Forty-Year Survey of White Oak (*Quercus alba*) Common Garden Experiment Planted in South-Central Indiana: Insights into Growth and Mortality of Seed Sources Across a Latitudinal Gradient

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We surveyed a common garden experiment of white oak (*Quercus alba*) planted in 1983 in south-central Indiana at Starve Hollow State Recreation Area and synthesized the data collected on this study over the 40-year growing period. Seed sources planted at this location covered the latitudinal range of white oak, from as far south as northern Mississippi to as far north as southeastern Minnesota. Our survey reveals four important findings. (1) White oak performs exceptionally well in a plantation setting at this location, far exceeding site index and DBH growth curves previously observed in naturally regenerating stands of white oak in the central hardwoods region. (2) Southern seed sources do not experience excess mortality due to harsh freezing temperatures. Mississippi seed sources were the best-performing trees, with low mortality and superior growth and form. (3) Budburst and fall senescence did appear to vary among seed sources, but the differences in budburst were very small (approximately 4 days across all latitudes), while peak senescence varied by as much as 17 days. (4) Northern seed sources have very slow growth rates, becoming suppressed by year 20 (even after thinning at year 12) and experiencing mortality by year 40, presumably due to competition for light. Our findings have important implications for the management and conservation of white oak populations in the face of climate change. We suggest that white oak may be a prime candidate for assisted migration as southern seed sources appear well adapted for current conditions in the central hardwoods region.