

Weed management in imidazolinone-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 weed management in imidazolinone-resistant canola. This study was located on the Roger Rinkenberger farm near Fosston, MN on an Onstad loam soil with 3.4% organic matter, pH 8.0 and soil test P and K levels of 30 and 118 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 twice in the fall after wheat harvest. Prior to spring planting, the site was fertilized with 75 lb/A N, 50 lb/A K<sub>2</sub>O, and 9 lb/A S. The site was leveled with a field cultivator 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 imidazolinone-resistant canola, Pioneer Brand '45A71' that had been treated with imidacloprid and benomyl, was planted at a seeding rate of 12 viable seeds/ft<sup>2</sup> in rows spaced 6 inches apart. After planting the canola, a single row of oat, barley and wheat was planted outside of the harvest area across one end of the plot and perpendicular to the canola rows to evaluate control of these species. 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 boom pressure. Application dates, environmental conditions, plant sizes and rainfall data are listed below:

Date	May 5	June 2	June 11
Application	PPI	POST I	POST II
Temperature (F)			
air	63	44	74
soil (4 in)	55	44	71
Soil moisture	dry	moist	moist
Sky	p. cloudy	clear	cloudy
Wind (mph:direction)	17:W-NW	5:SW	5:N-NW
Relative humidity(%)	29	58	61
Canola			
leaf no.	---	3-4	6-8
height (in)	---	3-4	5-7
Redroot pigweed			
leaf no.	---	2-4	6-8
height (in)	---	1-1.5	2-3
infestation (plants/ft <sup>2</sup> )	---	---	22
Pennsylvania smartweed			
leaf no.	---	4-5	5-8
height (in)	---	2-3	3-5
infestation (plants/ft <sup>2</sup> )	---	---	2

Common lambsquarters			
leaf no.	---	2-3	15-19
height (in)	---	1-2	3-4
infestation (plants/ft <sup>2</sup> )	---	---	1
Wild mustard			
leaf no.	---	2-3	5-6
height (in)	---	2-3	5-6
infestation (plants/ft <sup>2</sup> )	---	---	1
Rainfall after application (in)			
1st week	1.25	0.31	6.35
2nd week	0.19	6.35	2.85
3rd week	0.00	2.85	1.88

Early season canola injury was observed only for the treatments that included DPXtM-6316 applied POST I which were chlorotic and slightly stunted when evaluated on June 9, 16 and 29. This trial was almost completely void of any weedy grass species. Broadleaf weeds did not begin to emerge until nearly a week after the canola emerged. Therefore, the competitiveness of canola resulted in nearly complete control of all broadleaf weed species, including the weedy checks when evaluated on July 22 when the canola was flowering. Trifluralin applied at 0.75 lb/A PPI gave excellent control of redroot pigweed and common lambsquarters but poor control of both Pennsylvania smartweed and wild mustard early in the season. When evaluated on July 22 control of these species was very good due to the light infestation and the competitiveness of the canola. Trifluralin gave poor control of all three small grain species. A sequential application of trifluralin PPI followed by endothall POST I improved control of Pennsylvania smartweed and wild mustard compared to trifluralin alone. Imazamox applied POST I at either 0.016 or 0.032 lb/A with crop oil concentrate (COC) and 28%N following trifluralin PPI gave excellent control of all weed species and the three small grains. DPX M-6316 + COC applied at 0.023 lb/A POST I following trifluralin PPI also gave excellent control of all broadleaf weeds but poor control of small grains. Quizalofop + DPX M-6316 + COC gave excellent control of all weed and small grain species. Imazamox applied at either 0.016, 0.032 or 0.04 lb/A at POST I with either COC or nonionic surfactant (SURF) gave excellent control of all species evaluated on July 22. Imazamox applied POST II at a rate of either 0.032 or 0.04 lb/A resulted in excellent broadleaf control but control of the small grains averaged 10 to 20 percentage points lower on July 22 than the same treatment applied POST I. COC and SURF with 28%N were equally effective adjuvants for imazamox applied either POST I or POST II. The only significant yield reductions in this study were observed where DPX M-6316 was applied either as a sequential treatment with trifluralin or as a tank mixture with quizalofop. In both cases, canola yields were approximately 250 lb/A less than the hand-weeded control. [MN Agric. Exp. Stn., Paper No. 98-1-13-0096, Misc. Journ. Series, University of Minnesota, St. Paul, MN]

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

Herbicide treatment <sup>a</sup>	Rate	Rrpw		Colq		Pesw		Wimu		Oat		Barley		Wheat		Yield (lb/A)
		6/16	7/22	6/16	7/22	6/16	7/22	6/16	7/22	6/16	7/22	6/16	7/22	6/16	7/22	
---(lb/A or %)--- (% Control)----- --(%)--																
<b>PPI</b>																
Trifluralin	0.75	91	98	91	98	63	98	53	86	44	61	44	61	44	61	23 41 1996
<b>PPI/POST-I</b>																
Trifluralin/endothall	0.75/0.56	93	95	96	98	96	98	85	95	63	76	63	76	63	76	24 40 1931
Trifluralin/imazamox	0.75/0.016+1.25%	93	98	96	98	86	98	96	94	90	94	90	94	90	94	23 40 1877
+COC+28%N	+1.25%															
Trifluralin/imazamox	0.75/0.032+1.25%	97	98	97	98	97	98	97	98	91	96	91	96	91	96	23 41 1865
+COC+28%N	+1.25%															
Trifluralin/M-6313+COC	0.75/0.023+1%	93	98	96	98	96	98	95	98	35	60	35	60	35	60	22 41 1669
<b>POST-I</b>																
Imazamox+COC+28%N	0.016+1.25%+1.25%	78	96	76	96	69	98	93	98	70	89	70	89	70	89	22 41 1953
Imazamox+SURF+28%N	0.016+0.25%+1.25%	89	97	89	98	85	98	85	98	77	92	77	92	77	92	22 41 2025
Imazamox+COC+28%N	0.032+1.25%+1.25%	89	98	94	98	91	98	95	98	79	94	79	94	79	94	23 41 1808
Imazamox+SURF+28%N	0.032+0.25%+1.25%	80	98	86	97	75	98	95	98	80	96	80	96	80	96	23 41 1969
Imazamox+COC+28%N	0.04+1.25%+1.25%	89	98	92	98	88	98	95	98	80	95	80	95	80	95	22 41 1867
Imazamox+SURF+28%N	0.04+0.25%+1.25%	83	98	85	98	85	98	94	98	81	97	81	97	81	97	22 41 1937
Imazamox+sethoxymim	0.016+0.2%+1.25%	86	97	86	97	74	98	91	98	80	95	80	95	80	95	22 41 2007
+COC+28%N	+1.25%															
Imazamox+sethoxymim	0.032+0.2%+1.25%	83	97	89	98	86	98	95	98	84	97	84	97	84	97	22 42 1944
+COC+28%N	+1.25%															
Clopyralid+sethoxymim	0.125+0.2%+1.25%	55	96	75	98	73	98	23	98	84	96	84	96	84	96	23 41 1978
+COC+28%N	+1.25%															
Quizalofop+M-6316+COC	0.055+0.023+1%	84	98	93	98	89	98	93	98	83	97	83	97	83	97	23 39 1654
<b>POST-II</b>																
Imazamox+COC+28%N	0.032+1.25%+1.25%	78	93	76	97	76	95	81	98	43	79	43	79	43	79	22 41 1949
Imazamox+SURF+28%N	0.032+0.25%+1.25%	69	96	83	96	73	96	74	98	49	78	49	78	49	78	22 42 1962
Imazamox+COC+28%N	0.04+1.25%+1.25%	66	94	69	96	59	98	84	98	38	73	38	73	38	73	23 41 2029
Imazamox+SURF+28%N	0.04+0.25%+1.25%	70	95	74	94	30	97	55	91	50	72	50	72	50	72	22 42 1939
<b>Checks</b>																
Hand-weeded		100	100	100	100	100	100	100	100	100	100	100	100	100	100	22 41 1918
Trifluralin/imazamox	0.75/0.032+0.25%															
+SURF+28%N	+1.25%															
Weedy	---	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23 40 1948
LSD (0.10)	---	13	5	17	4	22	3	23	9	20	12	20	12	20	12	1 209

<sup>a</sup> Clopyralid=Stinger 3L; endothall=Herbicide 273 3 SC; imazamox=Motive 1 SC; quizalofop=Assure II 0.88 EC; trifluralin=Treflan 3EC; M6316=DPX-M6316 75DF; COC=Crop oil concentrate, Cennex Land O'Lakes 17% Class Additive; SURF=Nonionic surfactant, Cennex Land O'Lakes Preference and 28%N=Aqueous solution of urea and ammonium nitrate.  
<sup>b</sup> Protein  
<sup>c</sup> Oil