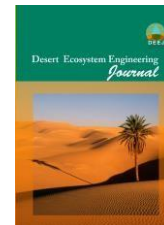




University of Kashan

Desert Ecosystem Engineering Journal

Journal homepage: <http://deej.kashanu.ac.ir>

## Determination of Occurrence Optimal Thresholds in the Predictive Models of Plant Species Distribution (Case study: Rangelands of Nir region of Yazd province)

Mohamad Ali Zare Chahouki<sup>1</sup> Hosein Piry Sahragard<sup>2</sup>, Mohsen Naghilou<sup>3</sup>

Received: 25/2/2016

Accepted: 19/4/2016

### Abstract

The current study addresses determination of occurrence optimal thresholds of predictive models of plant species distribution in Nir rangelands of Yazd province. Accordingly, after determination of homogeneous units using digital elevation model and geology maps with scale 1:25000, vegetation sampling was carried out using random systematic method via plots which establishment across 3-5 transects with 300-500 m lengths. In order to sample the soil at each habitat, eight holes was drilled and samples were taken from 0-30 and 30-80 cm depths. Measured soil properties included gravel, texture, available moisture, saturation moisture, organic matter, lime, gypsum, pH, electrical conductivity and soluble ions. Plant distribution modeling was conducted using LR, the MaxEnt and ANN. After preparation of predictive maps of plant species habitat, an occurrence optimal threshold was determined using sensitivity-specificity equality approach and Kappa maximization approach for each plant species. Then, the compliance of classified maps with real maps cover was measured using the kappa coefficient. Based on obtained results, accuracy of predictive maps derived from different methods is different from each other. Among derived maps from LR, MaxEnt and ANN methods, the highest compliance belonged to the *C. monacantha* ( $\kappa= 0.9$ ), *R. ribes-A. sieberi* ( $\kappa= 0.93$ ) and *S. rosmarinus* ( $\kappa= 0.93$ ), respectively. These results indicate that due to differences in the discriminatory ability of the model to classification of the presence or absence, occurrence optimal thresholds of plant species are different in various species, therefore, in order to determination of occurrence optimal thresholds, quality of predictive models should be considered in addition to the research objective and abundance of studied species.

**Keywords:** Occurrence optimal thresholds, Sensitivity-specificity equality approach, Kappa maximization approach, Rangelands of Nir, Plant distribution modeling.

1. Department of Rehabilitation of Arid and Mountainous Regions, Natural Resources Faculty, University of Tehran

2. Range and Watershed Department, University of Zabol

3. M.sc student of range management, Natural Resources Faculty, University of Tehran