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Maximum entropy modelling (Maxent) for mapping distribution of Mauritius thorn and River red gum distribution in the Vhembe Biosphere reserve.

This study aims to model the spatial and temporal distribution of invasive alien species using the Ecological Niche model (ENM) from presence-only data. The Ecological niche model used for this study was the (Maximum Entropy) MaxEnt model. MaxEnt was used to understand the distribution of [Mauritius thorn (Caesalpinia decapetala) and River red gum (Eucalyptus camaldulensis)] globally and within the Soutpansberg Mountain in the Vhembe Biosphere Reserve (VBR). Here, we examine how climatic, environmental, and remote sensing parameters affect the establishment and distribution of Invasive alien plant (IAP) species in the VBR. Twenty-one (21) Bioclim predictor variables, ten (10) environmental variables four (4) Remote sensing products were collected across two seasons (hot-dry, cool-dry). The MaxEnt analysis for Mauritius thorn and River red gum using Environmental, GIS and Remote Sensing variables produced a significantly high Akaike information criterion (AIC) and an area under the curve (AUC) values. Upon execution, the point-wise mean maps were generated for both the global and local distribution for Mauritius thorn and River red gum. The results show that the omission on River red gum is a very good match to the predicted omission rate, the emission rate for test data drawn from the Maxent distribution itself. The AUC values allow the comparison of the performance of one model with another and are useful in evaluating multiple MaxEnt models. The Receiver Operating Curve (ROC) curve shows superior predictive ability with a mean AUC close to 1 for both Mauritius thorn and Red river gum. Jackknife was run to identify variables that are most important in the model.