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Floristic Status of Galoochar Juniper Forest Reservoir, Iran

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Abstract: Plant coverage is very important for preventing soil erosion. It have virtual role for wildlife as food sources, shelter and habitant. The area chosen for the present investigation is Galoochar Juniper Forest Reservoir with 382 hectare area in the South-east of Iran. For a floristic study of the area plant specimens were collected and identified. The life forms as well as geographical distributions of the species were determined. Terrestrial vascular Flora in this region includes 253 species in 186 genera and 49 families. The largest families are Asteraceae (31 species), Papilionaceae (27 species), Brassicaceae (24 species), respectively. Life forms include Hemicryptophytes (29%), Therophytes (36%), Chamaephytes (11%), Phanaerophytes (11%), Crytophytes (3%). Phytogeographical elements in this region were determined as: 65.13% Irano-Turanian, 9.7% Irano-Turanian and Saharao-Sidian, 8.2% Palorctic, 6.1% Irano-Turanian and Mediterranean, 4.6% Cosmopolite, 2% Saharao-Sindian, 1.53% Irano-Turanian and Euro-Siberian, 1.53% Irano-Turanian, Mediterranean and Saharao-Sindian, 1% Irano-Turanian, Mediterranean and Euro-Siberian and 1% Mediterranean and Euro-Siberian.

Key words: Flora · Life form · Plant geography · Forest reservoir · Iran

INTRODUCTION

Floras or inventories of plants found in districted area provide a lot of valuable data to scientific communities [1]. These activities provided useful information for study of changes in plant distributions, habitant and effects of habitant fragmentation on frequency of species and biodiversity [2, 3]. Floristic data are also important for the study of diversity and abundance of species, environment management and ecological studies [4]. Identification of floristic component of an area is also important for rebuilding an area if it destroys by human activity or natural disasters. Finally, because of the numerous threats to native species (e.g. grazing, climatic changes), it is imperative that the cataloging of local flora continues indefinitely.

The life form is an important physiognomic attribute that have been widely used in ecological studies. The life form characteristic are said to be the indicators of micro and macroclimate [5]. In other hand, life form indicates the adaptation of plants to climate. Generally, biospectrum is dependent on relative proportion of different life form for determined region or area. In this system, plants were classified into different life form classes (Phanerophytes, Chamaephytes, Hemicryptophytes, Geophytes, Therophytes) according to [6, 7]. Raunkiaer believed that plant compositions can be indicated as an expression of the climatic situation. In a long time plant coverage adapted to climate so, they could be used as a geographical tool to describe the climate [8]. He developed the idea that plants life forms as a means of determining the biological attributes of the different climates [6]. The correlation between life form and climatic conditions has been demonstrated not only in big scale but also in small scale [9]. Thus life form combinations, as used in the BioHab methodology for habitat registration, can register relatively small differences interior a local area and can therefore be useful on both the global, local and regional scale. This indicated that Raunkiaer's method is an important step on the way to a more detailed analysis of the ecological diversity of plant communities [10]. Raunkiaer indicated that by considering the location of the plants wintering buds, plants can be divided into 30 minor life forms, gathered into five major life form groups;

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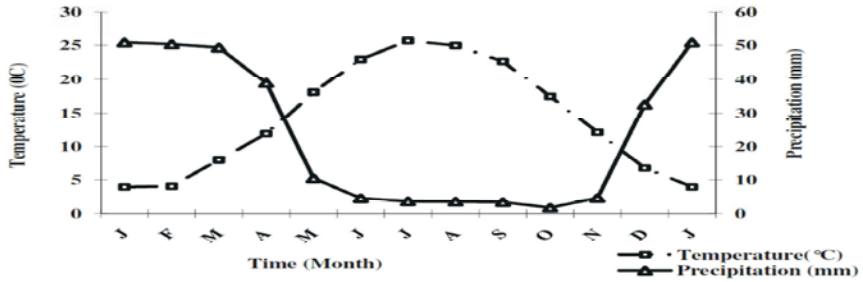

Fig. 1: Climatogram of Rabor city (1990-2010)

Fig. 2: Galoochar Juniper Forest Reservoir

Camaephytes (with surviving buds situated near to the ground), Phanerophytes (with surviving buds projecting freely into the air), Cryptophytes (with surviving buds perfectly hidden in the ground or at the bottom of water), Hemicryptophytes (with surviving buds exactly in the soil-surface) and Therophytes (finishing their life-cycle within a season and remaining dormant as seed during the contrary time [8]. Each life form and combination of them is indicators of special climate. Therophytes are characteristic of desert climate and hemicryptophytes are indicator of temperate zone, while geophytes are indicator of mediterranean climate [11, 5].

Remainder forest fragments, like Galoochar Juniper Forest Reservoir, can be noticed as biodiversity refugia, which have helped the survival of native ecosystem biota, over centuries or millennia, affected global warming and changes in environmental conditions. These remainder ecosystems may suggest many taxa the best chances for survival under new environmental conditions [12]. Literature dealing with the plant ecology of these area shows that very little work has been done in this area and it will be the first time that we studied the life form and floristic composition of the Juniper forest of Iran.

Study Area: The area chosen for the present investigation is Galoochar forest reservoir with 382 hectare area which is situated between Rabor and Sardoiye in Kerman province (South-east of Iran). This area is between latitude 29° 18' to 29° 17' N and longitude of 56° 07' to 56° 04' E. The lowest and highest altitudes range from 2200 to 2800 meters above sea level. The climate is cold and it is characterized by 400 mm/y rainfall and moderate temperature. The status of precipitation (cm) and temperature (°C) of study area during a period of 20 years (1990-2010) showed in climatogram (Fig. 1). Investigations on the soil showed that it is classified in soil-sandy, non-saline and weak alkaline class [13]. Provided density coverage map of Galoochar Juniper Forest Reservoir by using IRS-P6, Liss III satellite data [14].

MATERIALS AND METHODS

The systematic study of the vascular plants of area was carried out in 2011. Representative samples of plant species were collected preserved and herbarium specimens prepared for identification at Herbarium and a list was prepared. All specimens were identified and life forms and phytogeographical elements determined [15-19].

RESULTS

A floristic inventory of Galoochar Juniper forest was made based on several reconnaissance surveys carried out during 2010-2011 by using floristic-physiognomic methods [20]. Survey of terrestrial vascular flora of Galoochar Juniper Forest Reservoir documented 253 species in 186 genera and 49 families (Table 1).

Results showed that most of the genera belong to Asteraceae family with 25 genera (13.44%), Brassicaceae with 17 genera (9.14%) and Papilionaceae with 16 genera (8.6%) respectively. The largest families are Asteraceae 31 species (12.25%), Papilionaceae 27 species (10.67%), Brassicaceae 24 species (9.48%), respectively.

Table 1: Genus and species in each family in Galoochar Juniper forest reservoir

Family	Genus	Species	Family	Genus	Species
Aceraceae	1	1	Laminaceae	14	20
Amaranthaceae	1	1	Liliaceae	6	11
Amaryllidaceae	1	2	Linaceae	1	1
Anacardiaceae	1	2	Malvaceae	1	1
Apiaceae	9	10	Palmaceae	1	1
Asteraceae	25	31	Papilionaceae	16	27
Berberidaceae	3	3	Papaveraceae	3	4
Boraginaceae	8	10	Plantaginaceae	1	2
Brassicaceae	17	24	Plumbaginaceae	1	3
Campanulaceae	1	1	Poaceae	9	10
Capparidaceae	2	2	Polygonaceae	4	7
Carryophyllaceae	7	9	Primulaceae	2	2
Chenopodiaceae	6	8	Ranunculaceae	6	6
Convolvulaceae	1	1	Resedaceae	2	2
Cyperaceae	2	2	Rosaceae	3	5
Cupressaceae	1	1	Rubiaceae	4	4
Dipsacaceae	2	2	Salicaceae	1	1
Ephedraceae	1	2	Scrophulariaceae	4	5
Elaeagnaceae	1	1	Solanaceae	1	2
Euporbiaceae	2	7	Tamaricaceae	1	1
Fumariaceae	1	3	Thymelaceae	2	3
Geraniaceae	3	4	Typhaceae	1	1
Juglandaceae	1	1	Valerianceae	1	1
Juncaceae	1	1	Zygophylaceae	3	4

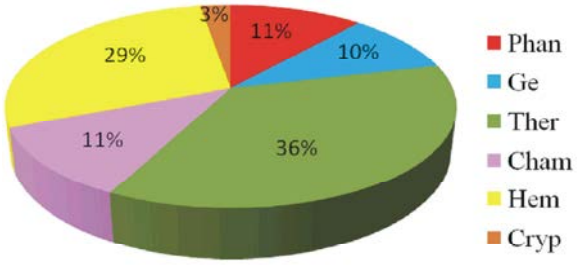

Fig. 3: Life form in this region (Ther = Therophyte, Hem = Hemicryptophyte, Cryp = Cryptophyte, Cham.= Chamaephyte and Phan.= Phanerophyte).

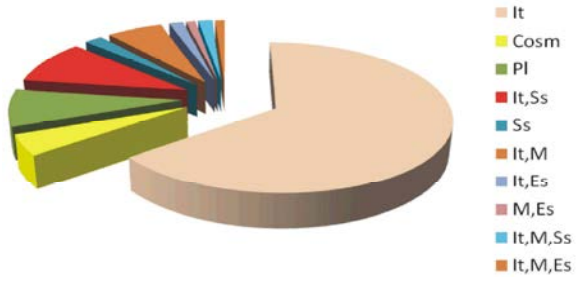

Fig. 4: Phytogeographical elements in this region (IT = Irano-Turanian, M= Meditrrranean, Es = Euro-Siberian, SS = Saharo-Sindian, Cosm = Cosmupolite).

Life form of 256 species was studied by Raunkiaerian method. The Results showed that life forms include Hemicryptophytes (29%), Therophytes (36%), Chamaephytes (11%), Phanaerophytes (11%), Crytophytes (3%) (Fig 3). Phytogeographical elements in this region were determined as: 65.13% Irano-Turanian, 9.7% Irano-Turanian and Saharao-Sidian, 8.2% Palorctic, 6.1% Irano-Turanian and Mediterranean, 4.6% Cosmopolite, 2% Saharao-Sindian, 1.53% Irano-Turanian and Euro-Siberian, 1.53% Irano-Turanian, Mediterranean and Saharao-Sindian, 1% Irano-Turanian, Mediterranean and Euro-Siberian and 1% Mediterranean and Euro-Siberian (Fig. 4).

DISCUSSION

Floristic survey provides an insight into what native plant species could be chose for reforestation and restoration programs in plantations and grasslands [21]. Life forms of various species recorded from study area were classified into six major life forms. A biospectrum is established when all plant species of a community is classified into life forms and their ratio expressed in percentage or number [22]. biospectrum are beneficial in comparing plant communities which separated geographically and are also regarded as an indicator of prevailing environment. Occurrence of similar biological spectrum in different regions indicates similar climatic conditions. Because no systematic study of this area had been carried out, this survey was undertaken. According to [6] the climate of an area is characterized by life form. However, due to biological disturbance, annual rainfall, agricultural practices and grazing, deforestation and trampling, the proportion of life forms may be changed [23].

CONCLUSIONS

The life form spectra of flora in the present study indicated that therophytes (36%) and Chamaephyte (29%) were dominant among other life forms. therophytes are characteristic of desert climate [11,5]. Therophytes predominant happens due to unfavorable habitat conditions [5,23]. Also chamaephytes became more prominent, because of adverse soil and climatic conditions [24]. On the other hands, chamaephytes and therophytes considered as the major life form in unfavorable environment in desert region [25, 26]. The biological spectrum obtained in the present study reflects the existing environmental conditions. Therefore, the Raunkiaer theory confirmed for studying this area.

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