ImiFlex Rates for Efficacy in Imidazolinone-Tolerant Grain Sorghum

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Summary

The objective of this study was to compare ImiFlex rates and timings for efficacy and crop response in imidazolinone-tolerant grain sorghum. Volunteer corn and Johnsongrass control was generally best when ImiFlex (imazamox) was applied postemergence (POST), except when tank mixed with Huskie (bromoxynil/pyrasulfotole). Likewise, Palmer amaranth control was most consistent when ImiFlex was applied POST. Though all herbicides increased grain yields relative to the weedy controls, yields increased the most when Moccasin II Plus (metolachlor) plus Motif (mesotrione) preemergence (PRE) was followed by ImiFlex POST or Moccasin II Plus and Sharpen (saflufenacil) PRE was followed by ImiFlex plus atrazine POST.

Introduction

Historically, producers have had limited options for postemergence grass control in grain sorghum. Troublesome grass weeds that escaped a preemergence herbicide treatment can negatively impact yields. Several herbicide-tolerant sorghum technologies have recently been developed to address this need. Imidazolinone-tolerant (Igrowth) sorghum is one such technology. The objective of this study was to compare ImiFlex rates and timings for efficacy and crop response in imidazolinone-tolerant grain sorghum.

Experimental Procedures

An experiment compared ImiFlex rates and timings for efficacy and crop response in imidazolinone-tolerant grain sorghum. All herbicides were applied using a tractor-mounted, compressed CO_2 sprayer delivering 19.4 gpa at 30 psi and 4.1 mph. 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 Beeler silt loam with 2.4% organic matter and pH of 7.5. Visual weed control estimates were determined on July 14 and August 23, 2021. These dates were 2 and 42 days after the late postemergence treatments (DA-B), respectively. Yields were determined on November 23, 2021, by mechanically harvesting the center two rows of each plot and adjusting grain weights to 14.0% moisture.

Results and Discussion

ImiFlex at 9.0 oz/a applied PRE controlled the volunteer corn 63 to 88% regardless of the tank mix partner early in the season (Table 2). By 42 DA-B, volunteer corn control exceeded 90% with ImiFlex PRE alone, or with Moccasin II Plus and Motif PRE,

followed by atrazine postemergence (POST), and with Moccasin II Plus with Motif or Sharpen PRE followed by ImiFlex at 6.0 oz/a POST. Late-season Johnsongrass control was best (95 to 99%) when ImiFlex was applied POST. However, tank mixing Huskie with ImiFlex POST provided only 85% Johnsongrass control. ImiFlex applied POST controlled Palmer amaranth 86 to 96% at 42 DA-B, and was similar to ImiFlex plus Motif PRE followed by atrazine POST. Grain yields from herbicide-treated sorghum were 29 to 66 bu/a greater than the untreated controls. Yields were best when Moccasin II Plus and Motif PRE were applied followed by ImiFlex POST or Moccasin II Plus and Sharpen PRE were followed by ImiFlex plus atrazine POST.

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Table 1. Application, environmental, and weed data for the ImiFlex sorghum trial

Application timing	Preemergence	Postemergence
Application date	June 16, 2021	July 12, 2021
Air temperature (°F)	87	78
Relative humidity	43	42
Soil temperature (°F)	77	72
Wind speed (mph)	4 to 11	3 to 7
Wind direction	South	South
Soil moisture	Good	Good
Grain sorghum		
Height (inches)	---	12 to 15
Leaves (no.)	0	5 to 7
Palmer amaranth		
Height (inches)	---	2 to 6
Density (plants/ft^2)	0	1
Volunteer corn		
Height (inches)	---	10 to 15
Density (plants/ft^2)	0	0.3
Johnsongrass		
Height (inches)	---	3 to 7
Density (plants/ft^2)	0	0.5

Table 2. Weed control and grain yield in the ImiFlex sorghum study

			Volunteer corn		Johnsongrass		Palmer amaranth		Sorghum
Treatment[1]	Rate	Timing[2]	2 DA-B[3]	42 DA-B	2 DA-B	42 DA-B	2 DA-B	42 DA-B	yield
	oz/a		% Visual						bu/a
Untreated	---	---	---	---	---	---	---	---	29.9
ImiFlex	9.0	PRE	70	88	73	73	75	78	83.3
Atrazine	32	PRE							
2,4-D amine	8.0	POST							
ImiFlex	9.0	PRE	75	83	90	83	94	91	90.4
Motif	6.0	PRE							
Atrazine	32	POST							
COC	1%	POST							
ImiFlex	9.0	PRE	83	85	75	75	80	73	74.2
Sharpen	1.0	PRE							
Atrazine	32	POST							
COC	1%	POST							
ImiFlex	9.0	PRE	78	88	84	73	85	81	77.6
Moccasin II Plus	21	PRE							
Atrazine	32	POST							
COC	1%	POST							
ImiFlex	9.0	PRE	63	98	80	83	78	65	59.3
Atrazine	32	POST							
COC	1%	POST							
UAN	2.5%	POST							
ImiFlex	9.0	PRE	88	91	90	83	94	85	93.3
Moccasin II Plus	21	PRE							
Motif	6.0	PRE							
Atrazine	32	POST							
COC	1%	POST							
Moccasin II Plus	21	PRE	0	99	88	99	95	91	95.8
Motif	6.0	PRE							
ImiFlex	6.0	POST							
COC	1%	POST							
UAN	2.5%	POST							
Moccasin II Plus	21	PRE	0	99	80	95	81	86	95.1
Sharpen	1.0	PRE							
ImiFlex	6.0	POST							
Atrazine	32	POST							
COC	1%	POST							
UAN	2.5%	POST							
Moccasin II Plus	21	PRE	0	100	78	98	91	96	93.7
Motif	6.0	PRE							
ImiFlex	6.0	POST							
Atrazine	32	POST							
COC	1%	POST							
UAN	2.5%	POST							

Table 2. Weed control and grain yield in the ImiFlex sorghum study

			Volunteer corn		Johnsongrass		Palmer amaranth		Sorghum
Treatment[1]	Rate	Timing[2]	2 DA-B[3]	42 DA-B	2 DA-B	42 DA-B	2 DA-B	42 DA-B	yield
	oz/a		---------- % Visual ----------						bu/a
Moccasin II Plus	21	PRE	0	0	70	0	83	75	60.9
Atrazine	32	PRE							
Huskie	14	POST							
AMS	1.0	POST							
Moccasin II Plus	21	PRE	0	86	70	85	85	93	82.5
Atrazine	32	PRE							
ImiFlex	6.0	POST							
Huskie	14	POST							
LSD (0.05)			8	10	15	12	12	10	20.7

[1] COC = crop oil concentrate. UAN = 28% urea-ammonium nitrate. AMS = ammonium sulfate.
[2] PRE = preemergence. POST = postemergence.
[3] DA-B = days after the postemergence treatments.

Figure 1. Untreated control.

Figure 2. ImiFlex 9.0 oz/a plus Motif 6.0 oz/a preemergence followed by atrazine 32 oz/a postemergence. Photo taken 29 days after the postemergence treatment.

Figure 3. ImiFlex 9.0 oz/a plus Sharpen 1.0 oz/a preemergence followed by atrazine 32 oz/a postemergence. Photo taken 29 days after the postemergence treatment.

Figure 4. Moccasin II Plus 21 oz/a plus Motif 6.0 oz/a preemergence followed by ImiFlex 6.0 oz/a postemergence. Photo taken 29 days after the postemergence treatment.

Figure 5. Moccasin II Plus 21 oz/a plus atrazine 32 oz/a preemergence followed by ImiFlex 6.0 oz/a plus Huskie 14 oz/a postemergence. Photo taken 29 days after the postemergence treatment.