A new species of the genus Alyssum section Alyssum (Brassicaceae) from Iran

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INTRODUCTION

The Brassicaceae family comprises 49 tribes, 321 genera, and 3660 species, of which 20 genera and 34 species remain to be assigned to tribes (Al-Shehbaz, 2012). Genus Alyssum consists of about 170-195 species worldwide, native to Europe, Asia and northern Africa (Al-Shehbaz, 1987; Appel & Al-Shehbaz, 2003; Warwick et al. 2006; Li et al., 2014). Most of its species grow on rocky slopes in arid regions. 28 species and 7 varieties were introduced in Iran (Rechinger, 1968). Later, A. stipitatum Kavousi & T.R.Dudley, A. mozaffariani Kavousi and A. hezarmasjedense Kavousi & Nazary were described (Kavousi, 2001; Kavousi et al., 2014).

Comprehensive taxonomic studies of Alyssum in Iran are rare; therefore, the first author started a...
taxonomic revision of the genus in Iran in the framework of a Ph.D. research project. Herbarium specimens from large herbaria in Iran (TARI, IRAN) and the Natural History Museum of Vienna (W) were also studied.

In addition, excursions to different parts of Iran to collect new specimens and field observations were made. This paper aims to describe the new species and compare it with the close affinities.

**Fig. 1.** Plant on sheet of Herbarium (A. mazandaranicum).

**Fig. 2.** A: Silicule of A. szowitsianum; B: Silicule of A. mazandaranicum; C: Inflated Pedicel of A. mazandaranicum; D: Sepals (A. szowitsianum); E: Sepals (A. mazandaranicum).
MATERIAL AND METHODS

The new species was first collected in 2012 by the first author from the higher areas of forests in Kojour, between Lashkenareh and Gandis-Kala villages, Mazandaran Province, Iran. Fifteen individuals were collected from this location. Flora Iranica (Rechinger, 1978), Flora of Turkey (Dudley, 1965), Flora of Iraq (Townsend & Guest, 1980), Flora of the USSR (Bush, 1939) and Flora Europaea (Dudley & Ball, 1964) were used to compare the new species with the taxa reported by them.

All specimens of TARI and IRAN were examined. Two other populations of the species were also found among unidentified materials. Characteristics of this species were compared with those of A. szowitsianum Fisch. & C.A.Mey. as its closest affinity.

The samples were examined with a binocular microscope and Planaplo lens at 7.5 X to 64.5 X magnifications. Silicules and pedicels of dry samples were selected for scanning electron microscopy (SEM). They were mounted on the stubs using double-adhesive tapes and coated with gold-palladium. Coated specimens were viewed with a SU 3500 Electron microscope at 15kv.

RESULTS AND DISCUSSION

Remarkable morphological characters of the new species include its glabrous silicule with inflated pedicels, 2 seeds in each silicule, petals clearly exceeding from the sepal, and monomeric sepal. These characters indicate that the new species belong to the Alyssum sect. Alyssum. Among the species of this section A. szowitsianum is the closest affinity.

Taxonomy

Alyssum mazandaranicum Mirzadeh & Assadi, sp. nov. (Figs. 1, 2)

Typus. Iran, Mazandaran province, Kojour, between Lashkenareh and Gandis-Kala villages, higher areas of forest with scattered trees, 1158 m,12.06.2012, Mirzadeh 101593 (holotypus TARI, isotypi T!, W!).

Species nova differt a A. szowitsianum siliculis glandibus (non pilis stellatis), sepals linearis (non ovatis), stylis glandibus (non ad basem pilosis). Annual, 5-9 cm high, branched from the base, ascending, stellate hairy. Leaves oblanceolate, linear or spatulate, 1-1.3×0.2-0.3 cm, stellate-hairy.

Racemes elongating in fruit, 2.5 to 4 cm long. Pedicels in fruiting stage 3-4 mm long, stellate-hairy with unequal rays, inflated, slightly spreading.

Sepals linear, 1.5-1.7×0.5 mm, membranous at margin, deciduous, stellate-hairy. Petals long corollate, sometimes narrowed at the middle, yellow, sparsely hairy on the upper surface, glabrous below. Long filaments 1 mm long, entire or unilaterally toothed above the middle; short filaments 0.7 mm long, toothed above the middle.

Ovary with 2 ovules in each loculus. Silicule 4×3-3.5 mm, elliptic-ovate, inflated on one side, flat on the other side, truncate or emarginated at the apex, often 2 seeded, glabrous. Nectar gland long. Style 0.5-0.7 mm. long, broad at base. Seeds 1.5-1.7× 1.2-1.5 mm, wingless or with narrowly winged.

Etymology. Specific epithet refers to the province Mazandaran (Iran), where type specimens were collected.

Other specimens studied. Iran. Gilan province, Asalem to Khalkhal, Kerman village, Moradi 102832 (TARI); Azarbayejan province, Arasbaran protected area, Mahmoodkaghi, above Ebrich-Jadid, Hamzeh'ee & Asri 81416 (TARI).

Distribution. The new species is endemic to transitional areas between Euro-Siberian and Irano-Turanin regions in Iran (Fig. 3).

Ecology. The new species grows in an open forest with scattered trees of mainly Fagus orientalis Lipsky and Ulmus glabra Hudson.

Chromosome number. The chromosome number of this species is determined to be 2n=4x=32 (x=8) (Fig. 4).

A. mazandaranicum is closely related to A. szowitsianum, but with spreading pedicels, elliptical silicules, shape and size of petals, style size, seed size, 2 ovulate loculus and apical placentaion.

The two species may be readily distinguished on sepal morphology, leaf size, silicule size and indumentums, nectar glands, pedicel trichomes, chromosome number and geographical distribution, as summarized in Table 1.
Fig. 3. Distribution of *Alyssum szowitsianum* (●) and *A. mazandaranicum* (▲) in Iran.

Fig. 4. Chromosome number of *A. mazandaranicum* (2n=32).
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>A. mazandaranicum</th>
<th>A. szowitsianum</th>
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<tbody>
<tr>
<td>Leaf</td>
<td>Linear, spatulate and oblongate</td>
<td>Oblongate</td>
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<td>Leaf size (mm)</td>
<td>10-11×2-3</td>
<td>13-40×2.5-8</td>
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<td>Petal Size (mm)</td>
<td>1.2-2×0.2-0.7, long</td>
<td>1.5-1.7×0.5, long cordate</td>
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<tr>
<td>Shape</td>
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<tr>
<td>Sepal form</td>
<td>Linear</td>
<td>Oval</td>
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<tr>
<td>Style size (mm)</td>
<td>0.5-0.7</td>
<td>0.5-1</td>
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<tr>
<td>Silicule</td>
<td>Glabrous, elliptic-ovate</td>
<td>Hairy, elliptic</td>
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<tr>
<td>Silicule size (mm)</td>
<td>4×3-3.5</td>
<td>3.5-5×3-4.5</td>
</tr>
<tr>
<td>Ovulate loculus</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Nectar glands</td>
<td>Long</td>
<td>Very short</td>
</tr>
<tr>
<td>Chromosome number</td>
<td>2n=32 (Fig. 4)</td>
<td>n=8, 2n=16</td>
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<td>Floristic region</td>
<td>Transitional area of Irano-Turanian</td>
<td>Irano-Turanian region</td>
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<td>and Euro-Siberian Regions</td>
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**ACKNOWLEDGEMENT**

The authors would like to thank the curators of the herbaria TARI, IRAN and W for making facilities to study the herbarium specimens. We are also grateful to Dr. A. Falatoury and Miss. A. Shamekhi for preparation of the illustrations.

**REFERENCES**


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