

PALMER AMARANTH CONTROL AND ECONOMICS IN COTTON TILLAGE SYSTEMS IN THE TEXAS HIGH PLAINS. A.J. Bloodworth, P.A. Dotray, J.W. Keeling, J.W. Johnson, L.V. Gilbert and B.W. Bean; Texas Tech University, Lubbock, TX and Texas AgriLife Research and Extension, Lubbock and Amarillo, TX.

ABSTRACT

Producers in the Texas High Plains continue to look for effective methods to produce high yields while reducing input costs and maximizing the use of rainfall and irrigation water. One potential solution is conservation tillage. No-till and strip-till are two forms of conservation tillage that retain soil moisture and reduce input costs due to fewer trips across the field. However, these systems rely heavily on the use of herbicides to control weeds. The development of glyphosate resistant cotton has improved weed control in conservation tillage. One concern with glyphosate resistant cotton is the development of weed resistance due to the continued use of one herbicide mode of action. The overall objective was to examine control options in three tillage systems for effective and economical weed management in Roundup Ready Flex cotton.

Studies were conducted in 2007-2009 at the Texas AgriLife Research Center near Halfway, TX on an Olton clay loam, with a pH of 7.8 and organic matter less than 2% using an overhead sprinkler irrigation system. Sixteen treatments were established in no-till, strip-till and conventional till systems using various combinations of soil residual herbicides. In 2009, pendimethalin at 1.0 lb ai/A was applied to designated plots on April 21. A rolling cultivator was used to incorporate the herbicide in the conventional tillage plots and a strip-till implement was used to incorporate the herbicide and prepare a seedbed. The entire test area was irrigated with 0.9 inches of water to incorporate the herbicides in the no-till and inter-row areas of the strip-till areas. Cotton (ST4554B2F) was planted, and prometryn at 1.2 lb ai/A was applied broadcast to selected plots on May 14. Glyphosate at 0.75 lb ae/A was used alone or in tank mix combination with pyriithiobac in selected plots on June 17. A layby treatment consisting of glyphosate alone or in tank mix combination with diuron was applied to selected plots on July 10. On August 11, a third glyphosate application was made to plots that had received no residual herbicides.

Cotton stand was analyzed using *t* tests to compare conventional tillage to strip-tillage, conventional tillage to no-tillage and strip-tillage to no-tillage at $P < 0.05$. There was no difference between stand in conventional tillage compared to no-tillage; however, stand in strip-tillage was greater compared to conventional tillage and strip-tillage. Palmer amaranth (*Amaranthus palmeri*) control was effective throughout the growing season. Season-long control of Palmer amaranth by treatment in the no-till system, strip-till system and conventional till system ranged from 86 to 100%, 90 to 99%, and 85-100%, respectively. Cotton lint yield was analyzed using *t* tests. Strip-tillage lint yield was greater than conventional tillage and no-tillage, and no-tillage lint yield was greater than conventional tillage. Weed control costs were analyzed by calculating herbicide input costs per treatment and net returns above weed control costs. Herbicide input costs per treatment ranged from \$35 to \$79/A. Net returns above weed control and tillage costs in strip-tillage ranged from \$385 to \$597/A. Treatments included pendimethalin followed by (fb) glyphosate fb glyphosate; prometryn fb glyphosate + pyriithiobac fb glyphosate; glyphosate fb glyphosate fb glyphosate; and glyphosate + pyriithiobac fb glyphosate had returns over \$550 per acre.