



Contribution to the Vascular and Flora as Well as Habitat Diversity of the Langarud and its Environs, (Guilan:IRAN)

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ABSTRACT

Langarud and Its Environs is in Guilan Province, N. Iran. This area is a critical refuge for a lot of migratory animals and so many valuable flora. The present study revealed that, the flora of this area comprises 322 vascular plants out of which six taxa are endemic for the flora of Iran. Chorotype spectrum of the plant species showed that most of them were pluriregional elements. Ecology and floristic composition of all habitats from the studied area were surveyed and summarized as a histogram. Moreover, detailed floristic inventory was presented. In addition, *Centella asiatica* and *Nasturtium officinale* · *Buxsus hyrcana*, which had been considered as three rare species in Iran from this area.

KEY WORDS: Habitat diversity, Chorotype, Flora, Life form, Guilan, N. Iran

INTRODUCTION

This research contains a floristic study from coastal area to the middle of water shed area of Shalmanrud located on the langarud (east of Guilan Province).at 37°, 05' to 37°, 11' north latitude and 50°,00' to 50°, 14' east longitude. This area limited in north to Caspian coastline, from east to polderud (Fig. 1). Habitat variation in the study area makes it possible to provide diversity of plant taxa as well as the development of ecologically specialized plant communities. The study of these habitats in north of Iran is very important because of the fact that this area serves as a very valuable resting, nesting and wintering place. There is no previous floristic information about this area, nevertheless, some information have been recently provided for other similar ecosystems in north of Iran, i.e. coastal area to the middle of water shed area polderud [1],Gisoum Talesh Reserve forest , Boujagh National Park [2].

MATERIALS AND METHODS

Study area

Langarud and Its Environs is located near the coast of Caspian Sea.At 37°, 05' to 37°, 11' N and 50°,00' to 50°, 14' E. Total surface, circumference and mean altitude of the Park is 1797 ha and -1500 m respectively (Fig. 1).



Fig. 1. Map of Bolurdekan mountain and its environs

Data collection

Data collection was performed from Mar. 2007 to Mar. 2008. Voucher specimens were deposited in two herbaria namely, urumia University Herbarium (UUH) and Guilan University Herbarium (GUH). Plant nomenclature (Angiosperms) was based on [3,4]. Life forms were named following the Raunkiaer's classification [5]. The distributions of the species are based on the reviews, monographs and distribution information in the floras, particularly Flora Iranica, Flora of Turkey. The terminology and delimitation of the main phytochoria (Irano-Turanian [IT], Mediterranean [M] and Euro-Siberian [ES]) is based on the known classical works particularly those of [6,7]. Based on Naghinejad's assessments, bujagh park [2], PL (Pluriregional elements) are plants ranging in distribution over three phytogeographical regions and SCOS (Subcosmopolitan elements) are plants ranging in distribution over most continents but not all of them. In addition, cosmopolitan elements are abbreviated by COS (Cosmopolitan). Information regarding collection sites habitat preferences, ecological status based on our own field observation is given for each taxon. In addition, delimitation of the habitats was performed with physiognomical approach and based on the field observation in each habitat.

RESULTS AND DISCUSSION

Inventory of vascular flora

A total of 322 species of native and naturalized vascular plants belonging to 79 families and 237 genera were known from studied area (Table 1). five families of Pteridophytes and 75 families of Angiosperms (65 dicotyledons and 9 monocotyledon families) constitute the studied flora. Asteraceae, Poaceae, Fabaceae, Brassicaceae, Rosaceae, Lamiaceae, Apiaceae, all exceed 12 taxa and show the highest species richness respectively. one families are represented by ten taxa, one families with nine taxa, one families with eight taxa, one families with seven taxa, six families with five taxa, one families with four taxa, nine families with three taxa, 19 families with two taxa and 33 families have only one taxon. seven families including Asteraceae (29), Poaceae (25), Fabaceae (10), Brassicaceae (15), Apiaceae (13), Lamiaceae (12) and Rosaceae (11), contain more than seven genera. Two families have six genera, Two families have five genera, one families have four genera, seven families have three genera, sixteen families have two genera and the rest (45 families) are unigeneric. As it concerns the species richness of the genus, genera exceeding five species are *Juncus* (five spp.), *Lathyrus* (five spp.), *Rubus* (five spp.), *Rumex* (five spp.), *Trifolium* (five spp.), *Centurea* (four spp.), *silen* (four), *Vicia* (four spp.), ten genera with three taxa, 35 genera with 2 species and 184 genera only with a single taxon. In the assessment of life form spectrum, the dominant life forms are therophytes, which constitute 36.02% of studied flora, followed by the hemicryptophytes (19.25%), phanerophytes (13.66%), geophytes (10.86%), helophytes (6.21%), champhytes (4.03%), hydrophytes (1.24%) and parasites (0.62%). (Fig. 2).

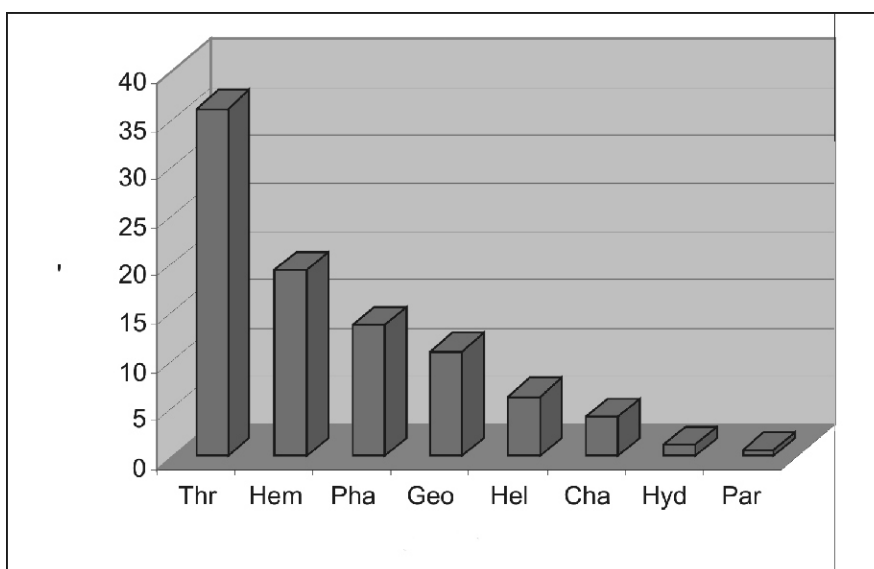


Fig. 2. Life form spectrum in studied area (abbreviation according to Table 1).

Although, therophytes occur abundantly in desert areas [8], a high presence of this life form proves destruction pressure in some parts of our studied area. Such an abundant presence of therophytes has been previously observed in other studied ecosystems [9].

Chorologically, the following taxa are endemic or nearly endemic to the Hyrcanian district: *Alcea hyrcana*, *Alnus subcordata*, *Gladitschia caspica*, *Quercus castaneafolia*, *Scutellaria tournefortii* and *Albizzia julibrissin*. The species that are confined to Euxino-Hyrcanian sub-province [6] are *Alnus glutinosa* ssp. *barbata* and *buxsus hyrcana*. The presence of these endemic taxa indicates special ecologic and biogeographic importance of the area. Chorologically, in the total sites, the flora is much affected by pluriregional elements (Fig. 4). Phytogeographical elements include PI (25.23%), ES (19.8%), ES, IT (16.61%), SCOS (11.18%), IT (7.98%), ES, IT, M (7.66%), COS (5.11%), ES, M (3.19%), IT, M (2.55%) and M(0.63%). (Fig. 3). It is obvious that most of plant species are widespread elements (ca. 50%).

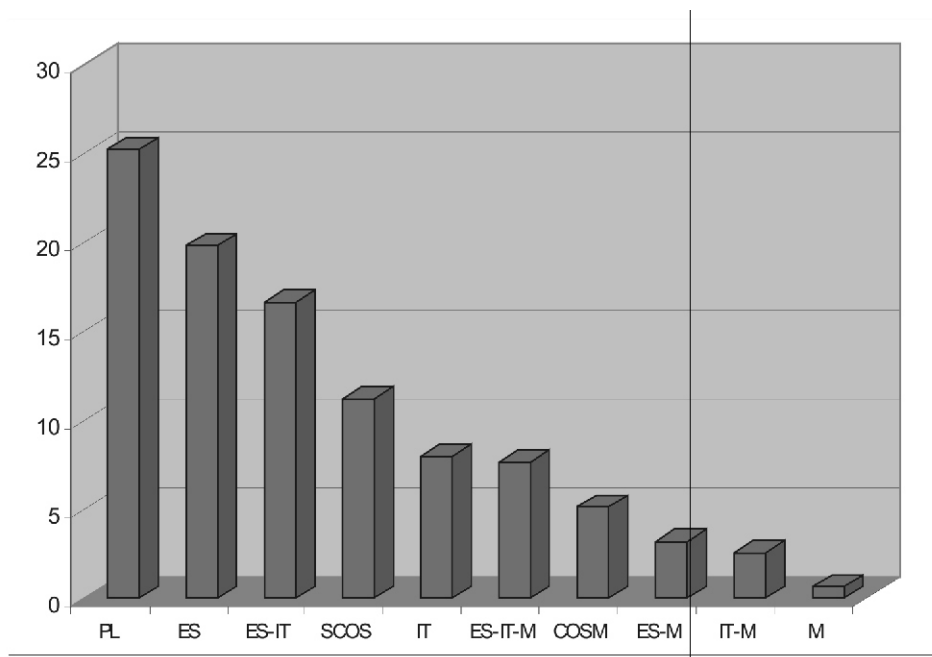


Fig. 3. Chorotype spectrum in studied area (abbreviation according to Table 1).

Habitat and Ecology

several different habitats occurred in the studied area. These habitats are ecological niches for the diversity of plant and animal species and can be classified as follow:

1. Sand dune habitat (SD in Table 1 and Fig. 4): This habitat is a barrier between the Sea and land habitats. Sand dune belt is characterized with some psammophytes which exclusively or preferably grow on this habitat e.g.: *Cakile maritima*, *Cerastium semidecandrum*, *Crepis foetida* subsp. *foetida*, *Salsola kali* and *Silene conica*. Similar vegetation and species cover some other coastal areas of Caspian sea shore [10, 9, 11,2].

2. Wet coastal areas (wet sand dunes = WSD in Table 1 and Fig. 4): there is a relatively wet habitat in the southern part of sandy habitat in a longer distance from the coast but still on sandy soils. The population of *Juncus acutus* definitely covers this habitat and constitutes wet stripe-like vegetation around the sand dunes. Some of frequent species in this habitat are: *Centaurium pulchellum*, *Hypericum perforatum*, *Juncus acutus*, *Lactuca seriolla*, *Lycopus europaeus*, The habitat structure was surveyed in other parts of Caspian shore [11]. These investigations revealed new reports in these areas [12,13].

3. Aquatic habitats (WR in Table 1 and Fig.4):

3-1: Open water parts: these parts are characterized with some floating and submerged flora e.g.: *Azolla filiculoides*, *Ceratophyllum demersum*, *Lemna* spp., and *Utricularia neglecta*.

3-2: Marginal parts : these parts cover the peripheral margin of open water areas as well as some marshlands and are characterized with emergent helophytic flora, e.g.: *Berula angustifolia*,

Hydrocotyle ranunculoides, *Iris pseudacorus*, *Nasturtium officinale*, *Phragmites australis*, *Ranunculus* spp., and *Typha* spp.

3-3: Wet places : Some plant species are adapted to relatively lower wetness and grow on wet places near to wetlands, rivers, streams etc. i.e.: *Cardamine hirsute*, *Hydrocotyle vulgare*, *Inula britannica*, *Ranunculus muricatus*, *Schoenus nigricans*.

4. The plain habitat : (PN in Table 1 and Fig.4):

This habitat covers permanently plain parts along the bank of Shalmanrud river. The plain with possessing of a favorable humid soil can be considered as one of the most diverse habitat for many plant and animal species. Some parts of this habitat have been covered with more or less large patches of *Juncus acutus* populations. Some elements of this habitat are *Centella asiatica*, *Euphorbia helioscopia*, *Fimbristylis bisumbellata*, *Juncus acutus*, *Myosotis palustris*, *Portulaca oleracea*, *Trifolium repense* and *Verbena officinalis* and *Alnus subcordata* populations .

5. West forest habitats(WF in Table 1 and Fig.4)

this habitate covers permanently forest parts in the southern part of area.some spiceses in this habitate are : *Carpinus betulus* L., *Zelkova carpinifolia* , *Ulmus* spp.

6. PLH This habitat comprise from some habitate . (PLH in Table 1 and Fig.4).

7. RP habitat (RP in Table 1): Some parts of area was characterized with species such as: *Primula heterochroma*, *Scilla sibirica*, *Gagea reticulata*. This habitat is located on mountaine ,A column in Table1 is relevant to habitat diversity of plant species. The number of plant species (in percent) which can be found in each habitat is summarized in Fig. 4. This figure shows also number of plants grow in more than one habitat (PLH in Fig. 4). It is obvious that most of plant species in study area grow in different habitats (ca. 30%) following with aquatic, Woodland , sandy habitats.

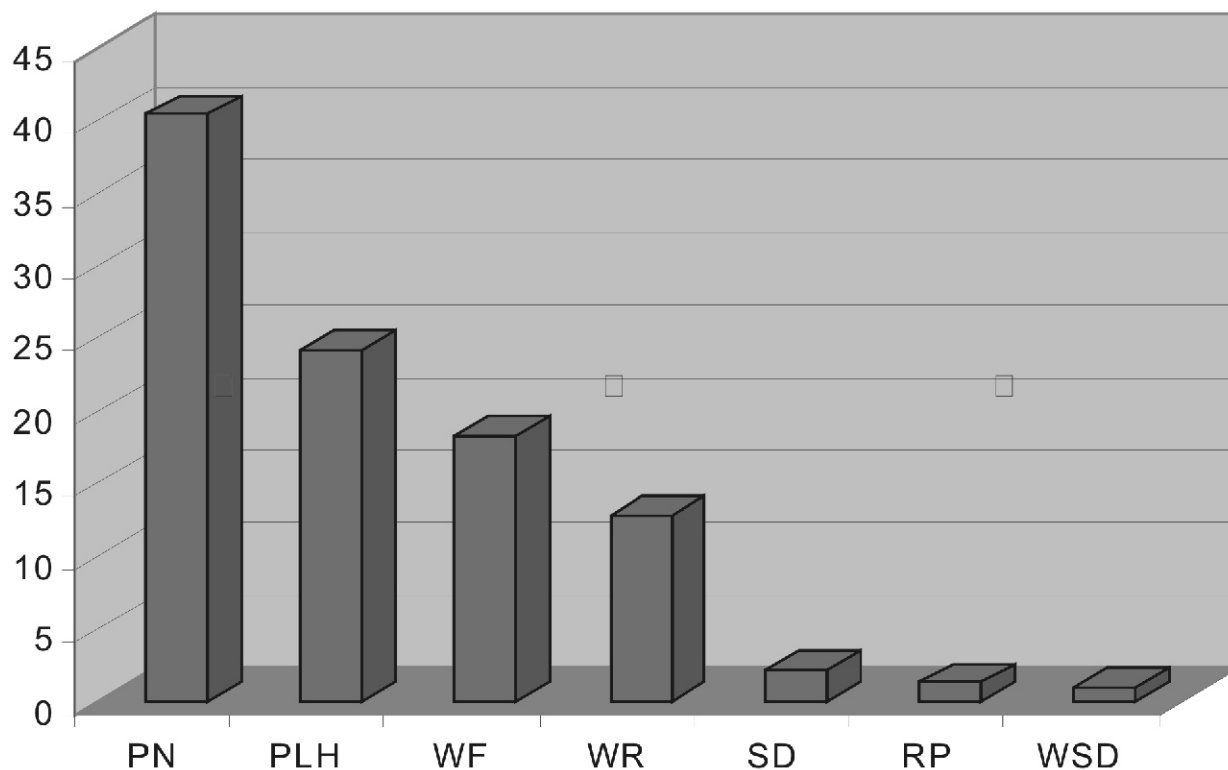


Fig. 4. Proportion of species plants in different habitat of studied area (abbreviation according to Table 1).

Table 1. Floristic list of langarud and its environs

| | Species | Life Form | Habitat | Chorology | DSI | Height |
|--------------------------------|--|-----------|--------------|-----------|-----|----------|
| Pteridophyta | | | | | | |
| Adiantaceae | | | | | | |
| 1 | <i>Adiantum capillus -veneris L.</i> | Geo(R) | PN-WF | SCOS | | -20-1000 |
| Aspleniaceae | | | | | | |
| 2 | <i>Asplenium adiantum nigrum L.</i> | Geo(R) | PN-WF | PL | | -20-1000 |
| 3 | <i>Phyllitis scolopendrium (L.)Newn.</i> | Geo(R) | PN-WF | PL | | -20-1000 |
| Azollaceae | | | | | | |
| 4 | <i>Azolla filiculoides Lam.</i> | Hyd(fl) | WR | PL | N | -20-500 |
| Equisetaceae | | | | | | |
| 5 | <i>Equisetum arvens L.</i> | Geo(R) | PN-WF- WR | SCOS | | -20-1000 |
| Hypolepidaceae | | | | | | |
| 6 | <i>Pteridium aquilinum (L.)Kuhn</i> | Geo(R) | PN-WF | COS | | -20-1000 |
| Spermatophyta | | | | | | |
| Angiospermae | | | | | | |
| Dicotyledon | | | | | | |
| Aceraceae | | | | | | |
| 7 | <i>Acer cappadocicum Gled</i> | Pha | WF | ES-IT | | -20-700 |
| 8 | <i>Acer velutinum Boiss .</i> | Pha | WF | ES | | 700 |
| Amaranthaceae | | | | | | |
| 9 | <i>Alternanthera sessilis (L.) R.Br.</i> | Thr(Hyg) | WR | PL | N | -20-500 |
| 10 | <i>Amaranthus chlorostachys Willd convar .chlorostachys.</i> | Thr | PN | PL | N | -20-500 |
| 11 | <i>Amaranthus retroflexus L.</i> | Thr | PN | PL | | -20-500 |
| Apiaceae / Umbelliferae | | | | | | |
| 12 | <i>Ammi majus LL</i> | Thr | PN | IT-M | | -20-300 |
| 13 | <i>Berula angustalialia (L) Mertens &W.D.koch</i> | Hel(Hyg) | WR | SCOS | | -20 |
| 14 | <i>Bifora testiculata (L.) Spreng .</i> | Thr | PN | SCOS | | -20 |
| 15 | <i>Centella asiatica (L.) Urban.</i> | Thr | WR | ES | | -20 |
| 16 | <i>Dacus sp.</i> | Thr | PN | | | -20 |
| 17 | <i>Eryngium caucasicum trautv</i> | Hem | PN | ES-IT-M | | -20-1000 |
| 18 | <i>Foeniculum vulgar Miller .</i> | Hem | PN | SCOS | | -20 |
| 19 | <i>Hydrocotyle ranunculoides L.fill</i> | Hel(Hyg) | WR | PL | N | -20-500 |
| 20 | <i>Hydrocotyle vulgaris L.</i> | Hel | WR | PL | N | -20-500 |
| 21 | <i>Oenanthe aquatica (L.) Poir.</i> | Hem | WR | ES-IT | | -20 |
| 22 | <i>Pimpinella affinis Ledeb.</i> | Hem | PN | PL | | -20 |
| 23 | <i>Torilis arvensis (Huds.) Link.</i> | Thr | PN-WF | PL | | -20-800 |
| 24 | <i>Trinia leiogona (C.A. Mey) B. Fedstcht.</i> | Hem | PN | ES | | -20 |
| Aquifoliaceae | | | | | | |
| 25 | <i>Ilex spinigerra (Loes) Loes .</i> | pha | WF | ES | | 800 |
| Araliaceae | | | | | | |
| 26 | <i>Hedera pastuchovii Woron .ex Grossh.</i> | Par | WF | ES | | -20-1000 |
| Asclepiadaceae | | | | | | |
| 27 | <i>Periploca graceca L.</i> | Pha | PN | ES-IT-M | N | -20-100 |

| Asteraceae | | | | | | |
|-------------------|--|----------|-------|-----------|----|----------|
| 28 | <i>Anthemis altissima L.</i> | Thr | WF | PL | | 600-1000 |
| 29 | <i>Arctium lappa L.</i> | Hem | PN | PL | | -20-500 |
| 30 | <i>Artemisia annua L.</i> | Thr | PN | ES-IT-M | | -20-300 |
| 31 | <i>Artemisia vulgaris L.</i> | Cha | PN | ES-IT | | -20-300 |
| 32 | <i>Cardus pycnocephalus L.</i> | Thr | PN | ES-IT | | 300 |
| 33 | <i>Cardus seminudus M.B.</i> | Hem | WF | ES-IT | | 600-900 |
| 34 | <i>Carpesium abrotanoides L.</i> | Hem | PN | ES | | -20-400 |
| 35 | <i>Centaurea cheiranthifolia willd</i> | Thr | PN | PL | | -20-100 |
| 36 | <i>Centaurea hyrcanica Bornm.</i> | Hem | WF | ES | | 400-1000 |
| 37 | <i>Centaurea iberica trev.ex sprong</i> | Thr | PN | PL | | -20-100 |
| 38 | <i>Centuaurea solstitialis L.</i> | Thr | PN | IT | | 200 |
| 39 | <i>Cichorium intybus L</i> | Hem | PN-WF | PL | | -20-300 |
| 40 | <i>Cirsium vulgare (Savi) Ten.</i> | Hem | PN | PL | | -20-300 |
| 41 | <i>Conyza bonariensis(L)cronq.</i> | Thr | PN | COS | | -20-300 |
| 42 | <i>Conyza canadiensis (L)cronq.</i> | Thr | PN | COS | | -20-300 |
| 43 | <i>Conyzanthus squamatus (Spreng.) Tamamsch.</i> | Hem | WSD | SCOS | | -20-200 |
| 44 | <i>Crepis foetida L.</i> | Thr | SD | ES, IT, M | | -20-300 |
| 45 | <i>Eclipta prostrata (L.)L</i> | Thr(Hyg) | WR | PL | | -20-300 |
| 46 | <i>Erigeron acer L.</i> | Thr | PN | IT | N | -20-200 |
| 47 | <i>Eupatorium cannabinum L.</i> | Cha | WR | IT- ES | | 600 |
| 48 | <i>Filago arvensis L.</i> | Thr | PN | ES, IT | | -20-500 |
| 49 | <i>Helianthus tuberosus L.</i> | Geo(R) | PN | PL | | -20-300 |
| 50 | <i>Inula Britanica L.</i> | Geo(R) | WR | PL | | 50-200 |
| 51 | <i>Lactuca serriola L.</i> | Hem | PN | PL | | -20-300 |
| 52 | <i>Lapsana communis L.</i> | Thr | PN-WF | ES | | -20-300 |
| 53 | <i>Petasites hybridus (L).PH.</i> | Geo(s) | RP-WF | ES | N | 900 |
| 54 | <i>Senecio vernalis Waldst & Kit.</i> | Thr | PN-SD | ES-IT | | -20-500 |
| 55 | <i>Siegesbekhia orientalis L</i> | Thr(Hyg) | WR-WF | SCOS | | -20-700 |
| 56 | <i>Silybrum marianum (L.)Gaertn</i> | Hem | PN | PL | | -20-700 |
| 57 | <i>Sonchus oleraceus L</i> | Thr | PN-WF | COS | | -20-700 |
| 58 | <i>Sonchus asper(L.)hill.subsp.glaucosens(Jordan)Ball.</i> | Hem | PN | PL | | -20-300 |
| 59 | <i>Tagetes sp.</i> | Thr | PN | | | -20 |
| 60 | <i>Taraxacum officinale F. H. Wigg. aggr</i> | Hem | PN | SCOS | | -20-500 |
| 61 | <i>Tussilago farfara L.</i> | Hem | WF | SCOS | | 1000 |
| 62 | <i>Willemetia tuberosa fisch&C.A.M</i> | Geo(R) | WF | ES | | 50-200 |
| 63 | <i>Xanthium spinosum L</i> | Thr | PN-WF | SCOS | | 100-800 |
| 64 | <i>Xanthium strumarium L.</i> | Thr | PN | PL | | -20-500 |
| Betulaceae | | | | | | |
| 65 | <i>Alnus glutinosa(L.)Gaertn subsp.barbata(C.A.Mey)Yaltirik.</i> | Pha(Hyg) | WR | ES | N | -20-500 |
| 66 | <i>Alnus subcordata C.A.M</i> | Pha | WF | ES | N* | 500-1000 |

| Boraginaceae | | | | | | |
|--------------------------------|--|----------|-------------|---------|----|----------|
| 67 | <i>Anchusa italica</i> Retz. | Hem | WF | ES-IT | | 400-1000 |
| 68 | <i>Echium amentum</i> Fisch .et.Meg. | Hem | WF | ES | | 500 |
| 69 | <i>Lappula microcarpa</i> (Ledeb.) Garke. | Thr | WSD | IT | | -20 |
| 70 | <i>Myosotis palustris</i> (L.)Nath | Hel(Hyg) | WR | SCOS | | -20-800 |
| 71 | <i>Nonnea lutea</i> (Deser)Reichenb. | Thr | PN | ES | | -20-600 |
| Brassicaceae/cruciferae | | | | | | |
| 72 | <i>Alliaria petiolata</i> (M.B) Cavara&Grande | Thr | PN (Hyg) | ES – IT | | -20-100 |
| 73 | <i>Arabidopsis thaliana</i> (L.)Heynh. | Thr | PN | PL | | -20-300 |
| 74 | <i>Arabis aucheri</i> Boiss. | Thr | WR | IT | | -20 |
| 75 | <i>Barbarea plantaginea</i> DC. | Hem | WF | ES-IT | | 600 |
| 76 | <i>Brassica napus</i> L. | Geo (B) | PN | COS | | -20-100 |
| 77 | <i>Cakile maritime</i> Scop. | Thr | SD | ES-M | | -20 |
| 78 | <i>Capsella bursa-pastoris</i> (L.)Medicus. | Hem | PN | PL | | -20-500 |
| 79 | <i>Cardamine draba</i> (L.)Desv. | Hem | PN | M | | -20-200 |
| 80 | <i>Cardamine hirsutia</i> L. | Thr(Hyg) | WR | COS | | -20 |
| 81 | <i>Cardamine</i> sp. | Thr | WR | | | -20 |
| 82 | <i>Descurainia Sophia</i> (L.) Schur. | Hem | PN | PL | | -20-500 |
| 83 | <i>Hesperis hyrcana</i> Bornm .& Gauba | Cha | PN | IT | | -20 |
| 84 | <i>Lepidium</i> sp. | Thr | PN | | | -20 |
| 85 | <i>Nasturtium officinale</i> R.Br. | Hel(Hyg) | WR | PL | | 20-900 |
| 86 | <i>Sinapis arvensis</i> L. | Thr | PN | PL | | -20-200 |
| 87 | <i>Sinapis</i> sp. | Thr | WR | | | -20 |
| 88 | <i>Sisymbrium officinalis</i> (L.)Scop. | Thr | PN | PL | | -20-500 |
| 89 | <i>Thlaspi umbellatum</i> (stev.)ex DC. | Thr | PN | ES | | -20-500 |
| 90 | <i>Thlaspi perfoliatum</i> L. | Thr | WR- PN | IT | | -20-700 |
| Buxaceae | | | | | | |
| 91 | <i>Buxus hyrcana</i> Pojark. | Pha | PN- WF | ES(Hyr) | N* | 50-200 |
| Campanulaceae | | | | | | |
| 92 | <i>Campanula glomerata</i> L. | Hem | WF | ES-IT | | 400-700 |
| 93 | <i>Campanula rapunculus</i> L. | Hem | PN | ES | | -20 |
| Caprifoliaceae | | | | | | |
| 94 | <i>Sambucus ebulus</i> L. | Geo(R) | PN- WF | PL | | -20-1000 |
| 95 | <i>Lonicera floribunda</i> Boiss .&. Busch. | pha | PN | IT | N | -20 |
| Caryophyllaceae | | | | | | |
| 96 | <i>Centarium minus</i> Moench. | Thr | PN-SD | PL | | -20-100 |
| 97 | <i>Cerastium glomeratum</i> Thuill | Thr | PN - WSD | SCOS | | -20 |
| 98 | <i>Polycarpon tetraphyllum</i> (L.)L. | Thr | PN | PL | | -20-200 |
| 99 | <i>Silene conoidea</i> L. | Thr | WF | PL | | 900 |
| 100 | <i>Silene gallica</i> L. | Thr | PN | COS | | -20-200 |
| 101 | <i>Silene schafta</i> Gmel. | Thr | PN | COS | | -20-200 |
| 102 | <i>Silene latifolia</i> poir.subsp.persica(Boiss.& Buhse)Melzh. | Hem | PN | ES-IT | | -20-200 |
| 103 | <i>Stellaria media</i> (L.) Vill. | Thr | PN - WSD | SCOS | | -20-200 |
| Chenopodiaceae | | | | | | |
| 104 | <i>Chenopodium album</i> L.subsp. album. | Thr | PN | COS | | -20 |
| 105 | <i>Kochia scoparica</i> (L.) Schrad. | Hem | PN - WSD | PL | | -20 |
| 106 | <i>Salsola kali</i> L. | Thr | SD | PL | | -20 |

| | | | | | | |
|-----------------------|--|---------|-------------|--------------|----|----------|
| Cistaceae | | | | | | |
| 107 | <i>Helianthemum nummularium (L.) Miller</i> | Cha | WF | ES-IT | | 700 |
| Convolvulaceae | | | | | | |
| 108 | <i>Calystegia silvatica (Kit.) Griseb., Spic.</i> | Geo (R) | PN | SCOS | | -20-600 |
| 109 | <i>Convolvulus arvensis L</i> | Hem | PN | PL | | -20-1000 |
| 110 | <i>Impoeca purpurea(L)Roth.Bet.</i> | Thr | PN | PL | | -20-500 |
| Corylaceae | | | | | | |
| 111 | <i>Carpinus betulus L.</i> | Pha | WF | ES | | 200-500 |
| 112 | <i>Corylus avellana L.</i> | Pha | WF | ES | | 300-1000 |
| Crassulaceae | | | | | | |
| 113 | <i>Sedum hispanicum L.</i> | Hem | PN-WF | ES-M | | -20-1000 |
| Dipsacaceae | | | | | | |
| 114 | <i>Ptercephalus plumosus (L.) Coulter.</i> | Hem | PN | IT | | -20-500 |
| Ebenaceae | | | | | | |
| 115 | <i>Diospyros lotus L.</i> | Pha | PN-WF | ES-IT | | 200-1000 |
| Euphorbiaceae | | | | | | |
| 116 | <i>Acalypha australis L.</i> | Thr | PN | PL | | -20-300 |
| 117 | <i>Euphorbia helioscopia L.</i> | Thr | PN-WF | ES-IT-M | | -20-1000 |
| 118 | <i>Euphorbia pepulus L.</i> | Thr | PN | ES- IT- M | | -20-300 |
| 119 | <i>Euphorbia maculata L.</i> | Thr | PN - WSD | COSM | | 200 |
| 120 | <i>Ricinus communis L.</i> | Hem | PN | SCOS | | -20-300 |
| Fabaceae | | | | | | |
| 121 | <i>Albizzia julibrissin Durazz., Mag. Tosc.</i> | Pha | PN-WF | ES (hyr) | N* | -20-500 |
| 122 | <i>Coronilla balansae Boiss.</i> | Hem | PN-WF | ES | | 200-1000 |
| 123 | <i>Gladitschia caspica Desf.</i> | Pha | PN-WF | ES(hyr) | N* | -20-500 |
| 124 | <i>Lathyrus aphaca L.</i> | Thr | PN-WF | ES-IT-M | | -20-1000 |
| 125 | <i>Lathyrus hirsutus L.</i> | Hem | PN | ES-IT-M | | -20-400 |
| 126 | <i>Lathyrus laxiflorus (Desf.)o.Kuntze.</i> | Hem | PN | ES-IT | | 300 |
| 127 | <i>Lathyrus pseudo-cicera. Pamp.</i> | Thr | PN | SCOS | | 400 |
| 128 | <i>Lathyrus vernus (L)Bernch</i> | Hem | WF | ES | | 800 |
| 129 | <i>Lens cyanea Boiss & Hohen.Alef.</i> | Thr | PN | ES-IT | | -20 |
| 130 | <i>Lotus corniculatus L.subsp.corniculatus var.corniculatus.</i> | Hem | SD | PL | | -20 |
| 131 | <i>Lotus halophilus Boiss.& sprun.</i> | Hem | PN | ES-M | | -20 |
| 132 | <i>Medicago polymorpha L.</i> | Thr | PN | IT-M | | -20-500 |
| 133 | <i>Melilotus officinalis (L.)Pall.</i> | Hem | PN-WF | SCOS | | -20-800 |
| 134 | <i>Trifolium aureum poll.</i> | Thr | PN-WF | SCOS | | -20-600 |
| 135 | <i>Trifolium arvense L.</i> | Thr | PN | ES-M | | -20-500 |
| 136 | <i>Trifolium pratense L.</i> | Hem | WF | ES | | 600 |
| 137 | <i>Trifolium repense L.var.repense.</i> | Geo(R) | PN-WF | ES-IT-M | | -20-400 |
| 138 | <i>Trifolium tumense stev.ex M.B.var.tumens</i> | Hem | PN-WF | PL | | -20-500 |
| 139 | <i>Vicia faba L.</i> | Thr | PN | PL | | -20 |
| 140 | <i>Vicia peregrine L.</i> | Thr | PN-WF | IT-ES | | 200 |
| 141 | <i>Vicia sativa L</i> | Thr | PN | ES-IT-M | | -20-500 |
| 142 | <i>Vicia tetrasperma(L.) Schreb.</i> | Thr | PN | ES-IT-M | | -20-500 |
| Fagaceae | | | | | | |
| 143 | <i>Fagus orientalis Lipsky.</i> | Pha | WF | ES | | 700-1000 |
| 144 | <i>Quercus castaneafolia C.A.Msubsp.Castaneifolia.</i> | Pha | WF | ES | N* | 800-1000 |
| Fumariaceae | | | | | | |
| 145 | <i>Corydalis rupestris subsp .aghustinii.</i> | Geo(B) | WF | ES | | 900 |
| 146 | <i>Corydalis sp.</i> | Geo(B) | WF | | | 900 |

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|------------------------|--|----------|-------|----------|----|----------|
| Gentianeaceae | | | | | | |
| 147 | <i>Centaurium pulchellum (swartz)Druce</i> | Thr | SD | PL | | -20 |
| Geraniaceae | | | | | | |
| 148 | <i>Geranium collinum Steph ex.evill.</i> | Thr | PN | IT | | -20-500 |
| 149 | <i>Geranium purpureum vill</i> | Hem | PN | ES-M | | -20-500 |
| Hammamelidaceae | | | | | | |
| 150 | <i>Parrotia persica (Dc.)C.A.Mey.</i> | Pha | WF | ES | N | 200-1000 |
| Hypericaceae | | | | | | |
| 151 | <i>Hypericum androsaemum L.</i> | Cha | PN-WF | ES | | 800 |
| 152 | <i>Hypericum perforatum L.</i> | Hem | PN | PL | | -20-300 |
| Juglandaceae | | | | | | |
| 153 | <i>Juglans regia L.</i> | Pha | PN-WF | ES-IT | | -20-1000 |
| 154 | <i>Pterocarya fraxinifolia(lam.)spach</i> | Pha | PN-WF | ES | N | 100-500 |
| Lamiaceae | | | | | | |
| 155 | <i>Ajuga comata Stapf.</i> | Thr | WF | IT | | 100-1000 |
| 156 | <i>Calamintha grandiflora (L.) Moench, Meth.</i> | Hem | PN | ES | | -20-100 |
| 157 | <i>Clinopodium vulgare</i> | Hem | SD | SCOS | | -20 |
| 158 | <i>Lamium album L</i> | Hem | WF-PN | PL | | 100-1000 |
| 159 | <i>Lycopus europaeus L.</i> | Hel(Hyg) | WR | PL | | -20-200 |
| 160 | <i>Melissa officinalis L.</i> | Hem | WF | PL | | 700 |
| 161 | <i>Menthe pulegium L.</i> | Hem | PN | ES | N | -20-500 |
| 162 | <i>Origanum vulgare L.</i> | Hem | WF | ES | | 200-700 |
| 163 | <i>Prunella vulgaris L.</i> | Hem | PN | ES | | -20-600 |
| 164 | <i>Scutellaria pinnatifida Arth.Hamilt.</i> | Hem | WF | SCOS | | 1000 |
| 165 | <i>Scutellaria tournefortii Benth .</i> | Geo(R) | PN-WF | ES(hyr) | N* | 100-800 |
| 166 | <i>Stachys byzanthina C.Koch.</i> | Cha | WF | IT-M | | 500-1000 |
| 167 | <i>Stachys persica Gmel .</i> | Cha | WF | ES | | 700-900 |
| 168 | <i>Stachys spectabilis choisy ex Dc.</i> | Cha | WF | IT | | 700 |
| 169 | <i>Teucrium chamaedrys L.</i> | Cha | WF | ES-IT | | 600-1000 |
| 170 | <i>Teucrium hyrcanicum L</i> | Geo(R) | PN-WF | ES(hyr) | N* | 100-1000 |
| Lentibularaceae | | | | | | |
| 171 | <i>Utricularia neglecta Lehm.</i> | Hyd | WR | PL | | -20 |
| Linnaceae | | | | | | |
| 172 | <i>Linum bienne Miller</i> | Hem | PN | M | | -20 |
| Lythraceae | | | | | | |
| 173 | <i>Lythrum salicaria L</i> | Hel | WR | SCOS | | -20-200 |
| 174 | <i>Lythrum sp.</i> | Hel | PN | | | -20-200 |
| Malvaceae | | | | | | |
| 175 | <i>Abutilon theophrasti medicus</i> | Thr | WR | SCOS | | -20-300 |
| 176 | <i>Alcea hyrcana (Grossh.) Grossh.</i> | Thr | PN | ES (hyr) | N* | -20 |
| 177 | <i>Malva neglecta .wallr</i> | Hem | PN-WF | SCOS | | 100-400 |
| 178 | <i>Sida rhomboica L.</i> | Pha | WF | SCOS | | 800 |
| Moraceae | | | | | | |
| 179 | <i>Ficus carica L.subsp.carica.</i> | Pha | PN-WF | IT-M | | -20-1000 |
| 180 | <i>Morus alba L.</i> | Pha | PN | IT | | -20-500 |
| Onageraceae | | | | | | |
| 181 | <i>Epilobium hirstum L.</i> | Hel | WR | SCOS | | -20-1000 |
| 182 | <i>Epilobium montanum L.</i> | Hem | WR | ES | | 100-400 |
| 183 | <i>Oenothera biennis L</i> | Hem | SD | PL | | -20 |
| Orbanaceae | | | | | | |
| 184 | <i>Orobanche nana Noe</i> | Par | PN | PL | | -20 |
| Orchidaceae | | | | | | |
| 185 | <i>Orchis coriophora L.</i> | Geo(C) | PN | ES-IT-M | | -20 |

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|-----------------------|--|----------|-------|---------|---|----------|
| Oxalidaceae | | | | | | |
| 186 | <i>Oxalis corniculata</i> L. | Thr | PN-WF | SCOS | | -20-1000 |
| Papaveraceae | | | | | | |
| 187 | <i>Chelidonium majus</i> L. | Hem | PN-WF | PL | N | 300-800 |
| 188 | <i>papaver dubium</i> L. | Thr | PN | ES-IT | | -20-200 |
| Phytolaceae | | | | | | |
| 189 | <i>Phytolacca Americana</i> L. | Hem | PN | PL | | -20-600 |
| Plantaginaceae | | | | | | |
| 190 | <i>Plantago lanceolata</i> L. | Hem | PN-WF | ES-IT-M | | -20-1000 |
| 191 | <i>Plantago indica</i> L. | Thr | PN | ES,M,IT | | -20 |
| 192 | <i>Plantago major</i> L. | Hem | PN-WF | SCOS | | -20-1000 |
| Plantanaceae | | | | | | |
| 193 | <i>Plantanus orientalis</i> L. | Pha | PN-WF | ES-IT | | -20-300 |
| Podophyllaceae | | | | | | |
| 194 | <i>Epimedium pinnatum</i> Fisch. | Hem | WF | ES | | 800 |
| Polygalaceae | | | | | | |
| 195 | <i>Polygala major</i> Jacq. | Hem | WF | IT | | 800-1000 |
| Polygonaceae | | | | | | |
| 196 | <i>Polygonum lapothifolium</i> subsp. <i>Lapothifolium</i> | Thr | PN | ES-IT | | 200 |
| 197 | <i>Polygonum mite</i> Schrank. | Thr | WR | ES-M | | -20-500 |
| 198 | <i>Polygonum persicaria</i> L. | Thr | PN-WR | PL | | -20-300 |
| 199 | <i>Rumex acetocella</i> L. | Hem | PN | ES-IT | | -20 |
| 200 | <i>Rumex angustifolius</i> CAMPD. | Hem | WR | ES-IT | | -20 |
| 201 | <i>Rumex chalepensis</i> Miller, Gard. | Ch | PN | IT | | -20 |
| 202 | <i>Rumex patientia</i> L. | Ch | PN | IT | | -20-100 |
| 203 | <i>Rumex pulcher</i> L. subsp. <i>pulcher</i> . | Hem | PN | ES-IT-M | | -20-300 |
| Polypodiaceae | | | | | | |
| 204 | <i>Polypodium vulgar</i> L. | Geo(R) | PN-WF | COSM | | -20-300 |
| Portulacaceae | | | | | | |
| 205 | <i>Portulaca oleracea</i> L. | Thr | PN | ES-IT-M | | -20-200 |
| Primulaceae | | | | | | |
| 206 | <i>Anagalis arvensis</i> L. | Thr | PN-WF | PL | | -20-1000 |
| 207 | <i>Cyclamen coum</i> Mill | Geo(c) | WF | ES | | 100-700 |
| 208 | <i>Primula heterochroma</i> stapf | Hem | WF-RP | ES-IT | N | 200-1000 |
| Pteridaceae | | | | | | |
| 209 | <i>Pteris cretica</i> L. | Geo(R) | WF | ES | | -20-400 |
| 210 | <i>Pteris 134entate</i> Forskah L. | Geo(R) | PN-WF | PL | | -20-400 |
| Punicacea | | | | | | |
| 211 | <i>Punica granatum</i> L. | Pha | PN-WF | ES-IT | | -20-1000 |
| Ranunculaceae | | | | | | |
| 212 | <i>Ranunculus dolosus</i> Fisch&C.A.Mey. | Hel(Hyg) | WR | ES(Hyr) | | -20-100 |
| 213 | <i>Ranunculus Mucricatus</i> L. | Thr(Hyg) | RP | IT-M | | -20-600 |
| 214 | <i>Ranunculus scleratus</i> L. | Thr(Hyg) | WR | ES-IT-M | | -20-300 |
| Rhamnaceae | | | | | | |
| 215 | <i>Paliurus spina-christi</i> miller | Pha | WF | ES-IT | | 500 |

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|-------------------------|---|----------|-------|---------|----|----------|
| Rosaceae | | | | | | |
| 216 | <i>Agrimonia eupatoria</i> L. | Hem | PN | ES-IT | | 200 |
| 217 | <i>Crataegus melanocarpa</i> M.B. subsp. <i>elbursensis</i> Rech .F. | Pha | PN-WF | ES-IT | N | 400 |
| 218 | <i>Crataegus microphylla</i> C.Koch. | Pha | WF | ES-IT | N | 200-1000 |
| 219 | <i>Cydonia oblonga</i> Mill. | Pha | PN-WF | ES-IT | | 50-1000 |
| 220 | <i>Eriobotrya japonica</i> Lindl. | Pha | PN | PL | | -20-300 |
| 221 | <i>Fragaria vesca</i> L. | Hem | WF | ES-IT | | 300-1000 |
| 222 | <i>Geum urbanum</i> L. | Hem | PN-WF | ES | | 50-800 |
| 223 | <i>Mespilus germanica</i> L. | Pha | PN-WF | ES | | -20-1000 |
| 224 | <i>Potentilla reptans</i> L. | Hem | PN-WF | ES-IT | | -20-800 |
| 225 | <i>Prunus divaricata</i> Ledeb. | Pha | PN-WF | ES-IT | | -20-1000 |
| 226 | <i>Pyrus communis</i> L. | Pha | PN-WF | ES-IT | N | 50-1000 |
| 227 | <i>Rubus caesius</i> L. | Pha | PN | ES-IT | | -20-500 |
| 228 | <i>Rubus hirtus</i> waldst.skit | Pha | PN-WF | ES-IT | | 200-500 |
| 229 | <i>Rubus hyrcanus</i> Juz ,Bull. | Pha | PN-WF | ES | | 200-1000 |
| 230 | <i>Rubus persicus</i> Boiss. | Pha | PN | ES | | -20 |
| 231 | <i>Rubus sanctus</i> schreber | Pha | PN | ES-IT | | -20-500 |
| 232 | <i>Spiraea creta</i> L. | Cha | PN | ES-IT | | 800 |
| Rubiaceae | | | | | | |
| 233 | <i>Galium aparine</i> L. | Thr | WR | SCOM | | 200 |
| 234 | <i>Galium haumifusum</i> Bieb | Hem | PN-WF | ES-IT | | 50-300 |
| 235 | <i>Galium</i> sp. | Thr | WF | | | 100 |
| 236 | <i>Phuopsis stylosa</i> (Trin)Hook.F. | Hem | WF | ES | | 800 |
| 237 | <i>Sherardia arvensis</i> L. | Thr | PN | ES | | -20-300 |
| Salicaceae | | | | | | |
| 238 | <i>Populus caspica</i> Bornm | Pha | WF | ES-IT | | 500 |
| 239 | <i>Populus nigra</i> L.var. <i>italica</i> | Pha | PN | ES-IT-M | | -20-300 |
| 240 | <i>Salix alba</i> L. | Pha | WF | ES-IT-M | | -20 |
| Scrophulariaceae | | | | | | |
| 241 | <i>Rhynchocorys elephas</i> (L.)Griscb. | Hem | WF | ES | | -20-900 |
| 242 | <i>Verbascum punalense</i> Boiss.et Bushe | Hem | PN-RU | ES – IT | N* | 300-700 |
| 243 | <i>Verbascum thapsus</i> L | Hem | PN-RU | ES | | -20-200 |
| 244 | <i>Veronica hederifolia</i> L. | Thr | PN | IT | | -20-100 |
| 245 | <i>Veronica persica</i> poir. | Thr | PN-SD | SCOS | | -20-200 |
| Solanaceae | | | | | | |
| 246 | <i>Datura stramonium</i> L. | Thr | PN | PL | | -20-300 |
| 247 | <i>Physalis alkekengi</i> L. | Hem | WF | ES | | 900 |
| 248 | <i>Solanum kieseritzkii</i> C.A.Mey. | Hem | WF | ES | | -20-800 |
| 249 | <i>Solanum nigrum</i> L. | Thr | PN-WF | SCOS | | -20-700 |
| 250 | <i>Solanum persicum</i> Willd .Ex Roemer & Schultes subsp. <i>persica</i> | Pha(Hyg) | WR | ES | N | -20 |
| Sparginiaceae | | | | | | |
| 251 | <i>Sparganium neglectum</i> Beeby. | Geo | WR | ES-M-IT | | -20 |
| Ulmaceae | | | | | | |
| 252 | <i>Ulmus minor</i> Miller | Pha | WF | ES | | 200-700 |
| 253 | <i>Zelkova carpinifolia</i> (Pall)Dipp. | Pha | WF | ES | | 100-1000 |
| Urticaceae | | | | | | |

| Monocotyledon Cyperaceae | | | | | | |
|-------------------------------------|--|----------|-------|---------|---|---------|
| 260 | <i>Carex divulsa</i> Stokes in <i>Withering</i> subsp. <i>divulsa</i> . | Geo(S) | PN | PL | N | -20-300 |
| 261 | <i>Cyperus alternifolius</i> L. | Geo(R) | PN | PL | N | -20-300 |
| 262 | <i>Cyperus odoratus</i> subsp. <i>transcaucasicus</i> (Kuk.)Kukkonen. | Hel(Hyg) | PN | ES-IT | - | -20 |
| 263 | <i>Cyperus serotinus</i> Rottb. | Hel(Hyg) | WR | PL | - | -20 |
| 264 | <i>Fimbristylis bisumbellata</i> (Forssk.)Bubani. | Thr(Hyg) | WR | SCOS | | -20 |
| 265 | <i>Pycneus flavesense</i> (L.)Reichenb B.Fedtsch. | Hel(Hyg) | PN | PL | N | -20 |
| 266 | <i>Pycneus flavidus</i> (Retz)Koyama. | Thr(Hyg) | PN | PL | | -20 |
| 267 | <i>Schonoplectus lacustris</i> (L.)palla subsp. <i>hippolytii</i> (V.Krecz.)KuKkone. | Hel | WR | PL | | -20 |
| 268 | <i>Schoenus nigricans</i> L. | Hel(Hyg) | PN-WR | ES-IT-M | | -20 |
| 269 | <i>Scirupus lacustris</i> L. | Hem | PN-WR | IT | - | -20 |
| Dioscoraceae | | | | | | |
| 270 | <i>Tamus communis</i> L. | Geo (C) | WF | ES – M | | -20-500 |
| Juncaeae | | | | | | |
| 271 | <i>Juncus articulatus</i> L. | Hel(Hyg) | PN | PL | | -20-100 |
| 272 | <i>Juncus buffonius</i> L. | Thr(Hyg) | PN-WF | ES-IT | | -20-300 |
| 273 | <i>Juncus effuses</i> L. | Geo(R) | PN-WF | ES-IT | | -20-200 |
| 274 | <i>Juncus minutulus</i> Albert&Jahan diez. | Thr(Hyg) | PN | ES-IT | | -20-200 |
| 275 | <i>Juncus turkestanicum</i> V. Krecz & Gontsch. | Thr | PN | IT | | -20-200 |
| Iridaceae | | | | | | |
| 276 | <i>Crocus caspius</i> fisch C.A.Mey | Geo | PN | ES | | -20 |
| 277 | <i>Iris psedoacorus</i> L. | Hel | WR | ES-M | N | -20-100 |
| Liliaceae | | | | | | |
| 278 | <i>Danae racemosa</i> (L)moench. | cha | PN | ES | | -20-200 |
| 279 | <i>Gagea reticulate</i> .nat.size | Geo(B) | RP | SCOS | | 1000 |
| 280 | <i>Muscari neglectum</i> Guss. | Geo(B) | WF | IT | | 1000 |
| 281 | <i>Ornithogallum sintenisii</i> freyn | Geo(B) | WF | ES | | 200-500 |
| 282 | <i>Ruscus hyrcanus</i> L. | Pha | WF | ES | | 200-600 |
| 283 | <i>Scilla hohenackeri</i> fiet mey | Geo(B) | RP | IT | | 100-800 |
| 284 | <i>Scilla sibirica</i> nat.size | Geo(B) | RP | IT | | 900 |
| Poaceae/Gramineae | | | | | | |
| 285 | <i>Aegilops tauschii</i> Cosson. | Thr | PN | IT | | -20-500 |
| 286 | <i>Agropyron repens</i> L. | Hem | WF | PL | | -20-500 |

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|---------------------|---|----------|------------------|------------|---|----------|
| 294 | <i>Calamagrostis pseudophragmites</i> (Hall.f)koel. | Geo | WSD, WP (Hyg) | PL | | -20 |
| 295 | <i>Catabrosa aquatica</i> (L.)P.Beauv. | Hem | PN | ES,M,IT | | -20 |
| 296 | <i>Digitaria sanguinalis</i> (L.)Scop. | Thr | PN | IT | | -20-100 |
| 297 | <i>Echinochloa crus-galli</i> (L.)Beauv var.crus-galli. | Thr(Hyg) | WR | PL | | -20-200 |
| 298 | <i>Eragrostis poaeoides</i> P. Beauv | Thr | PN | ES,M,IT,SA | | -20-300 |
| 299 | <i>Eragrostis barrelieri</i> Dav. | Thr | PN | PL | | -20-200 |
| 300 | <i>Hordeum spontaneum</i> C.koch. | Thr | PN | COS | | -20-500 |
| 301 | <i>Lophochloa pheoides</i> (Vill.)Reichenb. | Thr | PN | PL | | -20-500 |
| 302 | <i>Lolium perenne</i> L. | Hem | WF | PL | | -20-500 |
| 303 | <i>Lolium rigidum</i> Gaudir. | Thr | PN | M,IT | | -20-500 |
| 304 | <i>Milium vernale</i> M.B | Thr | PN | ES, IT | | -20-300 |
| 305 | <i>Oplismenus undulatifolius</i> (Ard.)P.Beauv. | Hem | WF | ES | | 800 |
| 306 | <i>Paspalum paspaloides</i> (Michx.)Scribner | Geo(R) | PN | PL | | -20-300 |
| 307 | <i>Phleum pretense</i> L. | Thr | WF | ES-IT | | 1000 |
| 308 | <i>Phleum</i> sp. | Thr | PN | | | 800 |
| 310 | <i>Phragmatis australis</i> (cav.)Tin.ex steud. | Hel | WR | COS | | -20 |
| 311 | <i>Poa annua</i> L. | Thr | PN-WF | PL | | -20-1000 |
| 312 | <i>Poa trivialis</i> L. | Hem | PN | ES,M,IT | | -20-1000 |
| 313 | <i>Polypogon semiverticillatus</i> (Forssk.) Hyl. | Thr | WSD | PL | | -20-1000 |
| 314 | <i>Setaria glauca</i> (L.)P.Beauv. | Thr | PN-WF | PL | | -20-1000 |
| 315 | <i>Setaria viridis</i> (L.)P.Beauv. | Thr | PN | PL | | -20-1000 |
| 316 | <i>Sorghum halepense</i> (L.)Pnes. | Hem | WF | Cosm | | -20 |
| 317 | <i>Vulpia myuros</i> (L.)J.F. Gmelin. | Thr | PN | Cosm | | -20 |
| 318 | <i>Vulpia</i> sp. | Thr | WR-PN | | | -20 |
| Nymphaeaceae | | | | | | |
| 319 | <i>Nymphaea alba</i> L | Hyd | WR | Cosm | | -20 |
| 320 | <i>Nuphar luteum</i> (L.) Smith. | Hyd | WR | SCOS | | -20 |
| Smilacaceae | | | | | | |
| 321 | <i>Smilax excelsa</i> L | Pha | PN | ES-M | N | 50 |
| Thyphaceae | | | | | | |
| 322 | <i>Typha australis</i> Schum .& Thonn. | Hel | WR | SCOS | | -20 |

Symbols and abbreviations used in the table:

1. Life form: Geo (geophyte), Hem (hemicryptophyte), Hyd (hydrophyte), Pha (phanerophyte), Thr (therophyte); Hel (helophyte),

2. Chorotype: COS (cosmopolitan), ES [Euro-Siberian (Eux-Hyr = Euxino-Hyrcanian, Hyr = Hyrcanian, En = endemic plant)], IT (Irano-Turanian), M (Mediterranean), PL (pluriregional), SCOS (subcosmopolitan);

3. Habitat and Ecology: WR (aquatic habitats), Fl (floating plant), Hyg (hygrophyte), Par (parasite on some other plants), PN (plain), RP (plant), SD(sand dune),WSD (wet sand dune),WF, RU(Ruderal plant), recreational activities during weekend and holidays.

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