MICROENCAPSULATED COMMAND FORMULATIONS IN COTTON

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Abstract

Command 3 ME, in combination with other standard cotton herbicides, has provided excellent control of problem weeds in cotton with no adverse affects on cotton yield or quality. Over fifty trials were conducted in 1996 to evaluate weed control efficacy and cotton yields with Command Cotton. Command Cotton was evaluated as premix formulations of microencapsulated clomazone plus fluometuron, and as Command 3 ME tank-mixed with fluometuron, Command Cotton tank-mix. Another objective was to evaluate Commence 5 EC and Command Cotton tank-mix in foundation soil applied and total weed control systems in cotton. F6597, F6897, and F6997 (Command Cotton premix formulations) provided weed control equal to Command Cotton tank-mix and other competitive standards evaluated. Command Cotton applied PRE alone controlled pitted morningglory, cocklebur, and smooth pigweed similar to Treflan applied PPI fb Cotoran applied PRE. Seed cotton yields from Commence fb Command Cotton tank-mix were similar to those from plots treated with Treflan fb Zorial + Cotoran. When Staple was applied following Commence 5 EC, Commence 5 EC fb Command Cotton tank-mix, or Command Cotton tank-mix applied PRE alone, weed control and seed cotton yields were equal to or greater than competitive treatments plus a postemergence treatment.

Introduction

Foundation soil applied herbicide programs have proven invaluable in cotton production systems (Wilcut, et. al., 1996). Command has become a key component in a total weed control program for many growers. Command controls annual broadleaf weeds not controlled by other soil applied herbicides (Dotray et. al., 1996). Past research has shown that there is no difference in weed control between Command 3 ME and Command 4 EC (Dotray et. al., 1996; Stringer et. al., 1996). Command 3 ME, in combination with other standard cotton herbicides, has provided excellent control of problem weeds in cotton with no adverse affects on cotton yield or quality (Dotray et. al., 1996; Webster and Shaw, 1996).

Research has shown the most economical and reliable weed control systems integrate soil applied and postemergent herbicides (Wilcut et. al., 1996). The objectives of this research were to evaluate Commence 5 EC and Command Cotton premix formulations, which were premix formulations of microencapsulated clomazone plus fluometuron (1:1 ratio), and to evaluate Command Cotton tank-mix which was represented by microencapsulated clomazone plus fluometuron tank-mixed (1 : 1 ratio), all as foundation soil-applied herbicides in cotton. Trials were also conducted to evaluate Command Cotton tank-mix in total weed control programs in cotton.

Materials and Methods

In 1996, over fifty field trials were conducted by university and FMC researchers in the southern cotton production states to evaluate Command Cotton and Commence 5 EC in cotton. Three primary programs were investigated: 1) evaluation of Command Cotton premix formulations for weed control in cotton, 2) evaluation of Command Cotton tank-mixtures, at equivalent rates to the premix, as soil-applied foundation weed control programs, and 3) the evaluation of Command Cotton in total weed control systems in cotton.

Trials were conducted in the following states; AL, AR, FL, GA, LA, MO, MS, NC, OK, TN, TX, and SC. All research was conducted as small plot, replicated trials. Herbicides were applied with compressed air type plot applicators.

Three formulations of a clomazone plus fluometuron premix were identified as F-6997, F-6897, and F6597. These Command Cotton premix formulations were compared to Command Cotton tank-mix at equivalent rates, and to other local standards for their weed control efficacy and crop safety. The experimental compounds were evaluated at rates of 0.5, 0.75, and 1.5 lb ai/A which was equivalent to microencapsulated clomazone plus fluometuron at 0.25 to 0.75 plus 0.25 to 0.75 lb ai/A, respectively. The premix compounds were formulated at 3 lb ai/gallon of product.

Commence 5 EC, a 1 : 1.5 ratio of clomazone and trifluralin was applied preplant incorporated (PPI) alone and PPI followed by (fb) Command Cotton tank-mix applied PRE in the foundation weed control program trials. Commence 5 EC was applied at 1.25 and 1.68 lb ai/A alone and at 0.625 to 0.95 lb /A when followed by Command Cotton at rates of 0.38 and 0.5 lb ai/A of each Command Cotton component, microencapsulated clomazone and fluometuron. Command Cotton was also applied alone and compared to competitive standards for foundation weed control programs in cotton. Command Cotton was applied at rates equivalent to 0.5 to 1.0 lb ai/A of each component in the combination.

The above foundation weed control programs were also compared to competitive standards in cooperator selected total weed control programs with Staple or Buctril. Standard weed control programs varied by state depending upon local cotton weed problems and differences in cotton

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production by state. Seed cotton yields were obtained by university cooperators on several of the foundation and total weed control trials.

Results and Discussion

Data were summarized and compiled in a spread sheet format by location. Data comparisons were made with treatments and weeds occurring within the same trial. There were no less than two and generally multiple trial locations for each treatment comparison.

Clomazone pre-mix evaluation

There were no outstanding differences noted between premix compounds. F6597, F6897, and F6997 provided weed control equal to Command Cotton tank-mix and other competitive standards evaluated.

When combined across rates, the pre-mix compounds controlled troublesome broadleaf and grass weeds similar to the Command Cotton tank-mix. Results were also comparable to a dinitroaniline (DNA) product applied PPI followed by Cotoran plus Zorial PRE. Smooth pigweed, pitted and ivyleaf morningglory, and common cocklebur were controlled by the pre-mix compounds combined by rate similar to the Command Cotton tank-mix or a DNA applied PPI followed by Cotoran plus Zorial applied PRE at 30 DAE.

Cotton injury from clomazone treatments and competitive standards was reported in some trials, however, it was generally equal to or less than 15 % and cotton outgrew this injury by 30 DAP. Foliar injury was generally characterized as interveinal chlorosis and / or marginal leaf bleaching.

Foundation Weed Control Programs

The observed cotton injury was minimal (< 15 %) and similar in magnitude to that observed with other standard treatments and was undetected past 30 DAE. Reported foliar injury was equal to or less than that observed in the Treflan + Cotoran or Treflan + Zorial + Cotoran treatments.

Smooth pigweed and pitted morningglory control by Commence applied PPI was similar to that obtained with Treflan PPI followed by Cotoran PRE at 30 DAP. Commence at 0.95 lb/A was applied PPI followed by Command Cotton applied PRE which controlled common cocklebur, large crabgrass, smooth pigweed, and pitted morningglory equal to a DNA followed by Zorial + Cotoran applied PRE.

Command Cotton controlled pitted morningglory, cocklebur, and smooth pigweed 82, 87, and 97 % compared to 78, 81, and 97 %, respectively, with Treflan PPI fb Cotoran applied PRE. Treflan applied PPI followed by Zorial + Cotoran applied PRE controlled pitted morningglory 82 %, cocklebur 89 %, and smooth pigweed
99 %.

Treatments with Commence 5 EC at 1.25 to 1.68 lb/A produced cotton yields similar to standard treatments, Treflan fb Cotoran or Zorial + Cotoran applied PRE. All treatments produced cotton yields greater than the untreated check.

Plots treated with Commence followed by Command Cotton produced higher cotton yields than Treflan fb Cotoran. Cotton yields from Commence fb Command Cotton were similar to those from plots treated with Treflan fb Zorial + Cotoran. Cotton yields were reduced 45 to 85 % from weed competition in the untreated checks. Command Cotton compared very favorably as a foundation PRE treatment with Zorial + Cotoran PRE. Treatments with Command Cotton produced seed cotton yields of 1850 to 1864 lb/A compared to 1522 to 1779 lb/A by Zorial + Cotoran. The untreated checks produced only 742 to 816 lb seed cotton/A.

Total Weed Control Programs

The same treatments applied in the foundation soil applied weed control programs were set up in university trials and followed by Staple or Buctril as total weed control programs. In twelve trials, no differences in weed control were observed at 48 DAP with Commence PPI at 0.625 lb/A or Commence applied PPI at 0.95 lb/A, each followed by Staple early POST at 0.625 lb/A. Weeds controlled by Commence followed by Staple included smooth pigweed, pitted morningglory, common cocklebur, and large crabgrass. When Staple was applied POST following Commence, regardless of the Commence rate, difficult to control weeds like pigweeds, cocklebur and morninglories were controlled equally (95 to 100 %). Similar results(data not shown) were obtained with Buctril following the PRE treatments with the exception of pigweed control. Smooth pigweed was controlled 77 % in two trials with Buctril following Command Cotton compared to 100 % with Staple following Command Cotton at 48 DAP. When Staple was applied following Commence 5 EC, Commence 5 EC fb Command Cotton, or Command Cotton PRE, seed cotton yields were equal to or greater than competitive soil applied treatments plus a postemergence treatment.

Summary

These results indicate that difficult to manage weeds are controlled by clomazone herbicide programs. Commence 5 EC and Command Cotton will serve as foundation soil applied herbicides in cotton and can be integrated into total weed control systems for maximum economic yields.

References

Dotray, P.A., J.W. Keeling, and C.L. Jones. 1996. Cotton tolerance and weed control in sandy soils with Command. Proceedings Belt- wide Cotton Conferences. 1546.

Stringer, S.J., T.I. Crumby, J.L. Taylor. 1996. Formulation alter- natives for Command Herbicide on cotton. Proceedings Beltwide Cotton Conferences. 1547 - 1549.

Webster, E.P. and D.R. Shaw. 1996. The potential for early application timings of Command. Proceedings Beltwide Cotton Conference. 1546 - 1547.

Wilcut, J.W., T. Baughman, B.J. Brecke, D. Bridges, S.M. Brown, E.F. Eastin, H. McLean, E.C. Murdock, and G.B. Wilson. 1996. A southeastern regional analysis of Zorial and POST Herbicides in BXN cotton. Proceedings Beltwide Cotton Conference. 1442 - 1543.

Table 1. Command 3 ME / Fluometuron premix evaluation - 1996.

Treatment	lb ai/A	AMACH	IPOLA	IPOHE	XANST
Clomaz. 3ME	1.5	93	93	72	97
fluometuron premix	0.75	97	87	64	88
Command / fluometuron	0.75 0.75				
Prowl + Cotoran	0.75 0.8	98	94	75	86
Zorial	0.75				

Mean of twelve trials in southern cotton states.

Table 2. Commence 5 EC and Command 3 ME in foundation weed control programs - 1996.

		% Weed Control 30 - 48 DAP			
Treatment	lb ai/A	DIGSA	XANST	AMACH	IPOLA
Commence	1.68	89	71	92	76
Treflan fb	0.75	97	81	97	78
Cotoran	0.9				
Commence fb	0.95	99	88	97	84
Command +	0.5				
fluometuron	0.5				
Treflan fb	0.75	98	89	99	82
Zorial +	1.0				
Cotoran	0.9				
Command +	0.75	97	87	97	82
fluometuron	0.75				

Mean of twelve trials in southern cotton states.

Table 3. Commence 5 EC and Command 3 ME in foundation weed control programs - 1996.

		Seed Cotton Yield
Treatment	lb ai/A	lb / A
Commence	1.68	1903
Treflan fb	0.75	1895
Cotoran	0.9	
Commence fb	0.95	2047
Command +	0.5	
fluometuron	0.5	
Treflan fb	0.75	1943
Zorial +	1.0	
Cotoran	0.9	
Command +	0.75	1862
fluometuron	0.75	
Zorial +	1.25	1779
Cotoran	1.0	
Untreated		602

Mean includes 2 - 5 trials in southern cotton states.

Table 4. Total weed control Programs with Commence 5 EC and Command 3 ME - 1996.

		% Weed Control 30 - 48 DAP			
Treatment	**lb ai/A**	**AMACH**	**IPOLA**	**XANST**	**DIGSA**
Commence	0.625	100	86	84	85
Staple	0.063				
Commence	0.95	98	90	88	100
Staple	0.063				
Commence fb	0.63	100	97	94	94
Command +	0.38				
fluometuron	0.38				
Staple	0.063				
Commence fb	0.95	98	96	96	98
Command +	0.5				
fluometuron	0.5				
Staple	0.063				
Command +	0.5	100	96	95	98
fluometuron	0.5				
Staple	0.063				
Treflan fb	0.75	100	97	92	93
Cotoran	0.9				
Staple	0.063				

Mean of 2 - 5 trials in southern cotton states.

Table 5. Total weed control Programs with Commence 5 EC and Command 3 ME - 1996.

Treatment	lb ai/A	Seed Cotton Yield lb / A
Commence	0.625	2079
Staple	0.063	
Commence	0.95	2451
Staple	0.063	
Commence fb	0.63	1985
Command +	0.38	
fluometuron	0.38	
Staple	0.063	
Commence fb	0.95	2607
Command +	0.5	
fluometuron	0.5	
Staple	0.063	
Command +	0.5	2597
fluometuron	0.5	
Staple	0.063	
Treflan fb	0.75	2468
Cotoran	0.9	
Staple	0.063	

Mean of 2 - 5 trials in southern cotton states.