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THE DEPARTMENT OF MATHEMATICAL SCIENCES PROUDLY PRESENTS

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Seed rain along a gradient of degradation in a Caribbean dry forest: Fitting a generalized linear mixed model to analyze large counts.

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Abstract

Tropical dry forests that experience severe disturbances (e.g., fires) often remain degraded for long time periods, during which non-native grasses and trees dominate. One barrier to native tree regeneration in degraded areas may be seed dispersal limitation. To better understand how dispersal limitation influences recovery from degradation, we tested whether the mode and rates of seed dispersal differed in degraded sites dominated either by the exotic tree *Leucaena leucocephala* or open areas dominated by introduced pasture grasses. In order to do this, seed rain was measured for one year in traps located within five vegetation types that ranged in degree of forest degradation from open grass to intact native forest. Since the observations were counts of seeds in the traps, generalized linear models using Poisson or negative binomial distributions are needed. These models fit count data and incorporate the relationship between variance and mean, implicit in these distributions. The study design, defined by where and how the traps were located, and where counts were recorded, must also be taken into account in the model, though appropriate random effects. Hence the model to analyze the data and test the scientific hypotheses is a generalized linear mixed model. He best fit was attained using a negative binomial distribution with random effects for areas and traps within each area. In this talk we will discuss how we constructed an appropriate model for these data, some of the properties of this model, and how we used this model to test the hypothesis of interest.