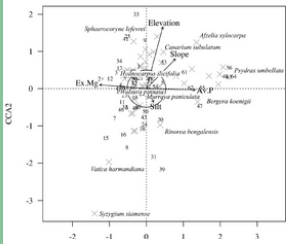
PUBLICATION

Environmental factors differentially influence species distributions across tree size classes in a dry evergreen forest in Sakaerat Biosphere Reserve, northeastern Thailand



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ABSTRACT

Plant communities in tropical forests are influenced by multiple environmental variables. For trees, soil and topographic characteristics are key factors that impact the establishment of many species. In this study, the impacts of soil properties and topography on forest structure, species composition, α- and β-diversity, and tree species distribution across size classes were investigated in a dry evergreen forest (DEF) in the Sakaerat Biosphere Reserve, northeastern Thailand. Within a 16 ha permanent plot, all trees with a diameter at breast height (DBH) ≥ 1 cm were recorded. Tree species distributions mostly respected gradients of plot elevation and soil nutrient, including available P; these variables were strongly associated for most size classes. Structural attributes (basal area and tree density) of trees with a DBH of 5–10 cm were highly sensitive to these variables. For trees with a DBH of 2–5 cm, α-diversity was negatively associated with available P while β-diversity was associated with topography and available P. These findings demonstrate the strong influence of topographic and edaphic variables in shaping the DEF. Sensitivity to these variables, particularly elevation and increases in available P, increased with increasing tree size among size classes, as small trees were less sensitive than were larger trees. Our study provides an example of how different environments affect many of the features of tropical forest structure, such as tree size class and species composition.

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