Grain Sorghum Response to Huskie™ Following Treatment with Herbicide Mixtures Containing Mesotrione.

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INTRODUCTION

- Options to rotate herbicides with different modes of action in grain sorghum (Fromme et al. 2012).
- Huskie™, a commercial herbicide containing two modes of action, pyrasulfotole, a 4-hydroxyphenylpyruvate dioxygenase (HPPD), and bromoxynil, a photosystem II (PSII) inhibitor provides effective broadleaf weed control.
- Huskie™ treatments cause chlorosis in grain sorghum that typically dissipates 3 to 4 weeks after treatment and has not been observed to affect final grain yield (Lally 2011, Reddy et al. 2013).
- Growers are warned on the Huskie™ label that unacceptable crop injury may result if Huskie™ is used following application of products containing mesotrione, another HPPD-inhibiting herbicide (Bayer CropScience 2013).

OBJECTIVE

- To determine whether Huskie™ treatment following application of pre-mergence applied herbicides containing mesotrione result in unacceptable sorghum injury and yield loss.

MATERIALS AND METHODS

- A field experiment was conducted at Ashland Bottoms research site (Department of Agronomy, KSU) near Manhattan, KS in summer 2015.
- Experimental design was a randomized complete block with four replications
- Plots were 3 m by 9 m consisting of four rows of sorghum. Only the center two rows used for data collection.
- Grain sorghum cultivar Pioneer 84G62 was planted at 96,000 seeds/ha on June 9, 2015.
- Pre-emergence (PRE) treatments were applied June 9th, using a backpack sprayer equipped with TurboTee 11002 nozzles calibrated to deliver 140 L/ha at 234 kPa.
- Post-emergence (POST) treatments were applied June 30th, using a backpack sprayer equipped with AIXR 110015 nozzles calibrated to deliver 140 L/ha at 317 kPa.
- Chlorosis symptoms were rated 3, 7, 14 and 28 days after treatment (DAT).
- Total weed biomass between the two center rows 1 m long was determined before sorghum grain harvest. Grain sorghum was harvested at physiological maturity.
- Data analysis was performed using Agricultural Research Manager®

RESULTS

Table 1. Grain sorghum chlorosis, grain yield and weed biomass at Manhattan, KS in 2015.

Trt #	App Time	Treatments	Rate (g ai ha^{-1})	Percent Chlorosis 3 DAT	7 DAT	14 DAT	Yield (kg/ha)	Weed Biomass (g/row)
1	PRE	s-metolachlor & mesotrione & atrazine	1464 & 187 & 1464	5 ef	1 EF	0.3 e	9100 ab	0 c
2	PRE	s-metolachlor & mesotrione & atrazine	1464 & 187 & 1464	15 a	6.0 a	3.5 ab	9500 ab	20 c
	POST	pyrasulfotole & bromoxynil + atrazine*	35 & 195 + 560					
3	PRE	s-metolachlor & mesotrione & atrazine	1464 & 187 & 1464	8 de	2.3 cde	0.8 de	9500 ab	0 c
	POST	bromoxynil + atrazine	280 + 560					
4	PRE	s-metolachlor & mesotrione & atrazine	1890 & 195 & 695	3 f	0.3 f	0.3 e	9500 ab	0 c
5	PRE	s-metolachlor & mesotrione & atrazine	1890 & 195 & 695	12 abcd	3.5 bc	4.0 a	9400 ab	0 c
	POST	pyrasulfotole & bromoxynil + atrazine*	35 & 195 + 560					
6	PRE	s-metolachlor & mesotrione & atrazine	1890 & 195 & 695	9 cde	2.8 bcd	0.5 e	10200 a	0 c
	POST	bromoxynil + atrazine	280 + 560					
7	PRE	s-metolachlor	1777	3 f	0.50 ef	0.0 e	4500 c	1000 a
8	PRE	s-metolachlor	1777	13 abc	4.5 ab	4.0 a	9200 ab	0 c
	POST	pyrasulfotole & bromoxynil + atrazine*	35 & 195 + 560					
9	PRE	s-metolachlor	1777	10 bcd	4.0 bc	2.0 cd	8300 b	290 b
	POST	bromoxynil + atrazine	280 + 560					

Values with different letters indicate a statistically significant difference at α=0.05.
& indicates active ingredients in a commercial premix.
*Pyrasulfotole & bromoxynil + atrazine treatments also contained NPAK AMS at 1120 g ai ha-1 and NIS at 0.25% (v/v).

- Huskie™ treatments following mesotrione resulted in similar chlorosis 3 DAT as Huskie™ applied alone.
- Chlorosis injury was greatest for all treatments 3 DAT, but decreased over time with no injury being observed 28 DAT.
- Grain yield was not reduced when Huskie™ was applied to sorghum treated with PRE-applied herbicides containing mesotrione when compared to sorghum treated with PRE-applied mesotrione herbicide only.
- Yield was lowest for treatments in which s-metolachlor was applied alone, due to competition with weeds not controlled.

CONCLUSIONS AND RESEARCH IN PROGRESS

- Application of Huskie™ following PRE-applied herbicides containing mesotrione did not increase crop injury or reduce grain yield.
- PRE treatments containing mesotrione followed by Huskie™ can provide season-long weed control in grain sorghum.
- Similar experiments are in progress near Manhattan, KS and Tribune, KS during the 2016 season. Crop response data from 2016 are consistent with 2015 results. Grain sorghum remains to be harvested.

REFERENCES

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