

THREE NEW SPECIES AND TWO SPECIES RECORDS FROM IRAN, ILAM PROVINCE

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Three new species including *Centaurea procera* (Compositae), *Convolvulus elymaiticus* (Convolvulaceae) and *Scrophularia elymaitica* (Scrophulariaceae) are described and illustrated. In addition, two new records are introduced from Ilam province including *Capparis spinosa* L. var. *leucophylla* (DC.) Boiss. (Capparaceae) and *Ephedra transitoria* Riedl (Ephedraceae). Taxonomic characters are given for all species

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Key words. New species, *Centaurea*, *Convolvulus*, *Scrophularia*, Ilam, Iran, taxonomy, flora, new records.

سه گونه جدید و دو گزارش تازه برای ایران از استان ایلام

ولی الله مظفریان، دانشیار مؤسسه تحقیقات جنگلها و مراتع کشور.

۳ گونه جدید برای جهان گیاهشناسی شرح داده شده، تصویر آنها ارائه می شود. همچنین ۲ گزارش تازه برای ایران تشخیص داده شده است. گونه های جدید عبارتند از:

Centaurea procera (Compositae), *Convolvulus elymaiticus* (Convolvulaceae), *Scrophularia elymaitica* (Scrophulariaceae).

و گزارش های تازه عبارتند از:

Capparis spinosa L. var. *leucophylla* (DC.) Boiss. (Capparaceae) and *Ephedra transitoria* Riedl (Ephedraceae).

صفات تاکسونومیک همه گونه ها ارائه شده است.

Introduction

During the study between 2003-2009 on the flora of Ilam province, the author visited about 134 localities from early spring to late in the autumn. In this attempt, about 1000 species were collected and determined. In these collections the author have found some new species for the world and Iran. Four new species were formerly described (Mozaffarian 2006) and a short survey on the vegetation of Ilam province was presented (Mozaffarian 2008). The aim of this paper is to describe three new species and to report two new taxa for the flora of Iran. The specimens of all taxa are preserved in TARI herbarium.

New species

Centaurea procera Mozaff., (sect. *Cynariodes* Boiss. & Walp.), **sp. nov.** (Fig. 1).

Planta perennis; collum residuis fibrosis petiolorum comosum. Radix crassa, diametro ad 3 cm. Caulis crassus, erectus, 120 cm altus, inferne dense crispato-

villosus, superne sparse villosus vel glaber, inferne breviter ramosus, superne racemosus vel paniculato-ramosus. Folia omnia consistentia herbaceo-coriacea, supra sparse papillosa, subtus prominente elevatim nervosa, nervis albidis, secus nervum medianum dense crispule villosa vel glabra; folia basalia permagna, longe petiolata, ambitu late ovata vel ± orbicularia, ± late cordata, integra, 20 × 15 cm; folia caulina inferiora densa, imbricata, ambitu late lanceolata vel oblongo-lanceolata, basin versus late decurrentia; folia caulina superiora oblongo-lanceolata, sed minora et apicem versus valde diminuta, integra vel cartilagineo-denticulata, sparse ciliolata vel papillosa. Inflorescentia longe racemoso-paniculata vel ± corymbosa. Capitula inferiora breviter, superiora longe pedunculata, inferiora in axilla folia caulina disposita. Involucrum in statu florifera 4-5 × 5-8 cm., ovoideum vel ovato-cylindricum; phylla multiseriata, coriacea, tomentosa, appendiculata; appendice integra, in phylla exteriora longe triangularia, in phylla interiora ovato-lanceolata, integra vel lacerato-laciniata, omnia longe acuminata,



Fig. 1. *Centaurea procera* ($\times 0.3$).

Table 1. Comparison of *Centaurea procera* and its relative.

Characters	<i>C. procera</i> (Sect. <i>Cynaroides</i>)	<i>C. ammadanensis</i> (Sect. <i>Paraphysis</i>)
Life form	Perennial	Biennial
Stem	Racemosely branched from base and densely leafy	Loosely branched above and non densely leafy
Basal leaves	Late ovate to \pm orbicular, entire, \pm late cordate	Late ovate, triangular, entire or lyrate with 1 or 2 lower segments
Capitula	40-50 \times 50-80 mm, ovate to ovate-cylindric	25-35 \times 22-30 mm, ovate or obconical
Phyllaries	Appendiculate, with broadly lanceolate to ovate-elliptic appendage	Exappendiculate, shortly simple mucronate, rarely with lateral short spines
Corolla	50- 55 mm long	Up to 40 mm

margine hyalina. Flores numerosi, albi, marginales non-radiantes, 5-5.5 cm longi; tubi tenui, ca. 30 mm longi; limbi 20 mm longi. Antherarum tubus pallide purpureus. Achenia opace alba, 8 mm longa. Pappus alba, inequalia, 10 mm longa, \pm scabrada.

Typus. Ilam, Abdanan, Dinar kuh, 1030 m, N. 32,57,34; E. 47,22,20; 06.05.2009, V. Mozaffarian 93165 (holotypus TARI).

Perennial; collum covered by remnants of fibrous petiole of former years; rootstock ca. 3 cm in diameter. Stem stout erect, 120 cm high, usually simple, branched in upper part, densely crispate-villous in lower part, sparsely villous or glabrous in upper part, at the top paniculately branched. All leaves with herbaceous-leathery texture, in upper surface glabrous or sparsely papillose, in lower surface prominently with elevated veins; nerves whitish, along the median nerve densely crisped-villous; basal leaves very large, long petiolate, broadly ovate or \pm orbicular, \pm broadly cordate, entire, 20 \times 15 cm; lower cauline leaves broadly lanceolate or oblong-lanceolate, towards the base broadly decurrent; upper cauline leaves oblong-lanceolate, but smaller and towards the top of the stem reduced, entire or cartilaginosly denticulate, sparsely ciliate or papillose. Inflorescence paniculate or corymbose. Lower lateral branches short, disposed in axile of lower cauline leaves; upper ones with rather long pedunculate capitula. Involucre in the flowering state 4-5 \times 5-8 cm, broadly ovate or obconical; phyllaries multiseriate, coriaceous, tomentose, appendiculate; appendages entire, long acuminate, with hyaline margins; outers long triangular, inners ovate-lanceolate, entire or lacerate-laciniate. Flowers numerous, white, marginals not radiant, 5-5.5 cm long; corolla tube thin, ca. 30 mm long; limb 20 mm long. Anther tubes pale purple. Achenes dirty white, 8 mm long. Pappus white, unequal, 10 mm long, \pm scabrous.

Affinities. New species according to the description given by Wagentiz (1975 and 1980) belong to the section *Cynaroides* Boiss. ex Walp (involucre

subglobose. Appendage firm, triangular to ovoid or orbicular, not decurrent, usually ciliate and ending in a firm spine or spinule, more rarely entire and spiny or ciliate without terminal spine) but differ from the species of this section by having non ciliate phyllaries and prominently whitish flowers. The new species seems to be more or less an isolated species and have not any related species in Flora Iranica (Wagenitz 1980) and Flora of Turkey (Wagenitz 1975). Habit of the species is more or less similar to *Centaurea ammadanensis* Schultz-Bip. section *Paraphysis* (DC.) Wagenitz but differs from it by having distinct appendiculate inner phyllaries etc. (Table 1).

***Convolvulus elymaiticus* Mozaff. sp. nov. (Fig. 2)**

Planta caespitosa; caudex longe lignosus, crassus, multicaulis. Caules 15-20 cm alti, herbacei, tomentosi et patule longe pilosi, irramosi, foliosi, interdum caules sicco anno praecedente praesentia. Folia basalia numerosa, anguste lanceolata, 5 cm longa et 2-8 mm lata, basi cuneato-petiolata, apice anguste attenuata, dense sericeo-pilosa, integra, nervatura supra paulo impressa, subtus prominentia, interdum dense lineario-oblonga et undulato-marginata, sessilia; folia caulina breviter petiolata, ovato-lanceolata, a basi rotundata, raro cuneata, apicem versus angustata plus minusve acuminata, dense flavescenti velutino-pilosa, 20-30 \times 10 mm longa et lata; folia caulina superiora plus minusve bracteata, ovato-acuminata. Inflorescentia cymosa; cymae plus minusve remotae, sessiles vel plus minusve breviter pedunculatae, laxae 1-4 florum. Bracteolae lineares, dense villosae, ca. 12 mm longae, pedicellis nullis. Sepala dense villosa, ovata, longe acuminata, \pm omnia similia, ca. 12 mm longa. Corolla in vivo alba, in sicco dilute purpurea, ad 20 mm. longa, ad angulos sericea, calyce ca. 2 plo longiora. Stamina unequalia, longiora ca. 4 mm longa. Filamenta glabra; anthera sagitata, basifixata. Ovaria pilosa, ovoidea, ad basalia discoidea. Capsula matura ignota.

Typus. Ilam: Mehran, ca. 10 km from Kavar to Zarrinabad, 747 m, N. 32,54,35, E. 46,50,09;



Fig. 2. *Convolvulus elymaiticus* ($\times 0.68$); opened calyx ($\times 1.7$); opened corolla ($\times 2$).

01.05.2007, V. Mozaffarian 88391 (holotypus TARI); Same locality 05.05.2009, V. Mozaffarian 93147 (TARI).

Plant cushion shaped; rootstock long woody, thick, many-stemmed. Stems 15-20 cm high, herbaceous, tomentose, or with long spreading hairs, without branches, leafy. Basal leaves numerous, narrowly lanceolate, to 5 cm long and 2-8 mm wide, cuneate-petiolate at base, with narrowly attenuate tip, densely sericeous-hairy, entire, sometimes linear-oblong and

with undulate margins, nervosa; nerves in upper surface \pm impressed, in lower surface prominently thick; cauline leaves shortly petioled, ovate-lanceolate, rounded at base, rarely cuneate, towards the tip narrowed, \pm acuminate, densely yellowish velutinous-hairy, 20-30 \times 10 mm; upper cauline leaves similar to basal leaves but much smaller and similar to bracts. Inflorescence cymose; cymes \pm distant, sessile or \pm shortly pedunculate, loosely 1-4 flowered. Bracteoles linear, densely villous, ca. 12 mm long, sessile. Sepals densely villous, ovate, narrowly acuminate, \pm similar to

Table. 2. Comparison of *Convolvulus elymaiticus* and its relatives.

Characters	<i>C. commutatus</i>	<i>C. schirazianus</i>	<i>C. calvertii</i>	<i>C. elymaiticus</i>
Habit	Not suffrutescent, branched from base	Suffrutescent, branched from base	Suffrutescent, branched from base	Thick long caespitose, many stemmed
Indumentum	Densely appressed pilose	Appressed pilose	Appressed pilose with long spreading hairs	Densely tomentose with long spreading hairs
Stem	Long spreading hairy	Long sericeous hairy	Long spreading hairy	Long villous
Sepals	Velutinous	Velutinous	Velutinous	Pilose
Ovary	Sericeous	Appressed-pilose	Sericeous or sericeous mixed with spreading hairs	Densely velutinous – pilose
Leaves	Spathulate or linear-oblancoelate, 3-5×4-8 (-12) mm	Linear-oblancoelate 10-20×2 mm	Broadly triangular to linear, 20-70×3-5 mm	Narrowly lanceolate to linear-oblong 50×2-8 mm
Basal leaves	Elliptic to linear-oblancoelate, 2.5-40×2-8 (-12) mm	Linear-lanccolate 15-30×2-3 mm	Linear or linear-oblancoelate 20-55×2-5 mm	Ovate-lanceolate 20-30×10 mm
Cauline leaves	Flowers 3 to several in compact cyme at the top of the shoots or branches, sometimes in the axils of the upper leaves	Flowers in compact cymes at the top of the shoots and their branches	Flowers 2 to several in compact cyme at the top of the branches or branchlets	Flowers 1-4 in rather loose cyme spreading along and at the apex of stems
Inflorescence	Pale bluish-pink or white with pink strips, 20-25 (-25) mm long	Yellow to white, 25 mm long	Pink, 15-20 mm long	In living state white, in dried state pale Pink, up to 20 mm long
Corolla				

each other, ca. 12 mm long. Corolla white, in dry state ± pale purple, ca. 20 cm long, each segments with a hairy band on the outside, ca. 2× longer than sepals. Stamens unequal; the longer one ca. 4 mm long. Filaments glabrous; anthers sagittate, basifixed. Ovary hairy, ovate, discoid at the base. Mature capsule unknown.

Affinities. *Convolvulus elymaiticus* is similar to *C. commutatus* Boiss. group (*C. commutatus*, *C. schirazianus* Boiss. and *C. calvertii* Boiss.) by having non spiny branches, hairy ovary and ± 1-4 capitate flowers (Rechinger 1963, Nowrozii 2002). These species are compared in table 2. For more confidence, the new species was compared with all of the species from our area in southwest of Iran like *C. buschiricus* Bornm., *C. cephalophorus* Boiss., *C. gonocladus* Boiss., *C. kotschyanus* Boiss. and *C. stapfii* Rech. f., all

of them having glabrous ovary or ± hairy ovary in upper part.

Scrophularia elymaitica Mozaff., sp. nov. (Fig. 3).

Perennis, caespitoso-lignosis, multicalulis, caulibus numerosis sicco anno praecedente praesentia. Caules robusti, a basi 4-6 mm diametro, teretes, indistincte striati, virgati, ad bases pallide rubescentes, saepe brunnei vel virides, supra media longe ramosi, ad 90 cm alti, glabri. Folia basalia opposita, crassa, rigidocoriacea, oblongo-lanceolata, petiolo incluso 9×1-1.5 cm longa et lata, petiolo ad 10-30 mm longo suffulta, sparse acute crenato-dentato-mucronulata, interdum ad basi minute lobata; foliola juvenalia ad axillarum foliorum non vel evoluta; folia caulina mediana basalibus similia sed minora, 3-4×1 cm, breviter petiolata vel sessiles; folia ramealia bracteiformia, apicem versus sensim reducta. Inflorescentia



Fig. 3. *Scrophularia elymaitica* ($\times 0.35$.); part of a cyme ($\times 2.4$); opened corolla ($\times 3.5$).

bracteolata, in parte basali minute frondosa; thyrsus angustatus, ad 70 cm longus. Cymae alternae oblique sursum spectantens, raro divaricatim bifurcatae, inferiores 4-5 florae, superiores 5-9 florae. Pedunculi ad 15 mm longi; pedicelli 0-3 mm longi, glabri; bracteae lineares vel linearo-triangulares, inferiores 15×5 mm, superiores ad 4×1 mm. Calycis lacinae orbiculatae, glabrae, ad 3 mm longae, albo-marginatae, ± irregulariter denticulatae, albae, parte centrali virescentes. Corolla ad 5-5.5 mm longa, tubo ventricoso, pallide viridis, nervosa, lobis superioribus erectis ad 2 mm longis, integris, purpureis. Staminodium ad 1.5 mm longum, et 1.5-2 mm latum, tubo inclusuo, reniforme, purpureum. Stylus ad 4-6 mm longus. Stamina in tubo inclusa; filamenta glandulosa; antherae albidae. Capsula depresso-ovoidea, 4.5 mm longa, 4 mm alta, breviter mucronata, dura, glabra, straminea, parce dehiscens. Semina reniformia, nigra, rugulosa.

Typus. Ilam, Salehabad, hills S. of Sarnei to Shur and Shirin 655 m, N. 33,29,08; E. 46,01,25; 30.05.2007, V. Mozaffarian 88393. (holotypus TARI). *Paratypus:* Same locality, 11.06.2006, V. Mozaffarian 88392 (TARI); same locality, 05.05.2009, V. Mozaffarian 93145 (TARI).

Perennial, caespitose-woody, many-stemmed, with many dried stems of former years, to 90 cm high, glabrous. Stems thick, 4-6 mm in diameter at base, terete, obscurely striate, virgate, from base turning to pale red, often pale brown or greenish, branched in upper half. Basal leaves opposite, thick, rigid-leathery, oblong-lanceolate, including petiole 9×1-1.5 cm long and wide, loosely acute crenate-dentate, mucronulate, infrequently lobulate at the base; petioles up to 10-30 mm long; young leaves rarely present at the axis of leaves; median cauline leaves similar to basal leaves, but smaller, 3-4×1 cm, shortly petiolate or sessile; leaves of branches bract-like, towards the apex gradually reduced. Inflorescence bracteolate, in lower part leaf bearing; thyrsus narrow, to 70 cm long; cyme alternate, oblique, toward the tip, rarely divaricate bifurcate; lower ones 4-8 flowered, upper ones 5-9 flowered; peduncle to 15 mm long; pedicels 0-3 mm long, glabrous. Bracts linear or linear-triangular; lower ones 15×5 mm; upper ones to 4×1 mm. Calyx teeth orbicular, glabrous, to 3 mm long, with white margin, irregularly denticulate, white, with greenish central part. Corolla 5-5.5 mm long, with inflated tube, pale green, nervosa; upper lobes erect, to 2 mm long, entire, purple. Staminode to 1.5 mm long and 1.5-2 mm wide, included in the tube, broadly kidney shaped, purple. Style 4-6 mm long. Stamens included in the tube;

filaments glandulose-pilose; anthers whitish. Capsule depressed ovate, 4-5 mm long, 4 mm high, shortly mucronate, glabrous, straw-coloured, rarely dehiscent. Seeds kidney-shaped, black, rugose.

Affinities. *Scrophularia elymaitica* by caespitose woody habit and many virgate terete stems and leathery mostly simple leaves is ± an isolated species. According to Rechinger (1964), Dothan (1978), Grau (1981), and Attar (2006), some characters close it to *S. sanguinea* Grau, *S. xanthoglossa* Boiss. and *S. xylorrhiza* Boiss. but main characters of the habit, leaves and structure of the inflorescence and flowers are different (Table 3).

Scrophularia elymaitica belongs to Saharo-Sindian region and mostly grows on calcareous soil from 400 to 750 m above sea level, but *S. sanguinea* grows mostly in higher altitudes from 1500 to 2400 m and belong to Irano-Turanian region.

New records

***Capparis spinosa* L. var. *leucophylla* (DC.) Boiss.**

Specimen seen. Ilam: Salehabad, around Sarnei 549 m, Mozaffarian, 29.04.2005, 92717 (TARI).

Capparis spinosa is a widespread species in Iran, and distributed from North to Northwest, West, South, Southeast, and Northeast of Iran, because of this distribution high variation especially in the shape of leaves and size of flowers are observed; different authors, different treatments have proposed, some separated them to varieties and some to distinct species (Saghafi Khadem 2000). In Flora Iranica (Hedge & Lamond 1970) 3 varieties were determined for this widespread species. The most complicated variety is *Capparis spinosa* var. *spinosa* which have more widely distribution in Iran, in Flora Iranica var. *canescens* DC. and var. *leucophylla* (DC.) Boiss. were regarded as a synonymy of it.

In recent collection from Ilam province especially from frontier of Iraq, I have found a kind of *Capparis spinosa* with entirely woody stems and entirely grayish leaves and small flowers in comparison with *Capparis spinosa* var. *spinosa*. According to Flora of Iraq (Townsend 1980) it can be separated as a rank of variety with the name of *Capparis spinosa* L. var. *leucophylla* (DC.) Boiss. having moderately robust stems, leaves orbicular, emarginate, moderately to densely white tomentose, flowers moderate to rather small, petals 20-30 mm long.

It is a wide spread variety in frontier of Iran and Iraq in Ilam province and easily distinguishable from var. *spinosa* by having small flowers and woody stem at the base and lower branches.

Table 3. Comparison of *Scrophularia elymaitica* and its relatives.

Characters	<i>S. elymaitica</i>	<i>S. sanguinea</i>	<i>S. xanthoglossa</i>	<i>S. xylorrhiza</i>
Habit	Perennial, chamaephyte, caespitose woody, many stemmed	Perennial or biennial, not caespitose-woody, with woody rhizome	Perennial or chamaephyte, branched at base	Perennial, chamaephyte, many-stemmed from a woody base
Leaf shape	Basal ones, oblong-lanceolate, sometimes lobulate at base	Basal ones ovate, simple	Basal ones 2-pinnatisect.	Ovate-oblong
Margins	Sparsely crenate-dentate with a short mucro	Crenate, acute crenate or double-crenate	With acutely dentate lobes	Entire and acutely dentate or lyrate to pinnatilobed
Indumentum	Glabrous	Glabrous	Glabrous	Minutely glandular-pruinose above, glabrous below
Inflorescence	Dichasial remote, cyme 4-9 flowered	Dichasial, cyme 2-7 flowered	Dichasial, cyme 3-many flowered	Narrowly dichasial cyme
Peduncle	± 15 mm	± 20 mm	± 10-15 mm	10-15 mm
Sepals	Orbicular, up to 3 mm long, glabrous,	Obovate, up to 4×3 mm, glabrous	Obovate, (2-) 2.5-3 mm, glabrous	Rounded 2-3 mm long, glabrous
Margin	Irregularly denticulate	Undulate or lacinate	Denticulate	Entire
Corolla length and colour	5-5.5 mm, purple	up to 7.5 mm, becoming red	6-7 mm, maroon to dark purple	4-5 mm, maroon
Staminode	Broadly reniform, 1.5×1.5-2 mm, dark purple	Orbicular, 1×1 mm, dark purple	Orbicular, yellowish to whitish	Small, oblong to ovate, longer than broad

***Ephedra transitoria* Riedl**

Specimen seen. Ilam, Salehabad, around Sarnei, 549 m, 29.04.2005, Mozaffarian 92716 (TARI); Salehabad to Mehran, ca. 3 km from Banrahman to Gonbade Pirmohammad, 476 m, 11.04.2006, Mozaffarian 92877 (TARI).

Ephedra L. consists of 6 (Riedl 1963) to 8 (Assadi 1998) species in Iran. These species are distributed mostly in Irano-Turanian region and one of them (*E. foliata* Boiss.) grows in lowland of Saharo-Sindian region in some part of Ilam, Khuzestan, Bushehr, Hormozgan and Baluchestan provinces and sometimes penetrate to southern part of Irano-Turanian region in Fars province. In my collections from frontier of Iran and Iraq in Ilam province was found a small shrub which determined as *Ephedra transitoria* Riedl (Blakelock & Gillett 1966). The most important characters of *E. transitoria* are as follows: small shrub about 20-50 cm high; branches minutely scabrid, grey-green; leaves up to 3, 4 or rarely 5 mm long including a sheath of 1-2 mm; female cones up to 7 mm long and 5 mm wide, sessile in the axil or at the tips of branches that are usually less than 2 but occasionally up to 3 cm

long; bracts united for half their length or more, in pairs or whorls of 3, to 4 or 5; arilus fleshy in fruit.

This species grows mostly on dry steppes, especially in gypsy lands with the conspicuous very low and densely branched stems which is a conspicuous feature for separating this species from the other *Ephedra* species in Iran.

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