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WITHIN BOLL YIELD COMPONENTS OF SIX CULTIVARS OF COTTON AND THEIR F1 AND F2 PROGENY

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Abstract

Six genotypes of cotton, DP5415, SG501, ST474, FM832, T2356, and T237 were utilized in a breeding scheme to determine the amount of additive and dominant genetic effects each contributed to six within boll yield components. The genetic effects were measured by variance components and estimated by MINQUE. The six traits evaluated included seeds per boll, lint percent, fiber weight per seed, number of fibers per seed, numbers of fibers per square centimeter of seed surface area, and yield. Results indicated that both additive (GCA) and dominant (SCA) genetic effects were significant at the .01 level for all six traits excluding GCA genetic effect for yield. General combining ability showed that using FM832 as a parent resulted in an increase of 1.62 seeds per boll over the population mean of 33.84. When ST474 was used as a parent, lint percent increased by 1.57% over the mean of 39.08% and fiber weight per seed increased by 4.95 mg over the mean of 67.2 mg. Using FM832 as a parent also resulted in increases of 1,170 fibers per seed over the mean of 13,774 and 602 fibers per square centimeter of seed surface area over the mean of 12,557. Specific combining ability showed that when FM832 was crossed with T237, the number of seeds per boll increased by 2.06 seeds over the mean. The cross T2356 X T237 resulted in a 1.94% increase in lint percent over the mean. Lint weight per seed was increased by 2.98 mg over the mean in the cross ST474 X T237. FM832 X T2356 increased the number of fibers per seed by 882 over the mean. The cross T2356 X T237 resulted in an increase of 1,393 fibers per square centimeter of seed surface area over the mean. The cross ST474 X T2356 increased yield by 890 lbs of seed cotton per acre over the mean of these six parents. GCA genetic effects for yield were not significant. These results provide a good genetic base for selecting parents to be used in a breeding program to increase yield through manipulation of specific within boll components.