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**یافته‌های نوین در علوم زیستی**
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# گزارش گونه جدیدی از سرده ترتیزک (کلمیان) برای فلور ایران

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**چکیده.** در این بررسی آرایه‌ای جدید تحت عنوان *Lepidium ferganense* (تیره کلمیان) برای نخستین بار برای فلور ایران گزارش می‌شود. این آرایه متعلق به منطقه ایرانو-تورانی است. شرح ریخت‌شناسی، تصویر و نقشه پراکنش برای گونه مذکور ارائه می‌گردد. همچنین با نزدیک‌ترین خویشاوند خود مقایسه می‌شود.

**واژه‌های کلیدی.** ایرانو-تورانی، استان خراسان رضوی، شمال شرقی ایران، شرح ریخت‌شناختی

# A new record of *Lepidium* (Brassicaceae) for the flora of Iran

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**Abstract.** In this paper, the new taxa *Lepidium ferganense* (Brassicaceae) was recorded for the flora of Iran for the first time. This taxon belongs to Irano-Turanian region. It was compared with the closest taxa in the present study. In addition, a morphological description, several Illustrations, and a distribution map were presented.

**Keywords.** Irano-Turanian, NE Iran, Morphological description, Razavi Khorassan province

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## INTRODUCTION

*Lepidium* L. is one of the five largest genera of the Brassicaceae with ca. 260 species in the world (Al-Shehbaz *et al.*, 2006). There are 16 species of this genus in Iran (Fakhr Ranjbari, 2017). The distribution areas of the species of this genus are mostly Central, Middle and South West Asia (German, 2014). In this genus, a tendency for some of the flower parts was observed to be reduced to the point of absence, therefore, flower structure is used in subgeneric classification (Hewson, 1981; Bona, 2012). Fruit and seed characters are also valuable. However, the latter tends to have been ignored in *Lepidium*. The characters of vegetative morphology are often used as species-defining characters (Hewson, 1981; Bona, 2012). There are 18 species of the genus *Lepidium* s.l. in Iran, two of which have been reported recently (Al-shehbaz, 2017; Mamizadeh & Naqinejad, 2018).

During the study on *Lepidium persicum* Boiss., specimens collected from NE Iran and deposited in Ferdowsi University of Mashhad Herbarium (FUMH) were invistigated. It was found that a specimen is different in some characteristics from individuals belonging to *L. persicum.* After reviewing and comparing the morphological traits, we came to the conclusion that the specimen belongs to *L. ferganense* Korsh. The species was originally introduced from Central Asia, Fergana (Uzbekistan). This is the first record of this species from Iran. The main morphological features of this taxon are flaccid to ascendence pedicel, oblong-lanceolate stem leaves or leafless and wingless seeds.

## MATERIALS AND METHODS

The present study was performed to evaluate the specimens collected from NE Iran and preserved in Ferdowsi University of Mashhad Herbarium (FUMH). Non-determined herbarium specimens of the genus *Lepidium* have been studied. These specimens were morphologically studied based on available literature (Busch, 1939; Vassilczenko, 1948; Hedge, 1968; Junussov, 1978; Hewson, 1981; Zhou *et al.* 2001; Bona, 2012; Al-Shehbaz, 2012; German, 2014). Also, we studied photographs available in JSTOR global plants (http://plants.jstor.org) and Virtual Herbaria (http://herbarium.univie.ac.at/database /index.php).

The Illustration of the new record was presented and the distribution map of the species in Iran was provided using ARC-GIS (Esri, 2011).

## RESULTS AND DISCUSSION

**Taxonomic treatment**

**New records**

***-Lepidium ferganense*** Korsh. (1898), Flora of Turkestan (1898: 417). Fig. 1, 2.

= *L. persicum* subsp. *arianum* Hedge; Fl. Iranica. 57: 343 Addena (1968).

= *L. seravschanicum* Ovcz. & Junussov in Junussov (1978: 628).

Distribution: Afghanistan, Iran, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, and Xinjiang.

Description: Perennial herbs, (25-) 35-100 (-110) cm tall. Stems simple, few from base, many branched above, glabrous. Basal and lower cauline leaves long petiolate, papery; leaf blades linear-lanceolate or linear-oblong, (2-) 3-12 (-14) × (0.3-) 1-2.5 (-4) cm, base cuneate or attenuate, margin serrate, apex often acute. Upper cauline leaves shortly petiolate; leaf blades linear, (1-) 2-8 (-10) cm × (1-) 2-7 (-10) mm, base attenuate or cuneate, margin entire, apex acute. Fruit stalks (3-) 4-5 (-6) mm, slender, divaricate. Sepals deciduous, ovate, 1-1.5 × 0.8-0.9 mm, glabrous, white at margin and apex. Petals white, broadly obovate, (2-) 2.5-3 × 1-1.4 mm, apex rounded; claw 0.7-1 mm. Stamens 6; filaments 0.9-1.3 mm; anthers ovate, 0.2-0.3 mm. Fruits ovate-oblong or suborbicular, 2.5-3.5 × 2-2.5 mm, glabrous, wingless, carinate at replum, base rounded; apical notch absent or obsolete; style obsolete or rarely to 0.1 mm; stigma wider than style. Seeds reddish brown, oblong, 1.5-2.2 × 0.7-1.2 mm, often 3-angled, wingless, finely papillate.

**Flowering and fruiting:** June-August.

**Habit and Ecology:** Dry mountain slopes; 1870-1900 m.

**Specimen seen:** Iran, Razavi Khorassan province, N Kashmar, Ili pass, 3 km of Chelpo, 1870-1900 m, N: 35º 37′ 10. 4″, E: 58º 30′ 33. 6″, 22.5.2007, Memariani & Zangooei 38929.

**Note:** *L. persicum* subsp. *arianum* has been considered to be a new synonym for *L. ferganense* and this synonymization, with regard to the *L. ferganense*, with highly variable features and wide distribution in neighboring Middle Asian mountains, is obviously unavoidable (German, 2014). The features attributed to the *L. persicum* and *L. ferganense* were compared in Table 1.

The identification key for the perennial species of *Lepidium* thriving in Iran, on the basis of prominent morphological features, is presented here.

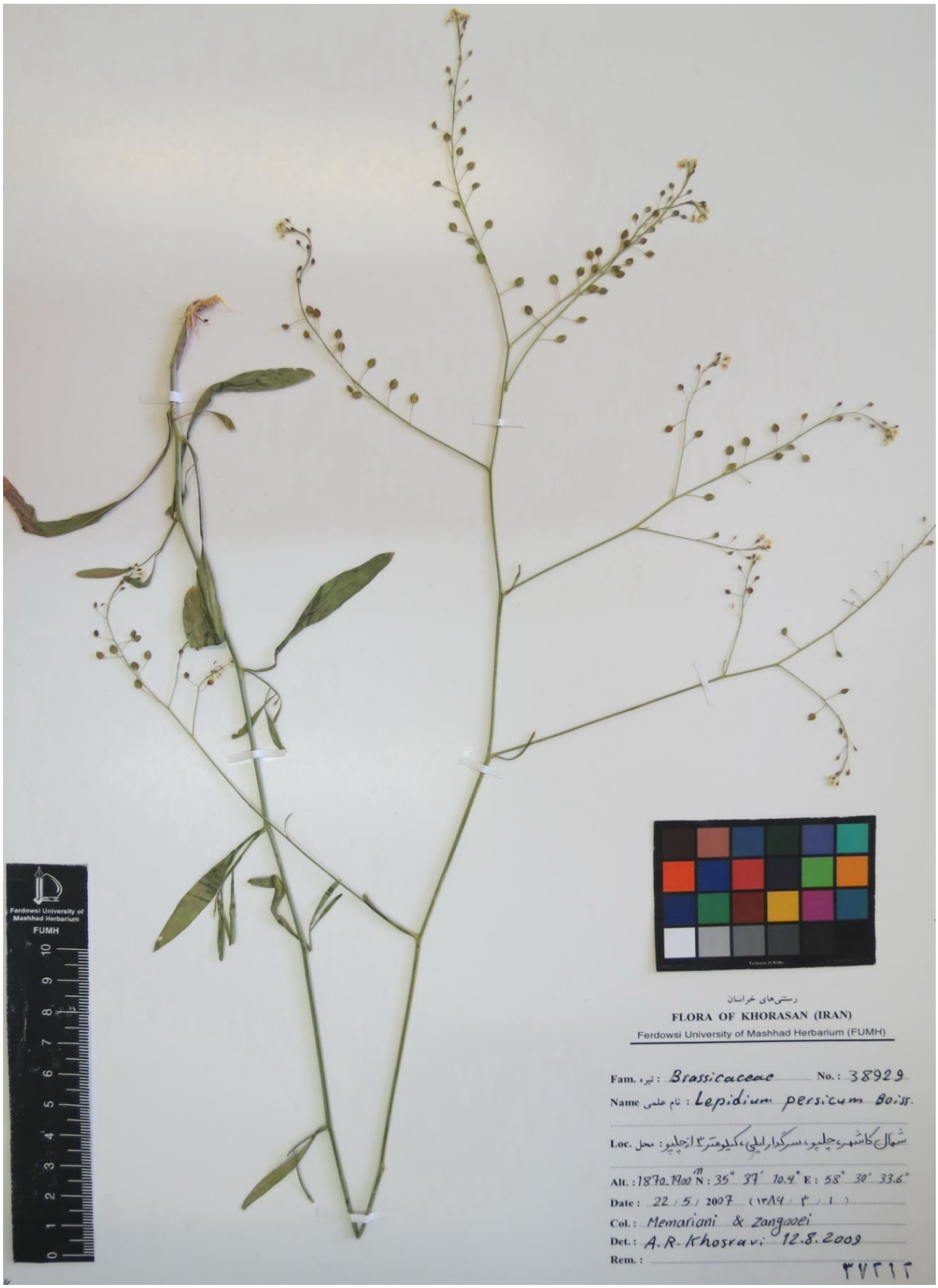



**Fig. 1.** *Lepidium ferganense* Korsh.; Memariani & Zangooei 38929 (FUMH).

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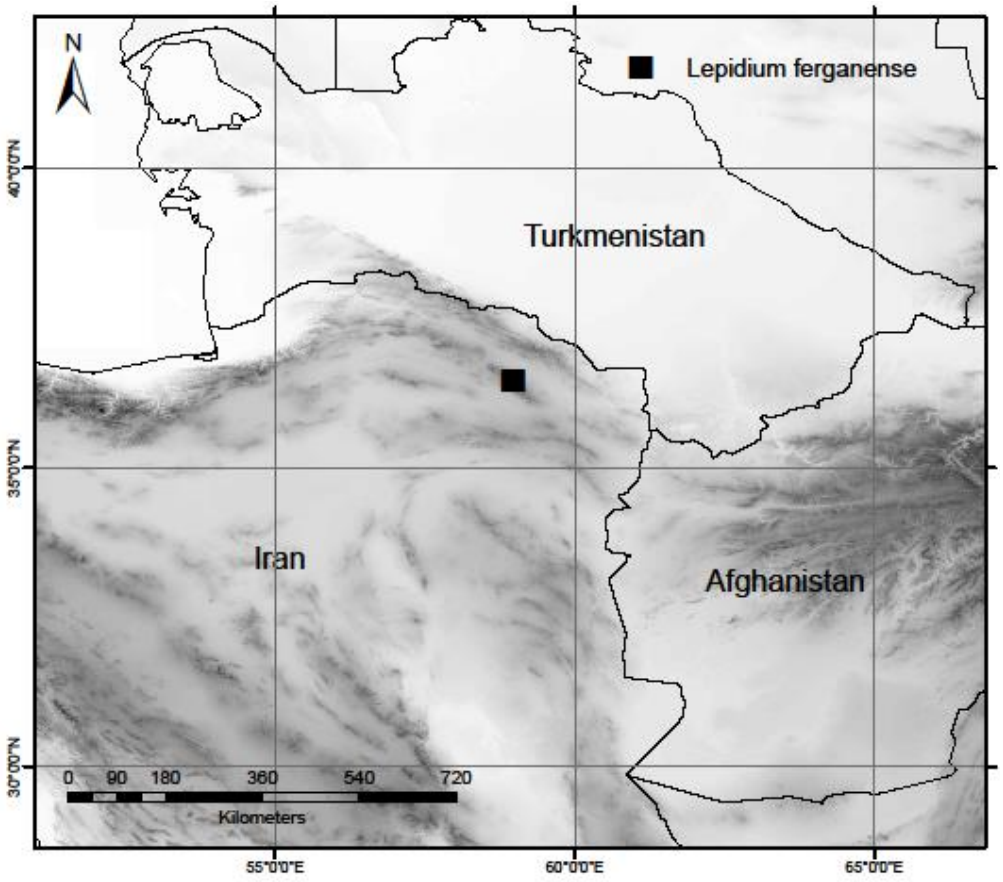



**Fig. 2.** Distribution map of *Lepidium ferganense* Korsh.

**Table 1.** Comparison of the characteristics between *Lepidium persicum* and *L. ferganense*

| **Species**<br>**Characters** | ***L. ferganense*** | ***L. persicum*** |
|---|---|---|
| **Stem leaves** | Oblong-lanceolate | Linear- oblong |
| **Pedicel when fruiting** | Flaccid patule, ascendense, 4-6 mm long | Rigid erect or patule, 1-4 (-5) mmlong, |
| **Seeds** | Wingless | Winged or wingless |

**Identification key for perennials *Lepidium* species in Iran**

1. Plants with orbicular and plump fruits…….....2
- Plants with flattened fruits……..……...…6
2. Plants with stoloniferous stems, without fibrous strands at base; fruits orbicular or ovate, twin in ripening, truncate or cordate at base, indehiscent ……....….*L. draba*
- Plants without stoloniferous stems, without fibrous strands remains of leaves from years ago at base; fruits dehiscent……..……3
3. Stem leaves sessile, amplexicaul…...*L. litwinowii*
- Stem leaves petiolate, non amplexicaul……....4
4. Silicles obovate to ovate, 7-9 mm long; style ca. 1 mm long……...*L. longifolium*
- Silicle ovate or elliptic, less than 7 mm long; style less than 1 mm long……..……5
5. Basal leaves lanceolate-linear, up to 0.8 cm width, middle leaves linar to linear-lanceolate, small numbers……..……..…*L. affghanum*
-Basal leaves lanceolate, 3-4 cm width, middle leaves spatulate or oblanceolate, large numbers……
…….....*L. buschianum*
6. Plants with clavate hairs; ripe silicle prominently reticulated on surface……...*L.cartilagineum*
- Plants glabrous or without clavate hairs; ripe silicle glabrous…..……..……7
7. Uppermost cauline leaves sessile or subsessile, leathery; fruit not carinate, seeds 1-1.3 mm long ……..……....…*L. latifolium*



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- Uppermost cauline leaves papery; fruit carinate, seeds 1.5-2.2 mm ……..…….....8
8. Stem leaves linear-oblong, pedicel when fruiting rigid erect or patule, 1-4 (-5) mm long; seeds winged ……..……..…….…*L. persicum*
- Stem leaves linear-oblong, pedicel when fruiting flaccid patule, ascendense, 4-6 mm long; seeds wingless or winged ……..…..…..*L. ferganense*

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