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Weed Control with Single and Split Herbicide Applications in Corn

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Abstract

The objective of the study was to compare season-long weed control from single and sequential herbicide applications in corn. Kochia control was 90% or more late in the season, and did not differ among herbicides. All herbicides except Lumax EZ provided 90% or more Russian thistle control by the season's end. Palmer amaranth control was lowest when Bicep II Magnum was applied preemergence (PRE) and followed by Lexar EZ postemergence (POST), and when Acuron was applied PRE and again POST. Compared to the untreated control, corn receiving herbicide treatments yielded more than three times as much grain, but yields did not differ among herbicides.

Keywords

sequential applications, residual control, corn herbicide

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Weed Control with Single and Split Herbicide Applications in Corn

R.S. Currie and P.W. Geier

Summary

The objective of the study was to compare season-long weed control from single and sequential herbicide applications in corn. Kochia control was 90% or more late in the season, and did not differ among herbicides. All herbicides except Lumax EZ provided 90% or more Russian thistle control by the season's end. Palmer amaranth control was lowest when Bicep II Magnum was applied preemergence (PRE) and followed by Lexar EZ postemergence (POST), and when Acuron was applied PRE and again POST. Compared to the untreated control, corn receiving herbicide treatments yielded more than three times as much grain, but yields did not differ among herbicides.

Introduction

Early season weed control in corn is critical to prevent competition during crop establishment. Herbicides with residual activity are typically used near planting time to achieve this, but extending the length of residual activity can be accomplished by delaying some of the preemergence herbicide until after the crop emerges. The objective of this study was to compare single preemergence herbicide treatments with sequential split applications for efficacy in corn.

Experimental Procedures

An experiment was conducted at the Kansas State University Southwest Research-Extension Center near Garden City, KS, to evaluate single versus split application of herbicide premixtures (Table 2) for efficacy in corn. Herbicides were applied using a tractor-mounted, compressed CO₂ sprayer delivering 19.4 gpa at 30 psi and 4.1 mph. Application, environmental, and weed information are shown in Table 1. Plots were 10 by 35 feet and arranged in a randomized complete block design with four replications. Soil was a Beeler silt loam with 2.4% organic matter and pH of 7.6. Visual estimates of weed control were taken on June 24 and August 14, 2020. These dates were 34 and 85 days after the postemergence treatments (DAB). Corn yields were determined on October 1, 2020, by mechanically harvesting the center two rows of each plot and adjusting grain weights to 15.5% moisture.

Results and Discussion

Early season control of all weed species was 90% or more with all preemergence (PRE) herbicides, and did not differ between treatments (data not shown). Control of common sunflower and green foxtail remained 90% or more throughout the season regardless of herbicide. Bicep II Magnum (*S*-metolachlor/atrazine) applied PRE

followed by Lexar EZ (*S*-metolachlor/atrazine/mesotrione) POST and Acuron (*S*-metolachlor/atrazine/mesotrione/bicyclopyrone) applied PRE and POST provided less than 90% kochia and Palmer amaranth control at 34 DAB (Table 2). Kochia control was similar among all herbicides at 85 DAB, but Palmer amaranth control remained less than 90% with the previously mentioned treatments as well as with Bicep II Magnum PRE followed by Halex GT (*S*-metolachlor/glyphosate/mesotrione) POST. All herbicides controlled Russian thistle similarly at 34 DAB, but Lumax EZ (*S*-metolachlor/atrazine/mesotrione) alone PRE was less efficacious than other treatments on Russian thistle at 85 DAB. Grain yields did not differ among herbicide-treated plots. However, yields increased 85 to 104 bu/a with herbicide-treated plots compared to the untreated controls (40.9 bu/a).

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Table 1. Application, environmental, and weed information for the single and sequential treatment study in corn

Application timing	Preemergence	Postemergence
Application date	May 1, 2020	May 21, 2020
Air temperature (°F)	59	67
Relative humidity	51	80
Soil temperature (°F)	58	66
Wind speed (mph)	3 to 7	6 to 10
Wind direction	Northwest	Southeast
Soil moisture	Fair	Good
Corn		
Height (inches)	---	2 to 5
Leaves (no.)	0	1 to 2
Russian thistle		
Height (inches)	---	4 to 6
Density (plants/10 ft ²)	0	2
Kochia		
Height (inches)	---	1 to 3
Density (plants/10 ft ²)	0	2
Palmer amaranth		
Height (inches)	---	1 to 2
Density (plants/10 ft ²)	0	1
Sunflower		
Height (inches)	---	2 to 3
Density (plants/10 ft ²)	0	0.5
Green foxtail		
Height (inches)	---	0.5 to 1
Density (plants/10 ft ²)	0	1

Table 2. Weed control and corn yield from the single and sequential treatment study in corn

Treatment ¹	Rate	Timing ²	Kochia		Russian thistle		Palmer amaranth		Grain yield
			34	85	34	85	34	85	
			DAB ³	DAB ³	DAB	DAB	DAB	DAB	
	oz/a		----- % Visual -----						bu/a
Untreated	---	---	---	---	---	---	---	---	40.9
Lumax EZ	86	PRE	95	97	84	77	94	93	138.9
Acuron	96	PRE	100	95	94	95	100	94	132.5
Lexar EZ	48	PRE	99	98	98	90	100	98	144.3
Acuron	48	POST							
AMS	1.0%	POST							
Bicep II Magnum	67	PRE	95	95	94	90	93	88	143.2
Halex GT	58	POST							
NIS	0.25%	POST							
AMS	1.0%	POST							
Bicep II Magnum	48	PRE	89	90	98	93	85	83	140.2
Lexar EZ	56	POST							
NIS	0.25%	POST							
AMS	1.0%	POST							
Acuron	48	PRE	86	90	98	93	85	80	125.6
Acuron	48	POST							
Resicore	80	PRE	98	95	90	90	95	95	145.3
Resicore	40	PRE	100	98	93	90	100	99	129.6
Resicore	40	POST							
Corvus	5.6	PRE	100	100	98	98	98	93	142.1
Atrazine	32	PRE							
Harness Max	40	POST							
Glyphosate	28	POST							
AMS	1.0%	POST							
LSD (0.05)			10	NS	NS	10	10	12	30.2

¹ AMS = ammonium sulfate. NIS = nonionic surfactant.

² PRE = preemergence. POST = postemergence.

³ DAB = days after the postemergence treatments.



Figure 1. Untreated control.



Figure 2. Acuron at 96 oz/a applied preemergence. Photo taken 69 days after preemergence treatment.



Figure 3. Lexar EZ at 48 oz/a applied preemergence followed by Acuron at 48 oz/a postemergence. Photo taken 49 days after postemergence application.



Figure 4. Bicep II Magnum at 67 oz/a applied preemergence followed by Halex GT at 58 oz/a applied postemergence. Photo taken 49 days after postemergence application.



Figure 5. Corvus at 5.6 oz/a plus atrazine at 32 oz/a applied preemergence followed by Harness Max at 40 oz/a plus glyphosate at 32 oz/a applied postemergence. Photo taken 49 days after postemergence application.