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The flora of Saluk National Park, Northern Khorassan province, Iran

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Abstract

Saluk National Park is located in Northern Khorassan province, NW Esfarayen between $37^{\circ} 07'$ - $37^{\circ} 14'$ N and $57^{\circ} 10'$ - $57^{\circ} 17'$ E. A total of 1137 plant specimens during 2007–2009 were collected and 505 taxa (species, subspecies and varieties), belonging to 296 genera and 71 families were identified. The largest families in the area are Asteraceae (80 taxa), Poaceae (46 taxa), Fabaceae (45 taxa) and Brassicaceae (42 taxa) respectively. The most diverse genera include *Astragalus* (25 species), *Cousinia* (12 species), *Allium* and *Alyssum* (each with seven species) and *Veronica* (six species) respectively. The life form rates of the taxa were as follows: Hemichryptophyte (36.7%), Therophyte (34.4%), Chamaephyte (11.3%), Geophyte (9.7%) and Phanerophyte (7.9%). From the standpoint of vegetation type, 56.2% of the chorotypes belong to Irano-Turanian vegetative elements. The results show that 31 taxa (6.1%) are endemics and 36 taxa (7.1 %) exist in the IUCN list. During this research one species "*Senecio joharchii* (Asteraceae: Senecioneae)" is presented as new species to science and three species are recorded for the first time from Iran.

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Introduction

Saluk National Park (Northern Khorassan province, Iran) was declared as a National Park in 2002. This park is one of the richest parks of Iran with the high diversity of plant species and is situated in Irano-Anatolian province of the Irano-Turanian Region in the Holarctic kingdom. Irano-Anatolian province comprises about 2/3 of Iran, Afghanistan and Baluchistan sector of Pakistan. It characterized by a continental climate. Hot and dry summers and cold winters predominate. Precipitation occurs in the winter and in the early months of spring; it reaches high levels (up to 800 mm/year) only at high elevations in the mountains. Typical vegetation unites are *Dwarf-scrub* (highland), *Salt swamps* (interior basins), *Woodlands* and *Thorn-cushin formations* (mountain ranges). This province is characterized by a large number of endemic species and genera. Examples are *Astragalus*, *Amygdalus*, *Ferula*, *Nepeta*, *Pistacia*, *Phlomis*, *Verbascum*, *Acanthophyllum*, *Acantholimon*, *Dionysia*, *Cousinia* and *Eremurus*, each of which has many species. This is one of the most pronounced centers of speciation and distribution in the Holarctic Kingdom; especially the montane and alpine zones of the mountain ranges exhibit extraordinary diversity (Kurschner, 1986).

It is important to mention here that the Khorassan province is now divided to three separated provinces: Razavi Khorassan, Southern Khorassan, and Northern Khorassan; it is located in NE of Iran, covering an area of 313, 335 sq. km. But in Flora Iranica treatments and several other works usually the former Khorassan is used. Recently some articles are published as a supplement for Flora Iranica about Khorassan's flora, i.e. Ghahremaninejad *et al.* 2005, 2010b, 2012; Joharchi *et al.* 2007, 2011.

Location and topography

Saluk National Park is located in NW Esfarayen in Northern Khorassan province, NE Iran. The area is situated with 8231 hectares between 37° 07' - 37° 14' N and 57° 10' - 57° 17' E (Fig. 1). The nearest cities to the park are Esfarayen and Bojnurd. Esfarayen is located in ca. 20 km SE and Bojnurd (the capital city

of the province) in ca. 30 km N from the park. Several villages surround the park: Sarmaran in SE, Chahar Borj in SW, and Siah Khaneh in NE and Ahangaran in NW. Saluk Protected Region is located in the western part of the park. Geomorphologically, the park is divided to two parts of plain and mountain. The Northern part of the park is mountainous and includes 2/3 of its total area. The elevation of the area ranges from 1300 to 2170 m. Hasan Chukhuni Mt. with an altitude of 2170 m is the highest mountain in this park. Its mountains are situated in the end of NW Khorassan zone and the mountains of this zone are connected through them to Alborz Mountain range in N Iran. The south part of the park comprises plain region that contains 1/3 of the park and the elevation of the area ranges from 1150 to 1300 m. The elevation difference between the highest and lowest points in the park, about 1000 m, has made various habitats, hence the biodiversity of the park also has increased. Because of valuable ecological characteristics, the area was designated as National Park in 2001.

Climate

The climate of the park is affected with different weather systems such as: Western winds, Azoor high pressure, Siberia high pressure and Mediterranean. In summer, Azoor high pressure system makes the weather of the area dry. Western winds that blow in the park from early autumn to late spring are the major agents of the precipitation in autumn, winter and spring. Siberia high pressure system affects the park from late autumn to early spring, hence it causes snowfall and temperature drops down to -20 C°. Mediterranean moisture is the most important origin of the precipitation in the park. Mainly, it is entered into the area by western winds.

Climatically the plain and mountainous parts of the park are different, hence available data mean in two climatological stations—Asadli station for mountainous part and Bala Khosh station for plain part—during the period of 21 years from 1986 to 2006 were utilized to determine the climatic parameters. According to these data the ombrothermic diagram of

the park was prepared. It shows that approximately six months of year are wet months and the rainiest month is April with a mean precipitation of 60.6 mm. Drought period starts in early May and continues until the end of October and the driest month is August with a mean precipitation of 1.5 mm. The coldest months are January and February with a minimum temperature of 0.2 and 0.5°C, respectively. The warmest months are July and August with a maximum temperature of 23.6 and 22.8°C, respectively.

According to available data mean, annual precipitation and median annual temperature are 282 mm and 12°C, respectively that results the study area is characterized as a “cold semi-arid” climate (Fig. 2).

Materials and methods

Data collection

Climatic data and the map of the park were provided by the Northern Khorassan Department of the environment. The vascular plants of the park regularly were collected from different habitats every month during growing seasons between 2007 and 2009. Efforts were made to collect both flowering and fruiting specimens. The exact location and elevation, latitude and longitude of every plant specimen were determined using GPS in addition notes on the vegetation and habitat. After the specimens had been dried by pressing, they transferred to the herbarium of Kharazmi University (FAR) and the specimens were prepared as herbarium material according to herbarium techniques. Then they were identified and named using available flora such as: Flora Iranica (Rechinger, 1963–2010), Flora of the USSR (Komarov, 1963–2001), Flora of Turkey (Davis, 1965–1988), Flora of Iraq (Townsend *et al.*, 1966–1985), Flora Europeae (Tutin *et al.*, 1964–1980), and Flora of Iran (Assadi *et al.*, 1988–2012).

Based on the type of vegetation in Saluk National Park, the habitats divided into plain regions, rocky areas, arid mountainous regions, humid mountainous regions and river sides, landslides, aquatic habitats and manipulated areas. The introduced habitats are

comparable with another floristic study in Khorassan province by Ghahreman *et al.* (2006).

Determining the life form was done by Raunkiaer classification (Raunkiaer, 1934). Life form, chorology and the species distribution in the world and Iran was extracted from the reviews of several monographs and Floras, particularly Flora Iranica and Flora of Iran.

The plant species of Saluk National Park checked with international IUCN (International Union for Conservation of Nature) list and their status in this list were denoted by Red Data Book of Iran (Jalili & Jamzad, 1999). The endemic plant species were determined using Biodiversity of plant species in Iran (Ghahreman & Attar, 1998), Flora of Iran (Assadi *et al.*, 1988–2011) and Flora Iranica (Rechinger, 1963–2010). The vascular plants of Saluk National Park are listed in Table 4 with information about life form, chorotype, endemism, IUCN categories and herbarium number of every plant species.

Results and discussion

Floristic diversity

The vascular flora of Saluk National Park includes a total of 505 taxa (496 species, six subspecies and three varieties) belonging to 296 genera and 71 families (Tab. 4). The dicotyledons with 58 families, 249 genera and 415 species are the most diverse group of vascular plants in the following monocots with eight families, 42 genera and 76 species, gymnosperms with two families, two genera, two species, and pteridophytes with two families, two genera and two species (Tab. 1).

The richest families in terms of number of taxa are Asteraceae (80 taxa), Poaceae (46 taxa), Fabaceae (45 taxa), Brassicaceae (42 taxa), Lamiaceae (25 taxa), Boraginaceae (20 taxa), Apiaceae (18 taxa), Caryophyllaceae and Chenopodiaceae (each with 17 taxa), Rosaceae and Scrophulariaceae (each with 15 taxa) and Liliaceae (14 taxa) (Tab. 2). The genus *Astragalus* (25 species) is the richest in this area

following *Cousinia* (12 species), *Allium* and *Alyssum* (each with seven species), *Veronica* (six species), *Artemisia*, *Bromus*, *Lappula*, *Poa* and *Tragopogon*

(each with five species), *Acantholimon*, *Centaurea*, *Crasus*, *Cirsium*, *Gagea*, *Galium*, *Plantago*, *Silene* and *Stachys* (each with four species) (Tab. 3).

Table 1. Number of families, genera and species of main groups of plants in Saluk National Park.

Plant Groups	Family	Genus	Taxon (subsp., var.)
<i>Pteridophytes</i>	3	3	3
<i>Spermatophytes</i>	68	293	502
<i>Gymnosperms</i>	2	2	2
<i>Angiosperms</i>	66	291	500
<i>Dicotyledones</i>	58	249	424
<i>Monocotyledones</i>	8	42	76
Total	71	296	505

The ratios of species/genera (1.7) and genera/families (4.2) for this park indicate a high taxonomic diversity rate. It could be due to diverse habitats in the area (Ghahremaninejad *et al.*, 2010a, Ghahremaninejad & Ezazi, 2009a, b).

Habitat

Seven different habitats are present in Saluk National Park as follows:

Plain regions

They include flat plains that are situated in the southern parts of the park. Various species such as ones listed below were found: *Acanthophyllum glandulosum*, *Acroptilon repens* subsp. *australe*, *Aegilops kotschy*, *Alhagi pseudoalhaji*, *Amygdalus spinosissima* subsp. *turcomanica*, *Androsace maxima*, *Anthemis rhodocentra*, *Artemisia sieberi*

subsp. *sieberi*, *Astragalus campylorrhynchus*, *Bromus tectorum*, *Centaurea bruguierana* subsp. *belangerana*, *Ceratocephalus falcata*, *Cousinia monocephala*, *C. prolifera*, *Crepis sancta* subsp. *iranica*, *Eremopyrum bonaepartis* var. *bonaepartis*, *Eremurus stenophyllus* subsp. *stenophyllus*, *Fritillaria gibbosa*, *Gagea reticulate*, *Glaucium elegans*, *Glycyrrhiza glabra* var. *glabra*, *Halocharis sulphurea*, *Hordeum bulbosum*, *Holosteum glutinosum*, *Iris fosteriana*, *I. songarica*, *Ixiolirion tataricum*, *Linaria simplex*, *Lycium ruthenicum*, *Muscati neglectum*, *Nonnea caspica*, *Papaver pavoninum*, *Perovskia abrotanoides*, *Poa bulbosa*, *P. sinaica*, *Polygonum hyrcanicum*, *Rhizocephalus orientalis*, *Roemeria hybrida*, *Rosa persica*, *Scabiosa olivieri*, *Sedum tetramerum*, *Silene coniflora*, *Stachys trinervis*, *Vulpia persica*, *Ziziphora tenuior*.

Table 2. List of rich families of vascular plants in Saluk National Park.

Families	Taxon (subsp., var.)	Genera
<i>Asteraceae</i>	80	42
<i>Poaceae</i>	46	27
<i>Fabaceae</i>	45	14
<i>Brassicaceae</i>	42	32
<i>Lamiaceae</i>	25	16
<i>Boraginaceae</i>	20	12
<i>Apiaceae</i>	18	15
<i>Caryophyllaceae</i>	17	9
<i>Chenopodiaceae</i>	17	11
<i>Rosaceae</i>	15	9
<i>Scrophulariaceae</i>	15	5
<i>Liliaceae</i>	14	7

Rocky areas

This kind of habitat is typically positioned on the slopes that cover with rocks and boulders. In this habitat various species are found such as: *Acantholimon pterostegium*, *Aeluropus littoralis*, *Anthemis odontostephana*, *Convolvulus dorycnium*, *Corydalis rupestris*, *Dielsiocharis kotschy*, *Dionysia*

tapetodes, *Graellsia integrifolia*, *Hymenocrater elegans*, *H. platystegius*, *Lonicera microphylla*, *Melica jacquemontii* subsp. *jacquemontii*, *Onosma longilobum*, *Parietaria judaica*, *Reaumuria alternifolia* var. *alternifolia*, *Scrophularia variegata* subsp. *variegata*, *Silene swertiaefolia*, *Stipa barbata*.

Table 3. List of rich genera of vascular plants in Saluk National Park.

Genus	Species	Genus	Species
<i>Astragalus</i>	25	<i>Acantholimon</i>	4
<i>Cousinia</i>	12	<i>Centaurea</i>	4
<i>Allium</i>	7	<i>Cerasus</i>	4
<i>Alyssum</i>	7	<i>Cirsium</i>	4
<i>Veronica</i>	6	<i>Gagea</i>	4
<i>Artemisia</i>	5	<i>Galium</i>	4
<i>Bromus</i>	5	<i>Plantago</i>	4
<i>Lappula</i>	5	<i>Silene</i>	4
<i>Poa</i>	5	<i>Stachys</i>	4
<i>Tragopogon</i>	5		

Arid mountainous regions

These habitats that exist in the northern parts of the park have high plant species diversity. Also valleys and peaks in these regions tend to isolate certain plant species that have a low dispersal capacity and a narrow habitat tolerance. Some examples of the species growing in these regions are: *Acantholimon raddeanum*, *Acanthophyllum glandulosum*, *Allium cristophii*, *A. sarawchanicum*, *Artemisia kopetdagensis*, *Astragalus masanderanus*, *A. neosassadianus*, *A. orthocarpoides*, *A. schahrudensis*, *Berberis integerrima*, *Cirsium bornmulleri*, *Clausia turkestanica*, *Cotoneaster nummularioides*, *Cousinia microcarpa*, *C. schindleriana*, *C. trachyphylaria*, *Dianthus crinitus* subsp. *turcomanicus*, *D. orientalis* subsp. *stenocalyx*, *Eryngium billardieri*, *Euphorbia aelleni*, *Ferula ovina*, *Fibigia suffruticosa*, *Gundelia tournefortii*, *Haplophyllum acutifolium*, *Hypericum helianthemooides*, *Juniperus excels*, *Jurinea monocephala* subsp. *sintenisii*, *Lagochilus aucheri*,

Linaria pyramidalis subsp. *kopetdagensis*, *Marrubium duabense*, *Onobrychis cornata* subsp. *cornuta*, *Onosma dichroanthum*, *Prangos bungei*, *Senecio joharchii*, *S. paulsenii* subsp. *Khorasanicus*, *Serratula latifolia*, *Thalictrum isopyroides*, *Ziziphora clinopodioides* subsp. *szowitsii*.

**Fig. 1.** Map of the study area: red and green boundaries show Saluk National Park and Saluk protected area, respectively.***Humid mountainous regions and river sides***

seasonal water channel and springs on the elevations create several suitable humid areas for growing plants.

In this habitat various species such as the followings are found: *Acer monspessulanum* subsp. *turcomanicum*, *Adianthus capillus-veneris*, *Althea cannabina*, *Asplenium ruta-muraria*, *Atriplex micrantha*, *Barbarea plantaginea*, *Brachypodium sylvaticum*, *Carex divisa*, *C. songorica*, *Chorispora tenella*, *Crambe kotschyana*, *Epilobium hirsutum*, *E. tetragonum*, *Equisetum ramosissimum*, *Eupatorium cannabinum*, *Juncus inflexus*, *Lycium kopetdaghi*, *Lythrum hyssopifolia*, *Matthiola alyssifolia*, *Mentha longifolia* var. *asiatica*, *Polygonatum sewerzowii*, *Rhamnus Pallasii* subsp. *sintenisii*, *Rosa beggeriana*, *Rubus sanctus*, *Salix acmophylla*, *S. pycnostachya*, *Samolus valerandi*, *Scrophularia umbrosa*, *Tanacetum parthenium*, *Thalictrum sultanabadense*, *Ulmus glabra*, *Verbena officinalis*, *Veronica anagalloides* subsp. *heureka*, *Vincetoxicum pumilum*.

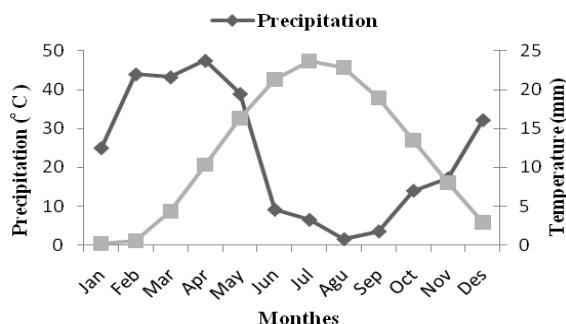


Fig. 2. Ombothermic climatic diagram for Saluk National Park based on data obtained from two climatological stations Asadli and Bala Khosh during 1986–2006.

Landslides

Landslides are rocky areas at the foot of the mountain slopes. The vegetation will be seen when some soil exists between the gravels. Some species of this habitat are: *Allium monophyllum*, *Arum kotschy*, *Atraphaxis spinosa*, *Bunium intermedium*, *Caccinia macranthera* var. *crassifolia*, *Cerastium inflatum*, *Delphinium turkmenum*, *Eremostachys labiosiformis*, *Eremurus luteus*, *Geranium*

rotundifolium, *Isatis tinctoria* subsp. *tomentella*, *Koelpinia linearis*, *Lamium amplexicaule* var. *amplexicaule*, *Lepyrodielis stellaroides*, *Pachyptrygium brevipes*, *Paracaryum turcomanicum*, *Peltaria Turkmena*, *Pimpinella tragium*, *Prangos latiloba*, *Psammogeton canescens* subsp. *Canescens*, *Pteropyrum aucheri*, *Ranunculus afghanicus*, *Scandix stellata*, *Solenanthus circinnatus*, *Tulipa micheliana*, *T. montana* var. *montana*, *Valeriana ficariifolia*, *Vincetoxicum pumilum*.

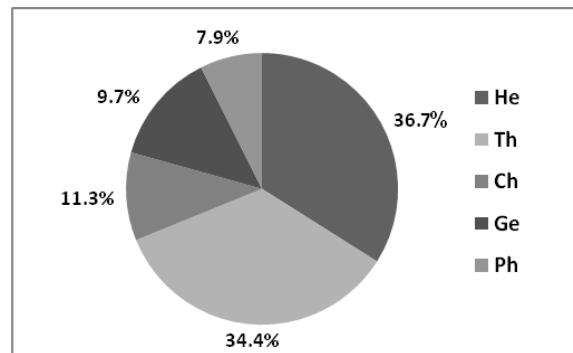


Fig. 3. The life form of the species in Saluk National Park.

Aquatic habitats

Few species are grown in this kind of rare habitats; such as: *Juncus articulatus*, *Phragmites australis*, *Plantago gentianoides* subsp. *griffithii*, *Veronica anagallis-aquatica*.

Manipulated areas

These areas include the manipulated rural localities used for farming or gardening and the margin of the roads and pathways. Some of these species are listed below: *Amaranthus retroflexus*, *Capparis spinosa*, *Cardaria draba*, *Convolvulus arvensis*, *Echinochloa crus-galli* var. *submutica*, *Hibiscus trionum*, *Hordeum glaucum*, *Malcolmia africana*, *Malva neglecta*, *Peganum harmala* var. *harmala*, *Plantago lanceolata*, *Portulaca oleracea*, *Reseda luteola*, *Roemeria refracta*, *Setaria glauca*, and *Tribulus terrestris* var. *terrestris*.

Life form

The life form of plants is an adaptive response to environment and provides an ecological classification

that may be indicative of habitat conditions (Archibald 1995). Adaptive features within a flora can give clues as to (1) origin of the flora, (2) migration pattern in the area, (3) evolutionary trends within populations, (4) and indications of present or past climatic trends (Radford *et al.*, 1974). Life form of the plant species of the study area was determined by Raunkiaer's classification based on the position of perennating buds on the plant species (Raunkiaer, 1934). The main phytotaxa are based on Zohary (1973), Léonard (1989) and Takhtajan (1986). In Saluk National Park, the dominant life forms are hemicryptophytes, which constitute 36.7% of the taxa, followed by Therophyte (34.4%), chamaephytes (11.3%), geophytes (9.7%) and phanerophytes (7.9%). The dominance of hemicryptophyte and therophyte clearly indicate the adaptation of these plants to aridity in this area (Fig. 3).

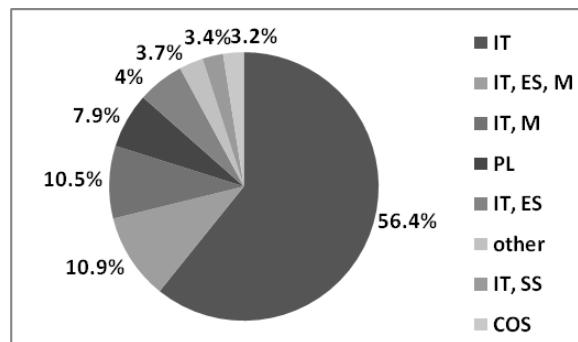


Fig. 4. The chorological affinities of the species in Saluk National Park.

Chorology

Irano-Turanian elements compose more than half of the plant species (56.4%) in the park, thus it is the dominant chorotype in the region. The Irano-Turanian/ Euro-Siberian/ Mediterranean species with 10.9%, the Irano-Turanian/Mediterranean species with 10.5%, the pluriregional species with 7.9%, the Irano-Turanian/ Euro-Siberian species with 4% and the cosmopolitan species with 3.2% compose other phytogeographical elements of the area (Fig. 4). The some of the taxa found exclusively in Irano-Turanian were mentioned below:

Acantholimon karelini, *Acanthophyllum glandulosum*, *Aegilops tauschii*, *Allium kuhsorkhense*, *Artemisia Khorassanica*, *A.*

kopetdagensis, *Astragalus iranicus*, *A. ochreatus*, *Berberis integerrima*, *Caccinia macranthera* var. *crassifolia*, *Cerasus chorassanica*, *Cousinia afghanicum*, *C. eryngioides*, *Crambe kotschyana*, *Delphinium turkmenum*, *Dionysia tapetodes*, *Echinops chorassanicus*, *Ephedra intermedia*, *Euphorbia aelleni*, *Ferula ovina*, *Graellsia integrifolia*, *Iris kopetdagensis*, *Juniperus excelsa*, *Korshinskyia kopetdagensis*, *Lagochilus aucheri*, *Leucopoa sclerophylla*, *Lonicera microphylla*, *Lycium kopetdaghi*, *Marrubium duabense*, *Noaea mucronata* subsp. *mucronata*, *Onobrychis cornata* subsp. *cornuta*, *Paracaryum turcomanicum*, *Peltaria turkmena*, *Perovskia abrotanoides*, *Prangos latiloba*, *Pulicaria gnaphalodes*, *Ranunculus afghanicus*, *Sedum tetramerum*, *Serratula latifolia*, *Silene swertiaefolia*, *Stachys turcomanica*, *Stipa barbata*, *Tulipa micheliana*, *Verbascum cheiranthifolium* var. *transcaspicum*

Endemism

Among 505 taxa distributed in Saluk National Park, 31 taxa belonging to 27 species, three subspecies and one variety are endemic to Iran. They compose about 6.1% of the total number of taxa. The endemic taxa include: *Acantholimon ptrestegium*, *Allium kuhsorkhensis*, *Astragalus campylanthoides*, *A. cyclophyllum*, *A. meschedensis*, *A. neo-assadianus*, *A. ochreatus*, *A. orthocarpoides*, *A. ruscifolius*, *A. submaculatus*, *Cerasus chorassanica*, *Cousinia diezii*, *C. lasiandra*, *C. lepida*, *C. monocephala*, *C. schindleriana*, *C. trachyphylaria*, *Dianthus orientalis* subsp. *stenocalyx*, *Echinops chorassanicus*, *Eremurus stenophyllus* subsp. *stenophyllus*, *Euphorbia aellenii*, *Graellsia integrifolia*, *Hymenocarper platystegius*, *Lagochilus aucheri*, *Onobrychis heliocarpa*, *Polygonum hyrcanicum*, *Rochelia mirheydari*, *Salvia hypoleuca*, *Tanacetum polyccephalum* subsp. *duderanum*, *Tragopogon jezdianus*, *Tulipa montana* var. *Montana*. Thus among 71 families, 12 families possess endemic taxa and the most endemic species in the area belong to *Fabaceae* and *Asteraceae* families with nine endemic taxa (58% of the total of endemic taxa).

Among 31 endemic taxa, 29 taxa belong to Irano-Turanian region, 11 taxa are found exclusively in Khorassan region and one taxon (*Astragalus neo-assadianus*) in Northern Khorassan.

IUCN categories

In the study area, two vascular plants as vulnerable plants (VU), 23 plant taxa as low risk plants (LR), 11 vascular plants with Data deficient (DD) are characterized based on the threatened categories proposed by Jalili & Jamzad (1999). Totally, 7% of vascular plants of the park (36 taxa) exist in IUCN categories. Of this number, 33 taxa belong to Irano-Turanian region and 17 taxa are endemic to Iran (Tab. 4).

Medicinal plant species

Medicinal plant species in Saluk National Park were determined using the Medicinal Plants book (Zargari, 1968–1995). They comprise 32% of total number of plant species. Some of these species are listed below: *Achillea wilhelmsii*, *Adiantum cepillus-veneris*, *Alhagi pseudalhagi*, *Amygdalus spinosissima*, *Anchusa italicica*, *Artemisia biennis*, *Cichorium intybus*, *Conium maculatum*, *Cynanchum acutum*, *Ephedra intermedia*, *Hypericum perforatum*, *Lallemantia royleana*, *Lonicera nummulariifolia*, *Peganum harmala*, *Pulicaria dysenterica*, *Rhamnus pallasii*, *Salsola kali*, *Salvia sclarea*, *Samolus valerandi*, *Stachys lavandulifolia*, *Teucrium polium*, *Verbena officinalis*, *Ziziphora tenuior*,...

Findings and reports

During this research one species “*Senecio joharchii* F. Ghahrem., Ezazi, Rahchamani and Attar” is presented as new to science (Ghahremaninejad *et al.*, 2010a), and two species are recorded for the first time from Iran: *Lonicera microphylla* Willd. ex Roem. and Schultes from *Caprifoliaceae* family (Ghahremaninejad & Ezazi, 2009b) and *Marrubium duabense* Murata from *Lamiaceae* family (Ghahremaninejad & Ezazi, 2009a).

Using all current references, 65 taxa as new records for the eastern Iran, 10 taxa as new records for Khorassan region, 156 taxa as new records for Northern Khorassan province and 503 taxa as new records for Saluk National Park are reported.

In appendix several natural pictures of plant taxa of the park are selected.

Recently a paper is published about the flora of Salok [Saluk] protected area (Nadaf *et al.*, 2011). In real Saluk area is divided to two parts: a- park, b-protected area. But based on the Nadaf *et al.* (2011) the studied area (17000 hectares) is larger than the protected part. In real the protected part is an area with 11677 hectares and the park part is an area with 8231 hectares. Thus Saluk area includes an area nearly 19908 hectares. In this paper there are not any Ombrothermic climatic diagram and any area map. Furthermore for the plant specimens there are not any voucher specimen.

Our results from 8231 hectares show 71 families, 296 genera and 496 species, whereas they resulted for a bigger area, 17000 hectares, 52 families, 174 genera and 213 species. 149 genera and 125 species are the same between both researches. 20 families, 147 genera and 371 species in our result are listed that did not mention in Nadaf *et al.*'s work. Family *Oleaceae* (*Fraxinus angustifolia* -cultivated ?-), and 25 genera and 88 species are mentioned in Nadaf *et al.*'s paper that we do not listed here; this difference is can be due to the larger studied area by them. As a result, it seems that Nadaf *et al.*'s work (2011) do not cover all the floristic composition of Saluk.

Acknowledgments

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Appendix 1. Checklist of vascular plants of Saluk National Park.

He = Hemicryptophyte, Th = Therophyte, Ch = Chamaephyte, Ge = Geophyte, Ph = Phanerophyte, IT = Irano-Turanian, ES = Euro-Siberian, M = Mediterranean, SS = Sahara-Sendia, PL = Pluriregional, COS = Cosmopolite, En = Endemic, NE = Not Evaluated, DD = Data Deficient, LR = Lower Risk, VU = Vulnerable, subsp. = subspecies, var. = variety.

Name of taxa	Life form	Chorology	Endemism	IUCN status	Herbarium number
Pteridophytes					
Aspleniaceae					
<i>Asplenium ruta-muraria</i> L.	Ge	COS	-	NE	5053
Equisetaceae					
<i>Equisetum ramosissimum</i> Desf.	Ge	PL	-	NE	4494, 4742, 5157
Pteridaceae					
<i>Adiantum capillus-veneris</i> L.	Ge	COS	-	NE	5052
Gymnosperms					
Cupressaceae					
Ephedraceae					
<i>Ephedra intermedia</i> Schrenk & C. A. Ch Mey.	IT	-	NE	4453, 4646	
Angiosperms: Dicotyledones					
Aceraceae					
<i>Acer monspessulanum</i> L. subsp. <i>Ph turcomanicum</i> (Pojark.) Rech. f.	IT, M	-	NE	4497, 4669, 5275	
Amaranthaceae					
<i>Amarantus retroflexus</i> L.	Th	PL	-	NE	4532, 5032, 5120
Apiaceae					
<i>Bunium intermedium</i> Korov	Ge	IT	-	NE	5392
<i>Bunium rectangulum</i> Boiss. & Hausskn.	Ge	IT	-	NE	4990
<i>Bupleurum exaltatum</i> M. B.	Ch	IT	-	NE	5089, 5461
<i>Conium maculatum</i> L.	He	PL	-	NE	4506, 5506
<i>Dorema hyrcanum</i> Kos.-Pol.	He	IT	-	NE	4475, 4889, 5103
<i>Eryngium billardieri</i> F. Delaroche	He	IT	-	NE	5497
<i>Eryngium bungei</i> Boiss.	He	IT	-	NE	4489, 4767, 4839

<i>Falcaria vulgaris</i> Bernh.	He	IT, ES, M	-	NE	4485, 5118, 5146
<i>Ferula ovina</i> (Boiss.) Boiss.	He	IT	-	NE	4416, 4995, 5261
<i>Ferulago angulata</i> (Schlecht.) Boiss.	He	IT	-	LR	4448, 5098, 5178
<i>Korshinskyia kopetdagensis</i> (Korov.) Ge	IT	-	NE		4854, 5424
M. Pimenov & Kljuykov					
<i>Pimpinella tragium</i> Vill. subsp. <i>Ch lithophila</i> (Schischk.) Tutin	IT, ES, M	-	NE		5065, 5458
<i>Prangos bungei</i> Boiss.	He	IT	-	NE	4698
<i>Prangos latiloba</i> Korov.	He	IT	-	NE	4717, 5350, 5390
<i>Psammogeton canescens</i> (DC.) Vatke Th	IT	-	NE		4509, 4847
subsp. <i>Canescens</i>					
<i>Scandix stellata</i> Bank & Soland.	Th	IT, M	-	NE	4861, 5246, 5344, 5388, 5478
<i>Torilis arvensis</i> (Huds.) Link	Th	PL	-	NE	4466
<i>Turgenia latifolia</i> (L.) Hoffm.	Th	IT, ES	-	NE	5469
Apocynaceae					
<i>Trachomitum venetum</i> (L.) Woods.	He	PL	-	NE	4499
subsp. <i>scabrum</i> (Russan.) Rech. f.					
Asclepiadaceae					
<i>Cynanchum acutum</i> L.	He	IT, M	-	NE	5076
<i>Vincetoxicum pumilum</i> Decne.	He	IT, ES	-	LR	4484, 4873, 4877, 4914, 4932, 5035, 5042, 5456
Asteraceae					
<i>Achillea biebersteinii</i> Afan.	He	IT	-	NE	4492, 4908, 5046
<i>Achillea wilhelmsii</i> C. Koch	He	IT	-	NE	4410, 4716, 4750, 5382, 5528
<i>Acroptilon repens</i> (L.) DC. subsp. <i>He australe</i> (Iljin.) Rech. f.	IT	-	NE		4535, 4883, 4942, 4976, 4991, 5153
<i>Anthemis hyalina</i> DC.	Th	IT	-	NE	5553
<i>Anthemis odontostephana</i> Boiss. var. <i>Th odontostephana</i>	IT, SS	-	NE		5262
<i>Anthemis rhodocentra</i> Iranshahr	Th	IT, SS	-	NE	4764, 5332, 5376
<i>Arctium lappa</i> L.	He	PL	-	NE	4443
<i>Arctium minus</i> (Hill) Bernh.	He	ES (M)	-	NE	5464
<i>Artemisia biennis</i> Willd.	He	PL	-	NE	5150, 5096
<i>Artemisia diffusa</i> Krasch. ex Poljak.	Ch	IT	-	NE	4434
<i>Artemisia khorassanica</i> Podl.	Ch	IT	-	NE	4571, 5225
<i>Artemisia kopetdagensis</i> Krasch.	Ch	IT	-	NE	4539
<i>Artemisia sieberi</i> Besser subsp. <i>Ch sieberi</i>	IT, ES, M	-	NE		4420, 4533
<i>Carduus pycnocephalus</i> L. subsp. <i>Th albidus</i> (M. B.) Hazmi	IT, M (ES, - SS)		NE		5347
<i>Carthamus oxyacantha</i> M. B.	Th	IT, ES, M	-	NE	4972
<i>Centaurea bruguierana</i> (DC.) Hand.- Th	IT, SS	-	NE		4511, 4956, 4964
Mzt. subsp. <i>belangerana</i> (DC.) Bornm.					
<i>Centaurea depressa</i> M. B.	Th	IT	-	NE	4760, 5386
<i>Centaurea iberica</i> Trev. ex Spreng.	He	IT, ES	-	NE	4933
<i>Centaurea virgata</i> Lam. subsp. <i>Ch squarrosa</i> (Willd.) Gugler	IT	-	NE		4440, 4461, 5001, 5073
<i>Cephalorrhynchus kossinskyi</i> He	IT	-	NE		4882, 5530
(Krasch.) Kirp.					
<i>Chondrilla juncea</i> L.	He	IT, ES, M	-	NE	4579, 4958, 5072
<i>Cichorium intybus</i> L.	He	PL	-	NE	4552
<i>Cirsium arvense</i> (L.) Scop. var. <i>Th incanum</i> (S. G. Gmelin) Ledeb	PL	-	NE		4444, 5023, 5119, 5199, 5203
<i>Cirsium bornmulleri</i> Sint. ex Bornm.	He	IT	-	NE	4542, 5482

<i>Cirsium congestum</i> Fisch. & C. A. He Mey. ex DC. var. <i>congestum</i>	IT	-	NE	4437, 5069, 5229
<i>Cirsium vulgare</i> (Savi) Ten. He	PL	-	NE	5126
<i>Codonoccephalum peacockianum</i> He Aitch. & Hemsl.	IT	-	NE	5532
<i>Conyza canadensis</i> (L.) Cronq. Th	COS	-	NE	4595
<i>Conyzanthus squamatus</i> (Spreng.) Th Tamamsch.	PL	-	NE	4596
<i>Cousinia afgghanicum</i> C. Winkl.	He	IT	-	NE 4711
<i>Cousinia diezii</i> Rech. f.	Th	IT	En	DD 5125
<i>Cousinia eryngioides</i> Boiss.	He	IT	-	NE 4438, 4663
<i>Cousinia lasiandra</i> Bunge	He	IT	En	LR 4947
<i>Cousinia lepida</i> (Bunge ex) Boiss.	Ch	IT	En	LR 5381
<i>Cousinia microcarpa</i> Boiss.	He	IT	-	NE 5510
<i>Cousinia monocephala</i> Bunge	He	IT	En	DD 4945, 4953, 5188, 5401
<i>Cousinia prolifera</i> Jaub. & Spach.	Th	IT	-	NE 4804
<i>Cousinia schindleriana</i> Bornm. & He Gauba	IT	En	DD	5494
<i>Cousinia trachiphyllaria</i> Bornm. & He Rech. f.	IT	En	LR	5495
<i>Cousinia umbrosa</i> Bunge	He	IT	-	NE 4472, 4884, 5417
<i>Cousinia sp.</i>	He	IT	-	NE 5504
<i>Crepis sancta</i> (L.) Babcock subsp. Th <i>iranica</i> Rech. f.	IT, M	-	NE	4618, 4766, 4830, 4962
<i>Crupina vulgare</i> Cass.	Th	IT, M	-	NE 4543
<i>Cymbolaena griffithii</i> (A. Gray) Th Wagenitz	IT, ES	-	NE	4849
<i>Echinops chorassanicus</i> Bunge	He	IT	En	LR 4948
<i>Echinops ritrodes</i> Bunge	He	IT	-	NE 4487
<i>Eupatorium canabinum</i> L.	He	IT, ES, M	-	NE 5195, 5051
<i>Filago arvensis</i> L.	Th	IT, ES	-	NE 5462, 5516
<i>Filago pyramidalis</i> L.	Th	IT, ES, M	-	NE 5158
<i>Gundelia tournefortii</i> L.	He	IT	-	NE 5132
<i>Helichrysum oocephalum</i> Boiss.	He	IT	-	NE 4557
<i>Heteroderis pusilla</i> (Boiss.) Boiss. var Th . <i>gymnocephala</i> Rech. f.	IT	-	NE	5210
<i>Heteropappus altaicus</i> (Willd.) He Novopokr. var. <i>canescens</i> (Nees) Serg.	IT, ES	-	NE	5107, 5196, 5202
<i>Jurinea monocephala</i> Aitch. & Hemsl. Ch subsp. <i>sintenisii</i> (Bornm.) Wagenitz	IT	-	NE	5498
<i>Koelpinia linearis</i> Pall.	Th	IT, SS	-	NE 5331, 5389
<i>Lactuca serriola</i> L.	He	IT, ES, M	-	NE 4486, 4510, 5093, 5145
<i>Lactuca undulata</i> Ledeb.	Th	IT, M	-	NE 4776
<i>Onopordon leptolepis</i> DC.	He	IT	-	NE 4449, 4712
<i>Pulicaria dysenterica</i> (L.) Bernh.	He	IT, ES, M	-	NE 4594, 4959, 5097, 5173, 5208
<i>Pulicaria gnaphalodes</i> (Vent.) Boiss. Ch <i>Scariola orientalis</i> (Boiss.) Sonjak Ch subsp. <i>orientalis</i>	IT	-	NE	4512, 4572 4598, 5087, 5165, 5192, 5201
<i>Scorzonera leptophylla</i> (DC.) Kradch. Ge & Lipsch.	IT	-	NE	4683
<i>Scorzonera litwinowii</i> Krasch. & He Lipsch.	IT	-	NE	4427
<i>Senecio glaucus</i> L.	Th	IT, ES, M, - SS	NE	4829, 5337, 5360, 5406
<i>S. joharchii</i> F.Ghahrem., Ezazi, He Rahchamani & Attar	IT	-	NE	4692
<i>Senecio paulsenii</i> O. Hoffm. subsp. He	IT	-	NE	5438

<i>Khorassanicus</i> (Rech. f. & Aell.) B.					
Nord					
<i>Serratula latifolia</i> Boiss.	He	IT	-	NE	5473
<i>Sonchus maritimus</i> L.	He	PL	-	NE	4784, 4796, 4965
<i>Tanacetum parthenium</i> (L.) Schultz-	He	PL	-	NE	4469, 4901, 5049
Bip.					
<i>Tanacetum polycephalum</i> subsp. He		IT	En	NE	4850, 4979, 5455,
<i>duderanum</i> (Boiss.) Podl.					5490
<i>Taraxacum montanum</i> (C. A. Mey.) He		IT, ES	-	NE	5190
DC.					
<i>Taraxacum syriacum</i> Boiss.	He	IT	-	NE	4746
<i>Tragopogon bornmuelleri</i> M. Ownbey	He	IT	-	NE	4555
& Rech. f.					
<i>Tragopogon bupthalmoides</i> (DC.) He		IT	-	NE	4722
Boiss. var. <i>bupthalmoides</i>					
<i>Tragopogon jezdianus</i> Boiss. & Buhse	He	IT	En	LR	4723
<i>Tragopogon longirostris</i> Bisch.	He	IT, ES, M	-	NE	5356
<i>Tragopogon reticulatus</i> Boiss. & Huet	He	IT, ES	-	NE	5489
<i>Tripleurospermum disciforme</i> (C. A. Th		IT	-	NE	5020
Mey.) Schultz Bip.					
<i>Xanthium spinosum</i> L.	Th	COS	-	NE	5081
<i>Xeranthemum longipapposum</i> Fisch. Th		IT	-	NE	5515
& C. A. Mey.					
Berberidaceae					
<i>Berberis crataegina</i> DC.	Ph	IT	-	NE	4537
<i>Berberis integerrima</i> Bunge	Ph	IT	-	NE	4463, 4465, 5061,
					5415
<i>Berberis integerrima</i> × <i>vulgaris</i>	Ph	IT	-	NE	4488, 4925, 5161,
					5180
Boraginaceae					
<i>Anchusa italicica</i> Retz. var. <i>italicica</i>	Th	IT, ES	-	NE	4516, 5026
<i>Arnebia decumbens</i> (Vent.) Coss. & Th		IT, SS	-	NE	4777
Kral.					
<i>Arnebia linearifolia</i> DC.	Th	IT	-	NE	5368
<i>Caccinia macranthera</i> (Banks & Th		IT	-	NE	5255, 5428
Soland.) Brand var. <i>crassifolia</i> (Vent.)					
Brand					
<i>Echium italicum</i> L.	He	IT, M	-	NE	4450, 5417, 4922
<i>Heliotropium lasiocarpum</i> Fisch. & Ch		IT	-	NE	4528, 4971, 5084
Mey.					
<i>Lappula ceratophora</i> (M. Pop.) M. Th		IT	-	NE	4789, 4938, 5242
Pop.					
<i>Lappula drobovii</i> M. Pop. ex Pavl.	Th	IT	-	NE	4821
<i>Lappula microcarpa</i> (Ledeb.) Gurke	Th	IT	-	NE	4649, 4943, 5399
<i>Lappula sinaica</i> (DC.) Ascherson ex Th		IT	-	NE	5237, 5449
Schweinf.					
<i>Lappula spinocarpos</i> (Forssk.) Th		IT, SS	-	NE	4973
Ascherson & O. Kuntze					
<i>Myosotis ramosissima</i> Rochel ex Th		IT, M	-	NE	4868
Schultes					
<i>Nonnea caspica</i> (Wiild.) G. Don	Th	IT	-	NE	4660, 4772, 4792,
					4967, 5380, 5412,
					5633
<i>Nonnea turecomanica</i> M. Pop.	Th	IT	-	NE	4775, 4803
<i>Onosma dichroanthum</i> Boiss.	He	IT	-	NE	4550, 5008
<i>Onosma longilobum</i> Beg.	He	IT	-	NE	4843
<i>Paracaryum turcomanicum</i> Bornm. He		IT	-	NE	5245, 5396, 5407
& Sint. ex Bornm.					

<i>Rochelia mirheydari</i>	Esfandiari	Reidl & Th	IT	En	NE	4626, 4864
<i>Rochelia pedicularis</i> Boiss.		Th	IT, ES	-	NE	5513
<i>Solenanthus circinnatus</i> Ledeb.		He	IT	-	NE	5282, 5285, 5450
Brassicaceae						
<i>Aethionema carneum</i> (Banks & Th Soland.) B. Fedtsch.		IT	-	NE	4424, 4637, 4816, 5235	
<i>Alyssum contemptum</i> Schott & Ky.	Th	IT	-	NE	4611, 4759, 5233	
<i>Alyssum hirsutum</i> M. B.	Th	IT	-	NE	4508	
<i>Alyssum linifolium</i> Steph. ex Willd. Th var. <i>tehranicum</i> Bornm.		IT, M	-	NE	4426	
<i>Alyssum minutum</i> Schlecht. ex DC.	Th	IT, M	-	NE	4612	
<i>Alyssum staphii</i> Vierh.	Th	IT	-	NE	4758, 5343	
<i>Alyssum tortuosum</i> Willd.	He	IT	-	NE	4679, 5013	
<i>Alyssum turkestanicum</i> Regel & Th Schmalh. ex Regel		IT	-	NE	4755	
<i>Arabidopsis pumila</i> (Steph.) N. Busch	Th	IT	-	NE	5294, 5346	
<i>Arabis nova</i> Vill.	Th	IT, ES, M	-	NE	5266, 5280	
<i>Barbarea plantiginace</i> DC.	He	IT	-	NE	5016	
<i>Buchingera axillaris</i> Boiss.	Th	IT	-	LR	4886	
<i>Camelina rumelica</i> Velen. subsp. Th <i>transcaspica</i> (Fritsch) Hedge		IT, ES, M	-	NE	4707, 5024	
<i>Cardaria draba</i> (L.) Desv.	He	IT, M	-	NE	4513, 4704, 4731, 4807	
<i>Chorispora tenella</i> (Pall.) DC.	Th	IT	-	NE	4870, 5288	
<i>Clausia turkestanica</i> Lipsky	He	IT	-	NE	4690	
<i>Clypeola jonthlaspi</i> L.	Th	IT, M	-	NE	4797, 5421	
<i>Conringia orientalis</i> (L.) Andrz. in Th DC.		IT, M	-	NE	5361	
<i>Conringia perfoliata</i> (C. A. Mey.) Th Busch		IT	-	NE	5306	
<i>Crambe kotschyana</i> Boiss.	He	IT	-	NE	4662, 4865, 5417	
<i>Descurainia sophia</i> (L.) Webb & Th Berth.		IT, ES, M	-	NE	4634, 4957, 5422	
<i>Dielsiocharis kotschyti</i> (Boiss.) O. E. He Schulz		IT	-	LR	5305	
<i>Erophila verna</i> (L.) Besser	Th	IT, ES, M	-	NE	4413	
<i>Erysimum sisymbrioides</i> C. A. Mey.	Th	IT	-	NE	4623	
<i>Erysimum sp.</i>	He	-	-	NE	4684	
<i>Euclidium syriacum</i> (L.) R. Br.	Th	IT	-	NE	5466	
<i>Euclidium tenuissimum</i> (Pall.) B. Th Fedtsch.		IT	-	NE	5316	
<i>Fibigia suffruticosa</i> (Vent.) Sweet	He	IT	-	NE	4689	
<i>Graellsia integrifolia</i> (Rech. f.) Rech. Ch f.		IT	En	LR	4875, 4917, 5268, 5292, 5446	
<i>Isatis tinctoria</i> L. subsp. <i>tomentella</i> He (Boiss.) Davis		IT, ES, M	-	NE	4702, 5511	
<i>Lepidium latifolium</i> L.	He	IT, ES, M	-	NE	4451, 5105, 5149	
<i>Leptaleum filifolium</i> (Willd.) DC.	Th	IT (SS)	-	NE	4635	
<i>Malcolmia africana</i> (L.) R. Br. var. Th <i>africana</i>		IT, SS	-	NE	4631, 4654, 4749, 4753, 5325	
<i>Matthiola alyssifolia</i> (DC.) Bornm.	He	IT	-	NE	5434	
<i>Matthiola farinosa</i> Bge. ex Boiss.	Ch	IT	-	NE	5402	
<i>Pachyptrygium brevipes</i> Bge.	Th	IT	-	NE	5459	
<i>Peltaria turkmena</i> Lipsky	Th	IT	-	NE	4900, 5045, 5431, 5521	
<i>Sisymbrium loeselii</i> L.	Th	IT, ES, M	-	NE	4554, 4929, 5021, 5228	
<i>Sisymbrium septulatum</i> DC.	Th	IT, ES, M	-	NE	4630, 4954, 5352,	

<i>Stroganowia litwinowii</i> Lipsky	Th	IT	-	NE	5372 4695, 4854
<i>Thlaspi perfoliatum</i> L.	Th	IT, ES, M	-	NE	4745, 5267, 5295
<i>Torularia torulosa</i> (Desf.) O. E. Schulz	Th	IT (SS)	-	NE	5327
Capparaceae					
<i>Buhsea trinervia</i> (DC.) Stapf	He	IT	-	NE	5345
<i>Capparis spinosa</i> L.	Ch	PL	-	NE	4436, 3523, 4715, 4848, 5071, 5162, 5187
Caprifoliaceae					
<i>Lonicera microphylla</i> Willd. ex Roem. Ph & Schultes		IT	-	NE	5320
<i>Lonicera nummulariifolia</i> Jaub. & Ph Spach		IT, M	-	NE	5002, 5062, 5492
Caryophyllaceae					
<i>Acanthophyllum glandulosum</i> Bunge ex Boiss.	Ch	IT	-	NE	4447, 4819
<i>Acanthophyllum heterophyllum</i> Ch Rech. f.		IT	-	NE	4790
<i>Acanthophyllum sordidum</i> Bunge ex Ch Boiss.		IT	-	NE	4401, 5117
<i>Cerastium inflatum</i> Link ex Desf.	Th	IT	-	NE	5363, 5393, 5411
<i>Dianthus crinitus</i> Sm. subsp. <i>Ch turcomanicus</i> (Schischk.) Rech. f.		IT	-	NE	5005, 5014
<i>Dianthus orientalis</i> Adams subsp. <i>Ch stenocalyx</i> (Boiss.) Rech. f.		IT	En	NE	5503, 5526
<i>Holosteum glutinosum</i> (M. B.) Fisch. Th & C. A. Mey.		IT	-	NE	4780, 4812, 5231, 5250, 5318
<i>Lepydodiclis holosteoides</i> (C. A. Mey.) Th Fenzl ex Fisch. & C. A. Mey.		IT	-	NE	4869
<i>Lepydodiclis stellaroides</i> Schrenk ex Th Fisch. & C. A. Mey.		IT	-	NE	5304, 5429
<i>Minuartia lineata</i> Bornm.	Ch	IT, ES	-	NE	5137
<i>Minuartia meyeri</i> (Boiss.) Bornm.	Th	IT	-	NE	5334
<i>Saponaria viscosa</i> C. A. Mey.	Th	IT, ES	-	NE	5512
<i>Silene coniflora</i> Nees ex Ott	Th	IT, M	-	NE	4765, 5323, 5326, 5330, 5378
<i>Silene conoidea</i> L.	Th	IT, M	-	NE	5362
<i>Silene latifolia</i> Poir. subsp. <i>alba</i> (Miller) Greuter & Burdet	He	IT, ES, M	-	NE	4858, 4881, 4904, 5290, 5303, 5426
<i>Silene swertifolia</i> Boiss.	He	IT	-	NE	4930, 4982, 4996, 5064, 5400, 5476
<i>Stellaria media</i> (L.) Vill.	Th	COS	-	NE	4481
Chenopodiaceae					
<i>Atriplex micrantha</i> Ledeb.	Th	IT	-	NE	5219
<i>Ceratocarpus arenarius</i> L.	Th	IT, ES, M	-	NE	4412, 4599, 5211
<i>Chenopodium album</i> L. subsp. <i>album</i>	Th	COS	-	NE	4590
<i>Chenopodium album</i> L. subsp. <i>Th striatum</i> (Krasan) Murr	Th	IT, ES, M	-	NE	5122, 5226
<i>Chenopodium botrys</i> L.	Th	PL	-	NE	4589, 5085, 5212
<i>Chenopodium foliosum</i> Aschers.	Th	PL	-	NE	5036, 5043, 5106
<i>Halocharis sulphurea</i> (Moq.) Moq.	Th	IT, SS	-	NE	4978
<i>Halothamnus glaucus</i> (M. B.) Botsch.	Ch	IT	-	NE	4502
<i>Halothamnus subaphyllus</i> (C. A. Mey.) Botsch.	Ch	IT	-	NE	4501
<i>Haloxylon persicum</i> Bge. ex Boiss. & Ph Buhse		IT, SS	-	NE	4980, 5205

<i>Kochia scoparia</i> (L.) Schrad.	Th	PL	-	NE	4504, 4507, 4562, 4591
<i>Krascheninnikovia ceratoides</i> (L.) Ch Gueldenst. subsp. <i>ceratoides</i> var. <i>ceratoides</i>	Ch	IT	-	NE	4503, 4893
<i>Noaea mucronata</i> (Forssk.) Asch. & Ch Schweinf. subsp. <i>mucronata</i>	Ch	IT	-	NE	4558
<i>Salsola dendroides</i> Pall.	Ch	IT	-	NE	4433, 4600, 5143, 5189
<i>Salsola kali</i> L. subsp. <i>ruthenica</i> (Iljin) Th Soo	Th	PL	-	NE	4553, 4583, 5082, 5213
<i>Suaeda altissima</i> (L.) Pall.	Th	IT, M	-	NE	5144
<i>Suaeda microphylla</i> Pall.	Ch	IT	-	NE	4592, 4718
Convolvulaceae					
<i>Convolvulus arvensis</i> L.	Ge	COS	-	NE	4593, 4752, 4757, 4920, 5153, 5198
<i>Convolvulus dorycnium</i> L.	He	IT	-	NE	4457, 4853, 5169
Crassulaceae					
<i>Sedum tetramerum</i> Trautv.	Th	IT	-	NE	4643, 5333
Cucurbitaceae					
<i>Bryonia aspera</i> Stev. ex Ledeb.	He	IT	-	NE	4482, 5276, 4902
Cuscutaceae					
<i>Cuscuta approximate</i> Babingt. var. <i>Th</i> <i>urceolata</i> (Kunze) Yunck.	Th	IT, M	-	NE	5536
<i>Cuscuta campestris</i> Yunck.	Th	COS	-	NE	5074
<i>Cuscuta monogyna</i> Vahl	Th	IT, ES, M	-	NE	4556
Dipsacaceae					
<i>Scabiosa olivieri</i> Coult	Th	IT, SS	-	NE	4644, 4936, 4977, 5452
<i>Scabiosa rotata</i> Bieb.	Th	IT	-	NE	4621, 4815, 4975, 5370
Elaeagnaceae					
<i>Elaeagnus angustifolia</i> L.	Ph	IT, M	-	NE	4500, 4531, 4748
Euphorbiaceae					
<i>Euphorbia aelleni</i> Rech. f.	He	IT	En	DD	4726, 4994, 5015, 5033
<i>Euphorbia buhsei</i> Boiss.	He	IT	-	NE	4725, 4837, 5398
<i>Euphorbia bungei</i> Boiss.	He	IT	-	NE	5310
Fabaceae					
<i>Alhagi pseudoalhaji</i> (M. B.) Desv.	He	IT	-	NE	4439, 4580, 4963
<i>Astragalus argyoides</i> G. Beck.	He	IT	-	NE	5236
<i>Astragalus biovulatus</i> Bunge	Th	IT	-	LR	5324
<i>Astragalus campylanthoides</i> Bornm.	He	IT, M	En	NE	4411
<i>Astragalus campylorrhynchus</i> F. & Th M.	He	IT, SS	-	NE	4404, 5385
<i>Astragalus citrinus</i> Bunge subsp. <i>He</i> <i>citrinus</i>	He	IT	-	NE	4673, 5012
<i>Astragalus curvipes</i> trautv.	He	IT	-	NE	5239, 5244, 5249
<i>Astragalus cyclophyllon</i> Beek	He	IT	En	NE	5308
<i>Astragalus eremophilus</i> Boiss. subsp. <i>Th</i> <i>eremophilus</i>	He	SS	-	NE	5357
<i>Astragalus iranicus</i> Bunge	He	IT	-	DD	4820, 5337
<i>Astragalus juratzkanus</i> Freyn & Sint.	He	IT	-	NE	4619, 5297

<i>Astragalus kurdaiacus</i> Saposhn. & He Summ.	IT	-	NE	4677
<i>Astragalus masanderanus</i> Bunge He	IT	-	LR	5485
<i>Astragalus meschedensis</i> (Bunge) Ch Podl.	IT	En	NE	4576, 5011, 5066, 5135, 5204
<i>Astragalus neo-assadianus</i> Ranjbar & He Karamiyani	IT	En	NE	5499
<i>Astragalus nephtonensis</i> Freyn He	IT	-	LR	5315
<i>Astragalus ochreatus</i> Bunge He	IT	En	NE	5312
<i>Astragalus orthocarpoides</i> Sirj. & He Rech. f.	IT	En	VU	5484
<i>Astragalus oxyglottis</i> M. B. Th	IT	-	NE	5384
<i>Astragalus podolobus</i> Boiss. & Ch Hohen.	IT	-	NE	5342
<i>Astragalus rawlinsianus</i> Aitch. & He Baker	IT	-	NE	4681
<i>Astragalus ruscifolius</i> Boiss. He	IT	En	NE	4939
<i>Astragalus schahrudensis</i> Bunge He	IT	-	NE	5486
<i>Astragalus submaculatus</i> Boriss. He	IT	En	LR	5314
<i>Astragalus suluklensis</i> Freyn et Sint He	IT, M	-	LR	4940, 5535
<i>Astragalus tribuloides</i> Del. Th	IT, SS	-	NE	4622
<i>Colutea buhsei</i> (Boiss.) Shap. Ph	IT, ES	-	NE	4465, 4727, 4899, 5148, 5271
<i>Glycyrrhiza glabra</i> L. var. <i>glabra</i> He	IT, ES, M	-	LR	4431, 4577, 4733, 4785, 4802
<i>Glycyrrhiza glabra</i> L. var. <i>He glandulifera</i> (Waldst. & Kit.) Boiss.	IT, M	-	LR	4432, 4966
<i>Hedysarum wrightianum</i> Aitch. & He Baker	IT	-	NE	4946, 5374
<i>Lathyrus inconspicuus</i> L. Th	IT, M	-	NE	4791
<i>Lotus corniculatus</i> L. subsp. He <i>corniculatus</i> var. <i>hirsutus</i> W. D. J. Koch	PL	-	NE	4470, 4559, 4910, 4986, 5227, 5505
<i>Medicago lupulina</i> L. He	COS	-	NE	5030
<i>Medicago sativa</i> L. He	IT	-	NE	4909, 4928
<i>Melilotus officinalis</i> (L.) Pall. He	IT, ES, M	-	NE	4974, 4984
<i>Onobrychis cornuta</i> (L.) Desv. subsp. Ch <i>cornuta</i>	IT	-	NE	4674, 5134
<i>Onobrychis heliocarpa</i> Boiss. Th	IT	En	DD	5403
<i>Onobrychis</i> sp. Ch	-	-	NE	5437
<i>Sophora pachycarpa</i> C. A. Mey. He	IT	-	NE	4761
<i>Trifolium pretense</i> L. var. <i>pretense</i> He	IT, ES, M	-	NE	5029
<i>Trifolium repens</i> L. subsp. <i>repens</i> He	IT, ES, M	-	NE	4904, 5028
<i>Trigonella monantha</i> C. A. Meyer Th subsp. <i>noeana</i> (Boiss.) Huber-Morath	IT	-	NE	4620, 4805, 4950, 5413
<i>Vicia monantha</i> Retz. Th	IT, M	-	NE	4642, 4770
<i>Vicia subvillosa</i> (Ledeb.) Boiss. Ge	IT	-	NE	4696, 5255
<i>Vicia venulosa</i> Boiss. & Hohen. He	IT	-	NE	4480, 4867, 4987, 5092
Fumariaceae				
<i>Corydalis rupestris</i> Ky. He	IT	-	NE	4872, 4903, 5279, 5283, 5425, 5420
<i>Fumaria asepala</i> Boiss. Th	IT, M	-	NE	4808, 5060
<i>Fumaria vaillantii</i> Loisel. Th	IT, ES, M	-	LR	4856, 5301
Gentianaceae				
<i>Centaurea pulchellum</i> (Swartz) Th Druce	PL	-	NE	4605
Geraniaceae				

<i>Bieberstiana multifida</i> DC.	Ge	IT	-	NE	5435
<i>Erodium cicutarium</i> (L.) L'Her. ex Th Aiton		IT, ES, M	-	NE	4407, 4608, 4751, 4811, 4937, 5257, 5328
<i>Geranium kotschyi</i> Boiss.	Ge	IT	-	NE	4675
<i>Geranium molle</i> L.	Th	IT, SS	-	NE	4862
<i>Geranium rotundifolium</i> L.	Th	IT, ES, M	-	NE	4880, 5354, 5277, 5427
Hypericaceae					
<i>Hypericum helianthemooides</i> (Spach) He Boiss.		IT	-	NE	4560, 4998, 5044, 5534
<i>Hypericum perforatum</i> L.	He	PL	-	NE	4457
<i>Hypericum scabrum</i> L.	He	IT	-	NE	4703, 4906, 4981, 5009, 5059, 5457, 5518
Juglandaceae					
<i>Juglans regia</i> L.	Ph	IT, ES	-	NE	4473
Lamiaceae					
<i>Drepanocaryum sewerzowii</i> (Regel) Th Pojark.		IT	-	VU	5302
<i>Eremostachys labiosiformis</i> (M. Pop.) He Knorring		IT	-	NE	5405
<i>Eremostachys regeliana</i> Aitch. & He Hemsl.		IT	-	NE	4743
<i>Hymenocrater elegans</i> Bunge	Ch	IT	-	NE	4666, 4701, 4734, 5006, 5259
<i>Hymenocrater platystegius</i> Rech. f.	Ch	IT	En	NE	5397, 5439
<i>Lagocheilus aucheri</i> Boiss.	Ch	IT	En	NE	5474, 5483, 5527
<i>Lallemantia royleana</i> (Benth. in Th Wall.) Benth.		IT	-	NE	5340, 5359
<i>Lamium amplexicaule</i> L. var. Th		COS	-	NE	4863, 5263, 5341
<i>amplexicaule</i>					
<i>Marrubium anisodon</i> C. Koch	He	IT	-	NE	4874, 4892
<i>Marrubium duabense</i> Murata	He	IT	-	NE	5050, 5519
<i>Mentha longifolia</i> (L.) Hudson. var. <i>He asiatica</i> (Boriss.) Rech. f.		PL	-	NE	4405, 4567, 4806, 4961
<i>Molucella laevis</i> L.	Th	IT, M	-	NE	4648
<i>Nepeta persica</i> Boiss.	He	IT	-	NE	4805
<i>Perovskia abrotanoides</i> Karel.	Ch	IT	-	NE	4474, 4768, 4960, 5070, 5140, 5164, 5177, 5217
<i>Phlomis cancellata</i> Bunge	He	IT	-	NE	4664, 4823, 4826, 4993, 5039, 5502, 5517
<i>Salvia hypoleuca</i> Benth.	He	IT	En	LR	4459, 4859, 4888, 5038, 5488
<i>Salvia sclarea</i> L.	He	IT, M	-	NE	4878
<i>Stachys lavandulifolia</i> Vahl	Ch	IT	-	NE	4680, 5004, 5313, 5441
<i>Stachys setifera</i> C. A. Mey. subsp. <i>Ge iranica</i> (Rech. f.) Rech. f.		IT	-	NE	4460, 4561, 4588, 5102, 5224
<i>Stachys trinervis</i> Aitch. & Hemsl.	Ch	IT	-	NE	4417, 4653, 4713, 5200, 5336
<i>Stachys turcomanica</i> Trautv.	Ch	IT	-	NE	5470
<i>Teucrium polium</i> L. var. <i>tonsum</i> Stapf	Ch	IT, M	-	NE	4456, 4983, 5172
<i>Ziziphora clinopodioides</i> Lam. subsp. <i>Ch bungeana</i> (Juz.) Rech. f.		IT	-	NE	4887, 5207
<i>Ziziphora clinopodioides</i> Lam. subsp. <i>Ch szowitsii</i> (Rech. f.) Rech. f.		IT	-	NE	5068
<i>Ziziphora tenuior</i> L.	Th	IT	-	NE	4610, 4714, 4809,

					4952, 4968
Lythraceae					
<i>Lythrum hyssopifolia</i> L.	Th	PL	-	NE	4569
Malvaceae					
<i>Alcea kopetdagensis</i> Iljin	He	IT	-	NE	4454
<i>Alcea rhyticarpa</i> (Trautv.) Iljan var. <i>rhyticarpa</i>	He	IT	-	NE	4526, 5170, 5537
<i>Althea cannabina</i> L.	He	IT, M	-	NE	5193
<i>Hibiscus trionum</i> L.	Th	IT, M	-	NE	5151
<i>Malva neglecta</i> Wallr.	He	IT, ES, M	-	NE	4423, 4476, 4625, 4657, 5025, 5034
Moraceae					
<i>Ficus carica</i> L.	Ph	IT, M	-	NE	4452
<i>Morus alba</i> L.	Ph	IT	-	NE	4747, 4851
Onagraceae					
<i>Epilobium hirsutum</i> L.	Ge	PL	-	NE	4479, 5104
<i>Epilobium minutiflorum</i> Hausskn.	He	PL	-	NE	4478, 4566, 4603
<i>Epilobium tetragonum</i> L.	Ge	IT	-	NE	5095, 5222
Orobanchaceae					
<i>Orobanch ceruna</i> Lofl.	Ge	IT, M, SS	-	NE	5525, 5531
Papaveraceae					
<i>Glaucium elegans</i> Fisch. & C. A. Mey.	Th	IT	-	NE	4771, 4801, 5077
<i>Hypecoum pendulum</i> L. var. <i>pendulum</i>	Th	IT, M	-	NE	4617, 4656, 4773, 5241, 5355
<i>Papaver decaisnei</i> Hochst. & Steud.	Th	IT (SS)	-	NE	5391
ex Boiss.					
<i>Papaver dubium</i> L.	Th	IT, SS	-	NE	5349
<i>Papaver pavoninum</i> Fesch. & C. A. Th	Th	IT	-	NE	4728, 5329, 5358, 5379
Mey.					
<i>Roemeria hybrida</i> (L.) DC.	Th	IT, ES, M	-	NE	4616, 4655, 4721, 5240, 5348
<i>Roemeria refracta</i> DC.	Th	IT	-	NE	4879
Plantaginaceae					
<i>Plantago gentianoides</i> Sibth. & Sm.	He	IT	-	NE	4586
subsp. <i>griffithii</i> (Decne.) Rech. f.					
<i>Plantago lanceolata</i> L.	He	IT, ES, M	-	NE	4607, 4740, 5033, 5508
<i>Plantago major</i> L.	He	COS	-	NE	5094
<i>Plantago</i> sp.	He	-	-	NE	
Platanaceae					
<i>Platanus orientalis</i> L.	Ph	IT, M	-	NE	5194
Plumbaginaceae					
<i>Acantholimon erinaceum</i> (Jaub. & Ch	Spach) Linck.	IT	-	NE	5131
<i>Acantholimon karelini</i> (Stschegl.) Ch	Bge.	IT	-	NE	4402, 4788, 4838, 4955, 5206, 5377
<i>Acantholimon pterostegium</i> Beg.	Ch	IT	En	NE	4828
<i>Acantholimon raddeanum</i> Czernjak	Ch	IT	-	NE	5130
Podophyllaceae					
<i>Bongardia chrysogonum</i> (L.) Spach	Ge	IT	-	NE	4687, 5251, 5272
Polygonaceae					

<i>Atraphaxis spinosa</i> L.	Ch	IT	-	NE	4575, 4824, 4842
<i>Polygonum afghanicum</i> Meisn. in Ch DC.	Ch	IT	-	NE	4951
<i>Polygonum hyrcanicum</i> Rech. f.	He	IT, ES	En	LR	4534, 4597, 4949, 5019, 5078, 5083, 5339, 5373
<i>Polygonum patulum</i> M. B.	Th	IT, M	-	NE	5223
<i>Pteropyrum aucheri</i> Jaub. & Spach	Ch	IT	-	NE	4724, 4827, 4840, 4944, 5078, 5086, 5142, 5186, 5191
<i>Rheum ribes</i> L.	He	IT	-	NE	4521
<i>Rumex caucacium</i> Rech. f.	He	IT	-	NE	4565, 5507
<i>Rumex pulcher</i> L. subsp. <i>divaricatus</i> (L.) Murb.	He	IT, M	-	NE	4491, 4522, 4730, 4894, 5147
<i>Rumex tuberosus</i> L. subsp. <i>Ge turcomanicus</i> (Rech. f.) Rech. f.	Ge	IT	-	NE	4852, 5423
Portulacaceae					
<i>Portulaca oleracea</i> L.	Th	IT, ES, M	-	NE	5155
Primulaceae					
<i>Androsace maxima</i> L.	Th	IT, ES, M	-	NE	4425, 4614, 4720, 4778, 5238, 5353
<i>Dionysia tapetodes</i> Bge.	Ch	IT	-	NE	5054, 5445
<i>Samolus valerandi</i> L.	He	PL	-	NE	5159, 5221
Punicaceae					
<i>Punica granatum</i> L.	Ph	IT, ES	-	NE	4647
Ranunculaceae					
<i>Adonis annua</i> L. subsp. <i>cupaniana</i> (Guss.) C. Steinb.	Th	IT, M	-	DD	4855, 5299, 5420
<i>Ceratocephalus falcata</i> (L.) Pers.	Th	IT, ES, M	-	NE	4613, 5230, 5243, 5286, 5309
<i>Clematis orientale</i> L.	Ch	IT	-	NE	4578, 4741, 5160, 5181
<i>Consolida orientalis</i> (Gay) Schrod.	Th	IT, M	-	NE	5027, 5463
<i>Delphinium turkmenum</i> Lipsky	Th	IT	-	NE	4844, 5472
<i>Nigella integrifolia</i> Regel	Th	IT	-	NE	4871, 4885, 5500
<i>Ranunculus afghanicus</i> Aitch. & Ge Hemsl.	Ge	IT	-	NE	5440, 5451
<i>Thalictrum isopyroides</i> C. A. Mey.	Ge	IT	-	NE	4697
<i>Thalictrum sultanabadense</i> Stapf	He	IT	-	NE	5442
Resedaceae					
<i>Reseda lutea</i> L.	He	IT, ES, M	-	NE	4632, 4769, 4979
<i>Reseda luteola</i> L.	He	IT, ES, M	-	NE	4519, 4547, 5031, 5197
Rhamnaceae					
<i>Rhamnus pallasii</i> Fisch. & C. A. Mey. Ph subsp. <i>sintenisii</i> (Rech. f.) Browicz & J. Zielinski	Ph	IT, ES	-	NE	5056, 5088
Rosaceae					
<i>Amygdalus communis</i> L.	Ph	IT	-	NE	4464
<i>Amygdalus spinosissima</i> Bge. subsp. <i>Ph turcomanica</i> (Lincz.) Browicz	Ph	IT	-	NE	4419, 4536, 4609, 4841, 4969
<i>Armeniaca vulgaris</i> Lam.	Ph	-	-	NE	4747, 4754
<i>Cerasus chorassanica</i> Pojark.	Ph	IT	En	LR	4678, 5447
<i>Cerasus microcarpa</i> (C. A. Mey.) Ph Boiss. subsp. <i>microcarpa</i>	Ph	IT	-	NE	4467, 4913, 5284

<i>Cerasus turcomanica</i> Pojark.	Ph	IT	-	DD	4931
<i>Cerasus vulgaris</i> Miller	Ph	-	-	NE	4670, 4912
<i>Cotoneaster nummularioides</i> Pojark.	Ph	IT	-	NE	4541, 4564, 5000
<i>Crataegus turkestanica</i> Pojark.	Ph	IT	-	NE	4490, 5121
<i>Pyrus communis</i> L.	Ph	-	-	NE	4671
<i>Rosa beggeriana</i> Schrenk	Ph	IT	-	NE	4471, 4688, 4911, 4926, 4992, 5090
<i>Rosa canina</i> L.	Ph	IT, ES, M	-	NE	4483, 4918, 5182
<i>Rosa persica</i> Michx. ex Juss.	Ge	IT	-	NE	4403, 4515, 4538
<i>Rubus sanctus</i> Schreber	Ph	IT, M	-	NE	4471, 5101, 5176
<i>Sanguisorba minor</i> Scop. subsp. <i>He</i> <i>laciocarpa</i> (Boiss. & Hausskn.) Nordborg	IT, ES, M	-	NE	4927, 5123, 5529	
Rubiaceae					
<i>Callipeltis cucullaria</i> (L.) DC.	Th	IT, M	-	NE	4787
<i>Crucianella gilanica</i> Trin. subsp. <i>He</i> <i>transcapica</i> (Ehrend.) Ehrend. & Schonb.-Tem.	IT	-	NE	5471	
<i>Galium ceratopodium</i> Boiss.	Th	IT	-	DD	4737, 4798
<i>Galium homifusum</i> M. B.	He	IT, M	-	NE	4446, 4736, 5075, 5175
<i>Galium spurium</i> L. subsp. <i>ibicinum</i> (Boiss. & Hausskn.) Ehrend.	Th	IT	-	NE	4874
<i>Galium spurium</i> L. subsp. <i>spurium</i>	Th	IT, ES, M	-	NE	4774
<i>Galium tricornutum</i> Dandy	Th	IT, M	-	NE	4989
<i>Rubia florida</i> Boiss.	Ch	IT	-	LR	4527, 4685, 4744, 5163, 5260, 5321, 5409, 5448
Rutaceae					
<i>Haplophyllum acutifolium</i> (DC.) G. He Don	IT	-	NE	4442, 4699, 5022, 5037, 5057, 5523	
Salicaceae					
<i>Populus nigra</i> L. subsp. <i>caudina</i> (Ten.) Bug.	Ph	IT, ES, M	-	DD	4498
<i>Salix acmophylla</i> Boiss.	Ph	IT, M	-	NE	4493, 4585
<i>Salix excelsa</i> S. G. Gmelin var. <i>rodinii</i> Ph A. Skvortsov	IT	-	NE	5291	
<i>Salix pycnostachya</i> N. J. Andersson	Ph	IT	-	NE	5289
Santalaceae					
<i>Thesium kotschyanum</i> Boiss.	Ge	IT	-	NE	4705, 5311
Scrophulariaceae					
<i>Leptorhabdos parviflora</i> (Benth.) Th Benth.	IT	-	NE	4548	
<i>Linaria pyramidalis</i> (Vent.) F. G. He Dietr. subsp. <i>kopetdagensis</i> (Kuprian.) D. A. Sutton	IT	-	NE	5209, 5475, 5514	
<i>Linaria simplex</i> (Willd.) DC.	Th	IT, M	-	NE	4645, 4810, 5234, 5335
<i>Scrophularia striata</i> Boiss.	Ch	IT	-	NE	4505, 4735, 4941
<i>Scrophularia umbrosa</i> Dumort.	He	IT, ES, M	-	NE	5099
<i>Scrophularia variegata</i> M. B. subsp. <i>Ch variegata</i>	IT	-	NE	5041, 5048, 5278, 5416	
<i>Verbascum cheiranthifolium</i> Boiss. He var. <i>transcaspicum</i> Murb.	IT	-	NE	4418, 4458, 4546, 5124	
<i>Veronica anagallis-aquatica</i> L. subsp. <i>He lysimachioides</i> (Boiss.) M. A. Fischer	IT	-	NE	5111	
<i>Veronica anagallis-aquatica</i> L. subsp. <i>He</i>	IT	-	NE	4551, 4584, 5110	

<i>oxycarpa</i> (Boiss. in Kotschy) A. Jelen.					
<i>Veronica anagalloides</i> Guss. subsp. He		IT, ES, M	-	NE	4915
<i>anagalloides</i>					
<i>Veronica anagalloides</i> Guss. subsp. He		IT	-	NE	5017, 5174
<i>heureka</i> M. A. Fischer					
<i>Veronica campylopoda</i> Boiss.	Th	IT	-	NE	4799
<i>Veronica persica</i> Poir.	Th	PL	-	NE	4813
<i>Veronica polita</i> Fries	Th	PL	-	NE	4786
<i>Veronica rubrifolia</i> Boiss. subsp. Th		IT	-	NE	4800
<i>respectatissima</i> M. A. Fischer					
Solanaceae					
<i>Hyoscyamus arachnoideus</i> Pojark.	He	IT	-	NE	4668
<i>Hyoscyamus turcomanica</i> Pojark.	He	IT	-	NE	4549, 4667, 5298
<i>Lycium kopetdaghi</i> Pojark	Ph	IT	-	NE	4514, 4921, 5109
<i>Lycium ruthenicum</i> Murray	Ph	IT	-	NE	4661, 4762, 5454
<i>Solanum nigrum</i> L.	Th	COS	-	NE	5220
Tamaricaceae					
<i>Reaumuria alternifolia</i> (labill.) Ch		IT	-	NE	4445, 4831
Britten var. <i>alternifolia</i>					
<i>Tamarix androssowii</i> Litw.	Ph	IT	-	NE	4708
<i>Tamarix ramosissima</i> Ledeb.	Ph	PL	-	NE	4441, 4529, 4474, 4709, 5080, 5141
<i>Tamarix tetragyna</i> Ehrenb. var. Ph		IT, SS	-	NE	4710
<i>deserti</i> (Boiss.) Zohari					
Ulmaceae					
<i>Celtis caucasica</i> Willd.	Ph	IT	-	NE	5179
<i>Ulmus glabra</i> Hudson	Ph	ES	-	NE	4924, 5063, 5444
Urticaceae					
<i>Parietaria judaica</i> L.	Ch	IT, ES, M	-	NE	4468, 4860, 4916, 5047, 5055, 5460
<i>Urtica dioica</i> L. subsp. <i>dioica</i>	He	COS	-	NE	5127
Valerianaceae					
<i>Valeriana ficariifolia</i> Boiss.	He	IT	-	NE	5264, 5281
<i>Valerianella cymbicarpa</i> C. A. Mey.	Th	IT	-	NE	4658, 5408
<i>Valerianella leiocarpa</i> (Stev.) Betcke	Th	IT	-	NE	4659
Verbenaceae					
<i>Verbena officinalis</i> L.	He	PL	-	NE	4520, 4818, 5094
Violaceae					
<i>Viola occulta</i> Lehm.	Th	IT	-	NE	4686, 5138, 5253, 5300, 5410, 5487
Zygophyllaceae					
<i>Peganum harmala</i> L. var. <i>harmala</i>	He	IT, ES, M	-	NE	4435, 4729, 4814, 4845, 5139, 5383, 5521
<i>Tribulus terrestris</i> L. var. <i>terrestris</i>	Th	PL	-	NE	5152
Angiospermae: Monocotyledones					
Alliaceae					
<i>Allium cristophii</i> Trautv.	Ge	IT	-	NE	5491
<i>Allium kuhsorkhense</i> R. M. Fritsch & Ge		IT	En	NE	5404
M. Joharchi					
<i>Allium lamondiae</i> Wendelbo	Ge	IT	-	NE	4779
<i>Allium monophyllum</i> Vved.	Ge	IT	-	DD	5395
<i>Allium rubellum</i> M. B.	Ge	IT	-	NE	5387

<i>Allium sarawschanicum</i> Regel	Ge	IT	-	NE	4919, 5509
<i>Allium vavilovi</i> M. Pop. & Vved.	Ge	IT	-	NE	5018, 5108
Araceae					
<i>Arum kotschyti</i> Boiss. & Hohen. ex Ge Boiss.		IT, M	-	NE	4452, 4866, 5269, 5419, 5533
Cyperaceae					
<i>Bolboschoenus affinis</i> (Roth) Drob.	He	PL	-	NE	4495
<i>Carex divisa</i> Huds.	Ge	IT, ES, M	-	NE	5287
<i>Carex songorica</i> Kar. & Kir.	Ge	IT	-	NE	5285
<i>Cyperus longus</i> L.	He	IT, M	-	NE	4496
<i>Scirpoides holoschoenus</i> (L.) Sojak subsp. <i>australis</i> (L.) Sojak	He	IT, M	-	NE	4604, 4817
Iridaceae					
<i>Iris fosteriana</i> Aitch. & Baker	Ge	IT	-	NE	4409, 4428
<i>Iris kopetdagensis</i> (Vved.) Mathew & Wendelbo	Ge	IT	-	NE	4694, 5256, 5307
<i>Iris songarica</i> Schrenk	Ge	IT	-	NE	5364
Ixioliriaceae					
<i>Ixiolirion tataricum</i> (Pall.) Herb.	Ge	IT	-	NE	4615
Juncaceae					
<i>Juncus articulatus</i> L.	He	COS	-	NE	4583, 5112
<i>Juncus inflexus</i> L.	He	PL	-	NE	4544, 4568, 4970, 5113, 5218
Liliaceae					
<i>Eremurus luteus</i> Baker	Ge	IT	-	NE	5247, 5293
<i>Eremurus stenophyllum</i> (Boiss. & Bunge) Baker subsp. <i>stenophyllum</i>	Ge	IT	En	LR	4676, 4693, 4985, 4999
<i>Erythronium caucasicum</i> Woron.	Ge	ES, M	-	LR	4422
<i>Fritillaria gibbosa</i> Boiss.	Ge	IT	-	NE	4429, 5394
<i>Gagea chomutowae</i> Pascher	Ge	IT	-	NE	4414, 5248, 5273, 5432
<i>Gagea gageoides</i> (Zucc.) Vved.	Ge	IT	-	NE	5296
<i>Gagea reticulata</i> (Pall.) Schultes & Schultes fil.	Ge	IT, SS	-	NE	4415, 4650
<i>Gagea tenera</i> Pascher.	Ge	IT	-	NE	4624, 4636
<i>Muscari neglectum</i> Guss.	Ge	IT, ES, M	-	NE	4406, 5270, 5317, 5433
<i>Polygonatum sewerzowii</i> Regel	Ge	IT	-	NE	5048, 5443
<i>Tulipa bibersteinana</i> Schultes & Schultes fil.	Ge	IT, ES	-	NE	4430, 5319
<i>Tulipa micheliana</i> Hoog	Ge	IT	-	NE	4672, 4691
<i>Tulipa montana</i> Lindl. var. <i>Ge chrysanthia</i> (Boiss.) Wendelbo	Ge	IT	-	NE	5322
<i>Tulipa montana</i> Lindl. var. <i>montana</i>	Ge	IT	En	NE	5265, 5274
Poaceae					
<i>Aegilops kotschyti</i> Boiss. var. <i>hirta</i> Eig	Th	IT	-	NE	4935
<i>Aegilops tauschii</i> Cosson	Th	IT	-	NE	4895
<i>Aeluropus littoralis</i> (Gouan) Parl.	He	IT, M, SS	-	NE	4825
<i>Aeluropus sp.</i>	He	-	-	NE	5167
<i>Agropyron libanoticum</i> Hack.	He	IT	-	NE	5116, 5183

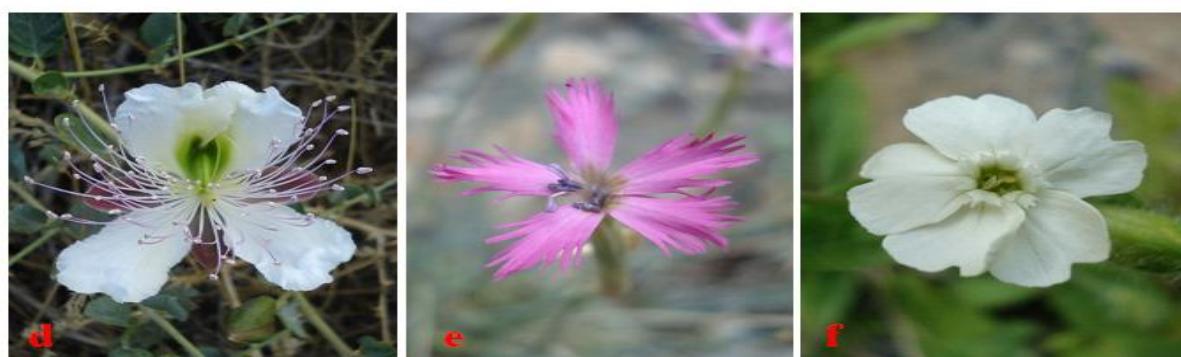
<i>Agropyron repens</i> (L.) P. Beauv.	He	IT, ES, M	-	NE	5115, 5184
<i>Agropyron trichophorum</i> (Link) Ch Richter	Ch	ES, M	-	NE	4890
<i>Avena eriantha</i> Durieu	Th	IT, M	-	NE	4896
<i>Avena wiestii</i> Steud.	Th	IT, M, SS	-	NE	5480
<i>Boissiera squarrosa</i> (Banks & Th Soland.) Nevski	Th	IT	-	NE	4638, 4836, 5366
<i>Bothriochloa ischaemum</i> (L.) Keng	He	PL	-	NE	4582, 5166
<i>Brachypodium sylvaticum</i> (Hudson) He P. Beauv.	He	ES, M	-	NE	5010
<i>Bromus danthoniae</i> Trin. var. <i>Th lanuginosus</i> Roshev.	Th	IT	-	NE	4822, 5367
<i>Bromus japonicas</i> Thunb. var. <i>Th japonicus</i>	Th	PL	-	NE	4518, 5468
<i>Bromus rubens</i> L. var. <i>rubens</i>	Th	IT, M	-	NE	4794
<i>Bromus sericeus</i> Drobov		IT	-	NE	4795
<i>Bromus tectorum</i> L. var. <i>hirsutum</i> Th Regel	Th	IT, ES, M	-	NE	4782
<i>Bromus tectorum</i> L. var. <i>tectorum</i>	Th	IT, ES, M	-	NE	4640, 4783
<i>Calamagrostis epigejos</i> (L.) Roth	He	PL	-	NE	4570
<i>Cynodon dactylon</i> (L.) Pers.	He	PL	-	NE	4581, 5079
<i>Echinochloa crus-galli</i> (L.) P. Beauv. Th var. <i>submutica</i> Neilr.	Th	IT, ES, M	-	NE	4524, 5156
<i>Elymus baldschuanicus</i> Roshev.	He	IT	-	NE	5493
<i>Eremopyrum bonaepartis</i> (Spreng.) Th Nevski var. <i>bonaepartis</i>	Th	IT (M)	-	NE	4628, 4781, 5338, 5365
<i>Festulolium × loliaceum</i> (Hudson) P. He Fourn.	He	IT	-	NE	5114, 5467
<i>Hordeum bulbosum</i> L.	He	IT, M	-	NE	4897
<i>Hordeum glaucum</i> Steud.	Th	IT, M	-	NE	4763, 4793
<i>Leucopoa sclerophylla</i> (Boiss. & He Hohen.) V. Krecz. & Bobrov	He	IT	-	NE	5477
<i>Melica jacquemontii</i> Decne. ex He Jacquem. subsp. <i>hohenackeri</i> (Boiss.) Bor	He	IT, ES	-	NE	4833
<i>Melica jacquemontii</i> Decne. ex He Jacquem. subsp. <i>jacquemontii</i>	He	IT, ES	-	NE	4834
<i>Nardurus subulatus</i> (Banks & Th Soland.) Bor	Th	IT	-	NE	4639, 5232
<i>Phalaris minor</i> Retz.	Th	COS	-	NE	4706
<i>Phragmites australis</i> (Cav.) Trin. ex He Steud. var. <i>australis</i>	He	COS	-	NE	4587, 4602, 4606, 4739, 4924
<i>Poa bactriana</i> Rochev.	He	IT	-	NE	4891
<i>Poa bulbosa</i> L.	He	IT, ES, M	-	NE	4627, 4898, 5465, 5503
<i>Poa sinaica</i> steud.	He	IT	-	NE	4738, 5258, 5369, 5453
<i>Poa trivialis</i> L.	He	IT, ES, M	-	NE	5481
<i>Poa</i> sp.	He	-	-	NE	4641
<i>Polypogon fugax</i> Nees ex Steud.	Th	PL	-	NE	4835, 5214
<i>Rhizocephalus orientalis</i> Boiss.	Th	IT	-	NE	4408
<i>Setaria glauca</i> (L.) P. Beauv.	Th	IT, SS	-	NE	4525, 4545, 5091, 5154
<i>Setaria viridis</i> (L.) P. Beauv.	Th	PL	-	NE	5168
<i>Stipa barbata</i> Desf.	He	IT	-	NE	4601, 4832, 5007, 5414, 5501, 5520, 5524
<i>Stipa caragana</i> Trin.	He	IT	-	NE	4988
<i>Taeniatherum crinitum</i> (Schereb.) Th	Th	IT, M	-	NE	5479

Nevski

<i>Vulpia myuros</i> (L.) C. C. Gmelin	Th	IT, M	-	NE	4629
<i>Vulpia persica</i> (Boiss. & Buhse)	V. Th	IT	-	NE	4756, 5375
Krecz. & Bobrov					



a. *Acer monspessulanum* L. subsp. *turcomanicum* (Pojark.) Rech. f., **b.** *Anthemis hyalina* DC., **c.** *Cousinia microcarpa* Boiss., **d.** *Anthemis rhodocentra* Iranshahr, **e.** *Senecio paulsenii* O. Hoffm. subsp. *Khorassanicus* (Rech. F. & Aell.) B. Nord, **f.** *Tanacetum parthenium* (L.) Schultz-Bip., **g.** *Pulicaria dysenterica* (L.) Bernh., **h.** *Tragopogon reticulatus* Boiss. & Huet, **i.** *Anchusa italicica* Retz. var. *italic.*



a. *Dielsiocharis kotschyi* (Boiss.) O. E. Schulz, **b.** *Fibigia suffruticosa* (Vent.) Sweet, **c.** *Peltaria turkmena* Lipsky, **d.** *Capparis spinosa* L., **e.** *Dianthus orientalis* Adams subsp. *stenocalyx* (Boiss.) Rech. f., **f.** *Silene latifolia* Poir. subsp. *alba* (Miller) Greuter & Burdet **g.** *Lotus corniculatus* L. subsp. *corniculatus* var. *hirsutus*, **h.** *Trifolium repens* L. subsp. *repens*, **i.** *Erodium cicutarium* (L.) L'Her. ex Aiton.



a. *Hymenocrater platystegius* Rech. f., **b.** *Marrubium duabense* Murata, **c.** *Hibiscus trionum* L., **d.** *Papaver dubium* L., **e.** *Roemeria hybrida* (L.) DC., **f.** *Adonis annua* L. subsp. *cupaniana* (Guss.) C. Steinb., **g.** *Delphinium turkmenum* Lipsky, **h.** *Ranunculus afghanicus* Aitch. & Hemsl., **i.** *Rosa beggeriana* Schrenk.



a. *Tribulus terrestris* L. var. *terrestris*, b. *Allium kuhsorkhense* R. M. Fritsch & M. Joharchi, c. *Iris kopetdagensis* (Vved.) Mathew & Wendelbo, d. *Ixiolirion tataricum* (Pall.) Herb., e. *Gagea gageoides* (Zucc.) Vved., f. *Muscari neglectum* Guss., g. *Tulipa montana* Lindl. var. *chrysanthia* (Boiss.) Wendelbo h. *Tulipa micheliana* Hoog, i. *Poa trivialis* L.