WITHIN BALE VARIATIONS OF COTTON FIBER PROPERTIES

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Abstract

Twelve bales of cotton having a wide range of lengths were selected for testing. Each bale was systematically sectioned so as to collect twenty-five individual fiber samples from each bale. HVI and AFIS measurements were carried out on each bale to determine the variability of the various measured properties with the bales. Variance components analysis was conducted to determine the relative impact of sample location, instrumental measurement, or the cotton itself.

The following summarizes our findings:

- The variances of all the HVI measurements included in this study were within tolerances recommended by the AMS Cotton Program.
- All HVI measurements discriminate among the bales. Bale variance components (> 90%) are much larger than experimental error components (<10%).
- For the group of 12 bales, experimental error is a larger component of variance than either the layer or zone components for all seven properties.
- Within an individual bale, the layer or zone component may exceed the error component.
- Some individual bales show significant differences between layers or zones for some of the seven HVI properties.
- No systematic variation across the 12 bales by either layer or zone.
- A single measurement of any property can be significantly outlying.
- The location in a bale from which a sample is taken can affect the value of an HVI property but not in a predictable way.
- Bales which are more variable with respect to SFC are also more variable in UHML and UI and tend to be less variable in Rd. Bales with greater Rd variability also exhibit greater +b variability.
- If additional measurements are to be taken, better to take more replicate measures on samples rather than taking more samples with fewer replications (because the replication variance component is generally larger than the layer and zone components).