THE IMPACT OF UNCONTROLLED PALMER AMARANTH IN CENTRAL TEXAS COTTON

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Abstract

Palmer amaranth (*Amaranthus palmeri*) is the most common weed invading Texas cotton (*Gossypium hirsutum*). Therefore, this weed was chosen to use as a model specie to investigate interspecific competition with cotton growth and development. Studies were conducted in 1996 and 1997 on a Belk clay soil at the Texas Agricultural Experiment Station Research Farm near College Station, Texas. Plot sizes were 4 rows by 30 ft. with the fourth row kept weed-free to serve as a buffer between plots. The cotton variety utilized was Delta and Pineland 50, a variety commonly grown throughout Central Texas and the Brazos River flood plain. Cotton was planted 1.5 inches deep at a rate of 67,000 seed per acre. One day after cotton planting, Palmer amaranth seedlings were transplanted 2 inches to the side of the cotton seed row, representing weeds not generally controlled by cultivation. Weed densities studied in 1996 were 0, 1, 2, 4, 6, 8, 10 and 12 plants per 30 ft. of cotton row. Due to findings in 1996, a density of 3 weeds per 30 ft. was added in 1997 and the 12 weed density was eliminated. Normal crop production and plant protection procedures were practiced in both years.

Significant cotton yield reductions occurred at all weed densities evaluated in both 1996 and 1997. Yield reductions for 1996 amounted to 0, 11, 12, 25, 38, 51, 59, and 66 percent for the 0, 1, 2, 4, 6, 8, 10 and 12 plant densities. Due to less favorable cultural and climatic conditions in 1997, overall cotton yields were substantially reduced, however, the influence of the Palmer amaranth remained consistent. Yield reductions were 0, 12, 16, 22, 25, 36, 47, and 54 percent for the 0, 1, 2, 3,4, 6, 8 and 10 weed densities, respectively.

Cotton canopy architecture, including height and width was influenced by the presence of Palmer amaranth. The impact on cotton development as influenced by the Palmer amaranth competition became more apparent as the season progressed. However, cotton canopy measurements were more the result of direct inter-specific competition between the cotton plant and the Palmer amaranth next to it, than by weed density in the plots.

Cotton lint qualities, including micronaire, length, strength, and uniformity, were not significantly reduced by Palmer amaranth at any of the densities.

Although harvestability of each treatment was not evaluated, the difficulty of such is certainly a consideration at any of the weed densities we investigated. However, the results of this study indicate that even low Palmer amaranth infestation levels can cause substantial yield losses. Therefore, control practices are justified and should be employed in a timely manner, and also to avoid harvest difficulties.

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