
Two New Species of *Saussurea* (Asteraceae) from the Qinghai-Xizang Plateau, China

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ABSTRACT. *Saussurea sugongii* S. W. Liu & T. N. Ho and *S. bartholomewii* S. W. Liu & T. N. Ho (Asteraceae) are described from the Qinghai-Xizang Plateau, China. The two new species are illustrated and compared with their closest relatives.

Key words: Asteraceae, China, IUCN Red List, Qinghai-Xizang Plateau, *Saussurea*.

Saussurea DC., with about 400 species, is widely distributed in the temperate zones of Europe, Asia, and North America. The highest diversity of species exists in China, where 264 species are found (Shih & Jin, 1999). Throughout its geographic range, *Saussurea* may be found in various habitats to altitudes of 5700 m. Four botanical expeditions to the Qinghai-Xizang Plateau in China included two in southwestern Qinghai Province in 1993 and 1996 and two in the Kunlun Mountains in 1987 and 1988. These expeditions yielded two taxa quite different from previously described species of *Saussurea*. They are presented here as new species and are named after the collectors of the type specimens, Bruce Bartholomew and Su-gong Wu, in appreciation of their contributions to taxonomy and floristics in the Qinghai-Xizang Plateau.

1. *Saussurea bartholomewii* S. W. Liu & T. N. Ho, sp. nov. TYPE: China. Qinghai: Yushu, Jianxigou forestry station, 32°8'N, 97°2'E, 3620 m, in *Picea* forests, 28 Aug. 1996, *Ho Ting-nong*, *B. Bartholomew* & *M. G. Gilbert* 2583 (holotype, HNWP; isotypes, CAS, GH). Figure 1A–D.

Haec species *Saussureae compta*e Franch. affinis, sed ab ea foliis obovato-lanceolatis vel oblanceolatis supra glanduloso-pubescentibus subtus sparse arachnoideis, illis medianis lyratis segmentis 1- vel 2-binatis, illis superioribus integris vel dentatis, calathibus numerosis, involucrio tubuloso-campanulato, phyllariis extimis et medianis ovatis vel ovato-oblongis apice obtuso-rotundatis atque pappo biseriato setis fere aequilongis valde differt.

Perennials, 7–9 cm tall; rhizomes short; stems erect, striate, sparsely white arachnoid and glandular-pubescent, branched, caudex covered with fibrous remains of old leaf bases. Leaves cauline; petioles 3–

4 cm, slender, sparsely white arachnoid and glandular-pubescent, base slightly decurrent; leaf blade obovate-lanceolate to oblanceolate, adaxially green, glandular-pubescent, abaxially glaucous, sparsely white arachnoid, penniveined, midvein prominent; basal leaves withered at anthesis; median leaf blade lyrate, 4–6 × 1.8–2.3 cm, terminal segment large, apex obtuse, margin dentate, the lateral ones 1 or 2 pairs, triangular, apex acute; upper leaf blade 2–5 × 0.4–2 cm, margin entire or dentate. Capitula many, cymose-corymbose at ends of stem and branches; peduncles 5–12 mm, having the same indumentum as the stems; involucre tubular-campanulate, 12–15 × 7–9 mm; involucre bracts arranged in 5 or 6 rows; exterior and median bracts ovate or ovate-oblong, 3–10 mm, apex obtuse-rounded and white lanate, abaxially almost glabrous, interior bracts lanceolate, to 15 mm, apex obtuse or acute and densely tomentose, abaxially white villose on the upper half; receptacular palea white, membranous, subulate, ca. 1.5 mm. Florets tubular, 12–13 mm, blue-purple, tube ca. 7 mm; anther tails white floccose-lanate. Achenes (immature) cylindrical, ca. 3 mm, glabrous, punctate, 4-ribbed, apex coronate; pappus biseriate; interior setae 10–12 mm, pale brown or white, plumose, connate at base in a ring; exterior setae white, scabrous, deciduous, most setae as long as interior ones but with a few shorter.

Distribution and habitat. *Saussurea bartholomewii* is known only from the type collection. It is endemic to Yushu Xian of Qinghai Province, China, where it occurs in spruce forests (*Picea* A. Dietr.) at elevations ca. 3620 m.

IUCN Red List category. Due to the rarity and limited distribution of *Saussurea bartholomewii*, this species is assessed here as Endangered (EN) according to the IUCN Red List criteria EN Blab(i,ii,iii) (IUCN, 2001).

Etymology. This new species is named after Bruce Bartholomew, a taxonomist and phytogeographer in the Department of Botany, California Academy of Sciences.

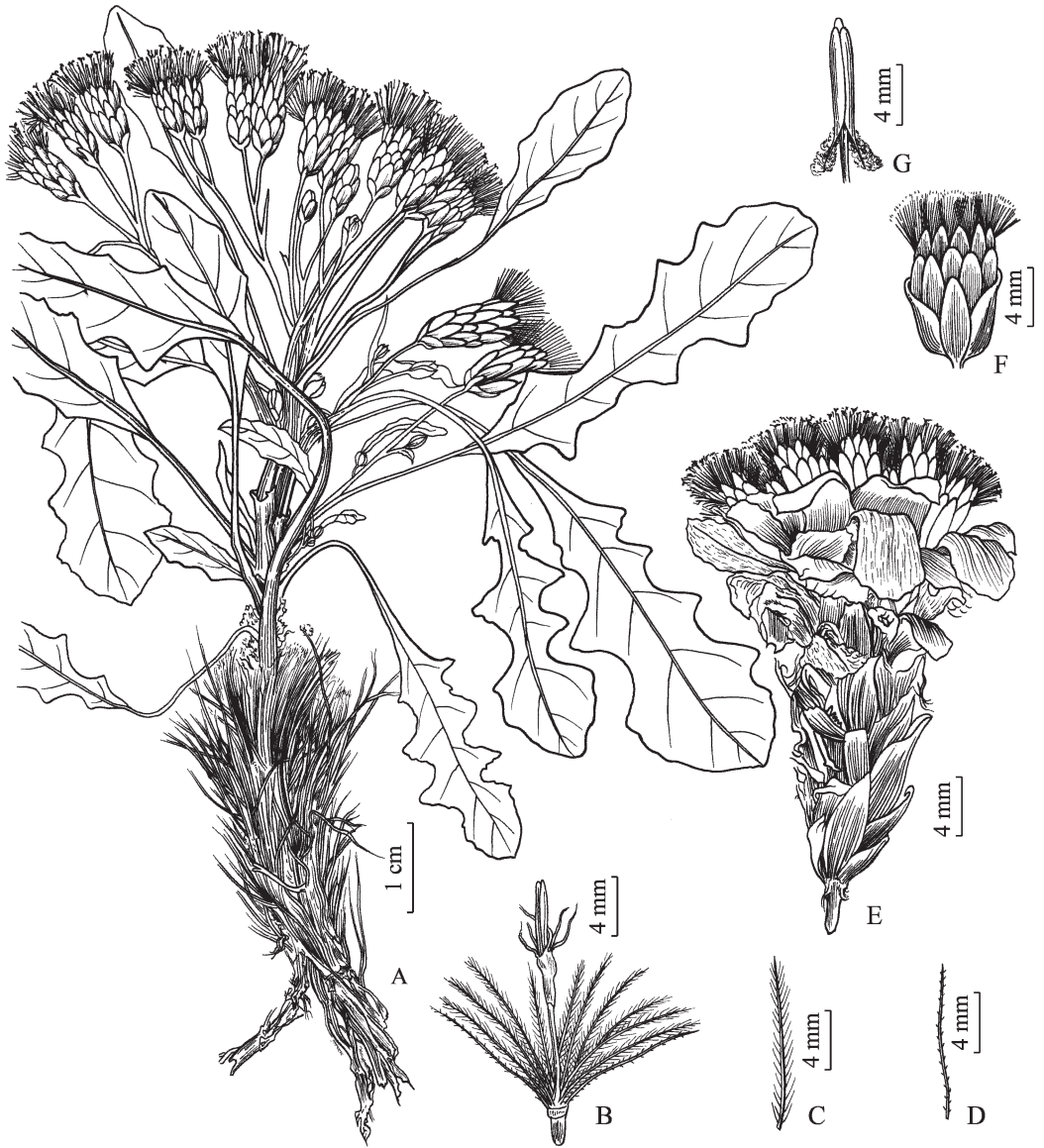


Figure 1. A–D. *Saussurea bartholomewii* S. W. Liu & T. N. Ho. (Drawn from the holotype *T. N. Ho et al.* 2583, HNWP). —A. Fertile plant. —B. Floret. —C. Inner seta of pappus. —D. Outer seta of pappus. E–G. *Saussurea sugongii* S. W. Liu & T. N. Ho. (Drawn from the holotype *S. G. Wu* 2725, KUN). —E. Fertile culm. —F. Capitulum. —G. Anther.

Relationships. *Saussurea bartholomewii* is closely related to *S. compta* Franch., but differs by the leaves that are obovate-lanceolate to oblanceolate, adaxially glandular-pubescent, and abaxially sparsely white arachnoid and the median leaves that are lyrate with lateral segments in one or two pairs. The new species is also distinguished in having upper leaves that are entire or dentate, numerous capitula, a tubular-campanulate involucre, ovate or ovate-oblong exterior and median bracts with an obtuse-rounded apex, floccose-lanate anther tails, a biseriate pappus, and

exterior setae that are mostly as long as the interior ones. *Saussurea compta* has leaves that are abaxially scabrous, sparsely hispid, densely white tomentose, and adaxially green, with the basal and lower stem leaves withered at anthesis; shortly petiolate middle stem leaves with a narrowly elliptic and pinnatisect leaf blade; lateral segments in two or three pairs, oblong, lanceolate, or narrowly triangular, with the blade margin entire or 1-lobed only at one side or 1-lobed on each side, and the apex acute to obtuse; caudate terminal segments; upper stem leaves that are

sessile or subsessile, similar to the middle stem leaves, and gradually smaller apically on the stem; fewer capitula; an obconic-oblong involucre with the bracts in six rows; ovate outer bracts that are apically pubescent with an acute to obtuse apex; elliptic middle phyllaries that are apically sparsely pubescent with an obtuse apex; narrowly linear-elliptic inner bracts with a sparsely villous margin and an obconic-oblong apex; floccose-lanate anther tails; a biseriate pappus; and exterior setae that are shorter than the interior ones.

2. *Saussurea sugongii* S. W. Liu & T. N. Ho, sp. nov. TYPE: China. Xizang: Baingoin, S side of Muztagae mtn. pass, in gravel zone on high mtns., 5200 m, 19 Aug. 1988, S. G. Wu 2725 (holotype, KUN; isotype, MO). Figure 1E–G.

Haec species *Saussureae glaciali* Herder et *S. gnaphalodes* (Royle) Sch. Bip. affinis, sed a hac phyllariis purpureis glabris, ab illa foliis basalibus obovatis suborbiculatis spatulatis vel flabellatis, supra glabris, subtus dense albotomentosis, ab ambabus setis pappi 1-seriatis flavido-brunneolis recedit.

Perennials, 1.5–2 cm tall; rhizomes slender, dark brown to blackish; stems short, base covered with remains of old leaf petioles. Leaves basal and cauline, crowded into a rosette; petioles of upper leaves slender and long, leaf blades orbicular, reduced to 1–2 mm diam.; petioles of upper leaves ca. 1 × 0.4 cm, purple, glabrous, base vaginate-amplexicaul, leaf blades ovate, flabelliform, spatulate to suborbicular, 3–6 × 2–5 mm, apex rounded and dentate, margin entire, base cuneate and narrowed, adaxially glabrous, abaxially densely white tomentose. Capitula 3 to 6, sessile, crowded into a hemispheric shape, 1–2 cm diam., surrounded by rosulate leaves; involucre narrowly campanulate, 3–6 × 3–4 mm; involucre bracts purple, membranous, glabrous, apex acuminate and dentate, arranged in 2 or 3 rows; exterior bracts narrowly elliptic, to 2 mm wide, broader than interior bracts, narrowed at both ends; interior bracts narrowly elliptic, sometimes narrowly oblanceolate; receptacle naked. Florets tubular, 6–8 mm, purple, tube as long as limb. Achenes (immature) glabrous; pappus uniseriate, with setae as long as florets, pale yellow-brown, plumose, arranged in one row.

Distribution and habitat. *Saussurea sugongii* is known only from the type collection and is endemic to the Kunlun Mountains in Xizang, China. It occurs in gravelly soils at elevations between 4950 and 5400 m.

IUCN Red List category. Due to the rarity and limited distribution of *Saussurea sugongii*, this species is assessed here as Endangered (EN) according to the IUCN Red List criteria EN Blab(i,ii,iii) (IUCN, 2001).

Etymology. This new species is named in honor of Wu Su-gong, a phytotaxonomist and phytogeographer at the Kunming Institute of Botany, Chinese Academy of Sciences.

Relationships. *Saussurea sugongii* is similar to *S. glacialis* Herder and *S. gnaphalodes* (Royle) Sch. Bip., but differs from both by its uniseriate pappus with pale yellow-brown setae and by lacking a receptacular palea. *Saussurea sugongii* is distinguished from *S. glacialis* by its broader leaves that are obovate, flabelliform, spatulate, or suborbicular, adaxially glabrous, abaxially densely white tomentose, and with a rounded and dentate leaf apex. *Saussurea sugongii* is distinguished from *S. gnaphalodes* by its purple, glabrous involucre bracts. *Saussurea glacialis* is characterized by narrower leaves that are linear-spatulate, adaxially pubescent, and abaxially glabrous, with a white pappus arranged in two rows. *Saussurea gnaphalodes* is characterized by leaves that are oblong or narrowly spatulate, with both blade surfaces pale gray or yellow-brown pubescent; the upper leaves and involucre bracts that are abaxially black pubescent; and the pappus that is black or rarely dark brown and arranged in two rows.

Paratypes. CHINA. **Xinjiang:** Ruoqiang, N side of Muztagae mtn. pass, in gravel zone on high mtns., 5400 m, 19 Aug. 1988, S. G. Wu 2248 (KUN, MO), 4950 m, 19 Aug. 1988, S. G. Wu 2249 (KUN, MO).

Acknowledgments. We are indebted to the curators and staff of the herbaria of the Kunming Institute of Botany, Chinese Academy of Sciences (KUN), and the Missouri Botanical Garden (MO) for making material under their care available for study and for a loan of specimens. We are grateful to Liu Jian-quan and Den De-shan for field assistance. We also thank Song Wen-shu and Li Ai-li for drawing the illustrations.

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