

Evaluation of herbicide programs for weed control in soybean, Ames, IA, 2003. Owen, Micheal D.K., James F. Lux, and Damian D. Franzenburg. The purpose of this study was to evaluate the crop safety, efficacy and yield from preemergence and postemergence applied herbicide programs in soybean. The soil was a Canisteo, Nicollet, Clarion and Webster clay loam with a pH 6.8 and 5.3% organic matter. The experimental design was a randomized complete block with three replications and plots were 10 by 25 ft. The 2002 crop was corn. Tillage included a fall chisel plowing and a spring field cultivation. Crop residue on the soil surface was 31% at planting. "Asgrow variety AG 2403" soybean were planted 1.25 inches deep on May 28, at 151,000 seeds/A in 30-inch rows. Preemergence (PRE) treatments were applied on May 29 at 20 gpa and 25 psi using flat fan nozzles. Postemergence (POST1) and POST2 treatments were applied on June 30, and July 3, respectively, at 20 gpa and 25 psi using flat fan nozzles. Conditions on May 29 were: air temperature 27 C, soil temperature at the 4-inch depth 19 C, 3 mph wind, 75% cloud cover, 30% relative humidity. Conditions on June 30 were: air temperature 27 C, soil temperature at the 4-inch depth 23 C, 3 mph wind, clear sky, 42% relative humidity. Soybean growth was V3 and 7 inches tall. Weed species, average size and number per ft² in the untreated control included: giant foxtail one to four leaves, 1 to 6 inches tall, fifty-five plants; velvetleaf cotyledon to two leaves, 0.25 to 2 inches tall, zero to one plant; common waterhemp cotyledon to numerous leaves, 0.25 to 6 inches tall, zero to eight plants; common ragweed numerous leaves, 5 to 6 inches tall, zero to two plants; common lambsquarters numerous leaves, 1 to 6 inches tall, zero to fifteen plants; common cocklebur numerous leaves, 5 to 8 inches tall, zero to two plants. Conditions on July 3 were: air temperature 33 C, soil temperature at the 4-inch depth 27 C, calm wind, 20% cloud cover, 72% relative humidity. Soybean growth was V4 and 9 inches tall. Weed species, average size and number per ft² in the untreated control included: giant foxtail two to five leaves, 1 to 7 inches tall, zero to twenty-five plants; velvetleaf cotyledon to seven leaves, 0.5 to 6 inches tall, zero to one plant; common waterhemp cotyledon to numerous leaves, 0.5 to 3 inches tall, zero to one plant; common ragweed numerous leaves, 1 to 12 inches tall, zero to five plants; common lambsquarters numerous leaves, 1.5 to 5 inches tall, zero to two plants; common cocklebur numerous leaves, 3 to 11 inches tall, zero to three plants. May rainfall included: 1.67, 0.37, 0.99, 0.15, 0.39, and 0.18 inches on May 4, 6, 8, 10, 13, and 14, respectively. Total rainfall for May was 3.75 inches. June rainfall included: 0.36, 0.53, 0.32, 0.23, 0.10, 0.28, and 0.55 inches on June 2, 6, 7, 8, 9, 24, and 25, respectively. Total rainfall for June was 2.37 inches. July rainfall included: 2.38 inches and 1.12 inches from July 1 through 15 and 16 through 31, respectively. Total rainfall for July was 3.5 inches. Rainfall total for August was 0.86 inches.

All PRE treatments demonstrated excellent crop safety on July 3. On July 15, POST1 applied fomesafen & adjuvant and fomesafen & adjuvant plus glyphosate demonstrated 15 and 22% injury, respectively. Injury by other postemergence treatments was inconsistent and less than 5%.

On July 15, PRE s-metolachlor treatments demonstrated at least 90% control of giant foxtail, while control ranged from 68 to 78% for other PRE treatments. PRE pendimethalin treatments provided 82 and 87% control of common waterhemp. Common waterhemp control by other treatments was at least 90%. S-metolachlor provided only 58% control of common lambsquarters. However, the remaining treatments demonstrated at least 93% control. Preemergence control of velvetleaf, common ragweed, and common cocklebur was generally unacceptable.

Weed control noted on July 15 was excellent for postemergence treatments with glyphosate and fomesafen & adjuvant plus glyphosate. Fomesafen & adjuvant provided excellent broadleaf weed control but unacceptable giant foxtail control. PRE s-metolachlor & metribuzin followed by POST2 applied fomesafen & adjuvant plus fluazifop-p & fenoxaprop did not provide adequate control of velvetleaf, common ragweed and common cocklebur. PRE applied pendimethalin and sulfentrazone also failed to control the same weeds. Trends in weed control were similar when noted on July 28 and August 25. However, common waterhemp and common cocklebur control began to diminish towards August with new weed germination.

Soybean yields were highest for treatments with preemergence applications followed by postemergence applications that included glyphosate. Yields for these treatments ranged from 33 to 39 bu/A. The remaining treatments yielded between 11 and 31 bu/A. (Dept. of Agronomy, Iowa State University, Ames).

Table 1. Evaluation of herbicide programs for weed control in soybean, Ames, IA, 2003 (Owen, Lux, and Franzenburg).

Treatment	Rate (lb/A)		Soybean injury	SETFA	ABUTH	AMATA	AMBEL	CHEAL	XANST
			7/3/03 ----- (%) -----	7/3/03 ----- (%) -----	7/3/03 ----- (%) -----	7/3/03 ----- (%) -----	7/3/03 ----- (%) -----	7/3/03 ----- (%) -----	7/3/03 ----- (%) -----
Untreated	-	-	0	0	0	0	0	0	0
Glyphosate ^a +ammonium sulfate ^b	0.75+2.0	POST1	0	0	0	0	0	0	0
Glyphosate+ammonium sulfate	0.75+2.0	POST2	0	0	0	0	0	0	0
Sulfentrazone	0.25	PRE	0	72	50	92	33	98	23
Sulfentrazone/ glyphosate+ammonium sulfate	0.25/ 0.75+2.0	PRE/ POST2	0	68	60	93	22	99	17
S-metolachlor ^c / glyphosate+ammonium sulfate	1.43/ 0.75+2.0	PRE/ POST2	0	92	13	90	23	58	5
Pendimethalin	1.24	PRE	0	83	55	87	28	95	13
Pendimethalin/ glyphosate+ammonium sulfate	1.24 0.75+2.0	PRE/ POST2	0	78	40	82	22	93	7
Flufenacet&metribuzin/ glyphosate+ammonium sulfate	0.18&0.27/ 0.75+2.0	PRE/ POST2	0	78	63	90	40	93	38
S-metolachlor+ sulfentrazone/ glyphosate+ammonium sulfate	1.43+ 0.1875/ 0.75+2.0	PRE/ POST2	0	92	47	98	53	99	22
S-metolachlor+ chlorimuron&sulfentrazone/ glyphosate+ammonium sulfate	1.43+ 0.035&0.176/ 0.75+2.0	PRE/ POST2	0	90	72	98	72	99	37
S-metolachlor&metribuzin/ glyphosate+ammonium sulfate	0.99&0.23/ 0.75+2.0	PRE/ POST2	0	92	57	96	77	96	42
S-metolachlor&metribuzin/ glyphosate+ammonium sulfate	1.18&0.28/ 0.75+2.0	PRE/ POST2	0	95	63	95	72	98	32
S-metolachlor&metribuzin/ fomesafen&adjuvant+ fluazifop-P&fenoxaprop+ COC ^d +28%UAN ^e	0.99&0.23/ 0.294+ 0.162&0.46+ 1.0+2.0	PRE/ POST2	0	93	65	98	83	98	45
Fomesafen&adjuvant+COC+ 28%UAN	0.294+1.0+ 2.0	POST1	0	0	0	0	0	0	0
Fomesafen&adjuvant+glyphosate	0.176+0.75	POST1	0	0	0	0	0	0	0
LSD (P=0.05)			0	12	21	4	30	6	20

^a Glyphosate = Touchdown KPMG. Rate in ae/A.^b Ammonium sulfate rate in % w/v.^c S-metolachlor = Dual Magnum.^d COC = Herbimax, an oil-surfactant adjuvant from Loveland Industries, Inc. Rate in % v/v.^e 28%UAN = Mixtures of urea and ammonium nitrate. Rate in qt/A.

Table 2. Evaluation of herbicide programs for weed control in soybean, Ames, IA, 2003 (Owen, Lux, and Franzenburg).

Treatment	Rate (lb/A)		Soybean injury	SETFA	ABUTH	AMATA	AMBEL	CHEAL	XANST
			7/15/03 ----- (%) -----	7/15/03 ----- (%) -----	7/15/03 ----- (%) -----	7/15/03 ----- (%) -----	7/15/03 ----- (%) -----	7/15/03 ----- (%) -----	7/15/03 ----- (%) -----
Untreated	-	-	0	0	0	0	0	0	0
Glyphosate ^a +ammonium sulfate ^b	0.75+2.0	POST1	0	99	98	98	98	99	98
Glyphosate+ammonium sulfate	0.75+2.0	POST2	2	99	93	95	98	99	99
Sulfentrazone	0.25	PRE	0	68	42	88	23	98	25
Sulfentrazone/ glyphosate+ammonium sulfate	0.25/ 0.75+2.0	PRE/ POST2	0	99	98	99	99	99	99
S-metolachlor ^c / glyphosate+ammonium sulfate	1.43/ 0.75+2.0	PRE/ POST2	0	99	98	99	96	99	96
Pendimethalin	1.24	PRE	0	80	55	87	8	95	8
Pendimethalin/ glyphosate+ammonium sulfate	1.24 0.75+2.0	PRE/ POST2	0	69	98	98	98	99	95
Flufenacet&metribuzin/ glyphosate+ammonium sulfate	0.18&0.27/ 0.75+2.0	PRE/ POST2	0	99	96	98	98	99	98
S-metolachlor+ sulfentrazone/ glyphosate+ammonium sulfate	1.43+ 0.1875/ 0.75+2.0	PRE/ POST2	0	99	96	99	98	99	99
S-metolachlor+ chlorimuron&sulfentrazone/ glyphosate+ammonium sulfate	1.43+ 0.035&0.176/ 0.75+2.0	PRE/ POST2	0	99	98	99	99	99	99
S-metolachlor&metribuzin/ glyphosate+ammonium sulfate	0.99&0.23/ 0.75+2.0	PRE/ POST2	2	99	96	99	99	99	98
S-metolachlor&metribuzin/ glyphosate+ammonium sulfate	1.18&0.28/ 0.75+2.0	PRE/ POST2	0	99	95	98	99	99	95
S-metolachlor&metribuzin/ fomesafen&adjuvant+ fluazifop-P&fenoxaprop+ COC ^d +28%UAN ^e	0.99&0.23/ 0.294+ 0.162&0.046+ 1.0+2.0	PRE/ POST2	5	90	53	85	57	98	55
Fomesafen&adjuvant+COC+ 28%UAN	0.294+1.0+ 2.0	POST1	15	47	98	99	98	93	98
Fomesafen&adjuvant+glyphosate	0.176+0.75	POST1	22	99	98	98	98	99	99
LSD (P=0.05)			6	23	21	10	14	3	16

^a Glyphosate = Touchdown KPMG. Rate in ae/A.^b Ammonium sulfate rate in % w/v.^c S-metolachlor = Dual Magnum.^d COC = Herbimax, an oil-surfactant adjuvant from Loveland Industries, Inc. Rate in % v/v.^e 28%UAN = Mixtures of urea and ammonium nitrate. Rate in qt/A.

Table 3. Evaluation of herbicide programs for weed control in soybean, Ames, IA, 2003 (Owen, Lux, and Franzenburg).

Treatment	Rate (lb/A)		Soybean injury	SETFA	ABUTH	AMATA	AMBEL	CHEAL	XANST
			7/28/03 ----- (%) -----	7/28/03 ----- (%) -----	7/28/03 ----- (%) -----	7/28/03 ----- (%) -----	7/28/03 ----- (%) -----	7/28/03 ----- (%) -----	7/28/03 ----- (%) -----
Untreated	-	-	0	0	0	0	0	0	0
Glyphosate ^a +ammonium sulfate ^b	0.75+2.0	POST1	0	98	98	92	96	99	75
Glyphosate+ammonium sulfate	0.75+2.0	POST2	2	99	90	83	96	98	92
Sulfentrazone	0.25	PRE	0	62	42	88	23	98	25
Sulfentrazone/ glyphosate+ammonium sulfate	0.25/ 0.75+2.0	PRE/ POST2	0	99	96	96	96	99	88
S-metolachlor ^c / glyphosate+ammonium sulfate	1.43/ 0.75+2.0	PRE/ POST2	0	99	96	98	94	98	88
Pendimethalin	1.24	PRE	0	75	55	82	0	95	0
Pendimethalin/ glyphosate+ammonium sulfate	1.24 0.75+2.0	PRE/ POST2	3	99	95	92	96	99	92
Flufenacet&metribuzin/ glyphosate+ammonium sulfate	0.18&0.27/ 0.75+2.0	PRE/ POST2	0	98	95	92	98	99	92
S-metolachlor+ sulfentrazone/ glyphosate+ammonium sulfate	1.43+ 0.1875/ 0.75+2.0	PRE/ POST2	0	99	94	98	98	99	90
S-metolachlor+ chlorimuron&sulfentrazone/ glyphosate+ammonium sulfate	1.43+ 0.035&0.176/ 0.75+2.0	PRE/ POST2	0	99	98	99	99	99	85
S-metolachlor&metribuzin/ glyphosate+ammonium sulfate	0.99&0.23/ 0.75+2.0	PRE/ POST2	2	98	96	99	98	99	93
S-metolachlor&metribuzin/ glyphosate+ammonium sulfate	1.18&0.28/ 0.75+2.0	PRE/ POST2	0	99	93	96	98	99	90
S-metolachlor&metribuzin/ fomesafen&adjuvant+ fluazifop-P&fenoxaprop+ COC ^d +28%UAN ^e	0.99&0.23/ 0.294+ 0.162&0.046+ 1.0+2.0	PRE/ POST2	2	88	50	82	55	98	47
Fomesafen&adjuvant+COC+ 28%UAN	0.294+1.0+ 2.0	POST1	8	40	93	96	98	87	95
Fomesafen&adjuvant+glyphosate	0.176+0.75	POST1	15	98	95	87	96	99	77
LSD (P=0.05)			5	10	23	11	13	6	18

^a Glyphosate = Touchdown KPMG. Rate in ae/A.^b Ammonium sulfate rate in % w/v.^c S-metolachlor = Dual Magnum.^d COC = Herbimax, an oil-surfactant adjuvant from Loveland Industries, Inc. Rate in % v/v.^e 28%UAN = Mixtures of urea and ammonium nitrate. Rate in qt/A.

Table 4. Evaluation of herbicide programs for weed control in soybean, Ames, IA, 2003 (Owen, Lux, and Franzenburg).

Treatment	Rate		Injury 8/25/03	SETFA 8/25/03	ABUTH 8/25/03	AMATA 8/25/03	AMBEL 8/25/03	CHEAL 8/25/03	XANST 8/25/03	Soybean yield
	(lb/A)		- (%) -	----- (%weed control) -----						- (bu/A) -
Untreated	-	-	0	0	0	0	0	0	0	9
Glyphosate ^a +ammonium sulfate ^b	0.75+2.0	POST1	0	95	96	87	95	99	63	30
Glyphosate+ammonium sulfate	0.75+2.0	POST2	0	98	87	78	95	98	87	31
Sulfentrazone	0.25	PRE	0	57	42	88	22	98	23	14
Sulfentrazone/ glyphosate+ammonium sulfate	0.25/ 0.75+2.0	PRE/ POST2	0	96	96	96	96	99	88	33
S-metolachlor ^c / glyphosate+ammonium sulfate	1.43/ 0.75+2.0	PRE/ POST2	0	96	96	98	94	98	85	36
Pendimethalin	1.24	PRE	0	72	50	82	0	95	0	11
Pendimethalin/ glyphosate+ammonium sulfate	1.24 0.75+2.0	PRE/ POST2	2	99	95	92	96	98	92	33
Flufenacet&metribuzin/ glyphosate+ammonium sulfate	0.18&0.27/ 0.75+2.0	PRE/ POST2	0	98	95	92	98	99	90	39
S-metolachlor+ sulfentrazone/ glyphosate+ammonium sulfate	1.43+ 0.1875/ 0.75+2.0	PRE/ POST2	0	98	94	98	98	99	87	36
S-metolachlor+ chlorimuron&sulfentrazone/ glyphosate+ammonium sulfate	1.43+ 0.035&0.176/ 0.75+2.0	PRE/ POST2	0	99	98	99	99	99	85	33
S-metolachlor&metribuzin/ glyphosate+ammonium sulfate	0.99&0.23/ 0.75+2.0	PRE/ POST2	0	98	95	99	98	99	92	38
S-metolachlor&metribuzin/ glyphosate+ammonium sulfate	1.18&0.28/ 0.75+2.0	PRE/ POST2	0	99	93	96	98	99	88	36
S-metolachlor&metribuzin/ fomesafen&adjuvant+ fluazifop-P&fenoxaprop+ COC ^d +28%UAN ^e	0.99&0.23/ 0.294+ 0.162&0.46+ 1.0+2.0	PRE/ POST2	2	85	50	82	50	98	38	18
Fomesafen&adjuvant+COC+ 28%UAN	0.294+1.0+ 2.0	POST1	5	37	91	96	96	83	92	14
Fomesafen&adjuvant+glyphosate	0.176+0.75	POST1	5	96	88	77	96	98	63	25
LSD (P=0.05)			4	13	23	12	12	9	18	5

^a Glyphosate = Touchdown KPMG. Rate in ae/A.^b Ammonium sulfate rate in % w/v.^c S-metolachlor = Dual Magnum.^d COC = Herbimax, an oil-surfactant adjuvant from Loveland Industries, Inc. Rate in % v/v.^e 28%UAN = Mixtures of urea and ammonium nitrate. Rate in qt/A.