Surtain Herbicide Programs for Weed Management in Corn

Patrick W. Geier and Sarah H. Lancaster

Summary

All herbicides evaluated provided good control of velvetleaf and Russian thistle at Garden City, and did not differ between treatments. Although slight differences occurred among treatments for kochia control, all herbicides provided at least 90% control early and late in the season. Surtain plus Armezon, atrazine, and glyphosate applied early postemergence (EPOST) as well as Surtain applied preemergence (PRE) followed by Armezon Pro, atrazine, and glyphosate postemergence (POST) or Status plus Zidua SC and glyphosate POST were the most effective herbicides for Palmer amaranth and johnsongrass control. At Manhattan, Palmer amaranth control did not differ between treatments at any rating date (98% to 100%). Storen PRE followed by Halex GT was slightly less effective on common sunflower early in the season, but control was nearly complete later in the season. By the end of the season, both Acuron or Storen PRE followed by Halex GT were less effective on entireleaf morningglory at Manhattan. The EPOST treatments of Surtain caused 20% corn necrosis at both locations, but injury did not persist. All herbicides increased yields relative to the untreated controls at both locations, but the difference between treatments only occurred at Garden City.

Introduction

Surtain herbicide is a newly registered premixture of pyroxasulfone, the active ingredient in Zidua and saflufenacil, the active ingredient in Sharpen. Surtain contains a microencapsulated formulation of saflufenacil that enables the herbicide to be applied to emerged corn; however, it will not control emerged weeds, and some risk of crop injury with Surtain applied POST still exists. The objective of these studies was to compare Surtain herbicide rates and application timings to commercial standards in corn at two Kansas locations.

Experimental Procedures

Experiments at Manhattan and Garden City compared Surtain herbicide as a PRE or EPOST and/or POST treatment to standard herbicides in corn. Herbicides were applied using either a tractor-mounted, compressed-CO_2 sprayer delivering 19.4 gpa or a compressed-CO_2 backpack sprayer delivering 15 gpa. Application, environmental, and plant information is shown in Table 1. Plots were 10 by 30 or 35 ft, and arranged in a randomized complete block design replicated four times. Soil was a silt loam at both locations. Visual weed control at Garden City was determined on June 6 and August 6, 2024. These dates were 5 days after the EPOST treatments (5 DAB) and 54 days after the POST treatments (54 DAC), respectively. At Manhattan, weed control was deter-

mined on May 8, May 22, May 30, June 6, and June 28, 2024. These dates were 14 days after the PRE treatments (DAA), and 12, 20, 27, and 49 DAB, respectively. Corn yields were determined on September 17, 2024, at Manhattan and on October 17, 2024, at Garden City by mechanically harvesting the center two rows of each plot and adjusting grain moistures to 15.5%.

Results and Discussion

The treatment structure differed between the two locations, so data are presented separately (Tables 2 and 3). At Garden City, all herbicides controlled velvetleaf 91% or more at 5 DAB and 54 DAC, and did not differ between treatments (data not shown). Similarly, Russian thistle control was 90% or more with all herbicides at 5 DAB, and 100% regardless of treatment at 54 DAC. Early season Palmer amaranth control was best when Surtain was applied EPOST with Armezon, atrazine, and glyphosate (Table 2). Palmer amaranth control at 5 DAB was 90% or less with all PRE-only herbicides except Surtain at 14 oz plus atrazine or Surtain at 17 oz. By 54 DAC, Palmer amaranth control was best when Surtain plus Armezon, atrazine, and glyphosate were applied EPOST, or when Surtain at 14 oz was applied PRE followed by Armezon Pro, atrazine, and glyphosate or Status, Zidua SC, and glyphosate POST. Surtain PRE followed by Status, Zidua SC, and glyphosate POST was the only treatment to provide less than 95% kochia control at 5 DAB. However, only Acuron PRE controlled kochia less than 96% late in the season. Trivolt applied PRE and Surtain plus Armezon, atrazine, and glyphosate controlled johnsongrass completely at 5 DAB. Surtain plus Armezon, atrazine, and glyphosate applied EPOST, Surtain PRE followed by Armezon Pro, atrazine and glyphosate, and Surtain PRE followed by Status, Zidua SC, and glyphosate POST controlled johnsongrass 95% or more by 54 DAC. At Manhattan, all herbicides provided nearly complete control of Palmer amaranth throughout the season (data not shown). Similarly, all herbicides controlled common sunflower later in the season. Acuron applied PRE followed by Halex GT was less effective on entireleaf morningglory at Manhattan throughout the season than other herbicides (Table 3).

When Surtain was applied as an EPOST treatment, 20% corn necrosis was observed at 5 DAB at Garden City and 20% to 21% at Manhattan at 14 DAA (data not shown), but necrosis did not persist more than 30 days. No other herbicide caused visible corn injury. Corn yields at Manhattan did not differ between herbicide treatments, but all herbicide-treated corn yielded 90 to 95 bu/a more grain than the untreated control (Table 3). Similarly, all herbicides increased grain yields relative to the untreated plots at Garden City (56 to 158 bu/a). However, yields were greatest when Surtain was applied PRE followed by Status plus Zidua or Armezon Pro plus atrazine POST (Table 2).

Acknowledgments

Funding for this research was provided by BASF Corporation.

Table 1. Application, environmental, and plant information for the Surtain corn trials in Kansas

	Garden City			Manhattan	
Application timing	Preemergence	Early postemergence	Postemergence	Preemergence	Postemergence
Application date	May 3, 2024	June 1, 2024	June 13, 2024	April 24, 2024	May 10, 2024
Air temperature (F)	53	82	83	68	76
Relative humidity (%)	66	59	52	47	54
Soil temperature (F)	58	74	74	57	74
Wind speed (mph)	2 to 4	4 to 7	4 to 7	1 to 2	4 to 5
Wind direction	East	South	South	Northwest	Northwest
Soil moisture	Dry	Wet	Good	Good	Good
Corn					
Height (inches)	---	4 to 6	12 to 18	---	3 to 5
Leaves (no.)	0	2 to 3	6 to 7	0	2
Kochia					
Height (inches)	---	2 to 5	2 to 6	---	---
Density (plants/ft^2)	0	0.3	0.1	0	0
Palmer amaranth					
Height (inches)	---	0.25 to 4	1 to 3	---	0.5
Density (plants/ft^2)	0	8	0.1	0	0.1
Russian thistle					
Height (inches)	---	2 to 4	2 to 4	---	---
Density (plants/ft^2)	0	0.2	0.1	0	0
Velvetleaf					
Height (inches)	---	1 to 3	---	---	---
Density (plants/ft^2)	0	0.4	0	0	0
Johnsongrass					
Height (inches)	---	0.5 to 2	---	---	---
Density (plants/ft^2)	0	1	0	0	0
Entireleaf morningglory					
Height (inches)	---	---	---	---	0.5 to 1
Density (plants/ft^2)	0	0	0	0	0.1
Common sunflower					
Height (inches)	---	---	---	---	0.5 to 1
Density (plants/ft^2)	0	0	0	0	0.1

Table 2. Weed control and grain yield at the Garden City Surtain corn trial

			Palmer amaranth		Kochia		Johnsongrass		Grain
Treatment[1]	Rate	Timing[2]	5 DAB[3]	54 DAC[3]	5 DAB	54 DAC	5 DAB	54 DAC	yield
	oz/a		---------- % visual ----------						bu/a
Untreated	---	---	---	---	---	---	---	---	16.9
Acuron	48	PRE	83	70	100	93	75	75	73.2
Resicore	40	PRE	89	70	98	98	81	78	132.0
Trivolt	12	PRE	81	70	100	100	100	89	82.1
Storen	38	PRE	88	75	100	100	83	78	113.3
Surtain	11	PRE	88	75	95	100	83	80	128.4
Surtain	11	PRE	90	80	100	100	90	81	131.3
Atrazine	32	PRE							
Surtain	14	PRE	90	83	99	100	90	85	128.1
Surtain	14	PRE	94	88	100	96	91	85	157.9
Atrazine	32	PRE							
Surtain	17	PRE	96	86	100	100	93	86	159.3
Surtain	14	EPOST	94	93	96	96	98	90	130.2
Clarity	8	EPOST							
Glyphosate	30	EPOST							
NIS	0.25%	EPOST							
AMS	1.0%	EPOST							
Surtain	14	EPOST	98	94	99	96	100	96	159.1
Armezon	0.75	EPOST							
Atrazine	32	EPOST							
Glyphosate	30	EPOST							
COC	1.0%	EPOST							
AMS	1.0%	EPOST							
Surtain	14	PRE	93	96	98	100	86	95	172.8
Armezon Pro	16	POST							
Atrazine	16	POST							
Glyphosate	30	POST							
COC	1.0%	POST							
AMS	1.0%	POST							
Surtain	14	PRE	91	100	90	99	89	100	175.4
Status	5.0	POST							
Zidua SC	2.5	POST							
Glyphosate	30	POST							
NIS	0.25%	POST							
AMS	1.0%	POST							
LSD (0.05)			5	6	6	5	6	8	25.3

[1] NIS is nonionic surfactant, AMS is ammonium sulfate, COC is crop oil concentrate.
[2] PRE is preemergence, EPOST is early postemergence, POST is postemergence.
[3] DAB is days after the early postemergence treatments, DAC is days after the postemergence treatments.

Table 3. Weed control and corn yield at the Manhattan Surtain corn trial

			Sunflower	Entireleaf morningglory				Corn
Treatment[1]	Rate	Timing[2]	14 DAA[3]	12 DAB[3]	20 DAB	27 DAB	49 DAB	yield
	oz/a		---------- % visual ----------					bu/a
Untreated			---	---	---	---	---	167.7
Verdict	10	PRE	100	96	94	94	90	262.6
Status	5.0	POST						
Zidua SC	2.5	POST						
Glyphosate	30	POST						
COC	1.0%	POST						
AMS	1.0%	POST						
Surtain	14	PRE	100	100	100	99	99	261.5
Surtain	11	POST						
Armezon	0.75	POST						
Atrazine	32	POST						
Glyphosate	30	POST						
COC	1.0%	POST						
AMS	1.0%	POST						
Surtain	14	PRE	100	100	99	99	99	262.8
Status	5.0	POST						
Zidua SC	2.5	POST						
Glyphosate	30	POST						
NIS	0.25%	POST						
AMS	1.0%	POST						
Acuron	48	PRE	100	90	76	68	69	258.1
Halex GT	60	POST						
NIS	0.25%	POST						
AMS	1.0%	POST						
Storen	38	PRE	95	96	91	88	81	258.9
Halex GT	60	POST						
NIS	0.25%	POST						
AMS	1.0%	POST						
Resicore	40	PRE	100	96	94	90	89	257.5
Resicore	40	POST						
Glyphosate	30	POST						
NIS	0.25%	POST						
AMS	1.0%	POST						
LSD (0.05)			4	4	11	15	17	43.4

[1] COC is crop oil concentrate, AMS is ammonium sulfate, NIS is nonionic surfactant.
[2] PRE is preemergence. POST is postemergence.
[3] DAA is days after the preemergence treatments, DAB is days after postemergence treatments.