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A STUDY OF ECOLOGICAL NICHE MODELS FOR PLANTS SPECIES USING ENVIRONMENTAL MODEL

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ABSTRACT

Ecological niche models (ENMs) for plant species are essential tools for understanding and predicting the distribution of vegetation based on environmental factors. These models use species occurrence data and environmental variables, such as temperature, precipitation, soil type, and light availability, to assess suitable habitats for plant species. By integrating environmental modeling, ENMs help identify the ecological preferences of different plants, shedding light on their responses to changing climate and habitat conditions. The approach often employs algorithms like MaxEnt, Bioclim, or generalized linear models to predict potential distributions and highlight areas of conservation importance. For instance, these models can forecast how climate change may alter plant species' habitats, assisting in strategies for biodiversity preservation and habitat management. They can also guide restoration efforts by identifying optimal regions for reintroducing native species. ENMs are crucial in studies that examine species invasions, forest dynamics, or rare plant populations. The reliability of these models, however, depends heavily on the accuracy of input data and the selection of relevant environmental variables. Despite limitations, such as incomplete species data and the assumption of equilibrium between plants and their environment, ENMs remain powerful tools in predicting ecological outcomes and making informed conservation decisions for plant diversity and ecosystems globally.