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Sequential Treatments of Rimsulfuron, Mesotrione, Thifensulfuron, Balance Flexx, Cinch, Cinch ATZ, and Prowl H2O Mixtures for Weed Control in Irrigated Corn

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Abstract

No treatment with less than 1.5 lb/a atrazine provided commercially acceptable Palmer amaranth control. The best level of Palmer amaranth control was produced by treatments that had good preemergence control augmented by a postemergence application with two or more modes of action that contained 0.5 lb/a atrazine. All treatments provided excellent kochia control. The best Russian thistle treatments provided from 77 to 88% control. The best foxtail or crabgrass treatments provided from 91 to 94% control. Combinations of preemergence treatments followed by a postemergence treatment achieved excellent shattercane control.

Keywords

weed science, weed control, rimsulfuron, thifensulfuron, Balance Flexx (isoxaflutole), Cinch (S-metolachlor), Cinch ATZ (Cinch+atrazine), Prowl H2O (microencapsulated pendimethalin), broadleaf and grass weed control in irrigated corn, glyphosate-resistant corn, shattercane, green foxtail, crabgrass, kochia, Palmer amaranth, Russian thistle, preemergence herbicide, postemergence herbicide

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Sequential Treatments of Rimsulfuron, Mesotrione, Thifensulfuron, Balance Flexx, Cinch, Cinch ATZ, and Prowl H₂O Mixtures for Weed Control in Irrigated Corn

R. Currie and P. Geier

Summary

No treatment with less than 1.5 lb/a atrazine provided commercially acceptable Palmer amaranth control. The best level of Palmer amaranth control was produced by treatments that had good preemergence control augmented by a postemergence application with two or more modes of action that contained 0.5 lb/a atrazine. All treatments provided excellent kochia control. The best Russian thistle treatments provided from 77 to 88% control. The best foxtail or crabgrass treatments provided from 91 to 94% control. Combinations of preemergence treatments followed by a postemergence treatment achieved excellent shattercane control.

Introduction

Rimsulfuron is a postemergence herbicide that has been used in corn for more than 25 years. It has a limited degree of preemergence activity and provides excellent postemergence control of sorghum species weeds. Although it provides good control of several other grassy weeds, control is limited if they exceed certain size limits. Because rimsulfuron is inexpensive to manufacture, it adds a great deal of value to tank mixes of other herbicides. The objective of this study was to explore tank mix partners to augment rimsulfuron's weed control.

Procedures

Tank mixes of rimsulfuron, thifensulfuron, Balance Flexx (isoxaflutole), Cinch (S-metolachlor), Cinch ATZ (Cinch+atrazine) and Prowl H₂O (microencapsulated pendimethalin) were evaluated for broadleaf and grass weed control in irrigated corn at the Kansas State University Southwest Research-Extension Center in Garden City, Kansas. Glyphosate-resistant corn was planted on April 24, 2014, with preemergence herbicides applied the following day. Air temperature, soil temperature, wind speed, relative humidity, and soil moisture conditions were 79°F, 48°F, 5 mph, 17%, and good, respectively, at the time of preemergence applications. Soil was a Ulysses silt loam with 1.4% organic matter, pH of 8.0, and cation exchange capacity of 18.4. The entire experimental area was overseeded with a mixture of shattercane (rox orange), green foxtail, and crabgrass seed. The kochia, Palmer amaranth, and Russian thistle populations were

natural infestations. Preemergence herbicides were applied with a tractor-mounted, CO₂-pressurized sprayer calibrated to deliver 20 gpa at 30 psi and 4.1 mph. Plots were 10 by 35 feet arranged in a randomized complete block with four replications. Postemergence herbicides were applied June 6, 2014, using a CO₂-pressurized backpack sprayer delivering 20 gpa at 27 psi and 3.0 mph. Air temperature, soil temperature, wind speed, relative humidity, and soil moisture conditions were 77°F, 60°F, 10 mph, 46%, and good, respectively, at the time of postemergence applications. Weed control was visually estimated 101 days after planting (100 days after preemergence applications and 57 days after postemergence treatments). Yields were determined October 27, 2014, by harvesting the center two rows of each plot and adjusting the grain to 15.5% moisture.

Results and Discussion

Weed pressure was intense and uniform across the treatment area. Excellent populations of Palmer amaranth, green foxtail, Russian thistle, crabgrass, and shattercane were achieved. No treatment with less than 1.5 lb/a atrazine provided commercially acceptable Palmer amaranth control. This supports observations and experiments conducted at this location for the past 24 years. The best level of Palmer amaranth control was produced by treatments that had good preemergence control augmented by a postemergence application with two or more modes of action that contained 0.5 lb/a atrazine. Although kochia weed pressure was not intense, all treatments provided excellent control. The best Russian thistle treatments provided from 77 to 88% control. The best foxtail or crabgrass treatments provided from 91 to 94% control. Excellent shattercane control was achieved by combinations of preemergence treatments followed by a postemergence treatment.

Table 1. Weed control in irrigated glyphosate-resistant corn with tank mixtures of rimsulfuron, mesotrione, thifensulfuron, Atrazine, Balance Flexx, Cinch, Cinch ATZ, and Prowl H₂O.

Trt.	Herbicide	Rate	Timing	% Control						Yield
				101 Days after planting						
				AMAPA ¹	KCHSC ²	SASKR ³	SETVI ⁴	DIGSS ⁵	SORVU ⁶	
1	Untreated			0	0	0	0	0	0	55.4
2	Rimsulfuron	1 oz	A	98	98	70	91	89	96	113.6
	Mesotrione	5 oz	A							
	Cinch	1 pt	A							
	Glyphosate+AMS	32 oz	A							
	Atrazine	1.5 qt	B							
	Glyphosate+AMS	32 oz	B							
3	Rimsulfuron	1 oz	A	100	99	75	90	91	93	106.1
	Mesotrione	5 oz	A							
	Cinch	1 pt	A							
	Glyphosate+AMS	32 oz	A							
	Rimsulfuron	1.2 oz	B							
	Mesotrione	2.5 oz	B							
	Isoxadifen	0.3 oz	B							
	Atrazine	1.5 qt	B							
	Glyphosate+AMS	32 oz	B							
4	Rimsulfuron	1 oz	A	98	100	78	95	93	100	101.4
	Mesotrione	5 oz	A							
	Cinch	1 pt	A							
	Glyphosate+AMS	32 oz	A							
	Rimsulfuron	0.92 oz	B							
	Thifensulfuron	0.1 oz	B							
	Isoxadifen	0.23 oz	B							
	Atrazine	1.5 qt	B							
	Glyphosate+AMS	32 oz	B							
5	Rimsulfuron	1 oz	A	92	100	78	89	91	100	113.4
	Mesotrione	5 oz	A							
	Cinch ATZ	1.5 pt	A							
	Glyphosate+AMS	32 oz	A							
	Atrazine	1.5 qt	B							
	Glyphosate+AMS	32 oz	B							
6	Rimsulfuron	1 oz	A	94	100	80	95	94	100	108.0
	Mesotrione	5 oz	A							
	Cinch ATZ	1.5 pt	A							
	Glyphosate+AMS	32 oz	A							
	Rimsulfuron	1.2 oz	B							
	Mesotrione	2.5 oz	B							
	Isoxadifen	0.3 oz	B							
	Atrazine	1.5 qt	B							
	Glyphosate+AMS	32 oz	B							

continued

Table 1. Weed control in irrigated glyphosate-resistant corn with tank mixtures of rimsulfuron, mesotrione, thifensulfuron, Atrazine, Balance Flexx, Cinch, Cinch ATZ, and Prowl H₂O.

Trt.	Herbicide	Rate	Timing	% Control						Yield
				101 Days after planting						
				AMAPA ¹	KCHSC ²	SASKR ³	SETVI ⁴	DIGSS ⁵	SORVU ⁶	
7	Rimsulfuron	1 oz	A	91	100	84	86	91	100	109.6
	Mesotrione	5 oz	A							
	Cinch ATZ	1.5 pt	A							
	Glyphosate+AMS	32 oz	A							
	Rimsulfuron	0.92 oz	B							
	Thifensulfuron	0.1 oz	B							
	Isoxadifen	0.23 oz	B							
	Atrazine	1.5 qt	B							
	Glyphosate+AMS	32 oz	B							
8	Lumax	3 qt	A	98	100	86	91	94	100	120.1
	Glyphosate+AMS	32 oz	A							
	Atrazine	1.5 qt	B							
	Glyphosate+AMS	32 oz	B							
9	Balance Flexx	1 oz	A	85	100	68	58	70	58	72.9
	Atrazine	1 qt	A							
	Glyphosate+AMS	32 oz	A							
10	Balance Flexx	1 oz	A	86	100	88	88	75	94	111.1
	Atrazine	1 qt	A							
	Glyphosate+AMS	32 oz	A							
	Dual II Magnum	2 pt	B							
	Glyphosate+AMS	32 oz	B							
11	Balance Flexx	1 oz	A	85	100	78	80	73	88	104.4
	Atrazine	1 qt	A							
	Glyphosate+AMS	32 oz	A							
	Prowl H ₂ O	2 pt	B							
	Glyphosate+AMS	32 oz	B							
LSD @ 5% =				7	3	11	6	4	5	11.7

¹ Palmer amaranth.² Kochia.³ Russian thistle.⁴ Green foxtail.⁵ Crabgrass.⁶ Shattercane.