**ATRAPHAXIS BINALUDENSIS (POLYGONACEAE), A NEW SPECIES FROM NORTHEASTER IRAN**

S. Tavakkoli, S. Kazempour Osaloo & V. Mozaffarian

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**Atraphaxis binaludensis** (Polygonaceae) is described as a new species from northeastern Iran. This species is morphologically similar to *A. intricata* but differs from it in having spiny whitish branches, petiolate obovate-rhomboid leaves, and large flowers. Taxonomic characters and illustration of the new species as well as a key to species from NE Iran are presented.

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**Key words:** Polygonaceae; Atraphaxis; new species; Iran

**INTRODUCTION**

*Atraphaxis* L. at the current status possesses 36 species with xeromorphic shrubby or sub-shrubby characteristics distributed throughout Northern Africa, Eurasia and Central Asia as its main biodiversity center (Cullen 1967; Rechinger & Schiman-Czeika 1968; Pavlov 1936; Brandbyge 1999; Qaiser 2001; Bao & Grabovskaya-Borodina 2003; Shuster & al. 2011; Tavakkoli & al. 2013; Yurtseva & al. 2013). In the recent studies, *Atraphaxis* has been classified in tribe Polygoneae of subfamily Polygonoideae (Sanchez & al. 2011; Schuster & al. 2011). According to floral characters, *Atraphaxis* has been divided into two subgenera, *Euatraphaxis* Jaub. & Spach and *Tragopyrum* Jaub. & Spach (Pavlov 1936) or two sections, *Atraphaxis* and *Tragopyrum* (M.B.) Jaub. & Spach (Rechinger & Schiman-Czeika 1968). The Section *Atraphaxis* is distinguished by four tepals, six stamens, two styles and compressed achenes, while Section *Tragopyrum* is characterized by five tepals, eight stamens, three styles and trigonous achenes.

During the investigation of the specimens belonging to *Atraphaxis* preserved at the herbarium of Research Institute of Forests and Rangelands (TARI), we found a questionable specimen collected from Khorassan province. After consulting regional floras and other relevant literatures (Rechinger & Schiman-Czeika 1968; Cullen 1967; Qaiser 2001; Pavlov 1970; Bao & Grabovskaya-Borodina 2003) as well as herbarium specimens, we concluded that the material actually is a new species of *Atraphaxis*. Considering previous findings together with this new species introduced herein, the number of *Atraphaxis* species increased to eight in Iran, four of which are endemics as follows: *A. aucheri* Jaub. & Spach, *A. suaedifolia* Jaub. & Spach, *A. intricata* Mozaff. and *A. radkanensis* Tavakkoli, 

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

<table>
<thead>
<tr>
<th>Characters</th>
<th><em>A. binaludensis</em></th>
<th><em>A. intricata</em></th>
<th><em>A. seravschanica</em></th>
<th><em>A. pyrifolia</em></th>
<th><em>A. radkanensis</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Branches</td>
<td>spinescent</td>
<td>inermis</td>
<td>inermis</td>
<td>spinescent</td>
<td>inermis</td>
</tr>
<tr>
<td>Leaf size (mm)</td>
<td>5-6×4-5</td>
<td>2-5×1.5-4</td>
<td>10-20×5-10</td>
<td>15-25×10-13</td>
<td>7-15×4-7</td>
</tr>
<tr>
<td>Leaf shape</td>
<td>obovate-rhomboid</td>
<td>orbicular</td>
<td>ovate-lanceolate</td>
<td>spathulate-broadly obovate</td>
<td></td>
</tr>
<tr>
<td>Leaf apex</td>
<td>rounded-obtuse</td>
<td>obtuse</td>
<td>obtuse-acute</td>
<td>shortly acuminate or slightly crenate</td>
<td></td>
</tr>
<tr>
<td>Leaf margin</td>
<td>slightly revolute</td>
<td>slightly revolute</td>
<td>slightly revolute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petiole (mm)</td>
<td>0.5-1</td>
<td>0</td>
<td>1.5-2</td>
<td>3-5</td>
<td>2</td>
</tr>
<tr>
<td>Flower size (mm)</td>
<td>6-8×5-6</td>
<td>5×3-4</td>
<td>6-7×5-6</td>
<td>6-7×7-8</td>
<td>5-6×4-5</td>
</tr>
<tr>
<td>Pedicel length (mm)</td>
<td>2-3</td>
<td>2-3</td>
<td>8</td>
<td>2.5-4</td>
<td>1-3</td>
</tr>
<tr>
<td>Fruit length (mm)</td>
<td>2-4</td>
<td>2-3</td>
<td>3-4</td>
<td>± 3</td>
<td>2-3</td>
</tr>
</tbody>
</table>


**NEW SPECIES**

*Atraphaxis binaludensis* S. Tavakkoli, Mozaff. & Kaz. Osaloo sp. nov. (Fig. 1)

**Type:** Iran. Khorassan province, Neishabour, Bojan village, Binalud Montain, 1500-1700 m, 4 July 1984, V. Mozaffarian 49006 (Holotype: TARI).

Subshrubs ca. 50-70 cm high, much branched. Stem stout, tortuous, with grayish-brown bark, epidermis splitting longitudinally. Branches dense, flexuous, ± rigid, current year’s branches ± straight, soon becoming lignified, grayish white, glabrous, leafless at the ends, pointed and spinescent, internodes 2-5 mm long. Leaves dark green, broadly obovate-rhomboid, rounded obtuse, slightly cuneate at base, 5-6×4-5 mm, glabrous on both surfaces, with abaxially prominent reticulate nerves, slightly revolute margin. Petiole short, 0.5-1 mm. Ochrea membranous, cylindrical, cleft in the upper part, into 2 or 3 lanceolate teeth, shorter than internodes, 1-2 mm long. Pedicel 2-3 mm. Flowers 1-3 in lateral fascicles on the current year branches, 6-8×5-6 mm. Perianth 5, light yellowish-red, turning brown, outer 2 smaller, reflexed in fruit, nearly ovate, the inner 3 larger, slightly unequal, broadly elliptic or orbicular-cordate, greatly exceeding the achene in both length and width. Stamens 8, filaments short, dilated at base. Ovary 3-angled. Style 3. Achenes dark brown, shiny, trigonous-ovoid, acuminate, smooth, 2.4×2.3 mm.

*Atraphaxis binaludensis* is morphologically close to *A. intricata* but differs from it in having spiny whitish branches; petiolate obovate-rhomboid leaves and larger fruits.

**Distribution and ecology:** *Atraphaxis binaludensis* seems to be restricted to Binalud Mountain (Neishabour, Khorassan province) in northeastern Iran. This species grows on calcareous-gypsum soil; other species accompanying this new species are *Pimpinella tragium* Vill., *Bunium persicum* B. Fedtsch., *Leontodon asperrospus* (Willd.) Endl., *Acanthophyllum microcephalum* Boiss., *Astragalus scleroclados* Bunge, *Crucianella gilanica* Trin., *Scorzoneranlla spp.*, *Jurinea spp.*

**Phenology:** Flowering and fruiting time: May to July.

**Affinities:** *Atraphaxis binaludensis* is morphologically close to *A. intricata*. Some of the diagnostic characters that are useful in distinguishing this species from the related species are presented in Table 1. These two species plus *A. seravschanica* Pavlov; *A. aucheri*; *A. suadifolia*; *A. tournefortii* Jaub. & Spach; *A. intricata* and *A. radkanensis* belong to section *Tragopyrum* (Rechinger & Schiman-Czeika 1968; Akhani 1999; Mozaffarian 2006; Tavakkoli & al. 2013). *Atraphaxis seravschanica*, *A. intricata*, *A. radkanensis* and the new species are distributed in northeastern Iran. A diagnostic key to the species of *Atraphaxis* occurring in the Iranian plateau is presented. Referring to increasing of the new species discoveries in the genus *Atraphaxis* in the Iranian plateau, it seems that the plateau is one of the active speciation centers for this genus.

**Etymology:** The specific epithet refers to Binalud Mountain in Neishabour City, Khorassan Province, where the specimen was collected.

Key to the species of *Atraphaxis* (section *Tragopyrum*) distributed in northeastern Iran

1. Leaves and twigs puberulent; leaves acute
   1. *Atraphaxis radkanensis*
   - Leaves and twigs glabrous; leaves mostly obtuse
   2. Leaves more than 5 mm long, ovate-lanceolate
      2. *A. seravschanica*
      - Leaves at most 5 mm long, orbicular to obovate-rhomboid
      3. Branches inermis, leaves sessile
         3. *A. intricata*
      - Branches spinescent, leaves shortly petiolate
         4. *A. binaludensis*
ACKNOWLEDGEMENTS
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REFERENCES
Fig. 1. *Atraphaxis binaludensis*: (A) Habit; (B1, B2, B3) inner perianth segments; (C1, C2) outer perianth segments; (D) flower; (E) Achene (Drawn from the holotype).