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Suzukia Kudo (Lamiaceae) in Taiwan

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ABSTRACT: The genus *Suzukia* Kudo is genus endemic to Taiwan and the Ryukyus and consists of only two species, *S. shikikunensis* Kudo and *S. luchuensis* Kudo. Hitherto, the former was reported from Taiwan and the latter was reported from the Ryukyus. Recently, *S. luchuensis* was collected from Lutao Island (Green Island), Taiwan. A taxonomic treatment of the genus *Suzukia* in Taiwan follows. SEM micrographs of pollen grains and nutlets, chromosome number, a key to species and descriptions, distribution map, and taxonomic notes are provided.

KEY WORDS: ***Suzukia*, Lamiaceae, Taxonomy, Taiwan.**

INTRODUCTION

Kudo proposed the genus *Suzukia* (Lamiaceae) some of S. Suzuki's collections from northern Taiwan in 1930. *Suzukia* is close to *Glechoma* L. in habit and foliage, but differs from it by its large lower lip with concave mid-lobe, large nutlets, and the strongly 5-nerved, obconic-campanulate calyx (Kudo, 1930). The genus includes two species, *S. luchuensis* Kudo. The two species similar, but *S. luchuensis* tends to have shorter floral branches arising immediately from the rhizome, and acute or subacute calyx lobes (Murata and Yamazaki, 1993).

Without citing specimens, Chen (1977), Li and Hedge (1994) reported both species to be in Taiwan based on the middle lobe of lower corolla lip entire (*S. shikikunensis*) or incised (*Suzukia luchuensis*). But, the middle lobe of lower corolla lip in both species is generally entire or slightly undulate on margin (Murata and Yamazaki, 1993). Previously, *S. shikikunensis* Kudo was reported from Taiwan (Huang and Cheng, 1978; Huang, Hsieh and Cheng, 1999) and *S. luchuensis* Kudo was reported from the Ryukyu Islands (Kudo, 1931; Murata and Yamazaki, 1993). Recently, however, *Suzukia luchuensis* Kudo was collected from Lutao Island (Green Island), Taiwan, thereby verifying its status in the flora. A taxonomic treatment of the genus *Suzukia* in Taiwan follows.

MATERIALS AND METHODS

Materials used in this study were collected from throughout Taiwan. Most specimens were pressed and dried for voucher specimens and deposited in the Herbarium, Department of Science Education, National Tainan Teachers College (NTNTC).

Pollen grains were acetolyzed according to the procedures outlined by Erdtman (1952). The acetolyzed grains were dehydrated in an ethanol series and critical point dried. Dried grains were coated with gold and examined using SEM.

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Root tips for chromosome counts were cut from living plants. After pretreatment with 0.002 M 8-hydroxyquinoline for 3-4 hours at 18-20℃, the materials were fixed in a mixture of absolute alcohol and glacial acetic acid (3:1/v:v), then macerated with 1% pectinase, stained with acetic orcein, squashed, and observed with a Nikon microscope.

RESULTS

External morphology

Although the specimens in herbaria are usually misidentified, the morphology of the leaf and calyx of *Glechoma hederacea* L. var. *grandis* (A. Gray) Kudo is different from *Suzukia shikikunensis* Kudo and *S. luchuensis* Kudo. *Glechoma* has a long petiole (2-4 cm long), is not aromatic, and has spiny tipped calyx lobes. *Suzukia* has a short petiole (0.5-3 cm long), is aromatic, and the calyx lobes are triangular (Fig. 1). *Suzukia luchuensis* is similar to *S. shikikunensis*, but differs from it by having smaller and thicker, pinnately veined leaves and a shorter corolla.

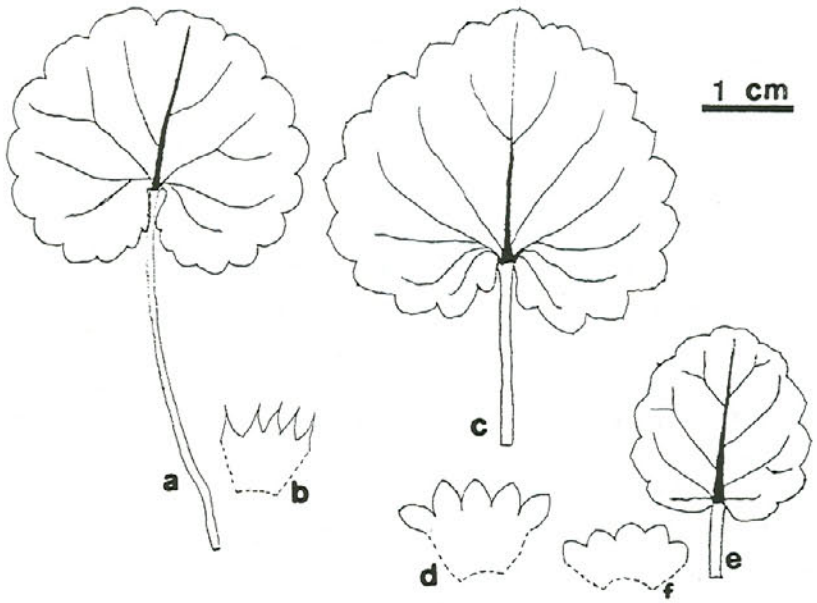


Fig. 1. External morphology of leaf and calyx of *Glechoma hederacea* L. var. *grandis* (A. Gray) Kudo (a, b), *Suzukia shikikunensis* Kudo (c, d), and *S. luchuensis* Kudo (e, f).

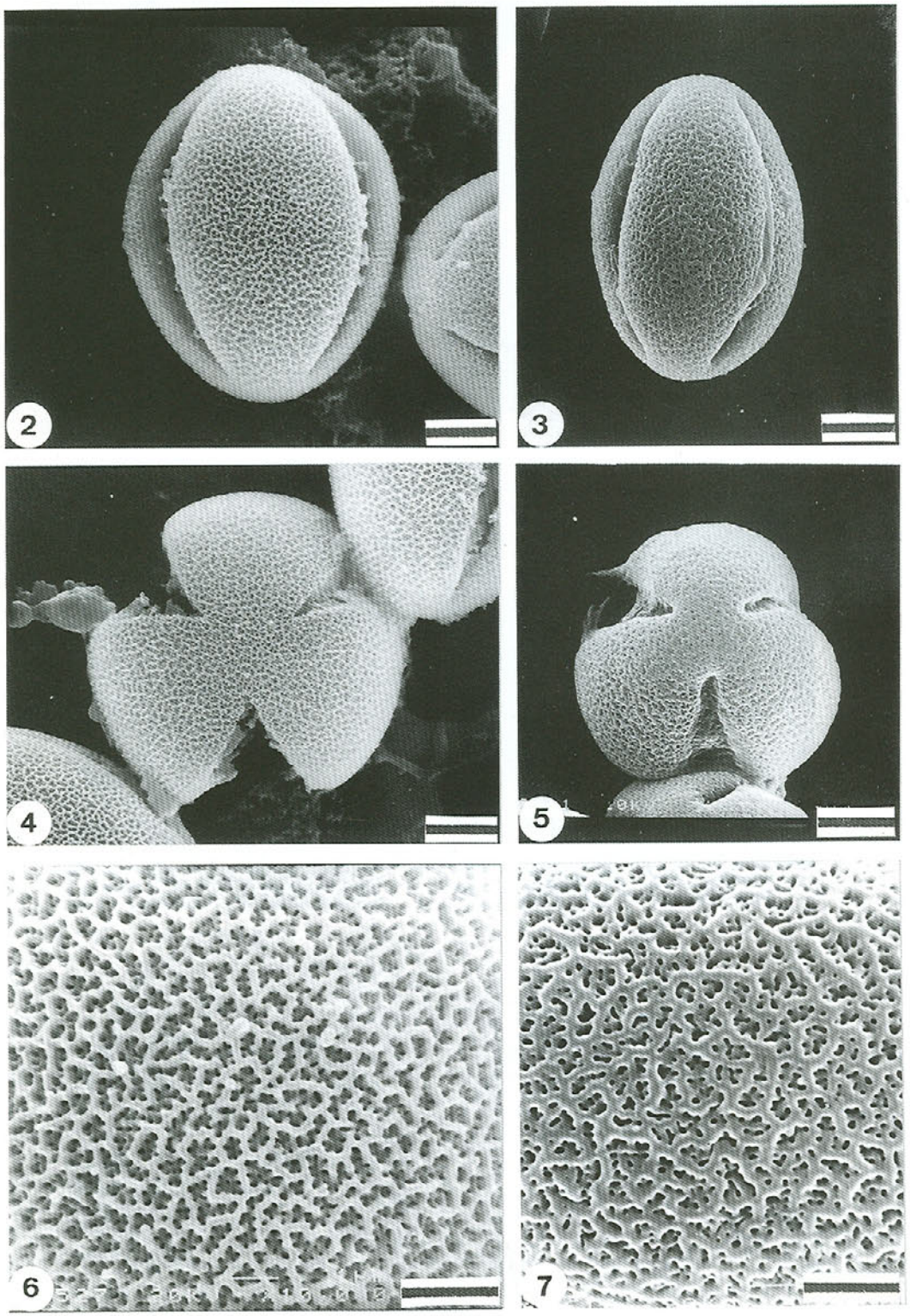
Pollen grains

The pollen grains of *Suzukia* are 3-colpate, isopolar, prolate to subprolate in equtorial view, circular in polar view, and the sexine is suprareticulate (supratectal ridges form a reticulate pattern) (Figs. 2-7).

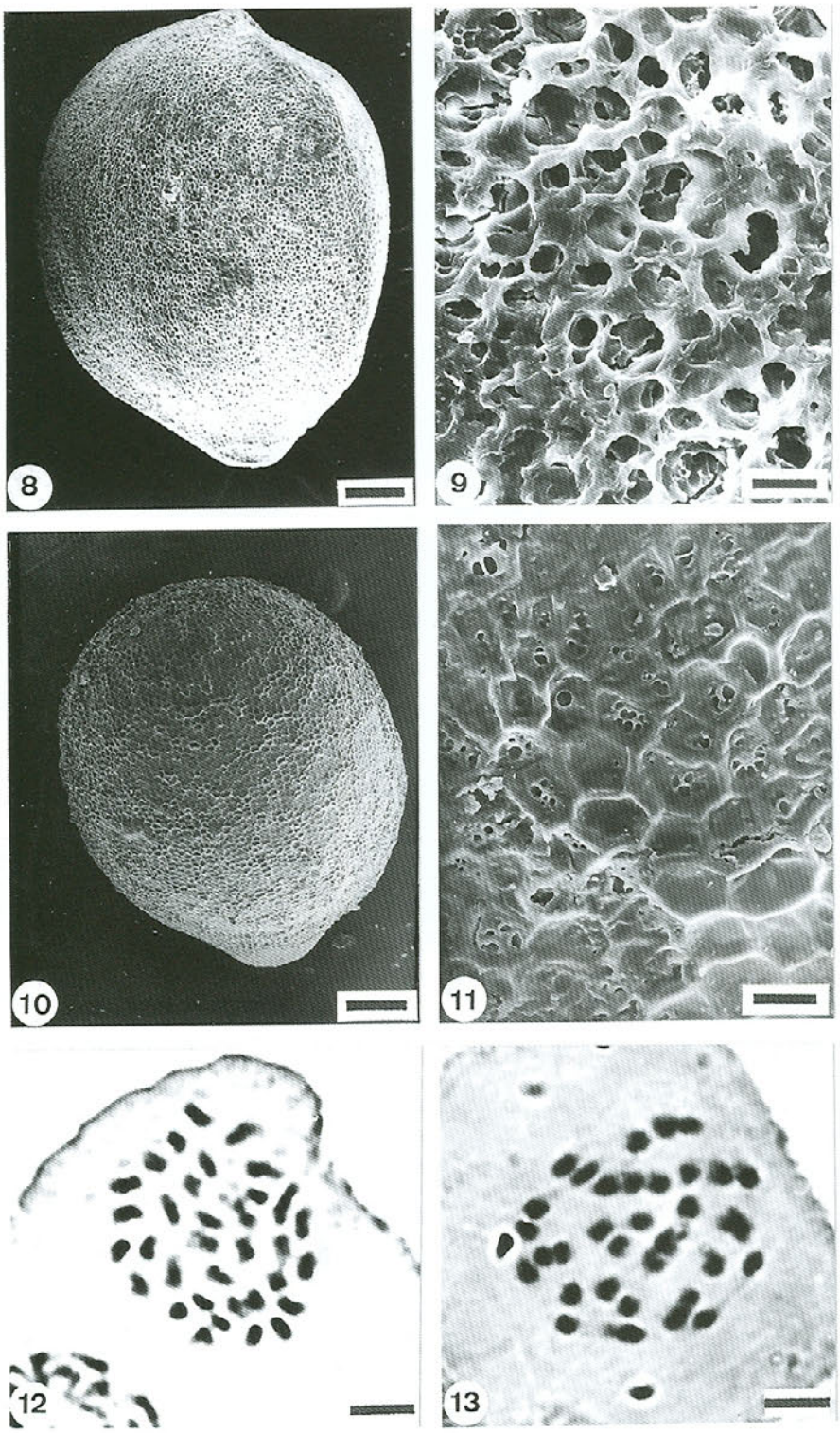
Although the ornamentation and sexine are similar, the pollen grains of *Suzukia luchuensis* are smaller and have more condensed muri than *S. shikikunensis*.

Nutlets

Nutlets of both species are blackish and punctulate on the surface. The nutlets of *Suzukia shikikunensis* are 3-ridged and 1.5-2.0 mm long; the nutlets of *S. luchuensis* are not 3-ridged and 1.4-1.7 mm long (Figs. 8-11).



Figs. 2-7. SEM micrographs of pollen grains of *Suzukia shikikunensis* (Figs. 2, 4 and 6), and *S. luchuensis* (Figs. 3, 5 and 7). Scale bar = 5 μm except 2 μm in Figs 6 and 7.



Figs. 8-13. SEM micrographs of nutlets of *Suzukia shikikunensis* (Figs. 8, 9), and *S. luchuensis* (Figs. 10, 11). Somatic chromosome of *S. shikikunensis* (Fig. 12), and *S. luchuensis* (Fig. 13). Scale bar= 200 μm (Figs. 8, 10), 20 μm (Figs. 9, 11), 5 μm (Figs. 12, 13).

Chromosome number

The chromosome number of *S. shikikunensis* (Fig. 12) and *S. luchuensis* (Fig. 13) is 2n = 34.

A chromosome number of 2n=24 was reported for *S. shikikunensis* by Hsu (1968), but that count was not confirmed in this study.

TAXONOMICAL TREATMENT

Key to species

Blade 10-20 mm long, 10-20 mm wide, pinnately veined, thick; corolla 12-14 mm long; lower lip 7-8 mm long ..... 1. *S. luchuensis*

Blade 10-25 mm long, 15-35 mm wide, palmately veined, thin; corolla 15-20 mm long; lower lip 10-12 mm long ..... 2. *S. shikikunensis*

1. **Suzukia luchuensis** Kudo, J. Trop. Agric. 3: 226. 1931; Murata and Yamazaki, Fl. Jap. 3b. 290-291. 1994. Fig. 14

Perennial herbs. Stems creeping 20-60 cm long, rooting at nodes, quadrangular, densely covered with pilose hairs. Leaves opposite, chartaceous, 430-470 μm thick; petiole 0.5-2 cm long; blade orbiculate or orbiculate-ovate, 1-2 cm long and wide, base truncate or shallowly cordate, coarsely rounded dentate, apex rounded, long-pilose on both sides. Inflorescences elongated racemes in axils of much-reducedd leaves or spatulate bracts. Pedicel 1-2 mm long, densely pilose. Calyx campanulate, slightly bilabiate, 6 mm long, villose, subequally 5-lobed; loboe deltoid, obtuse, 1-1.5 mm long. Corolla tubular, bilabiatae, 12-14 mm long, purplish-white, short pilose outside; upper lip 4-5 mm long, ovate, convex; lower lip 7-8 mm long, 3-lobed, middle lobe largest, orbiculate-ovate, margins slightly undulate. Stamens 4, didynamous, included. Nutlets globose obovid, 1.4-1.7 mm long, punctulate, blackish.

Habitat: on windward costal slopes.
Altitude: 0-50 m.
Distribution: C. to S. Ryukyu and Lutao Island (Green Island).
Flowering: March and April.

Specimens examined: TAITUNG: Lutao Island (Green Island): Haisenping, *C.I. Peng 7589* (HAST), *J. C. Wang 6858* (TNU), *T.H. Hsieh 2015* (NTNTC), *T. J. Lin s. n.* Apr 1998 (NTNTC).

2. **Suzukia shikikunensis** Kudo in J. Soc. Trop. Agr. 2: 146. 1930; Huang and Cheng, Fl. Taiwan 4: 526. 1978; Huang, Hsieh, and Cheng, Fl. Taiwan 2nd ed. 4: 542. 1999. Fig. 15

Perennial herbs. Stems creeping 30-60 cm or more long, rooting at nodes, quadrangular, densely pilose. Leaves opposite, chartaceous, 100-115 μm thick; petiole 2-3 cm long; blade orbiculate, 1-2.5 mm long, 1.5-3.5 cm wide, base cordate, coarsely rounded dentate, apex rounded, the veinlets palmate, long pilose on both surfaces. Inflorescences elongated racemes or verticillate cymes in axils of much reduced leaves or spatulate bracts. Pedicels 1-2 mm long, densely pilose. Calyx campanulate, slightly bilabiate, 7-10 mm long, villose, subequally 5-lobed; loboe acute, 2-3 mm long. Corolla tubular, bilabiatae, 15-20 mm long, purple, pilose outside; upper lip 4-5 mm long, erect, ovate, convex; lower lip 10-12 mm long, 3-lobed, middle lobe largest, orbiculate-ovate, margins slightly undulate. Stamens 4, didynamous, included. Nutlets globose obovid, 3-ridged, 1.5-2.0 mm long, punctulate, blackish.

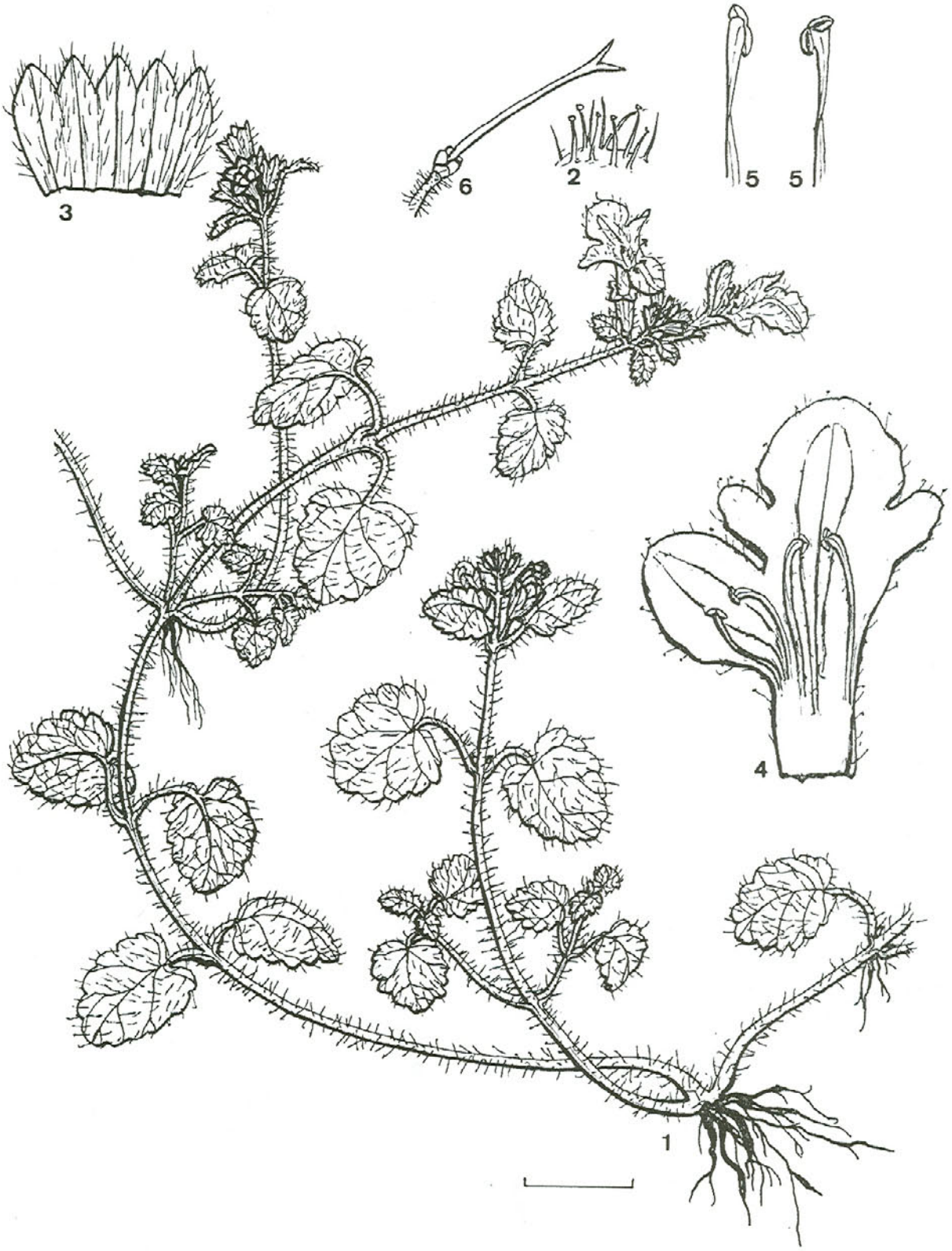


Fig. 14. *Suzukia luchuensis* Kudo. 1. habit; 2. hairs on the stems and leaves; 3. dissected calyx; 4. dissected corolla; 5. stamens; 6. pistil. Bar = 2 cm.

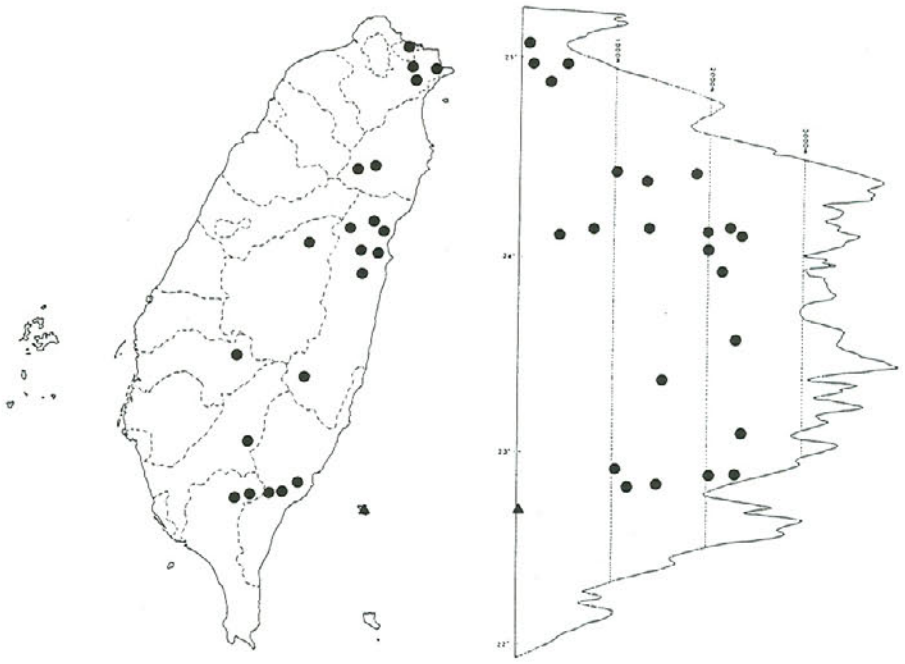


Fig. 15. Distribution map of *Suzukia shikikunensis* (●) and *S. luchuensis* (▲) in Taiwan showing with both of the coordinate (left) and altitude (right).

Habitat: Open grasslands.

Altitude: 0-2500 m.

Distribution: Endemic. Throughout Taiwan.

Flowering: Lowlands: April to May; medium elevations: July to September; high elevations: October to January.

Specimens examined: TAIPEI: Keelung, *S. Sasaki, s. n.* May 1925 (TAI); Shunhsi, *T. C. Huang et al. 4455* (TAI); Shandiauling, *W. T. Cheng 832, 764* (TAI); Fulung, *T. C. Huang 8297* (TAI). ILAN: Taipingshan, *S. Suzuki s. n.* Jul 1929 (TAI), *M. T. Kao s. n.* Jan 1976 (TAI); en route from Liumaoan to Ssuchitsun, *S. Suzuki 4937* (TAI); Tuchang, *S. Suzuki s. n.* Aug 1944 (TAI); Sikikun, *S. Suzuki 4984* (TAI), *W. T. Cheng 1504* (TAI). TAICHUNG: en route from Tatumi to Meijionsen, *K. Mori s. n.* Oct 1936 (TAI); Chihchiayangtashan, *S. Suzuki 5499* (TAI). NANTOU: Malapa, *Sasaki s. n.* Jul 1922 (TAI). CHIAYI: Yushan, *Sasaki s. n.* Oct 1928 (TAI), *Sasaki s. n.* Aug 1935 (TAI). KAOHSIUNG: en route from Shelter to the end of Chuyunshan Forest Road, *H. L. Ho et al. 882* (HAST). PINGTUNG: Baryiuchih, *S. F. Huang 3387* (TAI); Ali, *S. Suzuki s. n.* Aug 1931 (TAI); en route from Ali to Hsiaokeihu, *C. C. Liao et al. 564* (HAST). TAITUNG: Wushan, *Hosokawa 5376* (TAI); en route from Shenshan to Wushan, *Sasaki s. n.* Aug 1932 (TAI), *Hosokawa s. n.* Aug 1932 (TAI); Kueihu, *C. Hsu 3332* (TAI); Luyeh, C. H. *Ou 1948* (TCF). HUALIEN: Taroko, *S. Suzuki 9289*; Luanshan, *C. M. Kuo* et al. 6900 (TAI), *C. Hsu 3595, 3691* (TAI), *Y. C. Liu and C. H. Ou 1750* (TCF); en route from Tatung to shakatang, *T. C. Huang et al. 12774* (TAI); Hsinpaiyang, *M. T. Kao 8526*; Mukwashan, *M. T. Kao 4166*, *C. I. Peng 7275* (HAST); Near Erhtzushan, *C. I. Peng 5879* (HAST); en route from Pilu to Pilu Shenmu, *C. I. Peng 9259* (HAST); en route to Pilu, *C. I. Peng14513* (HAST); en route from Yamagon to Shihli, *T. P. Chiang et al. 50* (HAST); en route from Tatung to Chingshuishan, *W. P. Leu and H. F. Yen 82* (HAST), *W. P. Leu et al. 1813* (HAST).

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摘　　要

鈴木草屬為台灣和琉球地區的特有屬，本屬有二種分別為鈴木草和琉球鈴木草，前者分佈於台灣島上，而後者分佈於琉球群島。本文報導綠島地區亦有琉球鈴木草之分佈，比較二者在外部形態、花粉、小堅果、染色體等特徵，並提供檢索表作為鑑定之用。

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