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Factors Impact of Organic Matter, NPK, EC and pH of Soil on Species Diversity in the Watershed of Miandar Qarootag – Gilangharb

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ABSTRACT

Herbaceous plants recognition of diversity in the management of pastures and forests, and all the natural sciences, is used. In this study, to assess the operating effectiveness of organic matter, NPK, EC and pH on species diversity pastures, a 118 square meters plot, over 24 transects in different geographical directions in the watershed Qarootag Gilangharb district, in the province Kermanshah was implemented. In each plot, the number of grass species to species, altitude, and in the center of the plot of the depth of 30 cm, according to plant root penetration, soil samples were taken and notes. The results showed that the nitrogen, potassium and organic matter and diversity and uniformity, a positive association was found that 95% did not make sense. The results of the correlation between phosphorus and Simpson diversity index, 95% were positive and significant. Between the EC, pH and altitude, there was a negative correlation with diversity, it is not statistically significant.

KEYWORDS: diversification, rangeland, phosphorus, Gilangharb

INTRODUCTION

Range is a natural ecosystem, including large reserves of genetic resources, and a variety of plant species, always involve a wide range of sustainability in the face of changing environmental and biological factors (Mesdaghi 2005). Species diversity of important concepts in ecology and vegetation management (Mesdaghi 2005), and the role of health important on production and evaluation of ecosystems (Adam 1971, Noor Al-Hamad, 2006). Species diversity is made up of two components, the first of a number of species, and refers to the species richness. The second component is the variation of the uniformity of the distribution of species is concerned (Cocker and Kent 1996). Species richness, species diversity is one of the simplified indices. The total number of species, species richness in the area, and the relative abundance of species in the community do not do (Mesdaghi, 2001). By studying vegetation, and different environmental factors such as physiographic, soil and climate can sustain plant communities, and the correlation between these factors and the vegetation realized that, the issue of development and restoring plant communities, is very important and practical (Basiri 2003). Mirzaee et al. (2008), herbaceous and woody species diversity and richness of response, in conjunction with physical and chemical factors, soil, topography and forest Purple Meadow Preserve, located on the Ilam province, were studied. They concluded that, on the southern slopes of the diversity of species of grass, clay and sand with negative and positive correlation with Sylyt. In the West, a variety of grass species with high salinity and sea level, a negative correlation between the percent of lime, is a positive correlation. They also stated that, on the southern slopes of the diversity and organic matter, pH, nitrogen and potassium are positively correlated, but the correlation is statistically, at 95 percent, is likely not significant (05 / 0P≤). Gogo et al. (2000), species richness tundra of northern Alaska, studied, and species diversity found in the area, the abiotic environmental gradients such as topography, soil moisture, pH and natural fertility of the soil. Anrait et al. (2005), in Pakistan, the study concluded that soil physical factors such as cover stone, and the percentage of land slope, the soil chemical factors, the diversity of plant species, more of this. Their reason is due to the influence of physical factors of soil, the water knew. Paolo (2003), in a study to determine the increase in food, in lime and its effect on the plant species, and the structure of plant communities in America, concluded that changes in the frequency and location of species and plant communities with food limestone soil, a significant relationship. Fu et al. (2004), in a study entitled relationships between soil properties, topography and variety of plants in a heterogeneous deciduous broadleaf forest, near Beijing in China have expressed.

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Which is an important indicator of soil organic matter to soil fertility, and in between all factors of soil organic matter and nitrogen, the greatest influence on the characteristics and distribution of plants. Fisher et al. (1987), a study stated that, after the available water, soil nitrogen is the most limiting factor for plant growth, an important, and in increasing the diversity of plants, has a big role. According to the information presented, and the importance of biodiversity, pastures, natural areas management The purpose of this study, subjects expressed aim of this study was to evaluate the biological diversity of herbaceous plants, with Physical factor of soil, such as OM, NPK, EC and pH is.

MATERIALS AND METHODS

Features, characteristics of the study area

Gilangharb district, with Area 2,230 square kilometers, 1.9 percent of Kermanshah province has been allocated. The study area includes the watershed Miandar Qarootag, 5 km from the city Gilangharb, located at the foot of the Zagros Mountains. Size of the area in question, using topographic maps of 1: 50,000 of Forest and Rangelands, 18/2172 hectares respectively. The area between latitudes 34 degrees and 3 minutes and 47 seconds ("47 03 34), to 34 degrees 6 minutes and 55 seconds (55 06 34), and geographical lengths 45 and 54 minutes and 34 seconds (00 54 □45) to 45 degrees 59 minutes and 43 seconds ") 43 '59 □45), located in the East and North-East of the mountains Saravan, from the West and South West, is surrounded by mountains Bidmian. Altitude area is 1700 meters above sea level and the lowest point at 900 meters above sea level (Figure 1). The average annual rainfall in this area is 431/4 mm, the highest annual rainfall for the month of February, with the value of 97/4 mm, the smallest of August, with the zero mm. The average annual temperature domain, 20/36 ° C. The average temperature of the warmest and coldest months of the year so that, were as follows: 39/8 ° C (August), and (9.3) C (February) is.

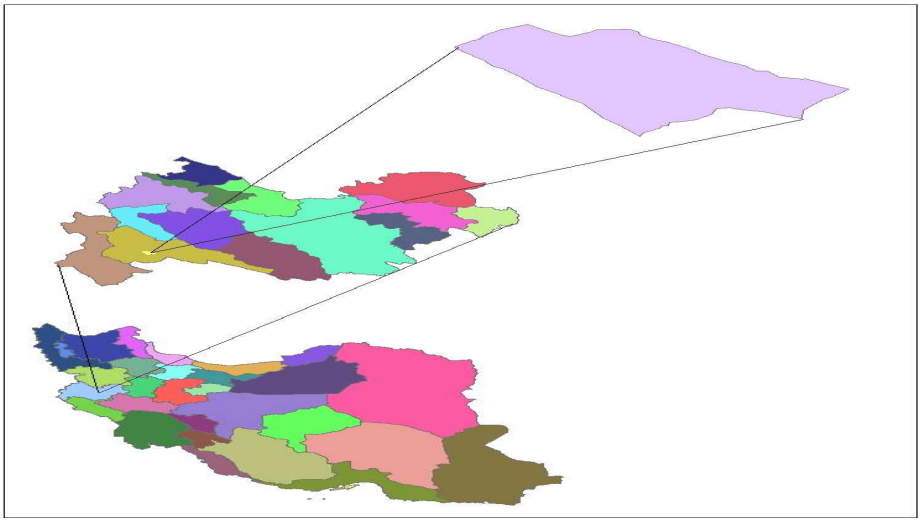

Figure 1. Geographical position in the region, the map of Iran – Kermanshah

The study area, with tree cover (wooded pasture), the type most Iranian Oak (Quercuspersica) is. With its species, Amygdalussp, Cratagossp, Pistaciaatlantica etc. Most of pasture cover it, so Bermoos Bromusdanthoniae and Helianthemumsalicifolium form. Among the species most common in sub-storey type can Erodiumsp, Loliumsp Trifoliumcampester, Medicaho minima, Aegilopssp and so on. In this study, the selection of transects in each domain, were selected randomly, so that after implementing transects in different geographical directions. First, a point randomly chosen along transects, and the plot was walking in Next in line transects, the slope for every 50 meters difference in height, were recorded with a GPS device, a plot was no longer walk. Within each plot, cover every single species was also recorded. In order to measure nitrogen, potassium, phosphorus, organic matter,

electrical conductivity and PH, in the middle of each plot pit, dug to a depth of 30 cm, and soil samples for soil testing, the bags were taken previously provided.

A total of 118 square meter plot that had achieved statistical methods, over 24 transects in the study area on foot, and was picked up. After data collection, biodiversity and uniformity Herbaceous plants, using a variety of criteria and uniformity Simpson and Shannon - Wiener, were analyzed. Data, first in Excel, data processing and prepared. In order to analyze the data, the SPSS 16 software have been used to demonstrate how data distribution (normal or normal), the test Kolmogorov - Smirnov was used, in the case of normal data, the relationship between the variables dependent and independent, the Pearson correlation was used, and in case of non-normality of the data, the association between dependent and independent variables, the Spearman correlation were used. The relationship between the dependent and independent variables, were assessed using linear and nonlinear regression.

Formula is used:

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Simpson diversity Index $\frac{1}{D} = {}^{1}/_{\sum_{i=1} Pi^2}$

Shannon diversity index – Weiner $H = -\sum_{i=1}^{s} Pi\, Ln\, Pi$

Simpson uniformity index $Est = \frac{1/D}{1/S}$

Uniformity index, Shannon – Wiener $Esh = \frac{H}{LnS}$

$\frac{1}{D}$: Simpson diversity index

S: the number of species

N: total abundance of species

Pi: individuals or abundance of species i,

RESULTS

In this study, using Pearson's correlation coefficient, the relationship between the independent variables (nitrogen, organic carbon, potassium, phosphorus, pH and electrical conductivity), with the dependent variables (diversity and uniformity index, Simpson and Shannon - Wiener), examined was. The results showed that the amount of nitrogen (N2) in the soil, and Simpson and Shannon-Wiener diversity index and uniformity, there is a positive association, but the association was not statistically significant (Table 1).

The results of the correlation between organic carbon (OC), and Simpson and Shannon diversity index and uniformity Wiener showed that there is a positive relationship between these variables, but the difference was not statistically significant (Table 1).

The results of the correlation between phosphorus, with Simpson and Shannon diversity index and uniformity - Wiener, revealed that between phosphorus, and Simpson diversity index, positive relationship between the level of 95% is available, so that by increasing the amount of phosphorus in soil, the Simpson diversity increases (Table 1).

The results of the correlation between potassium, and Simpson and Shannon diversity index and uniformity Wiener showed that there is a positive relationship between these variables, but this relationship is statistically not significant (Table 1).

The results showed a correlation between soil pH, and diversity and uniformity index showed that between diversity and uniformity index and pH, there is a negative relationship, this relationship is not significant statistically, so that by increasing the pH of the soil, the amount of trade diversity and uniformity Simpson and Shannon - Wiener, decreases (Table 1).

In this study, the relationship between the dependent variables (diversity and uniformity index, Simpson and Shannon - Wiener), the independent variables (nitrogen, organic carbon, potassium, phosphorus, pH and electrical conductivity), using linear and non-linear (regression), were studied. The results showed that, between dependent and independent variables, non-linear relationship exists (Table 2).

Table 1 examines the relationship between nitrogen, organic carbon, phosphorus, potassium, electrical conductivity, pH indicators of diversity and uniformity

Uniformity index		Diversity index		
Shannon - Weiner	**Simpson**	**Shannon - Weiner**	**Simpson**	
ns0/152	ns0/07	ns0/1	ns0/137	Nitrogen (N2)
ns0/163	ns0/08	ns0/111	ns0/153	Organic carbon (OC)
ns0/207	ns0/085	ns0/124	ns0/174	Potassium (K)
ns0/156	ns-0/137	ns-0/039	ns-0/057	Conductivity (EC)
ns0/193	ns0/235	ns0/229	0/292*	Phosphorus (P)
ns-0/254	ns-0/076	ns-0/109	ns-0/188	pH

* Indicates a link between the level of 95%
ns: show no relation between

Table 2. The study of the relationship between nitrogen, organic carbon, phosphorus, potassium, electrical conductivity, pH indicators of diversity and uniformity

Uniformity index		Diversity index		
Shanon-viner	**season**	**Shanon-viner**	**season**	
(Polynomial)	(Polynomial)	Polynomial)	(Polynomial)	Nitrogen (N2)
(Polynomial)	Polynomial)	Polynomial)	(Polynomial)	Organic carbon (OC)
Exponential)	(Polynomial)	(Polynomial)	(Exponential)	Potassium (K)
(Polynomial)	(Polynomial)	(Polynomial)	(Polynomial)	Conductivity)EC(
(Polynomial)	(Polynomial)	(Polynomial)	(Polynomial)	Phosphorus (P)
(Exponential)	(Polynomial)	(Polynomial)	(Polynomial)	pH

DISCUSSION AND CONCLUSION

In this study, the results of the study of the relationship between nitrogen, phosphorus, organic matter, potassium, electrical conductivity, and pH on the diversity and uniformity index of Simpson and Shannon - Wiener, using Pearson's correlation coefficient, were studied and the results showed that , the nitrogen, potassium, carbon (organic matter), and indices of diversity and uniformity, there is a positive association, but the association was not statistically significant. The results showed that the correlation only between phosphorus and Simpson diversity index, there is a positive relationship between the level of 95 percent. The study found that, by increasing the amount of soil pH and electrical conductivity (EC) levels of diversity, and such uniformity is reduced, or in other words, there is an inverse relationship, this relationship was not statistically significant (Table 1). Mirzaee et al. (2008), herbaceous and woody species diversity and richness of response, in conjunction with physical and chemical soil and topography were studied. They found that, on the northern slopes of the diversity of plant species, was negatively correlated with altitude. The western slopes of the diversity of herbaceous species, salinity and altitude, negative and positive correlation with the percentage of lime. They also stated that, on the southern slopes of the diversity and organic matter, pH, nitrogen and potassium are positively correlated, but the correlation is statistically, at 95 percent, is likely not significant (P≥0/05). So the results of this study, the correlation between diversity and organic matter, nitrogen, potassium and elevation above sea level, with the results corresponded Mirzaee and colleagues. Gogo et al. (2000), species richness tundra of northern Alaska, studied, and species diversity found in the area, the abiotic environmental gradients such as topography, soil moisture, pH and natural fertility of the soil. Anrait et al. (2005), in Pakistan, the study concluded that soil physical factors such as cover stone, and the percentage of land slope, the soil chemical factors, impacts on plant species diversity versa. The results of this study, corresponded almost. Fisher et al. (1987), a study stated that, after the available water, soil nitrogen is the most limiting factor for plant growth, an important, and in increasing the diversity of plants, has a big role. Their reason for this is due to the influence of physical factors of soil, the water knew. Mahdavi et al. (1389), demonstrated that, in the

North and South, with the increase in organic matter and nitrogen species diversity grass significantly increased, in this case, there is a positive correlation between these variables, the results have almost corresponded. Fu (2004), stated in a study near Beijing in China. The soil organic matter, soil fertility is an important indicator, and among all agents of soil organic matter and total nitrogen, the greatest effect on the characteristics and distribution of plants. That due to the greater impact of phosphorus on the variety, the results of Fu et al. (2004), with the results of this study do not match. The results of the relationship between diversity and uniformity index and Nitrogen, phosphorus, organic matter, potassium, pH and electrical conductivity showed that the communication line between Simpson diversity indices, Shannon - Wiener and nitrogen, phosphorus, organic matter, potassium, lead electrical and pH, there. That due to the large variance changes in the natural environment of this type of relationship seems quite logical.

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