

研究報告

臺灣鹿藥 (百合科) 之分類研究

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【摘要】臺灣鹿藥 (*Maianthemum formosanum* (Hayata) LaFrankie) 最早於 1920 年發表 (*Smilacina formosana* Hayata)，發表後多次被處理為鹿藥 (*S. japonicum* A. Gray) 之同物異名。最近著者檢視臺灣鹿藥及鹿藥之模式標本、比較原始發表文獻及相關資料後確認臺灣鹿藥之存在，且其形態與鹿藥有一定之差異，應獨立且併入 *Maianthemum* 屬為宜。本文提供模式標本照片、彩色照片及分布圖等以資辨識。

Research paper

The Taxonomy of *Maianthemum formosanum* (Hayata) LaFrankie (Liliaceae)

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【ABSTRACT】*Smilacina formosana* Hayata was first described at 1920 by Hayata. After that, many authors treated this species as a synonym of *S. japonica* A. Gray. Recently, type specimen of two species, reviewed the original materials and literature cited were reviewed and checked and *S. formosana* Hayata was confirmed different to *S. japonica* A. Gray. LaFrankie's concept transferred the genus *Smilacina* Desf. into *Maianthemum* Wigg were accepted. Distribution map, type specimen and photos were provided in this article.

【Key Words】*Maianthemum formosanum*, plant taxonomy, Liliaceae, Taiwan

INTRODUCTION

The genus *Smilacina* Desf. comprised about 35 species mainly distributed in eastern and northern Asia, northern America, central America

and northern Europe. A total of 19 species has been found in China (Chen and Kawano, 2000). One species was previously recognized in the Flora of Taiwan (Ying, 2000; Boufford *et al.*, 2003).

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In Flora of Taiwan second edition, the species of *Smilacina* was treated as *S. japonica* A. Gray (Ying, 2000; Boufford *et al.*, 2003). According to the type specimen, original materials, literature cited on *Smilacina* (Gray, 1856; Hayata 1908, 1917, 1920; Kawakami 1910; Ohwi, 1953; Yamamoto 1938; Ying, 1969, 2000), the plants in Taiwan should be *S. formosana* Hayata, not *S. japonica* A. Gray were confirmed.

In the past decades, *Maianthemum* Wigg. and *Smilacina* Desf. were two separated genus, and resembled to each other, and were separated based on floral characters. The flowers were trimerous (6 tepals, 6 stamens and 3 carpels) in *Smilacina* and dimerous in *Maianthemum* (4 tepals, 4 stamens and 2 carpels). LaFrankie (1986) suggested the genus *Smilacina* transferred into *Maianthemum* based on morphology and anatomy evidences. Meng *et al.* (2008) derived same result from the karyotype and molecular evidences. Chen and Kawano (2000) also followed this concept in Flora of China. In this paper we accepted LaFrankie's concept, transferred the genus *Smilacina* Desf. into *Maianthemum* Wigg.

TAXONOMIC TREATMENT

Maianthemum formosanum (Hayata) LaFrankie in Taxon 35 (3): 588. 1986.

臺灣鹿藥 Fig. 2, 3 and 4

Smilacina formosana Hayata, Icon. Pl. Formosan. 9:141. 1920.

Smilacina nokomonticola Yamam. in J. Soc. Trop. Agric. 10:179. 1938.

Smilacina japonica sensu acut. Ying non. A. Gray, Jap. Exped. 2:321. 1856.

Perennial herbs, monoecious. Rhizome creeping, moniliform or sometimes terete, 2-7 mm in diam., sometimes branched, with many fibrous roots, root with root hairs. Stem erect or

arching, 5-30 cm long, simple, pubescent at upper part, nodes close to base covered with scale leaf. Leaf deciduous, simple, alternate, ovate to calceolate, apex attenuate, base attenuate and decurrent, chartaceous, margin entire, undulate, slight pubescent along veins at abaxial surface, 5-10 cm long, 1-5 cm wide, sessile to petiolate, petiole 7-15 mm long, estipule. Inflorescence terminal, bisexual, raceme to panicle, brevi-pubescent, ca. 5 cm long, 4 cm wide, peduncle ca. 4 cm long, bract absent. Flowers bisexual, fragrance, perianth flattened, segments 6, connect at base, arranged into inconspicuously 2 whorls, each 3, white rarely with purplish spots, oblong, apex obtuse, 3 mm long, 1.5 mm wide, pedicels short, ca. 2 mm long, pubescent. Stamens 6, inserted at base of perianth, slight connect to perianth, filament 1-2 mm long, anthers cordate-reniform, ca. 0.5 mm long. Ovary superior, ovate, 1.5 mm long, 3-loculed, glabrous, style 0.5 mm long, stigma capitate, 3-lobed. Fruits berry, globose, 6 mm in diam., spotted when immature, mature red. Seeds numerous. Chromosome number $2n=36$

Endemic. Distributed in high altitude mountains, over 3,000 m.

Specimen examined:

HSINCHU: Wufeng Hsiang, Sheipa National Park: Tapachienshan, ca. 3,400 m, 121° 15' 29" E 24° 27' 47" N, 7 Sep. 1993, C. L. Huang *et al.* 107 (TNM);

TAICHUNG: Hsuehshan Heisenlin, 3,200 m, 19 Jun. 1993, S. T. Chiu 1990 (TNM); Nanhutashan, 3,400-3,500 m, 121° 22' 17" E 24° 26' 13" N, 24 Jun. 1994, C. M. Wang W00898 (TNM); Hsuehshan 369 hut, 3,170 m, Sep. 12 2009, C. T. Chao (TCF);

NANTOU: Hohuanshan, 3,000 m, 121° 15' 44" E 24° 08' 03" N, 13 May 2000, C. W.

Chen 1495 (TAIF);

CHIAYI: monte Morrison, 13,000 ped. alt., Oct. 1906, T. Kawakami and U. Mori 2384 (Syntype!, TAIF);

NOTES

This species is first described by Hayata at 1908 as *Smilacina japonica* A. Gray, he assigned 2 specimen of this name, one is Nakahara collected from Mt. Morrison at October 1905, and another one is T. Kawakami and U. Mori collected from Mt. Morrison 13,000 ft. at October 1906 number 2384. Kawakami (1910) and Hayata (1917) followed this concept.

Hayata (1920) published a new species *S. formosana* Hayata to replace the name he used formerly. Masamune (1930) transferred *S. formosana* Hayata to genus *Tovaria* Necker ex Baker as a new combination *T. formosana* (Hayata) Masamune. However, *Tovaria* was formerly used by Ruiz & Pavon in 1794 as a genus of *Tovariaceae*, earlier than Necker ex Baker. Therefore *T. formosana* (Hayata) Masamune was illegal.

Yamamoto (1938) described a new species *S. nokomonticola* Yamam. by morphological evidence. According to the original description, this new species was smaller than *S. formosana*

Hayata and had a smaller inflorescence. After checked the type specimen and original publications of *S. formosana* Hayata and *S. nokomonticola* Yamam., there was no conspicuously difference between two species, support *S. nokomonticola* Yamam. as a synonym of *S. formosana* Hayata by Ying (Ying, 1969, 2000; Boufford *et al.*, 2003).

In Flora of Taiwan second edition, *S. formosana* Hayata had been treated into *S. japonica* A. Gray. Recently, the taxa found in Taiwan was different from *S. japonica* A. Gray at several characters, and closed to the description of *S. formosana* Hayata, and several literatures in east Asia were reviewed (Chen *et al.*, 1780; Chen and Kawano, 2000; Ohwi, 1953), the species in Taiwan is different from *S. japonica* A. Gray were confirmed, and accepted LaFrackie's concept, so the name will be *M. formosanum* (Hayata) LaFrankie for Taiwan species.

M. formosanum (Hayata) LaFrankie is similar to *M. japonicum* (A. Gray) LaFrankie. The major differences between these two species are the rhizome thickness (2-7 mm vs. 7-10 mm), stem height (5-30 cm vs. 30-60 cm) and style length (0.5 mm vs. 0.5-1 mm) (Table 1).

Table 1. Comparison of *Maianthemum formosanum* and *M. japonicum*

	<i>M. formosanum</i>	<i>M. japonicum</i>
Rhizome	2-7 mm in diam.	7-10 mm in diam
Length of Stem	5-30 cm	30-60 cm
Leaves	ovate to lanceolate	ovate to oblong
Flowers		
Length of Pedicels	ca. 2 mm	2-6 mm
Length of Filaments	1-2 mm	2-2.5 mm
Length of Style	ca. 0.5 mm	ca. 0.5-1 mm
	1/2 long of ovary	as long as ovary
Stigma	capitate 3-lobed	subentire to entire

Distribution and habitat

This species is endemic to Taiwan, found in high mountain altitude over 3,000 m. Often grows at trails side or open grassland of *Yushania niitakayamensis* (Hayata) Keng or *Miscanthus sinensis* Anders., sometimes grows at bottom or

margin of *Abies kawakamii* (Hayata) Ito, often associate with *Ainsliaea latifolia* (D. Don) Sch. Bip. subsp. *henryi* (Diels.) H. Koyama, *Arenaria subpilosa* (Hayata) Ohwi and *Aletris formosana* Hayata (Fig.1).

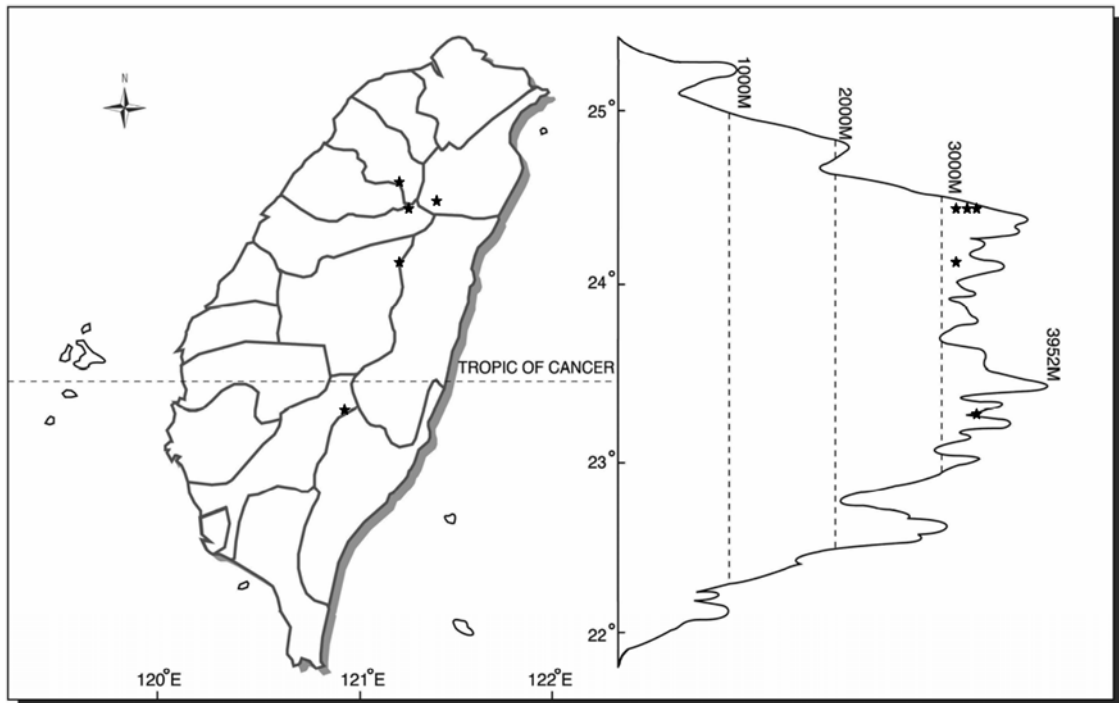


Figure 1. Distribution map of *Maianthemum formosanum* (Hayata) LaFrankie.

ACKNOWLEDGEMENT

We thanks Dr. Ying Meng (KUN) for valuable comments, Ms. Min-Chun Liao (TCF), Mr. Wei Wang (TCF), Mr. Hsueh-Yi Liao (TCF), Mr. Shih-Chang Liu (TCF) and Ting-Wen Cheng (TCF) for providing useful suggestions and field assistance.

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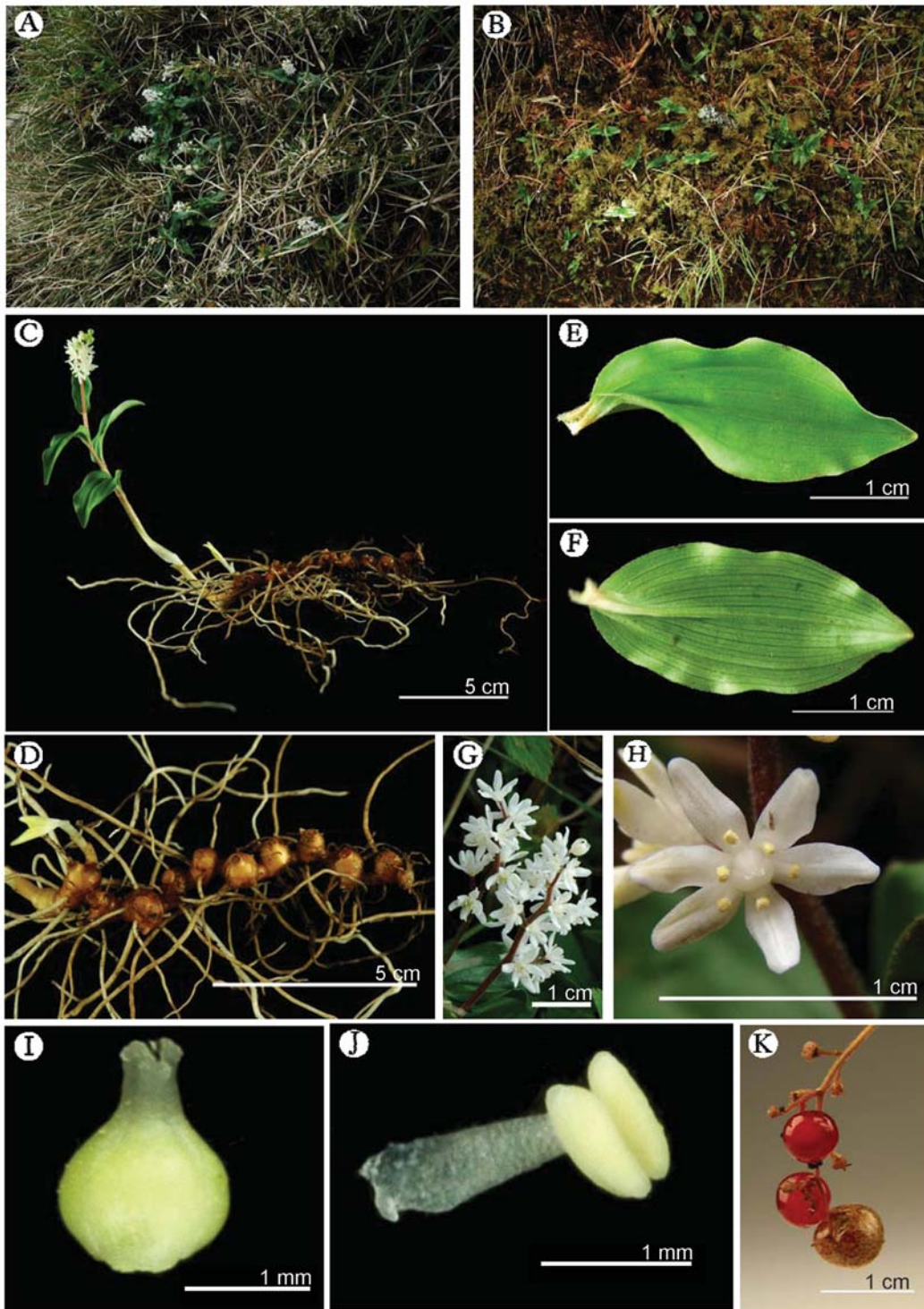


Figure 2. *Maianthemum formosanum* (Hayata) LaFrankie A. Habitat (open grassland) B. Habitat (under *Abies kawakamii* (Hayata) Ito forest) C. Habit D. Rhizome E. Leaf adaxial surface F. Leaf abaxial surface G. Inflorescence H. Flower I. Ovary J. Anther K. Fruit.



Figure 3. Type specimen of *Smilacina formosana* Hayata (syntype, TAIF!).



Figure 4. Type specimen of *Smilacina japonica* A. Gray., get from website of Smithsonian National Museum of Natural History (NMNH).

