COTTON BREEDING: HIGH VOLUME INSTRUMENT VERSUS CONVENTIONAL FIBER QUALITY TESTING Stephanie L. Latimer, T. P. Wallace, and D. S. Calhoun Department of Plant and Soil Sciences Mississippi State University Mississippi State, MS

Abstract

Cotton fiber evaluations have been practiced for many years in an attempt to relate the properties of raw cotton to spinnability and yarn appearance. During the 1940's and 1950's, mechanical instruments were developed to measure fiber quality characteristics. These included the Pressley tester which measures fiber strength and the fibrograph which measures fiber length. Mechanical (conventional) instruments have been used for many years, but they are time consuming and labor intensive. In an attempt to speed up fiber testing, an automated system called the High Volume Instrument (HVI) was developed in the mid 1960's and implemented in the 1980's.

The HVI system offers the advantages of low cost and speed, but the question of the HVI's reliability is still a concern. Past research has shown that the HVI may not be as useful to the plant breeder as conventional instruments. To address this issue, a study was undertaken to compare the HVI to conventional instruments using strength and length heritability estimates to determine which method of fiber quality testing is best suited to a cotton breeding program.

F2 and F3 populations were produced from two different sets of crosses made among genotypes with a wide range of fiber characteristics. Fiber was analyzed using a Motion Control, Inc. (MCI) High Volume Instrument - Model 3500, a Spinlab Digital Fibrograph - Model 430, and a Pressley Tester (1/8 inch gauge). Heritability values for fiber length (50% Span Length, 2.5% Span Length) and fiber strength were estimated using parent-progeny regression. Heritability values of the HVI system were compared to heritability values of the conventional instruments. The HVI generally gave higher heritability estimates than conventional instruments. Correlation analysis was used to determine the degree of relatedness of the two methods of fiber quality testing. The correlation coefficients for HVI versus conventional instruments were medium to high. These results suggest that HVI testing of breeding material provides a measure of fiber quality suitable for use in selection of high fiber quality genotypes.

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