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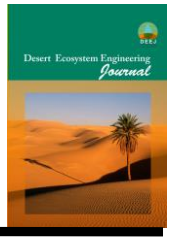

# Investigating Soil Characteristics and Physiographic Factors Affecting the Establishment of *Taverniera spartea* (Burnm. f.) DC. in Hormozgan province

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**Extended Abstract**

**Introduction**: Considering the extensive degradation of Iranian rangelands and forests due to livestock grazing and the land use change in recent decades, rangeland management requires a comprehensive knowledge concerning the ecological characteristics of native plant species and how they respond to environmental factors.

Developed from the Fabaceae legume family, *Taverniera spartea* is an important species indigenous to the Persian Gulf and Omani rangelands of Iran. As a rich source of plant protein, this plant has a high value in feeding animals. Possessing a strong root system, the plant plays an important role in biologically stabilizing nitrogen, increasing soil's organic matter, improving soil texture, and preventing soil erosion. Lack of sufficient knowledge concerning this plant species and the relationship between soil, environmental factors, and the vegetation status is a serious obstacle to using soil for biological regeneration of degraded rangelands and planning for optimal management of existing habitats. Therefore, this study sought to investigate the response pattern of the plant to the slope of soil and topographic factors in its habitats in Hormozgan province using the generalized incremental model.

**Materials and Methods**: This study was conducted in Siahoo, Ahmadi, and Bashagard regions in Hormozgan province. Siahoo region is located 55 km north of Bandar Abbas at an altitude of 450 meters above sea level, Ahmadi region is located 95 km north of Bandar Abbas at an altitude of 750 meters above sea level, and Bashagard region is located 135 kilometers east of Bandar Abbas at an altitude of 600 meters above sea level. The average rainfall of Siahoo, Ahmadi, and Bashagard region is 171.54, 183.61, and 193.18 mm, respectively, and their average annual temperatures are 27.34, 25.52, and 28.6 degrees Celsius respectively. Located among the semi-humid hot regions, Siahoo region is a semi-dry hot region with the average minimum and maximum

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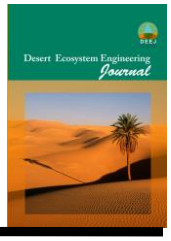

absolute temperature of 21.8 and 32.3 ° C, respectively. Moreover, Bashagard is a hot dry region with the average minimum and maximum absolute temperature of 21.1 and 33.9 degrees Celsius, respectively.

A 30 plots were chosen via random-systematic sampling for each ecological unit (90 plots in three study areas). Then, the percentage of canopy cover was measured for each species located inside the plots, and a soil sample was taken from each plot for analysis. Moreover, conventional comparative analysis method was used as a nonlinear method to investigate the relationship between effective and significant environmental variables and vegetation, and forward selection was used to reduce error. On the other hand, the significance of the relationship between species composition and axes obtained from environmental variables was investigated using the Monte Carlo permutation test. Furthermore, a generalized incremental model was used to predict the response of plant species to changes in environmental factors. Finally, the Akaic information criterion was used to rank the variables affecting the performance of the species.

**Results**: This study found that the soil texture was sandy loam in all three habitats. The amount of electrical conductivity in the three habitats revealed a significant difference. Soil acidity was also higher in Bashagard region than the other two ones. The highest amount of soil lime was found in Siahoo region with 54.3%, and the lowest one was observed in Ahmadi region with 19.3%. It was also found that as the soil clay percentage increased, the species response was decreased and the species presence was reduced. On the other hand, with an increase in soil acidity to 7.5%, the species response increased, and as soil acidity was increased to 7.7%, the presence of the species decreased. Also, the presence and growth of the species increased with and increase in soil acidity. The results also indicated that the presence and growth of species increased with an increase in the amount of soil lime to 55, and that the presence of the species decreased with an increase in soil lime. Moreover, as the percentage of the soil's organic carbon increased, the species response and presence increased. Furthermore, the species response and presence increased with an increase in the soil's nitrogen percentage. Also, as the percentage of uncovered soil (bare soil) increased to 55, the species response increased, and as the bare soil increased, the presence of the species decreased.

**Discussion and Conclusion**: The results of conventional adaptive classification showed that seven factors, including the percentage of neutralizing material, altitude, percentage of bare soil, electrical conductivity, soil saturation, litter percentage, and soil silt percentage were the main factors which influenced the distribution of *Taverniera spartea*. Applying the generalized collective model with Poisson error distribution for each environmental variable showed that soil lime percentage, clay percentage, acidity, soil organic carbon content, soil nitrogen, and bare soil percentage has a significant influence at the level of 0.05%. on the species yield. The study also examined the role of the presence and yield of *Taverniera spartea* as a valuable rangeland species in forage production, soil and water conservation using environmental factors. It could be said that to rehabilitate the degraded rangeland areas with the required conditions for the establishment of this *Taverniera spartea*, the species should be planted according to its ecological needs. At the same time, proper and optimal use of the species in rangeland and suitable habitats reduces the loss of capital and time.

**Keywords**: Physiography, Soil, *Taverniera spartea*, Hormozgan Province.