

USE OF PRINCIPAL COMPONENTS ANALYSIS (PCA) METHOD TO DETERMINE THE RELATIONSHIPS BETWEEN SOIL PROPERTIES AND *AMYGDALUS SCOPARIA* GROWTH

A. Ahmadian Marj¹, A. Jalalian², A.A. Besalatpour³

¹Department of Soil science, Faculty of Agriculture, Islamic Azad University- Khorasgan branch, Iran

²Department of Soil Science, Faculty of Agriculture, Islamic Azad University- Khorasgan branch, Iran

³Department of Soil Science, College of Agriculture, Vali-e-Asr University of Rafsanjan, Rafsanjan, Iran
Afsane_ahmadian@yahoo.com

INTRODUCTION:Plants differ in their requirements and tolerance to several soil variables such as nutrients, salinity and moisture conditions. In fact, the relationship between soil and vegetation cover is complex, whereby soil provides physical support for the vegetation in addition to nutrition that affords growth. Vegetation, in turn, contributes to the pool of soil nutrients through nutrient cycling (Moro et al., 2011). Therefore, it is deeply important to understand the ecological relationship between soil variables and tree species in order to plan and execute a successful forest restoration program for fragmented forests. In various studies, traditional regression models have been encountered to recognize the relationships between the landscape features, soil factors, and vegetation distribution. Nevertheless, many of the studied methods have not been recommended for large areas as various soils and environmental factors are effective and large amount of samples are required to characterize the above mentioned relationships (Zhang and Oxley, 1994). The main objective of this study was to determine how the *Amygdalus Scoparia* specie in the forests around Zob-e-Ahan factory (Isfahan, central Iran) is distributed in relation to soil physical and chemical characteristics. Investigating the potential use of principal components analysis (PCA) method to determine the relationships between soil properties and *Amygdalus Scoparia* growth was also part of the goal.

MATERIALS AND METHODS: The study area was a part of the forests around the Zob-Ahan factory located in 51° 15" to 51° 25" E and 32 °25 "to 32 ° 32" N, central Iran. The average temperature varies between -12.5 and 40.7°C. The average height of sea level and rainfall are about 1692 m and 169.5 mm, respectively. A stratified random sampling was designed using digital topography map in the environment of ArcGIS software and a total of 90 soil samples were collected from the depths 0-30 and 30-60 cm of soil surface. The positions of the sampling points were identified in the field using GPS (model: 76CSx). The soil samples were air-dried and ground to pass a 2-mm sieve. Soil organic matter (SOM) content, available phosphorus, pH, electrical conductivity (EC), and calcium content, magnesium content, gravel were determined. The plant growth indices including width and height of plants were measured in each sampling point by 4 replicates. Finally, parameters affect the *Amygdalus Scoparia* growth in the study area were estimated using the PCA method.

RESULTS AND DISCUSSION:The results showed that the parameters calcium content, magnesium content, gravel, and organic carbon are important factors affecting the width of *Amygdalus scoparia*. Calcium carbonate content in both depths (0-30 and 30-60 cm) had a negative relation with its growth. The reason is that T have appropriate Calcium carbonate content caused changes in soil acidity and good structure, which is effective in absorbing food. But if too much Calcium carbonate percentage increase and the increase of salts in the root zone by creating a hard layer creates problems for plants.



The 1st International Conference on New Ideas in Agriculture
Islamic Azad University Khorasgan Branch
26-27 Jan. 2014, Isfahan, Iran

