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## The study of physico-chemical characteristics of soil-vegetation relationships in saliferous and gypsiferous soils of winter rangelands in Eshtehard (Iran)

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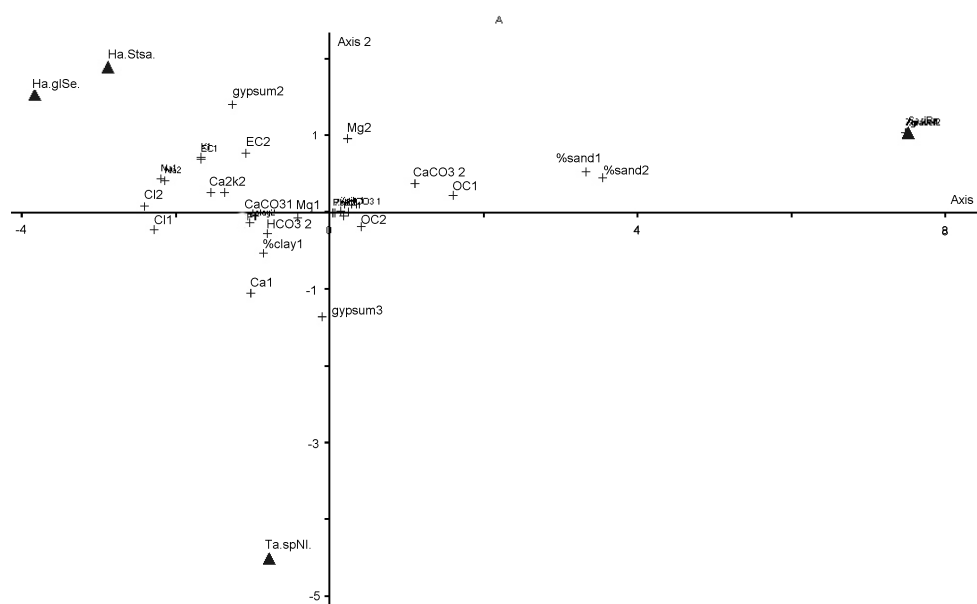
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**Key words :** saliferous and gypsiferous soils , PCA , cover , physico-chemical characteristics , Eshtehard

**Introduction** In order to integrate management of rangelands ecosystems , it is necessary to be aware of the relationship between environmental factors and plants in these ecosystems . Aridisols occupy vast extension of rangelands in arid and semi-arid regions of Iran . Scattered vegetation cover is representative of special physico-chemical characteristics in these soils . The aim of the present study was to identify gypsophyte and halophyte plants and investigate plant distribution related to physico-chemical characteristics of soils in Eshtehard winter rangelands .

**Materials and methods** The study area is located in the east of Eshtehard (35° 38' N , 50°13' E to 35°34' N , 50°33' E) . The mean elevation of the region is 1250 m and the Shour river passes across this plain . Vegetation sampling was conducted in the key area based on a randomized-systematic pattern . Vegetation data included canopy cover and density percentage , estimated quantitatively along transect within each quadrat . The four main plant types were *Halocnemum strobilaceum-Salsola crassa* , *Haplophyllum glaberrimum-Seidlitzia rosmarinus* , *Haplophyllum glaberrimum* , and *Tamarix sp .-Nitraria schober .* , The soil profiles excavated and disturbed soil samples were collected . Based on the standard methods , physico-chemical characteristics including soil texture , electrical conductivity in saturated extract soil reaction , organic carbon content , gypsum and equivalent calcium carbonate percentage , soluble anions and cations were determined . Multivariate method of principal component analysis (PCA) was used to analyze the collected data .

**Results** According to Figure 1 , the first two principal components accounted for 85 .83% of the total variance in data set . Therefore , 55 .62% and 30 .21% variance were accounted for by the first and second principal components , respectively . This means that the first principal component is by far the most important for representing the variation of the four vegetation types . Results showed that the vegetation distribution pattern was mainly related to soil characteristics such as salinity , texture , chloride , soil reaction , gypsum and gravel percentage .



**Figure 1** PCA-ordination diagram of the vegetation types related to the environmental factors in the study area .

**Conclusion** Since PCA method show high accuracy and have different abilities , it could be used for habitat analysis and determination of effective ecological factors in winter and desert rangelands .

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