



University of Kentucky
UKnowledge

International Grassland Congress Proceedings

21st International Grassland Congress / 8th
International Rangeland Congress

Relationships between Veresk Rangeland Vegetation and Environmental Characteristic Using Multivariate Analysis Methods

E. Shahriary
University of Tehran, Iran

M. Beniaz
University of Tehran, Iran

A. Tavili
University of Tehran, Iran

H. M. Asgari
University of Tehran, Iran

H. Khedrigharibvand
University of Tehran, Iran

Follow this and additional works at: <https://uknowledge.uky.edu/igc>



Part of the [Plant Sciences Commons](#), and the [Soil Science Commons](#)

This document is available at <https://uknowledge.uky.edu/igc/21/1-4/13>

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

This Event is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in International Grassland Congress Proceedings by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@lsv.uky.edu.

Relationships between veresk rangeland vegetation and environmental characteristic using multivariate analysis methods

E. Shahriary, M. Beniaz, A. Tavili, H. M. Asgari, H. Khedri gharibvand

¹ The University of Tehran, Natural Resources Faculty, P.O.Box 31585-4314, Karaj, Iran. E-mail: eshahriary@gmail.com (Corresponding author) ^{2, 3}. The University of Tehran, Natural Resources Faculty, P.O.Box 31585-4314, Karaj, Iran

Introduction Interest in how various landscape components affect biotic and abiotic resources has grown over the past 2-3 decades (Brosfokske *et al*, 2001). The distribution and abundance of range species has been correlated with a variety of complex environmental gradients. Environmental factors affect range plant growth and need to be understood and considered by rangeland managers. Plant growth and development are controlled by internal regulators, which are modified according to environmental conditions (Manske 1997). Of the most ecologically important environmental factors affecting rangeland plant growth and distribution are topography (slope, aspect, and elevation) and soil properties (Jafari *et al*, 2004). Environmental factor effects on vegetation could be considered as a main ecological subject during last recent decades.

Materials and methods The study was conducted at Zereshkin rangelands, approximately 60 km south west of Savadkouh, in north of Iran (52° 52' 58" — 52° 58' 5" E, 35° 55' 51" — 35° 58' 40" N). Based on field surveys, five vegetation types were identified at the study area. Fifteen 1 m² quadrats with 50 m distance from each other were established along each of four 200 m transects. Vegetative sampling method was randomized systematic. Soil samples were taken at the start and end points of each transect. Data matrix of environmental factors and vegetation types was made. The windows version of PC-ORD (McCune and Mefford, 1997) was used for ordination of vegetation types on a gradient of site factors. Data were analyzed by principal component analysis (PCA).

Results Figure 1 shows the distribution of vegetative types of Zereshkin rangeland defined by the first two axes of the PCA. As shown in Figure 1, the location of types in four quarters is different. The distance between the indicator points of the vegetation types along each axis shows the degree of similarity and dissimilarity of types in the environmental factors. In axis 1, the coefficients of some factors are negative such as gravel, thus those types located in quarter 1, have inverse relationship with this factors. In axis 2, coefficients some of factors are positive such as silt 30-60 cm, Therefore, those types that are lying in the third quarter have inverse relationships with this factors. For example, as shown in Figure 1, Da.gl-Br.to. type is relatively equally affected by PC1 and PC2. Since this type has been located in negative side of axes 1, therefore, it has a positive tendency to soils with high gravel percentage on top. The distribution of this type is negatively related to nitrogen percentage and OC of soil samples, that is, an increase in N and OC of soil leads to decrease of mentioned type occurrence in the study area.

Discussion Results showed that different vegetation types show different relationships with underlying soil characteristics. It seems that the most important factors affecting the occurrence and separation of vegetation in Zereshkin are texture, OC and nitrogen. Soil texture controls distribution of plants by affecting moisture availability, aeration and distribution of plant roots (Jafari *et al*, 2004). Soil organic carbon is an important determinant of soil fertility because of its impact on ion exchange capacities and its near-stoichiometric relationship to nitrogen. Future studies on the vegetation-site factor relationships of rangelands should attempt to study integrated site factors effects on vegetation occurrence and separation.

References

- Brosfokske, K.D., J. Chen and T.R. Crow. (2001). Understory vegetation and site factors: Implications for a managed Wisconsin landscape. *Forest Ecology and Management* 146: 75-87.
- Jafari, M., M.A. Zare Chahouki, A. Tavili, H. Azarnivand and Gh. Zahedi Amiri. (2004). effective environmental factors in the distribution of vegetation types in Poshtkouh rangelands of Yazd province (Iran). *Journal of Arid Environment* 56: 627-641.
- McCune, B., and M.J. Mefford. (1997). PC-ORD. Multivariate Analysis of Ecological Data Version 3.0. *MjM software design*. Glenden Beach, OR.

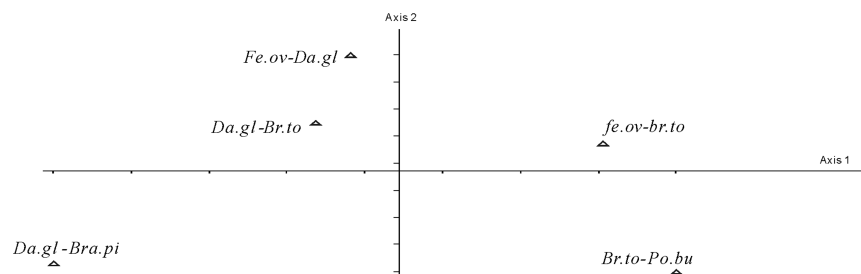


Figure 1 Distribution of Zereshkin rangeland types defined by the first two axes of PCA.