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Weed Control and Crop Tolerance in Inzen Grain Sorghum with Zest Tank Mixtures

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Abstract

Although preemergence applications of Cinch ATZ provided excellent green foxtail control, it did not provide commercially acceptable levels of Palmer amaranth or crabgrass control. All postemergence tank mixes of Zest raised the level of control achieved by the preemergence applications of Cinch ATZ to excellent levels for these species. With the exception of the Huskie tank mix, which provided excellent Palmer amaranth control, all other postemergence programs provided only adequate control of Palmer amaranth, crabgrass, or green foxtail. Weed pressure of these species was extreme. Under conditions of extreme weed pressure, a foundation treatment of Cinch ATZ followed by a postemergence application would be needed for commercially acceptable levels of weed control.

Keywords

weed science, weed control, shattercane, green foxtail; crabgrass, kochia, Palmer amaranth, Russian thistle, preemergence herbicide, postemergence herbicide, Inzen, grain sorghum, Zest, tank mix, crop tolerance, Cinch ATZ, Huskie, nonirrigated sorghum, nicosulfuron, Accent

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Weed Control and Crop Tolerance in Inzen Grain Sorghum with Zest Tank Mixtures

R. Currie and P. Geier

Summary

Although preemergence applications of Cinch ATZ provided excellent green foxtail control, it did not provide commercially acceptable levels of Palmer amaranth or crabgrass control. All postemergence tank mixes of Zest raised the level of control achieved by the preemergence applications of Cinch ATZ to excellent levels for these species. With the exception of the Huskie tank mix, which provided excellent Palmer amaranth control, all other postemergence programs provided only adequate control of Palmer amaranth, crabgrass, or green foxtail. Weed pressure of these species was extreme. Under conditions of extreme weed pressure, a foundation treatment of Cinch ATZ followed by a postemergence application would be needed for commercially acceptable levels of weed control.

Introduction

Nonirrigated sorghum is often planted under less than ideal conditions, and germination of the crop is uncertain. Producers often want to delay investing more resources in a crop until a good stand has been achieved. Grass control is often the most expensive component of an herbicide tank mix. At present, no labeled herbicide supplies excellent postemergence grass control that allows the producer to first determine if a stand of sorghum has been achieved before investing in grass control. Zest (nicosulfuron) has been used with the trade name Accent for more than 25 years for postemergence grass control in corn. A naturally occurring weedy sorghum with resistance to nicosulfuron has been used to breed commercial sorghum hybrids that are resistant to this herbicide. Although properly used nicosulfuron can provide postemergence grass control, it has only modest utility in controlling broadleaf weeds and preventing future emergence of other grasses. The objective of this study was to determine how to augment Zest's weed control in sorghum.

Procedures

An experiment at the Kansas State University Southwest Research-Extension Center in Garden City, Kansas, examined crop tolerance and weed control with Zest tank mixtures as either stand-alone or sequential treatments in irrigated acetolactase synthase-tolerant (Inzen) irrigated grain sorghum. Sorghum was planted June 19, 2014, and preemergence herbicides were applied the following day (Table 1). Early postemergence (stand-alone) and postemergence (sequential) treatments were applied on July

11 and July 28, 2014, respectively. All herbicides were applied with a CO_2-pressurized, backpack sprayer delivering 20 gpa at 3.0 mph and 27 psi. 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 Palmer amranth population was a natural infestation. Plots were 10 by 35 feet, arranged in a randomized complete block with four replications. Sorghum injury was evaluated July 14 (3 days after early postemergence treatments) and August 1, 2014, (4 days after postemergence treatments). Weed control was determined visually on August 20, 2014, which was 61, 40, and 23 days after preemergence, early postemergence, and postemergence applications, respectively.

Results and Discussion

Although Inzen sorghum produced an excellent-looking grain crop, at the request of the DuPont Company — which provided the seed grain — yields were not determined. Although preemergence applications of Cinch ATZ provided excellent green foxtail control, it did not provide commercially acceptable levels of Palmer amaranth or crabgrass control (Table 2). All postemergence tank mixes of Zest raised the level of control achieved by the preemergence applications of Cinch ATZ to greater than 93% for these species. With the exception of the Huskie tank mix, which provided excellent Palmer amaranth control, no total postemergence program provided greater than 86, 73, or 88% control of Palmer amaranth, crabgrass, or green foxtail, respectively. Weed pressure of these species was extreme. Under conditions of extreme weed pressure, a foundation treatment of Cinch ATZ followed by a postemergence application would be needed for commercially acceptable levels of weed control. All treatments provided 100% control of shattercane seeded across the entire plot area.

Table 1. Application information.

Application timing	Preemergence	Early postemergence	Postemergence
Application date	June 20, 2014	July 11, 2014	July 28, 2014
Air temperature (°F)	70	87	82
Relative humidity (%)	70	33	51
Soil temperature (°F)	58	59	60
Wind speed (mph)	5	5	6
Wind direction	South	South-Southwest	Southeast
Soil moisture	Fair	Good	Good

Table 2. Crop tolerance and weed control with Zest tank mixtures in Inzen grain sorghum.

				Sorghum injury		% Control			
				25 DAP[3]		62 DAP			
Trt.	Herbicide[1]	Rate	Timing[2]	Epinasty	Chlorosis	Palmer amaranth	Crabgrass	Green foxtail	Shattercane
1	Untreated control			0	0	0	0	0	0
2	Cinch ATZ	1.6 qt	A	0	0	68	83	100	100
3	Cinch ATZ	1.6 qt	A	0	0	100	93	100	100
	Zest	12 oz	C						
	Aatrex Nine-0	13 oz	C						
	2,4-D ester	8 oz	C						
4	Cinch ATZ	1.6 qt	A	0	0	100	94	100	100
	Zest	12 oz	C						
	Aatrex Nine-0	13 oz	C						
	Huskie	13 oz	C						
5	Cinch ATZ	1.6 qt	A	0	0	100	93	100	100
	Zest	12 oz	C						
	Aatrex Nine-0	13 oz	C						
	Clarity	8 oz	C						
6	Zest	12 oz	B	10	24	70	80	88	100
	Aatrex Nine-0	13 oz	B						
7	Zest	12 oz	B	7	28	100	65	85	100
	Aatrex Nine-0	13 oz	B						
	Huskie	13 0z	B						
8	Zest	12 oz	B	30	25	86	63	83	100
	Aatrex Nine-0	13 oz	B						
	Clarity	8 oz	B						
9	Zest	12 oz	B	24	23	73	73	88	100
	Aatrex Nine-0	13 oz	B						
	2,4-D ester	8 oz	B						
10	Zest	12 oz	B	24	24	74	68	83	100
	Aatrex Nine-0	13 oz	B						
	Ally	0.05 oz	B						
	2,4-D ester	8 oz	B						
	LSD @ 5%=			2.7	2.9	7.8	4.9	4.8	ns

[1] All early postemergence and postemergence herbicides included crop oil concentrate 1% v/v and ammonium sulfate at 2 lb/a.
[2] A is preemergence, B is early postemergence, C is postemergence.
[3] Days after planting.