# A COMPARISON OF TWO COTTON CULTIVARS DIFFERING IN MATURITY FOR WITHIN-CANOPY FIBER PROPERTIES

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## Abstract

Advances in spinning technologies require improvements in fiber quality. Both genotype and the environment under which cotton (*Gossypium hirsutum* L.) bolls develop influence the physical characteristics of fibers. In addition, fiber surface sugar and salt content have recently been found to influence yarn strength and spinning efficiency. Our objective was to compare genotypes of different maturities for within-canopy fiber properties. A two-year study was conducted comparing the mid-full-season cultivar DPL 555Bt/RR to the short-season cultivar Paymaster 1218Bt/RR. In each year, a dated tag was placed on all white blooms in a meter of row from early July through mid-August. At the end of the season, these bolls were hand-harvested by canopy position and advanced fiber information system (AFIS) fiber properties, fiber surface glucose content, and fiber surface salt content were determined on individual bolls. Lint yield and high volume instrumentation (HVI) fiber properties of the whole crop were also measured. There was no difference between the two cultivars for lint yield or the HVI fiber properties of length, length uniformity and strength in either year. Paymaster 1218Bt/RR had higher micronaire than DPL 555Bt/RR in 2004, but not in 2005. Contrary to the HVI results, AFIS analysis on individual bolls showed DPL 555Bt/RR had longer fibers that were finer and more mature than Paymaster 1218Bt/RR. DPL 555Bt/RR also had lower fiber surface glucose and salt content than Paymaster 1218Bt/RR. Even though the two cultivars differed in maturity, flowering dates at individual main stem and branch node positions were similar. Thus, few cultivar by node interactions occurred for the fiber property measurements made on the individual bolls. In 2004, precipitation was generally plentiful throughout the season and there was little within-canopy variability for any fiber property. Conversely, an extended dry period occurred at the beginning of the flowering period in 2005 and bolls at the position that flowered at this time had fibers that were shorter and coarser. The dry period in 2005 also affected fiber surface chemistry as bolls that flowered during the dry period had lower fiber surface glucose and salt concentrations than bolls that developed following rain events. These data suggest within canopy fiber property distribution is similar for cultivars differing in maturity and that both genetic background and environmental conditions during boll development influence fiber surface chemistry.