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RESEARCH ARTICLE

A BIODIVERSITY SURVEY IN DECIDUOUS BROADLEAVED FORESTS NORTH OF IRAN

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ABSTRACT

Biodiversity and its natural process in different ecosystems contribute to the correct understanding of the interrelationships between the land, climate, plants and other living things. Through biodiversity, it is possible to plan the utility patterns of natural resources by referring to its component parts. The forests of north of Iran (with an area of 1.8 square kilometers) belong to the Hycranian or deciduous broad-leaf forests and possesses a temperate and humid climate. They are of great importance in Iran because of their uniqueness in plant community, ecological, genetic and species diversity. As only a small per cent of the plants in Iran is located in Europe, Siberia, Caspian sea coasts and the forests of north of Iran, the number of tree species and shrubs reaches to more than 80 and 50 respectively. Besides, since the majority of the forests of north of Iran are mountainous and have a high diversity of woody species a study of the trees species of the Hycranian forests can prove to be very useful and of highest importance. For this purpose, 18 sample plots 0.5 hectare have been randomly chosen and surveyed in different altitudes between 50-1900 m of Siahkal Forests. The results obtained from the analysis of this survey, indicates that with increase in altitude from sea level, species richness decrease while species diversity and evenness continue to rise so that the maximum species diversity is observed at the altitude range of 100-700 m above sea level and the least diversity of species is observed above 700 m altitude.

INTRODUCTION

Biodiversity is an essential case for life continuance, economical affairs and ecosystems function and resistance (Singh, 2002). This study tries to examine the relationship between the richness and evenness of broadleaved trees in north

of Iran with height from the sea level and to use the results in managing these forests. Generally biodiversity measurement typically focuses on the species level and species diversity is one of the most important scales (Ardakani, 2004). Generally the site biodiversity is impressed by environmental factors and the physiographic factor of land as the height from sea level is one of the most important factor in this case (Schuster and Diekman, 2005; Rong, 2001; Maranon and Ajbilou, 1999). For this purpose, various researchers have examined biodiversity by separately considering different physiographic factors such as ,the height from sea level, slope and direction, they have mentioned that by height increase from sea level the average temperature of the weather decreases and with regard to other climatic factors it leads to the formation of climatic regions there botanical regions with specific species diversity are formed (Maguran, 2004).the specific environmental communities in forests have been led to occurrence of different forest communities (Sagheb Talebi, 2004). There fore to that more biodiversity would cause more fertility and ecological resistance (Smith, 1996).

MATERIALS AND METHODS

Material

Siahkal forests with an area of 13000 hectare are located in 18- kilometers far from the south of Lahijan (North of Iran) and have a minimum and maximum altitude range of 50-1900 meter above sea level (Fig. 1). According to Lahijan meteorology station records, in the last decade the area has had the average rain of 1100 millimeter and an average annual temperature of about 17°C. Besides, the mean differences of the coldest and hottest month of the year are 25°C which shows a relatively temperate weather. The relative humidity of the region fluctuates between 70-90 percent. From pedological point of view the soils are often alkaline and in some places neutral (Habibi, 1992; Sabeti, 1994). The soil texture in most of the area is heavy clay to semi-heavy sand with average to low permeability. In this study in order to obtain newer data a sample has been chosen and its physico-chemical conditions have been studied. The results of the experiments are shown in Table 1.

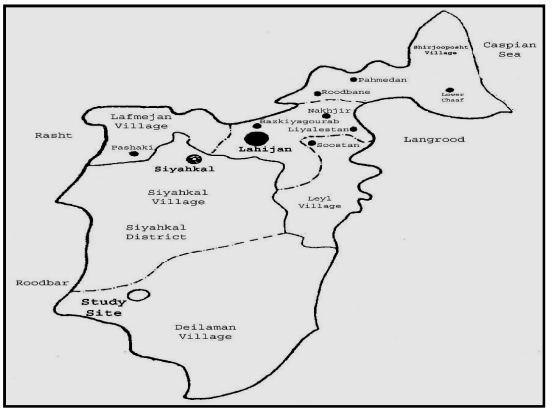

Fig. 1. Geographic location of research area

In order to study the diversity of tree species of Siahkal forests, first on the topography map of the area under investigation those areas which have been under the protection of forestry or were being used were excluded and from the remaining places only those which have not been used or manipulated at all were chose for the study. The chosen places have been classified into 6 altitudes for the minimum (50 m) to maximum (1900 m) altitude range from sea level (Table 2). In each altitude range, 3 sample 70x70 m lozenge pieces (totally 18 pieces) were randomly chosen and carefully surveyed for the study.

Table 1. The general physical and chemical characteristics of soil in the research area

Texture	Sand (%)	Silt (%)	Clay (%)	K (ppm)	P (ppm)	N (%)	pH
Si-cl-1	12	52	36	155	50	0.116	5.3

Table 2. Altitude range and limit values in the research area

Altitude range	*Limit values of altitude range (m)*
1	100-400
2	401-700
3	701-1000
4	1001-1300
5	1301-1600
6	1601-1900

RESULTS AND DISCUSSION

Biodiversity is much more extensive and widespread to be perfect and completed by a survey of some species. It includes complex methods and processes which interrelates living things to each other or to their ecology. In this regard, their genetic structure can be specified and the process by which a system can remain dynamic, active and self-systematizing be determined (Lust and Nachtergale, 1996). On the other hand, species diversity, depending on the level to be studied (whether ecology, species, genetic diversity) has different meaning and uses.

And in each of the levels mentioned the form and combination of biodiversity is of greater importance. So in relation to a complex mechanism like ecosystem of forest which possesses a perpetual dynamics, biodiversity should be studied by considering all its various aspects. This study indicated that the diversity of tree species is high in the site under investigation above. However, it is clear that to arrive at a generalization with regard to the changes in tree species or generally speaking woody species with increase in altitude from sea level, similar studies are necessary in different sites and at different conditions. In this zone species richness and plant diversity of woody species is particularly low in oriental beech forests (*Fagus orientalis* Lipsky) which are due to beech dominance (Pourbabaii, 2000). The results of this study indicates that with increase in altitude from sea level, species richness decrease while species diversity and evenness continue to rise so that the maximum species diversity is observed at the altitude range of 1 and 2 (100-700 m) and the least diversity of species can be observed from 100 m above. Besides, from 1200 meter above sufficient quantity of oriental beech can be observed.

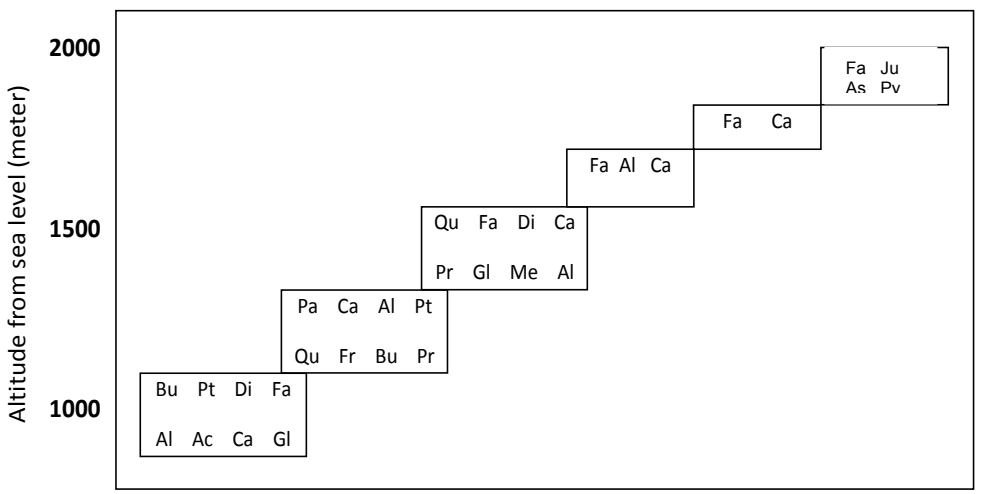

Fig. 2. The diversity of tree species at different altitude ranges

(Fa: *Fagus orientlis* Lipsky, **Ca**: *Caprinus betulus* L., **Qu**: *Quercus castaneifolia* C.A.M, **Ze**: *Zeikova carpinifolia* (Pall.) Dipp, **Pt**: *Pterocarpha fraxiniofolia* (Lam.) Spach**, Cr**: *Cerasus avium* (L) Moench**, Gl**: *Gletidschia caspica* Desf, **Fi:** *Ficus carica* L., **Py**: *Pyrus glabra* L., **Ju**: *Juniperus communis* L., **Ac**: *Acer cappadocicum* Gled, **Al**: *Alnus subcordata* C.A.M, **Fr**: *Fraxinus excelsior* L., **Di**: *Diospyrus lotus* L., **Pa:** *Parrotia persica* (DC.) Meyer, . **Bu:** *Buxus hyrcanapojark* L., **Pr**: *Prunus divaricata* Ledeb., **Me**: *Mespilus germanica* L., **As**: *Astraglaus sp*. L.)

This study in terms of tree species breeding abundance has come to the conclusion that lower and higher elevation stands due to heavy overgrazing are experiencing a poor condition while middle elevation stands enjoy a stable good quality situation. The distribution of trees in the diameter classes shows a normal, decreasing feature distribution, which is a prime character of natural forests (Figure 3 and 4).

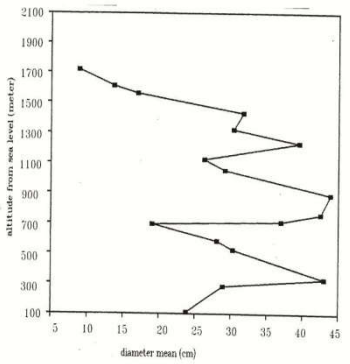

Fig. 3. Mean diameter of various trees at different altitude

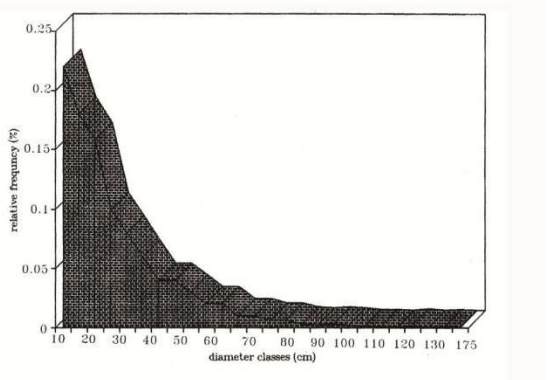

Fig. 4. The distribution of number of trees in the diameter classes

This survey clearly proves that traditional human interventions on species diversity and especially on breeding process have a deep negative impact. Therefore to select a site for scientific investigation it is suggested that those sites do not suffer from overgrazing and human activities. This must be especially true when it comes to important subjects such as biodiversity or diversity of woody species. This research showed that qualitative and quantitative parameters of plant species in relation to elevation above sea level changes in time. These changes are the results of inherent characteristics of the forest stand involved and the general conditions of the stands. The cognition of information diversity and understanding the genetic sources of woody species in forest stands of northern Iran and finding their relation to the concept of elevation above sea level is a subject that requires more investigation and scientific though. In this regard, study and cognition of genetic diversity of forest stands of northern Iran is of great importance that must be carefully considered.

Generally the confirmation and resistance of wooden species in different regions differ by the influence of factors such as the soil climatic factors the species kind structure and combination of species and being above the sea level (Jalali and Ersali, 2003). Various ecological factors have an important influence on the formation extension and resistance of wooden species. Meanwhile topography has the most direct and indirect effect on wooden species (Zare, 2000). The reduction of biodiversity in mountainous heights maybe due to unfavorable thermal conditions and the increase of evenness in these heights (Fisher, 2004).Generally the most richness and variety is noticed in the middle heights and this altitudinal boundary (Hegazy and El-Demedesh, 1998). An this research the most species diversity is noticed in 100 to 700 meters above the sea level and the least species diversity is noticed in the altitude of 700 m above since the environment temperature is favorable the amount of species richness is more in the lower heights (Sternberg and Shoshang, 2001) .

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