In conclusion, tank mixing herbicides with Roundup or Gramoxone Extra can increase the control of annual bluegrass, mouseear chickweed, cutleaf eveningprimrose, and horseweed. Adding Blazer, Reflex, Cobra, and Goal generally did not have affect the final burndown rating. Antagonism of Roundup from the tank mix herbicides was not a large problem, but did occur in a few instances. Tank-mix treatments with Bladex, Karmex, Caparol, Banvel, or 2,4-D tended to enhance weed control with Roundup and Gramoxone, but the three-way tank mix treatments provided the highest level of burndown control. Future research needs to evaluate 2,4-D and Banvel as a component in a weed control program that includes a burndown and a residual herbicide so the broadest spectrum of weeds possible can be controlled quickly after burndown application and last until cotton planting.

HORSEWEED AND CUTLEAF EVENINGPRIMROSE CONTROL IN NO-TILL COTTON

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Abstract

No-till and stalebed cotton production both require the use of herbicides to control vegetation prior to planting. The two primary preplant herbicides are Gramoxone or Roundup. There are over twenty broadleaf weeds commonly found in Arkansas reduced tillage fields. Of these weeds, horseweed (HW) and cutleaf eveningprimrose (CLEP), are the most troublesome. These two weeds can overwinter as a rosette and persist throughout the cotton growing season. Unfortunately, Roundup is effective on HW but not CLEP. Gramoxone is somewhat effective on CLEP but provides poor control of HW. The purpose of our research was to evaluate several herbicide combinations for HW and CLEP control, and to determine cotton tolerance to these herbicides.

To evaluate HW and CLEP control, several small-plot tests and large field demonstrations were conducted from 1992 to 1995 in southeast Arkansas. Standard techniques were used in the replicated small-plot tests, and the herbicides were applied with a backpack in 10 GPA. In all the small- plot tests, treatments were applied in mid to late March to 3-8 inch rosette weeds. In the non-replicated large field tests grower equipment was used.

In 1992 CLEP control with Roundup at 1 pt/A was 76% at planting. The addition of Goal at 1.25 pt/A did not improve control (75%). Gramoxone at 1.5 pt/A gave 84% control, and as with Roundup, the addition of Goal did not improve control. In 1993, several other herbicides were evaluated for CLEP control. Roundup at 1 and 2 pt/A gave 73 and 78% control, respectively. The addition of Banvel SGF at 1 pt/A to Roundup at 1 pt/A improved control to 94%. The addition of Harmony Extra at 0.5 oz/A to Roundup did not improve CLEP control (73%). Gramoxone alone at 2 pt/A provided poor CLEP control (49%). The addition of Bladex at 2 pt/A or Caprol at 1 pt/A to Gramoxone improved control slightly, 67 and 73% respectively. In 1994 Roundup at 1 and 2 pt/A provided 15 and 30% CLEP control at planting. As in previous years, the addition of Harmony Extra did not improve control (33%). The addition of Banvel SGF at 1 pt/A or 2,4-D at 1 pt/A improved CLEP control with Roundup at 1 pt/A to 95 and 98% respectively. Gramoxone plus Bladex at 2 + 2 pt/A gave poor control (18%). Gramoxone plus Cotton-Pro at 2 pt + 1.5 pt/A gave 72% CLEP control. In 1995 Roundup at 1 pt/A and 2 pt/A gave 25 and 70% CLEP control. As in previous years Harmony Extra failed to improve CLEP control with Roundup whereas the addition of Banvel SGF or 2,4-D did improve control.

Most of our horseweed (HW) control observations have come from grower fields, but in 1995 we were successful in establishing a good small plot test. Roundup at 1 and 2 pt/A gave 76 and 87% HW control at planting. Gramoxone plus Bladex at 2 + 2 pt/A gave 83% control. Tank-mixes of Gramoxone and Bladex with Banvel or 2,4-D ester at 1 pt/A provided excellent HW control, 100 and 94%, respectively. However, in several of the grower fields the three-way tank mix of Gramoxone, Bladex and 2,4-D ester failed to provide acceptable HW control. The best program in our grower field demonstrations for both CLEP and HW control has been a late February application of 2,4-D ester at 2 pt/A followed by Gramoxone plus Bladex at 2 + 2 pt/A applied in mid March.

To evaluate cotton response to preplant herbicides tests were conducted in 1993-1995. Our concern was primarily with 2,4-D and Banvel applied in a true no-till situation. Cotton beds were formed in late February and rolled flat prior to the herbicide applications. Herbicides were applied 8,6,4,2,1 and 0 weeks prior to planting cotton on the undisturbed beds. Cotton tolerance was evaluated visually and by stand counts 2-4 weeks after planting. The soil was a silt loam with 1.6% OM and a CEC of 12.

Application timing affected cotton response to the herbicides tested. Injury with 2,4-D or Banvel SGF was most severe if application was made within two weeks of planting. Only in 1995 was injury noted when application was made four weeks prior to planting and only Banvel SGF caused injury. Banvel SGF was also the most injurious of the herbicides evaluated when applied two weeks before planting or less. With 2,4-D and Banvel, it was noted that if rainfall between application and cotton planting exceeded 1 inch the injury was not observed. It is also interesting to note that injury with 2,4-D and Banvel was manifested primarily by stand reduction with only slight leaf malformation. If the tests had been conducted on a sandy soil, we may have observed more leaf strapping with these hormone herbicides. To be safe, it is recommended to apply these herbicides at least four weeks prior to planting.

WEED MANAGEMENT WITH BLACK OAT (*AVENA STRIGOSA*) IN NO-TILL COTTON

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Abstract

Black oat is being used in Brazil as a weed suppressive cover crop for soybeans and corn. Black oat grows faster than wheat and rye in warm climates and produces a relatively large quantity of biomass. Previous studies have indicated it may have allelopathic properties which inhibit the growth of annual grasses and small-seeded broadleaf weeds such as pigweed.

Research supported in part by check-off funds from Alabama cotton growers was initiated at the Alabama Agricultural Experiment Station located at Headland in the fall of 1994 to evaluate the potential of black oat for weed control in no-till cotton. Small grain cover crops including black oat, wheat, and rye were planted in November 1994 and compared to fallow ground (winter weeds including ryegrass and cutleaf eveningprimrose present). Small grains and fallow main plots were 30 by 108 ft and replicated 4 times.

Cover crops and weeds were allowed to grow until April 10, 1995 then sprayed with 3 pints Roundup herbicide. Dessicated small grains approximately 3 ft tall were rolled flat to the ground using a modified stalk chopper machine on April 14 and cotton, variety Deltapine 5690, was planted with a John Deere Maxemerge planter fitted with Martin row cleaners and Accra-Plant retrofit disk openers on May 2. Temik 15G at 4 lb/acre was applied infurrow at planting. Main plots of each cover crop were split into three subplots consisting of no herbicide treatment, low herbicide treatment (Prowl 2.4 pts + Cotoran 3 pts/A), and high herbicide treatment (low treatment + Cotoran 2 pts + DSMA 4 pts/A post-directed followed by Bladex 1.5 pts + Cobra 0.5 pt/A post-directed). Data collected included visual weed control ratings, weed biomass in the drill and in the middles, and seed cotton yield.

Early season palmer amaranth, *Amaranthus palmerii,* control ratings for cotton planted in black oat and rye cover crops were equal for both low and high weed control programs. Weed control was better for cotton planted in black oat and rye covers than for cotton planted in fallow ground when no herbicide was used, indicating these cover crops suppressed weed seed germination and emergence. Weed biomass harvested June 20 from individual plots show less biomass was produced in plots with black oat and rye cover than plots with wheat or fallow covers. Extremely high weed seed populations in the test area resulted in a breakdown of the low herbicide program by late season compared to the high herbicide program. Part of this was caused by the improper setting of the row cleaners on our planters, which resulted in more disturbance of the seed furrow than was needed to plant into the cover crops. Weed biomass in the row middles where cover crops were not disturbed were significantly lower than weed biomass in the drill for all cover crop/herbicide treatments. Without herbicides, black oat gave greater sicklepod, *Senna obtusifolia,* and palmer amaranth control than rye or wheat. Maximum seed cotton yield (3557 lb/A) was obtained with the rye cover and high herbicide input system. Using the low herbicide system, yields were 92% of the maximum with black oat, 84% with rye, 78% with wheat, and 76% with winter fallow.

WEED MANAGEMENT IN CONSERVATION-TILLAGE COTTON -BROADCAST VS. BANDED HERBICIDE APPLICATION: CULTIVATIONS VS. HOODED SPRAYER

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Abstract

With emphasis on conservation-tillage crop production increasing it is necessary to develop an effective weed management program in cotton. Banded and broadcast preemergence (PRE) applications of Prowl + Cotoran followed by Staple (Early-POST) were evaluated in combination with Roundup/shielded sprayer applications and conservation-tillage cultivations made 3, 5, and 7 weeks after planting. Generally, broadcast herbicide applications were necessary for adequate weed control and maximum lint yields. No differences in weed biomass and lint yields were evident between Roundup/shielded sprayer applications and conservation-tillage cultivations. Two Roundup/shielded sprayer applications or cultivations provided greater weed control, and lower weed biomass compared the a single application. However, weed control, weed biomass, and lint yields were similar with two or three Roundup/shielded sprayer applications or cultivations.

Introduction

Cotton producers have been slow to adopt conservation-tillage production systems for several reasons. Poorer weed control, lower yields and quality associated with conservation-tillage cotton compared to conventional cotton production, loss of incorporated treatments for annual grass control and few postemergence over-the-top broadleaf herbicides have delayed the adoption of conservation tillage cotton production.

Materials and Methods

Research was conducted in 1994-95 at the Pee Dee Research and Education Center in Florence, South Carolina on a Norfolk loamy sand with naturally occurring Palmer Amaranth (*Amaranthus palmeri*), sicklepod (*Senna obtusifolia*) and goosegrass (*Eleusine indica*) populations. Plots were 4 rows, 30 ft long and were arranged in a randomized complete block design with four replications. The row spacing was 30 inches. The cotton was seeded with a no-till Maxi-merge planter. Roundup was applied to the entire test area at 1 qt/ac immediately prior to planting. Treatments included banded (15 inch) and broadcast PRE applications of Prowl @ 0.75 lb ai/ac + Cotoran @ 2.0 lb ai/ac followed by Staple (early-POST) @ 0.0625 lb ai/ac and Roundup/shielded sprayer (0.75 lb e/ac) applications and cultivations at 3, 5, and 7 WAP.

Results and Discussion

Broadcast herbicide applications were necessary to provide adequate weed control. Weed control (92 vs. 91% 8 WAP), weed biomass (201 vs. 278 lb/ac 8 WAP), and lint yields (606 vs. 609 lb/ac, respectively) were similar with Roundup/shielded sprayer applications and cultivations. With banded herbicide applications, weed control (92 vs. 79% 8 WAP) was generally greater and weed biomass levels (99 vs. 86% reduction 8 WAP) were generally lower with two or three Roundup/shielded sprayer applications or cultivations compared to a single treatment. However, lint yields were similar (665 vs. 537 lb/ac). With broadcast herbicide applications weed control, weed biomass levels, and lint yields were similar with one, two, or three Roundup applications or cultivations.

ROUNDUP APPLIED BY HOODED SPRAYER VERSUS CULTIVATION IN COTTON

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Abstract

The use of Roundup *(glyphosate)* applied by hooded sprayer has found utility in many cotton growing areas of the United States. A question commonly asked by growers is whether Roundup hooded sprayer applications will substitute for the use of cultivation in cotton. Reports in the literature generally suggest that the main purpose for cultivation is weed control. The data obtained in these field trials indicate that Roundup applied by the hooded sprayer provided weed control equal to or better than a cultivated standard.

In 3 of 4 trials, Roundup hooded sprayer applications provided significantly greater cotton yields than comparable cultivated treatments. Since weed control was similar in hooded sprayer and cultivated treatments, indications are that other factors, such as root pruning and/or soil moisture loss with cultivation, may be contributing factors in cotton yields.