

Two New Species of *Saxifraga* (Saxifragaceae) from Southwestern China

Pan Jin-Tang[†], Mei Li-juan, Zhang De-jun, and Chen Shi-long

Key Laboratory of Adaptation and Evolution of Plateau Biota, Northwest Institute of Plateau Biology, Chinese Academy of Sciences, Xining 810008, People's Republic of China. Author for correspondence: slchen@nwipb.ac.cn

ABSTRACT. Two new species, *Saxifraga xiaozhongdianensis* J. T. Pan and *S. ludingensis* J. T. Pan, from the Saxifragaceae in China are described and illustrated. Of these, *S. xiaozhongdianensis* is endemic to Zhongdian, Yunnan, and is related to *S. brachyphylla* Franchet. It differs from *S. brachyphylla* in the sepals adaxially dark brown glandular-villose and the petals basally subauriculate. *Saxifraga ludingensis* occurs in Luding, Sichuan, and is very similar to *S. egregioides* J. T. Pan and *S. stellariifolia* Franchet. It differs from *S. egregioides* in the stems brown glandular-villose, the cauline leaves adaxially brown glandular-villose, the sepals spreading in anthesis and abaxially brown glandular-villose, and the petals 5-veined. It differs from *S. stellariifolia* in the leaves cordate and abaxially glabrous, the sepals abaxially brown glandular-villose, and the petals 4-callose and 5-veined. *Saxifraga xiaozhongdianensis* and *S. ludingensis* are apparently endemic to western China and belong to *Saxifraga* sect. *Ciliatae* Haworth, emend. J. T. Pan.

Key words: China, IUCN Red List, *Saxifraga*, Saxifragaceae, Sichuan, Yunnan.

From 2002 to 2003, a large number of specimens of the genus *Saxifraga* L. (Saxifragaceae) were collected from Qinghai, Sichuan, Yunnan, and Xizang provinces in China. Later, these specimens were all determined based on the literature (Pan, 1978, 1990, 1991, 1992; Wu & Pan, 1990; Pan et al., 2001), and new species were discovered. Of them, *S. xiaozhongdianensis* J. T. Pan and *S. ludingensis* J. T. Pan are newly described as follows.

1. *Saxifraga xiaozhongdianensis* J. T. Pan, sp. nov.

TYPE: China. Yunnan: Xiaozhongdian, 27°34'24"N, 99°48'20"E, in shrub, 3260 m, 7 Oct. 2003, S. L. Chen 03168 (holotype, HNWP). Figure 1.

Species *Saxifragae brachyphyllae* Franchet proxima, a qua sepalis adaxialiter nigro-brunnescenter-glanduloso-pilosus, petalis basi subauriculatis dignoscenda.

Herb perennial, caespitose, 14–17 cm tall; stem proximally brown crisped glandular-villose, distally dark brown glandular-villose. Basal leaves with petiole ca. 8 mm and marginally brown crisped

villose, leaf blade rhomboid-elliptic, ca. 6.2 × 3.6 mm, glabrous, apex subobtusely; cauline leaves with petiole gradually shorter to sessile distally on stem, 0.1–1 mm, abaxially and marginally brown glandular-villose, proximal ones denser, elliptic or ovate to narrowly ovate, 2.1–7.3 × 1.1–3 mm, glabrous toward margin or brown glandular-villose at basal margin, apex obtuse or subacuminate, distal ones more lax, lanceolate, 5–6.5 × 1.4–2 mm, adaxially glandular-villose, abaxially glabrous, marginally ± glandular-villose, apex obtuse or subacuminate. Cyme 4–4.3 cm, 3- to 6-flowered; pedicels 0.3–1.2 cm, dark brown glandular-villose. Flower with sepals reflexed in anthesis, ovate, 2.6–3 × 1.6–2.6 mm, both surfaces marginally dark brown glandular-villose, veins 3, not confluent at apex, apex obtuse; petals yellow, oblong, 6–7 × 2–3 mm, 4-callose, 3- to 5-veined, base subauriculate, contracted into a claw 0.5–0.8 mm, apex obtuse; stamens 3–3.5 mm, filaments subulate; ovary superior, ovoid, 2–2.2 mm, styles 1–1.2 mm.

Phenology. Flowering and fruiting July–October.

Relationships. *Saxifraga xiaozhongdianensis* is related to *S. brachyphylla* in having its stems proximally brown crisped glandular-villose and distally brown glandular-villose; its distal cauline leaves lax and lanceolate; its sepals reflexed in anthesis, ovate with three veins, not confluent at apex; and its petals yellow, oblong, and 4-callose. The new species differs by its sepals adaxially dark brown glandular-villose and petals basally subauriculate (vs. sepals dark brown glandular-villose abaxially and sparsely so at distal margin with petals base contracted into a claw in *S. brachyphylla*).

Distribution, habitat, and IUCN Red List category. *Saxifraga xiaozhongdianensis* is known from the type locality at an elevation of 3260 m, inhabiting alpine scrub meadow in Zhongdian County, Yunnan Province, China. Due to the rarity and limited distribution of *S. xiaozhongdianensis*, this species should be included in the endangered category of the IUCN Red List according to the following criteria (IUCN, 2001): EN Blab (i, ii, iii).

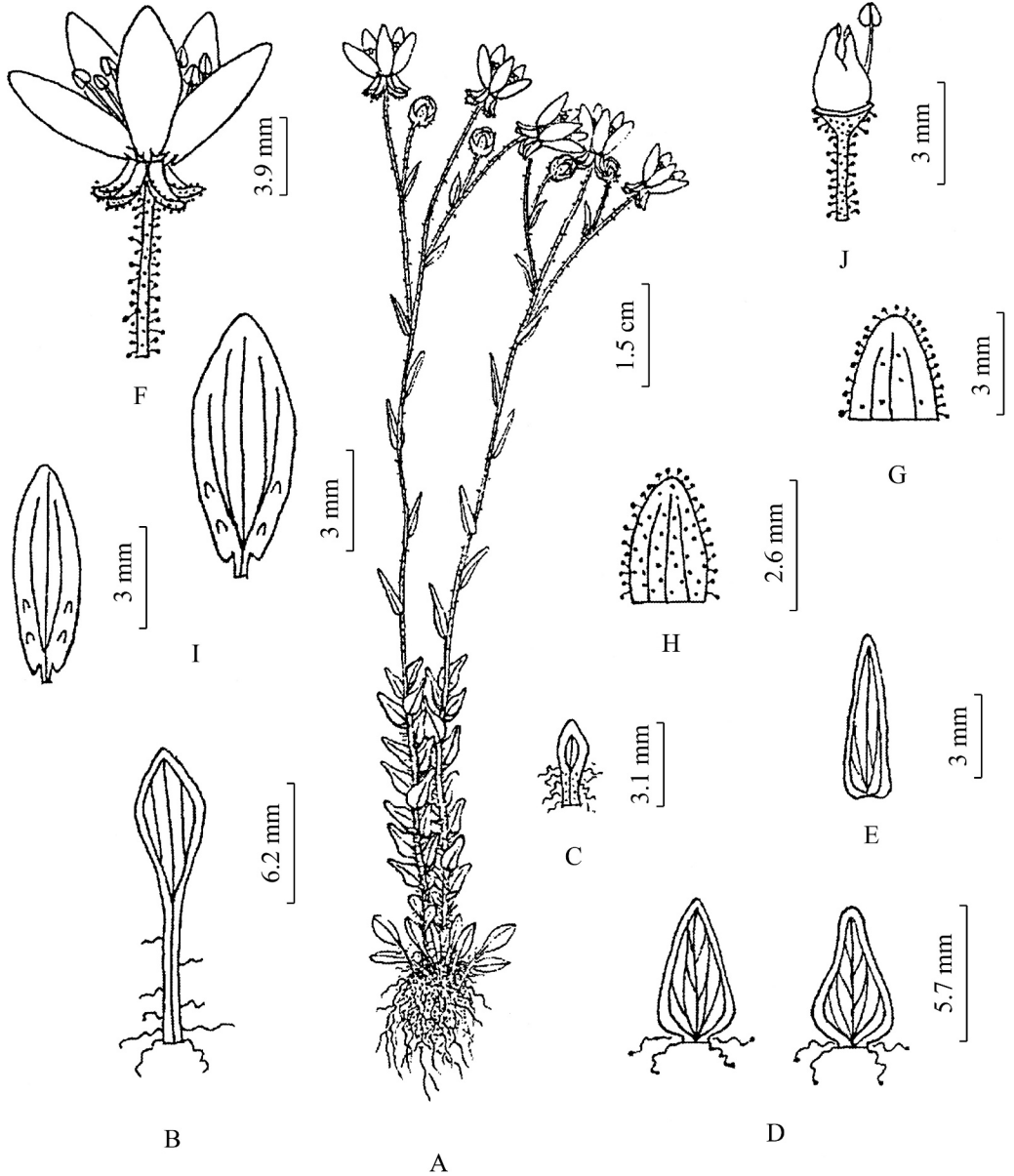


Figure 1. *Saxifraga xiaozhongdianensis* J. T. Pan. —A. Habit. —B. Basal leaf. —C. Lowermost cauline leaf. —D. Lower cauline leaf. —E. Upper cauline leaf. —F. Flower. —G. Ventral surface of sepal. —H. Back of sepal. —I. Petals. —J. Pedicel, stamen, and pistil. Drawn by J. T. Pan from the holotype (S. L. Chen 03168, HNWP).

2. *Saxifraga ludingensis* J. T. Pan, sp. nov.

TYPE: China. Sichuan: Luding, 29°33'98"N, 101°58'78"E, under forest, 3200 m, 13 Sep. 2003, S. L. Chen 03096 (holotype, HNWP).
Figure 2.

Species *Saxifragae egregioidi* J. T. Pan et *S. stellariifoliae* Franchet persimilis, sed a priori caule imprimis brunneo-glandulosim-piloso in illa glabro, foliis adaxialiter brunneo-glandulosim-pilosis in illa glabris, sepalis sub anthesi

patentibus (in illa reflexis), abaxialiter glanduloso-pilosis (in illa glabris), petalis 5-nerviis, a posteriore foliis basi cordatis et abaxialiter glabris (in *S. stellariifoliae* basi rotundatis et abaxialiter sparse glanduloso-pilosis), sepalis abaxialiter brunneo-glandulosim-pilosis (in *S. stellariifoliae* glabris), petalis 4-callosis et 5-nerviis (in *S. stellariifoliae* 4- ad 6-callosis et 3- ad 5-nerviis) recedit.

Herb perennial, ca. 20 cm tall. Stem slender, brown glandular-villose. Cauline leaves with petiole 3.5–8 mm, gradually shorter toward apex of stem, brown

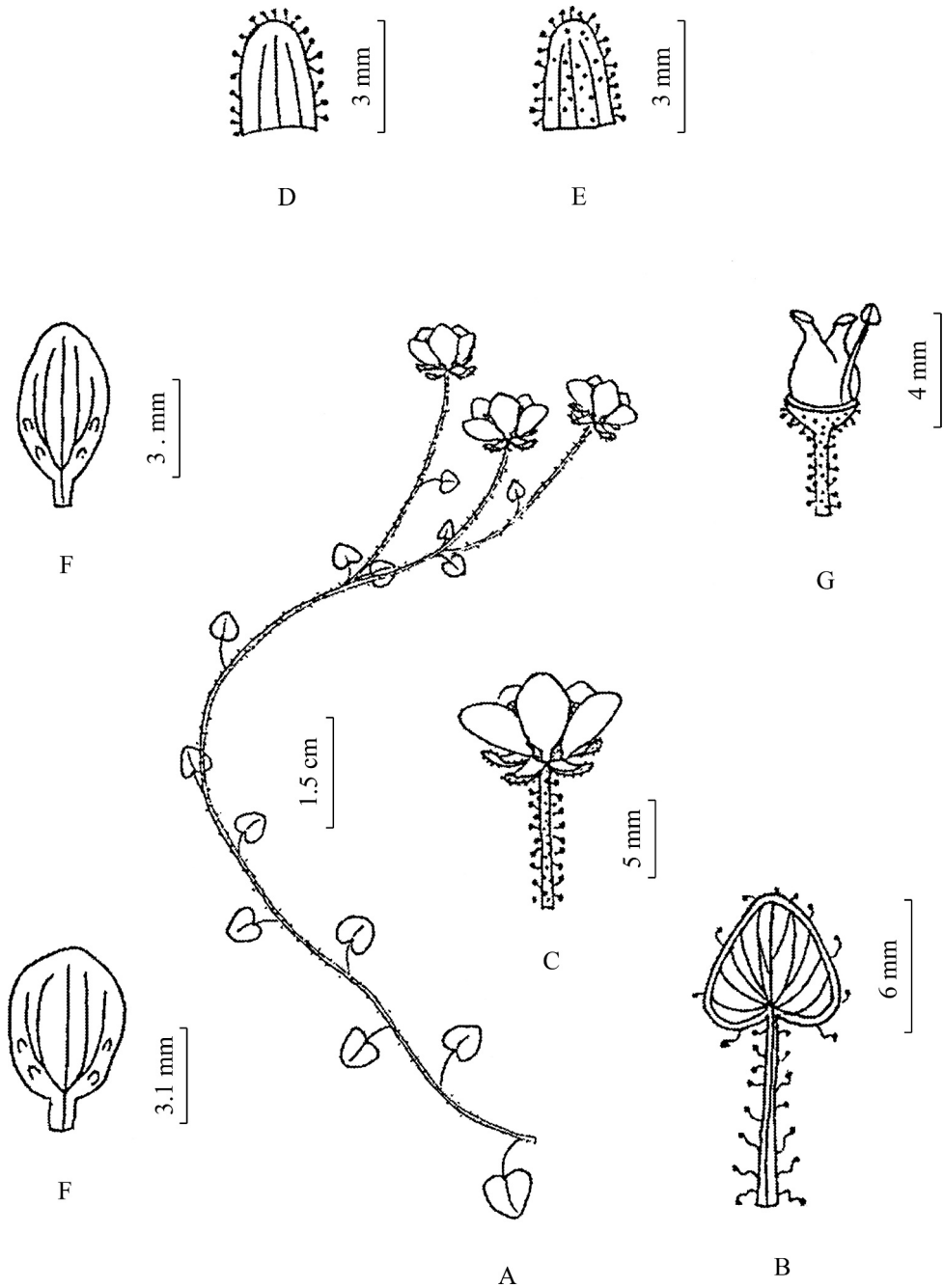


Figure 2. *Saxifraga ludingensis* J. T. Pan. —A. Part of plant. —B. Leaf. —C. Flower. —D. Ventral surface of sepal. —E. Back of sepal. —F. Petal. —G. Pedicel, stamen, and pistil. Drawn by J. T. Pan from the holotype (S. L. Chen 03168, HNWP).

glandular-villous, leaf blade cordate, 4–6 × 4–6 mm, adaxially and marginally brown glandular-villous, abaxially glabrous, apex acute or obtuse. Flower solitary or in 3-flowered cyme; pedicels 1.5–2.1 cm, brown glandular-villous. Flower with sepals spreading in anthesis, ovate, 3–3.3 × ca. 2 mm,

adaxially glabrous, abaxially and marginally brown glandular-villous, veins 3, not confluent at apex, apex obtuse; petals yellow, obovate, broadly obovate to broadly elliptic, 5–5.3 × 3–4 mm, 4-callose, 5-veined, base contracted into a narrow claw 0.8–1 mm, apex obtuse or rotund; stamens ca. 4.5 mm, filaments

subulate; ovary superior, ovoid, ca. 3 mm, styles 2, ca. 1 mm.

Phenology. Flowering July–September.

Relationships. *Saxifraga ludingensis* is similar to *S. egregioides* and *S. stellariifolia* in its slender stems, cauline leaves petiolate, leaf blades marginally glandular-villose, and sepals with veins not confluent at apex. The new species differs from *S. egregioides* by its stems glandular-villose, cauline leaves with the blade adaxially brown glandular-villose, sepals spreading in anthesis and abaxially brown glandular-villose, and 5-veined petals. In *S. egregioides*, the stems are distally glabrous, the leaf blades are glabrous adaxially and abaxially, the sepals are reflexed and glabrous adaxially and abaxially, and the petals are 4- to 6-veined. *Saxifraga ludingensis* is readily distinguished from *S. stellariifolia* by its cauline leaves with leaf blade cordate and abaxially glabrous, sepals abaxially brown glandular-villose, and petals obovate, broadly obovate to broad-elliptic, 4-callose, and 5-veined. In *S. stellariifolia*, the cauline leaves are ovate and abaxially glandular-villose, the sepals are glabrous adaxially and abaxially, and the petals are ovate to elliptic, 4- to 6-callose, and 3- to 5-veined.

Distribution, habitat, and IUCN Red List category. *Saxifraga ludingensis* was collected at an elevation of 3200 m, under the forest canopy in Luding County, Sichuan Province, China. Due to the rarity and limited distribution of *S. ludingensis*, the species should be included in the endangered category of the IUCN Red List according to the following criteria (IUCN, 2001): EN Blab (i, ii, iii).

Both *Saxifraga xiaozhongdianensis* and *S. ludingensis* are assigned to section *Ciliatae* Haworth, emend. J. T. Pan (1991), which is characterized by features such as plants forming erect, caespitose

clumps, cushions, or sprawling mats and lacking basal bulbils; the flowering stems are usually leafy; the inflorescence is cymose or the flower is solitary; flowers are sometimes unisexual, actinomorphic, and 5-merous; the petals are usually yellow or orange, occasionally white, pink, or red, sometimes spotted orange, red, or purple, very often with callosities; the ovary is superior to subinferior; and there are two integuments in the seed.

Acknowledgments. We gratefully thank the National Natural Science Foundation of China (30170066, 30370284, 30370284) for financial support; two anonymous reviewers for their critical comments on the manuscript; and Victoria C. Hollowell for her editorial support. Regretfully, Pan Jin-Tang, an authority of the Chinese Saxifragaceae, passed away on 24 December 2005, and this paper is dedicated to his memory.

Literature Cited

- IUCN. 2001. IUCN Red List Categories and Criteria Version 3.1. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland.
- Pan, J. T. 1978. The genus *Saxifraga* in Qing-Zang Plateau. *Acta Phytotax. Sin.* 16(2): 11–35.
- . 1990. New taxa of the genus *Saxifraga* from China. *Acta Phytotax. Sin.* 28: 384–396.
- . 1991. A study on the genus *Saxifraga* L. from China. *Acta Phytotax. Sin.* 24: 1–24.
- . 1992. *Saxifraga* L. In *Flora Reipublicae Popularis Sinicae* 34(2): 35–231. Science Press, Beijing.
- , R. Cornall & H. Oba. 2001. *Saxifraga* L. Pp. 280–345 in Z. Y. Wu & P. H. Raven (editors), *Flora of China*, Vol. 8. Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis.
- Wu, Z. Y. & J. T. Pan. 1990. New taxa of the genus *Saxifraga* from Hengduan Mountains. *Acta Phytotax. Sin.* 28: 54–67.