

Floristical and Chorological Studies of Vegetation in Myankaleh Wildlife Refuge, Mazandaran Province, Iran

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Abstract

Myankaleh wildlife refuge is one of the nine biosphere reserves in Man and the Biosphere Program (MaB). Special characteristics of the area make it a suitable habitat for terrestrial and aquatic plants and animals as well as migratory birds. The purpose of this study was to determine floristic composition and their chorology carrying a central importance in vegetation description and analysis. Therefore, about 70 quadrats (100 m²) were located according to the nature of vegetation. The species and their abundance-dominance were recorded. 242 plant species, belonging to 48 families, were identified from which seven were endemic. Chorological characteristics of the plant species showed that most of them were of Euro-Siberian, Mediterranean, Irano-Turanian chorotype (Euro-Sib.-Medit.-Ir.-Tur.). The dominant life form was Therophyte.

Keywords: *Myankaleh, Floristic composition, Chorology, Life form, Phytogeography*

Introduction

Wildlife refuges are particularly important in protecting and managing of habitats and wildlife. Among 25 wildlife refuges introduced in Iran (Madjnoonian, 2000), Myankaleh, located in south-east of Caspian Sea with the total area of 68800 ha. is considered of high conservation value owing to its floral and faunal characteristics. The habitat supports a variety of wildlife, migratory birds and special plant species which could not be seen in other parts of Mazandaran.

Living things are incredibly diverse. There are probably between 5 millions to 50 millions kinds of animals, plants and microbes living on

earth today. Less than 2 millions of them have been formally identified as species and described in the scientific literature. The rest is presented by specimens in museums waiting to be described, or by individuals in nature waiting to be discovered. Millions of species lived at some time in the past and are now extinct (Brown and Lomolino, 1998).

Just as all individuals eventually die, all species eventually go extinct. It is estimated that 99.9% of all species that ever lived are now extinct. This is an alarming figure needed for consideration (Meffe *et al.*, 1997).

Wildlife refuges of Iran are affected by anthropogenic impacts. Therefore, recognition and documentation of plant species and their geographical distribution are essential for further researches as well as for their protection.

Loss of genetic and species diversity by the destruction of natural habitats will take many years to correct and restore. So the primary goal of this research has been to document floristic composition and to determine the chorology of plant species in Myankaleh wildlife refuge which are important aspects of ecological and nature conservation investigations.

Methods

Study area

The Study area, Myankaleh wildlife refuge, is located in south-east of Caspian sea in Mazandaran province with the total area of 68800 ha. It is between 53 25' - 54 02' longitude and 36 48' - 36 55' latitude with the altitude of 15-25 m.a.s.l. It is consisted of two terrestrial and aquatic ecosystems each with the approximate area of 25000 and 43800 ha, respectively. This wildlife refuge is one of the nine biosphere reserves in the MaB program and of 25 wildlife refuges of Iran (Fig. 1).

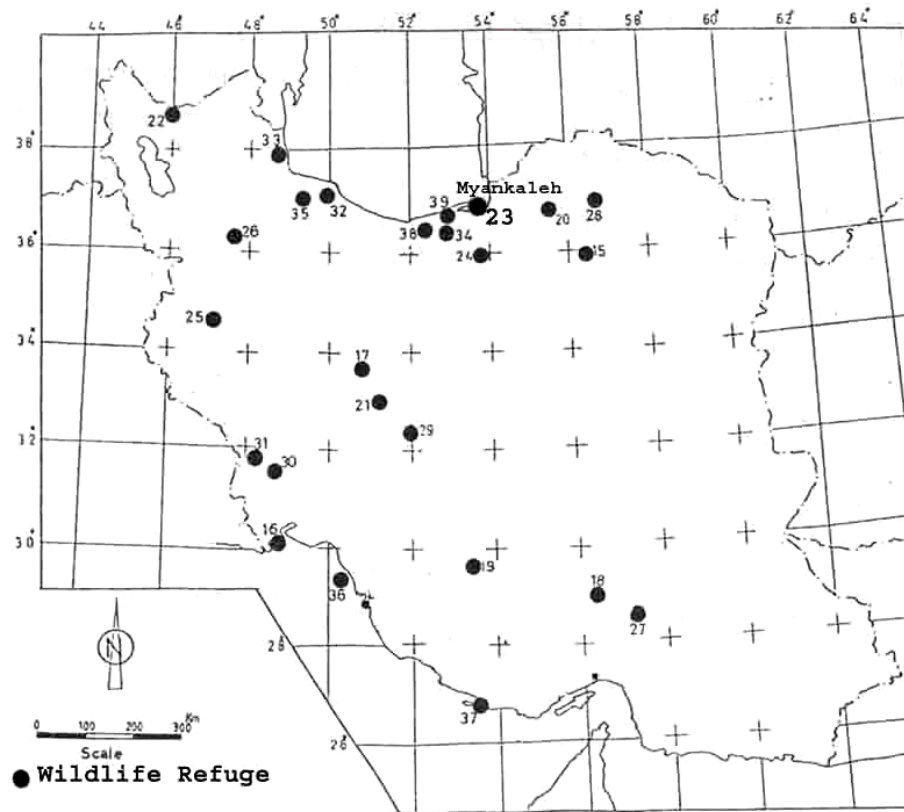


Figure 1 - Map of Iran showing the location of study area and distribution of the 25 wildlife refuges (From Madjnoonian, 2000, with a little modification). Myankaleh wildlife refuge is labeled with 23.

Species Collection and Identification

Since any detailed vegetation study is based on description and investigation of plant communities or vegetation segments that must first be recognized in the field (Mueller-Dombois and Ellenberg, 1974), seven vegetation types were recognized and delineated in the study area. Vegetation sampling was performed during the year 2000-2002. In each vegetation type, considering the nature of vegetation, 10 quadrats of the size 100 m², were located and abundance-dominance of each species was recorded. In the present study, the abundance-dominance data were not subjected to analysis. Species identification and their chorology were completed using Flora of Iranica (Rechinger, 1963-98), Flora of USSR (Komarov *et al.*, 1963-1974), Flora of Turkey (Davis, 1965-1988), Flora of Iraq (Townsend and Guest, 1960-1985), Flora of Iran (Assadi *et al.*, 1989-2002), Color Flora of

Iran (Ghahreman, 1984 -2002) as well as the books of Takhtajan (1986) and Zohary *et al.*, (1980-1993). Life form classification system of Raunkiaer was used to assign the life form of the species (Raunkiaer, 1934).

Results and Discussion

The total number of 242 plant species belonging to 48 families were identified in the study area based on Rechinger, 1963-98, Komarov *et al.*, 1963-1974, Davis, 1965-1988, Townsend and Guest, 1960-1985, Assadi *et al.*, 1989-2002 and Ghahreman, 1984 -2002. Species composition of Myankaleh along with their families, chorotypes and life forms are presented in Table 1. Psamophyte vegetation type with 132 out of the total plant species had the highest species diversity among the vegetation types. *Sida sp.* (Malvaceae family) was collected in psamophyte type which was previously found close to Noshahr. *Maresia nana*, *Equisetum palustre*, *Convolvulus persicus*, *Messerchmidia sibirica*, *cahile maritima*, *Artemisia scoparia*, *A. fragrans* and *A. Tschernieviana* were of high abundance in this type. Some individuals of *Celtis australis* were also could be seen grazed by the grazing animals. Since buffalo is one of the grazing animals of the area in the pure *Punica granatum* type, a minor vegetation type consisting of *Onopordon acanthium* could be seen within the main type. Most of the species in Myankaleh belong to Compositae, Gramineae and Papillionaceae (Fig. 2).

Chorological studies showed that most of species, in ascending order, have chorotype of Euro-Siberian, Mediterranean, Irano-Turanian (Euro-Sib.-Medit.-Ir.-Tur.), Pluriregion and Cosmopolit (Fig. 3). In each habitat, usually most of the species are endemic. This implies the need for consideration and conservation. So, 8 species out of 243 (ca. 3.5 %) were endemic of mostly Hyrcanian regions. Therophytes and Hemicryptophytes were dominant life forms (Fig. 4).

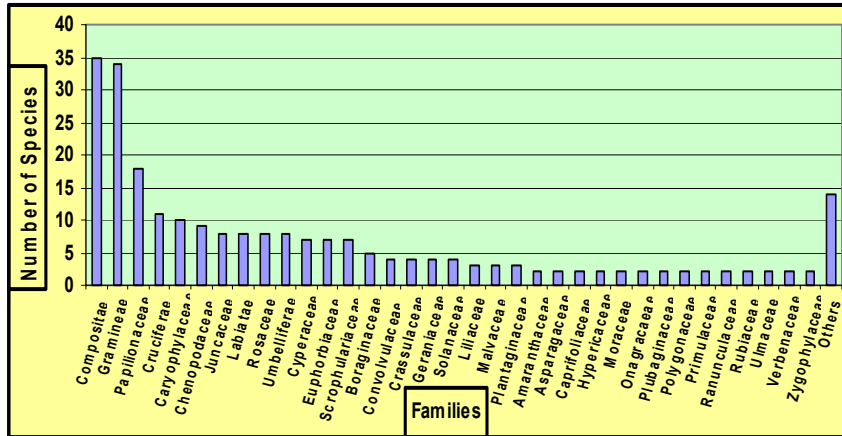


Figure 2 - A bar diagram showing contribution of different plant families in the study area as well as the number of species in each family.

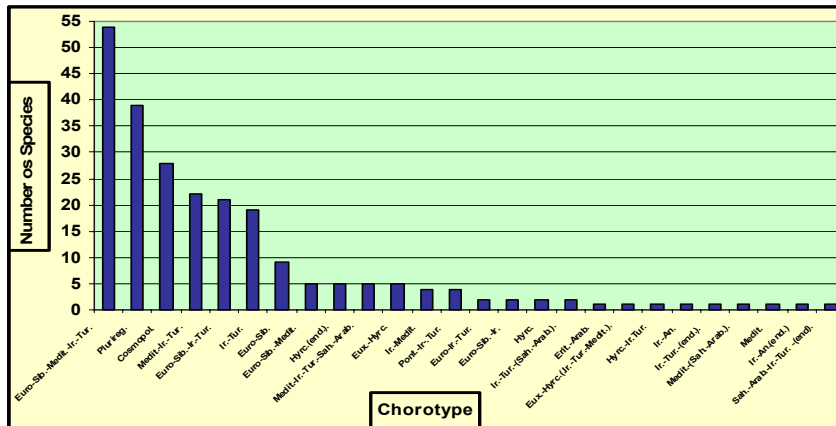


Figure 3 - Geographical distribution of plant elements in Myankaleh showing number of species in each chorotype.

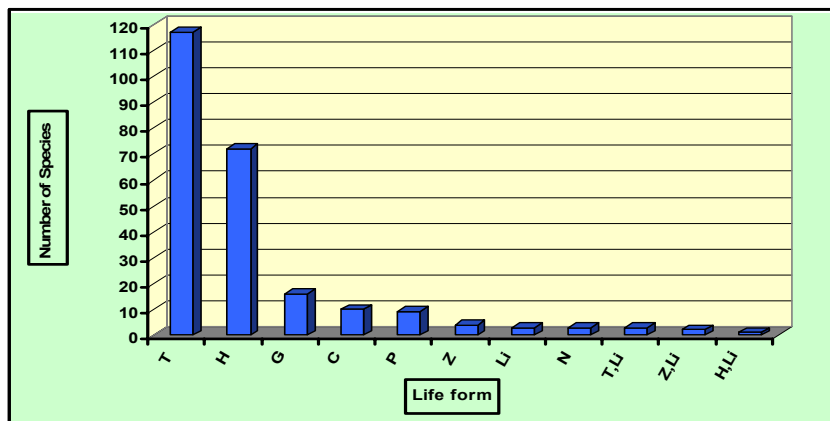


Figure 4 - Life form of species in the area based on Raunkiaer system (T: Therophytes, H: Hemicryptophytes, G: Geophytes, C: Herbaceous Chamaephytes, P: Phanerophytes, Z: Woody Chamaephytes, Li: Lianas, N: Nanophanerophytes)

Conclusion

Documenting floristic composition of a habitat is valuable for continuing ecological research, management and conservation of plants and animals. Resources available for conservation of species and ecosystems are in short supply relative to the needs for those resources. Targeting conservation and management actions toward the species and ecosystems require clearly established priorities such as study of floristic composition as a principle tool in biodiversity which was considered in the study. So, in this research, identification of 242 plant species in Myankaleh along with their chorology, plant family and life form as well as introducing eight endemic plant species are of central importance for further ecological investigation, conservation and management of wildlife refuge of Iran.

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Table 1 - Floristic composition of Myankaleh wildlife refuge. Family name, chorotype and life form of each species have been presented. Shaded rows show endemic species.

No.	Family	Plant Species	Chorotype	Life Form
1	Amaranthaceae	<i>Amaranthus albus</i> L.	Plurireg.	T
2		<i>Amaranthus blitoides</i> S. Watson.	N.AM.	T
3	Asclepiadaceae	<i>Cynanchum acutum</i> L.	Plurireg.	Li
4	Asparagaceae	<i>Asparagus officinalis</i> L.	Medit.-Ir.-Tur.-Euro-Sib.-Cult.	G
5		<i>Asparagus verticillatus</i> L.	Pont.-Ir.-Tur.	G
6	Betulaceae	<i>Alnus glutinosa</i> (L.) Gaerth.	Euro-Sib.	P
7	Boraginaceae	<i>Heliotropium Kaserunense</i> Bornm.	Ir.-Tur.-(Sah.-Arab.).	T
8		<i>Lappula microcarpa</i> (Ledeb.) Gurke	Plurireg.	H
9		<i>Messerchmidia sibirica</i> L.	Euro-Sib.-Ir.-Tur.	H
10		<i>Myosotis propinqua</i> Fisch.	Eux.-Hyrc.	T
11		<i>Nonnea lutea</i> (Desr.)Reichenb.	Euro-Sib.-Ir.-Tur.	T
12	Campanulaceae	<i>Campanula</i> sp.		T
13	Caprifoliaceae	<i>Lonicera floribunda</i> Boiss.& Buhse	Hyrc.	N-Li
14	Caryophyllaceae	<i>Arenaria serpyllifolia</i> L.	Euro-Sib.-Ir.	T
15		<i>Cerastium glutinosum</i> Fries	Plurireg.	T
16		<i>Moehringia trinervia</i> (L.)Clairv	Euro-Ir.Tur.	H
17		<i>Petrorhagia saxifraga</i> (L.)Link	Euro-Ir.-Tur.	H
18		<i>Silene conica</i> L.	Euro-Sib.-Ir.-Tur.	T
19		<i>Silene conoidea</i> L.	Medit.-Ir.	T
20		<i>Silene Ruprechtii</i> Schischk.	Eux.-Hyrc.	T
21		<i>Spergularia marina</i> (L.)Griseb.	Plurireg.	T
22		<i>Stellaria holostea</i> L.	Euro-Sib.	C
23		<i>Stellaria media</i> (L.)Cyr.	Plurireg.	T
24	Chenopodiaceae	<i>Chenopodium album</i> L.	Cosmopol.	T
25		<i>Chenopodium ambrosioides</i> L.	Cosmopol.	H
26		<i>Chenopodium botrys</i> L.	Medit.-Ir.-Tur.-Sah.-Arab.	T
27		<i>Chenopodium murale</i> L.	Euro-Sib.-Ir.-Tur.-Sah.-Arab.	T
28		<i>Chenopodium sosnowskyi</i> Kapeller	Ir.-Tur.-Pont.	T
29		<i>Corispermum orientale</i> Lam.	Hyrc.-Ir.Tur.	T
30		<i>Salicornia europaea</i> L.	Euro-Sib.-Ir.-Tur.	T
31		<i>Salsola kali</i> L.	Plurireg.	T
32		<i>Salsola brachiata</i> Pall	Euro-Sib.-Ir.-Tur.	T
33	Compositae	<i>Anthemis altissima</i> L.	Euro-Sib.-Ir.-Tur.	T
34		<i>Artemisia annua</i> L.	Euro-Sib.	T
35		<i>Artemisia fragrans</i> Willd.		Z
No.	Family	Plant Species	Chorotype	Life Form
36	Compositae	<i>Artemisia scoparia</i> Waldst.&Kit.	Euro-Sib.-Ir.-Tur.	Z

37	(continued)	<i>Artemisia sp.</i>		Z
38		<i>Artemisia tschernieviana</i> Besser	Ir.-Tur.	Z
39		<i>Bidens tripartita</i> L.	Cosmopol.	T
40		<i>Carthamus lanatus</i>	Euro-Sib.-Medit.-Ir.-Tur.	T
41		<i>Centurea hyrcanica</i> Bornm.	Ir.-Tur.	H
42		<i>Cichorium intybus</i> L.	Euro-Sib.-Ir.-Tur.	H
43		<i>Conyza bonariensis</i> (L.) Cronq.	Origin N-Am.	T
44		<i>Conyza canadensis</i> (L.) Cronq.	Origin N&S Am.	T
45		<i>Conyzanthus squamatus</i> (Spreng.) Tamamsch.	Origin Am.	H
46		<i>Cousinia crispa</i> Jaub.&Spach	Ir.-An.(end.)	H
47		<i>Crepis foetida</i> L.	Euro-Sib.-Medit.-Ir.-Tur.	T
48		<i>Crepis Gaubae</i> Bornm.	Hycr.(end.)	H
49		<i>Crepis papposissima</i> Babcock	Hycr.(end.)	T
50		<i>Eclipta alba</i> (L.) Hassk.	Plurireg.	T
51		<i>Filago arvensis</i> L.	Euro-Sib.-Ir.-Tur.	T
52		<i>Hedypnois rhagadioloides</i> (L.) F.W.Schmidt	Medit.-Ir.-Tur.	T
53		<i>Heteropappus altaicus</i> (Willd.) Novopokr	Plurireg.	H
54		<i>Lactuca undulata</i> Ledeb.	Ir.-Tur.	H
55		<i>Launaea oligocephala</i> (Hauskh. & Bornm. ex Bornm.) Bornm.	Ir.-An.	H
56		<i>Leontodon asperrimus</i> (Willd.) Boiss.ex Ball.	Ir.-Tur.	H
57		<i>Onopordon acanthium</i> L.	Euro-Sib.-Medit.-Ir.-Tur.	H
58		<i>Senecio vernalis</i> L.	Medit.-Ir.-Tur.	T
59		<i>Senecio vulgaris</i> L.	Euro-Sib.-Medit.-Ir.-Tur.	T
60		<i>Silybum marianum</i> (L.) Gaertn.	Medit.-Ir.-Tur.-(Euro-Sib.)	H
61		<i>Sonchus asper</i> (L.) Hill	Medit.-Ir.-Tur.	T
62		<i>Sonchus oleraceus</i> L.	Cosmopol.	T
63		<i>Sonchus palustris</i> L.	Euro-Sib.-Ir.-Tur.	H
64		<i>Taraxacum syriacum</i> Boiss.	Ir.-Tur.	H
65		<i>Tragopogon gongylorrhizus</i> Rech.f.	Hycr.(end.)	H
66		<i>Tragopogon graminifolius</i> DC.	Ir.-Tur.	H
67		<i>Xanthium spinosum</i> L.	Origin N.Am.	T
68		<i>Xanthium strumarium</i> L.	Borealo.-Trop.	T
69	Convolvulaceae	<i>Calystegia silvestris</i> (Willd.) Roem.	Medit.-Ir.-Tur.	H
70		<i>Convolvulus arvensis</i> L.	Plurireg.	H,Li
71		<i>Convolvulus cantabrica</i> L.	Medit.-(Euro-Sib.-Ir.-An.)	H
72		<i>Convolvulus persicus</i> L.	Eux.-Hycr.	H
No.	Family	Plant Species	Chorotype	Life Form
73	Crassulaceae	<i>Sedum lenkoranicum</i> Grossh.	Hycr.	T

74		<i>Sedum pallidum</i> M.B.	Euro-Sib.-Ir.-Tur.	H
75		<i>Sedum rubens</i> L.	Euro-Sib.-Medit.-Ir.-Tur.	T
76		<i>Sedum stoloniferum</i> S.G.Gmel.	Ir.-Medit.	H
77	Cruciferae	<i>Arabidopsis thaliana</i> (L.)Heynh.	Euro-Sib.-Medit.-Ir.-Tur.	T
78		<i>Brassica tournefortii</i> Gouan.	Medit.-Sah.-Arab.-(Ir.-Tur.).	T
79		<i>Cakile maritime</i> Scop.	Medit.-Euro-Sib.	T
80		<i>Capsella bursa pastoris</i> (L.) Medicus	Plurireg.	T
81		<i>Cardamine hirsuta</i> L.	Medit.-Euro-Sib.-(Ir.-Tur.).	T
82		<i>Descurainia sophia</i> (L.)Schur	Plurireg.	T
83		<i>Maresia nana</i> (DC.)Batt.	Medit.-(Sah.-Arab.).	T
84		<i>Raphanus raphanistrum</i> L.	Medit.-Euro-Sib.	T
85		<i>Rapistrum rugosum</i> (L.)All.	Medit.-Ir.-Tur.-(Euro-Sib.).	T
86		<i>Sisymbrium officinale</i> (L.)Scop.	Euro-Sib.-Medit.-Ir.-Tur.	T
87		<i>Brassica rapa</i> L.	Cult.	T
88	Cuscutaceae	<i>Cuscuta sp.</i>		T
89	Cyperaceae	<i>Carex digitata</i> L.	Euro-Sib.	Cr
90		<i>Carex divisa</i> Huds	Medit.-Ir.-Tur.-Euro-Sib.	H
91		<i>Carex grioletii</i> Rom.	Medit.-Ir.-An.	H
92		<i>Carex melanostachya</i> M. B. ex Willd.		H
93		<i>Cyperus glaber</i> L.	Medit.-Ir.-Tur.-(Euro-Sib.)	C
94		<i>Cyperus rotundus</i> L.	Medit.-Ir.-Tur.	C
95		<i>Schoenus nigricans</i> L.	Plurireg.	H
96	Equisetaceae	<i>Equisetum palustre</i> L.	Plurireg.	G
97	Euphorbiaceae	<i>Acalypha australis</i> L.	Cosmopol.	T
98		<i>Chrozophora hierosolymitana</i> Spreng.	Sah.-Arab.-Ir.-Tur. -(end).	T
99		<i>Euphorbia helioscopia</i> L.	Euro-Sib.-Medit.-(Ir.-Tur.-Sub.)	T
100		<i>Euphorbia indica</i> Lam.	Plurireg.	T
101		<i>Euphorbia stocksiana</i> Boiss.	Ir.-Tur.-(end.).	T
102		<i>Euphorbia stricta</i> L.	Euro-Sib.-Ir.-Tur.	T
103		<i>Euphorbia turcomanica</i> Boiss.	Ir.-Tur.	T
104	Frankeniaceae	<i>Frankenia hirsuta</i> L.	Medit.-Euro-Sib.-(Ir.-Tur.).	H
105	Gentianaceae	<i>Centaurium pulchellum</i> (Swartz)Druce.	Plurireg.	T
106	Geraniaceae	<i>Erodium cicutarium</i> (L.) L. Her.	Euro-Sib.-Medit.-Ir.-Tur.	H
107		<i>Geranium molle</i> L.	Euro-Sib.-Medit.	T
108		<i>Geranium robertianum</i> L.	Euro-Sib.-Ir.-Tur.-(Medit.).	T
109		<i>Geranium rotundifolium</i> L.	Euro-Sib.-Medit.-Ir.-Tur.	T
No.	Family	Plant Species	Chorotype	Life Form
110	Gramineae	<i>Aegilops crassa</i> Boiss.	Ir.-Tur.	T

111		<i>Aegilops tauschii</i> Cosson	Ir.-Tur.	H
112		<i>Aeluropus littoralis</i> (Gouan)Parl.	Medit.-Ir.-Tur.	H
113		<i>Agropyrum elongatiforme</i> Drobov	Ir.-Tur.	H
114		<i>Aira elegans</i> Willd.	Medit.-Ir.-Tur.-(Euro-sib.).	H
115		<i>Alopecurus myosuroides</i> Hudson.	Euro-Sib-Medit.-Ir.-Tur.	T
116		<i>Arundo donax</i> L.	Medit.-Ir.-Tur.-Euro-Sib.	G
117		<i>Avena barbata</i> Pott ex Link.	Medit.-(Ir.-Tur.).	T
118		<i>Briza minor</i> L.	Medit.-Ir.-Tur.-Euro-Sib.	T
119		<i>Bromus tectorum</i> L.	Plurireg.	T
120		<i>Catapodium rigidum</i> (L.)C.E.	Medit.-(Ir.-Tur.-Euro-Sib.).	T
121		<i>Crypsis schoenoides</i> (L.)Lam.	Medit.-Ir.-Tur.-Euro-Sib.	T
122		<i>Cutandia memphitica</i> Willd.	Sah.-Arab.-Ir.-Tur.-(Medit.).	T
123		<i>Cynodon dactylon</i> (L.)Pers.	Plurireg.	C
124		<i>Digitaria sanguinalis</i> (L.) Scop.	Plurireg.	T
125		<i>Eragrostis poaeoides</i> P. Beauv.	Plurireg.	T
126		<i>Hordeum glaucum</i> Steud.	Medit.-Ir.-Tur.-Euro-Sib.	T
127		<i>Imperata cylindrica</i> (L.)Beauv.	Medit.-Ir.-Tur.-Sah.-Arab-Trop.	H
128		<i>Lolium rigidum</i> Gaudin.	Ir.Medit.	T
129		<i>Milium vernale</i> M.B.	Medit.-Ir.-An.	T
130		<i>Parapholis incurva</i> (L.)C.E.Hubb.	Medit.-Ir.-Tur.-Euro-Sib.	G
131		<i>Paspalum dilatatum</i> Poir.	Nativ. S.Am.	C
132		<i>Paspalum urvillei</i> Steud.	N.Am.	C
133		<i>Phleum paniculatum</i> Hudson.	Ir.-Tur.-Medit.	T
134		<i>Phragmites australis</i> (Car.)Trin.ex Steud.	Plurireg.	C
135		<i>Poa anua</i> L.	Cosmopol.	T
136		<i>Poa nemoralis</i> L.	Plurireg.	H
137		<i>Saccharum Ravennae</i> (L.)Murray.	Medit.-Ir.-Tur.	G
138		<i>Setaria viridis</i> P.Beauv.	Euro-Sib.-Medit.-Ir.-Tur.	T
139		<i>Sorghum halepense</i> (L.)Pers	Medit.-Ir.-Tur.	H
140		<i>Trisetaria linearis</i> Forssk.	Medit.-Sah.-Arab.(Ir.-Tur.).	T
141		<i>Avena eriantha</i> Durieu.	Medit.-Ir.-Tur.	T
142	Hypericaceae	<i>Hypericum perforatum</i> L.	Euro-Sib.	H
143		<i>Hypericum tetrapterum</i> Fries	Medit.-Ir.-Tur.-Euro-Sib.	H
144	Juncaceae	<i>Juncus articulatus</i> L.	Cosmopol	H
145		<i>Juncus acutus</i> L.	Medit.-Ir.-Tur.-&World Wild.	H
146		<i>Juncus bufonius</i> L.	Cosmopol.	T
No.	Family	Plant Species	Chorotype	Life Form
147		<i>Juncus gerardi</i> Loisel.	Ir.-Tur.-Euro-Sib.	G

148		<i>Juncus heldrieckianus</i> Marsson ex Parl.	Medit.-Ir.-Tur.-&World Wid.	G
149		<i>Juncus minutulus</i> Albert & Jahandiez	Euro-Sib.-Ir.-Tur.	G
150		<i>Juncus rigidus</i> Desf.	Medit.-Ir.-Tur.	G
151		<i>Juncus socotranus</i> (Buchenau.)Snogerup.	Ir.-Sah.Arab.	G
152	Labiatae	<i>Lycopus europaeus</i> L.	Euro-Sib.	H
153		<i>Marrubium vulgare</i> L.	Medit.-Ir.-Tur.	C
154		<i>Mentha aquatica</i> L.	Borealo.-Trop.	H
155		<i>Mentha longifolia</i> (L.)Hudson	Plurireg.	H
156		<i>Nepeta cataria</i> L.	Euro-Sib.-Ir.-Tur.	H
157		<i>Nepeta</i> sp.		H
158		<i>Origanum vulgare</i> L.	Euro-Sib.-Ir.-Tur.	H
159		<i>Teucrium hyrcanicum</i> L.	Eux.-Hyrc.	C
160	Liliaceae	<i>Allium rotundum</i> L.	Euro-Sib.-Medit.-Ir.-Tur.	G
161		<i>Smilax excelsa</i> L.	Pont.-Ir.-Tur.	Li
162	Linaceae	<i>Linum bienne</i> Miller	Medit.-Euro-Sib.-Ir.-Tur.	T
163	Lythraceae	<i>Lythrum salicaria</i> L.	Plurireg.	H
164	Malvaceae	<i>Abutilon theophrasti</i> Medic.	Paleotr.,Advent.	T
165		<i>Hibiscus richardii</i> I.Riedl	Erit.-Arab.	T
166		<i>Malva neglecta</i> Wallr.	Euro-Sib.-Medit.-Ir.-Tur.	T
167	Moraceae	<i>Ficus carica</i> L.	Ir.-Tur.	P
168		<i>Morus alba</i> L.	Plurireg.	P
169	Onagraceae	<i>Epilobium hirsutum</i> L.	Plurireg.	H
170		<i>Oenothera biennis</i> L.	Origin N.Am.	H
171	Oxalidaceae	<i>Oxalis corniculata</i> L.	Euro-Medit.-Ir.	T
172	Papaveraceae	<i>Papaver chelidoniifolium</i> Boiss.& Buhse	Hyrc.(end.)	T
173	Papilionaceae	<i>Lathyrus aphaca</i> L.	Medit.-Ir.-Tur.-Euro-Sib.	T,Li
174		<i>Lathyrus vernus</i> (L.)Bernh.	Medit.-Ir.-Tur.-Euro-Sib.	G
175		<i>Lotus angustissimus</i> L.	Medit.-Euro-Sib.-Ir.-Tur.	T
176		<i>Lotus corniculatus</i> L.	Euro-Sib.-Medit.-Ir.-Tur.	H
177		<i>Medicago minima</i> (L.) Bartalini	Euro-Sib.-Medit.-Ir.-Tur.	T
178		<i>Medicago polymorpha</i> L.	Euro-Sib.-Medit.-Ir.-Tur.	T
179		<i>Medicago rigidula</i> (L.)All.	Medit.-Ir.-Tur.	T
180		<i>Medicago sativa</i> L.	Ir.-Tur.-Medit.-Euro-Sib.	H
181		<i>Melilotus alba</i> Desr.	Euro-Sib.-Medit.-Ir.-Tur.	T
182		<i>Melilotus indicus</i> L.	Plurireg.	T
183		<i>Melilotus officinalis</i> (L.)Desr.	Euro-Sib.-Ir.-Tur.	T
No.	Family	Plant Species	Chorotype	Life Form
184		<i>Trifolium angustifolium</i> L.	Euro-Sib.-Medit.-Ir.-Tur.	T
185		<i>Trifolium arvense</i> L.	Medit.-Euro-Sib.-Ir.-Tur.	T

186		<i>Trifolium campaster</i> L.	Medit.-Euro-Sib.Ir.-Tur.	T
187		<i>Trifolium clusii</i> Godron & Gren.	Medit.-Ir.-Tur.	T
188		<i>Trifolium scabrum</i> L.	Medit.-(Ir.-Tur.-Euro-Sib.).	T
189		<i>Trigonella monspeliaca</i> L.	Medit.-Ir.-Tur.	H
190		<i>Vicia sativa</i> L.	Medit.-Euro-Sib.-Ir.-Tur.	T,Li
191		<i>Vicia tetrasperma</i> (L.)Schreb.	Medit.-Ir.-Tur.-Euro-Sib.	T,Li
192	Plantaginaceae	<i>Plantago indica</i> L.	Medit.-Euro-Sib.	T
193		<i>Plantago lanceolata</i> L.	Euro-Sib.-Medit.-Ir.-Tur.	H
194		<i>Plantago major</i> L.	Plurireg.	H
195	Plumbaginaceae	<i>Limonium meyeri</i> (Boiss.) Kuntze	Ir.-Tur.	H
196		<i>Psylliostachys</i> sp.		T
197	Polygonaceae	<i>Polygonum aviculare</i> L.	Cosmopol.	T
198		<i>Polygonum lapathifolium</i> L.		T
199	Primulaceae	<i>Anagalis arvensis</i> L.	Medit.	T
200		<i>Samolus valerandi</i> L.	Cosmopol.	H
201	Punicaceae	<i>Punica granatum</i> L.	Ir.-Tur.	N
202	Ranunculaceae	<i>Ranunculus caucasicus</i> M.B.	Ir.-An.-Tur.-	G
203		<i>Ranunculus cicutarius</i> Schlechtend.	Ir.-Tur.	G
204	Rhamnaceae	<i>Paliurus spina-christi</i> Miller.	Medit.-Ir.-Tur.-(Euro-Sib.).	N
205	Rosaceae	<i>Crataegus melanocarpa</i> M.B.	Euro-Sib.-Ir.-Tur.	P
206		<i>Geum urbanum</i> L.	Euro-Sib.-Medit.-Ir.-Tur.	H
207		<i>Mespilus germanica</i> L.	Eux.-Hyrc.(Ir.-Tur.-Medit.).	P
208		<i>Potentilla reptans</i> L.	Euro-Sib.-Medit.-(Ir.-Tur.).	H
209		<i>Prunus divaricat</i> subsp. <i>caspica</i> Ledeb.	Pont.-Ir.-Tur.	P
210		<i>Rubus caesius</i> L.	Euro-Sib.-Ir.-Tur.	Z,Li
211		<i>Rubus sanctus</i> Schreber	Medit.(Ir.-Tur.-Euro-Sib.).	Z,Li
212		<i>Sanguisorba minor</i> Scop.	Euro-Sib.-Medit.-Ir.-Tur.	H
213	Rubiaceae	<i>Cruciata laevipes</i> Opiz	Euro-Sib.	H
214		<i>Galium humifusum</i> Bieb.	Medit.-Ir.-Tur.	T
215	Scrophulariaceae	<i>Kickxia elatine</i> (L.) Dumort.	Euro-Sib.-Ir.-Tur.	T
216		<i>Linaria simplex</i> (Willd.) D.C.	Euro-Sib.	T
217		<i>Parentucellia latifolia</i> L.	Medit.-Ir.	T
218		<i>Scrophularia Gaubae</i> Bornm.	Hyrc.(end.).	H
219		<i>Veronica anagalis - aquatica</i> L.	Ir.-Tur.-Medit.	T
220		<i>Veronica arvensis</i> L.	Cosmopol.	T
221		<i>Veronica persica</i> Poir.	Cosmopol.	T
No.	Family	Plant Species	Chorotype	Life Form
222	Solanaceae	<i>Datura innoxia</i> Miller	Origin(Am.-Cult.)	T

223		<i>Datura stramonium</i> L.	Cosmopol.	T
224		<i>Solanum elaeagnifolium</i> Cav.	Origin Trop.Am.	H
225		<i>Solanum nigrum</i> L.	Cosmopol.	T
226	Tamaricaceae	<i>Tamarix ramosissima</i> Ledeb.	Plurireg.	N
227	Typhaceae	<i>Typha latifolia</i> L.	Plurireg.	G
228	Ulmaceae	<i>Celtis australis</i> L.	Plurireg.	P
229		<i>Ulmus minor</i> Miller	Euro-Ir.	P
230	Umbelliferae	<i>Anethum graveolens</i> L.	Plurireg.	T
231		<i>Bupleurum exaltatum</i> M.B.	Ir.-Tur.	H
232		<i>Bupleurum marschallianum</i> C.A.Mey.	Ir.-Tur.	T
233		<i>Daucus carota</i> L. subsp. <i>carota</i>	Medit.-(Ir.-Tur.).	H
234		<i>Daucus littoralis</i> Smith	Plurireg.	H
235		<i>Eryngium caucasicum</i> Trautv.	Ir.-Tur.	H
236		<i>Pimpinella affinis</i> Ledeb.	Ir.-Tur.	H
237		<i>Torilis japonica</i> (Houtt.)DC.	Euro-Sib.-Medit.	T
238		Urticaceae	<i>Urtica dioica</i> L.	Euro-Sib.
239	Verbenaceae	<i>Phyla nodiflora</i> (L.) Greene	Medit.-Ir.-Tur.-Trop.	H
240		<i>Verbena officinalis</i> L.	Plurireg.	H
241	Zygophyllaceae	<i>Peganum harmala</i> L.	Plurireg.	H
242		<i>Tribulus terrestris</i> L.	Plurireg.	T