

RELATIONSHIPS BETWEEN FIBER LENGTH DISTRIBUTION AND FIBER MATURITY**Eric F. Hequet****Noureddine Abidi****Fiber and Biopolymer Research Institute – Texas Tech University****Lubbock, Texas****Abstract**

The shrinking U.S. textile manufacturing industry dictates an increased reliance on the international market for selling U.S. cotton. As example, approximately three-fourth of the 2009 U.S. cotton crop will be exported. This process, in turn, is transforming the requirements on fiber properties. The U.S. industry has long been focused on the production of medium and coarse yarns and has long emphasized open-end rotor spinning, rather than ring spinning. However, the focus of the dominant international textile industries is on the finer yarns and on ring spinning. Thus, global textile mills interested in sourcing cotton from the global market emphasize those cotton growths with fiber profiles adapted to this market (fiber that are long, uniform, mature, fine, strong, and with low contamination levels, such as neps, bark, and seed coat fragments).

Part of the production in the High Plains of Texas cannot reach an adequate level of fiber maturity. This translates into higher than desired short fiber content and neps. Therefore, our goal is to attempt to elucidate the relationships between fiber length distribution and fiber maturity.

Two experiments were conducted. One involved 12 commercial bales from which combed ring spun yarns were produced. Fiber samples were collected at several locations along the process, i.e., raw cotton, card slivers, and DII slivers. The samples were tested on the AFIS. The second experiment involved a larger set of samples from a cotton breeding program (144 samples). Combed ring spun yarns were produced and fiber samples were collected for AFIS analysis.

The results obtained were similar for both experiments. We concluded that short fibers are mostly immature fibers. These fibers are weak because of the lack of cellulose deposition. Therefore, we hypothesized that they have a higher propensity to break during mechanical handling than more mature fibers. These fibers are too short to be tested with the FAVIMAT with a 10 mm gauge. Additional FAVIMAT testing with a 1/8 inch gauge length will be undertaken to confirm that these fibers are weaker than the longer fibers.

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