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گونه *Onosma sulaimanica* (تیره گاوزبانیان) به عنوان گزارشی جدید برای فلور ایران

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چکیده. گونه *Onosma sulaimanica* که از استان کردستان ایران جمع‌آوری شده است به عنوان اولین گزارش گونه از ایران ارائه می‌شود. این گونه در بخش *Onosma*، زیربخش *Onosma* و سری *Wheeler-hainesii* قرار دارد. کلید گونه‌های دو سری *Wheeler-Hainesii* و *Aleppica* که در ارتباط با یکدیگر هستند به همراه تصاویر و نقشه پراکنش ارائه می‌شوند.

واژه‌های کلیدی. بخش اونوسما، خاورمیانه، زیربخش اونوسما، شاهو،کردستان

Onosma sulaimanica (Boraginaceae), a new record for the flora of Iran

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Abstract. In this article the collection of specimens related to *Onosma sulaimanica* from Kordestan Province, Iran, was confirmed and reported for the first time. Therefore, the species is recorded for the flora of Iran. This species is placed in the sect. *Onosma*, subsect. *Onosma,* ser. *Wheeler-hainesii*. A diagnostic key of related taxa belonging to series *Wheeler-Hainesii* and *Aleppica*, and the photos, micrographs and a distribution map of the species were also presented.

Keywords. Kordestan, Middle East, section *Onosma*, Shahu, subsection *Onosma*

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INTRODUCTION

Onosma L. is a species-rich genus (Boraginaceae, tribe Lithospermeae) and includes about 170 species all around the world (Naqinezhad & Attar, 2016; Cecchi & Selvi, 2009; Kolarčik et al., 2010). The genus is distributed across Europe to East Asia and is especially well-distributed in Western and Central Asia, the Mediterranean area, Anatolia and Southeast Europe (Kolarčik et al., 2010). Iran, Turkey (Anatolia) and Central Asia are the diversity centers of the genus *Onosma* (Tiwari et al., 2011). *Onosma* species grow in xeric, dry, cliffy, sunny, rocky, sandy and steppe habitats (Peruzzi & Passalacqua, 2004).

Riedl (1967) recognized three sections for genus *Onosma* in Flora Iranica: *Protonosma* Popov (*O. rostellata* Lehm.), *Podonosma* (Boiss.) Gurcke (*O. orientalis* L.) and *Onosma* with two subsections: *Onosma* (with about 50 taxa) and *Asterotricha* (Boiss.) Gurke (with about 14 taxa). *Onosma orientalis* has changed to *Podonosma orientalis* (L.) Feinbrun now. Genus *Onosma* contains about 60 species in Flora Iranica region based on Riedl's work (Riedl, 1967).

After the publication of Flora Iranica treatment of the genus (Riedl, 1967), Ponert (1973) and Teppner (1980) described *O. kurdica* and *O. sabalanica* from Kordestan and Azarbayejan Provinces, respectively. In recent years, some new species were described from Iran: *Onosma iranshahrii* Ghahr. & Attar (Ghahreman & Attar, 1996), *O. bisotunensis* Attar & Hamzeh'ee (Attar & Hamzeh'ee, 2007), *O. khorasanica* Attar & Joharchi (Attar & Joharchi, 2006), *O. ghahremanii* Attar & Naqinezhad (Naqinezhad & Attar 2016), *O. mozaffarianii* Mehrabian (Mehrabian et al., 2013), *O. estahbanensis* Ranjbar & Almasi, *O. mahabadensis* Ranjbar & Almasi and *O. maculata* Ranjbar & Almasi (Ranjbar & Almasi, 2013, 2014, 2015), *O. targevarensis* Mozaff. & Mehrabian, *O. sarvestanica* Mozaff. & Mehrabian (Mehrabian & Mozaffarian, 2018), *O. zagrica* Dehshiri (Dehshiri, 2018). Therefore, the number of *Onosma* species in the flora of Iran increased to 64.

The most important characters for delimiting of species are found to be indumentum type of lower leaves, inflorescence shape, bract shape, corolla length and its changing color, indumentum of corolla's outside, anther and filament length and hairy or glabrous nectariferous annulus (Riedl, 1967).

MATERIALS AND METHODS

During the study of genus *Onosma* related specimens stored in the herbarium of Kordestan Agricultural and Natural Resources Research and Education Center (HKS) were examined. Among them some interesting specimens belong flora of Iraq were found which previously not reported from Iran. For determine of specimens we used some literature resources such as Flora of Iran (Parsa, 1949), Flora Iranica (Riedl, 1967) and Flora of Iran (Khatamsaz, 2002). Moreover, specimens studied were compared to the pictures of type specimens.
Indumentum of the specimens was photographed by a Dino-Lite digital microscope AM413T and the measurement was done by means of the integrated software of the device. The specimens were photographed with a Canon PowerShot SX260 HS camera.

RESULTS

During floristic investigations in W Iran, Kordestan Province, some interesting specimens were collected. Based on Flora Iranica treatment for the genus (Riedl, 1967), these specimens were determined as *Onosma sulaimanica* Riedl that is a new record for the flora of Iran. Therefore, the total number of taxa within the genus *Onosma* in Iran reached to 65 taxa by the addition of this reported species. According to Riedl (1967), *Onosma sulaimanica* belongs to sect. *Onosma*, subsect. *Onosma*, series *Wheeler-hainesii*. The most diagnostic characters of series *Wheeler-hainesii* including: annulus densely hairy, calyx with 5 linear free segments, anthers free along length (Riedl, 1967). Series *Wheeler-hainesii* Riedl belongs to series *Aleppica* Riedl considering their habit, hairy nectariferous annulus, anther and filament length, free calyx lobes, corolla color and indumentum type of lower leaves.

Onosma sulaimanica Riedl, Flora Iranica, vol. 48: 190 (1967). Figs. 1-3.

Perennial, up to 30 cm tall. Stem branched, patent white setose. Lower and median leaves 35-80 × 5-10 mm, lorate-lanceolate; margin revolute; indumentum consists of patent-adpressed setae with glabrous tubercles, between setae sparsely pubescent. Cymes a compact scorpioid, with lateral branches, few-flowered, to 30 mm in diam.; lower bracts to 20 × 5 mm; pedicels up to 5 mm long; flowering calyx 14-17 mm; corolla yellowish white, 17-20 mm long, clavate-campanulate, outside papillose; lobes 4.5 × 3.5 mm; filaments 8 mm long; adnate to 6 mm above corolla base; anthers 6-7 mm long; annulus densely hairy. Nutlets not seen.

Examined specimens: Iran. Kordestan Province: Saqqez, Kanijegeni, 1450 m, 11.6.2004, Maroofi & Fani 6831 (HKS!); southern west of Sanandaj, Shahu area, Esparez village, 1150 m, Kaffash 3080

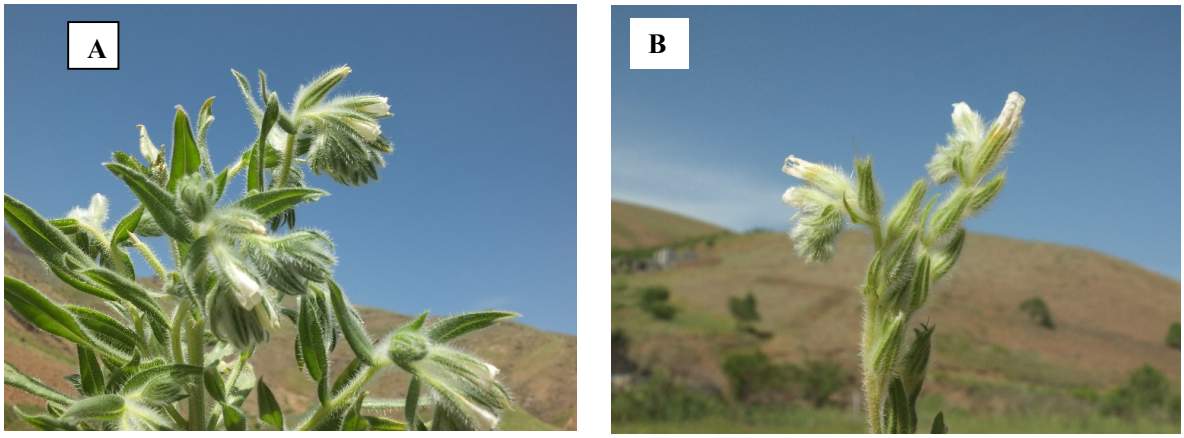

Figure 1. A. *Onosma sulaimanica* and B. *Onosma bulbotricha*. A part of inflorescence showing bract, calyx and corolla.

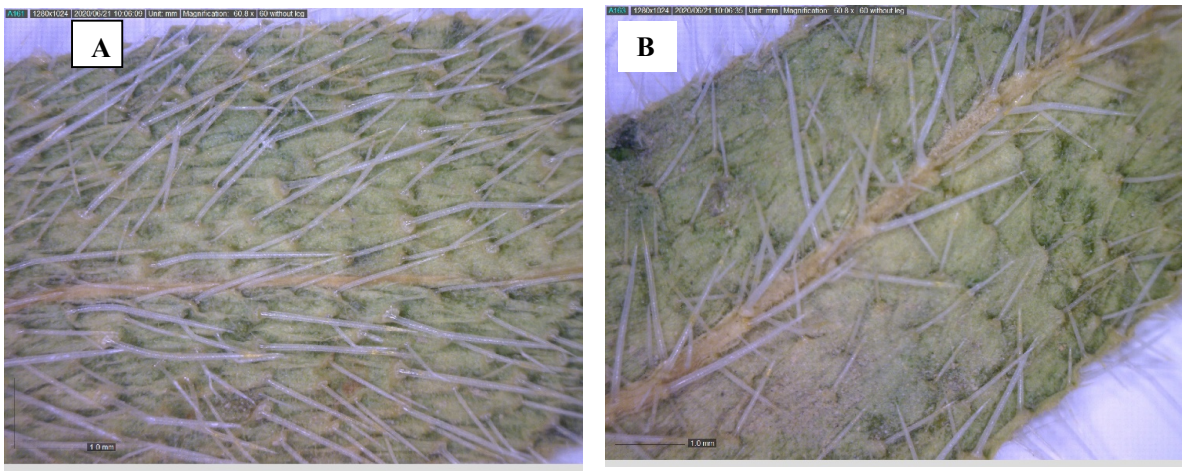

Figure 2. *Onosma sulaimanica*: **A.** upper surface, **B.** lower surface, showing adpressed tubercled setae.

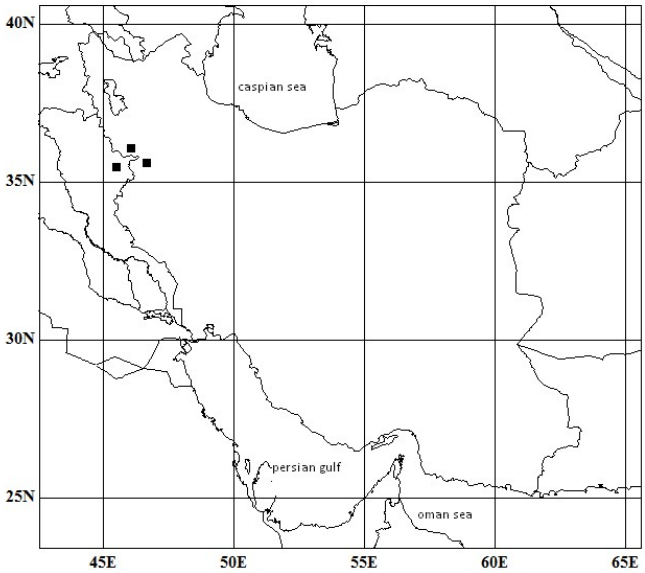

Figure 3. Distribution map of *Onosma sulaimanica.*

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(HKS!); above Avihang village, 2111 m, 27.05.2019, Attar, Asgari, Bahadori, Advay 48480 (TUH!).

Onosma solaimanica is close to *O. bulbotricha* DC. and *O. cyrenaica* Durand & Barr. var. *strausii* Riedl. Based on their habit, indumentum type of lower leaves, stamen status, hairy annulus nectariferous. Considering their similarities, a diagnostic key is presented for delimiting of species.

Diagnostic key of taxa of series *Wheeler-Hainesii* Riedl and *Aleppica* Riedl in Iran

1. Corolla pink; pedicel up to 9 mm long…….……. *O. cyrenaica* var. *straussii*
-Corolla white or yellowish-white ……..….... 2
2. Flowering calyx 14-16 mm long; corolla's outside papillose; corolla lobes 4.5 mm width at bas…….…. *O. sulaimanica*
-Flowering calyx 15-20 mm long; corolla's outside glabrous or pubescent, corolla lobes narrower at base ……..……. *O. bulbotricha*

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