

**Taxonomic revision of
Saussurea subgenus *Amphilaena*
(*Compositae*, *Cardueae*)**

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COVER DESIGN: Front cover: *Saussurea velutina* W. W. Sm., flowering at 4750 m altitude in the Hengduan Mountains, SW China, early September 2000. – Back cover: *Saussurea orgaadayi* Khanm. & Krasnob., flowering at 2760 m altitude in the Altai Mountains, S Siberia, Russia, July 2002.

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Summary

The present study is a taxonomic monograph of *Saussurea* subg. *Amphilaena*, one of the four currently accepted subgenera in *Saussurea*. It is based on field studies in high mountain regions of China and Russia and on a review of several thousand herbarium specimens from 40 institutions. Detailed analyses of the available material include the following morphological features: growth habit, roots, caudex, indumentum, flowering stems, leaves, bracts, peduncles, capitulum, synflorescence, involucre, receptacle, florets, achene and pappus. The comparative morphological examinations led to a revised taxonomy of *S.* subg. *Amphilaena*.

Saussurea has approximately 490 species in total. In this revision, 35 species and one additional variety are accepted in *S.* subg. *Amphilaena*. *Saussurea obvallata*, formerly interpreted as a single species with variable features and a partly disjunct, wide distribution in the Himalaya and on the Qinghai-Tibetan plateau, is recognized as a complex of eight closely related species. Six of them – *S. glandulosissima*, *S. hengduanshanensis*, *S. kawakarpo*, *S. septentrionalis*, *S. sikkimensis* and *S. sichuanica* – are described as new to science, and *S. obvallata* var. *orientalis* is raised to specific rank as *S. orientalis*. Additionally, *S. sunhangii* from SW China is described as a new species. As compared to the treatment of *S.* subg. *Amphilaena* in the latest revision of the genus by S. J. Lipschitz (1979), two hitherto accepted taxa are sunk into synonymy, while five taxa formerly regarded as synonyms are resurrected. Three taxa are excluded from *S.* subg. *Amphilaena*.

All accepted taxa are described in detail and illustrated. Images include a photograph of the type or another characteristic herbarium specimen, line drawings of involucral bracts, scanning electron micrographs of achenes, and for the species of the *S. obvallata* complex, line drawings of peduncles. The taxonomic treatment of each species contains a full synonymy

with nomenclatural references, details of nomenclatural types for all names and necessary new typifications, remarks on the etymology of the name, vernacular names, a list of previously published illustrations and maps, information on chromosome numbers, geographical distribution, habitat and altitudinal range, uses, conservation, variability and a taxonomic discussion. A full list of examined herbarium specimens and a distribution map based on those specimens which could reliably be georeferenced are provided for each accepted taxon. Keys are given for the determination of the subgenera of *Saussurea*, the species of *S.* subg. *Amphilaena*, and the species of the *S. obvallata* complex.

A comprehensive review of chromosome numbers in *Saussurea* and in *S.* subg. *Amphilaena* is given. For 12 accessions from ten species, new chromosome counts were performed. In *S.* subg. *Amphilaena*, chromosome numbers are now known for 17 of the 35 species. $2n = 32$ is the most frequent number, probably derived by dysploid reduction of the presumed ancestral number of $2n = 36$, which is found in *S. dorogostaiskii* and *S. hookeri*. For the latter species, this number was confirmed by my own, first count from China. The diploid chromosome number of $2n = 32$ was found in 14 species of the subgenus. For *S. iodostegia*, *S. luae*, *S. pilinophylla*, *S. septentrionalis* and *S. wettsteiniana*, this number was reported for the first time, while it was confirmed for *S. globosa*. $2n = 52$, counted in two populations of *S. polycolea*, is the first report of a tetraploid in *S.* subg. *Amphilaena*.

Key words: monograph, taxonomy, nomenclature, phylogeny, evolution, morphology, chromosome, identification key, description, illustration, distribution, *Asteraceae*, *Compositae*, *Cardueae*, *Saussurea*, *Saussurea* subg. *Amphilaena*, Asia, Himalaya, China, Russia