

## UNDERPLANTING PIN OAK SEEDLINGS IN BOTTOMLAND FORESTS MANAGED AS GREENTREE RESERVOIRS

**Nicholas Krekeler**

St. Charles County Parks Department  
St. Charles, MO 63301

**John M. Kabrick and Daniel C. Dey**

USDA Forest Service North Central Research Station  
Columbia, MO 65211  
and

**Michael Wallendorf**

Missouri Department of Conservation  
Columbia, MO 65201

Underplanting bottomland oaks may be necessary to maintain them in future stands where advanced reproduction is lacking. In bottomland forests of the Mingo Basin in southeastern Missouri, we compared the survival of underplanted pin oak (*Quercus palustris* Muenchh.) acorns, bareroot seedlings, and RPM™ container-grown seedlings in stands where the mid-story was thinned with and without controlling the ground flora with herbicide.

We used a randomized complete-block design replicated three times in declining bottomland oak stands and three times in healthy bottomland oak stands at Duck Creek Conservation Area and Mingo National Wildlife Refuge. Mid-story thinning decreased the canopy cover from 90 percent to 83 percent. After one growing season, underplanted RPM™ container seedlings had the greatest survival (87 percent without and 77 percent with ground flora control) followed by bareroot seedlings (86 percent without and 66 percent with ground flora control). The survival of both bareroot and container-grown seedlings increased with increasing initial seedling height and decreasing canopy cover. Direct-seeded acorns had the poorest survival (9 percent without and 4 percent with ground flora control). For surviving trees, bareroot seedlings had lower ( $P < 0.001$ ) height growth rate than natural seedlings, direct-seeded stock, and RPM™ container-grown stock. However height growth for all stock was fair and ranged from 0.35 feet (bareroot) to 0.65 feet (RPM™) and both bareroot and RPM™ stock were  $> 2$  feet tall at the end of the first growing season. Controlling competing ground flora with herbicide did not increase seedling growth regardless of stock type.

Based on these early results, container-grown stock performed the best but bareroot seedlings appeared nearly equally suitable for underplanting in bottomland forests. Ground flora control substantially decreased survival and did not improve seedling growth sufficiently to warrant its use. We will continue to monitor these seedlings to determine their competitive capacity for regenerating these stands.