2002 BELTWIDE COTTON CONFERENCES, ATLANTA, GA – JANUARY 8-12

# UPDATE ON PROPOSED REFERENCE METHOD FOR COTTON MATURITY PART II: ANALYSIS OF RESULTS

**Eric F. Hequet and Bob G. Wyatt**
**International Textile Center**
**Texas Tech University**
**Lubbock, TX**
**Devron Thibodeaux**
**USDA-ARS-SRRC**
**New Orleans, LA**

## Abstract

Image analysis of the cross section of cotton fibers constitutes an excellent reference method for maturity and fineness measurements. Nevertheless, this technique is too slow to be of practical use in commercial operations. This is the reason why, in collaboration with USDA-ARS-SRRC New Orleans and Cotton Incorporated, it was decided to create cotton standards. Such standards should have a low level of variability and be prepared in quantities large enough to be used during at least a decade. The primary goal is to have cottons of known values to calibrate high-speed instruments (dual compression testers, AFIS).

Seven bales were selected for this project. The bales were broken and processed following the ICCS (International Cotton Calibration Standards) committee procedures. One hundred samples were taken during the card web formation. Twenty-five samples were kept at the ITC for fiber cross-section (around 40,000 cross sections per bale), 25 samples were sent to Dr. Devron Thibodeaux (USDA – New Orleans) and 50 were kept for future investigations.

From this work it can be concluded that:

- The seven perimeter distributions have all the same features: they are not normal, they are nearly symmetrical, and they are more “peaked” than normal distributions.
- The seven area distributions have all the same features: they are not normal, they are not symmetrical with excess fibers on the left of the distributions, and they are more “peaked” than normal distributions.
- The seven perimeter distributions have all the same features: they are not normal, they are nearly symmetrical, and they are more “peaked” than normal distributions.
- The seven theta distributions are not all the same: they are not normal, they are slightly asymmetrical with excess fibers on both ends of the distributions (very immature and very mature fibers), and they are slightly flatter than normal distributions.
- From the data gathered, power calculations were done to calculate the minimum sample size. The goal being to get perimeter, area and theta values +/-2% with a power of 90%. It appeared that by taking at least 75 sub-samples throughout a bale and examining a minimum of a total of 4,000 fiber cross-sections per bale, precise and accurate measurements may be obtained. Thus, it is feasible to:
    - Gather data on at least 100 reference samples over a large range of perimeter and theta values.
    - Use these samples to calibrate high speed instruments (AFIS, Dual compression tester, NIR).