PROSPECTS FOR SIMULTANEOUS IMPROVEMENT OF COTTON FIBER AND SEED B.T. Campbell USDA-ARS Coastal Plains Soil, Water, and Plant Research Center Florence, SC

Abstract

Historically, cotton breeding programs have primarily focused on improving the quantity and quality of cotton fiber. Due to the added value of cottonseed, there is interest in developing cotton breeding programs that focus improvement efforts simultaneously on cotton fiber and seed. Genetic analysis of cottonseed traits such as protein and oil is a prerequisite to building new joint fiber and seed cotton breeding programs. In this study, our objective was to conduct a genetic analysis of a diverse set of elite upland cotton germplasm for cottonseed protein and oil. Environment was responsible for a large portion of the total variation for protein and oil, and genetics accounted for a larger portion of variation for oil than protein. Genotype × environment interactions were significant for oil. We identified a strong, negative relationship between protein and oil. Positive relationships were found for protein and several agronomic traits including lint yield; whereas negative relationships were found between oil and lint yield along with other agronomic traits. Overall, results showed very little association between protein, oil, and fiber quality traits.