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APPLICATION OF SATELLITE REMOTE SENSING AND ECOLOGICAL NICHE MODELING TO
ESTIMATE HABITAT DISTRIBUTION OF PROSOPIS CINERARIA IN THE UAE

Abstract

Integrating satellite remote sensing data with ecological niche models improves species' prioritization and implementation of conservation management practices. Understanding the habitat suitability of such species will provide an insight to the policy makers to develop informed long-term environmental plans. Fortunately, species habitat distribution is closely linked to environmental and bioclimatic variables used in the species distribution models (SDMs). Recent applications of satellite remote sensing data with the bioclimatic variables have improved SDM performance. Here, our objective is to assess the significance of including satellite remote sensing data in estimating the potential habitat suitability of an important arid plant species (*Prosopis cineraria*) using maximum entropy (MaxEnt) modeling in United Arab Emirates (UAE). One hundred species occurrences with 38 environmental variables were selected to simulate the MaxEnt model. Environmental variables, such as satellite remote sensing data (UVB, NDVI, LST and PET), 19 bioclimatic variables from WorldClim data and static parameters (topography, elevation, soil quality) were used. For the final model we selected three predictive scenarios: only bioclimatic variables (OB), without satellite remote sensing variables (WRS) and with all key variables (AKV). The AKV Model simulation has substantially improved the habitat suitability estimation with greater AUC value (0.99) than OB (0.96) and WRS (0.98). Therefore, the results suggest that the best *P. cineraria* habitat distribution predictions could be achieved when all key variables are combined. Further, our results showed that the UVB radiation in the highest quarter, precipitation of the coldest quarter, normalized difference vegetation index (NDVI) and temperature annual range are most significant variables in estimating the potential habitat distribution of *P. cineraria* from AKV model simulation. Model results showed that the spatial proportions of the potential habitat suitability in the UAE consisted of high (0.57%), medium (1.2%) and low (2.6%) suitability. Further work may be needed to expand such approach to include detailed modeling for other UAE plant species.