

Dominance of *Artemisia* community and *Stragalus* community in arid area of Iran: True or not?

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Abstract – As mentioned in the most of the relevant sources, in other parts of the arid regions of Iran the dominance of the *Artemisia* and *Astragalus* community may vary from an *Astragalus* species to another species of it, whether individually or in combination. Here are two previous researches on vegetation coverage in two regions of Iran which are located in a group of arid areas and on the other hand, have a large distance from each other: Catchment area of farm Haj Hassan in Yazd province and Maharloo Lake in Fars Province. After examining the two researches, the results of these studies were evaluated and, in the end, analyzed the information obtained from the above studies, which indicates the validity of the aforementioned claim.

Keywords – *Artemisia* community, *Stragalus* community, Catchment area of farm Haj Hassan, Maharloo lake area etc.

I. INTRODUCTION

Arid areas include 30% of the country's surface and 50% of the rangeland surface [1]. Its annual rainfall is between 100 to 230 mm. This region is divided into three sub region of warm steppe, temperate steppe and cold steppe base on the winter temperature [1, 2, 3]. According to Trigubove and Mobin (1969), *Artemisia sieberi* is the main element in the most plant communities in the arid region of the country [4]. The vast domain of arid and semi-arid lands is covered by *Artemisia* and *Astragalus* [1,2,3,4,5,6].

Catchment area of farm Haj Hassan in Yazd province [7] and Maharloo Lake in Fars Province [8] has been studied for the purpose of paper. Catchment area of farm Haj Hassan located on 140 kilometers North East of Yazd city in longitude 54° 32' and 30" to 54° 37' and 32" and latitude 32° 25' to 32° 30' and its area is 3317 hectares. The highest point in the area is 2900 meters and lowest point is 2100 meters above sea level.

Average slope in the areas is 25%. Regional climate was based on Emberger method, cold and dry and average rainfall 279 millimeters per year that is distributed in late autumn and early winter. The average temperature areas were 9.2 ° C and evaporation and transpiration 693.4 millimeters per year. Figure 1 shows location of catchment area of farm Haj Hassan in Iran.

The basin of Maharloo Lake is within the geographical area 52° 14' to 53° 28' East and 29° to 29° 57' North and from the northwest to the southeast it stretches the length of it along the width of up to 160 kilometers along the

Sarvestan plain and the maximum region is about 43 kilometers.



Fig.1 Location of catchment area of farm Haj Hassan in Iran.

The pool area is about 4272 square kilometers. The amount of 2323 square kilometers are highlands and 1949 square kilometers are plain areas [14].

The highest place is Gorr, about 3720 meters height and the lowest point at the center of the northwestern part of the lake is at an altitude of 1460 meters. The average height of the lake is 1,500 meters above sea level [13].



Fig. 2 Location of Maharloo Lake at Fars province in Iran

II.RESULTS

Results of flora Information in catchment area of farm Haj Hassan The results of flora Information in this review is given in Table 1.

The results of typology of catchment area of farm Haj Hassan

Two types were detected in the study area:

1.Artemisia sieberi

Generally the dominant type is seen mostly in wet areas and much of it on alluvial located. This type coverage is 12.5 %. Type area is 167.4 hectare and allocated surface is 48.47% of area.

2.Artemisia sieberi-Peganumharmala

This type is often located inside waterways. the cover of Artemisia sieberi in this type is 11.7 % and coverage of Peganumharmalaiwas 5.47 %. The extent of this type that is 5% of the total area, is 168 hectare.

The results of typology of Maharloo lake area: According to studies conducted in the region, five vegetation type is identified and presented as follows [16]:

1. Artemisia sieberi

The dominant species of this type is Artemisia sieberiofCompositae family which is a perennial plant with herbaceous growth and palatability degree of II. Some species of this type include Stipabarbatof Gramineae family and palatability degree of III of Rosaceae family and palatability degree of III.The tree Ficusjohannis, however, can be found only in the bases of rocks.

2.Astragalusarbusculus

Echinopsrobustus

The dominant species of this type, respectively, are: AstragalusarbusculusofLeguminosae family is a perennial plant with herbaceous growth and palatability degree of III.Then, Eryngiumbungeiof Umbelliferae family is also a perennial plant with herbaceous growth

Eryngiumbungei

and palatability degree of III. Echinopsrobustusof Compositae family is a perennial plant with herbaceous growth and palatability degree of III.The other related type includes Artemisia sieberiof Compositae family and palatability degree of II.As type No.1, Ficusjohannis can be found only in the bases of rocks. In high slopes, Amygdalusscoparia species can be found

Table 1 The floristic list of catchment area of farm Haj Hassan

Palatability classes	Durable plant	Family name	Scientific name
II	Perennial	Compositae	Artemisia sieberi
III	Perennial	Euphorbiaceae	Euphorbia sp
III	Perennial	Ephedraceae	Ephedra strobilacea
III	Annual and perennial	Chenopodiaceae	Anabasis aphylla
III	Annual and perennial	Chenopodiaceae	Noeamucronata
III	Perennial	Plumbaginaceae	Acantholimonsp
III	Perennial	Caryophyllaceae	Acantophyllumsp
III	Perennial	Zygophyllaceae	Peganumharmala
III	Annual and perennial	Compositae	Cousiniasp
III	Perennial	Polygonaceae	Pteropyrumaucheri
III	Annual and perennial	Labiatae	Nepetapersica
III	Perennial	Leguminosae	Astragalussp
III	Annual	Graminae	Bromustecturom
III	Perennial	Compositae	Echinopssp
III	Perennial	Umbelliferae	Eryngiumsp
III	Perennial	Moraceae	Ficussp
III	Perennial	Boraginaceae	Heliotropiumsp
III	Perennial	Labiatae	Teucriumpolium
III	Annual and perennial	Graminae	Stipabarbata
II	Annual and perennial	Malvaceae	Malvasp
II	Annual and perennial	Chenopodiaceae	Salsolasp
III	Perennial	Labiatae	Salvia eremophila
III	Perennial	Compositae	Pulicariagnaphalodes
III	Perennial	Labiatae	Stachys inflata
II	Perennial	Compositae	Lactucaorientalis

3. Echinopsrobustus Astragalusarbusculus

The dominant species of this type, respectively, are: Echinopsrobustus of Compositae is a perennial plant with herbaceous growth and palatability degree of III.

Then, Astragalusarbusculus of Leguminosae family is also a perennial plant with plant growth and palatability

degree of III The other related type includes *Eryngium bungei* of Umbelliferae family with palatability degree of III. *Ficus johannis* can be found only in the bases of rocks and *Amygdalus scoparia* is seen only in high slopes.

Table 2 General information about plant species in Maharloo lake area.

Species name	Family name	Plant life	Growth habit	Nutritional value
<i>Artemisia sieberi</i>	Compositae	Perennial	Grass	II
<i>Stipabarbata</i>	Gramineae	Perennial	Grass	III
<i>Astragalus arbusculus</i>	Leguminosae	Perennial	Shrub	III
<i>Echinops robustus</i>	Compositae	Perennial	Grass	III
<i>Amygdalus scoparia</i>	Rosaceae	Perennial	Bushy Tree	III
<i>Eryngium bungei</i>	Umbelliferae	Perennial	Grass	III
<i>Poa bulbosa</i>	Gramineae	Perennial	Grass	III
<i>Atriplex leucoclada</i>	Chenopodiaceae	Perennial	Grass	II
<i>Juncus</i> sp.	Juncaceae	Perennial	Grass	II
<i>Cressacretica</i>	Convolvulaceae	Perennial	Shrub	III
<i>Taraxacum seratinum</i>	Compositae	Perennial	Grass	I

4. *Juncus* sp.

The dominant species of this type is *Juncus* sp. of Juncaceae family which is a perennial with herbaceous growth and palatability degree of II. Its native name is "Khonk". The other related type includes *Taraxacum seratinum* of Compositae family with palatability degree of I. In terms of phenology, the time between flowering and seeding is not significant so that in the middle of winter, for a while, the plant can also be seen in the flowering and seeding stage simultaneously. Compared to other types, this type has the highest coverage in the region.

5. *Astragalus arbusculus*

The dominant species of this type is *Astragalus arbusculus* of Leguminosae family is a perennial with plant growth and palatability degree of III. The other related types included are: *Echinops robustus* of Compositae family with palatability degree of III; *Poa bulbosa* of Gramineae family with palatability degree of III; *Atriplex leucoclada* of Chenopodiaceae family with palatability degree of II and *Cressacretica* of Convolvulaceae family with palatability degree of III. In abundance, *Poa bulbosa* can be found in arable lands that have a greater distance from

lake. *Cressacretica* can be seen in smaller amount in arable lands that have a smaller distance from lake.

III. DISCUSSION

As it was seen, in the catchment area of farm Haj Hassan, the *Artemisia sieberi* species dominated over the both types, which in the second type, was dominant with *Peganum harmala*. However, *Astragalus* sp. is also seen as a species present on the flora list of the area but it has not been dominant. In the region of Maharloo Lake, the most widely distributed species in the region is the *Astragalus arbusculus*, which can be seen dominant in three types of area and is related species in one type.

Artemisia sieberi is also dominant in one type and is related species in another type. Now, considering the results of the two studies, it can be concluded that the two *Artemisia* and *Astragalus* species in these areas, which are arid in the country, have the highest dominance and distribution. It is similar to this case in other arid regions of the country, so it is correct to state that *Artemisia* and *Astragalus* species are dominant in arid regions of the country. The reasons for the dominance in arid regions of the country can be seen in the optimal compromise of these two species with the climatic, soil and ecological conditions which is in line with their biological range.

The *Artemisia sieberi* has an Allelopathic effect that, by secretion of a substance called Camphor, inhibits the growth of other plants around it, which results in the fixed establishment of the plant. Another important factor in the establishment of this plant is its root structure, since, in the case of a canopy diameter of 70 cm, its root depth penetrates up to 1.5 meters in soil, and when the stem diameter is between 3 and 4 mm, the diameter of the root reaches 2 cm.

Astragalus sp. is also one of the most psammophyte plants and with its rapid growth of roots, is one of the main reasons for its durability and sustainability in arid regions of Iran. In conclusion, according to the above mentioned factors, the dominance of *Artemisia* sp. and *Astragalus* sp. in the arid regions of the country is not far from expectation.

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