

FIRST-YEAR EVALUATION OF TWO NORTHERN RED OAK (*QUERCUS RUBRA* L.) PLANTINGS DURING A DROUGHT YEAR

Stacy L. Clark

Ecology and Management of Southern Appalachian Hardwood Forests
U.S. Forest Service, Southern Research Station
P.O. Box 1568, Normal, AL 35762

Scott E. Schlarbaum

The University of Tennessee, Department of Forestry, Wildlife and
Fisheries, 278 Ellington Hall, Knoxville, TN 37996

Callie J. Schweitzer

Ecology and Management of Southern Appalachian Hardwood Forests
U.S. Forest Service, Southern Research Station
P.O. Box 1568, Normal, AL 35762

Oak (*Quercus* spp.) reproduction can be introduced artificially through seedling planting on sites where natural reproduction is absent or when large oak reproduction is desired within a short time span. Specific parameters affecting early seedling performance are not well understood. The objectives of this study were 1) to determine if nursery seedling grade and characteristics can be used to predict first-year survival and dieback of outplanted seedlings; 2) to determine differences between seedling grade in first-year height and ground diameter growth; and 3) to characterize the relationship between competition, light and outplanting performance.

Nursery seedlings were lifted from one large family seed lot at the Georgia State Nursery in February 2007, and two seedling grades, premium and nursery-run, were visually distinguished. Seedlings from each grade were planted at two study sites located on the Royal Blue Wildlife Management Area, TN. The first site was treated with a midstory herbicide injection the first growing season after planting and the second site was a 1-year-old shelterwood harvest. Seedling performance was evaluated after one growing season.

Premium grade seedlings were significantly taller, larger in basal diameter and had more roots than Nursery-run seedlings at time of planting. Extreme drought during the growing season likely resulted in delayed leaf-out and increased mortality of the midstory treatment (31 percent) and the shelterwood stand (25 percent). Occurrence of dieback for both plantings was 25 percent and was negatively related to planting height. Taller seedlings at planting may have had increased stem dehydration during a particularly dry growing season resulting in mortality and contributing to the occurrence of stem dieback. However, other nursery variables used in selection of premium seedling grade, particularly number of roots, positively impacted first-year survival. Seedling grade did not significantly impact height or diameter growth in the midstory treatment, but nursery-run seedlings did have more height growth than premium seedlings in the shelterwood stand. Although the amount of light did not significantly differ between free-to-grow and suppressed seedlings in the shelterwood stand, free-to-grow seedlings had significantly more diameter growth. This research will provide important information for prediction of seedling performance given easily measured nursery and field characteristics, and will provide probability estimates for expected seedling success for a range of seedling sizes and competition control measures.