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Palmer Amaranth: Big Cotton Competitor

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Palmer amaranth, commonly referred to as pigweed or carelessweed is the most common weed in Texas cotton cultures. Although there are several other amaranth species that are frequently encountered — such as redroot, tumble, prostrate, and smooth pigweed — Palmer amaranth is the most wide-spread. Therefore, this weed was chosen as a representative species to evaluate competitive effects with cotton in a recent study.

MATURE Palmer amranth plants

PALMER amaranth seedling

Leadership in the conduct of the study was provided by Gaylon Morgan, a graduate student with the Texas Agricultural Extension Service at Texas A&M University. Studies were conducted at the Texas A&M research farm near College Station during the 1996 and 1997 growing seasons.

Several weed densities were examined, ranging from one to 10 Palmer amaranth per 30 feet of cotton row. The weeds were thinned to the appropriate density and allowed to grow in close proximity to the cotton row. This would represent weeds not controlled by normal cultivation practices. The influence of these weed populations was examined in Delta and Pineland 50 cotton planted on 38-inch row spacings.

Palmer amaranth per 30 ft. of row	Percent Yield Reduction	Economic Loss ($/acre)
1	11	27
2	16	40
3	22	55
4	27	67
6	38	95
8	48	120
10	59	147

Source: G.D. Morgan, P.A. Baumann, and J. M. Chandler, Texas Agricultural Extension Service and Texas Agricultural Experiment Station

Results from the two-year study showed that Palmer amaranth was highly competitive with cotton. Cotton canopy volume, cotton biomass, and cotton yield were all reduced by the competition. Cotton yields were decreased 13 to 59 percent from weed densities of one to 10 Palmer amaranth plants per 30 feet of cotton row.

The accompanying table depicts the associated losses at the respective weed densities examined. It also points out the

economic loss that would be expected assuming a 500 lb. per acre yield and 50 cent cotton.

It was obvious when conducting the studies that the lowest weed density examined would create harvest difficulties in normal field situations, forcing the removal of the weeds prior to the harvest. However, the point to be made is that when weeds are left uncontrolled during the growing season, they are having a significant impact on cotton growth and yield.

Other studies have shown that this is particularly true with early-season competition. Although season-long competition was allowed in this study, similar impacts on crop yield would probably have been shown even if the weeds were removed at mid-season. Whether a cotton producer decides to hand-weed, spot-treat or broadcast herbicides such as Roundup Ultra, Buctril or Staple, the important thing is to get the weed out of the crop.

This study provided a quantitative measurement of one specific weed's competitive effect on cotton growth and underscores the importance implementing control measures on densities as low as one weed per 30 feet of cotton row.

This type of information is very helpful when employing integrated weed management programs. It should be pointed out that individual weed species vary greatly in their competitive influence with crops. These effects may be greater or less than those observed in this study, and are also highly dependent on culture and climatic conditions.

The two-year study was supported by the Texas Pest Management Association, Center for Integrated Pest Management, Texas Agricultural Extension Service and the Texas Agricultural Experiment Station.

TEXAS Ag Extension graduate student Gaylon Morgan measures Palmer amaranth growth in cotton.