



Alkanna malatyana (Boraginaceae), a new species from East Anatolia, Turkey

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Abstract

Alkanna malatyana (Boraginaceae) is described as a new species to science. It is endemic to the eastern Anatolia region of Turkey. *A. malatyana* is an obligated chasmophytic species, which colonizes on limestone rocky cliffs, known from a single locality in Levent Canyon, located in Malatya Province. It is related to *A. mughlae* and it shows some morphological similarities with *A. confusa* and *A. kotschyana*, but it clearly differs from them based on the morphological differences presented in the species description. In addition, the conservation status, a distribution map, and notes on the biogeography and ecology of the new species are given.

Key words: *Alkanna*, chasmophyte, taxonomy, Levent Canyon, Malatya, Turkey

Introduction

The genus *Alkanna* Tausch (1824: 234) is one of the large groups in the family Boraginaceae, comprising about 50 species and distributed in the Mediterranean and Irano-Turanian region (southwest Asia) (Riedl 1967, Heywood 1978, Sümbül 1994). A total of 40 taxa (34 species) are found in Turkey and 35 taxa (endemism rate of 82%) are endemic for Turkey (Huber-Morath 1978, Sümbül 1994, Güner *et al.* 2000, Aktaş 2012).

Although several molecular studies have recently been carried out on the evolutionary history and phylogenetic relationships in the Boraginaceae family, especially on many taxa in the tribes Lithospermeae and Boragineae (Langstrom & Chase 2002; Hilger *et al.* 2004; Thomas *et al.* 2008; Weigend *et al.* 2009), there are no comprehensive phylogenetic studies on the genus *Alkanna*.

Malatya Province, which is located in southeastern Anatolia, is floristically one of the richest and main endemism centres in Turkey (Yıldız *et al.* 2003). Many new plant species still continue to be discovered in this area (Yıldırım *et al.* 2010, Mutlu & Karakuş 2012, Tan *et al.* 2012, Koç & Aksoy 2013, Yıldırım & Erol 2013, Yıldırım & Şenol 2013).

During fieldwork for the ‘Revision of *Alkanna* species in Turkey’ project in June 2010, the authors collected flowering and fruiting material of some interesting chasmophytic *Alkanna* specimens on calcareous rocky cliffs in Levent Canyon, in the Akçadağ district, in Malatya Province of eastern Anatolia. As a result of our detailed macro and micro morphological studies, we have concluded that the *Alkanna* specimens collected from Malatya differs from all other *Alkanna* species in its morphological characters. It is considered a new species that shows some similarities with *A. mughlae* Duman, Güner & Şağban (129: 340). With the inclusion of the new species described here, there are now 36 species of *Alkanna* in Turkey.

Materials and Methods

We have compared the *Alkanna* specimens with relevant taxonomic literature (Riedl 1967, Heywood 1978, Huber-Morath 1978, Sümbül 1994, Güner *et al.* 2000, Aktaş 2012) and material of *Alkanna* specimens in the herbaria ANK, EGE, G, GAZI, HUB, K, KONY and VANF. Features of gross morphology of the *A. malatyana* were examined by stereo-binocular microscope. Totally 50 pollen grains and 30 mature nutlets were measured by using

Duman & H. Şağban (HUB!); Bozburun tepesi batı yamaçlar, uçurum kayalıklar, 10–50 m, 15 June 1991, *A. Güner* 9385, *M. Vural*, *A. A. Dönmez & H. Şağban* (HUB!); Dalyan, Kaunos mezarlığı, 14 April 1991, *Ş. Başaçık* 8913295 (HUB!); Marmaris Kumlubük, Asar Tepe, Amos Harabeleri, 50 m, kaya üzeri, 29 June 1997, *H. Şağban* 1886 (HUB!). Dalyan, iztuzu, Kayalık uçurumlar, kalker kaya üzeri, 31 March 2006, *H. Yıldırım & S. G. Senol* 3249 (EGE!); ibid 31 March 2006, *S. G. Senol & H. Yıldırım* 1793 (EGE!).



FIGURE 5. *Alkanna kotschyana*: A—habit and habitat, B—flowers; *Alkanna confusa*: C—habit and habitat, D—flowers.

Acknowledgements

We are grateful to the curators of the following herbaria for allowing access to their *Alkanna* material for study: ANK, EGE, GAZI, HUB, KONY, K, and VANF. We are indebted to the Ege University Research Fund (Project number: 2012 BBH 001) for their financial support.

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