LENGTH OF FIBER ELONGATION PERIOD IN EXTRA LONG STAPLE UPLAND COTTON GENOTYPES COMPARED WITH TAMCOT 73

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Abstract

The natural fiber of upland cotton (*Gossypium hirsutum*) is a high-value crop that is grown by producers as raw material for the textile industry. The objective of this work was to evaluate fiber elongation in four cotton genotypes in five different periods of harvest. Field work was conducted at the Texas A&M University Research Farm, located near College Station, TX in 2013. The four cotton genotypes used were: Tamcot 73, TAM 11K-13 ELS, TAM B182-33ELS and NMSI 1331. For each genotype, bolls were harvested at 22, 25, 28 and 31 post-anthesis, and at open boll. These preliminary data suggest that the ELS trait in the Texas A&M AgriLife Research upland material may require longer boll maturation times but the NMSI 1331 data suggest that *Gossypium barbadense* may possess a higher rate of fiber length growth and reach its maximum length at the same DPA as medium staple uplands.

Introduction

Upland cotton (*Gossypium hirsutum*), an oilseed and fiber crop, native to Mexico, Central America, and United States, is grown in 17 states in the U.S. and in more than 70 countries worldwide. The natural fiber of upland cotton is a high-value crop that is grown by producers as raw material for the textile industry.

Fiber length has been reported as having relatively greater importance for the newer technological advancements taking place in spinning technology today. There are five length classes: short (21 mm), medium (22-25 mm), medium-long (26-28 mm), long (29-34 mm), and extra-long (> 34 mm). Perkins et al., (1984) stated that fiber length is considered the premier fiber quality parameter because it is closely correlated with processing efficiency and the quality of the yarn produced. Bragg and Shofner, (1993) said that length has been considered the most important cotton fiber property.

Objective

The objective of this work was to evaluate fiber length development in four cotton genotypes from boll age day 22 to maturity.

Material and Methods

Field work was conducted at the Texas A&M University Research Farm, located near College Station, TX in 2013. The four cotton genotypes used were: Tamcot 73 (medium staple cultivar), TAM 11K-13 ELS (extra-long staple germplasm - not released), TAM B182-33 ELS (extra-long staple germplasm - released), NMSI 1331 (sea island *Gossypium barbadense*). Bolls of the same age were harvested from different anthesis dates. For each genotype, bolls were harvested at 22, 25, 28 and 31 age old bolls, and at open boll. Boll age was estimated by tagging first position bolls located four nodes below the top most first position white bloom. These bolls were tagged and dated 10 days prior to date of tagging. Bolls subsequently were harvested when 22, 25, 28, and 31 days post their estimated date of anthesis. Unopened bolls were opened by hand, the seed cotton removed, and allowed to dry. For each genotype, 50 open bolls were harvested. All samples were ginned using a roller gin. Fiber elongation of the ELS upland genotypes will be compared with Tamcot 73 and NMSI 1331.

These are preliminary data; there are no appropriate statistical comparisons.

Results and Discussion

Tamcot 73 and NMSI 1331 reached their maximum length at 28 DPA while the two ELS upland germplasm lines required at least 3 additional days. TAM 11K-13 ELS, TAM B182-33 ELS, and NMSI 1331 exhibited shorter UHML at maturity than at 31 DPA while Tamcot 73 was essentially unchanged (Figure 1).

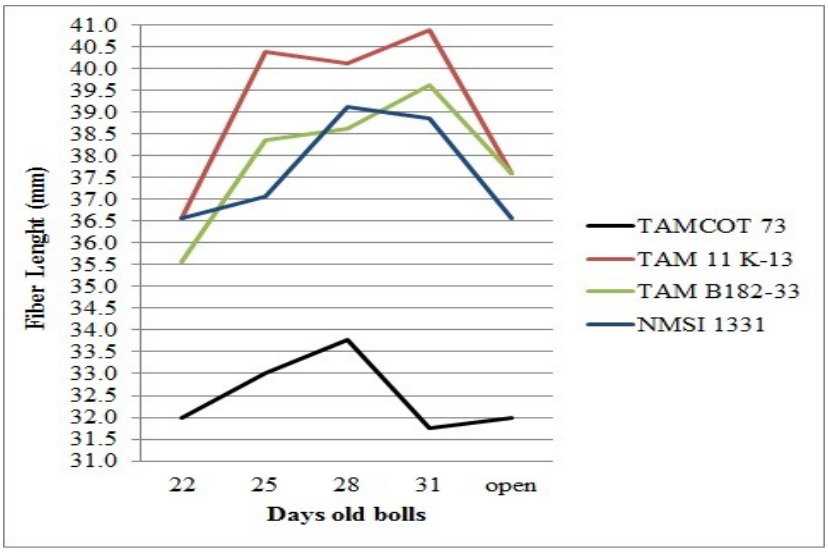

Figure 1. Fiber length in five days old bolls in four different genotypes.

Maximum HVI fiber bundle strength was recorded for fibers from mature, open bolls in the two ELS uplands and NMSI 1331, while fiber bundle strength in Tamcot 73 was unchanged after 31 DPA, suggesting faster secondary wall development (Figure 2).

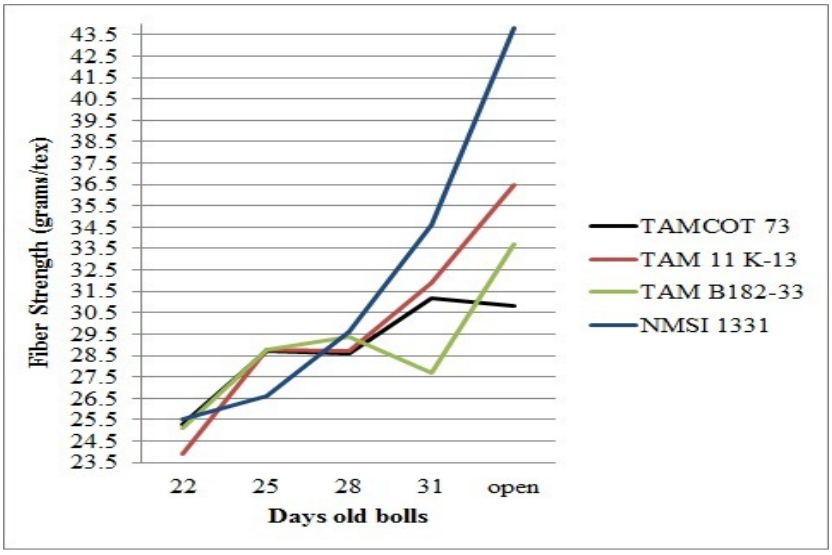

Figure 2. Fiber strength in five days old bolls in four different genotypes.

Braden and Smith (2004) reported that fibers of TAM 94L-25, a long staple upland, grew in length until 28 DPA compared with 25 days for comparison medium staple uplands. Smith et al. (2008) reported that TAM 94L-25 was a common parent in Extra Long Staple Uplands released by Texas A&M AgriLife Research. Merritt et al. (2012) reported that boll maturation period in the ELS uplands was about 4 days longer than comparison medium staple uplands.

Conclusion

TAMCOT 73 and NMSI 1331 requires less time for fiber length development than TAM 11 K-13 and TAM B182-33.

TAMCOT 73 requires less time for fiber strength development than TAM 11 k-13, TAM B182-33 and NMSI 1331.

These preliminary data suggest that the ELS trait in the Texas A&M AgriLife Research upland material may require longer boll maturation times but the NMSI 1331 data suggest that *G. barbadense* may possess a higher rate of fiber length growth and reach its maximum length at the same DPA as medium staple uplands.

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