

## Vegetation characteristics of four ecological zones of Iran

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### Abstract

Environmental (topography, climate) features have an important influence on plant diversity and richness of Iran. On the basis of environmental factors, four ecological zones with specific plant richness from lowest area to highest area (Hyrcanian, Khalij-o-Omani, Zagross and Iran-o-Touranian zones) were established respectively. Topography is from -28m which is close to Caspian Sea to 5678m which is located on the Alborz Mountain. Two mountains (Alborz and Zagross) prevent moist air moving to the centre of Iran. Northern Iran is rich in biodiversity with 8000 plant species representative of many different life forms (Herb, Grass, Shrub and tree) in the Hyrcanian zone that is located north of 35°N latitude. In contrast, the lowest plant diversity is in the southern part of Iran (Khalij-o-Omanian zone), which is a flat area. The vast central plateau (Iran-o-Touranian) is divided into two divisions with mountain part and an area of high plains. The western part of Iran (Zagross zone) is affected by Mediterranean and Black sea moisture which brings snow in the winter. The dominant species are low growing plant species with forbs, grass, shrub and tree life forms. Topography and climate factors interact to plant influence distribution and richness of Iran and they play an important role in creating microniches that foster great ecological biodiversity of this country.

**Keywords:** Biodiversity; Ecological zone; Physiogeographical; Climate features.

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### Introduction

The Islamic Republic of Iran (I.R.IRAN) with area of about 1,648,000 km<sup>2</sup> is located in the southwest of Asia and lies approximately between 25N and 40N in latitude and between 44E and 64E in longitude. Iran with an area of more than 1.6 million square km, Iran is the sixteenth largest country in the world (FAO, 2005). Placed in the Middle East and surrounded by the Armenia, Azerbaijan, Caspian sea, Turkmenistan on the north, Afghanistan and Pakistan on the east, Oman sea and Persian Gulf on the south and Iraq and Turkey on the west. Population of Iran is about 70 million and the growth rate estimated as 1.7% (FAO, 2005) and it has 30 Provinces.

Iran's important mountains are Alborz and Zagros ranges. Alborz and Zagros Chains stretch in northwest-northeast and northwest-southeast direction. These mountains play an important role in determining the non-uniform spatial and temporal distribution of

precipitation in the whole country. The area within the mentioned mountain ranges is high plateau with its own secondary ranges and gradually slopes down to become desert which continues into southern part of Afghanistan and near the Pakistan border. Elevation ranges from 500 to 2500m. Damavand peak in the Alborz reaches 5600m above mean sea level while the Caspian coastal area is below sea-level (-28 m)

The country's climate is mainly arid or semi-arid, except the northern coastal areas and parts of western Iran. The climate is extremely continental with hot and dry summer and very cold winter particularly in inland areas. Apart from the coastal areas, the temperature in Iran is characterized by relatively large annual range about 22°C to 26°C. The rainy period in most of the country is from November to May followed by dry period between May and October with rare precipitation. The average annual rainfall of the country is about 240 mm with maximum amounts in the Caspian Sea plains, Alborz and Zagros slopes with more than 1,800 and 480 mm, respectively.

Going inland at the central and eastern plains, the ranges of precipitation decreases to less than 100 mm annually depending on the location. From the synoptic aspects, the climate of most part of Iran is dominated by subtropical high in most part of the year. This phenomenon causes hot and dry climate in summer. The rainfall in the country is produced by Mediterranean synoptic systems, which move eastward along with westerly winds in cold season. Synoptic systems and year-to-year variation in the number of passing cyclones cause high variability in annual rainfall. Frontal Mediterranean cyclones associated with the westerly air flows produce most of precipitation in the whole country in late autumn and particularly in winter. In addition to the frontal Mediterranean cyclones, rainfall bearing systems called Sudanian cyclones which come from the southwest make an important contribution to increase annual rainfall amount of the west and southwest of the country (Raziei et al., 2005). In northwest mountainous regions, convective and frontal thunderstorms are important atmospheric process responsible for rainfall in spring and early summer.

These rainfall bearing systems are restricted to the west portion of the country and have no more energy and moisture to pass far to the east. These systems sometimes may reach central and east dry regions of the country when have no potential to produce rainfall due to long trajectory and loss of moisture. This region is the most drought prone area in the country due to high inter- and intra-annual irregularity in rainfall and high coefficients of variation. This region that accounts for over half of Iran's land area is surrounded by Alborz mountain range from the north and Zagros range from the northwest to southwest. The Zagros range prevents Mediterranean moisture bearing systems to pass through to the east. This phenomenon gives rise to high irregularity in rainfall in the center of Iran. Lack of rainfall in May to October compounded with high temperature leads to high evapotranspiration and water deficit in this region. As a result, the central and eastern parts of Iran are arid and semi arid regions.

Since Iran is in the arid zone, some 65% of its territory is arid or hyper arid, and approximately 85% has an arid, semi-arid or hyper arid environment, the specific features and location of Iran causes it to receive less than a third of the world average precipitation. Prolonged drought in this area and availability of moisture in other parts of Iran has led to the formation of different ecological zones.

Iranian habitats support about 8000 species of flowering plants (belonging to 167 families and 1200 genera), of which almost 1700 are endemic (Eftekhari and Ramezani, 2004). These plant species growing on four Ecological Zones (Figure 1) which have different physiographical and climatic conditions. These four ecological zones are:

- Hircanian
- Zagross
- Iran-o-Turanian
- Plains
- Mountain
- Khali-j-o-Ommanian

These four ecological zones support specific plant species as explained in detail below.

#### *Hircanian (Caspian) Zone*

The region extends throughout the south coast of Caspian Sea and northern part of the country which is bordered by the largest lake in the world. Mountains dominate the landscape of this ecoregion. Hircanian (Caspian) Zone could be divided into three subdivisions on the basis of geographical situations. These subdivisions are (1) Alborz Range forest steppe, (2) Caspian Hircanian mixed forest and (3) Caspian lowland desert.



Figure 1. Distribution of four ecological zones of Iran

### *Alborz range forest steppe*

The highest peak in the Alborz Range is Mount Damavand, a dormant volcano 5,766 m tall. Below Mount Damavand's crater are two small glaciers, as well as fumaroles, hot springs, and mineral deposits. Only between 280 and 500 mm of precipitation fall annually on this high elevations of Alborz mountain. The dominant trees, *Juniperus sabina*, and *J. communis*, are resistant to summer drought and heat and can tolerate winter cold equally well. However, the tree grows so slowly that it is difficult to reestablish these forests once they are cut. Shrubs include pistachio (*Pistacia Vera*), *Berberos integessima*, *Acer spp*, and *Amigdalus, spp*, with such a plant species: *Onobrychis cornuta*, *Astragalus gossipinus*, *Agropyron spp*, *Bromus tomentelus* forming the ground cover. A network of dam's supplies water to Iran's capital, Teheran, but it has severely disrupted aquatic ecosystems. Overgrazing at higher elevations by sheep and the continued fragmentation of habitat, which is accelerated by road construction, are also of concern because so few natural areas remain.

### *Caspian hyrcanian mixed forest*

Hyrcanian forests extend for 800 km in length and covers an area with 1,925,125 ha in the mid elevation of the middle altitudes of the Alborz mountain. The key trees of this area are: *Fagus orientalis*, *Carpinus betulus*, *Tilia rubra*, *Taxus baccata*, *Ulmus glabra*, *Quercus castanefolia*, *Parrotia persica*, *Alnus glutinosa*, *Punica granatum*, *Paliurus spira-ehristi*. The Caspian Hyrcanian Mixed Forests experience abundant rainfall and snowmelt that runs off the north slope of the Alborz Mountain. It has high production capacity due to humid temperate climate and suitable soil.

These forests sweep down to the coastal plain south of the Caspian Sea, where they eventually yield to coastal lagoons, swamps, and salt marshes. Extensive logging and clearing of forests for agriculture have nearly eliminated the forests in this ecoregion. The invasion of non-native plant species has also posed a serious threat to native plant communities.

### *Caspian lowland desert*

This ecoregion lies on the southern and eastern shores of the Caspian Sea at elevations between -28 to 100 m above sea level. To the south of the Caspian Lowland in Turkmenistan and Iran lies the delta of the Atrek River – the only river to enter the Caspian Sea from the east (Babaev, 1994); Most of its flow is used for irrigation so only flood waters actually reach the sea. Average annual temperature is 17.1 C. Annual precipitation is 187 mm (Heshmati, 1998). A long frostless period (271 days) encourages cultivation of crops such as olive, fig, pomegranate, and cotton.

This ecoregion is covered by shrubs and grasses which are used by livestock. The vegetation of the coastal Caspian desert within Iran is impoverished, it consists of highly specialized halophytes (salt-resistant plants) represented by shrubs and semishrubs such as various sagebrushes (*Artemisia*), tetyr (*Salsola gemmascens*), kevreik (*S. orientalis*), boyalych (*S. arbuscula*), biyurgun (*Anabasis salsa*, *A. ramosissimum*), sarsazan

(*Halocnemum strobilaceum*), *Halostachys*, *Ceratocarpus*, *Nitraria*, *Kalidium*. Herbaceous vegetation is represented by species of *Aristida*, *Peganum*, *Agropyron*, *Anisantha*, *Eremopyrum*. One of the most typical halophyte plant formations is dominated by tetry (*Salsola gemmascens*), a 30-50 cm shrub, associated with low species diversity and sparse coverage. Solonchaks are sometimes occupied exclusively by sarsazan (*Halocnemum strobilaceum*).

This ecoregion encompasses the Caspian depression of Kazakhstan, the Karabogaz Kol in Turkmenistan and includes the Volga Delta and surrounding semi-desert. Within Central Asia, it is defined by deserts and halophytic regions of the syrt regions according to Pereladova et al. (1997) map of Central Asian ecosystems. Adjacent Iranian littoral salt land vegetation from Zohary's (1973) geobotanical map of the Middle East is also included since it represents a similar halophytic environment. The European portions of the ecoregion consist of northern lowland dwarf semi-shrub deserts and small areas of floodplain vegetation and coastal and inland halophytic vegetation north of the Caspian Sea Bohn et al. 2000). Heshmati (1999) has published the key plant species of Hyrcanian (Caspian) Zone which is located in northern part of Iran on the basis of land use, habitat and altitude (Table 1).

Table 1. Key plant species of Hyrcanian zone (Heshmati, 1999).

| Key plant species   | Altitude(m) | Habitat                | Land use  |
|---|-------------|------------------------|-----------|
| <i>Juniperus sabina</i> , <i>J. communis</i> , <i>Acer spp</i> , <i>Berberos integerrima</i> , <i>Amigdalus</i> , <i>spp</i> .          | >1800       | Shrub                  |           |
| <i>Fagus orientalis</i> , <i>Carpinus betulus</i> , <i>Tilia rubra</i> , <i>Taxus baccata</i> , <i>Ulmus glabra</i>                     | 1800-800    | Tree                   | Forest    |
| <i>Quercus castanefolia</i> , <i>Parrotia persica</i> , <i>Alnus glutinosa</i> , <i>Punica granatum</i> , <i>Paliurus spira-ehristi</i> | <800        | Tree+Shrub             |           |
| <i>Onobrychis cornuta</i> , <i>Astragalus gossipinus</i> , <i>Agropyron spp</i> , <i>Br. Tomentelus</i>                                 | >1800       | High Altitude          |           |
| <i>Dactylis glomerata</i> , <i>Poa spp.</i> , <i>Trifolium pratense</i> , <i>Onobrychis spp</i> .                                       | 1800-800    | Middle                 |           |
| <i>Tamarix ramosissima</i> <i>Halostachys caspica</i>   | <800        | Lowlands: Shrubs       | Rangeland |
| <i>Halocnemum strobilaceum</i> , <i>Salicornia herbaceae</i>  | <800        | Lowlands: Shrubs+Forbs |           |
| <i>Artemisia herba-alba</i> , <i>Poa bulbosa</i>  | <800        | Lowlands:Grass+Shrubs  |           |

### Zagros Zone

The Zagros ecological zone extends throughout the Zagros mountain in the west and south - west of Iran, west Azarbaijan, Kordistan, Kermanshah, Lorestan, Fars, Charmahal & Bakhtiyari, Yasouj and north of Khozistan. This region with an area of about 4,749,000 ha has semi - arid climate and temperate winter. This mountain range parallels the Persian Gulf and consists of numerous parallel ridges, with the highest peaks exceeding 4,000 m

and maintaining permanent snow cover. Many large rivers, including the Karun, Dez, and Kharkeh, originate here, draining into the Persian Gulf or the Caspian Sea. Scenic waterfalls, pools, and lakes add beauty to the mountainous landscape.

The forest and steppe forest areas of the Zagros Mountain range have a semi-arid temperate climate, with annual precipitation ranging from 400 mm to 800 mm, falling mostly in winter and spring. Winters are severe, with winter minima often below  $-25$  degrees C, and extreme summer aridity also prevails (Anderson, 1999; Frey and Probst, 1986).

As described by Zohary (1973), the Kurdo-Zagrosian steppe-forest consists mainly of deciduous, broad-leaved trees or shrubs with a dense ground cover of steppe vegetation. The dominant species are oak (*Quercus* spp.), pistachio (*Pistacia* spp.) and a few others. In the northern reaches of the mountain range, lower altitudes (400 m to 500 m) host communities dominated by *Astragalus* spp., *Salvia* spp., or others while higher up (700 m to 800m) forests or forest remnants of *Quercus brantii* and/or *Q. boissieri* occur up to an altitude of about 1,700m. Above the timber line (1,900 m to 2,000 m) appears a relatively wide zone of sub-alpine vegetation (Zohary, 1973).

Further south along the range, the forest becomes more impoverished and a richer steppe flora develops among the trees. Forest remnants consist primarily of *Quercus persica* and, up to an elevation of 2,400m, xerophilous forest of *Quercus* spp., hawthorn (*Crataegus*), almond (*Prunus amygdalus*), nettle tree (*Celtis*) and pear (*Pyrus* spp) predominates. Below 1,400m, the vegetation is steppic, with shrubs predominating.

#### *Iran-o-Turanian Zone*

The region covers an area of about 3,452,775 ha with dry and mainly cold climate in winter. They are situated in Khorasan, Azarbaijan, Markazi and westem Provinces. Regarding to topographical conditions and diversity of species, the region is divided into plain and mountainous sub - regions.

#### *Iran-o-Turanian, Plain area*

This ecoregion is dominated by the central Iranian plateau, an immense area covering 1,648,000 km<sup>2</sup> in the center of Iran and encompassing a great variety of climates, soils and topography. It is almost completely surrounded on all sides by mountain ranges. According to Zohary (1973), the area can be divided into two major units: the Dasht-e-Kavir in the north, a vast saline desert, and the Dasht-e-Lut in the south, largely a sand and gravel desert and one of the hottest deserts in the world. The plateau is also partly covered with sand dunes. Adjacent regions, such as the Kavir-e-Namak ('salt desert') and a series of marshes and lakes east of Qom, are also included in this ecoregion (Zohary, 1973). In the northwestern corner of the central plateau, where the Kavir National Park is situated, habitat types range from desert and semi-desert to dry steppe. In the northeastern reaches of the plateau, in the area of the Touran Biosphere Reserve, the variety of landforms includes extensive plains, a saline river system, alluvial fans, limestone outcrops, salt desert, and 200,000 ha of the northernmost sand dunes in Iran (UNEP 1989c; Boulos et al., 1994). The peaks and ranges of the Kuhrud Kohbanan Mountains forest steppe ecoregion encroach upon the higher altitudes of this region, extending long fingers in a northwest-southeast

direction along the western and central part of the plateau and also rising along its eastern margins.

The central plateau and the mountain slopes facing it have a temperate, continental desert climate with extreme temperatures (Zohary, 1973). While the mean annual temperature ranges from 15 to 18 degrees C., the extreme maximum temperature can reach 42 degrees C. and the extreme minimum temperature can fall to -20 degrees C. In most of the region, annual rainfall does not exceed 200 mm and in much of it rainfall is less than 100 mm (Zohary, 1973). In the northwest corner of the region, precipitation is highly variable from year to year, ranging from less than 50mm to over 300mm and falling mostly as rain from November to May (UNEP, 1989b). The driest parts of Iran are found in the central and eastern parts of the plateau, with the Dasht-e-Hut receiving only up to 50 mm per year. The low amount of rainfall is aggravated by high evaporation rates.

The rivers descending into the central plateau from the surrounding mountain ranges carry high levels of soluble salts, and the ground in the plateau tends to be highly saline (Zohary, 1973). On the margins of the plateau, and in a few patches in the interior where the topography is such that the soil is less saline, areas of piedmont fans and alluvial soils exist and can be farmed. Zohary (1973) differentiates the central plateau into a series of habitats, including poorly drained flats inhabited by halophytic communities and better drained flats inhabited by a variety of sagebrush (*Artemisia*) steppes. The flats are interspersed with sand dunes and gravel deserts. True sand deserts, consisting of vast dune fields, exist in Iran only in the central plateau and cover a surface area of about 183,000 sq. km; they are found at altitudes of about 500 m to 1,200 m.

According to Zohary (1973), the central Iranian sector hosts the most typical vegetation of Iran's steppe and desert regions. Dwarf scrub vegetation is common in large areas of the interior of Iran and is very diverse and rich in species; in non-saline areas, a variant with many thorn-cushions (Zohary, 1973) is formed. Under extremely arid conditions, a very open variant of the dwarf shrublands appears, also characteristic of large areas of the Iranian interior; the dominant species are sagebrush (*Artemisia siberi*, *Astragalus gossypius*, and others (Frey and Probst, 1986). In areas receiving over 100 mm of rain, other genera such as *Pteropyrum*, *Zygophyllum* and *Amygdalus* can also be found.

With regard to vegetation of the sand deserts in the interior regions of Iran, among the more characteristic genera are *Ephedra*, *Calligonum*, *Heliotropum*, and others (Frey and Probst, 1986). Endemic shrubs and perennials include *Astragalus (Ammodendron) kavirensis* Freitag, *Heliotropum rudbaricum*, and others. Many species here are highly specialized as psammophytes; these sand-adapted species are estimated to make up one third to one half of the total number of species in the sand deserts of Iran and Afghanistan (Freitag, 1986). Iranian deserts also have a striking number of *Tamarix* species; they have been reported to occur on the margins of the more sandy and gravelly parts of the Dasht-e-Lut (Breckle, 1983).

Halophytic communities of varying composition are found on the margins of the undrained salt pans of the central Iranian region, such as the Dasht-e-Kevir. In such areas, clays and sand soils have a high surface salt content due to insufficient water and high summer evaporation. Characteristic genera and species include *Aellenia spp.*, *Halocnemum strobilaceum*, *Haloxylon spp.*, *Salsola spp.*, and others (Frey and Probst, 1986). The inner parts of the salt pans have almost no vegetation. Zohary (1973) points out that saline soils

can harbor an impressive number of plant communities, and he characterizes Iran as "outstanding in its rich halophytic flora and vegetation due to the abundance of saline habitats". He notes that Turanian stock in the central plateau region, particularly that of the dunes and saline areas, has supplied numerous taxa and their derivatives, especially halophytes and psammophytes, to the Old World northern subtropical deserts.

#### *Iran-o-Turanian, Mountain zone*

In mountainous sub-region the *Juniperus* polycar species are developed. The sub-region has dry and cold climate, temperate summer and the annual precipitation is about 400 mm. The plain sub-region is dominated by desert climate and hot summer. A variety of fruit trees, medicinal, industrial, and edible plants found in the mountain ecoregions of the Iran-o-Turanian Zone. The plant species of these regions are: *Amigdallus scoparia*, *Onobrychis cornuta*, *Acantholimon spp.*, *Astragalus spp.*, *Artemisia aucheri*, *Alleum spp.*, *Bromus tumentellus*.

#### *Khalidj-o-Ommanian Zone*

The region with an area of 2,130,000 ha extends throughout southern parts of the country in Khosiztan, Boushehr, Hormozgan and Sistan- Baluchistan provinces. They are dominated by sub-equatorial climate. The main plant species of the these regions are: *Acacia- Prosopia- Ziziphus- Avicennia- Rhizophora- Populus euphatica- Prosopis stephaniana*. The plant species of the above four ecological zones are classified on the basis of average rainfall and altitude (Table 2.)

### **Conclusion**

Most of Iran is located in the Iran-o-Turanian zone. Iranian habitats support about 8000 species of flowering plants (belonging to 167 families and 1200 genera), of which almost 1700 are endemic. There are 12.4 million hectares of forests, and about 8900 hectares of mangroves along the southern coasts of Iran.

The Central Persian Desert Basins ecoregion largely corresponds with the Iranian steppes of *Artemisietea herbae-albae iranica* as designated by Zohary's (1973) geobotanical map of the Middle East. It also includes areas of saltland vegetation enclosed within this zone (Zohary, 1973), including: littoral saltland vegetation of *Salicornietea europaeae*, falling primarily in the northern part of this ecoregion; the Irano-Turanian saltland vegetation of *Halocnemetea strobilacei*; and the Saharo-Arabian saltland vegetation of *Suaedetea deserta*. Smaller scattered areas of Irano-Turanian psammophilous vegetation, with *Haloxylon persicum* and *Stipagrostis pennata* (Zohary, 1973), are also included. Adjacent chenopodiaceous communities in Afghanistan (Freitag, 1971) were incorporated.



Table 2. Distribution of the key plant species of four ecological zones of Iran.

| Plant species   | Altitude (m) | Average rainfall (mm) | Ecological Zones  |                 |
|---|--------------|-----------------------|-------------------|-----------------|
| <i>Populus caspica</i> , <i>Alnus glutinosa</i> , <i>Celtis australis</i> , <i>Buxus hyrcana</i> , <i>Pterocarya fraxinifolia</i> , <i>Gleditsia caspica</i> , <i>Albizia julibrissin</i> , <i>Quercus petraea</i> subsp. <i>iberica</i> , <i>Paliurus spina-christi</i> , <i>Ficus carica</i> , <i>Smilax excelsa</i> , <i>Punica granatum</i> , <i>Pteridium aquilinum</i> , <i>Oenothera biennis</i> , <i>Lythrum salicaria</i> , <i>Sylibum marianum</i> , <i>Scirpus maritimus</i> , <i>Tamus communis</i> , <i>Zelkova carpinifolia</i> , <i>Celtis caucasica</i> , <i>Tilia platyphyllos</i> , <i>Cerasus avium</i> , <i>Taxus baccata</i> , <i>Prunus divaricata</i> , <i>Ruscus hyrcanus</i> , <i>Acer cappadocicum</i> , <i>Andrachne colchica</i> , <i>Hypericum androsaemum</i> , <i>Oplismenus undulatifolius</i> , <i>Equisetum</i> spp., <i>Polystichum</i> spp., <i>Dryopteris</i> spp., <i>Cyclamen coum</i> , <i>Primula heterochroma</i> | 0-700        | 700-2000              | Hyrcanian         |                 |
| <i>Fagus orientalis</i> , <i>Acer velutinum</i> , <i>Ulmus glabra</i> , <i>Sorbus torminalis</i> , <i>Diospyrus lotus</i> , <i>Alnus subcordata</i> , <i>Ilex spinigera</i>   | 700-2000     |                       |                   |                 |
| <i>Quercus macranthera</i> , <i>Carpinus orientalis</i> , <i>Juniperus communis</i> , <i>J.sabina</i> , <i>Cotoneaster multiflora</i> , <i>Cotoneaster racemiflora</i> , <i>Crataegus</i> spp., <i>Sorbus boissieri</i> , <i>Sorbus graeca</i> , <i>Viburnum lantana</i>  | 2000-2500    |                       |                   |                 |
| <i>Alchemilla</i> spp., <i>Androsace vulgaris</i> , <i>Campanula stevenii</i> , <i>Festuca ovina</i> , <i>F.sulcata</i> , <i>Gentiana cruciata</i> , <i>Potentilla</i> spp., <i>Ranunculus</i> spp., <i>Sibbaldia parviflora</i> , <i>Poa supina</i> , <i>P.pratensis</i> , <i>Erigeron</i> , <i>Caucasicus</i> , <i>Sesleria phleoides</i> , <i>Myosotis</i> , <i>Lithospermifolia</i> , <i>Pedicularis sibthorpii</i> , <i>Anthriscus nemorosa</i> , <i>Deschamsia</i> , <i>Caespitosa</i> , <i>Catabrosa capusii</i> , <i>Calamagrostis epigejos</i> .   | 2500>        |                       |                   |                 |
| <i>Q. libani</i> , <i>Q.infectoria</i> , <i>Q. brantii</i>  | 750<         | 750                   | Zagross           |                 |
| <i>Crataegus</i> spp., <i>Fraxinus rotundifolia</i> , <i>Pyrus syriaca</i> , <i>Colutea</i> Spp., <i>Acer monspessulanum</i> , <i>Cotoneaster</i> , <i>Lonicera nummulariifolia</i>   | 1200-2000    |                       |                   |                 |
| <i>Amigdalus scoparia</i> , <i>Pistacia atlantica</i> , <i>P.Khinjuk</i> , <i>Daphne mucronata</i>  | 2000>        |                       |                   |                 |
| <i>Artemisia herbaalba</i> , <i>Zygophyllum atriplicoides</i> , <i>Pteropyrum aucheri</i> , <i>Alhagi camelorum</i> , <i>Halocnemum strobilaceum</i> , <i>Aeluropus littoralis</i> , <i>Haloxylon ammodenderon</i>  | 800-1500     | 250                   | Plain             | Iran-o-Turanian |
| <i>Amigdallus scoparia</i> , <i>Onobrychis cornuta</i> , <i>Acantholimon</i> spp., <i>Astragalus</i> spp., <i>Artemisia aucheri</i> , <i>Alleum</i> spp, <i>Brumus tumentellus</i>  | 1500>        | 200-400               | Mountain          |                 |
| <i>Medicago</i> spp, <i>Acacia ehrenbergiana</i> , <i>T. Stricta</i> , <i>Prosopis cineraria</i> , <i>Euphorbia larica</i>  | 0-1000       | 70-400                | Khalidj-o-Omanian |                 |

The driest portions of Iran-o-Turanian, plain zone are uninhabited, but in areas where enough rain falls to support habitation, humans have degraded the landscape. Agriculture, pastoralism, and woodcutting have caused the loss of natural vegetation. One of the serious threats to most of the Iranian ecosystems is drought, because much of Iran lies in the arid or semi-arid regions. The other threats for plants are: overgrazing, fuelwood extraction, conversion of forest and other wildlands for agriculture, road construction, overexploitation, and unscientific extraction of plant resources for medicine, food, and other uses. Among the overexploited species, some are medicinal plants, which were very abundant until a few decades ago, but are now endangered in their natural habitats.

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