

Fourth-Year Results from a Clonal Test of Loblolly Pine

Barry Goldfarb, Fikret Isik, Anthony LeBude, Steve McKeand and Bailian Li¹

Abstract

In November and December 1998, two experimental plantings were established using rooted cuttings from 450 clones of eight unrelated full-sib families of loblolly pine (*Pinus taeda* L.). Clones from four of the families (282 clones) were planted in South Carolina and clones from the other four families in Florida (168 clones). Both tests were laid out as randomized complete blocks with nine blocks and one ramet/clone/block. Height, survival and rust resistance were measured annually and diameter was measured at age four. Best Linear Unbiased Prediction of clone genetic values were estimated for height and volume at age four. Estimated genetic gains from various clone selection strategies, the effect of increasing or decreasing the number of ramets for testing on genetic gain, height age-age and trait-trait genetic correlations were estimated.

Estimated genetic gain was highly sensitive to the intensity of clonal selection. Selecting the single best clone from each test resulted in an estimated gain of 13% (SC) and 14% (FL) in height at age four over the test average (all the clones). The single best clone from each family at each site (four in total) resulted in an estimated gain of 10% (SC) and 10% (FL). However, if six clones were selected from each family (twenty-four in total), gain was reduced to 8% (SC) and 6% (FL) in height. The genetic correlations between height at age one and height at age four were low (0.60 at SC, 0.58 at FL), but increased to 0.96 (SC) and 0.97 (FL) between heights at ages three and four. Simulations using test parameters showed that estimated gain increased with the number of ramets tested up until ten ramets per clone, but did not increase appreciably with ramet numbers above ten. Moreover, approximately 90% of the gain could be obtained using only six ramets. These data, additional details and the implications of these results will be discussed.

¹Department of Forestry, North Carolina State University, Raleigh, North Carolina 27695.