QUALITY SCORE (QS): BREEDER SELECTION TOOL

Don C. Jones
Ed M. Barnes
Cotton Incorporated
Cary, NC

Summary

A fiber quality score (QS), or what is sometimes referred to as a fiber quality index, was developed using four fiber properties provided from high volume instrument (HVI) testing. One impetus for development of QS is the greater proportion of US grown cotton being exported to international buyers. Many of these buyers demand longer staple length and less variation in micronaire than was acceptable in previous years. Also, improved uniformity and acceptable strength are two additional fiber properties that are desired by cotton buyers, therefore, these two fiber traits are also included in QS. In light of the greater demands in the international marketplace, QS was developed and its use will allow cotton breeders to easily and quickly select strains in a breeding program using the fiber quality properties discussed above. This experiment was conducted to test whether higher QS values resulted in higher quality yarn, and likewise, if lower QS values gave lower quality yarns.

QS is based on HVI data generated from entries grown in the same experiment. HVI fiber data is first scaled using two standard deviations of the entire US grown crop to eliminate units of measurement, and then QS in the experiment is calculated using the following weights: .5 (upper half mean length) + .25 (micronaire) + .20 (uniformity index) + .05 (strength). The score is reported on a 0 to 100 scale with higher values considered most desirable and lower numbers being problematic. Micronaire between 3.8 and 4.6 provide maximum contribution to QS, and this value range is based on international buyer demand trends. Micronaire outside of this range has decreasing contribution to QS. Likewise, international buyer demand prompted us to fashion QS such that strength values below 28 are less desirable while values above 28 provides slightly greater contribution to QS.

During the 2006 growing season a four replication, three entry experiment was grown in nine locations ranging from Maricopa, Arizona in the west to Raleigh, North Carolina in the east. Seed cotton from replications 1 and 2 were combined while replications 3 and 4 were combined so that enough seed cotton was available to generate a lint sample sufficient for spinning. All samples were ginned in a similar manner on the University of Georgia MicroGin in Tifton, Georgia. Lint samples were then analyzed using HVI and AFIS equipment at Cotton Incorporated in Cary, North Carolina. Yarn samples (Ne 20/1) were produced at the USDA facility at Clemson University. Data was analyzed using PROC GLM in SAS. AFIS traits are not reported in this abstract.

Three yarn traits reported on from spinning performance are evenness, entanglements, and strength. Evenness is measured by thin places (thins) and thick places (thicks). The data indicated thins were predicted with QS, but thicks were not. Likewise, entanglements, as determined by number of neps, were not able to be predicted using QS. Yarn strength, both as measured by the skein test and single end breaks, were fairly well predicted using QS. The prediction of thins and yarn strengths using QS were consistent across the nine locations tested. Additional data is needed to test whether these results will repeat in another year, so a similar experiment was grown during the 2007 season and is presently being ginned for further analysis.