THEORETICAL ASPECTS OF IMPROVING COTTON USING RANDOM MATING

Clay B. Cole and Daryl T. Bowman
North Carolina State University
Raleigh, NC
Osman A. Gutierrez, Johnie N. Jenkins and Jack C. McCarty Jr.
Clarence E. Watson
MAFES
Mississippi State, MS

Abstract

Breaking linkage between any two traits depends on the length of the chromosome(s) in question, the number of linked genes, how tightly the genes are linked, the number of parents used to produce the population, and the number of generations of intermating. Intermating in a random mating population with 50% self-pollination is 83% as effective in reducing the percentage of progenitor chromosome found intact in the random mating population as complete random mating. Self-pollinating a heterozygote is also an important source of recombination. After the initial cross, one would expect a 16% reduction in percentage of progenitor chromosome length when self-pollinating to homozygosity due to recombination. Ultimately, the goal is development of unique recombinant inbred lines. Theoretically, one could intermate for three generations and self-pollinate to homozygosity, which is equivalent to intermating for six generations.