

Mammalian Herbivory of Seedlings Planted for Hardwood Reforestation in the Lower Mississippi Alluvial Valley

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Abstract: The Mississippi Alluvial Valley (MAV) has undergone widespread loss of bottomland hardwood forests due to agricultural conversion. Hardwood establishment on marginal croplands has been proposed to mitigate effects of deforestation and related loss of carbon-capture potential. These reforestation areas can provide important wildlife habitat in agriculture-dominated landscapes; however, concern with reforestation is low seedling survival due to herbivory and vegetation competition. We surveyed reforested fields in the MAV of northwest Mississippi to assess survival of 10 species of hardwood seedlings ($n = 782$) planted for carbon sequestration. We sampled seedlings for stem and leaf herbivory and recorded percent cover and species diversity of herbaceous and woody vegetation surrounding seedlings during the first year following planting. To assess density of herbivorous rodents, we conducted mark-recapture trapping and recorded habitat characteristics surrounding each trap during winter months following planting. Seedling mortality was 48% after one growing season. Seedling mortality was caused by drought or human perturbation (83%) and herbivory by hispid cotton rat (*Sigmodon hispidus*; 11%), eastern cottontail rabbit (*Sylvilagus floridanus*; 3%), and pine vole (*Microtus pinetorum*; 3%). Of surviving seedlings ($n = 411$), 82% had no signs of herbivory, whereas 11% were damaged by cotton rats, vole (5%), rabbit (3%), and deer (<1%). Green ash (*Fraxinus pennsylvanica*), water oak (*Quercus nigra*), and nuttall oak (*Quercus nuttallii*) showed greatest survival.

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