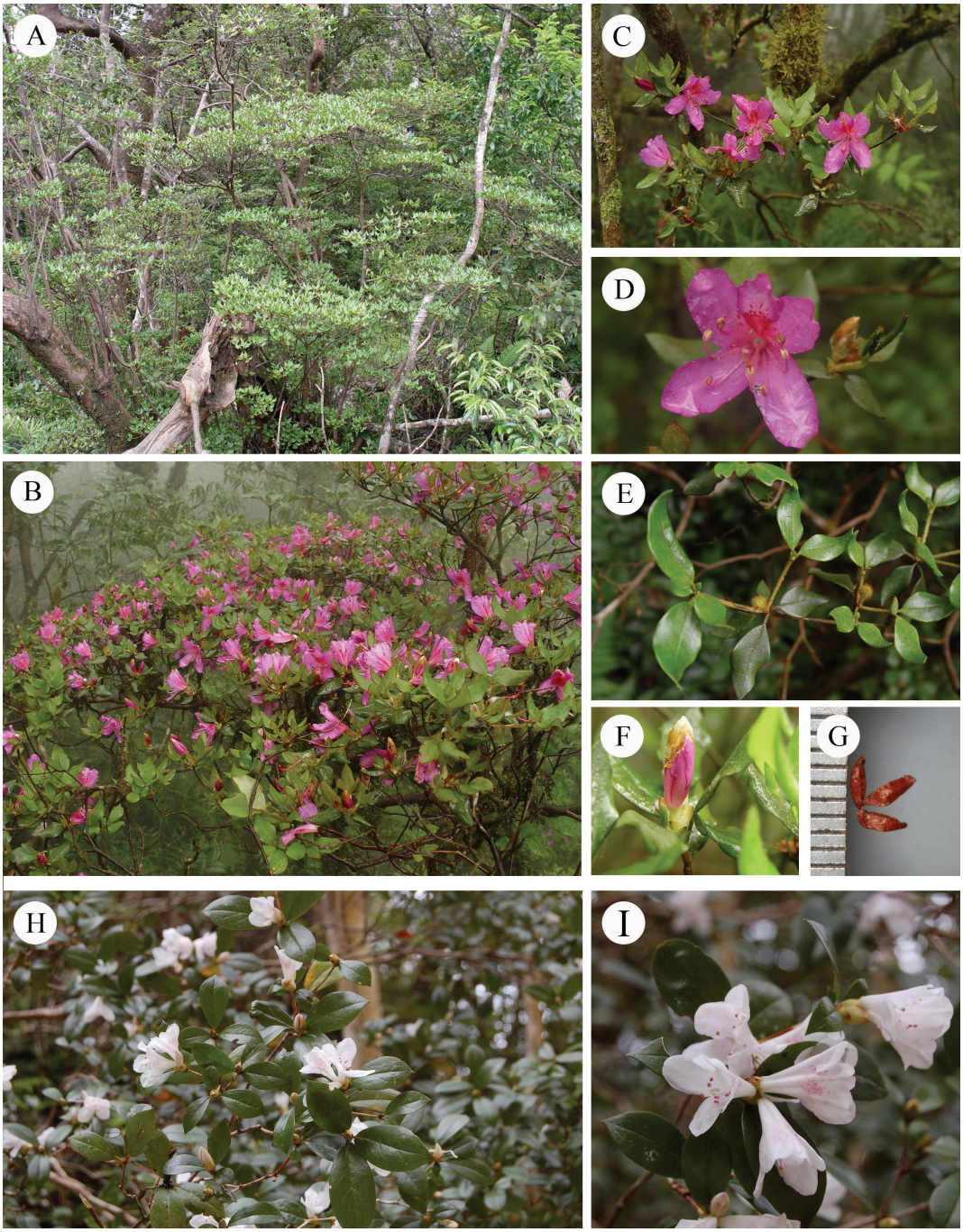

Fig. 3. Morphology of *Rhododendron farrerae* (A-G) and *R. tashiroi* (H-I; photographed by Dr. Goro Kokubugata). A: Habit. B: Horizontal branches. C: Young leaf and flowering branches. D: Flower. E: Fruit. F: Flower solitary, terminal. G: Seeds (scale = 0.5 mm). H: Flowering branches of *R. tashiroi*. I: Flowers (each bud with 3 flowers).

the flowers bloom before sprout (He et al., 1994). It is needed to assess these habits in detail. From the specimens preserved in PPI, the number of flowers in China population bear 1 mostly but 2 scarcely at anthesis. We recognized that it is still insufficient to divide them into two populations by those evidences.

The available collections of *R. farrerae* are primarily distributed in Guzilunshan and Dahanshan, southern Taiwan, where habitats are commonly more humid with a prevailing cloud zone. This species in Peitawushan at about 2,400-2,500 m altitude is less abundant than at lower elevations; the major distribution range of

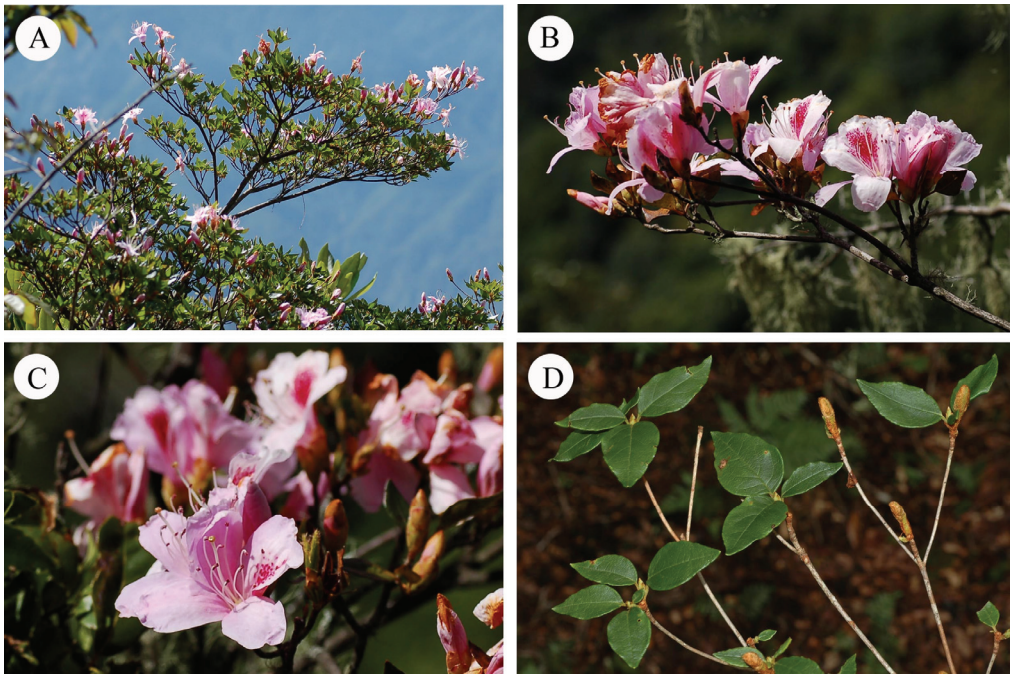

Fig. 4. Morphology of *Rhododendron mariesii* (photographed by Mr. Y. P. Liu). A: Habit. B: Flower branches. C: Flower. D: Leaf and fruit branches.

R. farrerae is between 1500-1700 m. In these areas, the critically endangered species, *Amentotaxus formosana* Li, is also found, so that protecting the vegetation habitats around these altitude ranges is more critical in the near future.

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重新確認臺灣產杜鵑花屬植物－丁香杜鵑

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摘要：日本學者Kawakamii 早在1910年記錄丁香杜鵑 (*Rhododendron farrerae*) 分布於臺灣。此段期間，由於缺乏足夠文獻與標本，本植物一直認定為大武杜鵑 (*R. tashiroi*) 並於 1998 年從臺灣植物誌刪除。經查閱貯存之標本與資料，可以確認丁香杜鵑確實分布於臺灣南部中央山脈南端，從北大武山至台東縣達仁鄉。本種與大武杜鵑及守城滿山紅最主要的區別在於本種花頂生於枝條且僅 1 朵花，大武杜鵑及守城滿山紅則 2-3 朵花叢生於枝條。本文提供丁香杜鵑詳細的分類處理、形態描述、分布圖、手繪圖、照片及 3 種近似種形態比較表，以供分類參考。

關鍵詞：大漢山、杜鵑花科、丁香杜鵑、守城滿山紅、大武杜鵑、臺灣。