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EVALUATING THE NOVEL METHODS ON SPECIES DISTRIBUTION MODELING IN COMPLEX FOREST

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Abstract. The prediction of species distribution has become a focus in ecology. For predicting a result more effectively and accurately, some novel methods have been proposed recently, like support vector machine (SVM) and maximum entropy (MAXENT). However, high complexity in the forest, like that in Taiwan, will make the modeling become even harder. In this study, we aim to explore which method is more applicable to species distribution modeling in the complex forest. *Castanopsis carlesii* (long-leaf chinkapin, LLC), growing widely in Taiwan, was chosen as the target species because its seeds are an important food source for animals. We overlaid the tree samples on the layers of altitude, slope, aspect, terrain position, and vegetation index derived from SOPT-5 images, and developed three models, MAXENT, SVM, and decision tree (DT), to predict the potential habitat of LLCs. We evaluated these models by two sets of independent samples in different site and the effect on the complexity of forest by changing the background sample size (BSZ). In the forest with low complex (small BSZ), the accuracies of SVM (*kappa* = 0.87) and DT (0.86) models were slightly higher than that of MAXENT (0.84). In the more complex situation (large BSZ), MAXENT kept high *kappa* value (0.85), whereas SVM (0.61) and DT (0.57) models dropped significantly due to limiting the habitat close to samples. Therefore, MAXENT model was more applicable to predict species ' potential habitat in the complex forest; whereas SVM and DT models would tend to underestimate the potential habitat of LLCs.

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