

Effect of time of removal of weeds on glyphosate tolerant soybeans at Lamberton, MN in 1998. Potter, Bruce D. and Jodie K. Getting. The objective of this study was to evaluate the effect of time of removal with soybean growth and yield. This study was conducted on a Ves loam soil containing 5.0% organic matter, pH 6.3 and soil test P and K levels of 52 and 390 lb/A, respectively. A randomized complete block design with a split plot arrangement of treatments with four replications and a plot size of 10 by 30 ft was used. The main plots consisted of 2 row spacings and the subplots were application timings of glyphosate. The test site was planted to oats in 1997. The site was fall moldboard plowed. On May 7, 1998 preplant incorporated treatments were applied and tilled twice with a field cultivator set to till 3 to 4 inches deep and operated at 5 to 6 mph. The same day Asgrow 'AG 2101' glyphosate tolerant soybeans were planted in either 10-inch or 30-inch rows at a seeding rate of 160,000 seeds/A. All treatments were applied with a tractor-mounted sprayer delivering 20 gpa at a pressure of 40 psi. The sprayer was equipped with 8002 flat-fan nozzles spaced 15 inches apart on the boom. Application dates, environmental conditions, plant sizes and rainfall data are listed below:

Date	May 7	May 29	June 16	June 22	June 29	July 8
Treatment	PPI	POST I	POST II, III	POST IV, V	POST VI, VII, VIII	POST IX, X, XI
Temperature (F)						
air	45	66	66	62	66	77
soil (4 inch)	50	68	66	76	68	78
Relative humidity (%)	74	58	60	77	82	72
Wind (mph)	NW 10	N 8	calm	WNW 5	calm	NW 4
Sky	cloudy	clear	clear	clear	p. cloudy	p. cloudy
Soil moisture	dry	dry	dry	dry	moist	moist
Rainfall after application (inch)						
1 week	0.46	0.25	0.39	1.80	0.94	0.04
2 week	0.57	0.11	1.80	0.94	0.72	3.71
3 week	0.25	1.54	1.54	0.72	2.32	0.03

Crop and weed sizes	POST application timing											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	
Soybean												
leaf no.	-	VC	V3	V2	V4	V4	V5	V4	V4	R1	R1	R1
height (inch)	-	3	6	5	10	10	13	9	9	20	13	13
Yellow foxtail												
leaf no.	-	1 to 3	1 to 5	4 to 6	4 to 7	1 to 3	2 to 4	2 to 4	2 to 4	4 to 6	1 to 3	1 to 3
height (inch)	-	1 to 3	0.25 to 6	5 to 8	8 to 12	1 to 3	2 to 5	2 to 4	2 to 4	6 to 8	1 to 3	1 to 3
no./ft ²	-	111	30	100	139	10	24	9	3	32	14	7
Common lambsquarters												
leaf no.	-	2 to 4	1 to 6	6 to 8	8 to 10	2 to 4	2 to 4	2 to 4	2 to 4	2 to 4	2 to 4	2 to 4
height (inch)	-	1 to 2	0.25 to 6	4 to 6	8 to 10	2 to 4	2 to 5	1 to 3	1 to 3	2 to 5	1 to 3	1 to 3
no./ft ²	-	14	3	11	21	31	5	6	2	5	5	1
Eastern black nightshade												
leaf no.	-	1 to 2	1 to 2	1 to 2	1 to 2	1 to 2	1 to 2	1 to 2	1 to 2	1 to 2	1 to 2	1 to 2
height (inch)	-	1	1 to 2	1 to 2	1 to 2	1 to 2	1	1	1	1 to 2	0.5 to 1	0.5 to 1
no./ft ²	-	0.9	1.1	1.6	0.8	0.3	0.4	0.8	1.3	4	1.3	0.4
Redroot pigweed												
leaf no.	-	2 to 4	2 to 4	2 to 4	3 to 5	1 to 2	1 to 2	1 to 2	1 to 2	3 to 4	1 to 2	1 to 2
height (inch)	-	1 to 2	3 to 4	3 to 4	6 to 8	1 to 2	1 to 2	1 to 2	1 to 2	4 to 6	1 to 2	1 to 2
no./ft ²	-	1.1	0.3	0.8	0.9	0.9	3.8	0.4	0.3	1.9	0.8	0.5

Soil moisture was limited from early June until June 23. Heights of soybeans were reduced at the 4 to 8-inch and 8 to 12-inch POST treatments compared to those treated PPI or at the 2 to 4-inch weed stage. Weed control in the 2 to 4-inch POST application allowed late season weed escapes. The 2 to 4-inch and 8 to 12-inch POST applications of glyphosate had reduced yields in both row spacings compared to the respective hand-weeded checks. The 4 to 8-inch POST treatment had soybean yields equivalent to the hand-weeded check and the sequential treatments in the 30-inch row spacing. However, in the 10-inch row spacing soybean yields were reduced in all non-sequential treatments. Soybean yields from glyphosate applied at 0.375 lb/A at 4 to 8-inch weeds followed by glyphosate applied at 0.375 lb/A at canopy were reduced compared to the hand-weeded check. This may relate to the level of control of yellow foxtail and common lambsquarters prior to the application at soybean canopy.

Table. Effect of time of removal of weeds on glyphosate tolerant soybeans at Lamberton, MN in 1998 (Potter and Getting).

Treatment ^a	Rate (lb/A)	Row spacing (inches)	Yeff	Cola	Rrpw	Ebns	Yield (bu/A) ^b
			—(% control 9/15/98)—				
<u>Preplant incorporate 2X/POST II (4 to 8-inch weeds)</u>							
Trif/glyphosate	0.75/0.75	10	100	100	100	100	59.3
<u>POST I (2 to 4-inch weeds)/POST V (2 to 4-inch weeds)</u>							
Glyphosate/glyphosate	0.375/0.375	10	100	98	99	100	63.5
<u>POST I (2 to 4-inch weeds)/POST VI (soybean canopy)</u>							
Glyphosate/glyphosate	0.75/0.375	10	100	100	100	100	63.5
<u>POST III (4 to 8-inch weeds)/POST VII (soybean canopy)</u>							
Glyphosate/glyphosate	0.375/0.375	10	100	100	100	100	55.6
<u>POST III (4 to 8-inch weeds)/POST VIII (soybean canopy)</u>							
Glyphosate/glyphosate	0.75/0.75	10	100	100	100	100	57.7
<u>POST I (2 to 4-inch weeds)</u>							
Glyphosate	0.75	10	96	98	97	100	55.1
<u>POST III (4 to 8-inch weeds)</u>							
Glyphosate	0.75	10	99	100	100	100	54.3
<u>POST IV (8 to 12-inch weeds)</u>							
Glyphosate	0.75	10	100	100	100	100	53.6
Weedy check	-	10	0	0	0	0	17.6
Hand-weeded check	-	10	100	100	100	100	60.2
<u>Preplant incorporate 2X/POST II (4 to 8-inch weeds)</u>							
Trif/glyphosate	0.75/0.75	30	100	100	100	100	57.4
<u>POST I (2 to 4-inch weeds)/POST V (2 to 4-inch weeds)</u>							
Glyphosate/glyphosate	0.375/0.375	30	96	95	98	100	57.6
<u>POST I (2 to 4-inch weeds)/POST IX (soybean canopy)</u>							
Glyphosate/glyphosate	0.75/0.375	30	100	100	100	100	52.5
<u>POST III (4 to 8-inch weeds)/POST X (soybean canopy)</u>							
Glyphosate/glyphosate	0.375/0.375	30	100	100	100	100	53.5
<u>POST III (4 to 8-inch weeds)/POST XI (soybean canopy)</u>							
Glyphosate/glyphosate	0.75/0.75	30	100	100	100	100	54.5
<u>POST I (2 to 4-inch weeds)</u>							
Glyphosate	0.75	30	87	96	91	100	48.0
<u>POST III (4 to 8-inch weeds)</u>							
Glyphosate	0.75	30	96	99	98	100	55.8
<u>POST IV (8 to 12-inch weeds)</u>							
Glyphosate	0.75	30	95	98	90	100	48.2
Weedy check	-	30	0	0	0	0	8.3
Hand-weeded check	-	30	100	100	100	100	54.6
	LSD (0.10)		2	2	3	ns	4.6
Average across treatments:							
<u>Preplant incorporate 2X/POST (4 to 8-inch weeds)</u>							
Trif/glyphosate	0.75/0.75		100	100	100	100	58.4
<u>POST (2 to 4-inch weeds)/POST (2 to 4-inch weeds)</u>							
Glyphosate/glyphosate	0.375/0.375		98	97	99	100	60.5
<u>POST (2 to 4-inch weeds)/POST (soybean canopy)</u>							
Glyphosate/glyphosate	0.75/0.375		100	100	100	100	58.0
<u>POST (4 to 8-inch weeds)/POST (soybean canopy)</u>							
Glyphosate/glyphosate	0.375/0.375		100	100	100	100	54.5
Glyphosate/glyphosate	0.75/0.75		100	100	100	100	56.1
<u>POST (2 to 4-inch weeds)</u>							
Glyphosate	0.75		91	97	94	100	51.5
<u>POST (4 to 8-inch weeds)</u>							
Glyphosate	0.75		97	99	99	100	55.1
<u>POST (8 to 12-inch weeds)</u>							
Glyphosate	0.75		98	99	95	100	50.9
Weedy check	-		0	0	0	0	13.0
Hand-weeded check	-		100	100	100	100	57.4
	LSD (0.10)		1	1	2	ns	3.2
Average for row spacing across herbicide treatments:							
	-	30	87	89	88	90	49.0
	-	10	89	90	90	90	54.0
	LSD (0.10)		1	1	2	ns	4.5

^a Glyphosate = Roundup Ultra 3S; Trif = Treflan 4E.

^b Yield adjusted to 13% moisture.