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Studies on the flora and vegetation of the Golestan National Park, NE Iran, I: A new species and some new plant records

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Abstract

Laser rechingeri AKHANI (Umbelliferae) is described as an isolated new species from limestone cliffs in the Golestan National Park, NE Iran. The following are new additions to the Iranian flora: *Cousinia leucantha*, *Erysimum kerbabaevii*, *Jurinea antonowii*, *Mattiastrum turcomanicum*, *Melilotus dentatus*, *Ononis spinosa* ssp. *antiquorum*, *Tragopogon capitatus*.

Key words: Umbelliferae, *Laser*, new species; Flora of Golestan National Park, Iran, new records.

Zusammenfassung

Laser rechingeri AKHANI (Umbelliferae) wird als eine neue, isolierte Art von Kalkfelswänden des Golestan Nationalparks im Nordosten Irans beschrieben. Folgende Sippen werden zum ersten Mal für den Iran aus demselben Gebiet nachgewiesen: *Cousinia leucantha*, *Erysimum kerbabaevii*, *Jurinea antonowii*, *Mattiastrum turcomanicum*, *Melilotus dentatus*, *Ononis spinosa* ssp. *antiquorum*, *Tragopogon capitatus*.

Introduction

The Golestan National Park, situated in northeast Iran in the three provinces of Mazandaran, Khorasan and Semnan (Fig. 1), covers 91895 hectares. The altitude varies from ca. 400 m s.m. in Tang-e Rah to 2411 m s.m. at the summit of Divar Kaji mountain (Aq-Mazar). The geographical position of the area, between the south Caspian forest belt, the *Juniperus* woodlands and the steppe of northwestern Khorasan, provides a unique area with very diverse vegetation and wildlife (FREY & KÜRSCHNER 1977, HASSAN-ZADEH KIABI & al. 1994). The vegetation has been studied by FREY (1980) on the basis of physiognomical and ecological features, and a list of known bryophytes was provided by FREY & KÜRSCHNER (1977). About 20 years ago, Rechinger & Wendelbo planned to provide a list of the flowering plants of the Park, based on their collections and field notes. However, this never materialized because of the Iranian revolution and the death of Prof. P. Wendelbo (RECHINGER 1989: 335). Nevertheless, there are many reports of the plants of the area in Flora Iranica, particularly those published after 1976. ZEHZAD (in HASSAN-ZADEH KIABI & al. 1994) listed 584 species from the published volumes of Flora Iranica or others published work, and a few species added by him.

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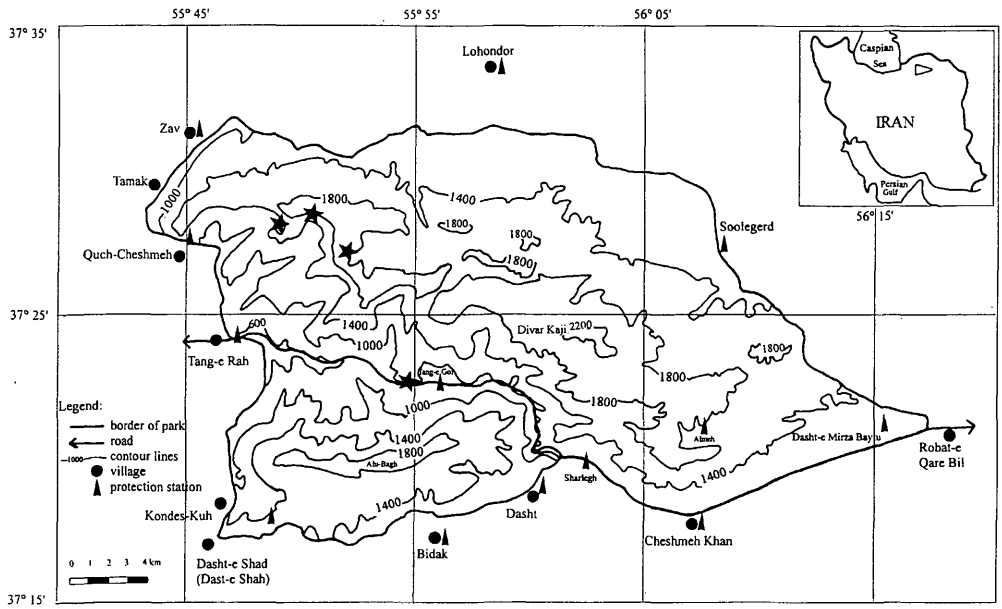

Fig. 1.: Map of Golestan National Park, showing distribution of *Laser rechingeri* AKHANI (★).

The study of the flora and vegetation of this area was undertaken by the author in a dissertation started in 1993. In the course of this study I found several new plant records to Iran and some new species to science. In this brief contribution, one of the interesting isolated new species is named in honour of Prof. Dr K. H. Rechinger, the pioneer of botanical researches in many parts of the huge territory of Iran and neighbouring countries.

Material & Methods

I collected 772 specimens in the Park during 1987, 1988 and 1989 (in part jointly with Dr M. Ghorbanli & Dr A. Shahsavari). Furthermore, I collected 2800 specimens during July and August 1994 and from April to October in 1995. I obtained over 500 specimens collected by Firuznia and Zehzad of the Natural History Museum of Iran and Shahid Beheshti University. During my herbarium visit to Vienna (March 1995) I studied the collection of Iranshahr, Termé, Rechinger, Wendelbo and Uotila. A total of over 5200 specimens has been studied. It is too early to give a precise number of all the flowering plants in Golestan National Park, but the existence of over 1200 species has been well-documented. Here, a new species and seven new records are added to the Iranian flora. Following abbreviations adopted for the herbaria not yet included in Index Herbariorum (HOLMGREN & al. 1990): Institut für Systematische Botanik, München [MSB], Natural History Museum of Iran, Tehran [MMTT]; Shahid Beheshti University, Tehran [SBUH] and my private herbarium [hb. Akhani].

Fig. 2.: *Laser rechingeri*, isotype (Akhani 12023) in [W].

Results & Discussion

Laser rechingeri AKHANI sp.n. (Umbelliferae)

Herba perennis, glauca, usque ad 110 cm alta, glaberrima; caulis solidus, collo fibroso. Folia basalia, 1 - 2-pinnata, triangulari-obovata, (15 -) 30 - 45 (- 50) cm longa, (15 -) 20 - 30 cm lata, petiolo 10 - 15 cm; pinnae saepe ternatae, petioluli ultimi 6 - 12 cm longi;

segmenta ultima coriacea, glauca, suborbicularia, distincte reticulato-venosa, 3 - 4 (- 4.3) cm diametro, obtusa, profunde vel parum ternati-lobata, lobis indistincte crenati-dentati. Folia caulina reducta, vaginata, amplexicaulia, 2 - 7 cm longa, 2 - 3 cm lata, ovato-lanceolata, acuta. Inflorescentia valde effusi-ramosa. Bracteae persistentes, c. 7, liberae vel ad 1/3 connatae, reflexae, elliptico-ovatae, 10 - 17 mm longae, 4 - 12 mm latae, obtusae. Umbellae radii (11 -) 18 - 29 (- 31), subaequales, 3 - 5 cm longi. Bracteolae c. 5 - 7, 5 - 6 mm longae. Umbellulae radii 20 - 30, 3 - 4 mm longi. Petala flava, unguliformia, apice inflexa. Fructus (verisimiliter immaturus) ellipticus, a dorso valde compressus, 4 - 5 mm longus, c. 2 mm latus; juga 5; vittae conspicuae, dorsales 4, commissurales 2.

Differt ab *L. trilobo* floribus flavis (nec albis), inflorescentia valde ramosa (nec pauciramosa), bracteis persistentibus c. 7, elliptico-ovatis, 10 - 17 mm longis, obtusis (nec c. 0 - 2, oblongo-lanceolatis, usque ad 40 mm longis, acutis), umbellae radiis 18 - 29, 3 - 5 cm longis (nec 15 - 20, 5 - 10 cm longis).

Holotype: NE. Iran, E. Mazandaran (Gorgan & Gonbad Area): Golestan National Park, ca. 10 km NE of Tang-e Rah, eastern corner of Kamarha-ye Qorghon (Qorghon rock walls), 37°28'N, 55°51'E, ca. 90° gradient, highest point of the rocks, in crevices of limestone cliffs, ca. 2010 m, 19. 8. 1995, H. Akhani 12023 [MSB, Isotypes: E, W (fig. 2); hb. Akhani].

Other material seen (all only with basal leaves): Golestan National Park, westernmost of Qortoy valley, ca. 9 km ENE of Tang-e Rah, 37°27'N, 55°51'E, 1830 m, 21. 8. 1995, Akhani 12045 [MSB, W; hb. Akhani]. - Ca. 8 km NE of Tang-e Rah, NE of Khojeh Galdi, 37°28'N, 55°49'E, 29. 6. 1995, 1580 m, Akhani 11510 [MSB; hb. Akhani]. - Ca. 3 km W of Tang-e Gol, Adam-Chaqran rocks, 37°22'N, 55°54'E, 770 - 1000 m, 21. 8. 1995, Akhani 11443 [hb. Akhani].

Glaucous perennial, up to 110 cm tall, completely glabrous; stem solid, strongly branched in upper parts; rootstock crowned with a fibrous collar to 3 cm diameter. Basal leaves 1 - 2 pinnate, triangular-obovate, (15 -) 30 - 45 (- 50) cm long, (15 -) 20 - 30 cm broad, with petiole 10 - 15 cm long; pinnae often ternately divided; ultimate petiole 6 - 12 cm, with 2 - 3 pairs of leaflets; segments coriaceous, glaucous, suborbicular, finely and conspicuously reticulate-veined, with an acrid smell when bruised; ultimate segments 3 - 4 (- 4.3) cm diameter, obtuse, deeply or shallowly ternately lobed, lobes indistinctly crenate-dentate. Cauline leaves reduced to sheath, amplexicaul, 2 - 7 cm long, 2 - 3 cm broad, ovate-lanceolate, narrowing at apex, acute. Inflorescence richly and divaricately branched, ultimate branches 5 - 15 cm. Bracts c.7, persistent, free or connate to 1/3 of their length, reflexed, finely reticulate-veined, elliptic - ovate, 10-17 mm long, 4-12 mm broad, obtuse. Umbels with (11 -) 18 - 29 (- 31) rays; rays 3 - 5 cm, thickened at the base, ± equal. Bracteoles 5 - 7, connate to the middle or free, 5 - 6 mm long, 2 - 4 mm broad, apex subacute to obtuse. Umbellules with 20 - 30 rays; rays 3 - 4 mm long, ± equal, thickened at the base. Petals yellow, clawed, 1.2 - 1.5 mm long, ± 2 mm broad, inflexed at narrow apex, with a prominent midrib and 4 - 5 lateral veins. Sepals minute, ca. 0.5 mm broad, 0.5 mm long, semiorbicular. Filaments 1.2 mm. Anthers 0.6 mm. Fruit (immature) ellipsoid, 4 - 5 mm long, c. 2 mm broad, glabrous, dorsally compressed, ridges 5, lateral slightly winged, between ridges indistinctly reticulate; vittae conspicuous, dorsal 4, commissural 2. Style 0.5 - 0.7 mm long, reflexed, slightly shorter than stylopodium; stylopodium convex.

The generic placement of the new species is questionable and can only be resolved when fully mature fruit is available. Various generic possibilities were considered including

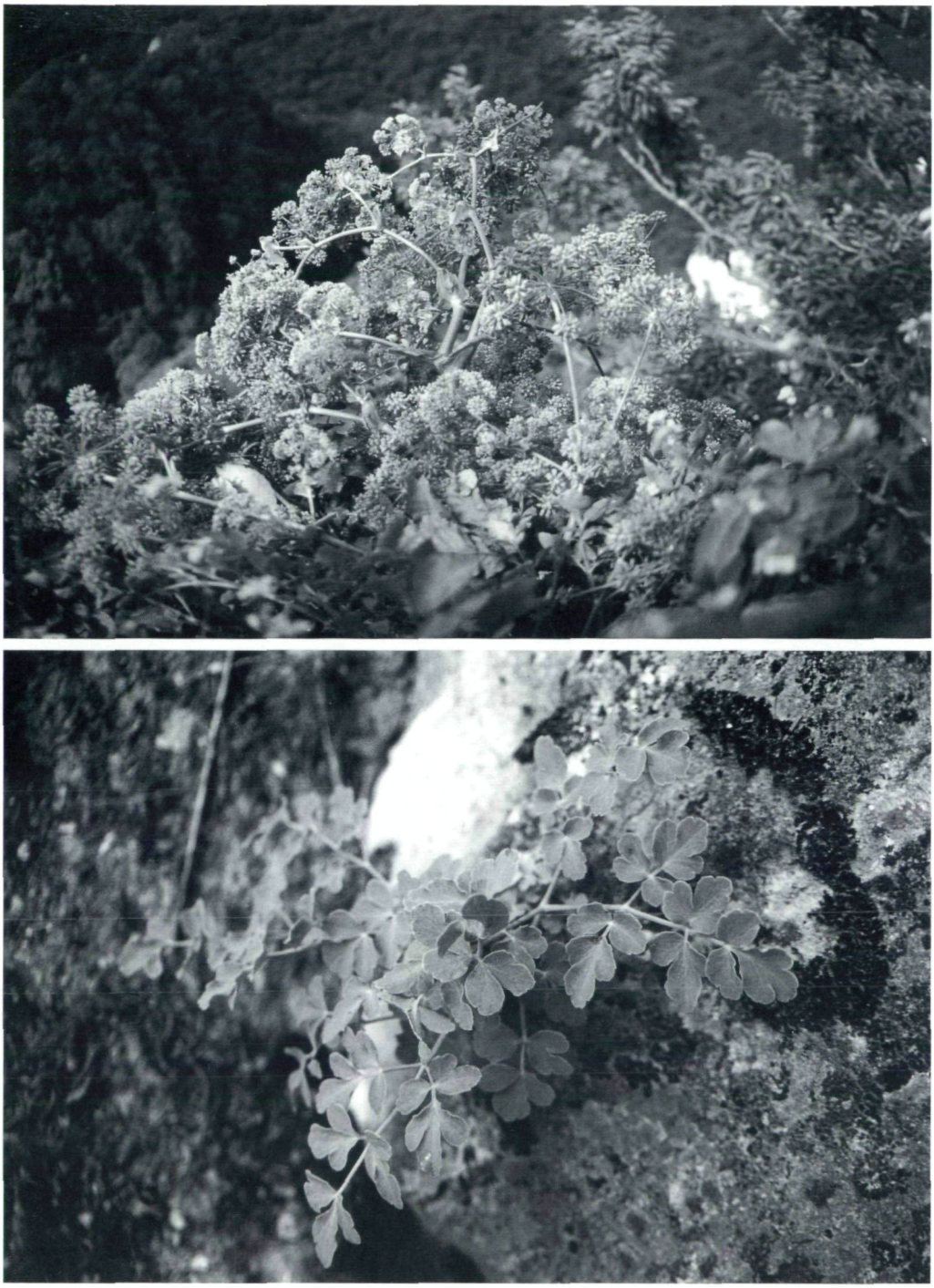

Fig. 3.: *Laser rechingeri* in natural habitat, above: habit and inflorescence (19. 8. 1995, Akhani 12023); below: basal leaves (29. 6. 1995, Akhani 11510).

Laserpitium (not known in the Flora Iranica area), *Peucedanum* s. l., *Pleurospermum* and *Prangos*. But on the basis of our present knowledge, *Laser* has the nearest affinity with it. As stated by RECHINGER (1987: 439), *Laser* is an isolated monotypic genus characterized by the entirely glabrous, glaucous, *Aquilegia*-like leaf lamina and strongly flattened, not winged fruits "Auffällig durch Kahlheit, glauke Färbung, *Aquilegia*-artige Blattform und stark flach gedrückte, nicht geflügelte Früchte". The leaf shape, size, texture and venation of the new species is identical with that of *Laser trilobum*. Fruit shape is also very similar, but due to the immature state of the fruits we cannot be sure what the mature fruit is going to be. Several other characters like the yellow flowers, the inflorescence branching, the numerous bracts and bracteoles seem to be anomalous for that monotypic genus. *Laser trilobum* (L.) BORKH. is a widespread species in south Europe, Turkey, Lebanon, north Iran, Caucasia and Transcaucasia; it also occurs in many parts of the Park, mainly at the margin of closed forest or in open forest at altitudes of 600 - 1800 m.

The habitat of *L. rechingeri* is very peculiar. It has only been found in crevices of limestone cliffs with a gradient of 80 - 90°. One of the interesting species collected together with it is the recently described species *Crucianella platyphylla* (SCHÖNBECK-TEMESY & EHRENDORFER 1989). Forests of the northwestern parts of the Park are cut by crescent-shaped limestone cliffs and provide a unique ecosystem. The vegetation consists of a few shrubs like: *Carpinus orientalis, Celtis caucasica, Juniperus communis* and *J. excelsa* (both prostrate).

L. rechingeri is the third member of Umbelliferae known as endemic to the Golestan National Park. *Johrenia golestanica* RECH.f. and *Leutea gracillima* M.PIMEN. are in the Flora Iranica account (RECHINGER 1987: 376, PIMENOV 1987: 448).

New records

Cousinia leucantha **BORNM. & SINT.**, Journ. Russe Bot. 1: 1 (1911), Compositae

Material examined: Golestan National Park, ca. 12 km ENE of Tang-e Gol, northern slopes of Divar Kaji mountain (Aq-Mazar), 37°25'N, 56°3'E, 1900 - 2100 m, 19. 6. 1995, Akhani 11357 [MSB; hb. Akhani]. - Regio transcaspia: Kisil-Arwat; Karakala: ad summum montem Sundsodagh, 12. 6. 1901, P. Sintenis 1945 (type) [M!].

Previously endemic to Kopetdagh (RECHINGER 1972: 177; NIKITIN & GELDYKHANOV 1988: 619). The species can easily be distinguished by ± not spiny and distinctly decurrent leaves, not or sparsely branched in upper parts and broad leaves to 3.5 cm wide. Its habit is ascending to ± prostrate with a distinct horizontal creeping rootstock. It was collected under *Juniperus excelsa*.

Erysimum kerbabaevii **KURBANOV & GUDKOVA**, Bot Zhurn. 68: 236 (1983), Cruciferae

Material examined: Golestan National Park: In planitie "dasht" ad viam versus Almeh ducentem, N Robat-e Qareh Bil, 37°19'N, 56°26'E, 1200 m, 5. 6. 1975, Rechinger 52831 [W, det. A. Polatschek]. - Ad viam N. Robat-e-Qareh Bil, 37°19'N, 56°26'E, versus Almeh ducentem, 1300 m, 6. 6. 1975, Rechinger 52956 [W, det. A. Polatschek]. - 2 km N. Mirza-Baylu towards Soolegerd, 37° 21'N, 56°15'E, ca. 1250 m, margin of a dry stream, sub-sandy soils, 1. 6. 1995, Akhani 11052 [MSB; hb. Akhani]. - Foothills in NW of Mirza-Baylu plains, 37°20'N, 56°12'E, on sandy soils margin of a dry stream, 1250 m, 24. 5. 1995, Akhani 10888 [MSB; hb. Akhani].

The species was originally described from Turkmenistan (BOTSCHANTZEV & al. 1983). It was collected in the northeastern part of the Park in more or less sandy soil along a dry stream. *E. kerbabaevii* is easily distinguishable from the frequent *E. ischnostylum* FREYN. & SINT. by the patent, subhorizontal and somewhat recurved long siliquae (5-) 6 - 7 (- 10) cm. In *E. ischnostylum* the siliquae are appressed to the axis and only 2 - 3 (- 4) cm long.

***Jurinea antonowii* C.WINKL.**, Acta Horti Petrop. 11, 1: 145. (1890), Compositae

Material examined: northern border of Golestan National Park, ca. 6 km SE of Lohondor, 37°31'N, 56°00'E, ca. 1150 m, gypsum hills, 5. 6. 1995, Akhani 11240 [MSB; hb. Akhani].

Previously endemic in S. Turkmenistan near the Iranian border (RECHINGER & WAGENITZ 1979: 200). It is characterized by its caespitose habit, and thick basal caudex covered by squarrose remains of dead leaves.

***Mattiastrum turcomanicum* (BORNM. & SINT.) BRAND.**, Feddes Repert. 14: 155 (1916), Boraginaceae

≡ *Paracaryum turcomanicum* BORNM. & SINT., Beih. Bot. Centrbl. 20/B: 193 (1906)

Material examined: northeast of Golestan National Park, between Mirza-Baylu & Almeh, 1300 - 1670 m, 24. 5. 1986, Zehzad, Azizian, Taheri & Kiabi 86/2599 [MSB, SBUH; hb. Akhani].

This is a new record for Iran, though previously known from Turkmenistan in the Flora Iranica area (RIEDL 1967: 113, see HILGER & al. 1981 for distribution map). Another specimen outside of the Park was collected by Rechinger "In collibus argillosis inter Shahabad et Bojnurd, 76 km a Bojnurd occidentem versus, 800 m, 23. 5. 1977, Rechinger 55510" [W].

Different authors have disagreed about the generic delimitations of *Mattiastrum* and *Paracaryum* and other related genera of *Cynoglosseae* (see HILGER & al. 1985 for a historical review). GREUTER & BURDET (in GREUTER 1981) combined all the closely related genera of *Cynoglosseae* under *Cynoglossum*. They emphasized, however, the need for a detailed micro-morphological investigation. HILGER & al. (1985) critically investigated the group using micro-morphological criteria, accepted the genera *Mattiastrum* and *Paracaryum* and added the new genus *Microparacaryum*. Recently, KHATAMSAZ (1994) combined *Paracaryum* and *Mattiastrum* into the former without referring to the earlier investigations and any critical comments.

***Melilotus dentatus* (WALDST. & KIT.) PERS.**, Syn. Pl. 2: 348 (1807), Leguminosae

≡ *Trifolium dentatum* WALDST. & KIT., Pl. Rar. Hung. 1: 41 (1802)

Material examined: S of Golestan National Park: 6 - 7 km W of Dasht, valley of Qez-Qale-e-Dasht, 1080 - 1100 m, 37°18'N, 55°57'E, margin of water, 4. 8. 1994, Akhani 9850 [MSB, hb. Akhani].

Widely distributed from central Europe to central Asia. According to Flora Iranica, it occurs in Turkmenistan and Talish (RECHINGER 1984: 200). It is likely to be found in similar ecological situations in other parts of Iran.

***Ononis spinosa* L. ssp. *antiquorum* (L.) ARCANG.**, Comp. Fl. Ital.: 157 (1882), Leguminosae

≡ *Ononis antiquorum* L., Spec. Plant. ed. 2: 1006 (1763)

Material examined: N of Golestan National Park, Soolegerd, 1250 m, 1. 7. 1988, Akhani 4343 [MMTT]. - Ibid., 18. 7. 1985, Zehzad 85/154 [SBUH].

According to Flora Iranica, only *O. spinosa* L. subsp. *leiosperma* (BOISS.) ŠIRJ. occurs in Iran (RECHINGER 1984: 195). The Iranian distribution of subsp. *leiosperma* is in western and central Iran. It is easily distinguished by its smooth seed surface and lax indumentum, subsp. *antiquorum*, on the other hand, has a dense indumentum and a granulate seed surface.

The problem of the *O. spinosa* group in central Asia and Afghanistan and northeast Iran is complicated. Most Russian botanists use the name *O. antiquorum* L. (MURAVJEVA 1945: 100; NIKITIN & GELDYKHANOV 1988). This taxon has a mediterranean distribution; it is known as a subspecies of *O. spinosa* in many European publications (ŠIRJAEV 1932: 584 - 590, GREUTER & al. 1989). The Afghanistan representatives of this complex are placed in Flora Iranica under *O. afghanica* ŠIRJ. & RECH.f. (Syn.: *O. spinosa* L. subsp. *afghanica* (ŠIRJ. & RECH.f.) KITAMURA). It is not possible to separate easily the above cited specimens either from *O. afghanica* (compared with PODLECH 11947 & 32230) or typical *O. spinosa* subsp. *antiquorum* from Mediterranean. A detailed survey of the group is required.

Tragopogon capitatus **S. NIKITIN**, Not. Syst. Leningrad 7: 257 (1937), Compositae

Material examined: NW of Golestan National Park, ca. 14 km SW of Lohondor, Koilar region, 37°30'N, 55°50'E, mixed formation of shrubs and grassland, 1350 - 1500 m, 2. 6. 1995, Akhani 11116 [MSB; hb. Akhani]. - Ibid., 4. 6. 1995, Akhani 11191 [MSB; hb. Akhani]. - Ibid., 1380 m, 16. 6. 1995, Akhani 11248 [MSB; hb. Akhani].

New to Iran but previously known in Turkmenistan within the Flora Iranica area (RECHINGER 1977: 89). This species is easily distinguished from all other species in NE Iran by a number of characters: tall growing up to 1 m; densely leafy stems, strongly inflated peduncle, 1 - 1.5 cm diameter; thick stem base ca. 2 cm diameter and the (8 -) 10 - 12 (- 14) phyllaries.

The species was found in a mixed formation of shrubs and grassland at the NE border of the Park, in a transition zone of high altitude forest and *Stipa-Artemisia* steppe. The main associated shrub species were: *Crataegus pentagyna*, *Malus orientalis*, *Paliurus spina-christi*, *Cotoneaster* spp., *Quercus castaneifolia*, *Prunus divaricata*. Herb vegetation included several grasses among others: *Dactylis glomerata*, *Hordeum bulbosum*, *Stipa lessingii*, *Vicia variabilis*, *Crucianella sintenisii*, *Festuca* sp., *Eryngium caucasicum*, *Haplophyllum acutifolium* and a *Centaurea* species which may be new to science.

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