PREPLANT CONTROL OF HORSEWEED FOR NO-TILL COTTON IN OKLAHOMA Shane Osborne Randy Boman Oklahoma State University Altus, OK Robert Rupp DuPont Crop Protection

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<u>Abstract</u>

Horseweed continues to be a challenge to control in many no-till cotton fields in Oklahoma due to its competitive nature. Controlling horseweed prior to planting cotton is essential since in-season chemical options are very few and often completely ineffective due to glyphosate resistance. The objectives of this project were to evaluate the effectiveness of FirstShot, Panoflex and Amathon applied alone or in a tank-mix with 2,4-D and glyphosate, and to compare the performance of these products to a standard hormone-based horseweed control program. Broadcast over-the-top applications were made with a compressed air, high-clearance sprayer with a spray volume of 10 gallons per acre (GPA). Four replicates of fifteen treatments were used, including an untreated control. Each of these herbicides were applied alone, in combination with 2,4-D and in combination with both 2,4-D and glyphosate. The 0.6 oz/A rate of FirstShot applied alone did not effectively control horseweed, but control did approach acceptable levels (78%) when the rate was increased to 0.8 oz/A. Regardless of rate, Panoflex applied alone at 0.45 oz/A provided similar control to the higher rate of FirstShot. Amathon was the only product applied alone that provided acceptable control of horseweed (88%). The addition of 2,4-D to any of the sulfonylurea (SU) treatments resulted in excellent control of horseweed. Although no benefit was observed from the addition of glyphosate to any SU/2,4-D combination, 2,4-D + glyphosate did effectively control (100%) horseweed and results suggest that glyphosate resistant horseweed was not present at this site.

Introduction

Horseweed continues to be a challenge to control in many no-till cotton fields in Oklahoma. Due to its competitive nature, a failure to control horseweed prior to planting results in reduced stands, harvest complications and reduced lint yields. Controlling horseweed prior to planting cotton is essential since in-season chemical options are very few and often completely ineffective due to glyphosate resistance. Hormone type herbicides have traditionally been the basis for preplant control programs in cotton, however many producers would prefer not to use them. Once in the sprayer system, it is virtually impossible to completely clean out 2,4-D. In addition, hormone based programs come with lengthy plant-back intervals. Currently, Oklahoma growers are advised to wait 30 days following an application of 2,4-D before planting cotton. Controlling horseweed without hormone-type herbicides would have the benefits of shortening the required plant-back interval and eliminating potential sprayer contamination issues. Sulfonylurea (SU) herbicides offer a different site-of-action compared to glyphosate and have proven to be effective on many additional broadleaf weed species. In addition, some offer shorter plant-back intervals compared to hormone herbicides. This project focused on the use of three SU herbicides: Firstshot, Panoflex and Amathon. FirstShot and Panoflex are currently registered for use ahead of cotton planting and only require 14-21 days (depending on soil type and pH) after application before planting cotton. Amathon's registration is currently pending.

Materials and Methods

This study was established as a randomized complete block design with four replicates and was conducted on a clay loam soil in Tillman County. Broadcast over-the-top applications were made with a compressed air, high-clearance sprayer with a spray volume of 10 gallons per acre (GPA). Treatments were applied on March 13, 2013 utilizing FirstShot, Panoflex and Amathon. A total of fifteen treatments were used, including an untreated control, and are listed in figure 1. Each of these herbicides were applied alone, in combination with 2,4-D (Barrage HF) and in combination with both 2,4-D and glyphosate (Roundup PowerMax). These treatments were compared to 2,4-D + glyphosate. Although our standard 2,4-D rate for horseweed control is 1.0 lb ai/a, in order to more clearly quantify the benefits of the SU herbicides the rate of 2,4-D used was 0.6 lb ai/A. The horseweed ranged from 2 to 5 inch rosettes at the time of application. Treatments were applied at 28 psi with flat fan nozzles. Figure 3 provides the observed treatment performance at 14, 28 and 45 days after treatment (DAT).

Untreated 0.6 oz/A FirstShot SG 0.6 oz/A FirstShot SG+ 0.6 lb ai/A 2,4-D 0.6 oz/A FirstShot SG + 0.6 lb ai/A 2,4-D + 1.0 lb ai/A glyphosate 0.8 oz/A FirstShot SG 0.45 oz.A Panoflex 0.45 oz/A Panoflex + 0.6 lb ai/A 2,4-D 0.45 oz/A Panoflex + 0.6 lb ai/A 2,4-D + 1.0 lb ai/A glyphosate 0.6 oz/A Panoflex 0.6 oz/A Panoflex + 0.6 lb ai/A 2,4-D 0.6 oz/A Panoflex + 0.6 lb ai/A 2,4-D + 1.0 lb ai/A glyphosate 0.33 oz/A Amathon 0.33 oz/A Amathon + 0.6 lb ai/A 2,4-D 0.33 oz/A Amathon + 0.6 lb ai/A 2,4-D + 1.0 lb ai/A glyphosate 0.6 lb ai/A 2,4-D + 1.0 lb ai/A glyphosate All treatments included 0.25% v/v non-ionic surfactant + 2 lb/A Ammonium Sulfate

Figure 1. Horseweed treatments evaluated



Figure 2. Horseweed control with FirstShot and Panoflex.



Figure 3. Horseweed control at 14, 28 and 45 DAT.

Results and Discussion

FirstShot applied alone at 0.6 oz/A controlled horseweed 55-65% over the course of all three evaluations (14, 28 and 45 DAT). Increasing the rate of FirstShot to 0.8 oz/A did not significantly increase horseweed control at 14 or 28 DAT. However, by the 45 day evaluation this treatment provided 78% horseweed control, which was significantly greater than the control provided by the lower rate. When 0.6 oz/A of FirstShot was combined with 2,4-D, horseweed was controlled 98% at 45 DAT. Similar control was observed when glyphosate was added to the tankmix of FirstShot + 2,4-D. Panoflex, regardless of rate (0.45 or 0.6 oz/A) controlled horseweed 69-75% 45 DAT. The addition of 2,4-D increased horseweed control to 100%. Similar control was observed when glyphosate was added to the tank-mix of Panoflex + 2,4-D. Amathon applied alone at 0.33 oz/A controlled horseweed 88% 45 DAT. The addition of 2,4-D increased horseweed control to 100 %. Similar control was observed when glyphosate was added to the tank-mix of Panoflex + 2,4-D. Amathon applied alone at 0.33 oz/A controlled horseweed 88% 45 DAT. The addition of 2,4-D increased horseweed control to 100 %. Similar control was observed when glyphosate was added to the tank-mix of Panoflex + 2,4-D. Amathon applied alone at 0.33 oz/A controlled horseweed 88% 45 DAT.

Summary and Conclusions

The lower rate of FirstShot applied alone did not effectively control horseweed. However, control did approach acceptable levels (>80%) when the rate was increased. Regardless of rate, Panoflex applied alone provided similar control to the higher rate of FirstShot. Amathon was the only product applied alone that provided acceptable control of horseweed (88%). The addition of 2,4-D to any of the SU herbicide treatments resulted in excellent control of horseweed. Although no benefit was observed from the addition of glyphosate to any SU/2,4-D combination, 2,4-D + glyphosate did effectively control (100%) horseweed at this location. This does allow for speculation concerning potential control provided by combinations of glyphosate with only the SU products (without 2,4-D). However, the documented presence of glyphosate resistant horseweed in Oklahoma and the incomplete control observed from FirstShot, Panoflex and Amathon applied alone, removes the consideration of programs depending heavily upon glyphosate. It should be noted that the performance of 2,4-D + glyphosate within this study suggests that no glyphosate resistant horseweed at this location.

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