

RESULTS FROM A 20-YEAR-OLD BOTTOMLAND OAK SPECIES COMPARISON TRIAL IN WESTERN KENTUCKY

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Greater financial returns from hardwoods are primarily based on two factors: species and quality. Species such as red and white oak (*Quercus* spp.), black walnut (*Juglans nigra* L.), black cherry (*Prunus serotina* Ehrh.) and green ash (*Fraxinus pennsylvanica* Marsh.) traditionally bring the highest revenue. However, the key is the quality that individuals within these species exhibit.

The test site for this study is located along Mayfield Creek 8 km (5 mi) east of the Mississippi River in Ballard County, Kentucky. Open-pollinated seed from seven mother trees were collected during the fall of 1985 from each of five species of red oaks, which included cherrybark oak (*Q. pagoda* Raf.), Nuttall oak (*Q. nuttallii* Palm.), pin oak (*Q. palustris* Muenchh.), water oak (*Q. nigra* L.), and willow oak (*Q. phellos* L.). The test was planted March 27, 1987. Herbaceous and vine competition was controlled during the first and second year by disking.

At age 20, differences in survival and growth among species were limited but form characteristics differed greatly among the five species. For all species mortality was highest between ages 1 and 3 during plantation establishment until tree-to-tree competition began increasing between the ages of 10 and 20 years. At age 20, willow oak had the highest survival, water oak the overall best growth and cherrybark oak the best form. Although suppressed trees quickly fell out of the stand there has been little regeneration in grasses and forbs due to the thick leaf litter and insufficient sunlight reaching the forest floor.

The general trend in height and diameter growth indicates a rather slow establishment period between ages 1 and 3. Height growth, on a yearly basis, peaked for all species between the ages of 5 and 10 years with water oak averaging 1.2 m (4 ft) of height growth per year. Correlations between age-1 height and age-20 height for all oak species were poor, with Nuttall oak exhibiting a negative correlation. As expected, correlations strengthened as age increased toward age 20. Currently, age-10 height exhibits fairly strong correlations with age-20 height, making crop tree selection effective at age 10.

The early self-pruning ability of cherrybark oak provided a cleaner bole than the other oak species. In addition, water oak was found to have more than eight times the number of form type defects as cherrybark oak at age 20. This striking difference in form quality between these two species indicates that if the site is suitable for cherrybark oak it would be advantageous to plant this species rather than water oak.