

FERTILIZER EFFECTS ON SOIL pH, SOIL NUTRIENTS, AND NUTRIENT UPTAKE IN SWAMP WHITE AND PIN OAK SEEDLINGS ON AN ALKALINE MISSOURI RIVER BOTTOMLAND

Matt Kramer

Dr. John Dwyer, Thesis Supervisor

ABSTRACT

There is growing interest among forest and wildlife managers in the reforestation of bottomlands with mast producing hardwoods in the Lower Missouri River and Mississippi River Alluvial valleys. However, it is common for bottomland hardwood plantings to experience high failure rates due to reasons such as improper soil pH, low nutrient availability, and poor drainage. In this study, fertilizer treatments containing combinations of S, Fe, and N were applied to pin and swamp white oak seedlings planted in a bedded and non-bedded calcareous (pH 8.29) soil in a Missouri River bottomland. Objectives were to evaluate the effects of these fertilizers on seedling foliar nutrient content, soil pH, and soil nutrient concentration at two depths throughout the growing season. The availability of nine nutrients was improved, mainly due to reductions in pH with the application of S, but many of the essential nutrient elements remain below sufficiency levels in the seedling foliage. The sandy soil at the Plowboy Bend Conservation Area study site did not benefit significantly from soil bedding. Overall, the growth of the trees at Plowboy Bend Conservation Area could not be accurately measured because of the greater herbivory by rabbits and white-tail deer on trees in some fertilizer treatments compared to others.