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Abstract

The purpose of this study was to evaluate several residual herbicides and Roundup Ultra for soybean phytotoxicity and weed efficacy in glyphosate resistant soybean production.

Keywords

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Weed Management in Soybean

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Introduction

The purpose of this study was to evaluate several residual herbicides and Roundup Ultra for soybean phytotoxicity and weed efficacy in glyphosate resistant soybean production.

Materials and Methods

The crop rotation was soybean following corn. The seedbed was prepared with fall disking followed by spring field cultivation. Preplant herbicide treatments were incorporated two passes with a field cultivator operating 2 to 3 inches deep. Crop residue was 41 percent at planting. A randomized complete block design with three replications was used. Herbicides were applied in 20 gallons of water per acre. Visual estimates of crop injury and percentage weed control were made during the growing season. These observations are compared with an untreated control and made on a zero to 100 rating scale (0 percent = no control or injury; 100 percent = complete control or crop kill).

'Kruger variety K202 RR' soybean was planted on May 16 and preplant incorporated (PPI) and preemergence (PRE) treatments followed. Postemergence (POST1 and POST2) treatments were applied on June 27 and July 14, respectively. Soybean was four trifoliolate and 6 inches tall on June 27, and on July 14 soybean was seven trifoliolate and 9 to 10 inches tall. Weed growth stage was 1 to numerous leaves and 4 to 10 inches tall on June 27. On July 14, weeds had

numerous leaves and were 0.5 to 4 inches tall. Weed species occurring in this study included: giant foxtail, common lambsquarters, common waterhemp, Pennsylvania smartweed, and velvetleaf with an average population of 3, 2, 3, and 4 plants/ft², respectively.

Results and Discussion

Summarized in Table 1 are the results of the study. Several POST1 applied herbicide treatments caused significant soybean injury when observed on July 5. Treatments of Pursuit plus Cobra, Flexstar, FirstRate with Select plus Cobra, and Synchrony STS with Stellar and Select caused 20 to 32% injury. These treatments continued to demonstrate significant soybean injury when noted on July 27. Nearly all of the treatments effectively controlled giant foxtail and Pennsylvania smartweed when observed on July 27. Velvetleaf, common waterhemp, and common lambsquarters control on this date was poor to excellent and was dependent on the treatment combination applied. Axiom applied PRE followed by Roundup Ultra POST1 did not provide acceptable control of common waterhemp and velvetleaf, nor did Roundup Ultra POST1. Treatments of Pursuit Plus applied PPI and followed by Roundup Ultra POST1, Prowl PPI followed by Pursuit and Cobra, and Roundup Ultra POST1 followed by Roundup Ultra POST2 effectively controlled common waterhemp, as well as Command plus Authority PRE followed by Flexstar, and Boundary PRE followed by Roundup Ultra POST1. Python applied PRE followed by FirstRate plus Select and Cobra POST1 did not provide common lambsquarters control. Soybean yields ranged from 33 to 48 bu/A, excluding the untreated control. Yields were generally lower when treatments provided marginal weed control and/or demonstrated significant soybean injury.

Table 1. Preplant incorporated, preemergence and postemergence applied herbicides for weed control in soybean.

Treatment ^a	Rate Product/A	Appl. time	Injury		Gift	Colq	Cowh	Pesw	Vele	Yield 9/28 bu/A
			7/5	7/27	7/27	7/27	7/27	7/27	7/27	
			--- (%) ---		----- (%weed control ^b) -----					
Control	-	-	0	0	0	0	0	0	0	22
Axiom 68 DF+	12.9 oz+	PRE+	0	5	96	83	77	83	65	41
(Roundup Ultra 4 SL+AMS)	(1.5 pt+2.0 lb/A)	(POST1)								
Sencor 75 DF+Authority 75 DF+	6.0 oz+2.0 oz+	PRE+	0	0	95	95	62	93	85	41
(Roundup Ultra 4 SL+AMS)	(1.5 pt+2.0 lb/A)	(POST1)								
Roundup Ultra 4 SL+AMS+	1.5 pt+2.0 lb/A+	POST1+	0	10	98	95	98	90	99	39
(Roundup Ultra 4 SL+AMS)	(1.5 pt+2.0 lb/A)	(POST2)								
Pursuit Plus 2.9 EC	2.5 pt+	PPI+	0	0	99	99	93	95	98	47
(Roundup Ultra 4 SL+AMS)	(1.5 pt+2.0 lb/A)	(POST1)								
Prowl 3.3 EC	3.0 pt+	PPI+	30	13	90	75	99	95	92	39
(Pursuit 2SL+Cobra 2 EC+	(4.0 oz+4.0 oz+	(POST1)								
Sun-it II+AMS)	1.5 pt+2.5 lb/A)									
Command 3 ME+Authority 4 F+	2.0 pt+12.0 oz+	PRE+	20	7	93	96	94	98	95	36
(Flexstar 1.88 SL+COC)	(1.25 pt+1.0 %v/v)	(POST1)								
Boundary 7.8 EC+	1.25 pt+	PRE+	0	3	96	87	90	92	88	43
(Roundup Ultra 4 SL+AMS)	(1.5 pt+2.0 lb/A)	(POST1)								
Boundary 7.8 EC+	2.5 pt+	PRE+	0	0	96	93	93	92	95	48
(Roundup Ultra 4 SL+AMS)	(1.5 pt+2.0 lb/A)	(POST1)								
Domain 60 DF+	16.0 oz+	PRE+	0	2	95	90	73	96	94	40
(Roundup Ultra 4 SL+AMS)	(1.5 pt+2.0 lb/A)	(POST1)								
Pursuit 2 SL+	4.0 oz+	PRE+	0	0	98	99	83	96	96	46
(Roundup Ultra 4 SL+AMS)	(1.5 pt+2.0 lb/A)	(POST1)								
Roundup Ultra 4 SL+AMS	1.5 pt+2.0 lb/A	POST1	0	5	93	92	72	87	78	37
Python 80 WDG+	1.0 oz+	PRE+	30	13	90	55	95	91	91	33
(FirstRate 84 WG+Select 2 EC+	(0.03 oz+6.0 oz+	(POST1)								
Cobra 2 EC+COC+AMS)	6.0 oz+1.0 pt+2.5 lb/A)									
Treflan HPF 4 EC+	1.0 pt+	PPI+	28	8	90	73	98	87	88	37
(Synchrony STS 42 DG+	(0.27 oz+	(POST1)								
Stellar 3.1 EC+Select 2 EC+	4.0 oz+6.0 oz+									
COC+AMS)	1.0 pt+2.5 lb/A)									
Valor 50 WG+	2.5 oz+	PRE+	27	10	93	93	98	96	91	41
(FirstRate 84 WG+Select 2 EC+	(0.3 oz+6.0 oz+	(POST1)								
Cobra 2 EC+COC+AMS)	6.0 oz+1.0 pt+2.5 lb/A)									
Valor 50 WG+Prowl 3.3 EC+	2.5 oz+1.5 pt+	PPI+	32	13	93	77	98	92	92	38
(FirstRate 84 WG+Select 2 EC+	(0.3 oz+6.0 oz+	(POST1)								
Cobra 2 EC+COC+AMS)	6.0 oz+1.0 pt+2.5 lb/A)									
LSD (0.05)			5	6	5	20	16	9	15	7

^a Sun-it oil = crop oil surfactant adjuvant, a modified vegetable oil surfactant from American Cyanamid;
COC = Herbimax, an oil plus surfactant from Loveland Industries.

^b % weed control: Gift = giant foxtail, Colq = common lambsquarters, Cowh = common waterhemp,
Pesw = Pennsylvania smartweed, Vele = velvetleaf.