

2011

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Recommended Citation

Owen, Michael D.; Lux, James F.; Franzenburg, Damian D.; and Grossnickle, Dean M., "Weed Management in Soybean, Part 1" (2011). *Iowa State Research Farm Progress Reports*. 230.

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Abstract

The purpose of this study was to evaluate preemergence and postemergence applications of various herbicides with different mechanisms of action for crop injury, weed control, and yield.

Keywords

RFR A10103, Agronomy

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences

Weed Management in Soybean, Part 1

RFR-A10103

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Introduction

The purpose of this study was to evaluate preemergence and postemergence applications of various herbicides with different mechanisms of action for crop injury, weed control, and yield.

Materials and Methods

The study was established using a randomized complete block design with three replications. Herbicides were applied in 20 gallons of water/acre. The crop rotation was soybean following corn.

Soybeans were planted at 188,000 seeds/acre in 30-in. rows on May 18. Preemergence (PRE) treatments were applied on May 19. Early postemergence (EPOST), postemergence (POST), and sequential postemergence (SPOST) treatments were applied on June 16, 24, and July 9, respectively. Soybean growth stage was V2, V3, and R1 on June 16, 24, and July 9, respectively. Weeds were 0.25–10 in. tall, 0.25–20 in. tall and 0.25–7 in. tall, on June 16, 24, and July 9, respectively. Weed species in the study included: giant foxtail, velvetleaf, common waterhemp, common lambsquarters, and Pennsylvania smartweed averaging a population of <math><1-10</math> plants/ft².

Visual estimates of crop injury and weed control were made during the growing season. These observations were compared with an untreated control and made on a rating scale (0% = no crop injury/no weed control;

100% = complete crop death/complete weed control). Soybean yields were measured and adjusted to 13 percent moisture.

Results and Discussion

No soybean injury occurred from the PRE treatments when observed on June 22 (Table 1). PRE treatments gave 58–90 percent giant foxtail, 90–99 percent velvetleaf, 57–95 percent common waterhemp and common lambsquarters, and 45–53 percent Pennsylvania smartweed control. EPOST applied Durango plus FirstRate caused 10 percent soybean injury. EPOST treatments afforded 96–99 percent weed control. An exception was Pennsylvania smartweed, where EPOST treatments gave 80–88 percent control.

No soybean injury was observed on July 1 and 9 from the EPOST and POST treatments (data not shown). No soybean injury was evident from the SPOST treatments on July 16, 7 days after application (Table 2). PRE followed by POST treatments afforded 93–99 percent weed control. EPOST plus SPOST treatments gave 99 percent control. EPOST applied Roundup PowerMAX (not followed by SPOST) gave 57–88 percent weed control.

On August 12, PRE plus POST and EPOST plus SPOST treatments gave weed control ranging from 88 to 99 percent (Table 3). The single, EPOST Roundup PowerMAX application, afforded 43–95 percent weed control. Soybean yields from the herbicide treatments ranged from 62–66 bushels/acre and most were significantly higher than the untreated control.

Acknowledgements

Thanks to Ken Pecinovsky and farm staff for help with this study. Funding for this study was provided by the crop protection industry.

Table 1. Weed management in soybean, Part 1.

Treatment	Rate	Appln timing	Injury Jun 22	Setfa ^c Jun 22	Abuth ^c Jun 22	Amata ^c Jun 22	Cheal ^c Jun 22	Polpy ^c Jun 22
	product/acre		-(%)	----- (% weed control) -----				
Untreated	-	-	0	0	0	0	0	0
Optill + (Roundup PowerMAX + AMS ^a)	2.0 oz wt + (22.0 fl oz + 2.0% ^b)	PRE + (POST)	0	90	99	85	80	45
Enlite + (Roundup PowerMAX + AMS)	2.8 oz wt + (22.0 fl oz + 2.0%)	PRE + (POST)	0	62	92	93	58	45
Authority First DF + (Roundup PowerMAX + AMS)	3.2 oz wt + (22.0 fl oz + 2.0%)	PRE + (POST)	0	58	98	57	63	48
Authority Assist + (Roundup PowerMAX + AMS)	5.0 fl oz + (22.0 fl oz + 2.0%)	PRE + (POST)	0	78	99	70	68	45
Authority Broadleaf + (Roundup PowerMAX + AMS)	3.2 oz wt + (22.0 fl oz + 2.0%)	PRE + (POST)	0	62	96	78	62	53
Valor SX + (Roundup PowerMAX + AMS)	2.0 oz wt + (22.0 fl oz + 2.0%)	PRE + (POST)	0	58	90	95	58	47
Sonic + (Durango DMA + AMS)	3.0 oz wt + (24.0 fl oz + 2.0%)	PRE + (POST)	0	78	92	62	72	45
Durango DMA + FirstRate + AMS + (Durango DMA + AMS)	24.0 fl oz + 0.3 oz wt + 2.0% + (24.0 fl oz + 2.0%)	EPOST + (SPOST)	10	99	99	99	99	88
Roundup PowerMAX + AMS	22.0 fl oz + 2.0%	EPOST	0	99	99	99	99	85
Roundup PowerMAX + AMS + (Roundup PowerMAX + AMS)	22.0 fl oz + 2.0% + (22.0 fl oz + 2.0%)	EPOST + (SPOST)	0	99	99	99	96	80
LSD (P = 0.05)			0	13	6	19	17	13

^aAMS = ammonium sulfate fertilizer from Agrilience, LCC.

^b% = % weight/volume.

^cSetfa = giant foxtail, Abuth = velvetleaf, Amata = common waterhemp, Cheal = common lambsquarters, Polpy = Pennsylvania smartweed.

Table 2. Weed management in soybean, Part 1.

Treatment	Rate	Appln timing	Injury Jul 16	Setfa ^c Jul 16	Abuth ^c Jul 16	Amata ^c Jul 16	Cheal ^c Jul 16	Polpy ^c Jul 16
	product/acre		-(%)	----- (% weed control) -----				
Untreated	-	-	0	0	0	0	0	0
Optill + (Roundup PowerMAX + AMS ^a)	2.0 oz wt + (22.0 fl oz + 2.0% ^b)	PRE + (POST)	0	93	98	96	98	98
Enlite + (Roundup PowerMAX + AMS)	2.8 oz wt + (22.0 fl oz + 2.0%)	PRE + (POST)	0	95	98	98	96	98
Authority First DF + (Roundup PowerMAX + AMS)	3.2 oz wt + (22.0 fl oz + 2.0%)	PRE + (POST)	0	93	99	98	98	98
Authority Assist + (Roundup PowerMAX + AMS)	5.0 fl oz + (22.0 fl oz + 2.0%)	PRE + (POST)	0	96	98	94	96	96
Authority Broadleaf + (Roundup PowerMAX + AMS)	3.2 oz wt + (22.0 fl oz + 2.0%)	PRE + (POST)	0	95	96	98	98	99
Valor SX + (Roundup PowerMAX + AMS)	2.0 oz wt + (22.0 fl oz + 2.0%)	PRE + (POST)	0	95	98	98	99	98
Sonic + (Durango DMA + AMS)	3.0 oz wt + (24.0 fl oz + 2.0%)	PRE + (POST)	0	95	98	99	98	98
Durango DMA + FirstRate + AMS + (Durango DMA + AMS)	24.0 fl oz + 0.3 oz wt + 2.0% + (24.0 fl oz + 2.0%)	EPOST + (SPOST)	0	99	99	99	99	99
Roundup PowerMAX + AMS	22.0 fl oz + 2.0%	EPOST	0	88	80	57	82	96
Roundup PowerMAX + AMS + (Roundup PowerMAX + AMS)	22.0 fl oz + 2.0% + (22.0 fl oz + 2.0%)	EPOST + (SPOST)	0	99	99	99	99	99
LSD (P = 0.05)			0	4	9	6	3	4

^aAMS = ammonium sulfate fertilizer from Agrilience, LCC.^b% = % weight/volume.^cSetfa = giant foxtail, Abuth = velvetleaf, Amata = common waterhemp, Cheal = common lambsquarters, Polpy = Pennsylvania smartweed.

Table 3. Weed management in soybean, Part 1.

Treatment	Rate product/acre	Appln timing	Setfa ^c	Abuth ^c	Amata ^c	Cheal ^c	Polpy ^c	Yield Oct 5 bu/acre
			Aug 12	Aug 12	Aug 12	Aug 12	Aug 12	
Untreated	-	-	0	0	0	0	0	59
Optill + (Roundup PowerMAX + AMS ^a)	2.0 oz wt + (22.0 fl oz + 2.0% ^b)	PRE + (POST)	93	98	91	98	99	65
Enlite + (Roundup PowerMAX + AMS)	2.8 oz wt + (22.0 fl oz + 2.0%)	PRE + (POST)	93	98	99	93	98	66
Authority First DF + (Roundup PowerMAX + AMS)	3.2 oz wt + (22.0 fl oz + 2.0%)	PRE + (POST)	92	99	93	98	99	66
Authority Assist + (Roundup PowerMAX + AMS)	5.0 fl oz + (22.0 fl oz + 2.0%)	PRE + (POST)	95	98	88	95	98	64
Authority Broadleaf + (Roundup PowerMAX + AMS)	3.2 oz wt + (22.0 fl oz + 2.0%)	PRE + (POST)	93	96	91	96	99	63
Valor SX + (Roundup PowerMAX + AMS)	2.0 oz wt + (22.0 fl oz + 2.0%)	PRE + (POST)	93	98	96	98	98	63
Sonic + (Durango DMA + AMS)	3.0 oz wt + (24.0 fl oz + 2.0%)	PRE + (POST)	95	96	90	98	98	64
Durango DMA + FirstRate + AMS + (Durango DMA + AMS)	24.0 fl oz + 0.3 oz wt + 2.0% + (24.0 fl oz + 2.0%)	EPOST + (SPOST)	99	99	99	99	99	62
Roundup PowerMAX + AMS	22.0 fl oz + 2.0%	EPOST	88	75	43	72	95	66
Roundup PowerMAX + AMS + (Roundup PowerMAX + AMS)	22.0 fl oz + 2.0% + (22.0 fl oz + 2.0%)	EPOST + (SPOST)	99	99	99	99	99	62
LSD (P = 0.05)			4	10	9	6	2	5

^aAMS = ammonium sulfate fertilizer from Agrilience, LCC.

^b% = % weight/volume.

^cSetfa = giant foxtail, Abuth = velvetleaf, Amata = common waterhemp, Cheal = common lambsquarters, Polpy = Pennsylvania smartweed.