

## *Atraphaxis radkanensis* (Polygonaceae), a new species from Iran

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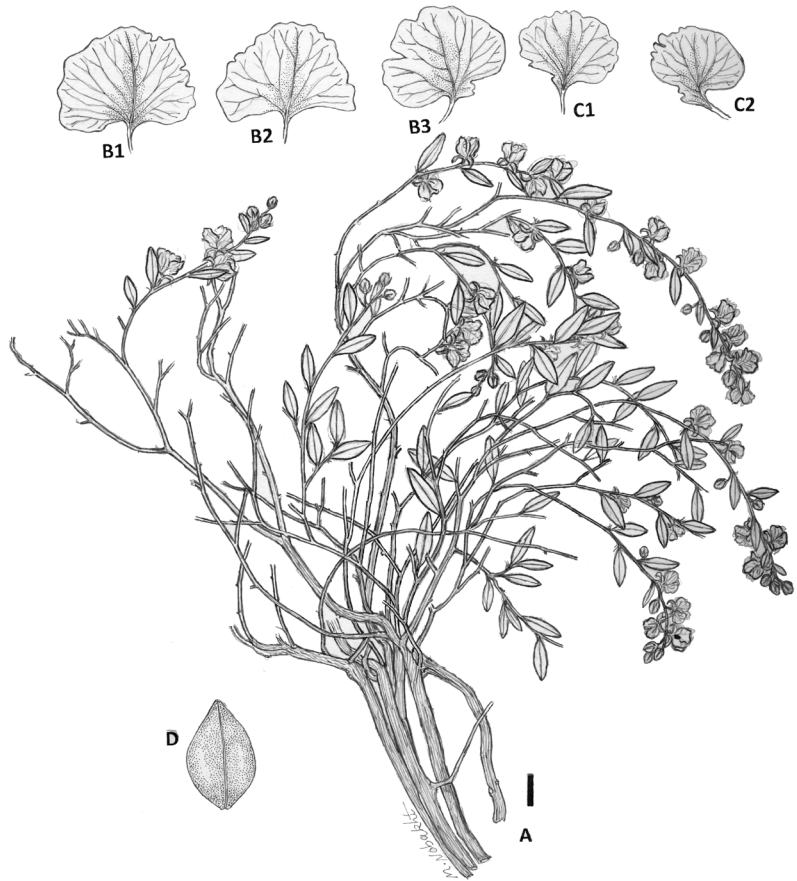
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*Atraphaxis radkanensis* Tavakkoli, Kaz. Osaloo & Mozaff. (Polygonaceae) is described and illustrated as a new species from NE Iran. *Atraphaxis radkanensis* is very similar to *A. seravschanica*, and both of them are placed in the section *Tragopyrum*. *Atraphaxis radkanensis* is characterized by oblong-ovate leaves, a puberulent indumentum on both surfaces of the leaves and twigs, a mostly terminal inflorescence, as well as by small-sized achenes.

*Atraphaxis* belongs to the tribe Polygoneae of Polygonaceae subfam. Polygonoideae (Sanchez *et al.* 2011). The genus comprises 30 species distributed in northern Africa and Eurasia, with the greatest diversity in Central Asia (Pavlov 1936, Cullen 1967, Rechinger & Schiman-Czeika 1968, Brandbyge 1993, Qaiser 2001, Bao & Grabovskaya-Borodina 2003, Shuster *et al.* 2011). In Iran it is represented by six species, including three endemics (Rechinger & Schiman-Czeika 1968, Akhani 1999, Mozaffarian 2006). Recently, two new taxa from the same family were described from Iran: *Polygonum khajeh-jamali* (Khosravi & Poormahdi 2008) and *Rheum khorasanicum* (Jafari *et al.* 2012).

The species of *Atraphaxis* are shrubs or subshrubs, often spiny, with a perianth of 4 or 5 segments, stamens numbering 6 or 8, stigmas 2 or 3, and the achenes lacking wings. They grow in steppe habitats (Brandbyge 1993). On the basis

of the floral characters such as the number of perianth segments, stamens and style as well as achene shape, *Atraphaxis* has been divided into two subgenera: *Atraphaxis* (as *Euatraphaxis*) and *Tragopyrum* (Pavlov 1936) or two sections: *Atraphaxis* and *Tragopyrum* (Rechinger & Schiman-Czeika 1968). In the framework of a taxonomic survey of *Atraphaxis* in Iran, several specimens collected from Golestan province and representing an unknown species drew our attention. Comparison of those specimens with other species of *Atraphaxis* as well as examination of the regional Flora including *Flora Iranica* (Rechinger & Schiman-Czeika 1968), *Flora of Turkey* (Cullen 1967), *Flora of Pakistan* (Qaiser 2001), *Flora of USSR* (Pavlov 1936) and *Flora of China* (Bao & Grabovskaya-Borodina 2003) revealed that the specimens indeed represented an undescribed species.



**Fig. 1.** *Atraphaxis radkanensis* (from the holotype). — **A:** Habit. — **B1–B3:** Inner perianth segments. — **C1** and **C2:** Outer perianth segments. — **D:** Achene. Scale bar: **A** = 2 cm, **B1–B3** = 0.7 cm, **C1** and **C2** = 0.5 cm, **D** = 0.4 cm.

***Atraphaxis radkanensis*** Tavakkoli,  
Kaz. Osaloo & Mozaff., *sp. nova* (Fig. 1)

**HOLOTYPE:** Iran. Golestan Province: Gorgan, south of Kordkuy, between Radkan and Chaman, 1400–1500 m a.s.l., 23 May 1986 A. A. Massoumni 55092 (TARI). — **PARATYPE:** Iran. Golestan Province: Gorgan, Kordkuy, between Radkan and Jahan-nama, 1450 m, V. Mozaffarian 77839 (TARI).

**ETYMOLOGY:** The specific epithet refers to the Radkan village in Golestan Province, where the specimens were collected.

Shrubs 30–50 cm high. Stem thick, densely branched, intricate, ± rigid, woody, bark splitting longitudinally into fibers, grayish, leafy throughout, without spiny tip; current year's branches terminated in a small leaf, slender, greenish, puberulent, internodes 5–10 mm long. Leaves green or grayish-green, short acuminate at apex, oblong-ovate, slightly revolute at margins, quite puberulent on both surfaces, with prominent nerves, shortly petiolate, 7–15 × 4–7 mm. Ochrea shortly

cylindrical, 1–2 mm long, shorter than leaves and internodes, membranaceous or pellucid, with 2 lateral teeth. Flowers 3–5 in terminal fascicles or on short raceme branchlets of the current year; pedicels short, joined below the middle. Perianth segments five, yellowish, obtuse at tip; 3 inner segments of fruiting perianth larger, orbicular, veined, greatly exceeding the achene in both length and width, 7 × 8 mm; 2 outer segments small, orbicular, reflexed, 5 × 6 mm. Ovary 1.0 × 0.5 mm, obovate, trigonous with three styles and a pink capitate stigma. Stamens 8, filaments short, dilated at base. Achenes trigonous-ovoid, dark brown, glabrous and smooth, acuminate, shiny, 2 × 3 mm. Flowering and fruiting in May to July.

*Atraphaxis radkanensis* with its five perianth segments, three styles and eight stamens belongs clearly to section *Tragopyrum*. That section includes also *A. seravschanica*, *A. intricata*, *A. aucheri*, *A. suaedifolia* and *A. tournefortii* in Iran (Rechinger & Schiman-Czeika 1968, Akhani

**Table 1.** Diagnostic morphological characters of *Atraphaxis radkanensis*, *A. seravschanica*, *A. intricata* and *A. tournefortii*.

Characters	<i>A. radkanensis</i>	<i>A. seravschanica</i>	<i>A. intricata</i>	<i>A. tournefortii</i>
Leaf indumentum	puberulent	glabrous	glabrous	glabrous
Leaf size (mm)	7–15 × 4–7	10–20 × 5–10	2–5 × 1.5–4	13–15 × 4–5
Leaf shape	oblong-ovate	ovate-lanceolate	orbicular	elliptic-oblong
Leaf tip	acute	obtuse-acute	obtuse	obtuse
Leaf margin	slightly revolute	slightly revolute	slightly revolute	undulate/crenulate
Petiole (mm)	2	1.5–2	sessile	1.5–2
Twigs of the current year	puberulent	glabrous	glabrous	puberulent
Inflorescence	terminal	lateral	lateral	lateral
Flower size (mm)	5–6 × 4–5	6–7 × 5–6	5 × 3–4	6–7 × 5–6

1999, Mozaffarian 2006). *Atraphaxis radkanensis* plus *A. seravschanica* and *A. intricata* are distributed in NE Iran, whereas the remainder are restricted to N and NW or W Iran. *Atraphaxis aucheri* and *A. suaedifolia* are distinct from the other species of the section in having glabrous linear-lanceolate leaves. *Atraphaxis radkanensis* is morphologically more similar to *A. seravschanica*. There are several diagnostic characters useful in distinguishing this species from congeners (Table 1).

**HABITAT:** *Atraphaxis radkanensis* grows on calcareous-gypsum soil in woodlands dominated by *Juniperus excelsa*, *Crataegus melanocarpa*, *Atraphaxis spinosa*, *Paliurus spina-christi* and *Astragalus denudatus* plus many annual and perennial plants such as *Heterocaryum macrocarpum*, *Medicago* spp., *Taraxacum* spp., and *Festuca* spp.

### Key to the species of *Atraphaxis* section *Tragopyrum* distributed in NE Iran

1. Leaves at most 5 mm long, orbicular, sessile .. *A. intricata*
1. Leaves more than 5 mm long, oblong-ovate or obovate, shortly petiolate ..... 2
2. Leaves and twigs glabrous; inflorescence lateral ..... *A. seravschanica*
2. Leaves and twigs puberulent; inflorescence terminal ..... *A. radkanensis*

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