COTTON DEVELOPMENT AS AFFECTED BY PALMER AMARANTH (*AMARANTHUS PALMERI*) COMPETITION

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Abstract

Cotton growth may be compromised by season-long infestation of noxious weeds. Palmer amaranth (*Amaranthus palmeri*) is the most common weed invading Texas cotton cultures and is also present throughout the Southern U.S.. Therefore, Palmer amaranth was chosen as the model species for this study to examine its competitive effects with cotton. Palmer amaranth control is generally obtained with Preplant incorporated and/or Preemergence herbicide treatments. However, recent herbicide developments have made postemergence control measures possible on an "as needed" basis. Therefore, this study was conducted to determine the competitive effect that Palmer amaranth has on cotton growth and development.

This study was conducted in 1996 and 1997 on a Belk clay soil near College Station, Texas. The cotton variety was Deltapine 50, a popular "picker" variety grown throughout the Central Texas area. Seedling Palmer amaranth plants were transplanted into the field one day after cotton planting at densities of 0, 1, 2, 3, 4, 6, 8, 10, and 12 plants/30ft. of row. The Palmer amaranth seedlings were transplanted two inches to the left of the cotton seed row, representing weeds not controllable by standard cultivation techniques. Plot sizes were 4 rows (40") by 30 feet in length with four replications in 1996 and five replications in 1997. Palmer amaranth seedlings were transplanted into three rows with the fourth row acting as a buffer row between population densities.

Cotton and Palmer amaranth plants were harvested from the outside row to determine the mid-season biomass of both species. Palmer amaranth plants were also harvested at the end of the season to determine Palmer amaranth biomass as related to cotton yield. Cotton plants were plant mapped at mid-season and at the end of the season to determine the effect that Palmer amaranth has on the physiological development of cotton. The cotton plants were mapped for height, total nodes, vegetative nodes, and total bolls. Cotton plots were hand harvested from the two center rows to obtain cotton lint yields. Cotton lint was processed to determine fiber quality characteristics which included micronaire, length, strength, and uniformity.

Palmer amaranth densities exceeding two and three plants per 30 feet of row significantly decreased cotton lint yields in 1996 and 1997, respectively. Densities ranging from four to twelve plants per 30 feet of row decreased cotton lint yields linearly from 26% to 65%. However, Palmer amaranth competition did not affect any of the cotton fiber qualities in either year. Midseason cotton biomass was significantly reduced by Palmer amaranth density, however, no significant differences in cotton development were proven. Palmer amaranth biomass significantly increased as population densities increased, however, this trend leveled off at the densities of 8 plants per 30 feet of row when the weeds began to compete with one another.

Reprinted from the *Proceedings of the Beltwide Cotton Conference*
Volume 1:869-869 (1998)
National Cotton Council, Memphis TN