

ABSTRACT OF THE THESIS

Factors Influencing the Foraging Behavior of White-Footed Mice: Consequences for Tree Seed Survival in Old-Fields

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The white-footed mouse, Peromyscus leucopus, is an important seed predator in eastern North America. Studies of the foraging behavior of this species are incomplete. Using a multifactorial approach, I examined the relative importance of and the interactions between factors influencing white-footed mouse seed predation. I quantified the influence of predation risk on mouse foraging activity by monitoring mouse removal of locally abundant seeds from treatment plots varying predation risk in a recently abandoned old-field at Hutcheson Memorial Forest, East Millstone, NJ. Seed species used include green ash (Fraxinus pennsylvanicus), box elder (Acer negundo), black cherry (Prunus serotina), the tree of heaven (Ailanthus altissima) and sunflower seeds (Helianthus annuus). The effects of competition and vegetation structure on mouse activity were determined using trapping grids overlapping treatment plots. Effects of seed weight, tannin concentration, energy content, percent lipid, carbohydrate and protein on mouse preferences were analyzed.

White-footed mouse seed predation was significantly

more sensitive to the type and degree of ground cover, particularly Rubus cover, than to distance from the forest edge or to canopy cover. The probability of tree seeds escaping predation by mice should be greatest in areas of low structural complexity, particularly later in the fall during periods of lower precipitation. Trap data indicated that the activity of mice and their principle competitor, the meadow vole (Microtus pennsylvanicus) did not correspond with field seed removal rates, suggesting that mark-recapture studies are not reliable indicators of the intensity of seed predation by mice in specific microhabitats. Sunflower seeds were removed more than local seed types indicating that previous studies using agricultural seeds to examine rodent foraging behavior may have overestimated the impacts of rodent seed predators on the native plant community. Preferences ranks in the lab were correlated with seed protein concentration suggesting that mice may be protein limited in late winter when trials were conducted. Ailanthus seeds were consumed significantly less than other local species. A multifactorial approach indicated that predation risk can influence mouse foraging behavior and subsequently the probability and spatial distribution of seed survival.