

## New Species of *Silene* L. (Caryophyllaceae) from the Sino-Himalayan Region

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(Received on April 27, 2007)

We report here new species of *Silene* L. (Caryophyllaceae) from the Sino-Himalayan region. They are three new species, *S. hideakiohbae* Rajbh. & Mitsuo Suzuki, *S. davidlongae* Rajbh. & Mitsuo Suzuki and *S. greywilsonii* Rajbh. & Mitsuo Suzuki, from Nepal and one new species, *S. akiyamae* Rajbh. & Mitsuo Suzuki, from China.

**Key words:** China, Himalaya, Nepal, new species, *Silene*.

The genus *Silene* L. (Caryophyllaceae), with about 700 species (Mabberley 1997), is distributed mainly in the northern temperate regions of the world. It is characterized by herbaceous plants with exstipulate leaves, sepals connate into a distinct calyx-tube, petals 5, usually clawed, 10 stamens, 3 or 5 styles, fruit berry-like dehiscent irregularly or capsule dehiscent with 6 or 10, rarely 5 teeth (Zhou et al. 2001). It is much diversified in the Himalayas and the adjacent regions in China. The Himalayan *Silene* has been investigated by Don (1825), Royle (1834), Rohrbach (1868), Edgeworth and Hooker (1875), Williams (1896), Bocquet (1967, 1969), Bocquet and Chater (1979), Grierson (1984), Ghazanfar and Nasir (1986) and Majumdar (1993). It is represented by 24 species in Nepal (Bocquet and Chater 1979), 12 species in Bhutan (Grierson 1984), 28 species in Pakistan (Ghazanfar and Nasir 1986), 28 species in India (Majumdar 1993), 110 species in China (Zhou et al. 2001) and one species in Myanmar (Kress et al. 2003). Recently, some new species of *Silene* have been added from the west Himalayan region.

*Silene subodhii* S. R. Kundu (synonym *S. stewartii* S. A. Ghazanfar) was described from Kashmir, Pir Panjal Range in 1982 (Kundu 2000). *Silene pakistanica* Lazkov was described from plants of Swat, Kulali to Kalam in 2000 (Lazkov 2000). In the same way, *S. gangotriana* Pusalkar, Singh & Lakshmin, which was previously thought to be *S. laxantha* Majumdar, was described from plants collected in Uttaranchal, Gangotri National Park, India in 2004 (Pusalkar et al. 2004). Although the Himalayan *Silene* has been well studied, it is still poorly represented in some regions of the Himalaya. We carried out the present study to recheck them by critically examining the morphological characters of the available herbarium materials. Besides the study of the herbarium specimens preserved in the Tohoku University Herbarium (TUS) specimens of the Himalayan *Silene* housed in the Royal Botanic Garden Edinburgh (E), Royal Botanic Gardens, Kew (K), University Museum, the University of Tokyo (TI) and Smithsonian Institution, National Museum of Natural History (US) were obtained as loan



Fig. 1. Holotype of *Silene hideakiohbae* Rajbh. & Mitsuo Suzuki (NEPAL: Gandaki Zone, Manang District, Suggi Khola, 2520 m, 12 Aug. 1994, M. Suzuki & al. 9485399, TUS).

material for this study. The study of these specimens has revealed three new species of *Silene* from Nepal and one new species from China.

#### New species from Nepal

***Silene hideakiohbae*** Rajbh. & Mitsuo Suzuki, sp. nov. [Figs. 1, 2]

*Silene khasiana* Rohrb. affinis, sed

calicibus eglandulosis, petalis quadrilobatis basi pubescentibus bene differt.

**TYPE:** Nepal, Gandaki Zone, Manang District, Suggi Khola, 2520 m, 12 Aug. 1994, M. Suzuki, N. Acharya, N. Fujii, T. Kajita, N. Kondo, M. Mikage, S. Noshiro & K. Yoda 9485399 (TUS-holotype).

Perennial herb, eglandular, pubescent throughout. Stem ca. 1 m tall, spreading,

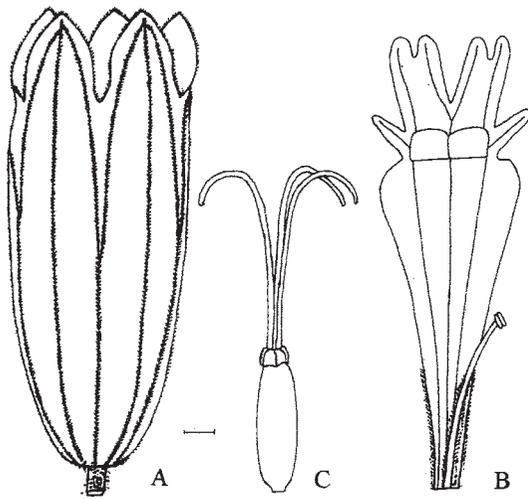


Fig. 2. *Silene hideakiohbae* Rajbh. & Mitsuo Suzuki. A. Calyx with minute eglandular hairs on veins and margins. B. Stamen and petal with 4-lobed limb and with 2 coronal scales. C. Ovary with 3 styles. Scale bar = 1 mm.

densely pubescent above. Leaves sessile, ovate, basal leaves obovate,  $5-6 \times 2.5-4$  cm, surface glabrous, pubescent along the nerves, margin ciliate, mid vein prominent, base round, lowermost leaves with cuneate base, apex acute or acuminate. Flowers in terminal dichasial cymes, the first internodes long (7–11 cm), distally dense, densely pubescent. Flowers drooping, erect in fruit. Pedicels densely pubescent, pedicel of first flower subequaling or longer than calyx; pedicels of other flowers shorter than calyx; bracts ovate-lanceolate, acuminate, herbaceous. Calyx tubular-campanulate,  $10-15 \times 5-7$  mm, base round, longitudinal veins 10, dark violet, eglandular pubescent, cohering at apex; calyx teeth ovate-triangular, ca.  $3 \times 2$  mm, apex acute, margin ciliate. Anthophore 1–2 mm, pubescent. Petals whitish-purple, 1–1.6 cm long, not or slightly exerted beyond calyx; claws equaling calyx, oblanceolate, pubescent at base, auriculate; limbs dark purple, 4-lobed, middle lobes oblong, notched at apex, side lobes linear; coronal

scales  $2.1 \times 1.5$  mm. Stamens 10, slightly exerted beyond calyx; filaments 12–14 mm, pubescent at base. Styles 3, included or slightly exerted beyond calyx. Capsule ovoid, equaling calyx. Seeds dark brown, globose-reniform, ca. 1 mm, tuberculate.

Flowering and fruiting: August.

Ecology: Open grassland, at 2520 m.

Distribution: Nepal (central).

This species is close to *S. khasiana* Rohrb., belonging to section Cucubaloideae Edgew. & Hook. f., distributed in India, Nepal, Bhutan, China and Myanmar. They both have ovate leaves and 3 styles. But this is distinguishable from the latter by its eglandular calyx and four-lobed petals, the bases of which are pubescent. In *S. khasiana* the calyx is glandular hairy and the petal is 2-lobed, with a glabrous base. The habit of the plant and the floral structure indicate that *S. hideakiohbae* also belongs to section Cucubaloideae. The type specimen of this species had been identified before as *S. indica* Roxb. ex Otth. But after detailed study of the specimen we came to the conclusion that this is in fact new to science. It is completely different from *S. indica*. *Silene indica* is a species with 5 (or 4) styles, glandular hairy calyx and anthophore 2–3 mm, whereas this species has 3 styles, eglandular hairy calyx and anthophore 1–2 mm. The type specimen of this species was collected in Manang District, during the Japan-Nepal botanical expedition of 1994 (Suzuki and Mikage 1994). It gives us great pleasure to name this species in honour of Dr. Hideaki Ohba, Emeritus Professor of the University of Tokyo, in recognition of his valuable contribution to the Himalayan plant taxonomy.

***Silene davidlongii*** Rajbh. & Mitsuo Suzuki, sp. nov. [Figs. 3, 4]

*Silene wardii* (Marq.) Bocq. affinis, sed limbis petalorum glabris differt. Ex *S. birgittae* Bocq. calycibus campanulatis, minoribus (1.5–1.8 cm lato), orem haud



Fig. 3. Holotype of *Silene davidlongii* Rajbh. & Mitsuo Suzuki (W NEPAL: Khaptang, Mugu Khola, 15000 ft., 21 Aug. 1952, O. Polunin, W. R. Sykes & L. H. J. Williams 5373, TI).

constrictis satis diagnoscenda.

**TYPE:** West Nepal: Khaptang, Mugu Khola, 15000 ft., open stony slopes, sepals with lines of hairs on veins, petals vary from white to brown, 21 Aug. 1952, O. Polunin, W. R. Sykes & L. H. J. Williams 5373 (TI-holotype; E, US-isotype).

Perennial herb. Root woody at base. Stems erect, 7–25 cm tall, rigid, yellowish-green,

simple, hirsute, with greenish hairs. Lower leaves narrowly oblanceolate, 5–6 × 1–1.2 cm, apex acute, base attenuate into short petiole, margin entire, yellowish-green, surfaces, midrib and margins glandular hairy; the upper leaves sessile, narrowly elliptic or lanceolate, 1.5–6.5 × 0.5–1.5 cm, hirsute-pubescent, 1–3-nerved. Inflorescence a 1-flowered terminal cyme. Pedicels 2–5.5 cm

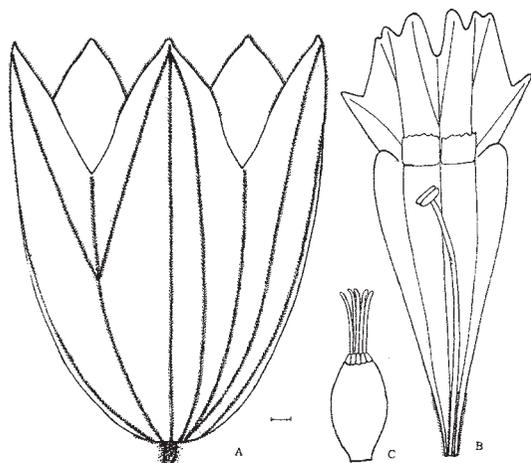


Fig. 4. *Silene davidlongii* Rajbh. & Mitsuo Suzuki. A. Calyx with minute eglandular hairs on veins and margins. B. Stamen and petal with 2-lobed limb and with 2 coronal scales. C. Ovary with 5 styles. Scale bar = 1 mm.

long, densely hirsute; bracts elliptic-lanceolate, 0.5–1 cm long, hirsute. Calyx campanulate, inflated, 1.8–2 × 1.5–1.8 cm, umbilicate at base, greenish, membranous, mouth open, hirsute particularly along the nerves, hairs blackish, glandular, longitudinal veins 10, blackish, cohering at apex; calyx teeth 5, ovate-triangular, 6–8 × 6–7.5 mm, apex acute, margins scarious, ciliate. Anthophore 2–3 mm long, woolly with blackish hairs. Petals slightly exerted beyond calyx, 2–2.2 cm long, white to brown; claws oblanceolate, ca. 1.5 cm long, auriculate, hairy at base; limbs ca. 7 × 9 mm long, 2-lobed, segments lobulate, with 2 small triangular side lobes; coronal scales 2, 1–2 mm long, apex truncate, dentate. Stamens 10, included; filaments 12–13 mm, woolly at basal part. Ovary ovoid. Styles 5, included. Seeds reniform, flattened, winged, 1–2 mm in diameter.

Flowering: August.

Ecology: Open stony slopes, at 4500 m.

Distribution: Nepal (west).

This species shares some characters with

*S. wardii* (Marq.) Bocq. of Tibet, such as leaf and calyx shape and seed characters, but differs from the latter in its glabrous petal limb. In *S. wardii* the petal limb is glandular hairy. The type specimen of this species was identified by Dr. Gilbert Bocquet as *S. birgittae* Bocq. of Bhutan (Bocquet 1969). But detailed analysis of the specimen reveals that it is quite different from the type specimen of *S. birgittae*, although both species share similar seed characters. The calyx of *S. birgittae* is very characteristic being globose and larger in size (2–2.2 cm broad), the mouth of which is constricted, while in this species the calyx is campanulate, smaller in size (1.5–1.8 cm broad) and its mouth is open, not constricted. In *S. birgittae* the surfaces and midrib of leaves are glabrous or sparsely hairy, while in this species the surfaces and midrib of leaves are hirsute with glandular hairs. The type specimen of this species was collected during the British Museum botanical expedition of 1952 to west Nepal (Williams 1953). We name this species in honour of Dr. David Long of the Royal Botanic Garden Edinburgh for his great contribution to the study of Himalayan plants.

***Silene greywilsonii* Rajbh. & Mitsuo Suzuki, sp. nov.** [Figs. 5, 6]

*Silene davidlongii* affinis, sed calycibus minoribus (12–15 × 11–12 mm) et anthophoris brevioribus (1 mm longis) stas distinguibilis.

**TYPE:** Nepal, Jengla, West of Namdo (both sides), c. 5300 m, leaves grey-green, florets deep blue, 25 Aug. 1973, Grey-Wilson and Phillips 703 (K–holotype).

Perennial herb, 12–24 cm tall. Roots robust. Stems clustered, erect, simple, sparsely pubescent, 2–3-noded. Leaves oblong or oblanceolate, 30–80 × 6–11 mm, surfaces glabrous, 1-nerved, midrib glabrous or slightly hairy, margin entire, minutely ciliate, base attenuate into petiole, upper leaves



Fig. 5. Holotype of *Silene greywilsonii* Rajbh. & Mitsuo Suzuki (NEPAL: Jungla, West of Namdo, ca. 5300 m, 25 Aug. 1973, Grey-Wilson & Phillips 703, K).

sessile, smaller, apex acute or obtuse. Cyme 1- or 2-flowered, flowers nutant at first, later erect. Pedicel 6–14 mm long, slender, densely pubescent; bracts oblong or oblong-lanceolate, 1.5–2.5 cm long, herbaceous, glabrous or sparsely hairy. Calyx campanulate, inflated, saccate, 12–15 × 11–12 mm, membranous, base rounded, mouth open, longitudinal veins 10, violet, eglandular pubescent, cohering at apex, with distinct

reticulate veins; calyx teeth ovate, ca. 5 × 5 mm, margin membranous, ciliate, apex obtuse. Anthophore ca. 1 mm, sparsely hairy. Petals not or slightly exerted beyond calyx, pale pink, ca. 11 mm long; claws oblanceolate, auriculate, slightly hairy at base; limbs ca. 2 mm long, 2-lobed, lobes obtuse; coronal scales 2, 0.5–1 mm long. Stamens 10, included; filaments ca. 6 mm, sparsely hairy at base. Styles 5, included.

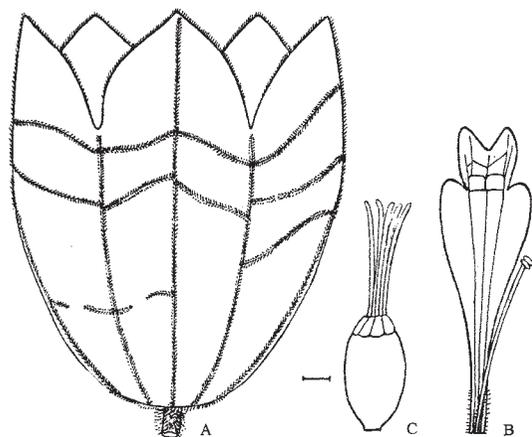


Fig. 6. *Silene greywilsonii* Rajbh. & Mitsuo Suzuki. A. Calyx with minute eglandular hairs on veins and margins. B. Stamen and petal with 2-lobed limb and with 2 coronal scales. C. Ovary with 5 styles. Scale bar = 1 mm.

Ovary oblong-ovoid.

Flowering: August.

Ecology: Open stony slopes, 5300 m.

Distribution: Nepal (central).

Other specimen examined: Nepal, Jengla, West of Namdo (both sides), c. 5300 m, leaves grey-green, calyx pale green patterned red, corolla pale pink, 25 Aug. 1973, Grey-Wilson and Phillips 705 (K).

Of the two specimens cited here, one (Grey-Wilson & Phillips 703) was identified as *S. himalayensis* (Rohrb.) Majumdar (*S. gonosperma* (Rupr.) Bocq. subsp. *himalayensis* (Rohrb.) Bocq.) and the other (Grey-Wilson & Phillips 705) as *S. setisperma* Majumdar. However, it differs from both of these species. The calyx of this species is inflated and saccate with glandular hairs thus differing from *S. himalayensis* which has not or very little inflated glandular hairy calyx. From *S. setisperma* it differs in having a bifid petal limb. The petal limb of *S. setisperma* is rotundate or apiculate, not bifid.

This species seems to be close to *S. davidlongii* as they share some characters, such as the inflated, campanulate calyx with

open mouth and bifid petal limb. However, they differ in calyx and anthophore size. *Silene davidlongii* has bigger calyx (18–20 × 15–18 mm) and longer anthophore (2–3 mm) than *S. greywilsonii* (calyx 12–15 × 11–12 mm and anthophore 1 mm long). The type specimen of this species was collected during the plant hunting expedition to west and central Nepal in the Dolpo area in 1973 (Greywilson 1974). This species is named in honour of Dr. Christopher Grey-Wilson, collector of this plant, in recognition of his great contribution to the study of Himalayan plants.

### New species from China

***Silene akiyamae*** Rajbh. & Mitsuo Suzuki, sp. nov. [Figs. 7, 8]

*Silene lhassanae* (F. N. Williams) Majumdar affinis, sed calicibus 7–9 mm longis, pilis eglandulosis plene diversa.

**TYPE:** China, Tibet, Lazi Xian – Jiakuola, 4800 m, 14 Aug. 2001, S. G. Wu, S. Akiyama, H. Ikeda, Y. L. Lu, S. T. Cheng, J. Y. Xiang & Yang Zhen 106712 (TI-holotype).

Perennial herb. Stems ascending to upright, branched, pubescent, with sterile leafy branches. Leaves ovate-lanceolate or lanceolate, 15–40 × 3–11 mm, upper surface glabrous, lower surface sparsely hairy, apex acuminate, base round, margin ciliate, 1-veined. Cymes pubescent. Flower erect. Pedicel 1–2 cm, pubescent; bracts lanceolate, 5–15 mm long, herbaceous, margin ciliate. Calyx campanulate, 7–9 × 6–8 mm, eglandular pubescent, truncate at base, slightly inflated in maturity, longitudinal veins 10, violet, cohering at apex; calyx teeth ovate, 2–3.5 × 2–4 mm, apex obtuse or round, margin membranous, ciliate. Anthophore 2–3 mm, glabrous. Petals 12–13 mm, exerted beyond calyx; claws oblanceolate, ca. 8 mm long, auriculate, glabrous; limbs 4–4.5 mm long, bifid, lobes oblong, round at apex, margin entire; coronal scales 2, ca. 1 mm long.

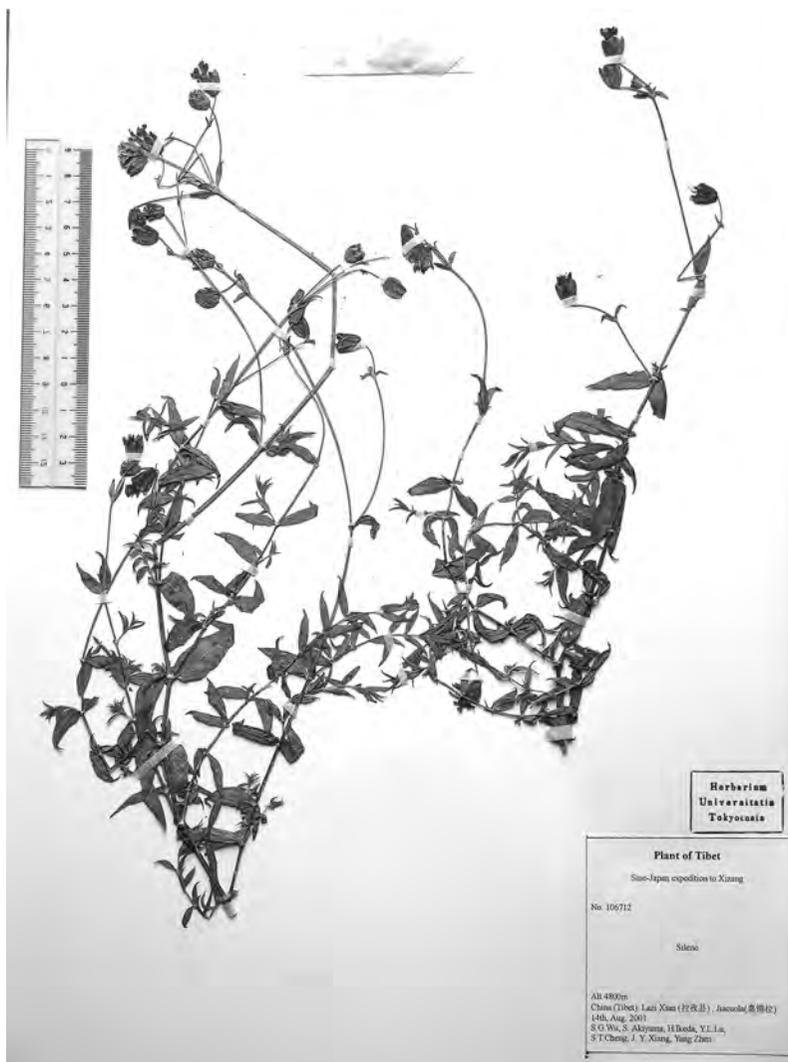


Fig. 7. Holotype of *Silene akiyamae* Rajbh. & Mitsuo Suzuki (CHINA: Tibet, Lazi Xian – Jiacuola, 4800 m, 14 Aug. 2001, S. Akiyama & al. 106712, TI).

Stamens 10, exserted beyond calyx; filaments 8–9 mm, glabrous. Styles 3, exserted beyond calyx. Capsule ovoid.

Flowering & fruiting: August.

Ecology: In the alpine region, at 4800 m.

Distribution: China (Tibet).

The shape of the calyx of this species resembles that of *S. lhassana* (F. N. Williams) Majumdar of China (Tibet). Both species

have a campanulate calyx which is slightly inflated at maturity. However, they differ in hairiness and size of calyx. The calyx of *S. lhassana* is 1–1.2 cm long and glandular hairy while the calyx of this species is 7–9 mm long and eglandular hairy. The type specimen of this species was collected during the Sino-Japanese expedition to Northwest Yunnan and Tibet in 2001

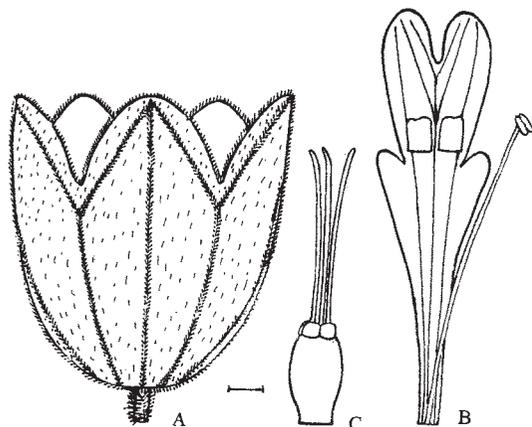


Fig. 8. *Silene akiyamae* Rajbh. & Mitsuo Suzuki. A. Calyx with glandular hairs. B. Stamen and petal with 2-lobed limb and with 2 coronal scales. C. Ovary with 3 styles. Scale bar = 1 mm.

(Akiyama and Ikeda 2002). We name this species in honour of Dr. Shinobu Akiyama of the National Museum of Nature and Science, Japan, the collector of this plant, in recognition of her great contribution to the study of Sino-Himalayan plants.

We are grateful to Professor Hideaki Ohba, Emeritus Professor, University of Tokyo, for encouragement and rendering Latin descriptions of the new species. We are thankful to Dr. Shinobu Akiyama for providing us a loan of her recent collections of *Silene* from China. We would like to express our sincere thanks to the directors and curators of E, K, TI, and US, for kindly providing us the specimens on loan for our study. K. R. Rajbhandari is grateful to Professor Masayuki Ehiro, Director of the University Museum, Tohoku University, for inviting him as a Visiting Professor for the study of the Himalayan plants. He is also grateful to Mr. Tamotsu Ishida and other members of the Museum and the Botanical Gardens, Tohoku University, for providing facilities, advice and other kind of help.

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K. R. ラジバンダリ\*, 鈴木三男：中国-ヒマラヤ地域産マンテマ属（ナデシコ科）の新種

マンテマ属 *Silene* (ナデシコ科) は世界に約700種あり、主に北半球の温帯に分布する。中国—ヒマラヤ地域産のマンテマ属植物の標本を検討した結果、ネパールから3種 (*S. hideakiohbae* Rajbh. & Mitsuo Suzuki, *S. davidlongae* Rajbh. & Mitsuo

Suzuki と *S. greywilsonii* Rajbh. & Mitsuo Suzuki), 中国から1種 (*S. akiyamae* Rajbh. & Mitsuo Suzuki) を報告した。

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