

2002

Soybean Weed Management Studies

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Recommended Citation

Pringnitz, Brent A. and Hartzler, Robert G., "Soybean Weed Management Studies" (2002). *Iowa State Research Farm Progress Reports*. 1652.

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Abstract

Several studies were conducted in soybeans to evaluate commercially available herbicides for weed control, crop phytotoxicity, and crop yield. Various herbicide treatment combinations and application methods were evaluated.

Keywords

Agronomy

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences

Soybean Weed Management Studies

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Introduction

Several studies were conducted in soybeans to evaluate commercially available herbicides for weed control, crop phytotoxicity, and crop yield. Various herbicide treatment combinations and application methods were evaluated.

Materials and Methods

The studies were established using a randomized complete block design with three or four replications. Herbicide evaluation plot size was 10 feet \times 25 feet. Herbicides were applied in 20 gallons of water/acre. Visual estimates of percentage weed control and crop injury data were made throughout June and July 2001. Weed control observations were compared with an untreated control and made on a 0–100 rating scale, with 0% = no weed control. Crop injury ratings were made on a 0–100 rating scale, with 0 = no crop injury. Weed species and populations that were evaluated included 100–150 foxtail/ft², 3–5 common ragweed/ft², 30–50 waterhemp/ft², 5 Pennsylvania smartweed/ft², 1–2 velvetleaf/ft², and 3 lambsquarters /ft².

The soil was a Canisteo Nicollet clay loam with a pH 6.2 and 5.9% organic matter. The 2000 crop was corn. Tillage included fall chisel-plowing and a spring field cultivation. Asgrow AG2101 glyphosate-tolerant soybeans were planted 1.75 inches deep on May 14, at 190,000 seeds/acre in 30-inch rows. Preplant-incorporated treatments were incorporated with two field cultivations at four-inch depth, within 20 minutes of application. Herbicide application dates and crops stages are presented in Table 1. Precipitation data is presented in Table 2.

Results and Discussion

KS-adjuvants (Table 3). Glyphosate was applied at the label-recommended and one-half label-recommended rates, with various petroleum and seed oil adjuvants. The trend was for less broadleaf weed control at the half-rate, independent of adjuvant. This was significant for lambsquarter control. At the full glyphosate rate, inclusion of an adjuvant did not affect broadleaf weed control.

KS-systems (Table 4). This experiment compared various herbicide systems typically used in north-central Iowa. First evaluations were made on the same day as the early post-emergence treatments, so these ratings do not reflect the activity of the post-emergence treatment. No significant injury was observed with any treatment (data not shown). Treatment 9 showed significantly lower waterhemp control than the other treatments. Treatments 5 and 7 resulted in lower common ragweed. However, the removal of the foxtail following the post-emergence application in Treatment 7 may have resulted in emergence of a second population of ragweed.

KS-glyphosate (Table 5). Four formulations of glyphosate were applied at two rates, full and reduced, in this experiment. Full and reduced rates contained an equal amount of glyphosate calculated as acid equivalent (a.e.). All applications provided acceptable weed control. This supports the statement that different glyphosate formulations provide equal control when compared on an a.e. basis.

Acknowledgments

BASF, Bayer, and Syngenta provided support for these studies. Cindy Greiman, Asgrow Seed Company, provided seed. The authors also acknowledge farm superintendent Dave Rueber for his assistance.

Table 1. 2001 herbicide application dates and crop stages at Kanawha, Iowa.

Treatment	Date	Crop stage
Preemergence/Preplant Incorporated (PRE/PPI)	May 14	--
Early postemergence (EPOST)	June 11	3 in.
Postemergence (POST) – KC-systems	June 27	6 in.
Postemergence (POST) – KC-glyphosate and KC-adjuvants	July 6	16 in.

Table 2. Weekly rainfall totals and largest single rainfall following planting.

Weeks after planting	Total rainfall (inches)	Largest single rainfall event (inches)
1	2.19	2.05
2	1.71	0.86
3	0.35	0.16
4	1.56	1.06
5	1.93	1.53

Table 3. Evaluation of petroleum and seed oil adjuvants with glyphosate (KS-adjuvants).

Treatment	Rate	Unit	Timing	Foxtail		C. Ragweed		P. Smartweed		Velvetleaf		Waterhemp		Lambsquarter		
				8/3	8/3	8/3	8/3	8/3	8/3	8/3	8/3					
----- % weed control -----																
1	Dual II Magnum	1	PT/A	pre	99.0	a	83.3	a	84.0	a	86.7	abc	96.3	a	92.3	a
	Glyphomax Plus	32	FL OZ/A	post												
2	Dual II Magnum	1	PT/A	pre	99.0	a	63.3	c	73.3	a	73.3	cd	96.3	a	75.0	b
	Glyphomax Plus	16	FL OZ/A	post												
3	Dual II Magnum	1	PT/A	pre	99.0	a	81.7	a	86.7	a	91.7	a	96.0	a	97.0	a
	Glyphomax Plus	32	FL OZ/A	post												
	COC	1	QT/A	post												
4	Dual II Magnum	1	PT/A	pre	97.7	a	78.3	a	76.7	a	73.3	cd	96.3	a	83.3	b
	Glyphomax Plus	16	FL OZ/A	post												
	COC	1	QT/A	post												
5	Dual II Magnum	1	PT/A	pre	99.0	a	83.3	a	86.7	a	88.3	ab	96.3	a	93.3	a
	Glyphomax Plus	32	FL OZ/A	post												
	Farm for Profit Veg Oil	1	QT/A	post												
	Achieve	4	FL OZ/A	post												
6	Dual II Magnum	1	PT/A	pre	99.0	a	68.3	bc	70.0	a	66.7	d	96.3	a	80.0	b
	Glyphomax Plus	16	FL OZ/A	post												
	Farm for Profit Veg Oil	1	QT/A	post												
	Achieve	4	FL OZ/A	post												
7	Dual II Magnum	1	PT/A	pre	99.0	a	86.0	a	87.3	a	83.3	abc	94.7	a	93.3	a
	Glyphomax Plus	32	FL OZ/A	post												
	Farm for Profit Veg Oil	1	QT/A	post												
8	Dual II Magnum	1	PT/A	pre	99.0	a	75.0	ab	73.3	a	76.7	bcd	86.7	a	81.7	b
	Glyphomax Plus	16	FL OZ/A	post												
	Farm for Profit Veg Oil	1	QT/A	post												
9	Dual II Magnum	1	PT/A	pre												
	Untreated check															
LSD (P = .05)					1.3		8.0		11.7		9.7		6.1		6.3	

Means followed by same letter do not significantly differ (P = .05, Student–Newman–Keuls).