COTTON FIBER IMPROVEMENT THROUGH BREEDING AND GENETICS

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Abstract

Since the development of instrumentation to quantitatively measure cotton fiber properties in the early part of this century, breeders have made impressive strides in improving length, strength, and fineness parameters that are important to textile processing. The purpose of this presentation is to review progress in the genetic improvement of fiber quality including some new properties and to discuss how technological change in the textile industry will impact breeding priorities. Rather than seeking increased fiber length of medium staple upland cottons, improvement of length uniformity and reducing short fiber content are priorities. These accomplishments would benefit both ring and open-end spinning. Increased fiber bundle strength that is reflected in higher yarn tenacity is necessary to sustain productivity gains in knit and woven fabric manufacture. An issue is which instrument, high volume, Stelometer, or Pressley should be used to select for fiber strength. Heritability of Stelometer strength was greater than that of high volume strength in two populations. Also, selection for Stelometer strength achieved twice as much increase in yarn tenacity when compared with selection for high volume strength in the same population. Wax and lubricants of cotton have been shown to contribute to denim fabric tear strength (4) but have received little attention from breeders and geneticists. Genotypic variation was found for wax and lubricants among entries in the Florence, SC, location of the 1996 High Quality Regional Cotton Variety Test. The next step is to determine the mode of inheritance. Yarn manufacturers that have adopted open-end spinning indicate that for this technology to operate cost-efficiently that breeders should develop cotton with different profiles of length, strength, and fineness as opposed to that for ring spinning (1). Genetic studies addressing this issue show that for 12-42 tex ring and open-end spun yarns that breeders do not need to develop cottons with different profiles of length, strength, and fineness (2,3). It is not known whether these principles hold for higher rotor speeds and finer count rotor spun yarns.

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