



Morphological and molecular data reveal a new species of *Allium* (Amaryllidaceae) from SW Anatolia, Turkey

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Abstract

Allium undulatitopalum (Amaryllidaceae) is described as a new species from the Antalya Province of Turkey. It belongs to the section *Melanocrommyum* and is endemic to the south-western region of Turkey. The new species is a close relative of *A. orientale*, but according to results of the ITS sequences, and based on the morphological differences presented in the description, it is clearly different from its relative. A phylogenetic tree, distribution map, illustrations, pollen and seed microphotographs, karyo-morphology, as well as notes on the biogeography and ecology of the new species are provided.

Key words: Antalya, ITS, *Melanocrommyum*, taxonomy

Introduction

The genus *Allium* Linnaeus (1753: 294) comprises more than 850 species, making it one of the largest petaloid monocotyledonous genera (Keusgen *et al.* 2011). It is a variable group that is widely spread across the Holarctic region from the dry subtropics to the boreal zone (Li *et al.* 2010). The genus *Allium* is represented by 180 species and subg. *Melanocrommyum* (Webb & Berthelot, 1848: 347) Rouy in Rouy & Foucaud (1910: 378) comprises about 33 accepted taxa (Koyuncu 2012, Genç & Özhatay 2014) in the Flora of Turkey.

The classification of the genus *Allium* is taxonomically very complex, often controversial and still in progress. In recent years, improvements in DNA recognition techniques have provided new insights into the intrageneric classification of genus *Allium*. The internal transcribed spacer (ITS) region, including the 5.8S rDNA and the two spacers ITS1 and ITS2, is one of the most commonly used markers for the differentiation of *Allium* species (Dubouzet & Shinoda 1998, Mes *et al.* 1999, Friesen *et al.* 2006, Gurushidze *et al.* 2008, 2010, Ipek *et al.* 2014). Until now the most comprehensive phylogenetic studies of *Allium* subg. *Melanocrommyum* were done by Leibniz-Institute of Plant Genetics and Crop Research team. In the scope of their studies, the ITS region of nuclear ribosomal DNA was sequenced from 195 representative species of *Allium* (Friesen *et al.* 2006), phylogenetic analysis of subg. *Melanocrommyum* was done with multiple individuals of more than 100 species (Gurushidze *et al.* 2008), species level phylogenetic relationships of the subgenus were investigated (Gurushidze *et al.* 2010). Altogether 160 species and subspecies were accepted in the subg. *Melanocrommyum* and as a new classification based on molecular and morphological characters sect. *Melanocrommyum* Webb & Berthelot (1848: 347) was subdivided into nine alliances (Fritsch *et al.* 2010).

During fieldwork (May 2008) in Antalya province, southwestern part of Turkey, the authors collected flowering material of some interesting *Allium* specimens with undulate tepals, on calcareous stony slopes and meadows in Salamut Plateau (Akseki/Antalya). Within these alliances, the new species presented in this study is morphologically related to *A. orientale* Boissier (1854: 25), *A. multibulbosum* Jacquin (1773: 9) and *A. nigrum* Linnaeus (1762: 430). To determine the phylogenetic position of the new species, it was investigated using sequences analysis of ITS regions and compared with the most related taxa contained within different alliances.

As a result of our detailed macro- and micro-morphological studies, we concluded that the morphological characters of these *Allium* specimens from Antalya differ from all other *Allium* species.