STABILITY OF HVI CALIBRATION STANDARDS FOR BUNDLE ELONGATION MEASUREMENTS

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Abstract

Many cotton breeding programs are relying only on the HVI bundle strength of cotton fibers and ignores elongation. The main reason for this lack of interest in elongation is the absence of HVI calibration cottons for elongation. Typically, results from multiple HVIs across multiple days are used to evaluate entries in breeding programs. HVI measurements are calibrated across instruments using USDA cotton calibration standards making it possible to compare results from different instruments over a long period of time. In addition, cotton testing laboratories use cottons of known values throughout the day to check for a possible drift in measurements over time. While calibration cottons are available for most HVI fiber properties, none are available for HVI elongation. This prevents the comparison of elongation measurements between separate HVI instruments and over time.

Since several years, we focused our efforts on a series of projects aimed at addressing the industry need for measuring fiber elongation. Our group, as well as several cotton breeders, provided evidence that fiber elongation is heritable, and can be improved through traditional breeding methods. More importantly, fiber elongation can be improved while simultaneously improving fiber strength leading to significant improvements in work-to-break. While HVI testing does provide a measure of fiber bundle elongation, it is currently not calibrated. Therefore, measurements between instruments cannot be reliably compared.

The need for elongation calibration led to the development of elongation reference material. High and low elongation calibration cottons were produced and tested every day for several weeks (Testing from 04/03/2019 through 08/27/2019 with 10 combs per sample and from 10/23/2019 through 12/17/2019 with 2 combs per sample). The results obtained showed that:

- After calibration, the three HVIs exhibit comparable elongation levels.
- The CV% between testing days are very good for all HVIs even with only two measurements per sample.
- The calibration is stable over a long period of time. Therefore, frequent calibration is not needed.
- Currently, due to the limitation of the Uster software, we recommend to calibrate the instruments with only one calibration point and to test the two FBRI standards daily to determine when a calibration is needed.

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