

Residual Weed Control With Preemergence Herbicides in Grain Sorghum

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Summary

In this study, herbicides were tested to compare preemergence (PRE) application for weed control in grain sorghum. All herbicides controlled quinoa and crabgrass similarly, as well as Russian thistle late in the season. Halex GT at either rate with atrazine as well as Bicep Lite II Magnum controlled Palmer amaranth less than 90% late in the season. Similarly, these herbicides along with Degree Xtra provided less than 90% kochia control late. Grain yields did not differ between herbicide-treated and non-treated sorghum.

Introduction

Residual weed control is important in any summer annual crop, and particularly important in grain sorghum. Postemergence weed control options in sorghum are limited compared to other crops, especially for grass weeds. Therefore, maximizing the length of the time the crop can grow without weed competition is critical. The objective of this study was to compare preemergence herbicides for efficacy in grain sorghum.

Experimental Procedures

An experiment was conducted at the Kansas State University Southwest Research-Extension Center near Garden City, KS, to compare various preemergence herbicides for residual weed control in grain sorghum. All herbicides were applied using a tractor-mounted, compressed CO₂ sprayer delivering 19.4 GPA at 4.1 mph and 30 psi. 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 Ulysses silt loam with pH of 7.9 and organic matter of 3.4%. Visual weed control estimates were made on July 16 and August 9, 2019. These dates were 7 and 31 days after the postemergence treatment (DA-B), respectively. Sorghum yields were determined on October 15, 2019, by mechanically harvesting the center two rows of each plot and adjusting grain weights to 14.0% moisture.

Results and Discussion

All herbicides controlled quinoa 88% or more at 7 DA-B and 95% or more at 50 DA-B, and did not differ between treatments. Similarly, crabgrass control was 95% or more regardless of herbicide treatment or rating date (data not shown). Kochia control at 7 DA-B was 93% or more with all herbicides except Halex GT (*S*-metolachlor/glyphosate/mesotrione) at 64 oz/a plus atrazine PRE or Degree Xtra (acetochlor/atrazine)

PRE (Table 2). These treatments, along with Halex GT at 80 oz/a plus atrazine PRE and Bicep Lite II Magnum (atrazine/*S*-metolachlor) PRE controlled kochia less than 90% at 50 DA-B. Lumax EZ and Lexar EZ (both *S*-metolachlor/atrazine/mesotrione) PRE were the only treatments to control Russian thistle more than 80% at 7 DA-B. However, no differences between herbicide treatments occurred for Russian thistle control at 50 DA-B. Palmer amaranth control was similar among herbicides at 7 DA-B. At 50 DA-B, Halex GT at 64 or 80 oz/a plus atrazine PRE and Bicep Lite II Magnum PRE provided less than 90% Palmer amaranth control. Grain yields were 88 to 106 bu/a from herbicide-treated sorghum plots, but did not differ from sorghum receiving no herbicide treatment (83 bu/a) (data not shown).

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Table 1. Application information

Application timing	Preemergence	25 Days after planting
Application date	June 14, 2019	July 7, 2019
Air temperature (°F)	96	74
Relative humidity (%)	41	73
Soil temperature (°F)	78	72
Wind speed (mph)	2 to 5	4 to 7
Wind direction	South	South
Soil moisture	Fair	Fair
Grain sorghum		
Height (inch)	0	2 to 3
Leaves (number)	---	1
Kochia		
Height (inch)	0	2 to 4
Density (plants/10 ft ²)	---	1
Russian thistle		
Height (inch)	0	2 to 4
Density (plants/10 ft ²)	---	1
Quinoa		
Height (inch)	0	2 to 4
Density (plants/10 ft ²)	---	1
Palmer amaranth		
Height (inch)	0	2 to 3
Density (plants/10 ft ²)	---	1
Crabgrass		
Height (inch)	0	0
Density (plants/10 ft ²)	---	---

Table 2. Weed control and grain yield with preemergence herbicides in grain sorghum

Treatment ¹	Rate	Timing ²	Kochia		Russian thistle		Palmer amaranth	
			7 DA-B ³	50 DA-B ³	7 DA-B	50 DA-B	7 DA-B	50 DA-B
	oz/a		----- % visual -----					
Lumax EZ	86	PRE	98	95	85	83	100	98
Lexar EZ	96	PRE	100	98	90	83	95	95
Halex GT	64	PRE	91	88	73	78	93	80
Atrazine	21	PRE						
Halex GT	80	PRE	93	85	70	80	93	85
Atrazine	21	PRE						
Bicep Lite II Magnum	48	PRE	94	85	80	80	85	78
Bicep Lite II Magnum	48	PRE	95	90	80	88	95	95
Dual II Magnum	21	POST						
Degree Xtra	72	PRE	85	83	80	78	93	90
Verdict	10	PRE	96	100	75	85	98	98
Outlook	10	PRE						
LSD (0.05)			8	10	9	NS	NS	10

¹ NIS = nonionic surfactant. AMS = ammonium sulfate.

² PRE = preemergence. POST = 25 days after planting.

³ DA-B = days after the postemergence treatment.



Figure 1. Untreated control.



Figure 2. Lumax EZ 86 oz/a applied preemergence. Photo taken 42 days after premergence application.



Figure 3. Halex GT 64 oz/a plus atrazine 21 oz/a applied preemergence. Photo taken 42 days after preemergence application.



Figure 4. Bicep Lite II Magnum 48 oz/a applied preemergence. Photo taken 42 days after preemergence application.



Figure 5. Degree Xtra 72 oz/a applied preemergence. Photo taken 42 days after preemergence application.