RELATIONSHIPS OF YIELD COMPONENT VARIABLES TO YIELD AND FIBER QUALITY PARAMETERS

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Abstract

Increased yield and improved yield stability have been difficult traits to attain in a cultivar. In an effort to improve selection methods, data from strain tests, and irrigated and non-irrigated variety tests conducted in the University of Arkansas Cotton Breeding and Variety Testing programs were evaluated. Data were collected from 1999 through 2006 at four locations encompassing a range of 200 miles. Path coefficients from PathSAS were used to identify the direct effects and correlations of a seven-causal model involving: lint yield; seed per acre, fiber density; seed yield, seed surface area, fibers per seed; seedcotton yield, seed percentage, or lint index, lint weight per fiber; upper half mean length, micronaire, or uniformity index. Preliminary analysis indicated seed per acre had the greatest influence on lint yield (0.86, 0.85 and 0.91) for the strain, irrigated and non-irrigated variety tests, respectively. However, this trait exhibits low heritability and is highly dependant on environmental factors. Strain tests and non-irrigated variety trials proved to be poor representatives of true genetic relationships due to limited genetic diversity and moisture variability, respectively. The irrigated variety tests data indicated fiber density (0.17) had a greater influence on lint yield than seed surface area (-0.02). Fibers per seed (0.68) had the greatest influence on fiber density and lint index (0.69) had the greatest effect on fibers per seed. These preliminary data suggests fiber density could serve as selection criteria for increased yield and stability.