Underestimated diversity in one of the world’s best studied mountain ranges: The polyploid complex of Senecio carniolicus (Asteraceae) contains four species in the European Alps

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Abstract

Senecio carniolicus (Asteraceae) is an intricate polyploid complex distributed in the European Alps (di-, tetra- and hexaploids) and Carpathians (hexaploids only). Molecular genetic, ecological, and crossing data allowed four evolutionary groups within S. carniolicus to be identified. Here, we establish that these four groups (two vicariant diploid lineages, tetraploids and hexaploids) are also morphologically differentiated. As a consequence, we draw taxonomic conclusions by characterizing four species, including the more narrowly circumscribed S. carniolicus (lectotypified here), the taxonomically elevated S. insubricus comb. nov. (lectotypified here), and the two newly described species S. disjunctus and S. noricus.

Key words: Asteraceae; European Alps; polyploidy; Senecio; species nova

Introduction

The European Alps are among the world’s best-explored mountain ranges with respect to their plant diversity, but additions to the inventory of Alpine plants still occur due to the discovery of species hitherto unknown from the Alps—e.g. Saxifraga carpatica Sternberg (1831: 32; published in Schneeweiss 1998) or Carex glacialis Mackenzie (1910: 244; published in Blanchenai et al. 2004)—or of so far overlooked species such as Pinguiculaoldinii J. Steiger & Casper (published in Casper & Steiger 2001: 28), Saxifraga styriaca Köckinger (2003: 82) and Alyssum neglectum Magauer, Frajman & Schönswetter (published in Magauer et al. 2014: 500). Further additions to the Alpine flora resulted from disentangling the components of polyploid complexes composed of lower-ploid parental entities and their higher-ploid derivatives such as in the group of Cardamine amara Linnaeus (1753: 656), Achillea pratensis Saukel & R. Länger (1992: 160) or Gymnadenia conopsea (Linnaeus 1753: 942) R.Br. in W.T.Aiton (1813: 191) s.l. (Marhold 1992, Saukel & Länger 1992, Marhold et al. 2005).

Senecio carniolicus Wildenow (1803: 1993) has only recently been identified as an intricate polyploid complex (Suda et al. 2007, Sonnleitner et al. 2010). Within the long-recognised Senecio sect. Jacobaea (Miller 1754: 667) Gray (1821: 469), a monophyletic group of mostly western Eurasian species (Pelser et al. 2002, 2003), the species belongs to the informal Incani-clade containing mountain species distributed from the Spanish Sierra Nevada to the Carpathians. Delimitation and taxonomic status of S. carniolicus as well as its evolutionary relationships to close relatives have been discussed controversially. Although sometimes treated as subspecies of Western Alpine S. incanus