STRIP-TILL, NO-TILL, AND CONVENTIONAL TILL WEED MANAGEMENT SYSTEMS IN THE TEXAS SOUTHERN HIGH PLAINS

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Abstract

The number of production acres that have been converted to strip-till or no-till have increased in the Texas South Plains and Texas Panhandle over the past five years. This acreage will likely continue to increase as producers search for ways to reduce inputs due to high energy costs. Reduced tillage also offers a way to conserve rainfall and irrigation water. In order for any cropping system to be profitable, weed control must be achieved. No-till and strip-tillage offer some unique weed control challenges since a dinitroaniline herbicide is not broadcast incorporated. Reduced tillage generally means more reliance on postemergence herbicides. If there is a high selection pressure with few herbicide modes of action, the potential for weed resistance will increase. These challenges must be addressed in order for producers to realize the full benefit of these reduced tillage systems. Not only must weed control options be effective, they must also be economical and sustainable. Strip-tillage provides a means of conserving soil water while providing an effective way to apply fertilizer, establish an excellent seedbed for planting, and protect young cotton seedlings from wind damage. The overall objective was to examine control options in different tillage systems for effective weed management using Roundup Ready Flex cotton. Studies were conducted at the Texas AgriLife Research Center near Halfway, TX. Soil type was an Olton clay loam, with a pH of 7.8 and organic matter less than 2%. The study was conducted using an overhead sprinkler irrigation system and followed corn that was planted in 2006. Sixteen treatments were established in each tillage system using various degrees of soil residual herbicides. Prowl H20 (pendimethalin) at 1.0 lb ai/A was applied to designated plots on April 11 (conventional tillage) or April 26 (strip-tillage and no-tillage). A Krause disk was used to incorporate the Prowl H20 in the conventional tillage plots and a strip-tillage implement was used to incorporate the herbicide and prepare a seedbed. The entire test area was irrigated with 0.75 inches of water on April 26 to incorporate the herbicides in the no-till and inter-row areas of the strip-till areas. ST4554B2F was planted on May 14 using a John Deere MaxEmerge vacuum planter. Caparol (prometryn) at 1.2 lb/A was applied broadcast in designated plots on May 14. No tillage by treatment interaction was observed for cotton stand; therefore tillage main effects were examined. Cotton stand was greatest in the conventional tillage plots (2.47 plants per foot) followed by (fb) strip-tillage (2.2 plants per foot) fb no-tillage (1.35 plants per foot). 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 8. Control of Palmer amaranth (*Amaranthus palmeri*) was greatest in plots that contained Roundup WeatherMax plus Staple compared to Roundup WeatherMax alone at 14 days after the first POST treatments. A second POST application was made on July 12 to plots where Palmer amaranth was not controlled at least 90%. All plots received this second POST application by August 2. A layby application was made to designated plots on August 15. This treatment consisted of Direx (diuron) alone or in tank mix with glyphosate (glyphosate was added if Palmer amaranth control was less than 95%). End of season Palmer amaranth control in conventional tillage and strip-tillage plots was at least 90% regardless of plots that received several residual herbicides (Prowl H20 fb Caparol fb Roundup WeatherMax plus Staple fb Roundup fb Direx) compared to no residual herbicides (Roundup WeatherMax fb Roundup WeatherMax). When averaged across tillage systems, Palmer amaranth control was greatest in the conventional tillage and strip-tillage systems compared to the no-tillage system. Herbicide and application costs were determined per treatment in each tillage system and ranged from$24.64 to $69.53 per acre. Net returns above weed control costs were calculated per system and ranged from $644.52 to $784.87. Although the benefit of a residual herbicide was not apparent in this study, the concern of weed resistance must be considered when developing effective long-term weed management strategies.