GENETIC MODIFICATION OF COTTON FIBER PROPERTIES WITH SINGLE AND HIGH VOLUME INSTRUMENTS

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Abstract

Improved cotton fiber properties for the textile industry depends largely on genetic progress. Progress towards better fiber quality would be facilitated through knowledge of whether choice of fiber property measurement instrument affects direct and correlated response to selection. We estimated heritability and selection response of fiber properties measured with single instrument (Stelometer, fibrograph) and high volume instrument (HVI) in two cotton populations. Heritability was estimated in the F_2 and F_3 generations, while selection response was calculated from F_4 and F_5 data. Additional fiber properties important to processing including neps, short fiber content, and fineness were measured with the Advanced Fiber Information System (AFIS). Heritability of micronaire reading, elongation, and length (2.5% span length or upper half mean) was mostly similar whether measured with single instrument or HVI. Heritability of fiber strength was greater when measured with Stelometer than HVI. Despite the disparity in heritability of fiber strength, the genetic subpopulations selected for highest fiber strength by Stelometer or HVI differed little for fiber strength when measured with either instrument. Apparently, selection for fiber strength with Stelometer or HVI instrument about equally modified those properties of fiber responsible for bundle fiber strength. Selection for fiber strength by Stelometer resulted in undesirable increases in short fiber in both populations and increased immature fiber in one population. Overall, improvement of fiber strength by Stelometer was only slightly superior to the improvement realized by selection for HVI-strength. To reduce short and immature fiber content while increasing fiber strength, selection on the basis of HVI-strength seems adequate.

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