

Weed Control and Crop Injury with Single or Sequential Herbicide Applications in Grain Sorghum

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Summary

The preemergence application of Dual II Magnum (*S*-metolachlor) improved the overall weed control compared to single postemergence treatments. Excessive rainfall after preemergence application compromised all treatments, producing abnormally low weed control.

Introduction

When conducting a weed control experiment focused primarily on broadleaf weed control, excessive grassy weed pressure will often compromise results. If one applies a full rate of any of several preemergence grass control compounds, they can often but not always produce a level of broadleaf weed control that defeats the original purpose of the experiment. Therefore, it was the objective of this experiment to compare a set of postemergence broadleaf weed control compounds with and without a preemergence application of a half rate of the grass control compound Dual II Magnum.

Procedures

An experiment at the Kansas State University Southwest Research-Extension Center near Garden City, KS, evaluated the crop response and efficacy of Huskie (pyrasulfotole + bromoxynil) tank mixtures in grain sorghum. Huskie treatments were applied either as stand-alone postemergence treatments or as sequential treatments following a pre-emergence application of Dual II Magnum. Preemergence applications were made June 10, 2015 and postemergence applications were made July 6, 2015, when sorghum was 6 to 10 inches tall and weeds were 2 to 7 inches in height. All treatments were applied using a tractor-mounted, compressed CO₂ sprayer delivering 20 gpa at 3 mph and 30 psi. Soil was a Ulysses silt loam with 1.4% organic matter, pH of 8.0, and cation exchange capacity of 18.4. Plot size was 10 by 35 feet, and plots were arranged in a complete randomized block with four replications. Visual sorghum injury was taken on July 13 and July 30, 2015, 7 and 24 days after postemergence application (DAPT). Weed control was estimated visually on September 15, 2015, which was 71 DAPT. Grain yields were not determined.

Results and discussion

All Huskie treatments caused 5 to 10% sorghum necrosis at 7 DAPT (Table 2), but sorghum had completely recovered by 24 DAPT. Palmer amaranth control at 71 DAPT was greatest (78 to 81%) when Dual II Magnum preemergence was followed by Huskie at 13 oz/a, atrazine, Banvel (dicamba), NIS and AMS or with Huskie at 16 oz/a plus atrazine and NIS. Dual II Magnum applied preemergence increased Palmer amaranth control with Huskie at 13 oz/a plus atrazine and 2,4-D or Banvel or Huskie at 16 oz/a plus atrazine postemergence compared to the same treatments applied alone postemergence. Dual II Magnum alone preemergence controlled green foxtail 68%. When Dual II Magnum was applied preemergence and followed by any Huskie postemergence treatment, green foxtail control increased 34 to 65% compared to the postemergence-only Huskie treatments. Although it did improve broadleaf weed control, the application of a half rate of Dual II Magnum did not provide a level of control so high as to compromise the experiment. Results were dramatically influenced by excessive rainfall and subsequent irrigation after application. Many previous studies with these compounds have produced much higher levels of control. It is common for growers to apply a set of early preemergence treatments three months prior to planting, followed by postemergence applications. The use of very early preemergence treatments was not used because resulting control with preemergence and postemergence treatments often produces 100% control, defeating the purpose of the experiment. In hindsight, had this been done, it would have reduced the impact of excessive rainfall and produced more normal levels of weed control.

Table 1. Application information.

Application timing	Preemergence	Postemergence
Application date	June 10, 2015	July 6, 2015
Air temperature (°F)	81	74
Relative humidity (%)	48	64
Soil temperature (°F)	76	77
Wind speed (mph)	3 to 6	6 to 9
Wind direction	South	Northwest
Soil moisture	Fair	Good

Table 2. Weed control and crop injury with single or sequential herbicide applications in grain sorghum.

Treatment ^b	Rate	Timing ^c	7 DAPT ^a	71 DAPT	
			Sorghum necrosis	Palmer amaranth	Green foxtail
			----- % visual -----		
Dual II Magnum	1.5 pt	PRE	0	50	68
Dual II Magnum	1.5 pt	PRE	6	43	72
Huskie	13 oz	POST			
Atrazine	16 oz	POST			
NIS	0.25%	POST			
AMS	1.0 lb	POST			
Dual II Magnum	1.5 pt	PRE	9	55	75
Huskie	16 oz	POST			
Atrazine	16 oz	POST			
NIS	0.25%	POST			
AMS	1.0 lb	POST			
Dual II Magnum	1.5 pt	PRE	9	58	78
Huskie	13 oz	POST			
Atrazine	16 oz	POST			
2,4-D ester	4 oz	POST			
NIS	0.25%	POST			
AMS	1.0 lb	POST			
Dual II Magnum	1.5 pt	PRE	6	81	84
Huskie	13 oz	POST			
Atrazine	16 oz	POST			
Banvel	4 oz	POST			
NIS	0.25%	POST			
AMS	1.0 lb	POST			
Dual II Magnum	1.5 pt	PRE	5	78	85
Huskie	16 oz	POST			
Atrazine	16 oz	POST			
NIS	0.25 %	POST			
Dual II Magnum	1.5 pt	PRE	9	47	77
Atrazine	16 oz	POST			
Buctril 2EC	16 oz	POST			
Huskie	13 oz	POST	8	30	20
Atrazine	16 oz	POST			
NIS	0.25%	POST			
AMS	1.0 lb	POST			
Huskie	16 oz	POST	10	45	23
Atrazine	16 oz	POST			
NIS	0.25%	POST			
AMS	1.0 lb	POST			

continued

Table 2. Weed control and crop injury with single or sequential herbicide applications in grain sorghum.

Treatment ^b	Rate	Timing ^c	7 DAPT ^a	71 DAPT	
			Sorghum necrosis	Palmer amaranth	Green foxtail
			----- % visual -----		
Huskie	13 oz	POST	5	40	25
Atrazine	16 oz	POST			
2,4-D ester	4 oz	POST			
NIS	0.25%	POST			
AMS	1.0 lb	POST			
Huskie	13 oz	POST	6	55	38
Atrazine	16 oz	POST			
Banvel	4 oz	POST			
NIS	0.25%	POST			
AMS	1.0 lb	POST			
Huskie	16 oz	POST	10	35	23
Atrazine	16 oz	POST			
NIS	0.25%	POST			
Atrazine	16 oz	POST	5	33	23
Buctril 2EC	16 oz	POST			
Untreated	---	---	0	0	0
LSD (0.05)			3.8	16.1	14.0

^a DAPT is days after postemergence application.

^b NIS is nonionic surfactant and AMS is ammonium sulfate.

^c PRE is preemergence, POST is postemergence.



Figure 1. Untreated control.



Figure 2. Huskie 13 oz + atrazine 16 + Banvel 4 oz + NIS 0.25% + AMS 1 lb postemergence, 19 days after postemergence treatment.



Figure 3. Huskie 16 oz + atrazine 16 oz + NIS postemergence, 19 days after postemergence treatment.



Figure 4. Dual II 24 oz preemergence followed by Huskie 13 oz + atrazine 16 + Banvel 4 oz + NIS 0.25% + AMS 1 lb postemergence, 19 days after postemergence treatment.



Figure 5. Dual II Magnum 24 oz preemergence followed by Huskie 16 oz + atrazine 16 oz + NIS postemergence, 19 days after postemergence treatment.