# Prediction of Cossus Linnaeus suitable growing area in China under Future Climate change based on optimized MaxEnt Model and Geographic detector

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## Abstract

CossusLinnaeus is a kind of insect that causes great harm to forest trees in China, which has a great impact on the country's agriculture and forestry, and seriously affects the stability of the ecosystem, so it is very important to predict its distribution and contain it. Most researchers use the MaxEnt model with default parameters to build models to predict the potential geographical distribution of species. Recent studies have found that in the case of default parameters, the prediction results of MaxEnt model are not only inaccurate, but also sometimes difficult to explain. In this paper, ENMeval packets are used to adjust the optimal feature combination parameters of MaxEnt model, and then the MaxEnt model with optimal parameters is used to predict the potential geographical distribution of CossusLinnaeus under present and future climatic conditions. The simulation results show that the simulation effect of the MaxEnt model is good (the area under the ROC curve (AUC = 0.914), Cossus Linnaeus is mainly distributed in Liaoning Province, Hebei Province, Shandong Province, Henan Province, Shaanxi Province, Shanxi Province, Ningxia and Gansu Province, etc., which is consistent with the actual distribution results. Under future climatic conditions, the area of Cossus Linnaeus high suitable growth area will rise up 26.7% to 87.4% compared with the current one. Climate change affects the potential distribution of Cossus Linnaeus, and the top four environmental variables with contribution rate are normalized vegetation index (NDVI,40.3%), annual mean temperature (Bio1,24.1%), coldest monthly minimum temperature (Bio6,12.4%) and diurnal range of mean temperature (Bio2,9%). Under the condition of future climate change, the center of gravity of Cossus Linnaeus will move to high latitudes. This study will provide theoretical support for the prevention and control of Cossus Linnaeus and tree protection in China.

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