

GENOTYPE-RELATED FIBER QUALITY VARIABILITY

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Abstract

The interaction of genotype with environment is important in genotype selection. The objective of this study was to assess fiber quality variability in four early maturity genotypes having different boll distribution patterns. Four cultivars (DP388, FM 958, PSC 355, and ST 474) which were part of the 1999, 2000, and 2001 Cotton Variety and Strains Test were grown under rainfed and furrow irrigated conditions at the LSU Northeast Research Station, Winnsboro, LA. In 2000 and 2001, two meters of row from each of three rainfed and four irrigated replications were mapped. Fiber properties were analyzed using HV1 (LSU) and the Advanced Fiber Information System (AFIS) (SRRC). Fiber properties from rainfed and irrigated plants were compared. In most cases yearly trends were similar across genotypes. In 1999 irrigation increased mean fiber length, (L_w) upper half mean length (UHM) and upper quartile length (UQL). Irrigation did not decrease short fiber content (SFC). In ST 474 short fiber content increased with irrigation (1999). In 2000 and 2001, irrigation did not increase fiber (L_w), UHM or UQL. In 1999, irrigation increased micronaire, micronafis and cell wall thickness for FM 958, PSC 355, and ST 474, while in 2001 irrigation decreased micronaire, micronafis and cell wall thickness for all genotypes. When genotypes grown under irrigated conditions were ranked according to variability in fiber length properties over the three year period, PSC 355 was the least variable. When genotypes grown under irrigated conditions were ranked according to variability in fiber maturity properties, DP 388 was the least variable. Over the three year period under rainfed and irrigated conditions, FM 958 was the least variable. Over the three year period under rainfed and irrigated conditions, FM 958, UHM and UQL lengths were longer than DP 388, PSC 355 and ST 474, UHM and UQL lengths. Mean fiber cell wall thickness over the three year period (irrigated) for DP 388, FM 058, PSC 355 and ST 474 were 2.5, 2.7, 2.6 and 2.8 μm , respectively. In 2000, under rainfed and irrigated conditions, DP 388 had more bolls at fruiting position 1 nodes 4 to 7 than the other genotypes. In 2001, under rainfed conditions, DP 388 did not have more bolls at any fruiting position than the other genotypes. Under irrigated conditions, DP 388 had more bolls at fruiting position 1 nodes 4 to 7 than FM 958 and PSC 355. A component of the degree of variability is the contribution of bolls at different fruiting positions and node locations to bulk fiber properties. Genotypic differences in fiber properties at different boll locations were found. When environmental conditions favor high micronaire cotton, some genotypes selected for long, fine fiber may produce high micronaire cotton.