ARE NATIVE SONGBIRD POPULATIONS AFFECTED BY NON-NATIVE PLANT INVASION?

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ABSTRACT

Development into forested areas is occurring rapidly across the United States, and many of the remnant forests within suburban landscapes are being fragmented into smaller patches, impacting the quality of this habitat for avian species. An ecological effect linked to forest fragmentation is the invasion of non-native plants into the ecosystem. Thousands of non-native plants have been introduced into the United States since European settlement through landscaping and accidental release. Past studies have repeatedly shown a decrease in bird biodiversity with suburban development and the negative impacts of non-native plants on individual bird behavior. However, few studies have explicitly examined the link between the density of native plants and avian communities and habitat use.

The objective of this project is to estimate avian occupancy, abundance, and diversity as a function of non-native plant density and associated invertebrate abundance. I conducted 98 avian point counts three times between May 15 and August 15, 2009, in Delaware and Pennsylvania to quantify avian occupancy, abundance, and diversity within plots.

Vegetative structure and composition was analyzed within a 500-m buffer surrounding each plot and within the plots by measuring understory coverage, canopy coverage, and proportion of stems that are native. Finally, invertebrate biomass (standardized by plant volume) was measured within each point by vacuum sampling to estimate the avian food supply. Avian surveys, vegetation surveys, and insect measurements will be repeated from May 15 to August 15, 2010.

Preliminary data analysis has suggested that the occupancy of some surveyed bird species is related to native plant proportion within the survey plot. Analysis will continue with the selection of candidate species for which there are adequate data, and multiple linear regression will be used to find the relationship between bird density and patch and landscape vegetation measurements as well as insect biomass. Program PRESENCE will be used to model occupancy for candidate species while accounting for unequal detection probabilities and incorporating site and survey covariates. The models will be evaluated using Akaike Information Criterion (AIC) to determine the most parsimonious model.