AGRONOMIC VARIABILITY WITHIN FOUR UPLAND COTTON GERMPLASM POOLS

Lori L. Hinze
Russell J. Kohel
USDA/ARS
College Station, TX

Abstract

A diversity of cotton (*Gossypium hirsutum* L.) germplasm exists with various characteristics useful for cotton improvement. This study was conducted to explore the germplasm base and evaluate the range of variation within four cotton germplasm pools which could serve as new sources of germplasm resources for cotton breeders. The properties of dwarfing and glandless genes, race stocks, and fiber quality were evaluated by creating a germplasm pool for each characteristic. One narrow based (four parent) synthetic was assembled as the dwarf germplasm pool, and three broad based (22 to 42 parent) synthetics were assembled as the glandless, race, and fiber germplasm pools. The pools were advanced separately for nine generations of intercrossing without selection. A representative sample of each pool was grown in a randomized complete block design with eight replications in 2003. Agronomic and fiber quality traits were measured in each replication. A wide range of values was obtained for all traits within each pool. The dwarf pool is earlier maturing (38.9%) with the lowest yield (1446.3 g) while the race pool has the latest maturity (15.1%) and highest yield (2010.3 g). With respect to the other three pools, dwarf germplasm has low micronaire (3.41 units), short 50% and 2.5% span lengths (13.60 mm and 25.86 mm, respectively), and a high uniformity ratio (52.6%). Although the pools do not differ for fiber strength, the dwarf pool shows the maximum value (262.8 kN m kg^{-1}) measured for this trait. The fiber, glandless, and race pools are indistinguishable based on fiber properties. Genetic material in the dwarf pool appears to increase the earliness of flowering and also has the greatest potential for improving fiber strength.