THE EVOLUTION OF BREEDING AND TESTING STRATEGIES IN THE NC STATE UNIVERSITY COOPERATIVE TREE IMPROVEMENT PROGRAM

Steve McKeand *and Fikret Isik*
NC State University, Raleigh, NC, USA

Tree breeding and selections strategies have changed dramatically in the NCSU Cooperative Tree Improvement Program since its beginning in 1956. For the first and second cycles, random mating was used to generate full-sib crosses for testing. In the third and fourth cycles, parents with high breeding values were crossed more often than lower ranking parents, a form of positive assertive mating. For the fourth cycle, we have also implemented the MateSelect algorithm to balance diversity and genetic gain. For the testing program, early tests were established as randomized complete block experiments with families established in row plots. In the first generation, most full-sib crosses were evaluated in six trials with three or six replications of 10-tree row plots; on average, 270 seedlings were evaluated. In the second cycle of testing, 144 seedlings were tested per cross. For the fourth cycle, the program is implementing alpha cyclic incomplete block row-column designs with the goal of testing 60 seedlings per full-sib family.

Over the years, we have sought to increase the efficiencies of our breeding and testing strategies with the objective of reducing the generation intervals. We will discuss the lessons learned from the breeding and testing strategies implemented over the past 60 years of the program.

Contact Information: Steve McKeand, Cooperative Tree Improvement Program, NC State University, Raleigh, NC 27695-8002, Phone: 919-886-6073, Email: Steve_McKean@ncsu.edu