

NOTES ON THE FLORA OF TAIWAN(19)-- *PARAPHLOMIS*
FORMOSANA (HAY.) HSIEH & HUANG, *COMB. NOV.*
(LAMIACEAE) (1)

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ABSTRACT: The relationships among *Ajuga formosana* Hay., *Paraphlomis gracilis* (Hemsl.) Kudo and *P. parviflora* Wu & Li have been confusing for a long time. Kudo (1929) treated *A. formosana* as conspecific with *P. gracilis*. We accept the generic name *Paraphlomis*, and we found that the Taiwan specimens so named *P. gracilis* are different from those of mainland Chinese ones on the basis of their external and pollen morphology and geographical distribution. Therefore, we propose a new combined name, i. e., *P. formosana* (Hay.) Hsieh & Huang, *comb. nov.* for the Taiwan plants. The name of *P. parviflora* was based on the specimen collected by Suzuki and is considered to be conspecific to *P. formosana*. The chromosome number of *P. formosana* ($2n = 34$) is also reported.

KEYWORDS: Lamiaceae, *Paraphlomis formosana*, *P. gracilis*, *P. parviflora*.

INTRODUCTION

Ajuga formosana Hay. (Fig. 1) was published by Hayata in 1906, but Kudo (1929) treated it as *Paraphlomis gracilis* (Hemsl.) Kudo including plants growing on both mainland China and Taiwan. Wu and Li published a new species, *P. parviflora* Wu & Li, for Taiwan specimen (Suzuki, T. 20399). It was distinguished from *P. gracilis* by its small flower and retroverse hair on the stem by Li (1965). Huang and Cheng (1978) accepted Kudo's opinion and treated the type specimen of *P. parviflora* (Suzuki, T. 20399) as a member of *P. gracilis* in the Flora of Taiwan. This type specimen was also used to produce an illustration in Vol. 4, pl.1082 of the Flora of Taiwan. The flower size is rather large, accordingly, these specimens from Taiwan apparently belong to a species which may be different from *P. gracilis* of mainland China. Therefore, We need to clarify the differences between these taxa.

MATERIALS AND METHODS

Pollen grains were prepared by the Erdtman method (1952). They were studied with a

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Fig 1. Type specimen of *Paraphlomis formosana* (Hay.) Hsieh & Huang (Honda 7).

scanning electron microscope. Somatic chromosomes were counted. The root tips had been held in a solution of 0.002M 8-hydroxyquinoline for 3-4 hours at a temperature of 18-20 °C, then fixed in 1:3 acetic ethanol overnight, and hydrolysed in pectinase and squashed in acetic orcein.

RESULTS AND DISCUSSION

Based on the external morphology, we can not distinguish the type specimen of *Paraphlomis parviflora* (Suzuki, T. 20399) from *Ajuga formosana*. In our opinion, *P. parviflora* and *A. formosana* (Honda 7) of Formosan specimens should be treated as conspecific. According to the Nomenclature Code (Article 57), since *A. formosana* was published earlier than *P. parviflora*, we transferred *A. formosana* to *P. formosana* (Hay.) Hsien & Huang, *comb. nov.* as the correct name.

The distinction between *P. formosana* of Taiwan and *P. gracilis* of mainland China is as follows. The corolla length of *P. formosana* (up to 2.0 cm) is longer than *P. gracilis* (up to 1.5 cm). The corolla tube of the former is longer than the calyx tube; on the contrary, the corolla tube of the latter is equal in length to the calyx tube. Furthermore, the calyx lobes of *P. formosana* (about 1.5 mm) are shorter than those of *P. gracilis* (3-4 mm).

The pollen morphology (Fig. 2) of *P. formosana* has a granulate surface with microperforate ornamentation. However, *P. gracilis* has a coarsely elevated reticulate surface with microperforate ornamentation.

As to the geographical distribution, *P. formosana* is confined to Taiwan, and *P. gracilis* is restricted to mainland China. Because of the floral and pollen morphology and geographical distribution mentioned above, we treated *P. formosana* and *P. gracilis* as two different species.

CONCLUSION

Based on external and palynological features, we came to the final taxonomical conclusion.

Paraphlomis formosana* (Hay.) Hsien & Huang, *comb. nov.

Ajuga formosana Hay. in Journ. Coll. Sci. Univ. Tokyo. **22**: 318. 1906. (Type: Honda 7, T1!)

Lamium fomasanum Nakai apud Hayata, Gen. Ind. Fl. formos. 57. 1917; Hayata, Icon. Pl. Formos. **8**: 90. 1919.

Paraphlomis parviflora C. Y. Wu, et H. W. Li in Act. Phytotax. Sin. **10**(1): 69. 1965; et Fl. Reip. Sinic. **65**(2): 567. 1977. (Type: Suzuki, T. 20399, PE!, TAI!) *syn. nov.*

Paraphlomis gracilis (Hemsl.) Kudo in Mem. Fac. Sci. Agr. Taihoku Imp. Univ. 2:210. 1929. *pro. part.* (Formosa borealis); Huang & Cheng in Fl. Taiwan **4**: 496. *pl. 1082*. 1978.

Lamium taiwanense Ying in Men. Coll. Agr. NTU. **31**(1): 22. 1991. (Type: Ying. *s. n.* Sept. 1989, NTUF!) *syn. nov.*

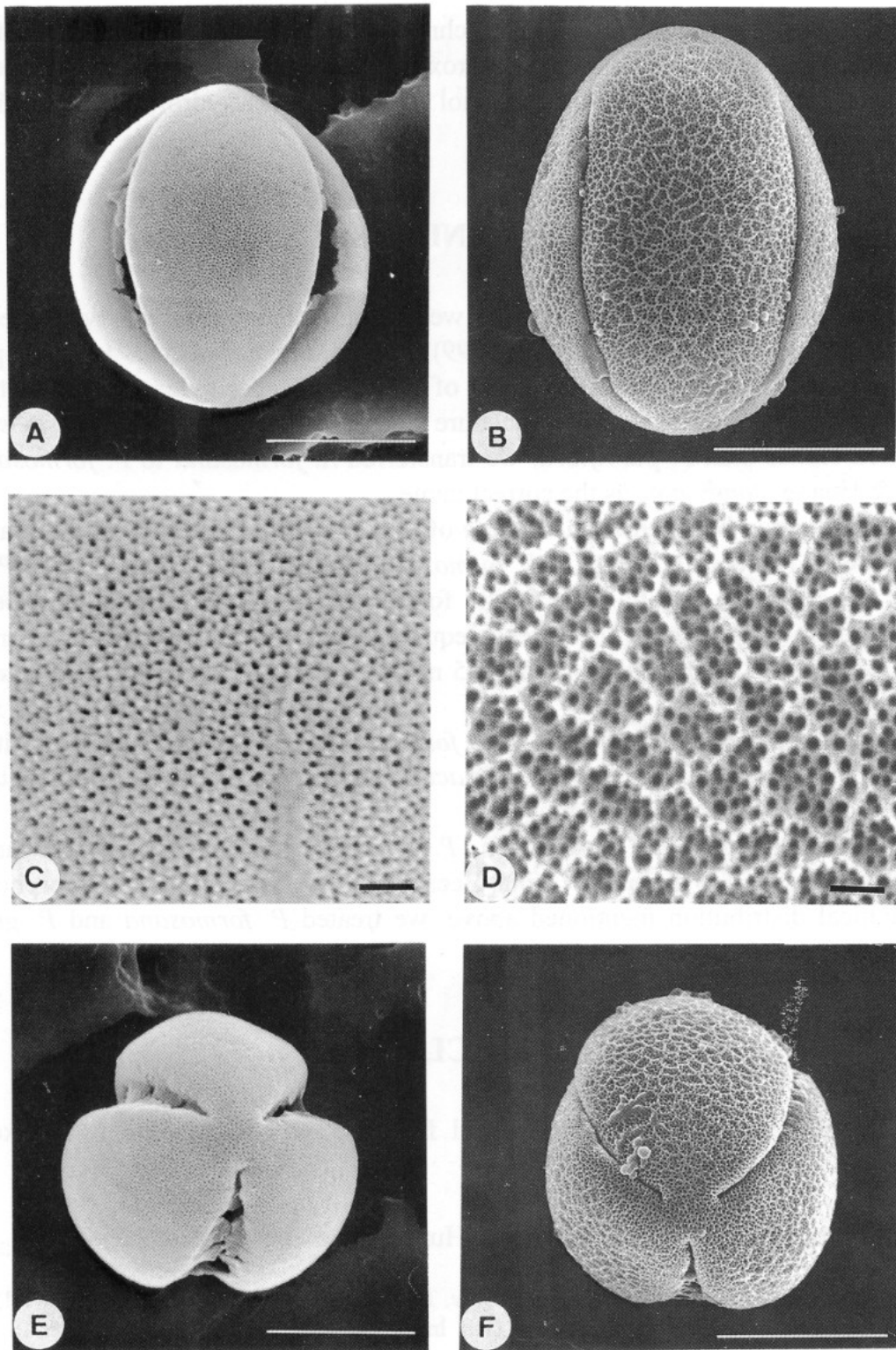


Fig 2. Scanning electron micrographs of pollen of *Paraphlomis formosana* (Hay.) Hsieh & Huang (A, C and E) and *P. gracilis* (Hemsl.) Kudo (B, D and F). A and B : equatorial view. C and D : high magnification of mesocolpia. E and F : Polar view. Voucher specimens: *P. formosana* (Yen 4139) and *P. gracilis* (Beijing exploring team 1788, PE). White bars equal 10 μm , black bars equal 1 μm .

An herb up to 100 cm high, covered with septate hairs; stems slender, square in section, glabrous or covered with minute hairs. Leaves opposite; blades elliptic to ovate, 5-18 cm long, 2-5 cm wide, the base cuneate, extending as wings on the petioles, the apex acuminate, the margins finely serrate to coarsely serrate, the upper surface sparsely and minutely hairy, the lower surface glandular; petioles slender, densely villose. Flowers axillary, 8-14 in a verticillate-cyme, loose; pedicels 1.5-2mm long, villose; calyx campanulate, minutely hairy, 5-8 mm long, 5-toothed, the teeth size equal or nearly so, narrowly triangular; corolla white, tubular, 10-20 mm long, the tube slender, minutely hairy, the limb bilabiate, the upper lip erect, elliptic, minutely hairy, the lower lip spreading, 3-lobed, minutely hairy and glandular-dotted outside, glabrous inside, the central lobe broadly ovate, larger than the 2 lateral lobes; stamens 4, included, pollen grains subprolate, 25-30 x 20-23 μm ; tectum with granulate surface and microperforate ornamentation. Fruitlets obovoid, smooth, trigonous at base, round at apex. Chromosome number: $2n = 34$ (Fig. 3).

Specimen examined:

Hsinchu Co.: Chutung, *Suzuki, T. 20399* (Type of *P. parviflora* Wu & Li, PE!, TAI!), Taitoty, Sinkogun, *Suzuki, T. 19544* (TAI). **Miaoli Co.:** Tafu, Funshui, *Honda 7* (Type of *Ajuga formosana* Hay., TI!); Talu logging tract 28-35k, *Wang & Yang 4854* (TAI). **Taichung Co.:** Anmashan, *Kuo 8821* (TAI). **Nantou Co.:** Tungpu, *Hsieh 1221* (TAI). **Taitung Co.:** Tien-chi to A-kou, *Ying, S. S. s. n.* Sept. 10. 1989. (Holotype of *Lamium taiwanense* Ying, NTUF!). **Pingtung Co.:** Hsiaokeihu, *Yen 4139* (TAI). **Hualien Co.:** Taroko, *Suzuki, T. 9714* (TAI).

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Fig 3. Mitotic metaphase chromosomes of *Paraphlomis formosana* (Hay.) Hsieh & Huang ($2n = 34$). Scale bars equal 20 μ m. Voucher specimen: *Yen 4139*.

臺灣植物誌之觀察(19)--臺灣假糙蘇(唇形花科)⁽¹⁾

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摘 要

根據模式標本比對說明 *Ajuga formosana* Hay. 和 *Paraphlomis parviflora* Wu & Li (小花假糙蘇) 為同一種植物,前者發表較早為有效的合法名。作者根據花部特徵將 *Ajuga formosana* 新組合成 *Paraphlomis formosana* (Hay.) Hsien & Huang, *comb. nov.* (台灣假糙蘇)。根據外部形態及花粉形態,說明產於台灣的台灣假糙蘇和產於中國大陸的纖細假糙蘇 (*P. gracilis* (Hemsl.) Kudo) 為不同的種。本文並首次報導台灣假糙蘇的染色體數目 $2n = 34$ 。

關鍵字：唇形花科，台灣假糙蘇，纖細假糙蘇，小花假糙蘇。

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