

SEASONAL VARIATION IN NUTRIENT AVAILABILITY AND UPTAKE BY OAK SAPPLINGS FOLLOWING
FOUR NITROGEN TREATMENTS ON A MISSOURI RIVER FLOODPLAIN

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ABSTRACT

Bottomland restoration of native hardwood species provides a variety of benefits to the environment and the landowners. However, when reforesting agricultural floodplains along the Missouri River, high soil pH often causes nutrient deficiencies that limit tree growth and survival. A study was established in May of 2007 to evaluate methods of enhancing tree growth and increasing foliar nutrient content of pin oak and swamp white oak saplings by fertilization using chemicals or nitrogen-fixing shrubs. Treatments included applying 83 g 20N-10P-10K as slow-release ammonium nitrate, 87 g 19N-6P-9K slow-release urea, interplanting with two nitrogen-fixing false indigo seedlings, or left untreated. After analysis, foliar nitrogen averaged 1.9 percent for pin oak and 1.7 percent for swamp white oak during the 2007 growing season at Plowboy Bend Conservation Area near Jamestown, Missouri. Despite fertilization pin oak and swamp white oak were still deficient in nitrogen, potassium, sulfur, calcium, manganese, and copper. Our findings are consistent with those reported in the literature that high soil pH can be a limiting factor in many nutrient transformations in soil and plant uptake. In conclusion, when choosing tree species to reforest bottomlands along the Missouri River in central Missouri the landowner or manager should pick trees that are better adapted to a high soil pH.