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Abstract

Warrant herbicide is an encapsulated formulation of acetochlor herbicide and labeled for postemergence use in soybean. This study was designed to evaluate crop safety from various Warrant treatments and application timings including early preplant, preemergence, and postemergence. Early preplant and preemergence applications of Warrant are currently not labeled for use in soybean.

Keywords

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Evaluation of Application Timings of Warrant Herbicide for Soybean Phytotoxicity

RFR-A1211

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Introduction

Warrant herbicide is an encapsulated formulation of acetochlor herbicide and labeled for postemergence use in soybean. This study was designed to evaluate crop safety from various Warrant treatments and application timings including early preplant, preemergence, and postemergence. Early preplant and preemergence applications of Warrant are currently not labeled for use in soybean.

Materials and Methods

The study was established using a randomized complete block design with three replications. Herbicides were applied in 15 gallons of water/acre. The crop rotation was soybean following corn. The seedbed was left untilled. Crop residue remaining on the soil surface following the previous crop was 58 percent. Prior to soybean planting, early preplant (EPP) treatments were applied on April 11. Soybeans were planted at 150,000 seeds/acre in 30-in. rows on April 27. Preemergence (PRE) treatments were applied shortly after planting. The study was irrigated shortly after planting to ensure sufficient moisture for herbicide activation. Early postemergence (EPOST) and mid-post (MPOST) treatments were applied on June 4 and June 19 to soybeans at the V3 and V6 stage of growth, respectively. Weed pressure in the study was minimized by in-season chemical and cultural control. Visual estimates of soybean injury included growth-

reduction (GRORED), phytotoxicity-necrosis/burn (PHYNEC), phytotoxicity-chlorosis (PHYCHL), and phytotoxicity-general injury (PHYGEN). These visual observations are compared with an untreated control and made on a 0–100 rating scale (0 % = no injury; 100% = complete crop kill).

Results and Discussion

The results of the study are summarized in Tables 1 through 4. Observations on May 11, which was 30 and 14 days after EPP and PRE application timing, respectively, demonstrated 0–2 percent overall soybean injury from the treatments (Table 1). When observed on May 18 (Table 2), 21 days after PRE treatment timing, EPP applied Warrant at 1.5 qt and PRE applied Valor SX plus Warrant resulted in 5 and 8 percent PHYGEN soybean injury, respectively. Remaining treatments resulted in negligible, 0–3 percent injury. Many treatments resulted in soybean injury when observed on June 19 and July 4 (Tables 3 and 4). Although 5 percent or less soybean injury is generally not considered significant, several treatments including Warrant application timings of PRE plus EPOST, PRE plus MPOST, PRE plus EPOST plus MPOST, and EPP plus EPOST plus MPOST resulted in 5–10 percent PHYGEN soybean injury (Table 4). Higher total Warrant application rates were used in these treatments. In summary, the various Warrant treatments and application timings evaluated in this study generally did not result in any form of significant soybean injury.

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Table 1. Evaluation of application timings of Warrant herbicide for soybean phytotoxicity in early May.

Treatment	Rate Product/acre	Appln Timing	Soybean injury ^a			
			GRORED May 11	PHYNEC May 11	PHYCHL May 11	PHYGEN May 11
			------(%)-----			
Roundup PowerMAX + (Roundup PowerMAX) + (Roundup PowerMAX) + (Roundup PowerMAX)	32.0 fl oz + (32.0 fl oz) + (32.0 fl oz) + (32.0 fl oz)	EPP + (PRE) + (EPOST) + (MPOST)	0	0	0	0
Warrant	1.5 qt	EPP	0	0	0	0
Warrant	1.5 qt	PRE	0	0	0	0
Reflex + Warrant	1.0 pt + 1.5 qt	PRE	0	0	0	2
Valor SX + Warrant	2.0 oz wt + 1.5 qt	PRE	0	2	0	2
Authority XL + Warrant	3.0 oz wt + 1.5 qt	PRE	0	2	0	0
Warrant	3.0 qt	PRE	0	0	0	0
Warrant + (Warrant)	1.5 qt + (1.5 qt) +	PRE + (EPOST)	0	0	2	0
Warrant + (Warrant)	1.5 qt + (1.5 qt) +	PRE + (MPOST)	0	0	0	2
Warrant + (Warrant) + (Warrant)	1.5 qt + (1.5 qt) + (1.5 qt)	PRE + (EPOST) + (MPOST)	0	0	0	2
Warrant + (Warrant) + (Warrant)	1.5 qt + (1.5 qt) + (1.5 qt)	EPP + (EPOST) + (MPOST)	0	0	0	2
Harness	0.75	PRE	0	0	0	0
LSD (P = 0.05)			0	1.9	1.4	3.1
Standard Deviation			0	1.1	0.8	1.8

^aSoybean injury = GRORED, PHYNEC, PHYCHL and PHYGEN are growth-reduction, phytotoxicity-necrosis/burn, phytotoxicity-chlorosis, and phytotoxicity-general injury, respectively.

Table 2. Evaluation of application timings of Warrant herbicide for soybean phytotoxicity in mid-May.

Treatment	Rate Product/acre	Appln Timing	Soybean injury ^a			
			GRORED May 18	PHYNEC May 18	PHYCHL May 18	PHYGEN May 18
			------(%)-----			
Roundup PowerMAX + (Roundup PowerMAX) + (Roundup PowerMAX) + (Roundup PowerMAX)	32.0 fl oz + (32.0 fl oz) + (32.0 fl oz) + (32.0 fl oz)	EPP + (PRE) + (EPOST) + (MPOST)	0	0	0	0
Warrant	1.5 qt	EPP	0	0	0	5
Warrant	1.5 qt	PRE	0	0	0	0
Reflex + Warrant	1.0 pt + 1.5 qt	PRE	0	0	0	3
Valor SX + Warrant	2.0 oz wt + 1.5 qt	PRE	0	0	0	8
Authority XL + Warrant	3.0 oz wt + 1.5 qt	PRE	0	0	2	2
Warrant	3.0 qt	PRE	0	0	0	3
Warrant + (Warrant)	1.5 qt + (1.5 qt) +	PRE + (EPOST)	0	0	0	3
Warrant + (Warrant)	1.5 qt + (1.5 qt) +	PRE + (MPOST)	0	0	0	0
Warrant + (Warrant) + (Warrant)	1.5 qt + (1.5 qt) + (1.5 qt)	PRE + (EPOST) + (MPOST)	0	0	0	3
Warrant + (Warrant) + (Warrant)	1.5 qt + (1.5 qt) + (1.5 qt)	EPP + (EPOST) + (MPOST)	0	0	0	3
Harness	0.75	PRE	0	0	0	2
LSD (P=0.05)			0	0	1.4	5
Standard Deviation			0	0	0.8	2.9

^aSoybean injury = GRORED, PHYNEC, PHYCHL and PHYGEN are growth-reduction, phytotoxicity-necrosis/burn, phytotoxicity-chlorosis, and phytotoxicity-general injury, respectively.

Table 3. Evaluation of application timings of Warrant herbicide for soybean phytotoxicity in mid-June.

Treatment	Rate	Appln Timing	Soybean injury ^a			
			GRORED Jun 19	PHYNEC Jun 19	PHYCHL June 19	PHYGEN Jun 19
	Product/acre		------(%)-----			
Roundup PowerMAX + (Roundup PowerMAX) + (Roundup PowerMAX) + (Roundup PowerMAX)	32.0 fl oz + (32.0 fl oz) + (32.0 fl oz) + (32.0 fl oz)	EPP + (PRE) + (EPOST) + (MPOST)	0	2	0	3
Warrant	1.5 qt	EPP	0	3	0	5
Warrant	1.5 qt	PRE	0	3	0	2
Reflex + Warrant	1.0 pt + 1.5 qt	PRE	0	2	0	3
Valor SX + Warrant	2.0 oz wt + 1.5 qt	PRE	0	3	0	7
Authority XL + Warrant	3.0 oz wt + 1.5 qt	PRE	0	3	0	3
Warrant	3.0 qt	PRE	0	3	0	3
Warrant + (Warrant)	1.5 qt + (1.5 qt) +	PRE + (EPOST)	2	5	0	8
Warrant + (Warrant)	1.5 qt + (1.5 qt) +	PRE + (MPOST)	0	2	0	3
Warrant + (Warrant) + (Warrant)	1.5 qt + (1.5 qt) + (1.5 qt)	PRE + (EPOST) + (MPOST)	3	3	0	10
Warrant + (Warrant) + (Warrant)	1.5 qt + (1.5 qt) + (1.5 qt)	EPP + (EPOST) + (MPOST)	0	5	0	7
Harness	0.75	PRE	0	2	0	5
LSD (P=0.05)			3.2	5.2	0	5.9
Standard Deviation			1.9	3.1	0	3.5

^aSoybean injury = GRORED, PHYNEC, PHYCHL and PHYGEN are growth-reduction, phytotoxicity-necrosis/burn, phytotoxicity-chlorosis, and phytotoxicity-general injury, respectively.

Table 4. Evaluation of application timings of Warrant herbicide for soybean phytotoxicity in early July.

Treatment	Rate Product/acre	Appln Timing	Soybean injury ^a			
			GRORED Jul 4	PHYNEC Jul 4	PHYCHL Jul 4	PHYGEN Jul 4
			------(%)-----			
Roundup PowerMAX + (Roundup PowerMAX) + (Roundup PowerMAX) + (Roundup PowerMAX)	32.0 fl oz + (32.0 fl oz) + (32.0 fl oz) + (32.0 fl oz)	EPP + (PRE) + (EPOST) + (MPOST)	0	0	0	0
Warrant	1.5 qt	EPP	0	0	0	2
Warrant	1.5 qt	PRE	0	0	0	2
Reflex + Warrant	1.0 pt + 1.5 qt	PRE	0	0	0	0
Valor SX + Warrant	2.0 oz wt + 1.5 qt	PRE	0	0	0	2
Authority XL + Warrant	3.0 oz wt + 1.5 qt	PRE	0	0	0	2
Warrant	3.0 qt	PRE	0	0	0	2
Warrant + (Warrant)	1.5 qt + (1.5 qt) +	PRE + (EPOST)	0	0	0	5
Warrant + (Warrant)	1.5 qt + (1.5 qt) +	PRE + (MPOST)	0	2	0	7
Warrant + (Warrant) + (Warrant)	1.5 qt + (1.5 qt) + (1.5 qt)	PRE + (EPOST) + (MPOST)	3	2	0	10
Warrant + (Warrant) + (Warrant)	1.5 qt + (1.5 qt) + (1.5 qt)	EPP + (EPOST) + (MPOST)	0	2	0	10
Harness	0.75	PRE	0	0	0	0
LSD (P=0.05)			2.8	2.6	0	3.4
Standard Deviation			1.7	1.5	0	2

^aSoybean injury = GRORED, PHYNEC, PHYCHL and PHYGEN are growth-reduction, phytotoxicity-necrosis/burn, phytotoxicity-chlorosis, and phytotoxicity-general injury, respectively.