

# RESPONSE OF LEAF ANTHOCYANIN LEVELS TO CUTOUT

Randy Wells

Department of Crop Science  
North Carolina State University  
Raleigh, NC

## Abstract

Anthocyanin is the red pigment responsible for the red color exhibited by leaves late in the season. The appearance of this color change has been observed to accompany a decrease in canopy photosynthesis. The objective of this study was to ascertain changes in anthocyanin concentrations in cotton leaves throughout their ontogeny. Chlorophyll concentration was also measured to determine whether chlorophyll influenced to appearance of the red pigment. Cotton was grown in the field in both 1994 and 1995. Deltapine 50 was grown in 4-row plots which were 25 feet in length and 38 inches apart. Two treatments, a untreated control and a flower removal, were established when flowering occurred. The flower removal treatment consisted of the first two weeks of flowers and fruit. Pigment concentrations were followed in the newly emerging main stem and first position reproductive leaves tagged at approximately first flower. Anthocyanin extracted in cold methanol containing 1% HCl. The amount of pigment was determined by subtracting the absorbance by chlorophyll at 653nm (x 0.25) from the absorbance at 532 nm. Chlorophyll was also determined.

Flower removal caused a second peak in flowering at approximately 115 days after planting (DAP) in 1994, but not in 1995. Similarly, anthocyanin concentrations in 1994 increased steadily after 109 DAP in the controls but not in plants with fruit removed. This increase in anthocyanin concentration was not seen in 1995 until later in the season (129 DAP). The general trends in anthocyanin levels and chlorophyll concentrations were unaffected by leaf type regardless of year. In both years, chlorophyll concentration acted in a reciprocal manner with respect to chlorophyll concentration, with highly significant negative relationships between the two pigments ( $r^2 > -0.70$ ). The decrease in chlorophyll was concomitant with increases in anthocyanin concentration. The increase in red color was due to new biosynthesis of anthocyanin and not merely due to a loss of chlorophyll.