

**VARIATION IN MARGINAL BRACT TRICHOMES OF COTTON CULTIVARS**

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**Abstract**

Although bract tissue is a major component of leaf trash in ginned cotton, improvement in cleanliness of ginned cotton has primarily been approached by genetically reducing trichomes (hairs) on cultivars. Three studies were conducted to 1) establish sampling procedures for evaluating marginal bract trichomes, 2) characterize marginal bract trichome densities and bract size parameters of selected cultivars, and 3) determine the relationships among and between visual ratings and counts of trichomes on leaves, bracts, and stems.

For the first study, three cultivars of contrasting leaf pubescence were examined in 2001 and 2002. First position bolls on the first fruiting node, a middle node, and a top node on representative cultivars were tagged, and bracts from each tagged boll were removed on three sampling dates (cutout, pre-defoliation, and pre-harvest). Marginal bract trichome number varied significantly for year, cultivar, plant position, and sampling date. Significant interactions were primarily associated with samples from lowest and latest sampling date. Results suggest cultivars should be sampled on the same date, preferably before defoliation, and plant positions examined should be consistent among the cultivars being sampled.

For the second study, leaf pubescence was rated and bracts were sampled from selected commercial cultivars in the Arkansas Cotton Variety Test at multiple locations in 1999, 2000, 2001, and 2002. Significant variation in marginal bract trichome density was found among locations and cultivars. The cultivar by location interaction was significant in only one year, but was non-significant when one non-irrigated site was excluded. This suggests that one (non-stressed) location is sufficient to characterize variation among cultivars for marginal bract trichomes. An additional analysis of four cultivars common to the Marianna irrigated site in all years revealed no year x cultivar interaction, indicating that relative marginal bract trichome densities of cultivars remain stable over time. Variation between groups of smooth-leaf and hairy-leaf cultivars suggests that marginal bract trichome density might be reduced in both smooth-leaf and hairy-leaf cultivars.

For the third study, random plants were sampled from segregating F2 populations (derived from crosses of lines differing for leaf pubescence) grown at Keiser, AR in 2001 and 2002. On each plant, the pubescence on a full-sized leaf, the main stem, and a bract from a full-sized first position boll were visually rated, then taken to the lab where trichome density on each plant part was determined. Bract trichome densities were significantly correlated with leaf and stem trichome densities, although the low values of the coefficients suggest the possibility of decreasing bract trichomes independently of leaf and stem trichomes. Relatively high correlations were obtained for visual ratings with trichome counts on a given plant part, indicating that trichomes on leaves, bracts, and stems can be visually rated.

Marginal bract trichomes of cotton cultivars can be characterized at one location and year as long as bracts are samples at the same time from similar plant positions. Consistent relative variation among cultivars for marginal bract trichomes over plant positions (except lowest bolls), sampling locations and years suggests a strong genetic component for this trait. Genetic control of marginal bract trichomes appears to be different from genetic control of trichomes on leaves and stems.