
Sinojohnstonia ruhuaii (Boraginaceae), a New Species from Jiangxi, China

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ABSTRACT. *Sinojohnstonia* Hu (Boraginaceae, Trigonotideae) is endemic to China and previously included only three species. *Sinojohnstonia ruhuaii* W. B. Liao & Lei Wang, a new species from Jiangxi, China, is described and illustrated. The new species is most closely related to *S. chekiangensis* (Migo) W. T. Wang by its morphology and differs in that its flowers are smaller, the corolla limb is slightly shorter than or nearly as long as the tube, and the stamens are positioned below the throat appendages. A key is provided to distinguish the four species of *Sinojohnstonia* now recognized.

Key words: Boraginaceae, China, IUCN Red List, Jiangxi, *Sinojohnstonia*.

Sinojohnstonia Hu (Boraginaceae) has included only three species (Zhu et al., 1995; Mabberley, 2008) that are endemic to China. *Sinojohnstonia moupinensis* (Franch.) W. T. Wang is distributed among the provinces of Gansu, Ningxia, Shaanxi, Shanxi, Hubei, Hunan, Sichuan, Yunnan; *S. plantaginea* Hu is found in southeastern Gansu and Sichuan provinces; and *S. chekiangensis* (Migo) W. T. Wang occurs in the provinces of Zhejiang, Jiangxi, Hunan, Shaanxi, and Shanxi (Zhu et al., 1995). Herein we describe a new species in *Sinojohnstonia* from Mt. Sanqing in Jiangxi province of China. In its entirety, *Sinojohnstonia* occurs in northwestern to central areas in China, and also to the east and southwest.

In October 2009, Professor Ru-huai Miao identified a specimen of Boraginaceae collected in the province of Jiangxi in April 2007 as a new species of *Omphalotrigonotis* W. T. Wang. He used the ined. epithet "leucopetalus" based on the white corolla, but did not go on to formally describe and validate the name. The current authors re-examined this specimen in January 2012 and concluded that the

new species is better assigned to *Sinojohnstonia* based on the ovate to cordate leaf blades and a fruiting calyx that was extremely enlarged and enclosed the fruit. In contrast, *Omphalotrigonotis* has leaf blades that are elliptic to ovate, and its fruiting calyx is slightly enlarged and does not enclose the fruit. Nonetheless, *Sinojohnstonia* and *Omphalotrigonotis* are closely related and share the common feature in that their nutlets are tetrahedral, with the abaxial margin exerted as a membranous cupule. Both these genera belong to tribe Trigonotideae, subfamily Boraginoideae, mainly on the basis of the nutlet morphology as tetrahedral or lenticular and pollen morphology (Zhu et al., 1995; Riedl et al., 1997).

Sinojohnstonia ruhuaii W. B. Liao & Lei Wang, sp. nov. TYPE: China. Jiangxi: Mt. Sanqing [Sanqingshan], Jinshayulian waterfall, 28°55'N, 118°06'E, 560 m, 2 Apr. 2007, *Team of Mt. Sanqingshan of Sun Yat-sen University 19117* (holotype, SYS). Figures 1–3.

Haec species *Sinojohnstoniae chekiangensi* (Migo) W. T. Wang similis, a qua floribus minoribus, corollae lobis tubo paulo brevioribus subaequilongisve et staminibus paullulum e tubo corollae exsertis infra appendices paulo posticas differt.

Herbs perennial; plants with several rhizomes; stems several, prostrate to spreading, 10–40 cm tall, sparsely short strigose. Leaves alternate, the blade ovate, base cordate or slightly flattened truncate or deltoid, apex acuminate or acute, densely strigose abaxially and adaxially; basal leaves several, with petioles 5–10 cm, lamina 4–6 × 2–3 cm; cauline leaves, with petioles 1–8 cm, lamina 2–6 × 1–3 cm. Inflorescences terminal, racemose with 2 or 3 branches, ca. 3–5.5 cm, densely short strigose, to 8-



Figure 1. Holotype specimen of *Sinojohnstonia ruhuaii* W. B. Liao & Lei Wang (Team of Mt. Sanqingshan of Sun Yat-sen University 19117, SYS).

or 9-flowered, ebracteate. Calyx in flower ca. 3–3.5 mm, slightly longer than corolla tube, 5-parted to base; lobes linear-lanceolate; densely strigose abaxially and adaxially; in fruit enlarging to 8–10 mm and

becoming saccate. Corolla white or light reddish white, campanulate, ca. 5–6 mm, glabrous; corolla limb 5-parted, spreading, slightly shorter than or nearly as long as corolla tube; lobes ovate; throat appendages 5,

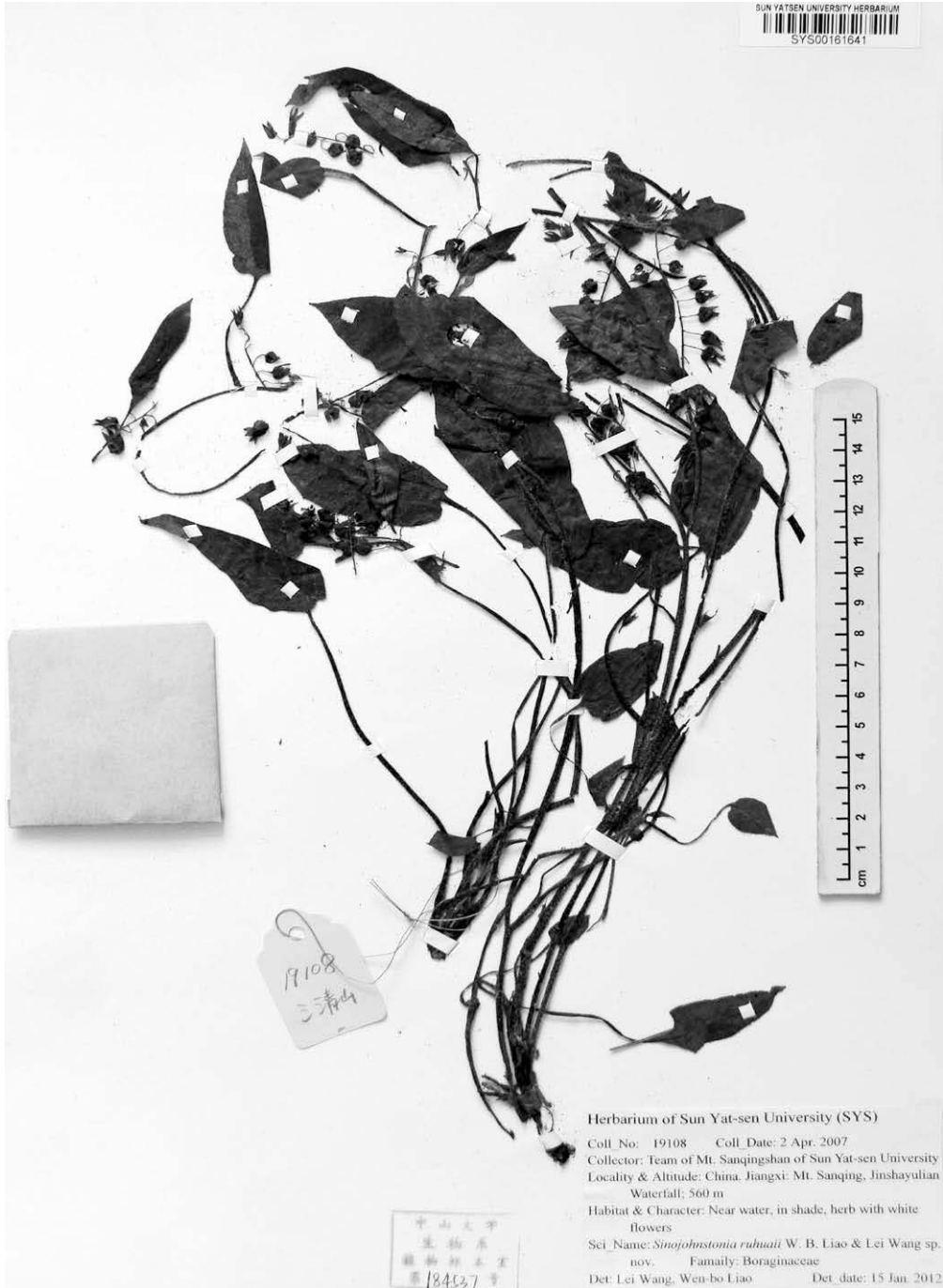


Figure 2. Paratype specimen of *Sinojohnstonia ruhuaii* W. B. Liao & Lei Wang (Team of Mt. Sanqingshan of Sun Yat-sen University 19108, SYS).

semi-orbicular, ca 0.2–0.3 mm, bottom connected to the lower corolla lobes; stamens 5, inserted on upper part of corolla tube, anthers slightly exserted from the corolla tube, but below the throat appendages;

filaments ca. 0.5 mm; anthers oblong, ca. 0.6–0.8 mm. Ovary deeply 4-lobed; style ca. 2.5–4 mm; stigma capitate. Fruit a nutlet, tetrahedral, ca. 3–3.8 × 2–3 mm, glabrous; nutlet with abaxial membranous

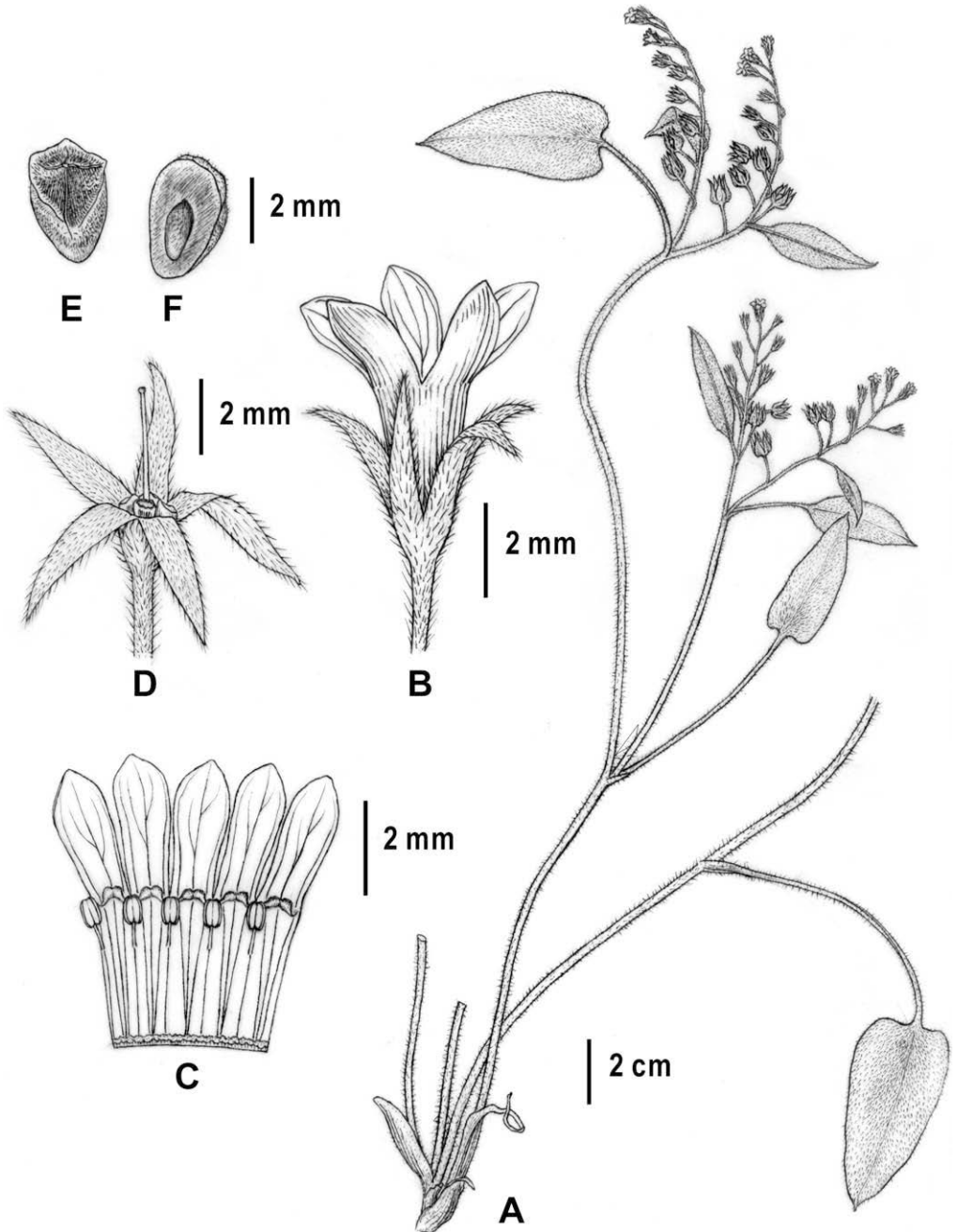


Figure 3. *Sinojohnstonia ruhuaii* W. B. Liao & Lei Wang. —A. Habit. —B. Flower with calyx and corolla. —C. Corolla and stamens. —D. Calyx and pistil. —E. Nutlet, ventral view. —F. Nutlet, dorsal view. A–E drawn from the type *Team of Mt. Sanqingshan of Sun Yat-sen University 19117* (SYS).

margin-inflexed cupular emergence; attachment scar slightly below middle of adaxial surface.

Etymology. The epithet *ruhuaii* honors Professor Ru-huai Miao (1943–) who was the first botanist to

recognize the new species. Professor Miao is a specialist in the floras of Hainan and southern China, as well as the taxonomy of the Elaeocarpaceae and Myrtaceae.

Phenology. *Sinojohnstonia ruhuaii* can be observed to flower and fruit from March to July.

Distribution and habitat. *Sinojohnstonia ruhuaii* occurs on Mt. Sanqing in northeastern Jiangxi province (type locality) and possibly also occurs in Mt. Tongbai in southern Henan province, Jixi county in southeastern Anhui province, and Mt Qingliang-feng and Hangzhou city in Zhejiang province, inferred from the internet images in which *S. ruhuaii* was wrongly determined as *S. chekiangensis* or *S. moupinensis*. *Sinojohnstonia ruhuaii* has been observed to grow on a shaded, moist rocky slope beside a ravine stream at an altitude of ca. 400–800 m.

IUCN Red List category. Despite the careful return of the authors to the type locality on Mt. Sanqing in 2013, only three populations in the Jinshayulian waterfall area and one population in Shiguling were found. The habitat of *S. ruhuaii* is narrow and the number of individuals is low. Otherwise, the known occurrences of *S. ruhuaii* are in the nature reserves or in the botanic garden. According to IUCN Red List criteria (2001), *S. ruhuaii* would fall under the Near Threatened (NT) assessment category.

Relationships. The flowers of *Sinojohnstonia ruhuaii* easily distinguish it from the other three species of the genus. Morphologically, the closest relative of this species is *S. chekiangensis*. The new species differs from *S. chekiangensis* in that its flowers are smaller, 5–6 mm (vs. 1 cm in *S. chekiangensis*), the corolla limb is slightly shorter than or nearly as long as corolla tube, and the stamens are slightly exerted from the tube and lie below the throat appendages (vs. being distinctly exerted from the tube and upon the throat appendages).

Paratype. CHINA. **Jiangxi:** Mt. Sanqing [Sanqingshan], Jinshayulian waterfall, 28°55'N, 118°06'E, 560 m, 2 Apr. 2007, *Team of Mt. Sanqingshan of Sun Yat-sen University 19108* (SYS).

Additional specimens examined. CHINA. **Jiangxi:** Mt. Sanqing [Sanqingshan], Jinshayulian waterfall, 28°55'N, 118°06'E, 560 m, 12 Apr. 2014, *Wenbo Liao, 2014-L0310, 2014-L0314, 2014-L0317*; Jinshayulian waterfall valley, slope near river bank, 423 m, 2 Nov. 2013, *Wenbo Liao & Lei Wang, 2013-L048*; and Sanqingshan, Shiguling, 400 m, beside the water streams of valley, 4 Nov. 2013, *Wenbo Liao & Lei Wang, 2013-L007* (SYS).

The following key includes the new species and the other three known species of *Sinojohnstonia* (modified from Zhu et al., 1995).

TAXONOMIC KEY TO *SINOJOHNSTONIA* IN CHINA.

- 1a. Stamens included within the corolla tube; corolla limb distinctly longer than tube; throat appendages basally connected to the upper corolla tube and higher than stamens, nutlets pubescent; plants without rhizomes 1. *S. moupinensis*
- 1b. Stamens exerted from the corolla tube; corolla limb slightly longer to shorter than tube; throat appendages basally connected to the lower corolla lobes; nutlets glabrous or sparsely pubescent; plants with rhizomes 2
- 2a. Corolla lobes narrowly triangular, ca. as long as tube; stamens inserted on throat between appendages, slightly shorter to longer than corolla 2. *S. plantaginea*
- 2b. Corolla lobes ovate to oblong; stamens inserted on the upper corolla tube 3
- 3a. Corolla lobes distinctly shorter than tube; stamens distinctly exerted from corolla tube and upon throat appendages 3. *S. chekiangensis*
- 3b. Corolla lobes slightly shorter than or nearly as long as tube; stamens slightly exerted from corolla tube and below throat appendages 4. *S. ruhuaii*

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