

2011 Canola Production Centre



TABLE OF CONTENTS

MINNESOTA CANOLA PRODUCTION CENTRE RESULTS

SITE INFORMATION Page 2

SMALL PLOT VARIETY & SYSTEMS TRIAL..... Page 4

NITROGEN, BORON, & SULFUR FERTILITY TRIAL..... Page 6

DATE OF PLANTING TRIAL Page 9

HARVESTING METHODS STRIP TRIAL..... Page 11

ACKNOWLEDGEMENTS

Minnesota Canola Production Centre

The Minnesota Canola Production Centre is a public-private partnership between the Minnesota Canola Council and the University of Minnesota.

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SITE INFORMATION

Location: *Roseau, MN*

Cooperator: Northern Resources Cooperative

Previous Crop: Canola or Fallow (dependent on plot area)

Soil Test Results:

Macronutrient Level:	(0-6", 6-24")
Nitrogen -	20 lb/ac
Phosphorous -	5 ppm
Potassium -	124 ppm
Sulfur -	32 lb/ac
Target Yield:	2000 lb/ac
Fertilizer Applied:	N – 95 lb/ac P – 50 lb/ac K – 40 lb/ac S – 32 lb/ac
Organic Matter:	3.7%
Soil pH:	8.3
Salinity	0.48 mmho (0-6") (low)

Tillage Operations: The field was chisel plowed in the fall of 2010 and worked with an S-tine cultipacker in spring 2011.

Seeding Method: The strip trial was seeded with a John Deere 9350 double disc press drill. All others seeded with a small-plot planter.

Herbicides Applied:

- A) Clearfield hybrids – Beyond @ 4 fl oz/ac, AMS @ 15 lbs/100 gal, MSO @ 2 gal/100 gal, Assure II @ 5 fl oz/ac
- B) Liberty Link hybrids – Ignite @ 22 fl oz/ac, AMS @ 1.5 lbs/ac, Assure II @ 5 fl oz/ac
- C) Roundup Ready hybrids – Roundup PowerMax @ 16 fl oz/ac, AMS @ 17 lbs/100 gal

Comments: When compared to 2010, the 2011 growing season got off to a late start. While warmer-than-average spring temperatures in 2010 allowed most growers in the area to begin planting canola in late April and finish planting canola by the 10th of May, most canola was planted from early May through mid May in 2011. The 2011 CPC was planted on May 18 and 19. Seedbed conditions were near ideal at planting, and timely rainfalls 4 days and 11 days after planting resulted in excellent stand establishment. Moisture stress was observed in some plot areas shortly after

herbicides were sprayed on June 16, as rainfall events on June 18, June 21-22, and June 26-27 deposited 0.66, 1.29, and 0.81 inches of rainfall, respectively. This stress resulted in purpling and stunting in some areas of the date of planting study. However, rainfall conditions were near ideal throughout the rest of the growing season, as rainfall varied from 75% of normal to 105% of normal from July 1 through August 15. Temperatures throughout most of the growing season were near ideal for canola growth, with the average temperature from May through August being 0.6°F warmer than the 30-year average. However, high temperatures ranging from 85°F to 93°F from July 15 through July 20 may have led to high-temperature stress during the flowering period.

SMALL PLOT VARIETY & SYSTEMS TRIAL

- Objective:** To establish agronomic criteria for choosing among existing and forthcoming variety options.
- Background:** The availability of many canola varieties has given producers many options for variety selection. Yield, lodging resistance, maturity, and crop quality are important variety traits for growers to consider when making variety selections. Companies were invited to submit their current and pending varieties for entry in the trials to compare against similar varieties in a small plot setting.
- Methodology:** All varieties were seeded at 5 lb/ac. The trial was laid out as a modified RCB design with four replicates. Roundup Ready, Liberty Link, and Clearfield varieties were grouped separately to reduce crop damage due to herbicide drift. Swathing commenced on 8/19/2011, and harvest was completed on 8/27/11. Plot size was 20 x 5 ft. To protect against white mold development, Proline @ 5.7 fl oz/ac + Preference @ 0.5 pt/100 gal was sprayed on July 6.
- Results:** The trial was seeded on May 19 into warm soils with adequate seedbed moisture. Emergence was uniform, and timely rainfall was received not long after planting.
- A total of 40 hybrids from 7 different companies were tested. There were 30 Roundup Ready hybrids, 6 Clearfield hybrids, and 4 Liberty Link hybrids.
- The top-yielding hybrids were Bayer CropScience InVigor 5440, Bayer CropScience InVigor 8440, Bayer CropScience InVigor L130, BrettYoung 6070RR, Croplan Genetics HyCLASS 947, Monsanto DKL70-07, Monsanto G08027, Monsanto G08039, Mycogen Seeds 2012CL, Mycogen Seeds 2014CL, Mycogen Seeds 1012RR, Mycogen Seeds G152936H, and Pioneer 46H75. According to the statistical analysis, these 13 hybrids do not significantly differ in yield.

Table 1: Relative seed yield (% of the mean), relative oil content (% of the mean), test weight, harvest moisture, and growth characteristics of canola (*Brassica napus*) varieties grown in small plots at Roseau in 2011.

Brand	Hybrid	HR ¹	Mat. ²	BLR ³	Test Wt. (lb/bu)	Moisture (%)	ESV ⁴	% Flower on July 7	Height (in.)	Lodging ⁵	Relative Yield ⁶	Relative Oil ⁶
Bayer CropScience	InVigor 5440	LL			49.7	5.9	6	30	49	5	117	97
Bayer CropScience	InVigor 8440	LL			47.8	6.2	6	30	47	3	114	97
Bayer CropScience	InVigor L130	LL			49.3	5.9	5	30	47	4	108	96
Bayer CropScience	InVigor L150	LL			49.6	5.9	5	25	48	3	98	100
BrettYoung	6040 RR	RR			48.1	6.2	5	25	46	4	100	98
BrettYoung	6070 RR	RR			49.1	6.0	4	30	45	4	107	99
BrettYoung	BY11-860	RR			48.2	6.3	5	23	48	4	103	98
Croplan Genetics	HyCLASS 947	RR			49.4	5.8	7	30	46	3	106	103
Croplan Genetics	HyCLASS 955	RR			49.3	5.7	5	30	44	3	96	101
Monsanto	DKL30-42	RR			49.8	5.8	5	30	42	3	91	98
Monsanto	DKL51-45	RR			49.3	5.8	5	30	42	3	92	102
Monsanto	DKL52-41	RR			48.7	5.9	4	33	44	3	85	99
Monsanto	DKL55-55	RR			49.3	6.0	4	33	45	3	92	103
Monsanto	DKL70-07	RR			49.6	5.8	6	30	44	3	105	102
Monsanto	DKL72-40	RR			49.5	6.1	6	30	45	2	100	102
Monsanto	DKL72-55	RR			49.6	6.0	4	33	44	4	103	100
Monsanto	G08027	RR			49.7	6.3	5	23	47	4	105	98
Monsanto	G08039	RR			49.2	5.8	6	28	44	3	108	102
Monsanto	G88605	RR			49.3	6.1	6	30	41	2	90	102
Monsanto	G89304	RR			49.1	5.9	5	30	42	3	98	101
Monsanto	G98689	RR			49.7	6.0	4	30	41	3	96	102
Monsanto	G98739	RR			49.1	5.9	5	30	42	3	96	102
Monsanto	G98767	RR			49.4	5.7	5	30	45	3	101	102
Monsanto	G99010	RR			49.5	5.5	5	30	43	2	89	103
Monsanto	G99396	RR			49.2	5.8	5	30	43	3	100	103
Monsanto	G99402	RR			49.3	6.1	5	33	48	3	95	104
Mycogen Seeds	2012 CL	CL			48.2	5.8	5	28	45	4	107	96
Mycogen Seeds	2014 CL	CL			48.8	5.2	3	23	45	5	117	100
Mycogen Seeds	CL166102H	CL			49.8	5.6	5	30	43	3	95	102
Mycogen Seeds	CL166103H	CL			49.2	5.7	7	30	44	4	90	98
Mycogen Seeds	1012 RR	RR			48.9	6.0	4	15	50	4	112	98
Mycogen Seeds	1014 RR	RR			49.3	6.4	6	15	45	2	103	97
Mycogen Seeds	G152936H	RR			48.9	6.3	5	30	47	5	111	99
Mycogen Seeds	G152951H	RR			49.3	6.2	6	15	52	3	96	96
NDSU	662c	RR			48.5	5.5	3	30	40	2	86	101
Pioneer	45H73	CL			48.1	5.9	4	33	45	3	98	97
Pioneer	46H75	CL			47.6	6.0	5	23	46	4	120	100
Pioneer	45H29	RR			49.1	6.2	5	30	49	3	89	99
Pioneer	45S52	RR			48.4	6.2	4	20	44	4	79	100
Pioneer	46S53	RR			48.2	5.5	6	20	49	4	100	103

¹ Herbicide resistance: CL = Clearfield, LL = Liberty Link, RR = Roundup Ready

² Maturity rating provided by seed companies: E = early, M = mid, L = late

³ Blackleg resistance: R=Resistant, MR = Moderately Resistant, MS = Moderately Susceptible

⁴ Early Season Vigor: 1 = poorest, 9 = best

⁵ Plant Lodging score: 1 = stem completely flat, 9 = erect stem

⁶ Percent of the mean

Mean 2031 bu/A 44.6 %
LSD 0.10 15 -
CV (%) 13.2 -

NITROGEN, SULFUR, AND BORON FERTILITY TRIAL

- Objective:** Evaluate yield response to urea applied at preplant, urea topdressed at 6-leaf, and ESN (environmentally smart nitrogen) urea applied at preplant, with and without applied sulfur. A secondary objective was to evaluate boron foliar fertilizer treatments.
- Background:** Canola requires high levels of N and usually shows increased yields with an N fertilizer application. The high N requirement of canola is one reason why canola acreage in Minnesota is being replaced with soybeans or sunflowers which require substantially lower N amounts. Several growers have had success with a urea product known as ESN, which is a polymer-coated urea that releases nitrogen based on temperature and moisture. This study was initiated to evaluate the yield responses to different N fertilizer systems.
- Methodology:** The variety Pioneer P45H28 was used and seeded at 5 lb/ac. The trial was laid out as a RCB design with four replicates. The entire plot area had a background N fertility of 20 lbs/ac. Nitrogen and sulfur fertility treatments included PPI urea applications of an additional 45, 90, 135, or 180 lbs N/acre (with and without 30 lbs/acre PPI sulfur), topdress urea applications of an additional 45, 90, 135, or 180 lbs N/acre (with and without 30 lbs/acre PPI sulfur), and PPI ESN applications of an additional 45, 90, 135, or 180 lbs N/acre (with and without 30 lbs/acre PPI sulfur). In addition, there were three foliar boron applications in this trial, with Max-IN Boron applied at rates of 0.5, 1.0, and 1.5 pt/acre. Swathing commenced when seed color change was 40% on the main stem, and harvest was completed when suitable conditions existed. Plot size was 20 x 5 ft. To protect against white mold development, Proline @ 5.7 fl oz/ac + Preference @ 0.5 pt/100 gal was sprayed on July 6.
- Results:** The trial was seeded on May 19 into warm soils with adequate seedbed moisture. Boron did not have a positive impact on yield. When using PPI ESN, yield could be maximized at a lower N rate than when using PPI urea (144 lbs N/acre versus 200 lbs N/acre). Sulfur did not appear to have a positive yield impact.

Figure 1: Yield response to PPI Urea, PPI Urea + 30 lbs/A PPI Sulfur, Topdress Urea, Topdress Urea + 30 lbs/A PPI Sulfur, PPI ESN, and PPI ESN + 30 lbs/A PPI Sulfur.

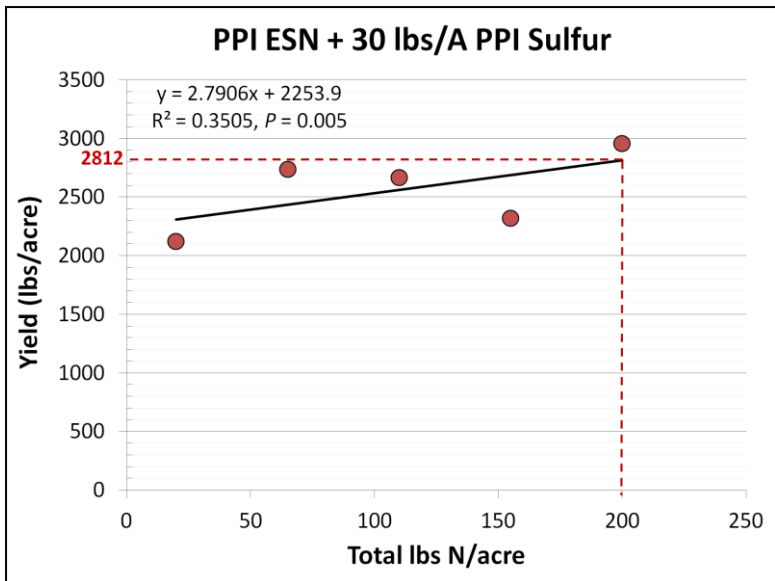
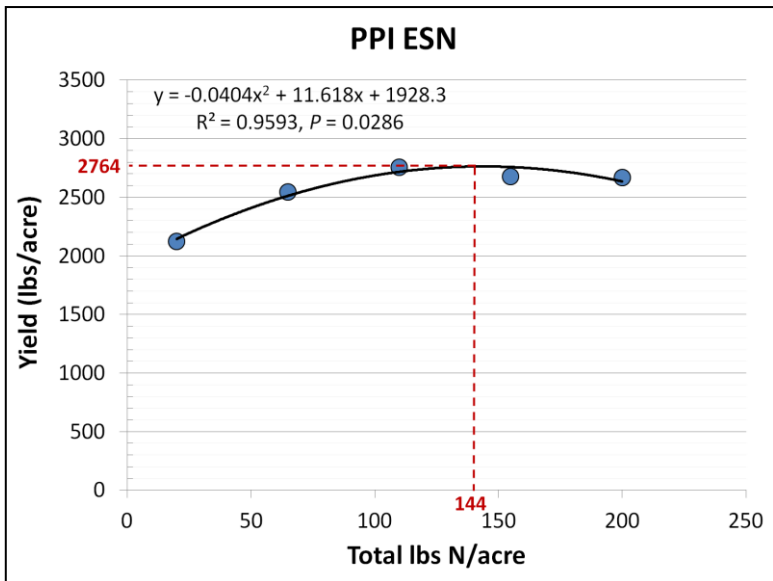
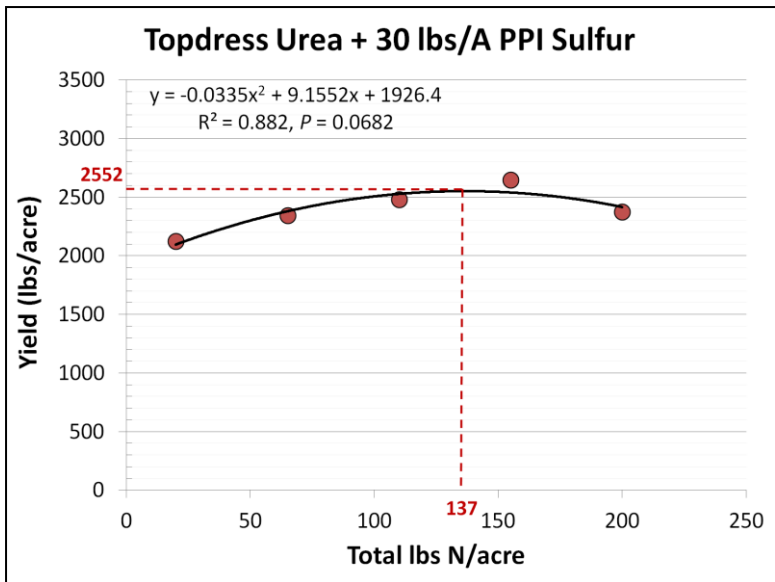
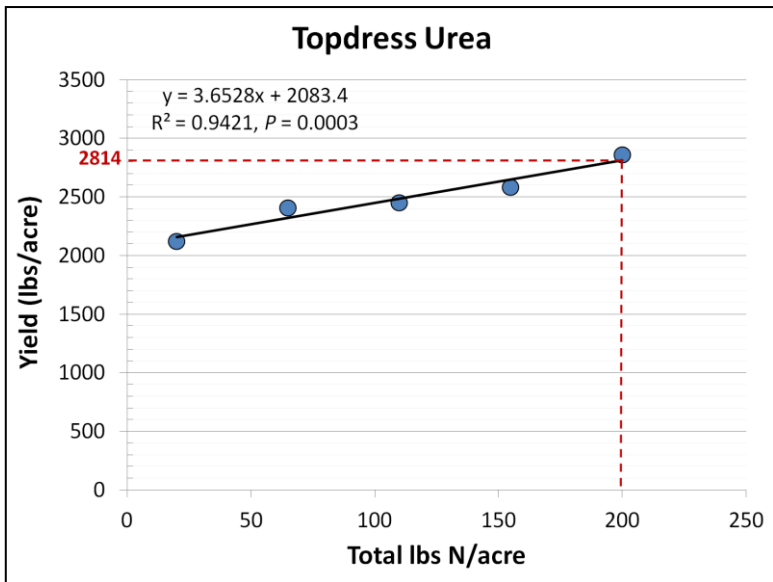
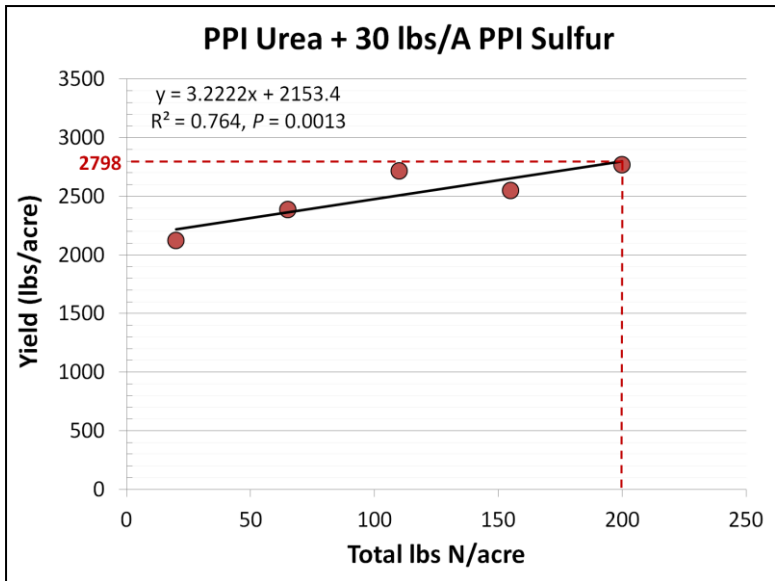
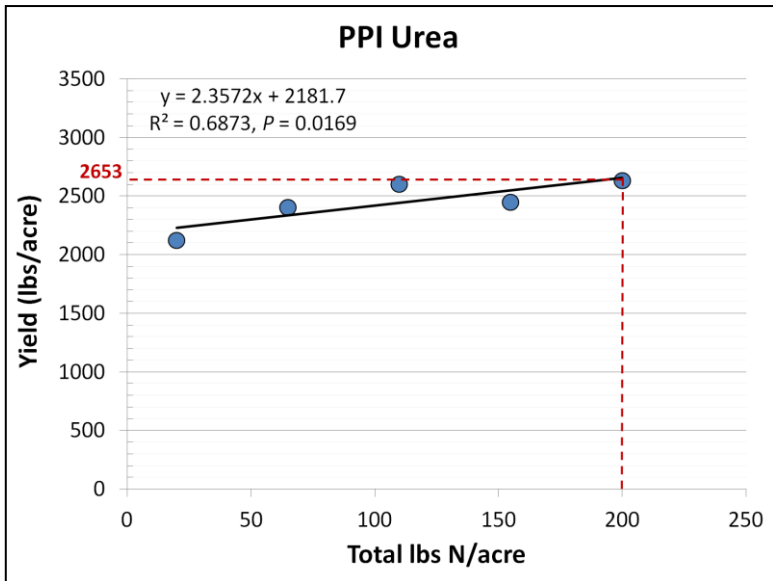


Table 2: Seed yield (at 8.5% moisture), test weight, harvest moisture, and growth characteristics of Pioneer P45H28 in the nitrogen, sulfur, and boron fertility trial at Roseau in 2011.

Fertilizer Application	Total N (lbs/A)	Yield (bu/A)	Test Wt. (lb/bu)	Moisture (%)	Early Season Vigor¹	Height (inches)	Lodging²
Control	20	2123	48.3	5.0	3	45.5	2
PPI Urea	65	2404	48.3	5.2	5	46.5	3
	110	2599	48.6	5.1	6	48.8	3
	155	2448	48.7	5.6	5	49.6	2
	200	2631	48.0	5.3	4	48.5	3
PPI Urea + 30 lbs/A PPI Sulfur	65	2386	48.6	5.2	6	47.8	3
	110	2716	48.5	5.2	5	49.4	3
	155	2547	48.1	5.1	5	50.0	3
	200	2767	48.4	5.3	4	49.6	3
Topdress Urea	65	2410	48.5	5.2	3	46.5	2
	110	2452	48.5	5.3	5	46.0	3
	155	2583	48.3	5.0	6	45.0	3
	200	2859	48.1	5.3	5	45.9	2
Topdress Urea + 30 lbs/A PPI Sulfur	65	2343	48.6	5.0	4	46.1	2
	110	2478	48.0	5.6	4	47.0	3
	155	2643	48.7	5.6	4	46.3	3
	200	2373	48.1	5.3	4	46.9	3
PPI ESN	65	2543	48.2	5.2	6	49.1	3
	110	2754	48.6	5.1	6	49.5	3
	155	2678	48.6	5.1	5	49.4	3
	200	2669	48.8	5.5	6	47.3	3
PPI ESN + 30 lbs/A PPI Sulfur	65	2737	48.3	5.2	6	47.0	3
	110	2665	48.1	5.1	6	49.4	3
	155	2321	47.8	5.1	6	50.8	3
	200	2959	48.7	5.6	5	50.1	3
MAX-IN Boron (0.5 pt/A)	200	2285	48.5	5.3	4	44.8	2
MAX-IN Boron (1.0 pt/A)	200	2538	48.5	5.3	5	47.3	4
MAX-IN Boron (1.5 pt/A)	200	2594	48.4	5.8	6	46.9	4
¹ 1=poorest, 9=best	Mean	2554	48	5	5	48	3
² 1=flat stem, 9=erect stem	LSD 0.05	389	NS	NS	1.9	3.0	NS
	CV (%)	10.8	1.1	7.6	29.3	4.4	33.6

DATE OF PLANTING TRIAL

Objectives: i.) evaluate seeding date effect on performance of glyphosate (Roundup Ready) and glufosinate (Liberty Link) herbicide resistant systems, with new hybrid canola varieties; ii.) compare net returns of the two herbicide resistant systems based on grain value and seed and herbicide costs; iii.) investigate seeding date influence under previously not reported no-till production and also conventional tillage. This research was in conjunction with Dr. Burton Johnson at NDSU.

Methodology: The Roundup Ready hybrid Dekalb 30-42 and the Liberty Link hybrid InVigor 8440 were seeded at 650,000 pure live seeds/ac. The trial was laid out as a RCB design with four replicates. The entire plot area had a background N fertility of 20 lbs/ac. Seeding dates were May 18, May 26, June 4, June 9, and June 14. Plot size was 20 x 5 ft.

Results: Yields dropped significantly between the June 4 and June 9 planting dates, with a 40% yield decrease for both Dekalb 30-42 and InVigor 8440. For the May 18 and May 26 planting dates, Dekalb 30-42 had significantly lower yield when compared to InVigor 8440. This was due to purpling and stunting that occurred following the Roundup application on June 16. It is believed that moisture stress shortly after the Roundup application was made played a part in the observed stunting and purpling.

Table 3: Harvest plant population, seed yield (at 8.5% moisture), test weight, and harvest moisture of Roundup Ready and Liberty Link hybrids in date of planting trial at Roseau in 2011.

Hybrid	Planting Date	Plant Pop. at Harvest (plants/acre)	Yield (bu/acre)			Test Wt. (lb/bu)	Moisture (%)
DKL 30-42	5/18/11	402,500	d	1104	bc	49.2	4.6
DKL 30-42	5/26/11	480,000	cd	1098	bc	48.4	4.6
DKL 30-42	6/4/11	440,000	cd	1350	b	48.5	5.1
DKL 30-42	6/9/11	477,500	cd	814	cd	41.9	5.5
DKL 30-42	6/14/11	587,500	bc	731	cd	41.6	5.3
InVigor 8440	5/18/11	667,500	ab	1840	a	47.4	5.2
InVigor 8440	5/26/11	675,000	ab	1899	a	47.8	5.0
InVigor 8440	6/4/11	800,000	a	1503	ab	47.6	5.9
InVigor 8440	6/9/11	735,000	ab	898	cd	47.7	6.2
InVigor 8440	6/14/11	585,000	bc	629	d	40.2	6.2
	Mean	585,000		1187			
	LSD 0.05	165,000		421		NS	NS
	CV (%)	19.5		24.5		12.5	9.5

STRAIGHT HARVESTING STRIP TRIAL

Objective: Evaluate the effectiveness of an anti-shattering agent and a desiccant when straight combining rather than swathing.

Background: Canola has conventionally been swathed prior to harvest to eliminate shattering loss, reduce moisture content, and reduce green count. However, many growers are interested in ways to eliminate the swathing procedure and find a way to direct harvest canola. This study was initiated to determine the usefulness of a desiccant and an anti-shattering agent to aid in straight harvest, as compared to conventionally swathing prior to harvest.

Methodology: The trial was laid out as a strip RCB design with three replicates. Variety Pioneer 45H28 was seeded to a rate of 5 lbs/ac. Treatments included swathing, an anti-shattering agent (Pod Ceal) followed by swathing, straight harvesting, and straight harvest with a desiccant agent (Reglone). Application of Pod Ceal commenced on August 5th, when the intense green color of the pods turned to a lighter green color. Application of Reglone commenced on August 19th, at 40% seed color change. Swathing commenced on August 20th, and harvest of all plots was completed on August 27. A rate of 1 pint/ac was used for Reglone, while a rate of 1 pint/ac was used for Pod Ceal. Plot size was 250 x 20 ft.

This study was also conducted in 2010, with results from both years presented in the accompanying table.

Results: The trial was seeded on May 18 into warm soils with adequate seedbed moisture. Yield differences among treatments were not significantly different in 2011, with yields ranging from 1699 lb/ac to 2173 lb/ac. Yield differences among treatments were not significantly different in 2010, either. The Pod Ceal + Swathed treatment had slightly higher yield than the other treatments when averaged across both years of the study, but this difference in yield was not large enough to be significantly different than the other treatments.

Table 4: Seed yield (at 8.5% moisture), test weight, and harvest moisture of Pioneer P45H28 in the harvesting methods trial at Roseau in 2010 and 2011.

Treatment	Yield (bu/acre)			Test Wt. (lb/bu)			Moisture (%)		
	2011	2010	2-Yr.	2011	2010	2-Yr.	2011	2010	2-Yr.
Pod Ceal + Swathed	2173	2264	2225	49.6	48.6	49.1	5.6	5.6	5.5
Reglone + Straight Harvest	2154	1931	2027	49.3	49.7	49.5	5.6	7.9	6.8
Straight Harvest	1699	2191	1980	49.6	49.2	49.4	5.9	12.5	9.5
Swathed	2130	2065	2092	49.5	49.0	49.3	5.7	5.8	5.6
<i>Mean</i>	2039	2113	2081	49.5	49.1	49.3	5.7	8.0	6.8
<i>LSD 0.10</i>	NS	NS	NS	NS	0.6	NS	0.3	0.9	1.7
<i>CV (%)</i>	10.8	0.1	17.1	0.7	0.7	0.9	0.2	6.6	22.6