

FIELD PERFORMANCE OF GRADED NORTHERN RED OAK SEEDLINGS PLANTED UNDER FOUR OVERSTORY TREATMENTS IN TENNESSEE: TWO-YEAR RESULTS

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Oak replacement persists as an obstacle to high quality hardwood management, especially on highly productive sites. Difficulties in naturally regenerating oak can be viewed as the result of social and economic constraints imposed by the biological solution, not the lack of a solution. As a result, economically viable alternatives are being explored to maintain oak as an important component of future stands including artificial regeneration; however, to be successful, studies are needed on artificial oak regeneration to enhance the methods and explore impediments.

We examined the growth of outplanted high-quality 1-0 northern red oak (*Quercus rubra* L.) seedlings after four overstory treatments on the Ames Plantation in west Tennessee. Sixty seedlings were outplanted within each of twelve two-acre treatment units, resulting in three replicates of the four treatments. Initial height, root-collar diameter, and number of first-order lateral roots were recorded for each seedling. Seedlings were ocularly graded into one of two categories (premium and good) based on morphological characteristics. Outplantings were measured after the 2002 and 2003 growing season. Mean seedling survivorship after two growing seasons was 94, 92, 87 and 58 percent for the commercial clearcut, two-age, high-grade, and no-cut control units, respectively. Average growth of unbrowsed seedlings for the two growing seasons was 44 cm, 42 cm, 41 cm, 29 cm in the two-age, high-grade, commercial clearcut, and control treatments, respectively. Differences in seedling growth were found between the harvested units and control units ($P < 0.005$) using Tukey-Kramer multiple comparisons. After two growing seasons, premium-graded seedlings grew an average 21 cm more than seedlings graded as good ($P < 0.005$). In addition, seedlings browsed heavily by white-tail deer (*Odocoileus virginianus* (Boddaert)) during the 2002 and 2003 growing seasons were on average 36 cm ($P < 0.001$) smaller than unbrowsed seedlings.

While differences in seedling growth within harvested units have not been documented after two growing seasons, high levels of mortality and diminished growth in the control units suggests that pre-harvest enrichment planting without competition control is not a viable management option. However, a simple ocular grading of seedlings prior to planting can result in significant growth gains early in the development of the seedlings.