



Twenty-six new species of *Saussurea* (Asteraceae, Cardueae) from the Qinghai-Tibetan Plateau and adjacent regions

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Abstract

Twenty-six new species of *Saussurea* (Asteraceae, Cardueae) from the Qinghai-Tibetan Plateau and adjacent regions are described and illustrated. Our molecular phylogenetic analysis based on the nuclear ribosomal DNA internal transcribed spacer (ITS) and two chloroplast DNA fragments (*trnL-F* and *psbA-trnH*) has shown that most of the new species are well recognized in the molecular tree, with their taxonomic affinities also largely revealed.

Key words: Compositae, taxonomy, new species, China

Introduction

The Qinghai-Tibetan Plateau (QTP) is the highest and largest plateau in the world with an average elevation of more than 4000 m. It extends from the southern edge of the Himalayan Range to the northern edge of the Kunlun Mountains, and from the western boundary of the Pamir Mountains to the eastern edge of the Hengduan Mountains (Zhang *et al.* 2002). The QTP flora is possibly the most diverse alpine flora in the world, with a number of genera present in this area (such as *Pedicularis*, *Gentiana*, *Primula*, *Rhododendron*, *Corydalis*, *Meconopsis*, *Saussurea*, *Anaphalis*, *Cremanthodium*, *Ligularia*, *Saxifraga*, *Rhodiola*, *Delphinium* and *Aconitum*) dramatically differentiated and forming modern diversity centers.

Saussurea is one of the largest genera in the tribe Cardueae of Asteraceae, including over 400 species, mostly endemic to the QTP, and also occurs in arid highlands elsewhere in the Northern Hemisphere (Lipschitz 1979; Shi & Raab-Straube 2011, Wang *et al.* 2009). It is the largest genus of the family Asteraceae both in China and in the QTP. In recent years, new *Saussurea* species from China, mostly from the QTP, were continuously described (Chen 2010, 2011, 2014a, 2014b, 2014c; Chen & Gan 2011; Raab-Straube 2011; Xu *et al.* 2013; Wang *et al.* 2014). According to our recent statistics, there are about 456 species of *Saussurea* already known in the world (including new species described in this paper), with about 317 species in China, about 239 species in the QTP (about 157 species endemic in this area, mostly in the Hengduan Mountains and the Himalayan region). Obviously the QTP is the distribution and diversity center of this highly diverse genus.

In the course of preparing an account of *Saussurea* for the *Flora of Pan-Himalaya*, we examined the rich materials of the genus in the major herbaria in China (CDBI, HNWP, KUN, PE), the United Kingdom of Britain (BM, E, K), the United States of America (A, GH, MO) and Russia (LE). We have also made several botanical expeditions in southwestern China to collect DNA materials and make field observations on the genus. As a result, twenty-six new species have been discovered from the QTP and adjacent regions. Among these, *S. tsoongii* belongs to *S.* subgen. *Theodorea*; *S. pseudotridactyla*, *S. pseudoleucoma*, *S. pseudosimpsoniana* and *S. zogangensis* belong to *S.* subgen. *Eriocoryne*; *S. jindongensis* and *S. habashanensis* belong to *S.* subgen. *Amphilaena*; *S. pseudoplatyphyllaria* and *S. yui* belong to *S.* subgen. *Saussurea* sect. *Gymnocline*; *S. gongriensis*, *S. minutiloba*, *S. multiloba*, *S. pseudoeriestemon*, *S. pseudolingulata*, *S. xianrendongensis*, *S. nyingchiensis* and *S. zayuensis* belong to *S.* subgen. *Saussurea* sect. *Strictae*; *S. chinduensis*, *S. dulongjiangensis*, *S. pseudoyunnanensis* and *S. yanyuanensis* belong to *S.* subgen. *Saussurea* sect.