

STUDIES ON THE FLORA OF IRAN, NEW SPECIES, NEW COMBINATIONS AND NEW RECORDS

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Aethionema semnanensis, *Aster bachtiaricus*, *Atractylis delvarii*, *Indigofera sinuspersica*, *Thlaspi maassoumii* and *Thlaspi pulvinata* are described as new species. *Thlaspi apterocarpum* and *Thlaspi trinervium* are treated as new combinations. *Acacia nilotica* (L.) Del. subsp. *nilotica*, *Centaurea pallescens* Del. subsp. *pallescens*, *Convolvulus betonicifolius* Mill., *Convolvulus prostratus* Forssk., *Oxystelma esculenta* (L. f.) R. Brown and *Ruta chalepensis* L. are reported as new records to Iran.

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مطالعاتی درباره فلور ایران

ولی الله مظفریان

گونه‌های *Atractylis delvarii* و *Aster bachtiaricus* و *Aethionema semnanensis* و *Indigofera sinuspersica* و *Thlaspi pulvinata* و *Thlaspi maassoumii* و *Thlaspi trinervium*، گونه‌های *T. apterocarpum* به عنوان ترکیب‌های جدید در نظر گرفته می‌شوند و گونه‌های زیر برای اولین بار از ایران گزارش می‌گردند.

Acacia nilotica (L.) Del. subsp. *nilotica*, *Centaurea pallescens* Del. subsp. *pallescens*, *Convolvulus betonicifolius* Mill., *Convolvulus prostratus* Forssk., *Oxystelma esculenta* (L. f.) R. Brown and *Ruta chalepensis* L.

INTRODUCTION

The author during the working on the Iranian plants in the field and herbarium of Research Institute of Forests and Rangelands (TARI) has come across to 6 new species, 2 new combinations and 6 new plant records for the flora of Iran.

The new species are described and the new combinations are discussed. Also the newly collected species which are new to the flora of Iran will be introduced and their geographical distributions are mentioned.

NEW SPECIES

Aethionema semnanensis Mozaffarian, sp. nov.

Planata perennis, basi lignosa, caudex multiceps, caespitosa, ca. 2-7 cm alta, glabra, glauca. Caules floriferi simplices procumbentes. Folia obovato-orbiculata, basi \pm cuneata, apice rotundata, \pm leviter mucronulata vel emucronulata, coriacea, sessilia, margine integra. Inflorescentiae floriferae et fructiferae densae, spicato-racemosae, multiflorae. Petala albo-purpurea, 8-9 mm longa, apice breviter emarginata, basi sensim unguiculata. Filamenta nec connata nec dentata, alata. Ovarium biloculare, loculis

biovulatis. Pedicelli fructiferi patenti-erecti vel \pm deflexi, tenui, glabri, ca. 2-5 mm longi. Siliculae orbicularo-ellipticae, longitudinem latiore; 15 mm longae et ca. 20 mm latae, late alatae, alae accrescentes, marginem versus manifeste nervosae, integrae. Semina 4, brunnea, ca. 2 mm longa et 1 mm lata.

Typus. Semnan, Dastjerd, Eij to Javin, 1900 m, Taherian and Maddah 850 (holotypus TARI; isotypus Research Center of Semnan)

This species with the coriaceous orbicular leaves and the big winged fruits is clearly distinguishable among the *Aethionema* species.

Caespitose perennial, woody at base, with many simple flowering stems, ca. 2-7 cm high, glabrous, greenish-blue. Flowering stems simple, spreading. Leaves obovate-orbiculare, \pm cuneate at base, rounded at the apex, \pm slightly mucronulate or emucronulate, coriaceous, sessile, entire at the margin. Inflorescence many flowered, at flowering and fruiting time densely spicato-racemose. Petals whitish-purple, 8-9 mm long, slightly emarginate at the apex, clawed at base. Filaments neither connate nor dentate, but winged. Ovary 2-locular. each loculus with 2-ovules. Fruiting



Fig. 1. *Aethionema semnanensis* nat. size; flower & fruit (x2)

pedicels spreading, erect or \pm recurved, thin, glabrous, ca. 2-5 mm long. Silicle orbicular-elliptic, 15 mm long and ca. 20 mm wide, with very wide wing,

conspicuously nerved towards the margins, entire. Seeds 4, brown, 2 mm long and 1 mm wide.

Aster bachtiaricus Mozaffarian, **sp. nov.**

Plantae perennae, ca. 5-20 cm altae. Caudex crassus lignosus, multicaulis, foliati, crispulis pubescentes, monocephalus. Folia heteromorpha, linearo-spathulata vel ovata, vel elliplico-spathulata, sessilia vel in petiolum brevum attenuata, apice acuta vel rotundata, sensim mucronulata, margine integra, supra glabra, subtus crispulis hirsuta, 2-10 mm lata, 10-16 mm longa. Capitula singula, 16 mm diametro. Involucrum 6 x 8 mm, imbricatum, 4 seriatum; phylla ovato-lanceolata, herbacea, viridia, margine rubra vel interiora membranacea. Flores radii 10-16; tubus basalis 3-5 mm longus; ligulae purpurae vel albae-roseae, 5-6 x 2-3.5 mm. Flores disci flavi, 5-6 mm longi. Achenia (immatura) 2.5 mm longa, albo-sericea; pappus albus, uniseriatus, scaber, 5 mm longus.

Typus. Chaharmahal-e Bakhtiari, Darreh Bazoft, Chebed, N. slope of Kuh-e Taraz, 1700-2300 m, 12.7.1986, Mozaffarian 57812 (holo. TARI).

Perennial. Stems 5-20 cm high; rootstock thick, woody, many, leafy, crispate-pubescent. Leaves heteromorphous, linear-spathulate, ovate or elliptic-

spathulate, sessile or attenuate at the base and shortly petioled, acute at the apex or rotundate, somewhat mucronulate, entire, glabrous above, shortly crispate hairy below, 2-10 x 10-16 mm. Capitule solitary, 16 mm in diameter. Involucre 6 x 8 mm; phyllaris 4-seriate, outer series ovate-lanceolate, herbaceous, greenish, brownish-red at the margin, sparsely crispate pubescent or inner series membranaceous. Ray flowers 10-16, purpule or whitish rose, basal tube 2-5 mm long; ligules 5-6 x 2-3.5 mm. Disc flowers 5-6 mm, yellow. Achenes (immature) 2.5 mm long, whitish sericeous. Pappus 1-seriate, scabrous, 5 mm long.

Atractylis delvarii Mozaffarian, **sp. nov.**

Biennis, arachnoideo-lanata, multicaulis, ascendens, 25-35 mm alta, monocephala, foliata. Folia basalia anguste oblongo-spathulata, partim mediano sensim angustiores, attenuata, a basi petiolata, 8-9 x 1-1.5 cm, margine spinulata; folia caulina sessilia, lanceolata vel oblongo-lanceolata, spinosa, utrinque 4-6 lobata, lobo-terminalia longe acuminata, spinosa; folia summa capitula fulcrantia et



Fig. 2. *Aster bachtiaricus* (x 0.66); ligulate flower (x3).

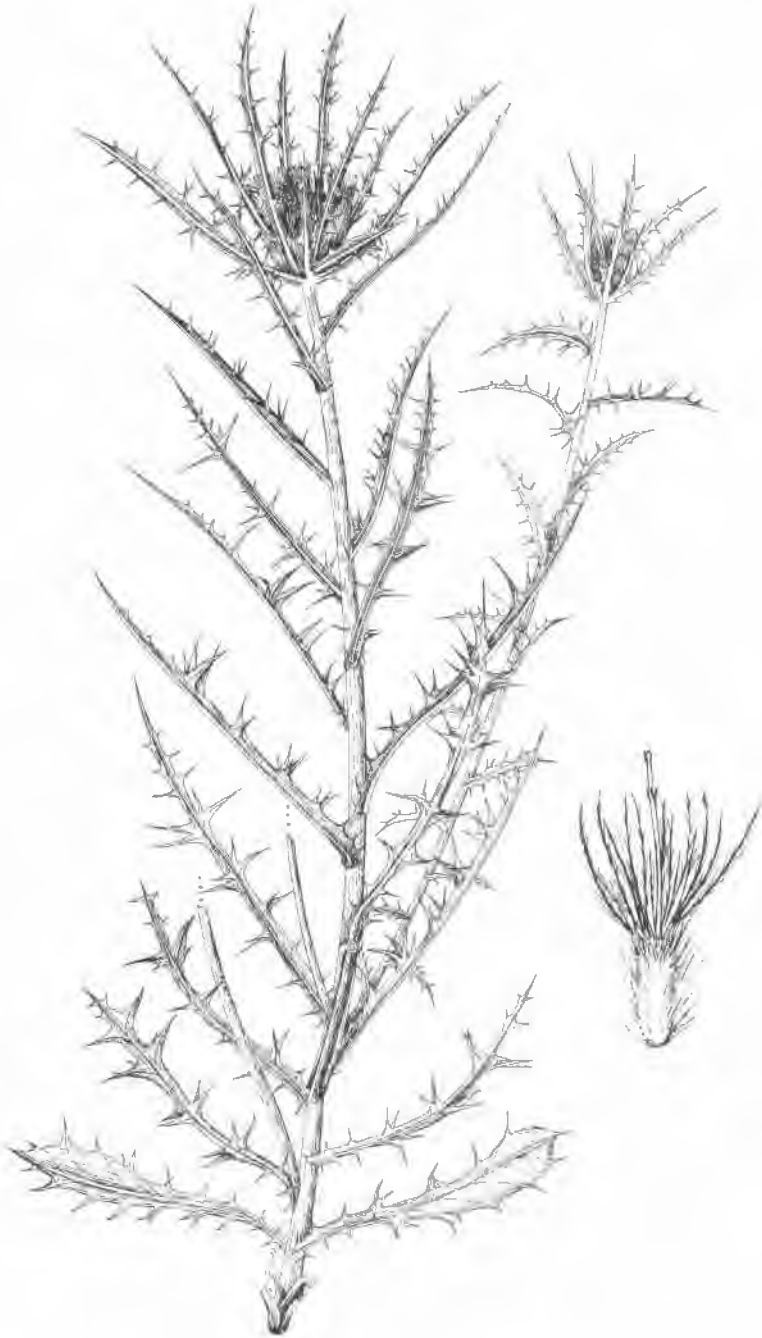


Fig. 3. *Atractylis delvarii* (x 0.59); flower (x2).

involucrantia. Capitula oblonga vel semiglobosa, 1.5-2.5 x 1-2.5 cm, involucri phylla dimorpha, exteriora biseriata; phylla exteriora foliis similia, remote spinolusa, phylla interiora spinoso-pectinata; involucri phylla interiora numerosa, imbricata. Flores heteromorphus, tubulosi et radiantes, flavi. Achenia longe villosa-lanata; pappus achenio longior, plumosus.

Typus. Bushehr: between Delvar and Kabkan, ca. 10 m, Mozaffarian 74043 (holo. TARI), on sand dunes.

Our specimen morphologically is different from the species of *Atractylis* mentioned in K. H. Rechinger Flora Iranica (1979) and Zohary Flora Palaestina vol. 3 (1978).

Biennial, cobwebbed-wooly, many stemmed. Stems ascending, 25-35 cm, leafy. Basal leaves narrowly oblong-spathulate, median part somewhat narrower, attenuate at the base, petiolate, 8-9 x 1-1.5 cm, spiny dentate; cauline leaves sessile, lanceolate or oblong-lanceolate with 4-6 spiny lobes, terminal lobes acuminate, spiny; uppermost leaves crowded around the outer involucre and overtopping it. Capitule solitary, oblong or semiglobose, 1.5-2.5x1-2.5 cm. outer bracts of the involucre similar to the

upper cauline leaves, in 2 rows, outer row remotely spiny, inner one pectinately spiny. Bracts of the inner involucre imbricate. Capitules heterogamous with tubular and radiate yellow flowers. Achenes long villose; pappus longer than achene, plumosus.

The new species is named in the honour of Raeisali Delvari.

Indigofera sinuspersica Mozaffarian, **sp. nov.**

Planta annua, prostrata, multicaula, pilis bifidis et glanduliferis pluricellularibus obsitis; folia imparipinnata, ca. 20 mm longa, basi ca. 6-7 mm petiolata, foliola 4-5 juga, ca. 3-5.5 x 2-3.5 mm, obovato-elliptica, apice rotundata, utrinque appresse mediofixi pilosa. Inflorescentia axillaris racemosa, pedunculo 4-10 mm longo. Calyx 2-3 mm longus, pilosus; dentes calyci tubus longiores. Corolla violacea. Legumen 14-17 mm longum, pilis appressis et glanduliferis obsitis, ventro applanto, dorso leviter carinatum.

Typus. Bandar-Abbas; B. Jask, Jask-e kuhne, ca. 10 m, 5.5.1995, Mozaffarian 74337 (holo. TARI), on sand dunes.

Annual, much branched, prostrate, all part

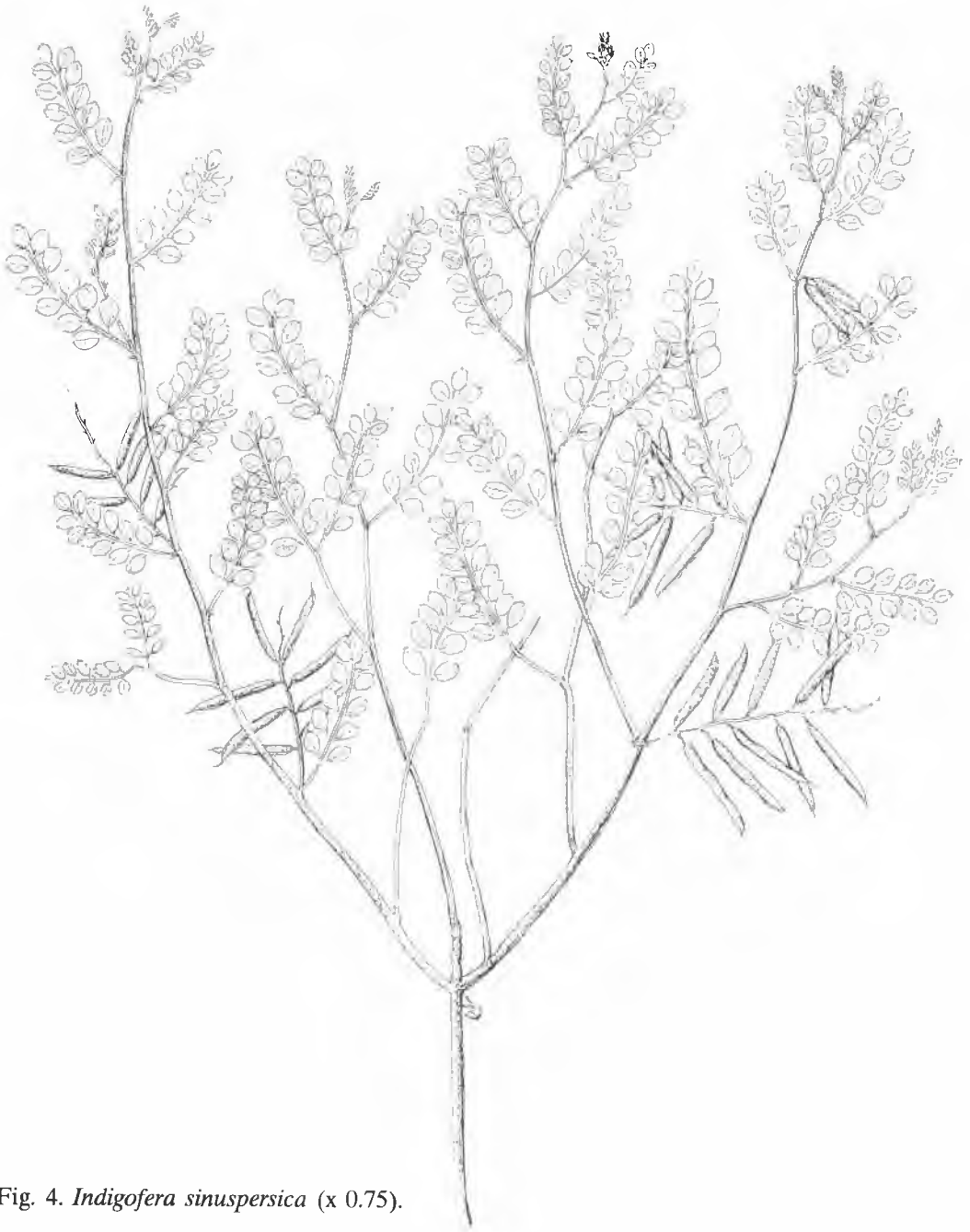


Fig. 4. *Indigofera sinuspersica* (x 0.75).

of the plant appressed hairy with medifixed and glandular hairs. Leaves imparipinnate, ca. 20 mm long, with ca. 6-7 mm petiole; leaflets 4-5 pairs, ca. 3-5.5 x 2-3.5 mm, obovate-elliptic, rotundate at the apex, appressed medifixed hairs on both sides. Inflorescence axillary, racemosous, with 4-10 mm long peduncles. Calyx 2-3 mm long, pilose; calyx teeth longer than the tube. Corolla violet. Pods 14-17 mm long, covered with appressed medifixed and gland-bearing hairs.

In K. H. Rechinger Flora Iranica (1984), there is not any annual species from the Flora Iranica region and in Ali, SI (1978) Flora West Pakistan there are two annual species of *Indigofera* clearly different from our specimen.

***Thlaspi maassoumii* Mozaffarian, sp. nov.**

Planta perennis, lignescens, surculis ± elongatis repentibus. Caulis floriferi adscendens, elongatus, 10-14 cm altus, foliosus. Folia glabra, lanceolato-triangularia, basi manifeste hastato-auriculata, glauca, apice acuta, margine leviter cartilagineo-dentata. Inflorescentiae racemosae, pedicelli floriferi 2.5 mm longi,

fructiferi 3-4 mm longi, tenui, axi appressi vel divaricato-patenti. Calyx ca. 2-2.5 mm longus; sepala violascentia, apice rotundata basi saccata. Petala alba, 5 mm longa, spathulata, unguiculata. Stylus 2 mm longus. Silicula 8 mm longa, carinata, reticulata, elliptica, basi et apice aequaliter attenuata.

Typus. Mazandaran, S. of Ramsar, Siemam (Mt) 3600 m, Runemark & Maassoumi, 21825 (hol. TARI). -*Paratypus.* Ibidem Runemark & Maassoumi 21819 (TARI).

Perennial, woody at the base with ± long prostrate shoots. Flower bearing shoots ascending, leafy, 10-14 cm long. Cauline leaves lanceolate-triangular, amplexicaul or conspicuously hastate-auriculate at the base, glaucous, glabrous, acute, with cartilaginate-denticulate margins. Inflorescences racemose, elongated in fruit; Flowering pedicels 2.5 mm long, fruiting pedicels 3.5 mm long, thin, appressed to stem or spreading erect. Calyx 2-2.5 mm long; sepals violet, rounded at the apex, saccate at the base. Petals white, 5 mm long, spathulate, clawed. Style 2 mm long. Silicule elliptic, 8 mm long; valves reticulate, carinate, unwinged, equally



Fig. 5. *Thlaspi maassumii* (nat. size); flower (x3); fruit (nat. size)



Fig. 6. *Thlaspi pulvinata* (x2); flower and fruit (x3).

attenuate at both ends. Radicula incumbent.

***Thlaspi pulvinata* Mozaffarian, sp. nov.**

Planta dense pulvinata, nana, multicaula, glabra, 4-6 cm alta. Folia heteromorpha; folia basalia dense glomerata, minuta, filiformia, hyaline mucronata 8-16 mm longa, 0.5 mm lata; caulina anguste linearo-lanceolata, manifeste nervosa, 8-12 mm longa, 1.5 mm lata, sessilia exauriculata, subcartilagineo-denticulata. Caules floriferi adscendente-erecti, pumili, 3-5 mm alti. Inflorescentiae \pm racemosae 2-4 cm longae, pedicelli floriferi vel fructiferi 4-6 mm longi, tenui, axi appressi vel subpatenti. Calyx ca. 3 mm longus; sepala margine anguste membranacea, violascentia, a basi saccata. Petala alba, erecta, oblongo-spathulata, basi in unguem sensim attenuata, apice rotundata. Stylus ca. 1-1.5 mm longus. Siliculae 4-7 mm longae, juveniles leviter compressae, deinde costatae, reticulatae, apice interdum leviter emarginatae, corniculatae. Semina brunnea; radicula incumbens.

Typus. Azarbaijan: between Shahindege and Takab, kuh-e Gharadash (Aghdash), from Ghezghan and Auchdare, 2500-2800 m,

4.7.1991, Mozaffarian 69874 (holo. TARI). -*Paratypus.* Azarbaijan: Zanzan, Mahnesan, Anguran, Belgheis Mnt. 2700-2900 m, Maassoumi 64832.

Dwarf cushion-formed plant, glabrous, many stemmed, perennial, 4-6 cm high. Leaves heteromorphous; basal leaves forming a dense glomerate, narrowly filiform, hyaline mucronate, 8-16 x 0.5 mm; cauline leaves narrowly linear-lanceolate, prominently nerved, 8-12 x 1.5 mm, sessile, without auricle, cartilaginously toothed. Flower bearing stems ascending-erect, 3-5 cm high. Inflorescence racemose, \pm elongated in fruit, 2-4 cm long; pedicel at flowering or fruiting state 4-6 mm long, thin, adpressed to the stems or slightly spreading. Calyx ca. 3 mm long; sepals with narrowly membranaceous margins, violascent, saccate at the base. Petals white, erect, oblong-spathulate, clawed, rounded at the tip. Style ca. 1-1.5 mm long. Silicule 4-7 mm long in young state, slightly compressed, finally costate, navicular, reticulate, at the tip \pm emarginate, horned.

NEW COMBINATIONS

The genera *Aethionema* and *Thlaspi* in Iran were studied morphologically.

Table 1: Morphological characters and chromosome counts of *Aethionema* and *Thlaspi*.

Aethionema	Thlaspi
1. Fruit with wide and ciliate to lacerate wing except in <i>A. trinervium</i> .	1. Fruit winged or unwinged, or only winged at the apex of silicule.
2. Valves compressed and without reticulate nerve except in <i>A. trinervium</i> .	2. Valves compressed or not as in <i>Thlaspi pumilum</i> , <i>T. kurdicum</i> , <i>T. rostratum</i> .
3. Basic chromosom number $x=6$ except in <i>A. trinervium</i> $x=7$.	3. Basic chromosome number $x=7$ in <i>Thlaspi</i> species.

Reviewing the works on chromosome counts of the two mentioned genera (Kupfer P., 1980; Khosravi A., 1989) revealed the systematic position of them and some related genera such as *Eunomia* (N. A. Bush, 1970). Reports on chromosome counts show the basic number $x=6$ for *Aethionema* and for the *Thlaspi* it is $x=7$. Some of the morphological characters of the two genera and chromosome counts are compared in Table 1.

Characteristics cited in the table confirm that some species of *Aethionema* (*Ae. trinervium*) should be transferred to the genus *Thlaspi*.

Thlaspi apterocarpum (Rechinger f. & Aellen) Mozaffarian, **comb. nov.**

Syn. *Aethionema apterocarpum* Rech. f. & Aellen, *Phyton* 3: 49 (1951); *Aethionema*

trinervium (DC.) Boiss. var. *apterocarpum* Rech. f. & Aell.) Hedge, *Fl. Iranica* 57: 107 (1968).

The chromosome count of *Aethionema trinervium* var. *apterocarpum* was reported as $x=7$ (Khosravi, 1989). Moreover, morphological characters are different from *A. trinervium*, i. e. sepals persistent and silicules inflated. Therefore *Aethionema trinervium* var. *apterocarpum* is treated as a distinct species under the genus *Thlaspi*. *T. apterocarpum* is known only from Khorassan.

Thlaspi trinervium (DC.) Mozaffarian, **comb. nov.**

Syn.: *Hutchinsia trinervia* De Candolle, *Regni Vegetabilis Systema Naturale* 2: 387 (1821); *Aethionema trinervium* Boissier, *Flora Orientalis* 1: 342 (1867).

The chromosome counts report of

Aethionema trinervium (DC.) Boiss.; n=7 (Kupfer, P. 1980) together with the valve character are the reason for considering *Aethionema trinervium* as *Thlaspi trinervium*.

NEW RECORDS

Acacia nilotica (L.) Del. subsp. **nilotica**

Bushehr: Bandar-e Kangan, ca. 10 m, Mozaffarian 74045.

According to Rechinger (1986) in Flora Iranica no. 161 general distribution of the subspecies was Africa tropica, but it was collected from Iran.

Centaurea pallescens Del. subsp.

pallescens

Bushehr: between Khormouj and Kaki, Badule, ca. 20 m, Mozaffarian 74044, Bordekhon, ca. 20 m Mozaffarian 74104.

Centaurea pallescens Del. subsp. *pallescens* is new to the flora of Iran. The general distribution of the *centaurea pallescens* Del. subsp. *Pallescens* according to Zohary Fl. palaestina vol. 3 p. 401 (1987) is W. N. and C. Negev, Dead sea area, Arava valley, Moav, Sinai and Egypt.



Fig. 7. *Thlaspi apterocarpum* (x 0.66)

Convolvulus betonicifolius Mill.

subsp. **betonicifolius**

Kurdestan: Sanandaj to Marivan, Sarveabad, ca. 40 km to Marivan, ca. 1150 m, Mozaffarian 71613 (28.7.1992).

The species is new to Iran, according to B. S. Paris in P. H. Davis Flora of Turkey vol. 6 general distribution of the species is Balkans, Cyprus, Crimea, Caucasia, W. Syria, N. Iraq, W. Iran but in K. H. Rechner Flora Iranica No. 2, 1963, it was not recorded from Iran.

Covolvulus prostratus Forssk.

Bandar-Abbas: B. Jask, ca. 23 km from Jask to Konarak, ca. 50 m, Mozaffarian 74350.

The species is new to Iran, according to Fatima Sa'ad (1967). It is a Saharo-Sindian species.

Oxystelma esculenta (L.f.) R. Brown

Baluchestan: Iranshahr to Chahbahar, Jakigour bridge, over the Sarbaz river, ca. 300 m, V. Mozaffarian 74381.

Genus and species are new to Iran. According to K. H. Rechinger (1970) and Ali, S. I. (1983) general distribution of the plant is Iraq, Pakistan, India and Indonesia.

Ruta chalepensis L.

Bushehr: Bandar-e Taheri, kuh-e Haftchah, ca. 1200-1600 m, Mozaffarian 74087.

The genus and species is new to Iran. According to C. C. Townsend in K. H. Rechinger. Fl. Iranica (1966), the genus has not been reported from Iran.

REFERENCES

- Ali, S. I. 1983: *Oxystelma* in Asclepiadaceae Flora of West Pakistan, no. 150. -Karachi.
- 1978: *Indigofera* in Papilionaceae Flora of West Pakistan no. 100. -Karachi.
- Bush, N. A. 1939: *Aethionema* and *Thlaspi* in Komarov, Flora of the U.S.S.R vol 8. -Moskva and Leningrad.
- Dothan, N. F. 1978: *Centaurea* and *Atractylis* in Zohary Flora Palaestina vol. 3 - Jerusalem.
- Hedge, I. C. 1968: *Aethionema* and *Thlaspi* in Cruciferae K. H. Rechinger Fl. Iranica no. 57. -Graz.
- Khosravi, A. 1989: Cytotaxonomy and Phylogeny of Cruciferae family (in Farsi, thesis for M. S. degree, unpublished, Tehran).
- Küpfner, P. 1980: Contribution à la Cytotaxonomie de quelques orophytes

- Iranians. -Biol. -Ecol. Medit 7: 37-48 in Goldblatt & Johnson Index to plant chromosome numbers 1986-1987. -Missouri Botanical Garden.
- Paris, B. S. 1987: Convolvulus in P. H. Davis Flora of Turkey vol. 6. -Edinburgh.
- Rechniger, K. H. 1963: Convolvulus in Convolvulaceae Fl. Iranica no. 2. -Graz.
- 1970: Oxystema in Asclepiadaceae Fl. Iranica no. 73. -Graz.
- 1979: Atractylis in Cynareae Fl. Iranica no. 139. -Graz.
- IRAN. JOURN. BOT.** 7 (1), 1996
- 1986: Acacia in Mimosaceae Fl. Iranica no. 161. -Graz.
- Rechinger, K. H. & Ali, S. I. 1984: Indigofera in K. H. Rechinger Fl. Iranica no. 157. -Graz.
- Sa'ad, F. 1967: Convolvulus species of the Canary isles, the Mediterranean region and the near and middle east. -Rotherdam.
- Townsend, C.C. 1966: Rutaceae in K. H. Rechinger Fl. Iranica, no. 37. -Graz.
- Wagenitz, G. 1979: Centaurea in Cynarea K. H. Rechinger, Fl. Iranica no. 139b. -Graz.