WEED MANAGEMENT AND ECONOMICS IN COTTON TILLAGE SYSTEMS IN THE TEXAS HIGH PLAINS

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Abstract

Producers in the Texas High Plains continue to look for effective methods to maintain yields while reducing input costs and maximizing the use of rainfall and irrigation water. One potential solution is conservation tillage. No-tillage and strip-tillage 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 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 following sorghum from 2007. Sixteen preplanned treatments were established in no-till, strip-till and conventional till systems using various combinations of soil residual herbicides. Prowl H20 (pendimethalin) at 1.0 lb ai/A was applied to designated plots on May 2. A rolling cultivator was used to incorporate the Prowl H20 in the conventional tillage plots, and a strip-tillage implement was used to incorporate the herbicide in the strip-tillage plots. The entire test was irrigated within 24 hours after application with 1.0 inch of water to incorporate the herbicides in the no-till and inter-rows of the strip-till plots. Stoneville 4554B2F was planted on May 19, and Caparol (prometryn) at 1.2 lb ai/A was applied broadcast in designated plots immediately after planting. Roundup WeatherMax (glyphosate) at 0.75 lb ae/A was used alone or in tank mix combination with Staple (pyrithiobac) in designated plots on June 27. A layby treatment consisting of Roundup WeatherMax alone or in tank mix combination with Direx (diuron) was applied to designated plots on July 25. 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 Pr>t at 0.05. Average cotton stand was 2.3 plants/ft in conventional till, 2.2 plants/ft in strip-till and 2.0 plants/ft in no-till. There was no difference between stand in conventional tillage compared to strip-tillage; however, stand in no-tillage was less compared to conventional tillage and strip-tillage. Palmer amaranth (*Amaranthus palmeri*) control was excellent throughout the growing season. No difference was observed by treatment in the strip-tillage system two weeks after the first POST application, four weeks after the layby treatment, or among tillage systems. Cotton lint yield was analyzed using *t* tests to compare conventional tillage to strip-tillage, conventional tillage to no-tillage and strip-tillage to no-tillage at Pr>t at 0.05. Average lint yield was 993 lb/A in conventional till, 1130 lb/A in strip-till and 914 lb/A in no-till. Strip-tillage lint yield was greater than conventional tillage and no-tillage, and conventional tillage lint yield was greater than no-tillage. Gross returns based on lint yield were calculated by treatment in the strip-tillage system and ranged from $502.93 to $706.76. Weed control costs were analyzed by calculating herbicide input costs per treatment and net returns above weed control costs. Herbicide input costs per treatment in strip-tillage ranged from $32.94 to $83.10, and net returns above weed control costs in strip-tillage ranged from $425.83 to $652.48. This experiment will be repeated for the second time in 2009 following sorghum that was planted in 2008.