

Weed management in glufosinate-resistant canola at Fosston, MN in 1998. Lueschen, William E., Ervin A. Oelke, Erik J. Levorson, David G. LeGare, and Karen B. Andol. The objective of this study was to evaluate herbicides for weed management in glufosinate-resistant canola. This study was located on the Ellsworth Danielson farm near Fosston, MN on a Chapette fine sandy loam with 3.4% organic matter, pH 7.6, and soil test P and K levels of 43 and 150 ppm, respectively. A randomized complete block design with four replications and a plot size of 12 by 25 ft was used. Only the center 6 ft of each plot was used for data collection and yields were obtained from a 6 by 19 ft area of each plot. Wheat was the previous crop and the site was chisel plowed in the fall after wheat harvest. Prior to planting, the site was fertilized with 90 lb/A N and 15 lb/A S and the site was field cultivated just prior to applying the preplant (PPI) herbicides, which were incorporated twice with a field cultivator set to till 3 to 4 inches deep. On May 5 glufosinate-resistant canola, HCN 35, that had been treated with imidacloprid and benomyl was planted at a seeding rate of 12 viable seeds/ft² in rows spaced 6 inches apart. After planting the canola a single row of barley, wheat and oat was planted outside the harvest area and perpendicular to the plot length. This was done to evaluate control of volunteer small grains. All treatments were applied with a tractor-mounted sprayer equipped with 8002 flat-fan nozzles spaced 15 inches apart on the boom. The sprayer was calibrated to deliver 20 gpa at 30 psi at the boom. Application dates, environmental conditions, plant sizes and rainfall data are listed below:

Date	May 4	June 1	June 11
Application	PPI	POST I	POST II
Temperature (F)			
air	53	62	75
soil (4 in)	56	62	75
Soil moisture	dry	moist	moist
Sky	cloudy	p. cloudy	p. cloudy
Wind (mph:direction)	4:NW	5:NE	5:NW
Relative humidity(%)	42	66	62
Canola			
leaf no.	---	3-4	5
height (in)	---	3-4	6-7
Green foxtail			
leaf no.	---	2-3	3-5
height (in)	---	2-3	4-6
infestation (plants/ft ²)	---	---	56
Wild oat			
leaf no.	---	3	6
height (in)	---	4	9-11
infestation (plants/ft ²)	---	---	1
Redroot pigweed			
leaf no.	---	2-4	3-5
height (in)	---	1	2-3
infestation (plants/ft ²)	---	---	22

Common lambsquarters			
leaf no.	---	2	6-7
height (in)	---	1	2-4
infestation (plants/ft ²)	---	---	2
Pennsylvania smartweed			
leaf no.	---	1-2	4-5
height (in)	---	2	2-3
infestation (plants/ft ²)	---	---	0.5
Eastern black nightshade			
leaf no.	---	1-2	2-3
height (in)	---	1-2	2-3
infestation (plants/ft ²)	---	---	0.5
Rainfall after application (in)			
1st week	1.13	0.21	2.14
2nd week	3.49	0.56	2.16
3rd week	0.00	3.77	1.10

Neither canola injury nor stand reduction was observed with any of the treatments in this trial. Trifluralin alone at 0.75 lb/A gave 88% green foxtail control on July 22 but only 49% control of wild oat. Pennsylvania smartweed and wild buckwheat control were poor with this treatment on June 29 but control of Pennsylvania smartweed improved to 95% on July 22. This response was probably due to the sparse population of this species and the competitiveness of the canola. A sequential application of 0.75 lb/A of trifluralin PPI followed by 0.27 lb/A glufosinate + ammonium sulfate (AMS) POST I resulted in nearly complete control of all species. Addition of AMS to all rates of POST I glufosinate, resulted in improved control of nearly all weed species compared to the same rates of glufosinate applied alone, but it did not enhance control of the POST II glufosinate treatments. This difference in response was probably due to the lower temperatures (62F) at the time of application of the POST I treatments compared to the higher temperatures (75F) at the time of application of the POST II treatments. A sequential application of glufosinate at 0.27 lb/A + AMS POST I followed by the same treatment POST II resulted in nearly complete control of all weed species. There was little difference in weed control among the three rates of application of glufosinate applied either POST I or POST II. Barley, wheat and oat control were poor with all POST I glufosinate treatments. Control of these species ranged from 63% to 88% with POST II glufosinate. Canola yields were generally not affected by herbicide treatments. There were five treatments that yielded less than the hand-weeded treatment but these differences were not well correlated to difference in weed control. [MN Agric. Exp. Stn., Paper No. 98-1-13-0098, Misc. Journ. Series, University of Minnesota, St. Paul, MN]

Table. Weed management in glufosinate-resistant canola at Fosston, MN in 1998 (Lueschen, Oelke, Levorson, LeGare, and Andol).

Herbicide treatment ^a	Rate -(lb/A or %)-	Grft		Wioa		Rrpw		Colq		Pesw		Blns		Bar ^b		Whe		Oat ^b	Yield (lb/A)	
		6/29	7/22	6/29	7/22	6/29	7/22	6/29	7/22	6/29	7/22	6/29	7/22	6/29	7/22	6/29	7/22			6/29
PPI																				
Trifluralin	0.75	90	88	34	49	75	88	73	85	60	95	44	66	34	34	34	34	24	37	1965
PPI/POST I																				
Trifluralin/endothall	0.75/0.56	93	96	70	95	73	86	65	88	73	95	43	85	54	54	54	54	23	39	2162
Trifluralin/glufosinate+AMS	0.75/0.27+3	93	95	86	82	86	94	76	93	92	97	92	97	33	33	33	33	22	39	1957
PPI/POST II																				
Trifluralin/glufosinate+AMS	0.75/0.27+3	95	96	97	97	94	97	95	97	90	97	88	95	97	97	97	97	22	39	2169
POST I																				
Glufosinate	0.27	78	64	20	61	69	74	69	76	60	77	51	87	29	29	29	29	21	40	1808
Glufosinate+AMS	0.27+3	76	84	43	85	71	87	70	77	77	97	73	93	46	46	46	46	22	38	1726
Glufosinate	0.36	75	86	19	38	70	79	61	79	65	84	69	73	23	23	23	23	22	39	1630
Glufosinate+AMS	0.36+3	93	88	76	95	89	95	87	90	81	96	86	93	54	54	54	54	22	39	2064
Glufosinate	0.45	76	80	41	65	54	78	50	78	65	84	64	71	30	30	30	30	23	39	1908
Glufosinate+AMS	0.45+3	88	88	76	90	63	78	51	77	91	96	76	96	66	66	66	66	22	39	1790
Sethoxydim+clopyralid+COC	0.2+0.125+1.25%	95	98	89	96	43	64	49	71	61	90	73	96	71	71	71	71	22	38	2121
POST I/POST II																				
Glufosinate+AMS/glufosinate+AM	0.27+3/0.27+3	91	97	86	98	91	98	95	98	96	98	96	98	89	89	89	89	23	38	2050
POST II																				
Glufosinate	0.27	76	84	71	90	92	93	93	95	96	97	95	94	63	63	63	63	21	41	1938
Glufosinate+AMS	0.27+3	81	81	80	87	90	94	93	97	95	97	95	97	78	78	78	78	22	39	1961
Glufosinate	0.36	74	84	82	94	88	93	93	95	96	96	92	96	75	75	75	75	21	39	1910
Glufosinate+AMS	0.36+3	80	85	89	88	91	93	91	96	96	96	92	95	88	88	88	88	21	40	1999
Glufosinate	0.45	81	77	94	97	92	94	92	97	94	97	90	97	86	86	86	86	21	40	1584
Glufosinate+AMS	0.45+3	88	90	76	88	96	95	96	97	96	97	93	97	78	78	78	78	21	40	2140
Hand Weeded		95	97	90	99	97	98	97	98	97	98	93	97	54	54	54	54	23	39	2240
Weedy		5	83	5	68	5	86	5	80	5	79	5	79	5	5	5	5	22	38	1832
LSD (0.10)		10	14	22	19	21	13	23	18	23	13	24	12	20	20	20	20	1	1	327

^a Clopyralid=Stinger 3SL; endothall=Herbicide273 3SC; glufosinate=Liberty 1.67EC; sethoxydim=Poast 1.53 EC; trifluralin=Treflan 4EC;

AMS=spray grade ammonium sulfate.

^b Bar=barley, Whe=wheat and Oat=cultivated oat.

^c Prot=protein content of canola seed.