

PERFORMANCE OF NORTHERN RED OAK SEEDLINGS ACROSS A PH GRADIENT

Anthony S. Davis and Douglass F. Jacobs

Hardwood Tree Improvement and Regeneration Center
Department of Forestry and Natural Resources, Purdue University
West Lafayette, IN 47907

Northern red oak (*Quercus rubra* L.) seedlings were grown from acorns in 4-gallon containers in a greenhouse. Growing medium was amended to a pH of 3.50, 4.25, 5.00, and 5.75 using tri-weekly applications of aluminum sulfate. In addition, seedlings were subjected to either: (1) addition of a 16- to 18-month controlled-release fertilizer (CRF), (2) mycorrhizal inoculation, (3) the combination of CRF and mycorrhizal inoculation, or (4) a control with neither CRF or mycorrhizal inoculation of the growing medium.

Mycorrhizal inoculation did not influence seedling root or shoot growth or foliar nutrient status. Addition of CRF to the growing medium increased the number of leaves, seedling leaf area, and leaf dry weight, as well as foliar N and P content. Seedlings grown in the CRF-amended medium had more first-order lateral roots than seedlings that did not receive CRF. Growing medium pH influenced seedling height, root-collar diameter, foliar N and P concentration and content, and all leaf morphological parameters.

The results of this study indicate that northern red oak may be able to successfully establish under more acidic conditions than had previously been identified. The addition of CRF to the growing media of containerized seedlings could be designed to maintain seedling nutrient levels at an adequate level into the second growing season. The addition of CRF could benefit seedling establishment when outplanting occurs on nutrient-poor sites where the nursery cultural regime could be adjusted for site-specific nutrient deficiencies.