

**VARIABILITY IN MICRONAIRE:
SOURCES AND SIGNIFICANCE**

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Abstract

Although genotype is the main determining factor in some cotton fiber properties, variations in growth environment are significant determinants of micronaire and the micronaire components, fiber circularity and cross-sectional area. When four Upland cotton genotypes were grown in a South Carolina planting-date study, the offsets in heat unit accumulation associated with the staggered planting dates modulated micronaire and interacted with genotype to determine fiber circularity, a major component of micronaire. Fiber cross-section, the other major component of micronaire, was also strongly related to both growth environment and genotype. Temperature [as cumulative heat units or degree-days-15.5°C] altered the rates of fiber wall deposition, of fiber cross-sectional growth, and of micronaire increase. The heat units accumulated in the first 50 days after planting had the most significant effect on micronaire at harvest.

Post-harvest plant maps indicate that micronaire varies across fruiting sites, and site-specific fiber-quality maps corresponding to spatial variability in soil properties indicate that higher levels of soil phosphorus and percent organic matter were associated with increased fiber maturity and higher micronaire. Field sites highest in pH and calcium content produced more immature fiber with micronaire falling in the price-penalty range below 3.5, an effect that intensified with decreasing rainfall.

Weather and edaphic spatial variability alter the ranges and means of micronaire and other fiber properties so that strategies for improving or managing cotton intrinsic fiber quality clearly must incorporate the effects of growth environment on genetic traits being introduced.