



Investigation on the values of International Parishan Lake's plants

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ABSTRACT

Parishan Lake has been selected by UNESCO as a biosphere reserve and was recorded as an international wetland in Ramsar convention in 1986. This region is located (29°31'N 51°48'E) at 820 m in Kazeroon, Fars province, south of Iran and is the largest freshwater lake in the country. Parishan Lake is extremely important for a wide variety of wintering waterfowl and also for breeding waterfowl, especially in wet years. It fed by permanent springs and seasonal watercourses, lies in an enclosed drainage basin in a broad valley and is brackish to saline, the salinity varying widely with the size of the lake. Unfortunately at the moment time this important lake endangers. In this research plant diversity of Parishan Lake was observed. In this way, the list of floristic was provided and determined values and uses of its plants. The results showed there are 70 plant families and 217 plant species in the region. Based on the results of this research, it seems that without regard to laws and without seriously support by global communities, the extinction would be sure. However, the state of biosphere reserves in world and specially Iran has many problems and that main reason for its incorrect management.

Keyword: Parishan Lake, International wetland, Biosphere reserve, Plant diversity, Management.

INTRODUCTION

Human biological needs based on vegetation but accessing human to the advanced tools and increasing human population made exploitation of vegetation and people do not pay attention to the harmful consequences of the destruction of the nature. The literal word of wetlands consist of (wet+ land) is used in this paper (Behruzi rad, 1998). There are three elements defining wetlands that are: Hydrology or moisture, vegetation type and soil type. Periodically, flooded or saturated soil is too long for the pond to be created. Characteristics of wetland soils are poor drainage and lack of oxygen. So, growth of the plants adapted to this situation (Butkin and Keler, 2003). The Ramsar convention wetlands state that where the height of a place is not more than 6 meters and it can be marsh, natural or artificial pond, static or flowing water and the taste is fresh or salty (Behruzi rad, 1998). Parishan Lake is located within the protected area of Arjan and Parishan Biosphere reserve. The lake and wetland Arjan is known as an international

wetland under the Ramsar convention's list. This area is also known by the UNESCO as a Biosphere Reserve (Nezakati, 2009). Diversity of the plants depends on many factors and influences like geographical and ecological factors, and a range of indicators of ecosystem studies are considered (Abedi et al., 2009). Several studies have been conducted in relation to Parishan wetland: Tabiei (2009) has studied diversity of overwintering birds in wetland. Based on these result, water birds are 69 species belonging to 15 families and 6 orders. Torabian (2008) investigated the negative social impacts of tourism on local communities of Parishan wetland. This study showed that current level of Parishan adverse effects of tourists in rural settlements is beyond the acceptable levels of impact. This indicates the need for a balance between the number and types of visitors to the pond to achieve the sustainable nature of Arjan and Parishan. Shaheen (2009) evaluate the capacity of ecotourism of Parishan wetland and efficient ways. For the evaluation of ecological parameters of Parishan, slope parameter, soil and rock, aspect, water, vegetation and climate were studied. Furthermore, the studies about the natural features and ecological features of this recreational lake have the importance of tourism to the national, regional and transnational. Dolatkhahi et al. (2009) have studied Parishan wetland floristic And 269 species from 204 genera and 68 families were introduced, the largest family with 40 species and the Asteraceae, Poaceae with 24 species, Papilionaceae with 20 species and 17 species of Brassicaceae. Convolvulus genus with 6 species is the largest genus in this region, While Centaurea, Euphorbia and Plantago each with four, Amaranthus species and each of the three species of Anthemis are in the later stages. Dolatkhahi and Yosefi (2009) study aquatic and semi-aquatic plants in Parishan wetland and found in 54 species of 48 genera and 28 families in the area. Doshmanziare (2009) also study Parishan wetland and communicate with sustainability strategies to present sustainable development in relation to Preserve Lake.

MATERIAL AND METHODS

Parishan wetland permanent freshwater lake is fed by springs and seasonal stream, are located in the Fars, 12 kilometers southeast of Kazeroun. 2-2.5 meters average depth of wetland between the years of low rainfall and high rainfall varies. Parishan wetland height is 820 m from the high seas; its features are the warmth and dryness of the air in the summer and warmth in the winter. Parishan Lake is extremely important for a wide variety of wintering waterfowl and also for breeding waterfowl, especially in wet years. It fed by permanent springs and seasonal watercourses, lies in an enclosed drainage basin in a broad valley and is brackish to saline, the salinity varying widely with the size of the lake.

Parishan wetland is located 12 kilometers southeast of Kazeroun between the mountains of Famur and 125 km West Kazeroon (Fars province).

This region is located (29°31'N 51°48'E) at 820 m in Kazeroon, Fars province, south of Iran and is the largest freshwater lake in the country.

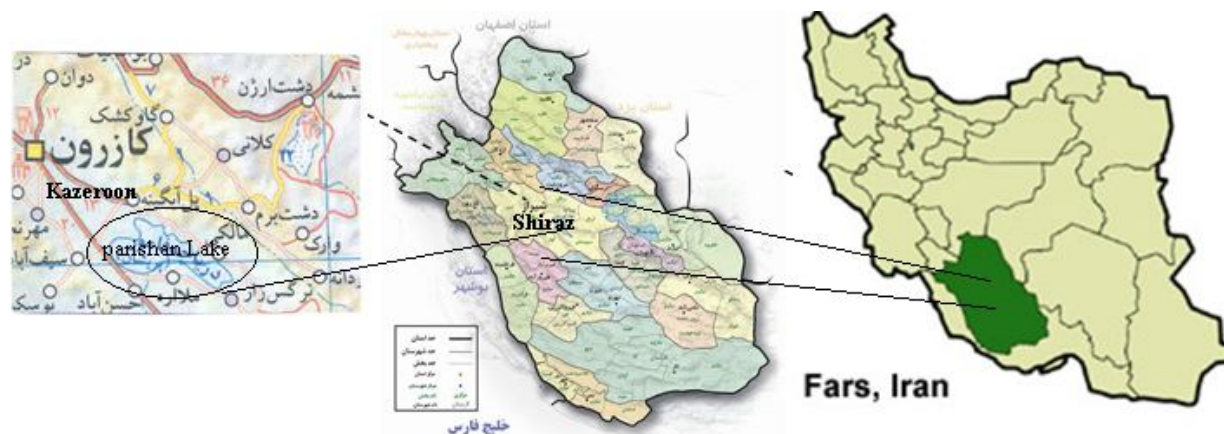


Figure 1- kazeroon and Parishan Lake

Over an area of 59,784 hectares and it is considered as a part of the hydrological basin of the river Shapur - Dalky. This region contains 9 units (water cognition) and it is the second recirculating aquatic ecology unit. The main approach of this project is library method, and gathering information based on scientific research projects of Parishan wetlands floristic survey (Dolatkhahi et al., 2009). Tables was prepared by using data collected from the above and In order to check the values for the various species use valid papers and books. This application includes medicine, oral, nectar production (specifying using nectar species used), forage, ornamental, and edible and protection values. Also, we consider life form of the plants and endemic species in this table.

RESULTS AND DISSCUSION

The results showed that there are 70 plant families and 217 plant species in the region. 24 species of Poaceae, 21 species of Papilionaceae and 15 species of Brassicaceae .In this research 59% of species is Therophytes, 14% Hemicryptophytes, 12% geophytes, 10%Chamaephytes, 5% and less than 1% cryptophytes. The highest and lowest life form is belonging to Therophytes and cryptophytes species. Tables are found in Appendix plants show specific values. 80 species of plants are medicinal plants and 13 species are edible. The plants are used extensively in industry, wood processing industry in various industries such as paper production, which today produces a range of paper types in different forms. The most important plants are food sources for domesticated and wild animals. 85 species are nectar producers, 16 species have industrial values, 70 species have forage value and 19 species have ornamental values and 15 species have conservation value which 2 species are vulnerable and 13 species are low risk. In chat 1-3, the percentage of these values can be seen. Some valuable forage plants in this area are either direct measures of the processing is done. Palatability of forage plants with grades I, II, III are defined in the table in appendix. One of the important values of the plants is their ornamental values. Numbers of plants are used in gardens and parks or farm houses and other public places. There are some plants that have been severely damaged due to unauthorized uses of the nature. These plants are located in a red list of IUCN according to the Forest and Range Organization regulations and international environmental organizations. In the table in annex there are species-grade LR means at Low Risk and VU means

Vulnerable. Comparisons that are made in the mentioned tables indicate that most of the species are endemic. In the following charts the various use of species of terrestrial, aquatic and both in one charts are shown.

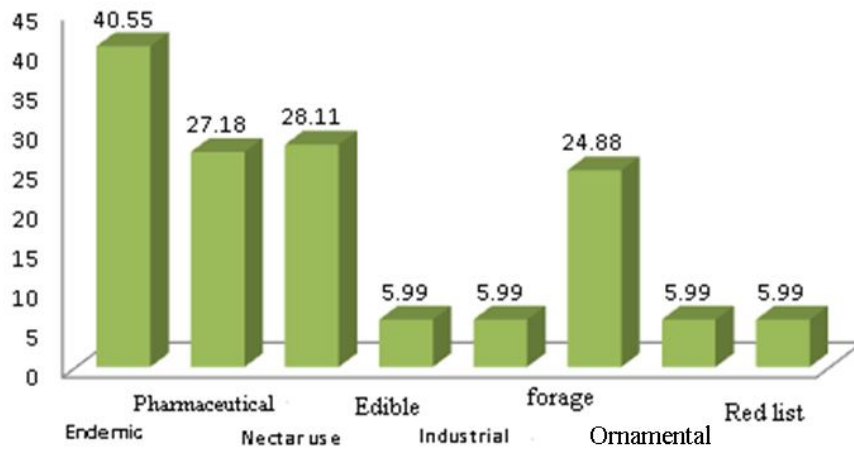


Chart 1- Various uses of terrestrial species

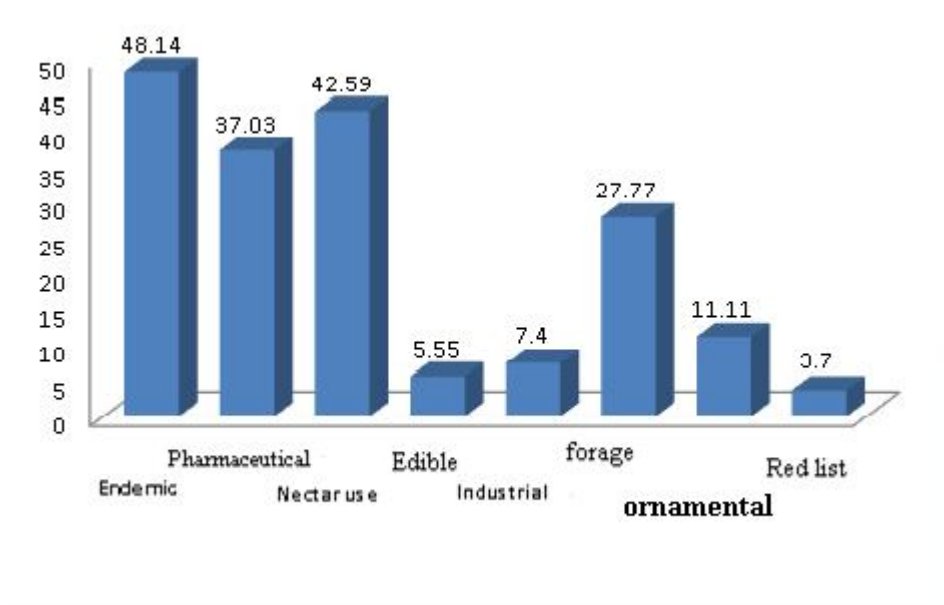


Chart 2- Various uses of aquatic species

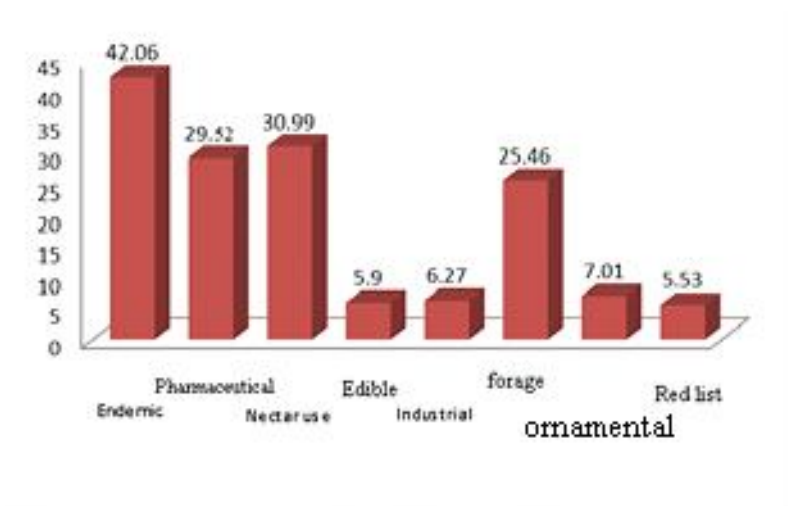


Chart 3- Various uses of both aquatic and terrestrial species

In this chart T is Therophytes, G is geophytes, P is phanerophytes, H is Hemicryptophytes, C is Chamaephytes and Cr is Cryptophytes. Maximum habitat belongs to Therophytes and minimum owned cryptophytes.

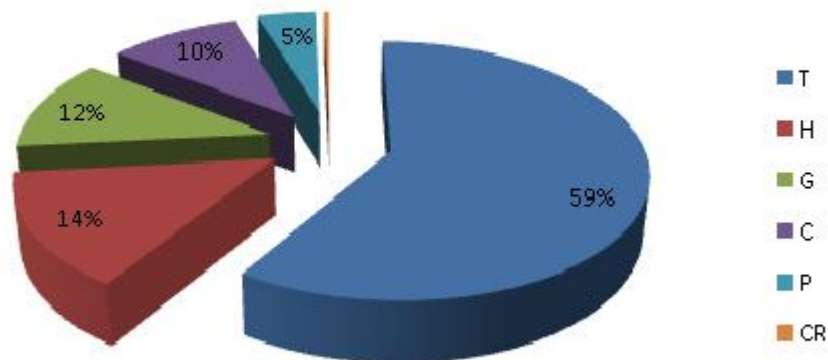


Chart 4-Vegetation form

The numbers of plants that are produce nectar are 85 out of total and it is belonging to 33 families. Maximum numbers of plants are belonging to the family Papilionaceae with 10 species. The whole numbers of Medicine plants are 80 that is Belonging to 42 families. The greatest number of species in the family is belonging to Asteraceae.

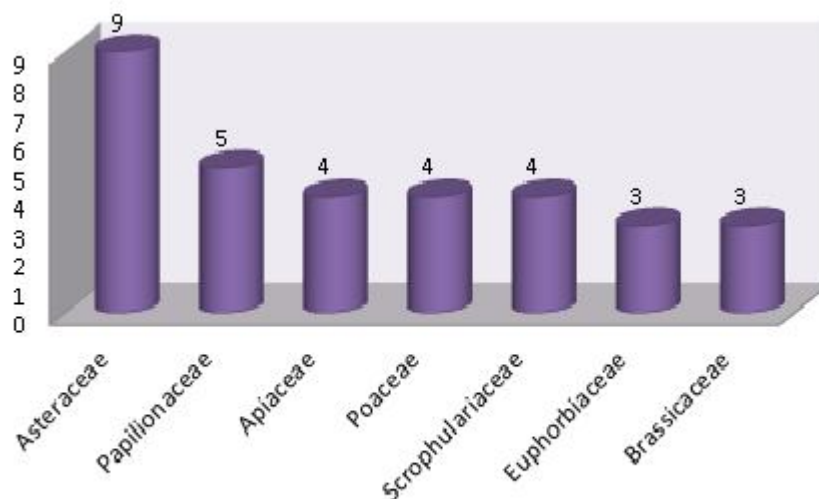


Chart 5- Medicine plants and their family

Conclusion

There are 70 plant families and 217 plant species in the region and indicate that it has relatively rich flora, therefore it has habitat diversity. Although factors such as agricultural destruction and degradation of wetlands is the most factors on wetland degradation, the factors like livestock grazing and indiscriminate destruction of the surrounding beaches and mountain ranges also is important. *Phragmites australis* is one of the greatest wetland plant community, which makes up the biggest such belt on the shores of the wetland. There are also large communities of submerged aquatic plant *Najas marina* that occupy most of the internal parts of the floor of the wetland and it can be seen as a sign of low salinity wetlands. There are numerous springs around the lake that is one of the hallmarks of these wetlands. It is also rich of plants such as *Verbena officinalis* L. and *Ceratophyllum demersum* L.

Due to The plant species richness, complexity and stunning beauty of the wetland ecosystem, authorities need to give wise management to the indiscriminate destruction caused by human pressure in order to prevent and protect the wetlands. Asteraceae species of flora represent destroyed an area which is affected by the expansion of agriculture in the region (Dowlatkahi 1389). Arjan and Parishan reserve area due to the presence of villagers and nomads who have attended a relatively compact and they are busy with agriculture and horticulture in this region, plants including trees and plants do not have opportunity for rebirth and renewal. In this area almost more than 75% of vegetation is destroyed. Presence of tourists in the surrounding of the sensitive and the vulnerable ecosystems make serious problems with their local communities. If ecotourism is not controlled, it can also damage the natural resource. (Ziaei and Torabi, 2011). The other factor especially observed in recent years is drought, which leads the ecosystem to destroy. According to the above reason and the destructions, the more attention is need to the area. Based on the results of this research, it seems that without regard to laws and without seriously support by global communities, the extinction would be sure. However, the state of biosphere reserves in world and especially in Iran has many problems and the main reason is its incorrect management.

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Appendix

Species that have medicine values:

Blepharis persica (Burm.) O.Kuntze, *Amaranthus albus* L., *Amaranthus chlorostachys* Willd., *Pistacia khinjuk* Stocks., *Ammi majus* L., *Anethum graveolens* L., *Eryngium billardier* F. Delaroché, *Olivaria decumbens* Vent., *Anthemis altissima* L., *Calendula persica* C.A.Mey., *Carthamus oxyacantha* M. B., *Cichorium intybus* L., *Onopordon* sp., *Picnomon acarna* (L.) Cass., *Silybum marianum* (L.) Gaerth., *Sonchus oleraceus* L., *Anchusa italic* Retz., *Capsella bursapastoris* (L.) Medicus., *Eruca sativa* Lam., *Sinapis arvensis* L., *Capparis spinosa* L., *Chenopodium murale* L., *Convolvulus arvensis* L., *Citrullus colocynthis* (L.) Schrad., *Andrachne aspera* Spreng., *Chrozophora tinctoria* (L.) Juss., *Quercus brantii* Jaub. & Spach, *Erodium cicutarium* (L.) L'Her., *Geranium rotundifolium* L., *Alcea aucheri* (Boiss.) Alef., *Malva parviflora* L., *Ficus johannis* Boiss., *Boerhavia diffusa* L., *Papaver argemone* L., *Roemeria hybrida* (L.) DC., *Alhagi camelorum* Fisch., *Astragalus glaucacanthus* Fisch., *Hymenocarpus circinnatus* (L.) Savi, *Plantago coronopus* L., *Leontice leontopetalum* L., *Rumex vesicarius* L., *Ranunculus asiaticus* L., *Reseda aucheri* Boiss. subsp. *Aucheri*, *Reseda aucheri* Boiss. Subsp., *Rotundifolia* (Kotschy ex Mull. Arg.) Rech. F., *Ziziphus nummularia* (Burm. F.) Wight & Arn., *Ziziphus spina chirsti* (L.) Willd., *Amygdalus lycioides* Spach., *Hyoscyamus tenuicaulis* Schonbecktemesy., *Scrophularia striata* Boiss., *Verbascum sinuatum* L., *Urtica pilulifera* L., *Viola modesta* Fenzl., *Peganum harmala* L., *Tribulus terrestris* L., *Colchicum montanum* L., *Scilla autumnalis* L., *Urginea maritime* (L.) Baker, *Sorghum halepense* (L.) Pers., *Senecio glaucus* L., *Euphorbia helioscopia* L., *Mentha longifolia* (L.) Hudson., *Lythrum salicaria* L., *Lotus cornicalatus* L., *Trifolium campestre* Scherb., *Plantago major* L., *Portulaca oleracea* L., *Anagallis arvensis* L., *Samolus valerandi* L., *Solanum nigrum* L., *Verbascum sinuatum* L., *Veronica nagalis-aquatica* L., *Tamarix aphylla* (L.) Krast., *Phyla nodiflora* (L.) Green., *Verbena officinalis* L., *Narcissus tazetta* L., *Cyperus pygmaeus* L., *Aeluropus littoralis* (Gouan) Parl., *Cynodon dactylon* (L.) Pers., *Phragmites australis* (Cav.) Trin. ex Steud.

Species that have nectar production values:

Anethum graveolens L., *Eryngium billardier* F. Delaroché, *Carthamus oxyacantha* M. B., *Centaurea bruguieriana* (DC.) Hand. Mzt., *Centaurea Hyalolepis* Boiss., *Centaurea iberica* Trev. ex Spreng., *Echinops cephalotes* DC., *Onopordon* sp., *Picnomon acarna* (L.) Cass., *Sonchus oleraceus* L., *Anchusa italic* Retz., *Arnebia decumbens* (Vent.) Coss. & Karl., *Heliotropium brevilimbe* Boiss., *Nonnea caspica* (Willd.) G. Don., *Eruca sativa* Lam., *Istatis raphanifolia* Boiss., *Malcolmia africana* (L.) R. Br., *Sinapis arvensis* L., *Sisymbrium loeselii* L., *Cleome oxypetala* Boiss., *Stellaria media* (L.) Cyr., *Helianthemum ledifolium* (L.) Miller, *Helianthemum salicifolium* (L.) Miller, *Convolvulus arvensis* L., *Sedum rubens* L., *Cephalaria dichaeoohora* Boiss., *Cephalaria microcephala* Boiss. & Hohen., *Scabiosa olivieri* Coult., *Fumaria asepsala* Boiss., *Fumaria vaillantii* Loisel., *Gentiana olivieri* Griseb., *Erodium cicutarium* (L.) L'Her., *Ajuga austro-iranica* Reisch. f., *Phlomis bruguieri* Desf., *Stachys inflata* Benth., *Teucrium polium* L., *Roemeria hybrida* (L.) DC., *Roemeria refracta* DC., *Alhagi camelorum* Fisch., *Onobrychis cirstagalli* (L.) Lam., *Ononis spinosa* L., *Scorpiurus muricatus* L., *Trifolium repens* L., *Limonium thouien* (Vir) O.Kuntze, *Leontice leontopetalum* L., *Adonis aestivalis* L., *Ranunculus asiaticus* L., *Reseda aucheri* Boiss. subsp. *Aucheri*, *Rhamnus pallasii* Fisch. et Mey., *Ziziphus nummularia* (Burm. F.) Wight & Arn., *Ziziphus spina chirsti* (L.) Willd., *Linaria chalepensis* (L.) Miller., *Verbascum aucheri* (Boiss.) Hub. Mor., *Verbascum sinuatum* L., *Verbascum speciosum* Schrad., *Peganum harmala* L., *Tribulus terrestris* L., *Colchicum montanum* L., *Ixiolirion tataricum* (Pall.) Herb., *Allium stamineum* Boiss., *Sorghum halepense* (L.) Pers., *Bupleurum lancifolium* Boiss., *Crepis sancata* (L.) Bobcock, *Picris strigosa* M.B., *Senecio glaucus* L., *Lycopus europaeus* L., *Mentha longifolia* (L.) Hudson., *Salvia macrosiphon* Boiss., *Lythrum salicaria* L., *Lotus angustissimus* L., *Lotus cornicalatus* L., *Melilotus indicus* (L.) A. L., *Trifolium campestre* Scherb., *Trifolium repens* L., *Plantago major* L., *Portulaca oleracea*

L., *Solanum nigrum* L., *Verbascum sinuatum* L., *Veronica Persica* Poir., *Tamarix aphylla*(L.) Krasten., *Phyla nodiflora*(L.) Green., *Verbena officinalis* L., *Narcissus tazetta* L., *Cynodon dactylon*(L.) Pers.

Species that have edible value:

Anethum graveolens L., *Ducrosia anethifolia*(DC.) Bioss., *Eryngium billardier* F. Delaroché, *Eruca sativa* Lam., *Sinapis arvensis* L., *Capparis spinosa* L., *Ficus johannis* Boiss., *Rumex vesicarius* L., *Ziziphus spina chirsti*(L.) Willd., *Amygdalus lycioides* Spach., *Callipeltis cucullaris*(L.) Stev., *Urtica pilulifera* L., *Ixiolirion tataricum*(Pall) Herb., *Portulaca oleracea* L., *Solanum nigrum* L., *Verbena officinalis* L.

Species that have industrial value:

Echinophora sibthorpiana Guss., *Oliveria decumbens* Vent., *Carthamus oxyacantha* M. B., *Sinapis arvensis* L., *Convolvulus arvensis* L., *Citrullus colocynthis*(L.) Schrad, *Ziziphus spina chirsti*(L.) Willd., *Urtica pilulifera* L., *Peganum harmala* L., *Suaeda aegyptiaca*(Hassel q.) Zoh., *Euphorbia helioscopia* L., *Plantago major* L., *Phragmites australis*(Cav.) Trin.ex Steud.

Species that have forage value and its degree:

Eryngium billardier F. Delaroché (II), *Oliveria decumbens* Vent. (II), *Anthemis altissima* L.(II), *Atractylis cancellata* L. (III), *Calendula persica* C.A.Mey.(III), *Cardus arabicus* Jacq. Ex Murray. (III), *Carthamus oxyacantha* M. B. (III), *Centaurea intricata* Bioss. (III), *Crepis kotschyana*(Bioss.) Bioss.(III), *Onopordon* sp. (III), *Pulicaria arabica*(L.) Cass. (III), *Scariola oreintalis*(Bioss.) Sojak(III), *Siebera nana*(DC.) Brnm.(III), *Urospermum picroides*(L.) Desf (III), *Anchusa italic* Retz.(III), *Asperago procumbens* L.(III), *Biscutella dydima* L.(II), *Capsella bursapastoris*(L.) Medicus.(II), *Clypeola jonthlaspi* L.(II), *Eruca sativa* Lam. (II), *Hesperis persica* Bioss.(II), *Hirchfeldia incana*(L.) Lag.(II), *Istatis raphanifolia* Bioss.(II), *Silene conoidea* L.(III), *Atriplex leucoclada*(Boiss.) Aellen (III), *Rosularia sempervivum*(M.B) Berger(II), *Sedum rubens* L.(III), *Cephalaria dictaetoohora* Boiss(III), *Ajuga austro iranica* Reach.f.(III), *Alcea aucheri*(Boiss)Alef.(III), *Alhagi camelorum* Fisch.(II), *Ebenus stellata* Boiss.(III), *Trifolium repns* L.(I), *Plantago coronopus* L.(III), *Scrophularia striata* Boiss., *Verbascum speciosum* Schrad., *Thymelaea mesopotamica*(C.Jeffy) B. Peterson.(III), *Tribulus terrestris* L(II), *Avena wiestii* Steud.(II), *Bromus danthoniae* Trin.(II), *Bromus tectorum* L.(III), *Heteranthelium piliferum*(Banks & Soland.) Hochst.(I), *Hordeum glaucum* Steud.(II), *Hordeum spontaneum* C.Koch. (II), *Hyparrhenia hirta*(L.) Stapf.(II), *Lolium rigidum* Gaudin.(II), *Lophochloa phleoides*(Vill.) Reichenb.(III), *Pennisetum orientale* L.C. Rich.(II), *Phalaris minor* Retz.(II), *Poa bulbosa* L.(II), *Sorghum halepense*(L.) Pers.(II), *Trachynia distachya*(L.) Link.(II), *Tricholaena teneriffae*(L.f.) Link.(II), *Bupleurum lancifolium* Bioss.(II), *Sperglaria diandra*(Guss) Heldr & Sart(III), *Ceratophyllum demersum* L.(III), *Salvia macrosiphon* Boiss.(III), *Lotus cornicalatus* L.(I), *Trifolium repns* L.(I), *Anagallis arvensis* L.(II), *Samolus valerandi* L.(III), *Phyla nodiflora*(L.) Green.(II), *Juncus bufonius* L.(II), *Aeluropus littoral*(Gouan) Parl.(I), *Cynodon dactylon*(L.) Pers.(II), *Phragmites australis*(Cav.) Trin.ex Steud.(II).

Species that have ornamental value:

Calendula persica C.A.Mey., *Ajuga austro iranica* Reach.f., *Alcea aucheri*(Boiss)Alef., *Astragalus glaucacathus* Fisch., *Trifolium repns* L., *Consolida tomentoas*(auch) schrod., *R.anunculus asiaticus* L., *R.anunculus marginatus* dUrv., *Reseda aucheri* Boiss.subsp.Aucheri., *Antirrhinum orontium* L., *Scrophularia striata* Boiss., *Viola modesta* Fenzl., *Colchicum montanum* L., *Trifolium repns* L., *Ranunculus marginatus* dUrv., *Veronica anagalis-aquatica* L., *Narcissus tazetta* L., *Juncus bufonius* L., *Phragmites australis*(Cav.) Trin.ex Steud.

Species that have conservation value:

Convolvulus gonocladus Boiss(LR), *Fumaria vaillantii* Loisel.(LR), *Ajuga austro iranica* Rech.f.(LR), *Astragalus glaucacathus* Fisch.(LR), *Astragalus ledinghamii* Barneby(LR), *Astragalus myriacanthus* Boiss.(LR), *Medicago laciniata*(L) Miller(LR), *Rhamnus pallasii* Fisch.et Mey.(LR), *Amygdalus lycioides* Spach.(LR), *Hyoscyamus tenuicaulis* Schonbecktemesy.(LR), *Verbascum aucheri*(Boiss.) Hub.Mor.(LR), *Tribulus terrestris* L(VU), *Urginea maritime*(L.) Baker maritime(L.) Baker (VU), *Vicia pannonica* Cranrz(LR), *Baccopa monnieri*(L.) Pennell.(LR) .

(Abrsejy et al., 2008; Akbarzadeh et al., 2009; Taghavi zade et al., 2009; Zargari, 1992,1996,1973,1993,1995; Mohajeri, and Sadough, 2002)