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## Fitting Species Abundance Models in Tree Strata in a Cloud Forest

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### Abstract

Species-abundance models can be used to detect forest disturbance in ecosystems that had been logged. With the aim of knowing the impact of the selective logging on the distribution of tree species abundance, we analysed the forest disturbance and successional stage of two experimental plots with different historical of management. Four species-abundance models were fitted in the tree strata of two stands with different historical of management in “El Cielo” cloud forest, Tamaulipas, Mexico. Two sampling schemes were tested to evaluate its efficiency in collecting the data needed to fit species-abundance models. The log-normal distribution fitted well the data in the unlogged plot, while for the logged plot none of the abundance models shows a significant fit, however, the species distribution of this plot is developing to a log-normal. The geometric series and the broken stick model did not fit well the abundance data in none of analysed plots. The results indicate that both stands show an intermediate succesional grade, between the pioneer and climax stages, where the species with middle abundance are the most dominant. The transects were found to be better to collect the data needed to fit species-abundance models in the tree strata of this forest. We found significant evidence that the stand that had been selectively logged is currently in an earlier succesional stage compared to the unlogged stand, due to the latter fitted a log-normal distribution, whereas the data for former did not. Contrary to some studies that claim that species-abundance are nor good to detect forest disturbance in sites that had been logged, this study shows that these models can be used appropriately to evaluate whether or not a forest is disturbed.

**Keywords:** Cloud forests, species abundance-models, successional stage