

A new species and a synonym in Chenopodiaceae from Iran

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Abstract:

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Salsola zehzadi Akhani is described as a new species from the gypsum hills of E Iran in the Khorasan province. The newly described species *Halotis pedunculata* Assadi is reduced to synonymy of *Halimocnemis purpurea* Moq. Difficulties on the taxonomic ambiguity of the latter are discussed and a description and distribution map are given.

Zusammenfassung:

Salsola zehzadi Akhani wird als eine neue Art von Gipshügeln aus dem Osten Irans in der Provinz Khorasan beschrieben, die kürzlich beschriebene Art *Halotis pedunculata* Assadi in die Synonymie von *Halimocnemis purpurea* Moq. gestellt. Schwierigkeiten der taxonomischen Stellung von *Halimocnemis purpurea* werden diskutiert, sowie eine Beschreibung und Vorbereitungskarte angegeben.

Introduction

The family *Chenopodiaceae* is one of the most critical families of the Iranian flora. The account of this family in *Flora Iranica* was finished four years ago, however, due to technical problems it has not yet been published. A look to the proofs of the accounts of *Salsola*, *Halanthium* and *Halimocnemis* in the *Flora Iranica* leads me to describe a new *Salsola* and discuss the taxonomic ambiguity of *Halimocnemis purpurea* Moq.

A new *Salsola*

During my visit to Mashhad University Herbarium in January 1991 a characteristic *Salsola* species was found there. Further studies in the field and study of a lot of materials in Iran and the specimens studied for *Flora Iranica* in Kassel proved its novelty. The species is named after and in honour to Mr. B. Zehzad, my first teacher of Botany (Shahid Beheshti University, Tehran).

Salsola zehzadi Akhani, sp. nov.

Holotype: Khorasan: E of Torbat-e Jam, between Mohammad-abad and Malu, 22.10. 1991, 700 m, *Faghihnia & Zangui*, 21222 (Hb. AKHANI!, Iso: M!, Mashhad University Herbarium!).

Species et sectione *Belanthera* Iljin, differt a *S. tomentosa* (Moq.) Spach habitu majore, apice tepalorum excepta glaberrima, foliis majoribus, fasciculatis, atroviridibus, succulentis.

Dwarf subshrub, 30–60 cm tall, much branched at the woody base, except the upper parts of the tepals completely glabrous, even in young state; stems ascending, erect, like the branches white, shining; lower branches robust and straight, inflorescence branches oblique. Leaves very fleshy, dark green, terete, linear, with a fasciculate arrangement of 3–5; outer leaves of the lower cauline parts 10–20 × 2–3 mm, slightly curved towards the axis, obtuse in living state, changing acute after drying; inner leaves 1/3 to 2/3 as long as the outer ones. Bracts terete to semiterete, shorter than leaves, as long as or slightly longer than the perianths. Bracteoles 5–6 × 2 mm, widened at the base, with hyaline margin, connate to each other at base, obtuse. Flowering tepals membranaceous, 3–3.7 mm long, 1–1.4 mm broad, 3-veined, apex obtuse, indistinctly lobed; transversal line at 1/3 of the length; above the line with a tuft of multicellular hairs 1.2–1.5 mm long. Fruiting perianths including wings 7–10 mm in diameter, pale yellow to pale pink, the older ones becoming black in the lower part; tepals above the wing forming a cone, covered by a tuft of whitish hairs. Stigma 2, 0.8 mm, papillose in the middle, naked at the apex. Filaments 3–3.2 mm long, inserted near the base of tepals, without staminal disk. Thecae 1.5 mm long, divided up to the appendage, appendage 1.1 mm long, triangular, acute.

Specimens seen:

Iran. Khorasan: E of Torbat-e Jam, between Mohammad-abad and Malu, 22.10.1991, 700 m, *Faghihnia & Zangui*, 21222 “fruiting specimen” (M, Mashhad University Herbarium, hb. AKHANI). – c. 37 km E of Torbat-e Jam, 9 km after Mohammad-abad towards Malu, gypsum hills, 750–760 m, 15.8.1994, *Akhani & Zangui 10029* “flowering specimen” (M, hb. AKHANI) – c. 38 km E of Torbat-e Jam, 11 km after Mohammad-abad towards Malu, gypsum hills, 720–740 m, 15.8.1994, *Akhani & Zangui 10035* “ (M, hb. AKHANI).

This species more likely belongs to the sect. *Belanthera* Iljin, however, none of the members of this section are completely glabrous. Moreover this species can be distinguished from other related ones by its fasciculate leave arrangement and dark green leaf colour. The very fleshy leaves are also peculiar, so the species looks like a *Suaeda* in life. It is likely to be closely related to *Salsola tomentosa* (Moq.) Spach. This latter is a very variable species widely distributed in Iranian deserts and semi-deserts. Despite of its highly variable range in respect to the indumentum and habit, it is never completely glabrous in the young state and the leaves are semiterete, not or only slightly fleshy and without a fasciculate arrangement. The collected *S. tomentosa* from the same locality (*Akhani 10043*, M, hb. AKHANI) has a lower growth habit, whitish tomentose indument and not fleshy leaves. In the subglabrous populations of *S. tomentosa* there is always a correlation between glabrescens of the vegetative parts and the perianth. In *S. zehzadi* on the other hand, the glabrous nature of the vegetative parts and the hairy perianth are not correlated. Its fleshy leaves, habit and even its ecology show some similarities with *S. aucheri* (Moq.) Iljin, however it can be distinguished from this by its glabrous habit, dark green colour (not glaucous), shorter and not carinate bracts and bracteoles and by the fact that it does

not have a fasciculate leaf arrangement. The leaf arrangement of this species is similar to *S. abarghuensis* Assadi (ASSADI 1984: 136), but in other characters it is totally different.

Distribution and ecology:

On the basis of our present knowledge *S. zehzadi* is confined to the gypsum hills east of Torbat-e Jam in the Khorasan province along the Afghanistan frontier. Its occurrence in Afghanistan is to be expected (see map 1). The species grows in the gypsum hills in an area about 4 km long, where it is the main component of the vegetation. Associated species are: *Atraphaxis spinosa*, *Limonium sogdianum*, *Ephedra intermedia*, *Artemisia cf. turanica* and *Salsola tomentosa*. The vegetation is that of a very dry climate.

What is *Halanthium purpureum*?

During a joint Chenopod expedition with Mr. M. Assadi in 1987 we collected an interesting species from South Iran between Bastak and Bandar-e Lengeh. Two years later I found the same plant in the Southwest of the Iran, in the lowlands of the Ilam province. With the help of an illustration given for *Physogeton acanthophyllus* Jaub. & Spach in Ill. Pl. Or. 2: 48, tab. 135, 1846, I concluded that these gatherings with a characteristically large and vesicular purplish anther appendage could be the same as the illustrated plant by Jaubert & Spach. But because of the long distance and different phytogeographical area of our gathering from the Southern Iran and the type locality of *Physogeton acanthophyllus* (or its validly published older name *Halimocnemis purpurea* Moq.) in Western Iran we had doubts about their identity.

In 1990, I had the possibility to study the type of this species in Paris. Despite of the young and sturdy state of the type, the characteristic large and vesicular anther appendage is peculiar. The purplish colour of the appendage disappeared over time. On the same label there are three generic names: *Physogeton*, *Halanthium* & *Halimocnemis*. In autumn 1992, I made another expedition to the Ilam province and collected fruiting specimens. Field observations and the collected fruiting material showed clearly, that the perianth segments are wingless. Therefore it belongs to the genus *Halimocnemis* and not to *Halanthium*. In 1993, I discussed the problem with Prof. H. Freitag and he kindly gave me a copy of the unpublished accounts of the genera *Halanthium* and *Halimocnemis* of the Flora Iranica written by I.C. Hedge. HEDGE (in press) followed Bunge's and Boissier's opinion and placed this species under *Halanthium* with this note: "I find this one of the most problematic of all our species, and even after studying type material and quite a wide range of other specimens, I do not feel confident about the description or correctness of all the identifications". At the same time ASSADI (1992: 60) published a new *Halotis pedunculata* on the basis of our own earlier collection in 1987. In my opinion MOQUIN (1840: 153) has correctly described the species under the genus *Halimocnemis*.

Another problematic matter in this species is its type locality in the West of Iran with a different phytogeography. Attempts to rediscover it in type locality have failed. The problem could be interpreted due to wrong or mixed label. We have discussed another example of such ambiguity in Aucher's collection for *Heliotropium aucheri* Moq. (see AKHANI & FÖRTHNER 1994: 200).

Halimocnemis purpurea Moq., *Chenopod. Monogr.* 153 .1840 ≡ *Physogeton acanthophyllus* Jaub. & Spach. *Ill. Pl. Or.* 2: 48, tab. 135, 1846. ≡ *Physogeton purpureus* (Jaub. & Spach) Moq., in DC., *Prodr.* 13, 2: 202, 1849 ≡ *Halanthium purpureum* (Moq.) Bunge, *Mém. Acad. Imp. Sc. Pétersb.* 7 sér., 4, 11: 85, 1862 ≡ *Halogeton purpureus* Fenzl in Ledeb., *Fl. Ross.* 3: 833, 1851 in nota. **Type:** Persia, [? prope Hamadan], *Aucher-Eloy 2777* (P!, G-DC: microfish in M!).
 = *Halotis pedunculata* Assadi, *Iran. J. Bot.* 5(2): 60, 1992 (1993). Holotype: Hormozgan: 8 km from Bastak to Bandar-e Lengeh, 800 m, 30.11.1987, *Assadi & Akhani 61930* (TARI!).

Fig.: JAUBERT & SPACH l.c. (under *Physogeton acanthophyllus*); ASSADI l.c. 61: fig. 2 (under *Halotis pedunculata*).

Annual, prostrate to ascending, 15–50 cm high, woody and much branched at the base, glaucous green, stem perpendicularly branched from base to apex; lower epiderm whitish, sometimes tinged in branching parts; pubescent with short patent to semiappressed upward hairs 0.1–0.3 mm long; margin of leaves and bracts with few long spreading hairs, 2–5 mm long. Leaves linear, 2–5 cm long, 2–3 mm broad, semiterete, canaliculate after drying, pubescent, lower margin with long hairs up to 5 mm, pointed at apex. Bracts (floral leaves) 1–2 cm, recurved, hardened and indurated at base, semiamplexicaule, carinate on the back, widened at the base, hyaline at margin. Bracteoles as long as perianth. All branches even the lowermost bearing flowers. Perianth segments 5, oblong-lanceolate, membranaceous, 8–10 mm long, 2–3 mm broad in fruiting time, hardened in lower 1/2 to 2/3, pubescent on the back, at the middle with a small transversal outgrowth, obtuse and indistinctly lobed at the apex. Filaments c. 6 mm long, 0.7 mm broad; thecae 2 mm long, divided nearly to the appendage; appendage obovate, nearly sessile. Style 1 mm long. Stigma subulate, c. 3 mm long, papillose at apex.

Specimens seen:

Iran. Khuzestan: Inter Seytun et Behbahan, *Hausksnecht* (P). – Ilam: ca. 25–28 km N of Mehran, Konjancham river margin, c. 300 m, 16.10.1992, *Akhani 9036* (M, hb. AKHANI) – ca. 45 km from Mehran towards Dehloran, Changooleh river margin, ca. 300 m, 16.10.1993, *Akhani 9043* (M, hb. AKHANI) – ca. 15 km NE of Mehran, Konjancham river bed, ca. 350 m, 3.8.1989, *Akhani 5448* (KAS, MMTT). – Hormozgan: 8 km from Bastak to Bandar-e Lengeh, 800 m, 30.11.1987, *Assadi & Akhani 61930* (TARI). – not exactly to localize: Persia. [? prope Hamadan], *Aucher-Eloy 2777* (P). – Other materials given by ASSADI (1992): Hormozgan: 170 km from Bandar Abbas to Lar, 450 m, *Foroughi & Assadi 15064* (TARI). – Bushehr: 15 km NW of Ganaveh, 30 m, *Bokhari et al. 14803* (TARI).

Distribution and ecology:

Based on the material cited above *Halimocnemis purpurea* has a wide distribution in the South and Southwest of the Iran from the Hormozgan to the Ilam province (see map. 1). The occurrence of this species near the frontier of the Iraq suggests that this species more likely could be found in similar habitats in the Iraq. Phytogeographically it seems to be an Irano-Sindian element, a subdivision of Saharo-Sindian regional zone (see LÉONARD 1989). The habitat of this plant in the lowlands of the Ilam province is the margin of rivers (Konjancham and Changooleh rivers) on sandy-gravelly and disturbed soils, surrounded by gypsum hills. The associated species are: *Carthamus oxyacantha*, *Amaranthus albus*, *Heliotropium crassifolium*, *H. noeanum*, *H. suaveolens* and *H. europeum* s.l.

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I am indebted to Prof. Dr. H. Freitag (Kassel) who gave me a copy of his unpublished account of the genus *Salsola* and the genera of *Halanthium* and *Halimocnemis* (written by I. C. Hedge) and thank him for his valuable discussions. I further appreciate the great helps of my friends in Mashhad University Herbarium (Dr. M. H. Rashed, Mr. M. R. Joharchi, Mr. Zangui and Mrs. H. Safavi) and those of Natural History Museum of Iran and Research Institute of Forests and Rangelands for their generous cooperations during field studies and herbarium visits. The improving of the English text by Dr. W. Kofler (Munich) is also much grateful.

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Map 1. Distribution of ● *Halimocnemis purpurea* Moq.
★ *Salsola zehzadi* Akhani

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