



## A new species of *Acanthophyllum* (Caryophyllaceae) from Iran

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### Abstract

The new species *Acanthophyllum yasamin-nassehiae* (Caryophyllaceae) from North Khorassan province (north-eastern Iran) is here described and illustrated. It belongs to the sect. *Oligosperma*, and it is related to *A. lilacinum* and *A. brevibracteatum* from the morphological point of view. Notes on its ecology and conservation status are given.

**Key words:** sect. *Oligosperma*, Endemic species, Irano-Turanian, Taxonomy

### Introduction

*Acanthophyllum* Meyer (1831: 210) is a genus of about 60 species mainly distributed in the Irano-Turanian region, with center of diversity in north-east of Iran and adjacent areas of Afghanistan and Turkmenistan (Takhtajan 1986, Ghaffari 2004). This genus includes small pulvinate shrubs with spiny leaves that grow in open habitats. These taxa are floristic components of steppe and mountain vegetation in Iran (Zohary 1973).

The first classification of *Acanthophyllum* was made by Boissier (1897). He recognized five groups within the genus (any certain taxonomic rank was given). Boissier's classification has been followed by several authors (e.g. Golenkin 1893, Shishkin 1936, Schiman-Czeika 1988). There are two main taxonomic treatments of the genus *Acanthophyllum*. The first one by Shishkin (1936) in the *Flora of USSR* in which two subgenera [subgen. *Acanthophyllum* and subgen. *Allochrusa* (Bunge in Boissier 1867: 559) Shishkin (1936: 799)], six sections, five series and 33 species are recognized. The other important study has been made by Schiman-Czeika (1988) for the Flora Iranica region: seven sections were recognized for *Acanthophyllum*, of which four [sect. *Acanthophyllum*, sect. *Macrostegia* Boissier (1867: 563), sect. *Oligosperma* Shishkin (1936: 783), and sect. *Pleiosperma* Boissier (1867: 565)] occur in Iran.

Several other works have recently been published on the taxonomy of the genus in Iran. Parsa (1951) recognized 18 species [five sections corresponding to the five groups by Boissier (1867)]. Mobayen (1979) reported 17 species without subgeneric classification. Schiman-Czeika (1988) recognized four sections including 33 *Acanthophyllum* species in Iran. Some new records as well as a new species of *Acanthophyllum* for Iran have been recently published (Joharchi & Akhane 2006, Mahmoudi-Shamsabad *et al.* 2012). Basiri-Esfahani *et al.* (2011) reduced the number of Iranian species to 21, on the basis of morphological studies. They followed the sectional classification by Schiman-Czeika (1988), and suggested seven synonymies as well as the treatment of five species at variety rank.

*Oligosperma* is the largest section of *Acanthophyllum*, and represents the most diverse and controversial group (Ghaffari 2004, Mahmoudi-Shamsabad *et al.* 2012). It includes shrubs with elongate internodes, cushion-forming shrubs and, subshrubs with extremely reduced stems and imbricate leaves. All members of the section have inflorescences in cymes (compound dichasia), five sepals, five clawed pink to lilac petals, 10 exerting stamens and 4-ovuled ovaries.

During a field investigation in the NE Iran in 2008, a new *Acanthophyllum* species was observed from North Khorassan province. Several individuals were collected and studied. The species was carefully compared with *Acanthophyllum* specimens at B, BM, FUMH, G, GB, JE, K, LD, M, MSB, TARI, TMRC, TUH and WU herbaria (codes according to Thiers 2011).

Because of the complexity of the inflorescence structure in the genus *Acanthophyllum*, the definition of some parts is necessary: “floral leaves”, the leaves subtending each inflorescence branch; “upper floral leaves”, the leaves subtending the inner branches of the inflorescence; “lower floral leaves”, the leaves subtending the outer branches of the inflorescence; “cymule”: the smallest part of a compound dichasium; “bracts”, the leaves subtending each cymule; “bracteoles”, the leaves subtending each flower.

***Acanthophyllum yasamin-nassehiae*** Joharchi & Pirani, *sp. nov.* (Fig. 1).

Type:—IRAN. North Khorassan province: NE Jajarm, 19 km west of Showqan village, 37° 20' 21.0"N, 56° 40' 36.1"E, 1256 m, 7 September 2008, *Memariani & Zangoeei 41448* (holotype FUMH!).

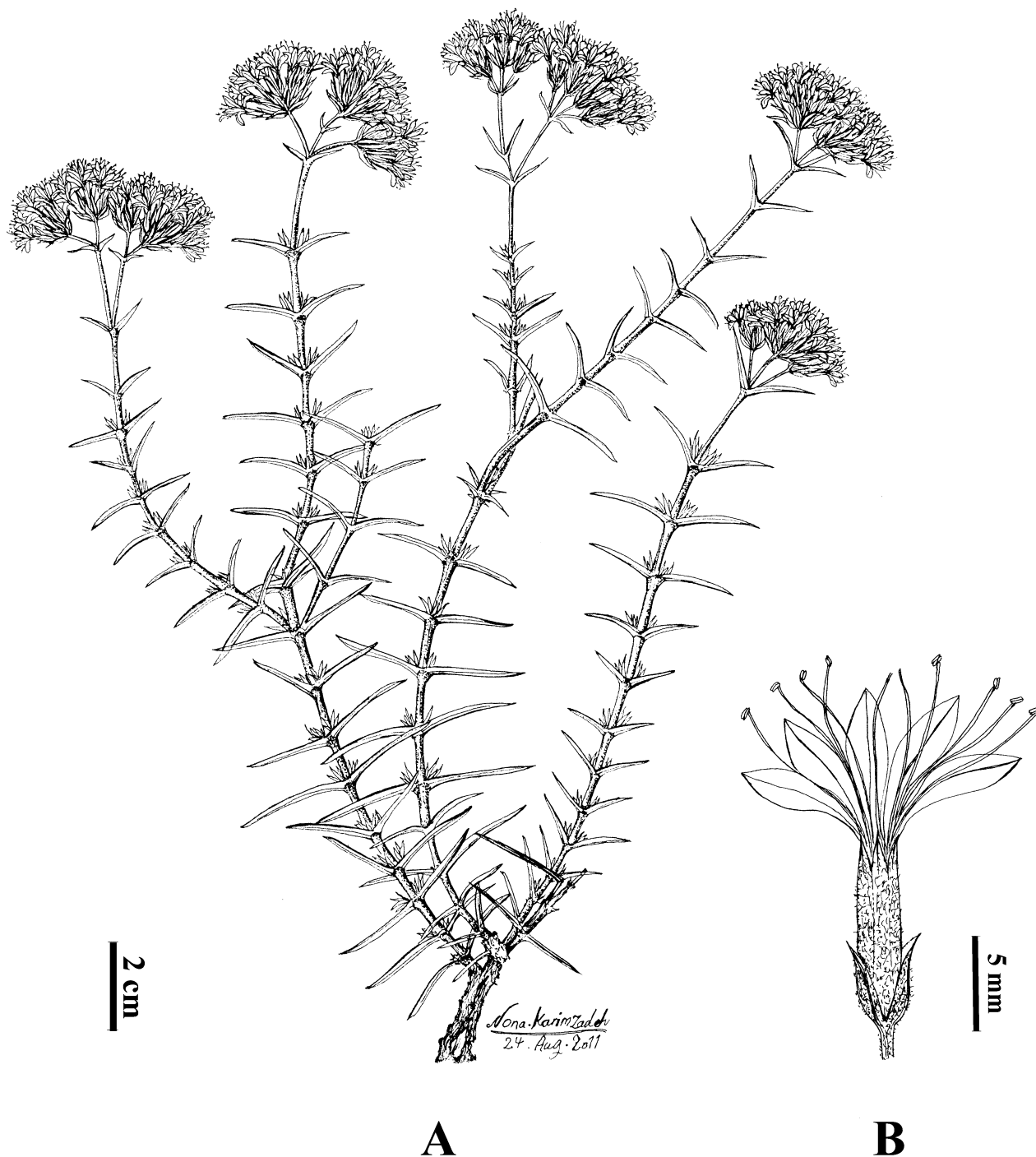
**Diagnosis:**—*Similis A. lilacino et A. brevibracteato, sed differt ab A. lilacino bracteis calyce brevioribus, foliis crassiusculis, indumento non scabrido et differt ab A. brevibracteato caulibus a medio valde ramosus, bracteis convicibus, calycibus non angulato-costatis.*

**Description:**—Subshrub, pulvinate, 25–30 cm high, densely branched from the middle (few branches at the base), covered with ±dense and simple to multicellular hairs. Stems brownish; internodes subequal, (8–)9.5–10.5(–12) mm long. Leaves subulate, (13–)14.5–16.5(–18) long, 1.5–2 mm wide, sparsely hairy, rigid, thickened, horizontally spreading, with a terminal yellowish mucro. Inflorescence cymose, multi-flowered, (18–)20–40(–45) mm in diameter, with peduncles 10–12 mm long; flowers sessile. Floral leaves 6–14 × 1.5–2 mm, the uppers bract-like, the lowers leaf-like, not exceeding the calyx. Bracts shorter than calyx, 5.5–6 mm long, 1.5–2 mm wide, lanceolate, narrowly hyaline at the margins, mucronate, with prominent midrib, sometimes recurved at the apex. Bracteoles similar to the bracts, 4.5–5 mm long, about 1.5 mm wide, lanceolate, hyaline at the margins, mucronate, with prominent midrib, sometimes recurved at the tip. Calyx tubular, 5-ribbed, 7–8 mm long, with 5 subequal teeth; teeth 0.5–1 mm long, narrowly triangular, mucronulate. Petals pink, clawed, blade lanceolate, obtuse at the apex, 12–12.5 mm long, about 2 mm wide, about 5 mm longer than the calyx. Ovary ovate, styles 11 mm long, ovules 4. Stamens 5, about 14 mm long. Fruit capsule, with one mature seed. Seed ovate-reniform.

**Etymology:**—The species is dedicated to Mrs. Yasamin Nasseh, the Iranian botanist at Herbarium of Ferdowsi University of Mashhad (FUMH).

**Distribution, ecology and conservation remarks:**—*A. yasamin-nassehiae* is a narrow endemic species currently known only from the type locality. Its distribution area overlap with those of the related species (Fig. 2). The new species includes late summer flowering plants which grow on semi-saline soils of the plain located between southern foothills of Aladagh mountain range in SW Bojnord and northern foothills of Salook and Bahar ranges in NE Jajarm. The main co-occurring species are *Astragalus podolobus* Boissier (1849: 49), *Diaphanoptera khorasanica* Rechinger (1940: 42), *Suaeda microphylla* Pallas (1803: 52), *Halothamnus glaucus* (von Bieberstein 1808: 185) Botschantzev (1981: 157), *Halimocnemis pilifera* Moquin-Tandon in De Candolle (1849: 195), *Kaviria aucheri* (Moquin-Tandon in De Candolle 1849: 207) Akhani (in Akhani *et al.* 2007: 948), *Pyankovia brachiata* (Pallas 1803: 30) Akhani & E.H. Roalson (in Akhani *et al.* 2007: 949), and *Sophora pachycarpa* Schrenk ex Meyer (in Fischer *et al.* 1843: 89). The habitat of *A. yasamin-nassehiae* is threatened by human activities (road constructions between Showqan and Jajarm). On the basis of the IUCN Red List categories and criteria (IUCN 2010) this species is here evaluated as critically endangered [CR, B1ab(iii) + B2ab(iii)]. Another endangered endemic species (*D. khorasanica*) grows in the same place of *A. yasamin-nassehiae*. Therefore, a conservation planning for the threatened ecosystem and species is needed.

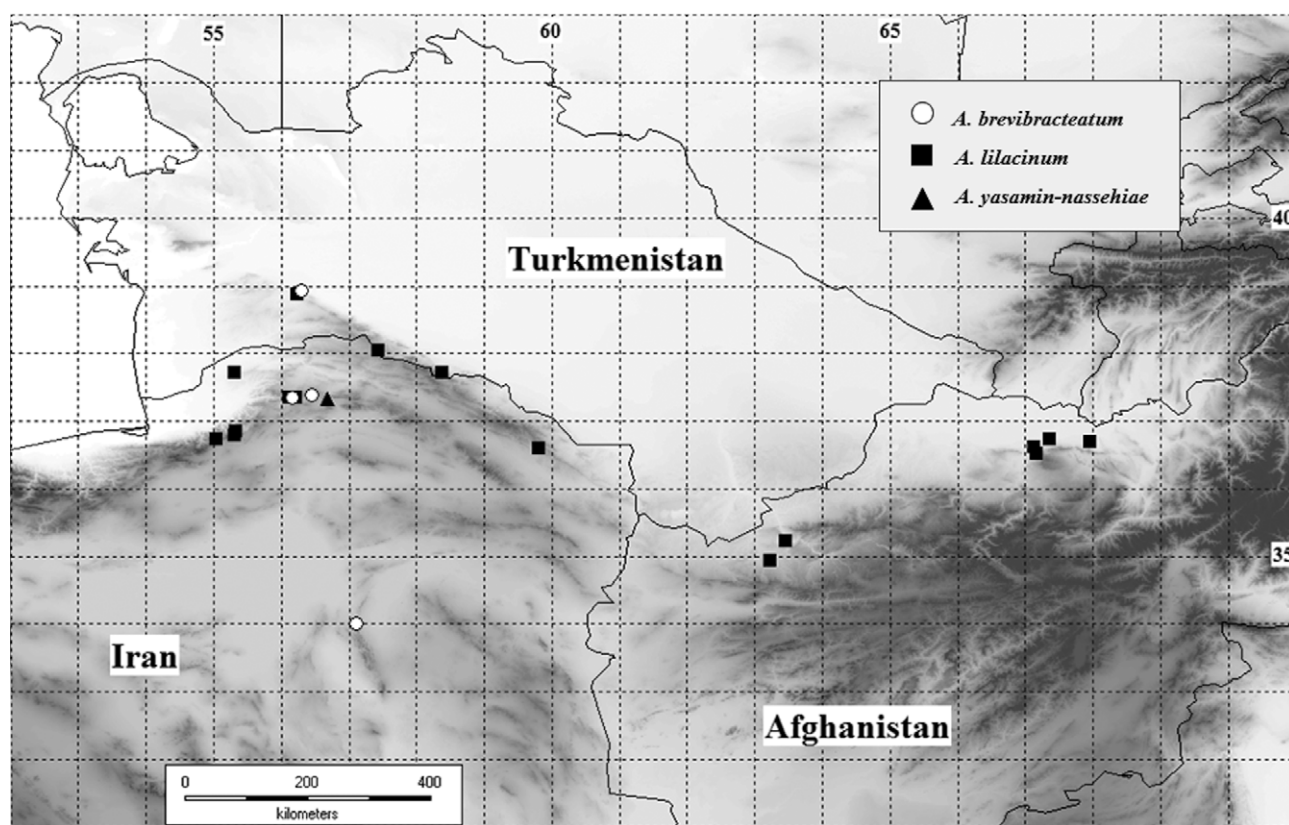
**Taxonomical notes:**—The new species certainly belongs to sect. *Oligosperma*, showing however peculiar inflorescence and stem characteristics. Morphologically similar species are *A. brevibracteatum* Lipsky in Shishkin (1936: 790) and *A. lilacinum* Shishkin (1936: 787, 892). It is characterized by short bracts never exceeding the calyx, non-glandular hairs, and brownish stems which are densely branched from the middle. It differs from *A. brevibracteatum* in having dense simple to multicellular hairs, non-angled ribs of the calyx, and convex bracts with hyaline margin, while differs from *A. lilacinum* by short bracts with non-crisped hairs, and by short thickened leaves (Table 1).



**FIGURE 1.** *Acanthophyllum yasamin-nassehiae* (drawing by Nona Karimzadeh from holotype). A: Habit, B: Flower.

**TABLE 1.** Morphological comparison of *A. yasamin-nassehiae*, *A. lilacinum* and *A. brevibracteatum*. The characters are based on studies of the only one know population of *A. yasamin-nassehiae* (five individuals), fifteen populations of *A. lilacinum* and five populations of *A. brevibracteatum*.

	<i>A. yasamin-nassehiae</i>	<i>A. lilacinum</i>	<i>A. brevibracteatum</i>
Stem	densely branched from the middle, brownish	densely branched from the base, violet-tinged	densely branched from the base, non-violet-tinged, non-brownish
Indumentum	simple to multicellular hairs all over, glandular hairs absent	scabrid hairs; crisped hairs on bracts, short glandular hairs intermixed on inflorescence region	scabrid hairs; crisped hairs on calyx, short glandular hairs intermixed on stem and leaves
Internodes	(8–) 9.5–10.5 (–12) mm	(10–) 14–20 (–30) mm	(5–) 7–15 (–17) mm
Leaves	(13–) 14.5–16.5 (–18) mm long, thickened, horizontally spreading	(20–) 25– 35 (–40) mm long, non-thickened, obliquely ascending	(12–) 15– 20 (–30) mm long, non-thickened, ±horizontally spreading
Calyx ribs	non-angled	non-angled	angled
Bracts	5.5–6 × 1.5–2 mm, obviously shorter than calyx, convex at base, narrowly hyaline-margined	8–12 × 2.5–3 mm, longer than calyx, often convex at base, covered with ± dense crisped hairs, non-hyaline-margined	5–7 × 1–1.5 mm, shorter than or equal to calyx, keeled or shield-shaped at base, narrowly hyaline-margined toward the base
Petal blade	lanceolate, obtuse	narrowly obovate, acute	narrowly obovate, acute



**FIGURE 2.** Distribution map of *A. yasamin-nassehiae*, *A. lilacinum*, and *A. brevibracteatum*.

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