**Abstract.** In the framework of floristic and vegetation studies of different parts of the Hyrcanian region of northern Iran, *Lepidium virginicum* L. (Brassicaceae) is reported here for the first time for the flora of Iran. Along with a distribution map for the species, an identification key is provided for the nine annual or biennial species of *Lepidium*, already reported from Iran.

**Keywords.** alien plant, Asia, Cruciferae, urban areas, Mazandaran
 RESULTS AND DISCUSSION

Type: Herbarium Linnaeus No. 824.18 (lectotype designated by Marais).

Mazandaran Province, Babolsar, on the road of Babolsar to Babol, Imam Khomeini str., 36°41’ 18.05” N; 52°39’ 02.55” E, -22 m a.s.l., 29 June 2017, L. Mamizadeh 8050-HUMZ.

Description

Annual herb, 15-40 cm long. Stems usually simple from base, erect, branched above, puberulent with antrorse/retrorse, sub-appressed indumentums, 0.07-0.2 mm long, deciduous in elder materials. Basal leaves not rosetted, early deciduous, obovate or spatulate. Cauline leaves shortly petiolate; leaf blade oblanceolate or linear, 1-3 cm ×2-5 mm, attenuate or subcuneate toward base, leaf margin entire to serrate, not lobed, antrorse puberulent along margins and midrib and rarely elsewhere. Inflorescence much elongated, with rather dense erect to ascending flowers; rachis and pedicels are puberulent with tiny curved, antrorse/retrorse, cylindric sub-appressed indumentums. Fruiting pedicels slender, spreading, 2.7-4.2 mm × 0.3 mm, glabrous abaxially. Sepals oblong to ovate, ca. 0.8 × 0.5 mm. Petals white, spatulate to oblanceolate, attenuate at base, 1 × 0.3-0.4 mm, rounded at apex. Stamens 2; filaments 0.8-1 mm long; anthers ca. 0.2 mm long. Fruit oblong, glabrous, 2.5-3 mm in diam., narrowly winged apically, apex emarginate; apical notch ca. 0.3-0.5 mm long; width of the lower part of apical notch 0.2-0.3 mm long; style ca. 0.15-0.2 mm long, included in apical notch. Seeds reddish brown, ovate-oblong, narrowly winged, 1.5 × 0.9-1 mm, seed wing in the basal part 0.3-0.4 mm width.

Taxonomic remarks

Lepidium virginicum is closely related and frequently misidentified with L. ruderale, but differs from the latter by having petals, orbicular fruit and lyrate basal leaves (Table 1; Figs. 3). It also differs from L. pinnatifidum by having smaller style and glabrous fruits. Seeds are reddish brown and winged in L. virginicum vs. dullish yellow and wingless in L. pinnatifidum and L. ruderale. L. virginicum is classified in sect. Dileptium DC. This section is characterized by mostly winged fruit, free style, not amplexicaule leaves, 2-4 stamens. Based on a morphometric analysis of some species of this section, quantitative characters of density of the pedicels, length of stem hair, width of the silicle, width of the lower part of the apical notch, length of the beak and width of the wing in the basal part of the seed are regarded as diagnostic characters to distinguish L. virginicum from the most closely related species (Wąsowicz & Rostański, 2009).

Table 1. Comparison between Lepidium virginicum and its most similar species.

<table>
<thead>
<tr>
<th>Characters</th>
<th>L. virginicum</th>
<th>L. ruderale</th>
<th>L. pinnatifidum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves</td>
<td>lower leaves lyrate</td>
<td>lower leaves bipinnate</td>
<td>basal leaves pinnatifid</td>
</tr>
<tr>
<td>Petals</td>
<td>present, white, obovate-spatulate</td>
<td>absent</td>
<td>rudimentary (sometimes absent)</td>
</tr>
<tr>
<td>Fruit</td>
<td>orbicular, winged at apex, apical notch 0.2-0.5 mm</td>
<td>orbicular-elliptic, winged at apex, apical notch 0.1-0.2 mm</td>
<td>elliptic-oval to sub-elliptic, wingless, hardly emarginated</td>
</tr>
<tr>
<td>Style</td>
<td>0.1-0.2 mm, included in apical notch.</td>
<td>obsolete (or 0.1 mm, included in apical notch)</td>
<td>as long as notch or longer</td>
</tr>
<tr>
<td>Seed</td>
<td>reddish brown, winged</td>
<td>dark yellow, wingless</td>
<td>dark yellow or dark rufous, wingless</td>
</tr>
</tbody>
</table>
**Distribution and habitat**


![Image of Lepidium virginicum](image_url)
*Lepidium virginicum* is native to N America and has been introduced and widely naturalized elsewhere (De Carvalho e Vasconcellos *et al.*, 1993; Zhou *et al.*, 2001). In Europe, this is one of the most widespread alien plants occurring in more than 80% of all European countries (Pyšek *et al.*, 2009). The distribution of the species is still expanding (e.g. Protopopova *et al.*, 1994; Ilyinska, 2014; Stoyanov & Vladimirov, 2015). The nearest recorded localities of the plant to Iran are NE Turkey (Davis *et al.*, 1988) and Pakistan (Jafri, 1973).

**Phenology.** Flowering and fruiting from May to July.

![Distribution map of *Lepidium virginicum* in Iran (●).](image)

**Fig. 2.** Distribution map of *Lepidium virginicum* in Iran (●).

![Inflorescence (left) and seeds (right) of *Lepidium virginicum*.](image)

**Fig. 3.** Inflorescence (left) and seeds (right) of *Lepidium virginicum*. 
Determination key for annual/biennial *Lepidium* species of Iran

1. Fruits distinctly costate……………………………………2
2. Fruits without distinct veins………………………………3
3. Fertile stamens 6………………………………………………..L. squamatum
4. Fertile stamens 2………………………………………………..L. didymum
5. Fruiting pedicels adpressed……………………………………4
6. Fruiting pedicels spreading……………………………………5
7. Fruits 2.5-3 mm long, cotyledons entire..L. aecheri
8. Fruits 5-6 mm long, cotyledons trifid..L. sativum
9. Stems with prominent turbinate swellings at nodes………………L. vesicarium
10. Stems not as above…………………………………………..6
11. Cauline leaves apical………………………………………..7
12. Cauline leaves ovate–orbicular, flowers yellow…………………L. perfoliatum
13. Cauline leaves oblong–lanceolate, flowers white………………L. campestrum
14. Fruits ovate, petals absent……………………………………..L. ruderale
15. Fruits orbicular, petals present……..L. virginicum

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REFERENCES


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