ADDITIVE AND DOMINANCE GENETIC PARAMETERS OF MATURE-AGED TRAITS IN ARKANSAS POPULATIONS OF SHORTLEAF PINE (*PINUS ECHINATA* MILL.)

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Range-wide ecosystem restoration efforts are in progress for shortleaf pine (*Pinus echinata*). Genetic considerations must include provenance or seed source and genetic diversity as well as performance of the planted seedlings. Genetic information on seed source performance has been documented through provenance tests conducted in the 1950s-1980s. Genetic diversity studies have shown an increase in hybridization with loblolly pine from the 1950s to the 2000s. Only limited information is available on within source variation attributed to individual parents. We remeasured 15 R8 progeny tests representing the Ouachita and Ozark National Forests seed sources. Disconnected half-diallel crosses were made among the first-generation parents in the Mt Ida, AR seed orchard and established at tests sites in both national forests. Earlier measurements (ages 5 and 10 years), available on some of these tests, were merged with the current measurements that ranged from 31 to 40 years from planting. In total, 21,260 planted trees were evaluated for survival through the current assessment age, with all surviving trees measured for DBH and scored for damage and straightness, and a sample of these trees were measured for height. This data set provided progeny test performance information on 126 parents and 330 full-sib families. We found substantial additive and dominance genetic variation in growth and straightness, while the proportions of these variances differed by traits and ages. Additive and dominance genetic variances increased with age resulting in larger narrow- and broad-sense heritabilities for height at the latest measurement age. Predicted genetic gain is promising to advance tree growth and straightness for reforestation using both open- and control-pollinated families. Moderate age-age correlations suggest selection of high-performing parents in older trials can be done at younger ages.