

**LOSSES OF GENOTYPIC DIFFERENCES IN FIBER QUALITY
ARE RELATED TO GROWTH ENVIRONMENT**

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Abstract

Environment acts on genotype to modify boll load, boll location and fiber quality. Genotype selection coupled with management practices has the potential to alter fiber quality. The objective of this study was to compare final plant maps and fiber properties across genotypes under rainfed and irrigated conditions. Two field studies were designed to assess the impact of environment on fiber quality. Four cultivars (DP 388, FM 958, PSC 355, and ST 474) which were part of the 2000 LSU Cotton Variety and Strains Test were grown under rainfed and furrow irrigated conditions at the LSU Northeast Research Station, Winnsboro, LA. Two cultivars (PSC 355 and ST 474) which were part of the Franklin Parish Cotton Variety Demonstration were grown under furrow irrigated conditions at the Travis Walker Farm, Crowville, LA. First position flowers were tagged on July 5, 12 and 18 in Winnsboro and July 5 and 18 in Crowville. In each of the three rainfed and four irrigated replications plants from two meters of row were mapped. Fiber properties were analyzed using the Advanced Fiber Information System (AFIS). Under rainfed conditions in Winnsboro yields ranged from 290 to 540 kg/ha while under irrigated conditions yields ranged from 1355 to 1540 kg/ha. Yields at Crowville were 764 kg/ha (PSC 355) and 635 kg/ha (ST 474). Differences in Winnsboro plant maps across genotypes under both rainfed and irrigated conditions were found in the number of bolls per plant at first position, (FP1) nodes 4-7. Deltapine 388 had more bolls located at FP1 nodes 4-7 than the other three cultivars. Phytogen PSC 355 had more bolls located at FP1 nodes 4-7 than ST 474. At Crowville the plant maps did not differ. For most tagging dates in rainfed cotton mean fiber length and micronafis/micronaire values did not differ when compared across genotypes. Under irrigation at Winnsboro mean fiber length did not differ for most tagging dates but differences in micronafis/micronaire values were found across genotypes for all tagging dates. Genotypic differences in fiber perimeters for DP 388 and FM 958 were maintained under rainfed and irrigated conditions for all tagging dates. Under rainfed and irrigated conditions at Winnsboro no differences in fiber length, short fiber content and perimeter were found between PSC 355 and ST 474. Under rainfed conditions no differences in cross sectional area, theta or micronafis values were found between PSC 355 and ST 474 fiber, while under irrigated conditions PSC 355 fiber had a smaller cross sectional area, lower theta and lower micronafis values than ST 474 fiber. At Crowville no differences between PSC 355 and ST 474 were found in fiber length and short fiber content. Phytogen PSC 355 fiber had a smaller cross sectional area, lower theta and lower micronafis values than ST 474 fiber. Within each genotype the same number of bolls per plant at FP1 nodes 4-7 was found in rainfed and irrigated cotton (Winnsboro). Irrigation increased the number of FP1 nodes 8-13 bolls and second position bolls. Micronafis values for fiber from July 5, PSC 355 bolls was 5.96 and 4.81 for rainfed and irrigated cotton, respectively. The effect of irrigation on July 5 bolls depended on genotype. Irrigation did not decrease micronafis values for fiber from July 12 and July 18 bolls. While irrigation increases yield it may also increase fiber maturity if accompanied by high temperatures during fiber development.