

Effect of delayed glyphosate applications on weed control and soybean yield in late planted soybean.

Krausz, Ronald F. and Bryan G. Young. This study was designed to evaluate the effects of delayed glyphosate applications on weed control and soybean yield in late planted soybean. The study was conducted on a Ebbert silt loam with 1.5% organic matter and pH 6.7 at the Belleville Research Center. Fertilizer applied in 2003 was 50 and 150 lb/A P₂O₅ and K₂O, respectively, to an area that had been cropped to field corn in 2002. Asgrow brand 'AG 4403' glyphosate-resistant soybean was planted 1.0 inch deep at 75 lb/A into a reduced-till seedbed on June 21. Plots consisted of four rows with 30 inch row spacing, 28 ft long arranged in a randomized complete block design with three replications. Application timings were preemergence (PRE) and postemergence, based on weed height in inches ("W) or weed regrowth height in inches ("RG) and are listed below. The herbicides were broadcast applied with a CO₂ pressurized sprayer using 8002 flat fan tips at 40 PSI in 20 GPA water. Monthly rainfall in inches was 2.8, 4.8, 8.3, 1.9 and 4.2 in April, May, June, July and August, respectively. Weed population per 0.25 m² in the nontreated plots, mid-season, was 21 velvetleaf, 4 common waterhemp, 2 ivyleaf morningglory, 4 yellow nutsedge, 2 Palmer amaranth, 21 giant foxtail and 3 common cocklebur.

Application information is listed below.

Date	Jun-23-03	Jul-15-03	Jul-16-03	Jul-25-03	Aug-4-03	Aug-10-03	Aug-15-03	Aug-19-03	Aug-25-03	Aug-28-03	Sep-5-03	Aug-10-03	Aug-19-03
Treatment	PRE	0-4"W	2-4"W	4-8"W	8-12"W	12-16"W	16-20"W	20-24"W	24-28"W	28-32"W	32-36"W	2-4"RG-1	2-4"RG-2
Air temp.(F)	82	76	64	76	84	82	88	82	72	90	72	82	82
RH (%)	32	92	98	50	54	50	50	68	90	56	40	50	68
Soil moist.	normal	normal	wet	normal	wet	normal	normal	normal	dry	dry	normal	normal	normal
soybean													
leaf no.		V2	V3	V4	R1	R1	R3	R3	R4	R5	R5.5	R1	R4
height (inch)		3-5	6	6-10	8-12	16-20	20-24	24-26	28-30	28-30	28-30	16-20	28-30
velvetleaf													
leaf no.		4-5		5-6	5-8	5-8	8-10	10+	10+	10+	10+	5-6	4-5
height (inch)		1-3		4-8	8-12	12-16	16-20	20-28	24-28	28-32	28-32	2-4	2-4
common waterhemp													
leaf no.		5-6		10+	10+	10+	10+	10+	10+	10+	10+	5-10	
height (inch)		1-3		4-8	8-12	12-16	16-20	20-24	24-28	28-32	28-32	2-6	
ivyleaf morningglory													
leaf no.		3-4		5-6	10+	10+	10+	10+	10+	10+	10+	5-8	2-5
height (inch)		1-3		4-6	4-10	4-10	4-10	6-12	6-12	28-32	6-12	2-4	2-4
yellow nutsedge													
leaf no.		5-6		5-6	5-8	5-8	5-8	6-10	6-10	6-10			2-5
height (inch)		1-4		4-10	8-14	8-10	16-20	20-24	24-28	28-32			5-6
Palmer amaranth													
leaf no.		5-6		10+	10+	10+	10+	10+	10+	10+	10+		
height (inch)		1-3		4-8	8-12	12-16	16-20	20-24	24-28	28-32	28-32		
giant foxtail													
leaf no.		5-6	1-4	5-6	5-8	5-8	8-10	10+	10+	10+	10+		
height (inch)		1-5	2-4	5-10	8-14	12-16	16-20	20-24	24-28	28-32	32-36		
common cocklebur													
leaf no.		5-6		6-8	8-10	8-10	8-10	10+	10+	10+	10+		
height (inch)		1-4		4-8	8-12	12-16	16-20	20-28	24-28	28-32	32-36		

Sulfentrazone plus cloransulam applied preemergence followed by glyphosate postemergence controlled 98 to 100% of velvetleaf, common waterhemp, ivyleaf morningglory, yellow nutsedge, Palmer amaranth, giant foxtail, and common cocklebur. Glyphosate alone controlled 72 to 77% of the 0 to 8 inch velvetleaf whereas glyphosate alone controlled 8 to 36 inch velvetleaf, 90 to 94%. Glyphosate alone controlled common waterhemp 95 to 100%. Ivyleaf morningglory and yellow nutsedge control ranged from 88 to 97% with glyphosate alone. Glyphosate alone controlled 100% of the Palmer amaranth, giant foxtail, and common cocklebur regardless of weed height. Postponing the glyphosate application did not delay soybean maturation. However, soybean grain yield was reduced by delaying the glyphosate application until weeds were 8 to 12 inches. Grain yields were reduced by 17 to 55% when compared with a residual herbicide followed by glyphosate. Grain yields tended to decrease as the weed height increased from 8 to 36 inches. Grain yield ranged from 16 to 47 bu/A. (Dept. of Plant, Soil and General Agriculture, Southern Illinois University, Carbondale).

Table. Effect of delayed glyphosate applications on weed control and soybean yield in late planted soybean. (Krausz and Young)

Treatment ^a	Application		Soybean			Control, 28 days after treatment ^d						
	Rate (lb/A)	Time	Height	Maturity	Yield	ABUTH	AMATA	IPOHE	CYPES	AMAPA	SETFA	XANST
			EOS ^b Inch	DAP ^c	bu/A	%	%	%	%	%	%	%
Nontreated			29	121	16	0	0	0	0	0	0	0
Sulfentrazone +cloransulam /glyphosate	0.25 +0.031 /0.56	PRE /2-4"W	31	114	47	100	100	100	100	100	100	98
Glyphosate /glyphosate	1.12 /0.75	0-4"W /2-4"RG-1	29	114	44	72	95	88	90	100	100	100
Glyphosate /glyphosate	1.12 /0.75	4-8"W /2-4"RG-2	27	114	41	77	100	99	96	100	100	100
Glyphosate /glyphosate	1.12 /0.75	8-12"W /2-4"RG-3	28	114	39	94	100	98	95	100	100	100
Glyphosate /glyphosate	1.12 /0.75	12-16"W /2-4"RG-3	28	114	35	91	100	90	93	100	100	100
Glyphosate /glyphosate	1.12 /0.75	16-20"W /2-4"RG-3	28	114	33	92	100	92	95	100	100	100
Glyphosate /glyphosate	1.12 /0.75	20-24"W /2-4"RG-3	29	114	33	90	100	90	98	100	100	100
Glyphosate /glyphosate	1.12 /0.75	24-28"W /2-4"RG-3	29	114	31	90	100	95	95	100	100	100
Glyphosate /glyphosate	1.12 /0.75	28-30"W /2-4"RG-3	29	114	25	90	98	97	95	100	100	100
Glyphosate /glyphosate	1.12 /0.75	32-36"W /2-4"RG-3	29	114	21	90	100	90	95	100	100	100
Handweed +no herbicide			31	114	43	100	100	100	100	100	100	100
LSD			2	0	7	14	1	3	5	0	0	1
P			0.01	1.0	0.01	0.01	0.01	0.01	0.01	1.0	1.0	0.01

^aAll glyphosate was Roundup UltraMax from Monsanto Co.

Planned application timing 2-4"RG-3 was not applied, not needed.

^bEOS = end of season.^cDAP = days after planting.^dRatings at 28 days after the 0-4"W, 2-4"W, 4-8"W, 8-12"W, 12-16"W, 16-20"W, 20-24"W, 24-28"W, 28-32"W and 32-36"W application were on Aug-12-03, Aug-13-03, Aug-22-03, Sep-1-03, Sep-7-03, Sep-12-03, Sep-16-03, Sep-22-03, Sep-26-03 and Oct-3-03, respectively.