Canola injury with preplant incorporated herbicides at Roseau and St. Paul, 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 canola injury potential with four preplant incorporated herbicides under near weed-free conditions. This study was conducted at two locations: near Roseau, MN on the Steve Dahl farm and at the University of Minnesota St. Paul Campus, St. Paul, MN. A randomized complete block design with a split plot treatment arrangement, four replications and a plot size of 6 by 25 ft was used. Main plots were seven herbicide treatments and subplots were three canola varieties, 'Hyola 401', 'Sponsor' and OAC 'Summit'. The PPI herbicide treatments were applied and incorporated twice immediately after application with a field cultivator set to till 3 to 4 inches deep. Sethoxydim + clopyralid + COC was applied at both locations to all plots when canola was 3 to 5 inches tall and all plots were hand-weeded to help maintain a near weed-free condition. Seed for both locations was prepackaged for a seeding rate of 12 viable seeds/ft^2 and the seed was treated with imidacloprid and benomyl for control of flea beatles and seedling fungus diseases, respectively. All herbicide treatments were applied with a tractor-mounted, compressed-air sprayer calibrated to deliver a spray volume of 20 gpa using 30 psi boom pressure. The spray boom was equipped with 8002 flat-fan nozzle tips spaced 15 inches apart. Pertinent information for the two locations follows:

	Roseau	**St. Paul**
Soil information		
type	Borup very fine sandy loam	Waukegan silt loam
sand (%)	45	19
silt (%)	31	61
clay (%)	24	20
CEC (meq/100g)	23.3	20.7
organic matter (%)	2.2	3.3
pH	7.9	6.7
P (ppm)	7	200+
K (ppm)	101	300+
Fertilization (lb/A)		
N	110	100
P_2O_5	30	0
K_2O	30	0
S	20	0
Previous crop	wheat	soybean
Fall tillage	moldboard plow	moldboard plow
Planting	5/1	4/22
PPI applications	4/30	4/22
Temperature (F)		
air	75	75
soil (4 in)	65	70
Sky	clear	clear

Relative humidity (%)	28	14
Wind (mph:direction)	9:SW	7:W
Rainfall after PPI applications (in)		
1st week	0.11	0.04
2nd week	0.82	0.48
3rd week	2.38	1.17

Very dry conditions were experienced at Roseau for four weeks prior to and for 10 days following planting. At St. Paul, dry conditions were experienced for two weeks prior to and 10 days after planting. Because of these dry conditions, canola emerged unevenly at both locations as evidenced by the injury assigned to the check treatment, postemergence clopyralid + sethoxydim. With only one exception, there were no significant interactions between herbicide treatments and canola varieties for canola injury or stand reduction. When averaged over herbicide treatments, OAC Summit consistently had higher injury and stand reduction and lower stand counts in late August than the other two varieties. Canola injury, primarily stunting and uneven growth, was slightly higher for both rates of trifluralin than for the check, but both trifluralin rates had similar injury and stand reduction at both locations. Ethalfluralin consistently caused higher injury and stand reduction ratings than either rate of trifluralin at both locations, although the difference was greatest at Roseau. Canola stand counts taken at harvest showed little differences among treatments at St. Paul. However, at Roseau the trifluralin treatments had stand counts that were 86 to 90% of the check treatment while the ethalfluralin treatments had stands that were only 56% of the check. Sulfentrazone at both rates of application resulted in canola stands that were only about 25% of the control. Canola maturity at Roseau was affected very little by herbicide treatment and maturity at St. Paul was not affected at all. Differences were observed among varieties for this trait with Hyola 401 maturing before OAC Summit and Sponsor which had similar maturity. White mold infection was affected by both herbicide treatment and variety. The lowest level of white mold infestation among the herbicide treatments occurred with sulfentrazone, which was probably due to the reduced canola stands observed with this herbicide. Protein and oil content of canola seed was influenced very little by herbicide treatments; variety differences were observed for these traits. Canola seed yields were not affected by herbicide treatment at either location. This response is surprising because of the high level of stand loss associated with the sulfentrazone treatments and ethalfluralin at Roseau. Other research has indicated that canola has the ability to compensate for a wide range in plant densities before yields are affected. [MN Agric. Exp. Stn., Paper No. 98-1-13-0093, Misc. Journ. Series, University of Minnesota, St. Paul, MN].

Table 1. Canola injury with preplant incorporated herbicides at Roseau and St. Paul, MN in 1998 (Lueschen, Oelke, Levorson, LeGare and Andol).

Herbicide treatment[a]	Rate	Variety	% Injury						% Stand Reduction						Stand Counts	
			ROS[b] 5/20	STP[b] 5/7	ROS 6/10	STP 5/26	ROS 6/17	STP 6/4	ROS 5/20	STP 5/7	ROS 6/10	STP 5/26	ROS 6/17	STP 6/4	ROS	STP
	--(lb/A or %)--		(%)						(%)						(plts/10ft^2)	
PPI																
Ethalfluralin	0.95	Hyola 401	14	13	21	13	12	10	32	38	31	14	18	23	75	60
		OAC Summit	15	15	19	15	11	12	28	39	24	18	15	17	90	72
		Sponsor	21	26	25	23	20	17	60	55	41	30	30	23	48	41
Pendimethalin	1.24	Hyola 401	13	14	14	16	12	16	24	41	18	19	20	26	78	62
		OAC Summit	11	13	14	12	9	11	24	38	17	19	14	15	114	63
		Sponsor	19	24	23	24	16	20	45	55	34	31	23	24	59	40
Sulfentrazone	0.25	Hyola 401	20	11	29	12	28	8	65	36	58	16	51	21	40	59
		OAC Summit	25	13	28	16	25	8	74	41	60	20	54	14	26	69
		Sponsor	34	23	30	25	31	17	84	56	65	34	60	22	26	50
Sulfentrazone	0.375	Hyola 401	29	13	29	21	31	12	83	45	70	26	65	30	39	67
		OAC Summit	33	16	33	16	35	12	88	50	76	23	70	16	24	59
		Sponsor	33	23	34	26	34	18	88	63	73	35	64	22	33	42
Trifluralin	0.75	Hyola 401	8	11	8	11	7	8	10	35	7	13	8	18	118	75
		OAC Summit	7	14	7	8	4	5	7	36	4	10	4	7	143	71
		Sponsor	17	21	18	18	11	14	35	53	21	26	14	18	79	48
Trifluralin	1	Hyola 401	9	11	9	7	6	4	12	35	6	10	11	19	124	61
		OAC Summit	8	13	9	9	6	6	11	38	6	11	4	11	143	90
		Sponsor	20	24	17	15	11	15	40	53	23	26	13	19	63	49
Clopyralid+sethoxydim	0.125+0.2	Hyola 401	3	8	8	6	8	6	5	24	5	8	7	18	122	65
+COC	1.25%	OAC Summit	8	11	7	11	8	5	13	36	5	14	4	11	159	64
		Sponsor	13	21	15	15	13	12	35	50	17	25	9	15	97	46
Herbicide Means																
Ethalfluralin	0.95		17	18	22	17	14	13	40	44	32	21	21	21	71	58
Pendimethalin	1.24		14	17	17	17	12	15	31	45	23	23	19	22	83	54
Sulfentrazone	0.25		26	15	29	18	28	11	74	45	61	23	55	19	30	59
Sulfentrazone	0.375		31	17	32	21	33	14	86	53	73	28	66	23	32	56
Trifluralin	0.75		11	15	11	12	7	9	17	41	11	16	8	14	113	65
Trifluralin	1		12	16	12	10	8	8	21	42	12	16	9	16	109	66
Clopyralid+sethoxydim	0.125+0.2+1.25%		8	13	10	11	10	8	18	37	9	15	7	14	126	58
LSD (0.10)			3	3	4	3	3	3	7	4	7	4	6	3	19	7
Variety Means																
Hyola 401			14	11	17	12	15	9	33	36	28	15	26	22	85	64
OAC Summit			15	13	17	12	14	8	35	40	28	16	24	13	100	70
Sponsor			22	23	23	21	19	16	55	55	39	30	30	20	58	45
LSD (0.10)			2	2	2	2	2	2	5	3	4	3	4	2	7	5
Herbicide x Variety (P>F)			0.19	0.92	0.85	0.39	0.85	0.74	0.19	0.56	0.71	0.86	0.77	0.82	0.01	0.17

[a] All treatments were applied and incorporated twice except sethoxydim+clopyralid+COC which was applied postemergence.

[b] ROS=Roseau, STP=St. Paul

Table 2. Canola injury with preplant incorporated herbicides at Roseau and St. Paul, MN in 1998 (Lueschen, Oelke, Levorson, LeGare and Andol).

Herbicide treatment[a]	Rate	Variety	Maturity		Wh Mold	Protein		Oil		Lodging		Yield	
			STP[b]	ROS[b]	ROS	ROS	STP	ROS	STP	ROS	STP	ROS	STP
	--(lb/A or %)--		--(DAP[c])--		----------(%)----------					--(1-9[d])--		--(lb/A)--	
PPI													
Ethalfluralin	0.95	Hyola 401	89	99	8	25	27	37	37	4	4	2060	2567
		OAC Summit	91	104	8	26	28	37	37	7	6	2017	2115
		Sponsor	93	104	4	27	29	37	35	3	5	2341	1301
Pendimethalin	1.24	Hyola 401	90	100	9	26	28	36	36	5	4	1824	2430
		OAC Summit	91	104	8	27	28	36	36	6	6	1458	2277
		Sponsor	93	103	4	27	29	37	35	3	5	2323	1534
Sulfentrazone	0.25	Hyola 401	89	101	6	25	27	36	36	3	5	1939	2390
		OAC Summit	91	105	3	26	28	37	36	4	6	1841	2277
		Sponsor	93	106	3	28	29	35	36	3	6	2052	1455
Sulfentrazone	0.375	Hyola 401	90	104	4	27	28	34	36	5	5	1918	2497
		OAC Summit	91	106	4	26	28	37	36	5	6	1661	2139
		Sponsor	93	105	4	27	29	36	34	2	6	1924	1520
Trifluralin	0.75	Hyola 401	89	97	11	24	28	36	36	3	5	1999	2430
		OAC Summit	91	101	8	25	28	39	36	5	7	1768	2284
		Sponsor	93	103	5	27	29	37	35	3	6	2105	1498
Trifluralin	1	Hyola 401	90	99	7	25	28	36	35	4	4	1945	2582
		OAC Summit	91	103	7	26	29	37	36	6	6	1865	2228
		Sponsor	93	104	4	28	30	37	35	3	5	2415	1418
Clopyralid+sethoxydim+COC	0.125+0.2+1.25%	Hyola 401	90	96	8	23	28	36	36	3	5	1921	2552
		OAC Summit	91	101	8	24	28	40	36	5	6	1850	2178
		Sponsor	93	101	4	24	29	39	35	2	6	2044	1574
Herbicide Means													
Ethalfluralin	0.95		91	102	7	26	28	37	36	5	5	2140	1994
Pendimethalin	1.24		91	102	7	26	28	36	36	4	5	1868	2080
Sulfentrazone	0.25		91	104	4	26	28	36	36	3	6	1944	2041
Sulfentrazone	0.375		91	105	4	27	28	35	35	4	6	1835	2052
Trifluralin	0.75		91	100	8	25	28	37	36	4	6	1957	2071
Trifluralin	1		91	102	6	26	29	36	35	4	5	2075	2076
Clopyralid+sethoxydim+COC	0.125+0.2+1.25%		91	100	7	24	28	38	35	3	5	1938	2102
LSD (0.10)			1	1	2	1	1	1	0	1	1	190	180
Variety Means													
Hyola 401			89	99	7	25	27	36	36	4	5	1944	2493
OAC Summit			91	103	6	26	28	37	36	6	6	1780	2214
Sponsor			93	104	4	27	29	37	35	3	5	2172	1472
LSD (0.10)			1	1	1	1	1	1	1	1	1	96	110
Herbicide x Variety (P>F)			1.00	0.08	0.17	0.03	0.66	0.01	0.77	0.43	0.84	0.13	0.89

[a] All treatments were applied and incorporated twice except sethoxydim+clopyralid+COC which was applied postemergence.
[b] ROS=Roseau, STP=St. Paul
[c] DAP=days after planting when 90% of the pods were brown.
[d] 1-9=Range of lodging with 1 = plants are erect, 9 = plants are laying flat.