A comparison of liquid and granular herbicide formulation applied in the fall and spring for weed management in canola at Roseau, 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 the effects of time and rate of application and herbicide formulation on weed management and crop injury in canola. This study was located on the Steve Dahl farm near Roseau, MN on a Borup very fine sandy loam soil with 2.4% organic matter, pH 7.8 and soil test P and K levels of 10 and 116 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. Prior to applying the fall treatments, the site was fertilized with 110 lb/A N, 30 lb/A P_2O_5, 30 lb/A K_20 and 20 lb/A S. Wheat was the previous crop and the site was plowed and disked once in the fall after wheat harvest and field cultivated once just prior to applying the fall preplant (PPI) herbicides. The fall treatments were incorporated once with a field cultivator set to till 3 to 4 inches deep and the other treatment areas were not tilled. The spring treatments were applied and incorporated once with a field cultivator set to till 3 to 4 inches deep. The entire site was then tilled once with a field cultivator just prior to planting. On May 21 'Hyola 401' canola seed that had been treated with imidacloprid and benomyl was planted at a seeding rate of 12 viable seeds/ft^2 in rows spaced 6 inches apart. All liquid formulations were applied with a tractor-mounted sprayer equipped with 8002 flat-fan nozzles spaced 15 inches apart. The sprayer was calibrated to deliver 20 gpa at 30 psi at the boom. A tractor-mounted granular pneumatic applicator with four distribution tubes spaced 30 inches apart was used to apply all granular formulations. The granular applicator was calibrated to deliver the appropriate amount of granules for each herbicide and rate. Application dates, environmental conditions, plant sizes and rainfall data are listed below:

Date	October 23	April 30	June 11
Application	PPI	PPI	POST I
Temperature (F)			
air	32	75	64
soil (4 in)	34	65	64
Soil moisture	moist	dry	moist
Sky	cloudy	clear	cloudy
Wind (mph:direction)	10-15:E	8-10:S	5:S-SW
Relative humidity(%)	80	28	80
Canola			
leaf no.	---	---	1
height (in)	---	---	0.5-0.75
Green foxtail			
leaf no.	---	---	3-4
height (in)	---	---	1-2
infestation (plants/ft^2)	---	---	3

Redroot pigweed			
leaf no.	---	---	5-6
height (in)	---	---	2-3
infestation (plants/ft^2)	---	---	2
Canada thistle			
leaf no.	---	---	6-7
height (in)	---	---	5-6
infestation (plants/ft^2)	---	---	1
Rainfall after application (in)			
1st week	0.03	0.11	0.56
2nd week	0.00	0.82	1.71
3rd week	0.00	2.38	1.38

Canola stand reduction averaged 25% for the weedy and hand-weeded checks due to heavy rainfall after planting that caused crusting of the soil. There was little difference observed among the herbicide treatments for either canola injury or stand reduction. Green foxtail and redroot pigweed were the only two weed species that were present in sufficient quantity to evaluate. All herbicide treatments gave 95% control of redroot pigweed regardless of rate or time of application or herbicide formulation. Green foxtail control was sufficient, with this very light population, to prevent any canola yield loss from any herbicide treatment. The fall and spring applied granular ethalfluralin and trifluralin gave slightly less control of green foxtail than the same rate of the liquid formulations. There was little difference in green foxtail control between fall and spring application. [MN Agric. Exp. Stn., Paper No. 98-1-13-0097, Misc. Journ. Series, University of Minnesota, St. Paul, MN]

Table. A comparison of liquid and granular herbicide formulation applied in the fall and spring for weed management in canola at Roseau, MN (Lueschen, Oelke, Levorson, LeGare and Andol).

Herbicide treatment[a]	Rate	Form	Application	Injury			Stand Reduction			Grft			Rrpw	
				6/10	6/17	6/30	6/10	6/17	6/30	6/10	6/17	6/30	6/30	Yield
	(lb/A)			(%)						(% Control)				(lb/A)
Pendimethalin	1.23	3.3 EC	Fall	12	9	8	28	27	25	90	91	94	95	2277
	1.48	3.3 EC	Fall	11	6	5	23	21	16	83	87	84	94	2228
Pendimethalin	1.23	3.3 EC	Spring	9	8	6	25	25	20	92	88	88	95	2147
	1.48	3.3 EC	Spring	12	16	8	25	30	21	95	95	91	95	2226
Ethalfluralin	0.95	3 EC	Fall	10	10	5	23	23	21	85	81	82	95	2205
	1.125	3 EC	Fall	16	16	9	30	26	23	95	90	85	95	2212
Ethalfluralin	0.95	3 EC	Spring	14	18	15	27	30	27	95	94	93	95	2034
	1.125	3 EC	Spring	14	13	8	25	27	18	94	87	87	95	2192
Ethalfluralin	0.95	10 G	Fall	12	8	7	26	25	24	86	81	81	95	2108
	1.125	10 G	Fall	10	9	7	28	24	20	76	71	70	95	2056
Ethalfluralin	0.95	10 G	Spring	12	9	5	28	28	18	83	82	84	95	2355
	1.125	10 G	Spring	14	18	11	31	31	28	83	93	87	95	2030
Trifluralin	0.75	4 EC	Fall	11	7	5	23	25	20	85	86	88	95	2230
	1	4 EC	Fall	9	12	7	25	28	26	90	94	88	95	2227
Trifluralin	0.75	4 EC	Spring	13	12	11	28	29	31	84	87	85	95	1923
	1	4 EC	Spring	13	9	7	31	29	24	81	84	80	95	2252
Trifluralin	0.75	10 G	Fall	11	6	4	24	23	21	76	78	73	95	2288
	1	10 G	Fall	13	6	5	26	22	18	85	84	82	95	2288
Trifluralin	0.75	10 G	Spring	14	11	8	25	29	23	79	75	81	95	2200
	1	10 G	Spring	18	15	7	30	31	24	90	89	91	95	2130
Checks														
Hand-weeded				11	8	6	24	26	21	100	100	100	100	2278
Trifluralin	0.75	4 EC	Spring											
Endothall	0.375	3 SC	POST I											
Weedy Check	---			11	9	7	25	25	23	0	0	0	0	1883
LSD (0.10)				4	6	4	5	6	6	15	14	14	13	328

[a]Treatments: endothall=Herbicide 273, ethalfluralin=Sonalan, pendimethalin=Prowl, and trifluralin=Treflan.