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The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

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Relation between vegetation and soil in West Azarbaijan rangelands of Iran

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Key words : Iran, classification, ordination, soil characteristics

Introduction In order to better understand and manage rangeland ecosystems, it is important to study the relationship between environmental factors and plants in these ecosystems (Jafari *et al.*, 2003). The objective of this research was to study the relationships between soil characteristics and vegetation in order to find the most effective factors in the separation of the plant communities.

Material and methods Vegetation data including Abundance-Dominance were estimated within each quadrat (Table 1). Two-way indicator species analysis (TWINSPAN), was used to classification of vegetation into different groups. Soil characteristics including; PH, EC and OC (Table 1), were taken in each quadrat. Multivariate techniques including detrended correspondence analysis (DCA) was used to analyse the collected data (Torkan, 2006).

Table 1 Ecological series for soil characteristics at Nazlochai Basin in West Azarbaijan rangelands of Iran

No. Quadrat	7	16	1	19	6	11	4	13	17	3	15	2	9	20	10	18	8	14	12	5	
OC	2.6	3.9	3.6	3.4	3.4	1.2	3.7	2.8	2.5	1.9	2	1.2	1.4	2.6	3.9	2.1	2.2	3.5	2	2.1	
Ph	6	5.2	5.4	5.5	5.6	5.6	5.4	6	6.1	6.1	6.5	5.7	5.8	6	5.2	6.6	6.6	6.5	6.8	6.8	
EC	2.3	1.9	2.7	2.7	1.4	1.7	2.7	3.5	1.1	1.5	3.7	2	3.3	2.2	2.1	3.7	3.7	2.4	3.2	3.4	
<i>Linum cartharticum</i>		2	2	1	2		2	1					1								
<i>Alopecurus pratensis</i>	2			1		2			1	3		2		2							
<i>Polygonum bistorta</i>											1						1			2	
<i>Koeleria cristata</i>			1		3		2									2			2		
<i>Geum rivale</i>	1			1	2			1	2			1									
<i>Prunella vulgaris</i>					1			2		1			3	2							
<i>Scabiosa columbaria</i>		2		2			1													1	
<i>Campanula glomerata</i>		2			1	2	2					3	2		1				1		
<i>Festuca pratensis</i>										2									1	3	3
<i>Viola hirta</i>		1		2		2	1	2					1						2		
<i>Briza media</i>			2	1	1			2					1							3	
<i>Bromus tomentellus</i>		2					1													3	
<i>Festuca ovina</i>	2			2	1	3			1	2				1	3						
<i>Ajuga reptans</i>						1		2	1				1	1							
<i>Trisetum flavescens</i>									3	1							3	2		2	
<i>Thymus serpyllum</i>		1	3	2			2									1			1		
<i>Cirsium oleraceum</i>		2							1		3						1	3		1	
<i>Deschampsia caespitosa</i>				2	1					2	3						2		1	1	

Results and discussion vegetation of the study area was classified into 3 groups. Each groups differs from the other in terms of its environmental needs. The results of DCA ordination (Figure 1) showed; PH is effective factors in the distribution of vegetation types.

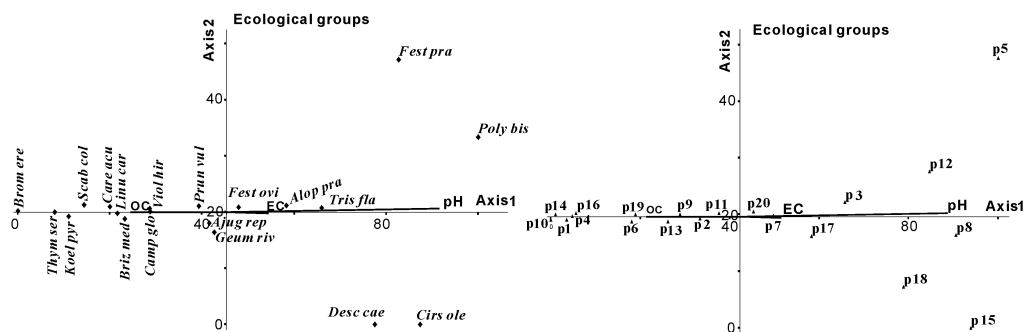


Figure 1 DCA-ordination diagram of the vegetation types related to the soil characteristics in Table 1.

Conclusions The results showed that the vegetation distribution pattern was mainly related to soil characteristics. Totally, considering the habitat conditions, ecological needs and tolerance range each plant species has a significant relation with soil properties. Analyzing ecological data using ordination methods (e.g. DCA) makes simpler understanding of the complex relationship between plants and environmental gradients. In addition, these methods prevent presence of ineffective factors and data complexity from affecting ecological models (Jafari *et al.*, 2003).

Reference

Jafari, M., Zare Chahouki, M., Tavili, A., Azarnivand, H., and Zahedi Amiri, GH., (2003). Effective environmental factors in the distribution of vegetation types in Poshtkouh rangelands of Yazd Province (Iran), *J. Ar. Envi.* 56, 627-641.