EFFECTS OF PLANTING DENSITY AND GENOTYPE ON LOBLOLLY PINE STANDS GROWING IN THE MOUNTAINS OF SOUTHEASTERN OKLAHOMA

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Abstract—We determined the effects of planting density (4- by 4-, 6- by 6-, 8- by 8-, and 10- by 10-foot spacing) on stand-level height, diameter at breast height, stem volume, basal area, and periodic annual increment for two loblolly pine (*Pinus taeda* L.) seed sources. Seed sources for the 25-year-old stands were a North Carolina seed source (NCC 8-01) and a regionally local Oklahoma/Arkansas seed source (O/A mix 4213). The research site was a droughty, mountain soil in southeastern Oklahoma outside the native range of loblolly pine. Except for subsoiling at planting, no other stand-level treatments were applied. The experimental design was a split-plot with whole-plot factor planting density (n = 2) and the split-plot factor genotype (n = 8). While similar between genotypes, as stand density increased, basal area increased (188 to 241 square feet per acre), stand volume increased (4,230 to 5,030 cubic feet per acre), and average tree diameter decreased (10.1 to 6.3 inches). Average tree heights decreased with stand density (61 to 55 feet), and the North Carolina genotype was taller than the Oklahoma/Arkansas genotype (60 vs. 56 feet). Between ages 22 and 25, periodic annual increment decreased with stand density, and density-dependent mortality occurred in the two highest planting densities. These results indicate that over 25 years, the North Carolina genotypes performed as well or better than the regional seed source. In addition, sites outside the native range of loblolly pine can support relatively high basal areas and can successfully grow commercial loblolly pine stands with little outside inputs.

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