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A Multivariate Analysis in Relation to Edaphic and Environmental Factors of Rangelands Vegetation of Mugla Province

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ABSTRACT

This study was carried out in order to compare in 20 different rangeland sample areas that determined in order to environmental variables, vegetation and soil properties by multivariate ordination analysis in Mugla province. Cluster analysis was made to determine the similarity and species compositions of sample areas, and as a result of this analysis, three different groups have occurred. Additionally, detrended correspondence analysis (DCA) was made after the indicator species analysis. The interaction between environmental and soil-borne factors as altitude, distance to village,

soil depth, pH in saturated soil with water, lime and surface stoniness were found to be significant and this significance was expressed by graphs. Moreover, it was indicated that relationship with species in the vegetation of the variables that were determined as significant by tables and figures. The relationship with the species in the vegetation of the variables that were determined as significant was also indicated. The result of the study showed that environmental variables as soil depth, soil pH saturated with water, stony surface, altitude and distance to villages had a significant effect on the species diversity and distribution in the samples areas.

Keywords: Clustering analysis; Multivariate analysis; Rangeland

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1. Introduction

The best way to learn about habitat, niche, and vegetation beside the different interaction between plants in an ecosystem is an investigation of plant biodiversity (Khan et al 2016). Biodiversity is defined as species richness that consisting of the influence of different environmental characters (Khan et al 2018). It is important that examination of the relationship between environmental factors and plants in these ecosystems for better understanding and management rangeland ecosystems, which are among the areas with the richest vegetative biodiversity in the world. The impact of environmental factors on plant communities has been the subject of many ecological studies in recent years (Amiri & Saadatfar 2009; Altın et al 2011; Ispirli et al 2016). Determination of the interaction between different biotic and abiotic components of an ecosystem is an important part of ecological studies (Rahman et al 2016; Khan et al 2017). The species composition, which is one of the main components of rangeland ecosystems, is highly controlled by environmental factors. Climate,

Table 4- The results of the length and eigenvalues in Detrended Correspondence Analysis (DCA)

	Axis 1	Axis 2	Axis 3
Eigen value	0.54110	0.37308	0.14921
Gradient length	3.473	2.975	2.923

4. Conclusions

Rangeland areas have had a great impact on every period of human history from ancient times to the present day. For the suitable management of rangeland areas that have biodiversity and supply the nutritional needs of livestock, it is very important to know the species of plants in the area and investigate their relationship with environmental factors. For this purpose, the species and environmental variables were examined by vegetation study in 20 different sample areas by ordination analysis, especially in Mugla province, where is located in a known ecology with its rich in biodiversity. According to the results, it was determined that many environmental variables had an effect on botanical species composition. The results of the study revealed the species that have a growing potential in the regions. The data obtained from this study will be a resource for future studies about rangeland management and improvement in these areas.

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Abbreviations and Symbols	
DCA	Detrended Correspondence Analysis
MRPP	Multi-Response Permutation Procedures
TAGEM	General Directorate of Agricultural Research and Policies
BUGEM	General Directorate of Plant Production
TUBITAK	The Scientific and Technological Research Council of Turkey
MUG	Mugla Province
<i>pH</i>	Stands for the potential of Hydrogen
<i>CaCO₃</i>	Calcium Carbonate
<i>P₂O₅</i>	Phosphorus Pentoxide
<i>K₂O</i>	Potassium Oxide
<i>r</i>	Correlation Coefficient

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