

**ELEVATED GROWING DEGREE DAYS INFLUENCE TRANSITION STAGE TIMING DURING
COTTON (*GOSSYPIUM HIRSUTUM* L.) FIBER DEVELOPMENT RESULTING IN INCREASED FIBER
BUNDLE STRENGTH**

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Abstract

Growing degree days required for cotton (*Gossypium hirsutum* L.) growth and development were recorded for four growing seasons and compared with fiber quality measurements and gene expression data indicative of different stages of fiber development. Fiber bundle strength differences between the Upland cotton near-isogenic lines MD 52ne and MD 90ne were observed using immature and mature fibers collected at different time points of development stages. Previously characterized fiber bundle-strength differences between the near-isogenic lines, known as a result of early entrance into the transition stage of fiber development, were present as early as 20 days post-anthesis and persisted to boll opening and fiber maturity. The onset of transition stage was correlated with the accumulated degree day heat units from the day of anthesis in both cotton lines in all seasons. Fiber quality measurements obtained over multiple growing seasons indicated that an earlier entrance into the transition stage of fiber development resulted in increased fiber bundle strength. These data suggest that the identification of genes associated with early entrance into the transition stage can be used to temporally manipulate fiber development and improve fiber quality.