ASSESSING COTTON MATURITY USING DISTRIBUTIONAL PARAMETERS OF FIBER CROSS-SECTION MEASUREMENTS Bugao Xu University of Texas at Austin Austin, TX

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<u>Abstract</u>

Many previous studies on cotton maturity assumed the maturity variables follow normal distributions, and often used a sole parameter, e.g., the mean maturity value, to rank the maturity level of a bale-cotton sample containing a large amount of fibers. In light of complexity of maturity distributions, the sole-parameter approach does not appear to be reliable and rational for cotton maturity evaluation. More distributional parameters of maturity should be examined and included in the new classification methods. However, the current Fiber Image Analysis System (FIAS)—the software dedicated for analyzing cotton cross sections—is not able to detect immature fibers as reliably as mature fibers, yielding a systematic bias in the maturity distribution. This paper firstly introduces important changes in the image analysis algorithms to enhance consistency of fiber detections to reduce the bias on immature fibers, and investigates the characteristics and pattern of a cotton maturity distribution, and finally presents the experimental results on seven selected cotton samples with a wide range of maturity levels. It is found that the skewness of a maturity distribution is an essential parameter to classify the distribution patterns, and the dead fiber content and the mature fiber content are the important distributional parameters for assessing cotton maturity.