

Weed control in direct-seeded field pea. Gregory J. Endres and Blaine G. Schatz. (Carrington Research Extension Center, North Dakota State University, Carrington, ND 58421) Weed control and field pea response to selected soil- and POST-applied herbicides were evaluated in a randomized complete-block design with three replicates. The experiment was conducted on a Heimdahl loam soil with 6.9 pH and 3.3% organic matter at the NDSU Carrington Research Extension Center. Herbicide treatments were applied with a CO₂ pressurized hand-held plot sprayer at 17 gal/A. Fall treatments were applied November 3, 2005 at 35 psi through 80015 flat-fan nozzles with 36 F, 81% RH, 100% cloudy sky, and 11 mph wind. The trial area was treated on April 21, 2006 with a burn-down application of glyphosate at 0.57 lb ae/A plus liquid ammonium sulfate at 0.5% v/v. Spring herbicide treatments were applied at 30 psi through 8002 flat-fan nozzles. Spring preplant (PP) treatments were applied on April 21 with 63 F, 48% RH, 30% clear sky, and 13 mph wind. Rainfall totaled 0.62 inches 7 d following PP application. On April 27, inoculated 'Admiral' field pea was seeded into standing wheat stubble in 7-inch rows at a rate of 300,000 pure live seeds/A. PRE treatments were applied on April 27 with 58 F, 61% RH, 100% cloudy sky, and 3 mph wind. Rainfall totaled 0.8 inches 3 d following PRE application. The early POST (EPOST) treatment was applied on May 23 with 80 F, 42% RH, 15% clear sky, and 9 mph wind to 3-inch tall field pea, 2- to 3-leaf foxtail (green and yellow), and 0.5-inch tall common lambsquarters and pigweed (prostrate and redroot). POST treatments were applied on June 5 with 80 F, 44% RH, 65% clear sky, and 2 mph wind to 8- to 9-inch tall field pea, 5-leaf foxtail, 1- to 4-inch tall common lambsquarters, and 1- to 3-inch tall pigweed. Average plant density in untreated plots was measured on June 2: field pea = 9 plants/ft², grass weeds = 28 plants/ft², and broadleaf weeds = 2 plants/ft². The trial was harvested with a plot combine on July 24.

PP sulfentrazone + imazethapyr provided 98 to 99% control of foxtail and broadleaf weeds on June 2 (Table 1). Fall- or spring-applied (PP and PRE) sulfentrazone at 0.14 lb/A provided 95 to 99% control of broadleaf weeds; however, foxtail control was as low as 68%. Spring-applied pendimethalin provided 93 to 99% broadleaf weed control compared to 84 to 89% control with fall application. Linuron at 1 lb/A and KIH 485 provided 90 to 95% control of broadleaf weeds. Sequentially-applied bentazon at 0.5 lb/A + sethoxydim at 0.1 lb/A provided 97% control of pigweed spp. compared to 84% control with the single application of bentazon at 1.0 lb/A + sethoxydim at 0.2 lb/A on July 3 (Table 2). Also, bentazon at 0.5 lb/A + sethoxydim at 0.1 lb/A + imazamox at 0.016 lb/a provided similar foxtail and common lambsquarters control, and improved pigweed control compared to bentazon at 1.0 lb/A + sethoxydim at 0.2 lb/A. The tank mixture of imazamox at 0.03 lb/A with bentazon + sethoxydim caused crop chlorosis and 17% height reduction when visually evaluated 14 d after application (data not shown), delayed crop maturity and reduced seed yield compared to yield of the untreated check. Crop injury or delay in maturity did not occur with other treatments in the trial. Pea seed yield exceeded 50 bu/A with PP sulfentrazone + imazethapyr followed by sethoxydim, and PRE pendimethalin followed by bentazon + sethoxydim.

Table 1. Weed control with soil-applied herbicides in direct-seeded field pea, Carrington, 2006.

Treatment ¹	Application timing ²	Rate lb ai/A	June 2		
			Foxtail spp. ³	Common lambsquarters	Pigweed spp. ³
			-----% control -----		
Untreated	x	x	0	0	0
Sulfentrazone	Fall	0.141	77	95	99
Sulfentrazone/Sulfentrazone	Fall/PRE	0.07/0.07	68	98	98
Pendimethalin	Fall	1.5	85	84	89
Sulfentrazone	PRE	0.141	68	99	99
Sulfentrazone+imazethapyr	PP	0.105+0.016	98	99	99
Pendimethalin	PRE	1.5	88	98	99
Sulfentrazone+pendimethalin	PRE	0.07+0.75	90	96	99
Pendimethalin	PP	1.5	91	98	93
Ethalfuralin	PP	0.75	86	76	96
Sulfentrazone	PP	0.141	73	99	98
Pendimethalin	PP	1.5	93	95	99
Linuron	PRE	0.5	57	86	85
Linuron	PRE	1	73	95	95
Diuron	PRE	1.88	68	76	96
KIH 485	PRE	0.15	68	90	91
C.V. (%)			11	9	6
LSD (0.05)			13	14	9

¹Pendimethalin=ProwlH₂O, BASF. The trial was treated on April 21 with a PRE burn-down application of glyphosate at 0.57 lb ae/A plus liquid ammonium sulfate at 0.5% v/v.

²Fall=November 3, 2005; PP=April 21, 2006; PRE=April 27.

³Foxtail spp.=yellow and green; Pigweed spp.=redroot and prostrate.

Table 2. Weed control and crop response with soil- and POST-applied herbicides in direct-seeded field pea, Carrington, 2006.

Treatment ¹	Application timing ²	Rate lb ai/A	July 3			Field pea		
			Foxtail spp. ³	Common lambs-quarters % control	Pigweed spp. ³	Plant maturity ⁴	Seed yield	Test weight
			-----	-----	-----	Jday	bu/A	lb/bu
Untreated	x	x	0	0	0	193	38.5	63.8
Sulfentrazone/bentazon+sethoxydim+MSO+UAN	Fall/POST	0.14/0.5+0.1+1%+2pt	77	98	99	193	47.8	64.1
Sulfentrazone/sulfentrazone/Bentazon+sethoxydim+MSO+UAN	Fall/PRE/POST	0.07/0.07/0.5+0.1+1%+2pt	84	99	99	193	44.2	64.0
Pendimethalin/bentazon+sethoxydim+MSO+UAN	Fall/POST	1.5/0.5+0.1+1%+2pt	90	93	91	193	49.4	63.3
Sulfentrazone/bentazon+sethoxydim+MSO+UAN	PRE/POST	0.14/0.5+0.1+1%+2pt	88	99	99	193	48.0	64.3
Sulfentrazone+imazethapyr/sethoxydim+MSO	PP/POST	0.105+0.016/0.1+1%	96	99	99	194	53.9	64.1
Pendimethalin/bentazon+sethoxydim+MSO+UAN	PRE/POST	1.5/0.5+0.1+1%+2pt	98	98	98	193	52.0	63.9
Sulfentrazone+pendimethalin/bentazon+sethoxydim+MSO+UAN	PRE/POST	0.07+0.75/0.5+0.1+1%+2pt	97	99	99	194	49.9	64.0
Pendimethalin/bentazon+sethoxydim+imazamox+MSO+UAN	PP/POST	1.5/0.2+0.04+0.031+1%+2pt	98	99	99	204	22.5	52.7
Ethalfuralin/bentazon+sethoxydim+imazamox+MSO+UAN	PP/POST	0.75/1+0.2+0.016+1%+2pt	90	99	99	195	45.8	63.7
Sulfentrazone/bentazon+sethoxydim+imazamox+MSO+UAN	PP/POST	0.14/1+0.2+0.016+1%+2pt	92	99	99	194	40.3	63.9
Pendimethalin/bentazon+sethoxydim+imazamox+MSO+UAN	PP/POST	1.5/1.0+0.2+0.016+1%+2pt	96	99	99	196	47.3	64.3
Linuron	PRE	0.5	40	79	88	193	43.0	64.0
Linuron	PRE	1	53	82	95	193	44.9	63.6
Diuron	PRE	1.88	57	48	83	193	46.7	64.1
KIH 485	PRE	0.15	57	68	82	193	49.8	64.3
Bentazon+sethoxydim+MSO+UAN	POST	1+0.2+1%+2pt	81	91	84	193	48.5	64.6
Bentazon+sethoxydim+MSO+UAN/bentazon+sethoxydim+MSO+UAN	EPOST/POST	0.5+0.1+1%+2pt/0.5+0.1+1%+2pt	76	96	97	194	49.8	64.0
Bentazon+sethoxydim+imazamox+MSO+UAN	POST	1+0.2+0.016+1%+2pt	74	93	99	193	42.2	64.1
Bentazon+sethoxydim+imazamox+MSO+UAN	POST	0.5+0.1+0.016+1%+2pt	78	98	99	196	36.6	64.2
C.V. (%)			8	13	8	1	9	6
LSD (0.05)			10	19	12	2	6.8	NS

¹MSO=Destiny, a methylated seed oil from Agrilience, St. Paul, MN; Pendimethalin=ProwlH₂O, BASF; UAN=urea ammonium nitrate. The trial was treated on April 21 with a PRE burn-down application of glyphosate at 0.57 lb ae/A plus ammonium sulfate at 0.5% v/v.

²Fall=November 3, 2005; PP=April 21, 2006; PRE=April 27; EPOST=May 23; POST=June 5.

³Foxtail spp.=yellow and green; Pigweed spp.=redroot and prostrate.

⁴Plant maturity from planting date (Julian d 117).