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ONOSMA DEMIRIZII (BORAGINACEAE), A NEW SPECIES FROM CENTRAL ANATOLIA, TURKEY

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Key words: Boraginaceae, New species, *Onosma*, Turkey

Abstract

Onosma demirizii Kaynak, Tarımcılar & Yılmaz sp. nova (Boraginaceae) is described as a new species from central Anatolia, Turkey. This new species is closely related to *O. subulifolium* H. Riedl but differs by its yellowish-green stems, patent-setose indumentum, linear to narrowly oblanceolate cauline leaves, shorther calyx and corolla and anthers that are longer than the filaments. The diagnostic morphological characters of this new species are discussed.

Introduction

The Boraginaceae family is distributed mainly in temperate, pantropical and subtropical areas and comprises approximately 150 genera and 2700 species worldwide (Heywood *et al.* 2007). The genus *Onosma* L. is restricted to Asia and Europe and includes about 150 species (Peruzzi and Passalacqua 2008). *Onosma* is a systematically difficult genus, and most of the diagnostic characters are based mainly on the whole indumentums, leaf and flower morphology (Ball 1972, Riedl 1978, Pavlova 2009). Riedl (1978) has reported 88 species of Turkish flora. Currently, 10 new species have been recognised by different authors (Davis *et al.* 1988 Güner 2000, Yıldırımlı 2000, Riedl *et al.* 2005, Binzet and Orcan 2007, Kandemir and Türkmen 2010, Aytaç and Türkmen 2011, Koyuncu *et al.* 2013). Approximately half of the species are endemic to the Flora of Turkey. In this paper, a new species of the genus *Onosma* is described.

Materials and Methods

Flowering specimens were collected during a botanical survey in central Anatolia around Kayseri province in the spring of 2013. These specimens were compared to *Onosma* species that were kept at ANK, BULU and digital images from E and different herbaria were studied. In addition, these specimens were checked against the literature cited above. For the scanning electron microscope studies, stem leaves were coated with gold-palladium for 4 min in a BAL-TEC SCD 005 sputter-coater (Leica Microsystems, Wetzlar, Germany). All of the observations were made on a Carl Zeiss EVO 40 (Carl Zeiss AG, Oberkochen, Germany) at a voltage of 15 kV.

Results and Discussion

***Onosma demirizii* Kaynak, Tarımcılar & Yılmaz sp. nova** **(Figs 1, 2, 3)**

Holotype: Turkey. B6 Kayseri: Pınarbaşı, 38°43′N, 36°23′E, 1540 m, 24.v.2013, *G. Kaynak, Ö. Yılmaz* s.n. (BULU 35011).

Diagnosis: This new species is closely related to *Onosma subulifolium* H. Riedl. However *O. demirizii* is different by its yellowish-green stem with patent-setose indumentums; linear to narrowly oblanceolate, and 12 - 16 mm long (not 15 - 32 mm) cauline leaves; setose and 7 - 9 mm long (not hispid, 10 - 11 mm) calyx; cream coloured and 12 - 14 mm long (not 15 - 18 mm) corolla, and anthers that are longer than the filaments.

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Table 1. Comparison of some morphological characteristics *Onosma demirizii*, *O. subulifolium* and *O. thracicum*.

	O. demirizii	*O. subulifolium*	*O. thracicum*
Stem	11 - 17 cm	6 - 12 cm	12 - 25 cm
Indumentum	Yellowish-green patent-setose	Bluish black adpressed-setose	Green patent-setose
Leaves	12 - 16 × 1 - 2 mm linear to narrowly oblanceolate	15 - 32 × 1 - 1.8 mm subulate	10 - 29 × 1 - 5 mm linear-oblong
Bracts	6 - 9 mm revolute	7 - 8 mm flat	-
Calyx	7 - 9 mm setose	10 - 11 mm hispid	6-8 mm setose
Corolla	12 - 14 mm cream, glabrous	15 - 18 mm white, glabrous	11-19 mm pale yellow puberulent
Filament	Anthers are longer than the filaments	Filaments are equal to anthers	-
Inflorescence	Short cyme, subcapitate	Subcapitate cyme	Lax cyme

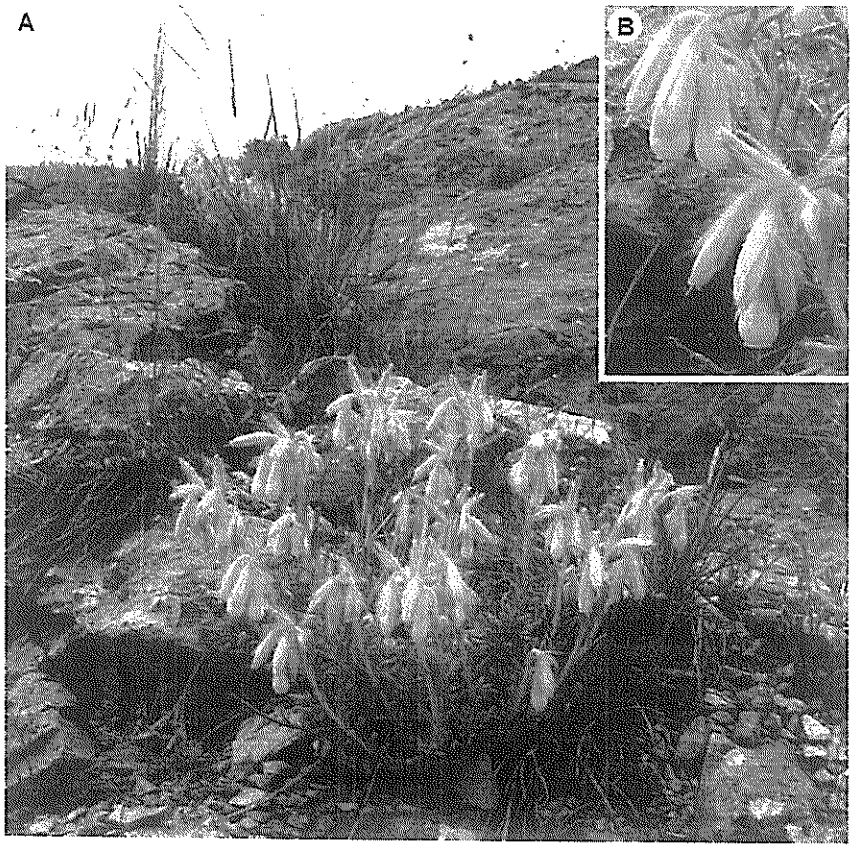


Fig. 1. *Onosma demirizii* in the wild. A- Habit. B- Flowers (photos Gönül Kaynak).

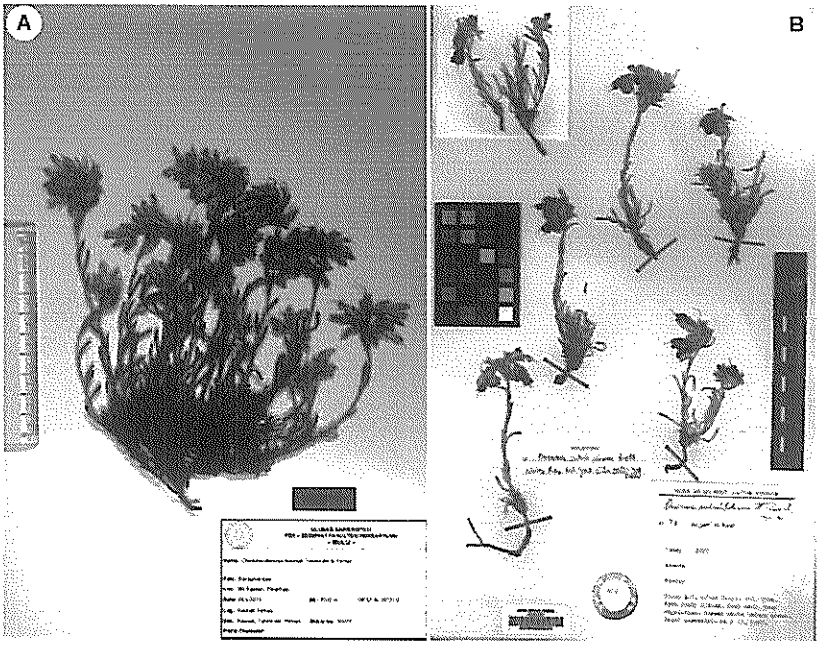


Fig. 2. A- Holotype of *O. demirizii* from the herbarium BULU (photo Özer Yılmaz).
B- Type of *O. subulifolium* from the herbarium E.
(available at website:http://elmer.rbge.org.uk/bgbase/vherb/bgbasevherb.php?cfg = bgbase/vherb/zoom. cfg&filename = E00022534.zip&queryRow =1).

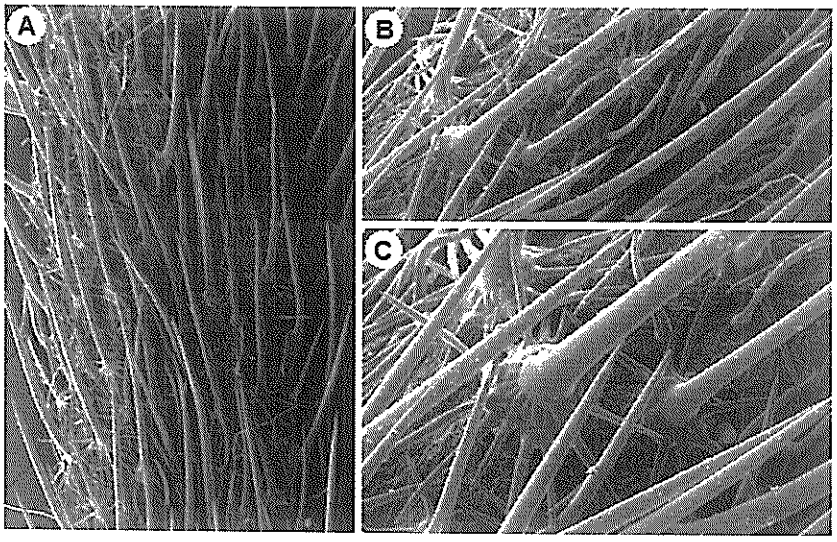


Fig. 3. A- Leaf indumentum of *Onosma demirizii* (× 100). B- Asterotrichous hair in general view (× 150). C- Asterotrichous hair in closer view (× 300).

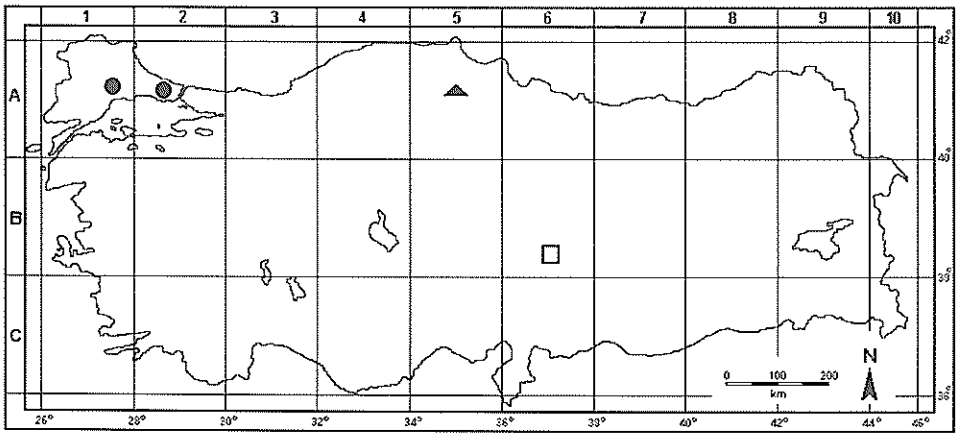


Fig. 4. Map shows the distribution of *Onosma demirizii* (□), *O. subulifolium* (▲) and *O. thracicum* (●) in Turkey.

Description: Perennial. Stem numerous, 11 - 17 cm, erect to ascending yellowish-green with long patent stellate tubercles and whitish setose hairs. Basal leaves crowded in to an irregular tuft or rosette, shorter than cauline leaves spathulate, margins strongly revolute, shorter than cauline leaves, 6 - 12 × 0.6 - 1.2 mm wide, upper surface dull greyish-green, densely long patent stellate tubercles robust setae, 1.5 - 2 mm long, lower surface with adpressed short setae, 2 - 3.5 mm long, indumentum ± uniform on both surface. Cauline leaves linear to narrowly oblanceolate, 12 - 16 × 1 - 2 mm, margins strongly revolute, densely clothed with yellowish-green long patent stellate tubercles, robust setae on the upper surface, 2-3.5 mm long; lower surface with adpressed short setae, 1.5 - 3 mm long. Inflorescence cyme, short subcapitate. Bracts 6 - 9 × 1- 2 mm, foliaceous, linear-lanceolate, revolute, acute, setose with similar indumentum as the stem and leaves. Pedicels 1 - 1.5 mm long, setose. Calyx divided almost to base lobes, lobes narrowly linear, 7 - 9 mm long, densely covered with long adpressed setae, a few long patent setae and short thin hairs on the upper surface. Corolla 12 - 14 mm long, clavate-campanulate, lobes short acute, glabrous, cream-coloured, pale yellow when dry. Anthers included, linear, 5 - 5.5 × 1 mm wide; apex acuminate membranous, base sagittate; free part of filament 5 - 5.5 mm long, coherent only near apex, flattened, glabrous. Ovary glabrous, approximately 1 mm diam. Style filiform, exserted, approximately 16 mm, longer than corolla. Stigma distinctly 2-lobed. Nutlets unknown.

Distribution and habitat: This new species is endemic to central Anatolia. *Onosma demirizii* is only known from the type locality and is geographically well isolated from the related species (Fig. 4). This new species grows on calcareous rocky slopes with *Onosma albo-roseum* Fisch., *Scrophularia libanotica* Boiss., *Aubrieta canascens* (Boiss.) Bornm subsp. *canescens*, *Asphodeline taurica* (Pallas) Kunt and *Ebenus laguroides* Boiss.var. *laguroides* at an altitude of greater than 1500 m.

Phenology: Flowering in May.

Etymology: This species is named in honour of the eminent Turkish Botanist, Professor Dr. Hüsnü Demiriz (1920 - 1999) (Department of Biology, Istanbul University).

Conservation status: Onosma demirizii is endemic to Turkey. It is known from the type locality only. It is known from one locality (criterion B2 a), with an estimated area of less than 10 km² (criterion B2). The population is unhealty with less than 100 indivudials (criterion C).

Therefore it should be classified as "Critically Endangered (CR)" based on the criteria of the IUCN Red List Categories (IUCN, 2001).

Onosma demirizii is closely related to *O. subulifolium*; however, this new species is considerably different. *O. demirizii* has yellowish-green patent-setose indumentum, linear to narrowly oblanceolate cauline leaves, shorter calyx and corolla, anthers that are longer than the filaments.

Additionally, this new species has similarities with *O. thracicum* Velen., but differs by its shorter stem, revolute leaves, glabrous and cream corolla, and subcapitate inflorescence (Table 1). *Onosma demirizii* and the remaining two have asterotrichous indumentum (Fig. 3). According to the Flora of Turkey (Riedl 1978) they belong to the subsect. *Asterotricha* (Boiss.) Gürke.

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References

Aytaç Z and Türkmen Z 2011. A new *Onosma* (Boraginaceae) species from southern Anatolia, Turkey. Turk. J. Bot. **35**: 269-274.

Ball PW 1972. *Onosma* L. *In*: Flora Europaea (T.G. Tutin, V.H. Heywood Eds.), vol. 3. pp. 89-94. Cambridge University Press, Cambridge Binzet R and Orcan N 2007. A new species of Onosma L. (Boraginaceae) From Southern Turkey. Novon **17**(1): 8-10.

Binzet R and Orcan N 2007. A new species of *Onosma* L. (Boraginaceae) From Southern Turkey. Novon **17**(1): 8-10.

Davis PH, Mill RR and Tan K 1988. *Onosma* L. *In*: Flora of Turkey and the East Aegean Islands (Davis PH, Mill RR and Tan K Eds.), (Suppl. 1), vol. 10. pp. 184-185. Edinburgh University Press, Edinburgh.

Güner A 2000. *Onosma* L. *In*: Flora of Turkey and the East Aegean Islands (Güner A, Özhatay N, Ekim T and Başer KHC Eds). (Suppl. 1), vol. 11. p. 188. Edinburgh University Press, Edinburgh.

Heywood VH, Brummitt R, Culham A and Seberg O 2007. Flowering Plant Families of the World. Royal Botanic Gardens Kew, Kew Press, London. pp. 424.

IUCN. 2001. IUCN Red List Categories and Criteria: version 3.1. IUCN Species Survival Commission. IUCN, Gland, Switzerland, Cambridge.

Kandemir A and Türkmen Z 2010. A new species of *Onosma* (Boraginaceae) from eastern Turkey. Turk. J. Bot. **34**: 277-282.

Koyuncu O, Yaylacı OK, Özgişi K, Sezer O and Öztürk D 2013. A new *Onosma* (Boraginaceae) species from Central Anatolia, Turkey. Plant. Syst. Evol. **299**:1839-1847.

Peruzzi L and Passalacqua NG 2008. Taxonomy of the *Onosma echioides* (L.) L. complex (Boraginaceae) based on morphometric analysis. Bot. J. Linn. Soc. **157**: 763-774.

Pavlova D 2009. *Onosma bulgarica* sp. nov. (Boraginaceae- Lithospermeae) found on serpentine in Bulgaria. Nordic J. Bot. **27**: 216-221.

Riedl H 1978. *Onosma* L. In: Flora of Turkey and the East Aegean Islands (P.H. Davis Eds.) vol. 6. pp. 326-376. Edinburgh University Press, Edinburgh, UK.

Riedl H, Binzet R and Orcan N 2005. A new species of *Onosma* (Boraginaceae-Lithospermae) from southern Turkey. Edinburgh J. Bot. **61**: 127-130.

Yıldırımlı Ş 2000. The chorology of the Turkish species of Boraginaceae family. Ot Sistematik Botanik Dergisi 7: 257-272.

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Record 1 of 4

Title: ANATOMY OF THREE ONOSMA SPECIES FROM TURKEY

Author(s): Akcin, OE (Akcin, Oznur Ergen); Binzet, R (Binzet, Riza)

Source: BANGLADESH JOURNAL OF BOTANY Volume: 48 Issue: 2 Pages: 329-337 Published: JUN 2019

Abstract: Three Onosma L. species (O. papillosa Riedl, O. rutila Hub-Mor. and O. auriculata Aucher ex DC.) were examined anatomically. All these taxa had secondary root structure and xylem which were composed of sclerenchymatic cells and tracheary elements. O. papillosa has crystals and sclereids in the stem and leaf. Sand crystals are seen in the pith region of O. auriculata. O. papillosa and O. auriculata has bifacial leaf types and O. rutila has equifacial type. Stomata are anisocytic, anomocytic and staurocytic. These species have long and short simple eglandular and glandular trichomes. Setae with glabrous tubercles are present in O. papillosa and O. rutila. O. auriculata has porrect-stellate trichomes. Simple trichomes are unicellular and generally short. They have lignified, ornamental or smooth walls.

Accession Number: WOS:000470911600015

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Record 2 of 4

Title: Onosma erzincanica (Boraginaceae: Lithospermeae), a new scree species from Turkey

Author(s): Binzet, R (Binzet, Riza); Eren, O (Eren, Ozkan)

Source: PHYTOTAXA Volume: 356 Issue: 2 Pages: 117-130 DOI: 10.11646/phytotaxa.356.2.2 Published: JUN 14 2018

Abstract: A new species of Onosma (Boraginaceae: Lithospermeae) from the Erzincan province of eastern Anatolia, O. erzincanica, is described and illustrated. It belongs to the Haplotricha informal group which comprises the species with basal leaves covered by simple setae only. The species appears to be endemic to scree and is very narrowly distributed. The closest relative of O. erzincanica is O. obtusifolia Hausskn. & Sint. ex Riedl, which also occurs in Turkey. In addition to the its restriction to screes, it is primarily distinguished from O. obtusifolia by its golden yellow, shorter (14-17 mm) and clavate corollas, longer pedicels (2-5 mm), shorter filaments (ca. 4 mm), acute cauline leaves and having stems covered not only with 2-5 mm long patent setae but also with short hairs, and chartaceous to membranous leaves, calyx and bracts when dried. The geographical distribution of O. erzincanica and O. obtusifolia are mapped and an identification key for those species is provided. Pollen and nutlet micrographs of O. erzincanica are presented using scanning electron microscopy. The site conditions and conservation status of O. erzincanica are also considered.

Accession Number: WOS:000435588200002

ISSN: 1179-3155

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Record 3 of 4

Title: Check-list of additional taxa to the supplement flora of Turkey VIII

Author(s): Ozhatay, N (Ozhatay, Neriman); Kultur, S (Kultur, Suran); Gurdal, B (Gurdal, Bahar)

Source: ISTANBUL JOURNAL OF PHARMACY Volume: 47 Issue: 1 Pages: 31-46 DOI: 10.5152/IstanbulJPharm.2017.006 Published: 2017

Abstract: The eighth check-list of the series entitled "Check-list of Additional taxa to the Flora of Turkey" comprises a total of 152 taxa based on the data given in 133 papers published the period between December 2014-December 2016. Additionally taxa which have not been recorded neither in the 11 volumes of the Flora of Turkey nor in the seven previously published supplementary check-lists. With this paper the following are added to the Turkish flora: 127 taxa new to science and 25 taxa new records.

Accession Number: WOS:000408261900006

ISSN: 0367-7524

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Record 4 of 4

Title: Onosma juliae (Boraginaceae), a new species from southern Turkey, with remarks on the systematics of Onosma in the Irano-Turanian region

Author(s): Cecchi, L (Cecchi, Lorenzo); Coppi, A (Coppi, Andrea); Selvi, F (Selvi, Federico)

Source: PHYTOTAXA Volume: 288 Issue: 3 Pages: 201-213 DOI: 10.11646/phytotaxa.288.3.1 Published: DEC 16 2016

Abstract: The new species Onosma juliae is described and illustrated based on specimens collected in the westernmost part of the Taurus range in southern Anatolia (Turkey, Karaman province). Differences with the putatively more closely related species are briefly discussed, and a synthetic but comprehensive key to the Irano-Turanian members of the genus known to date is provided to allow the identification of the major species group.

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