ACKNOWLEDGEMENTS

The Canola Council of Canada is the co-ordinating body of the Canola Production Centre Program across Canada and is a major contributor to the program.

Each year, sponsors (both locally and nationally), help support the Canola Production Centre Program across Canada. With their generous contribution, the Program has become an effective tool in technology transfer to all interested parties.

The Program is supported on a national basis by the following cash sponsors.

AgrEvo Canada Inc.
Agrium Inc.
Monsanto Canada Inc.
Novartis Crop Protection Inc.
Rhône-Poulenc Canada Inc.

The program is supported on a national basis by the following product sponsors:

Advanta Seeds
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Canadian Seed Coaters
Cargill AgHorizons
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Dow AgroSciences Canada Inc.
DuPont Canada Inc.
Enviro-Test Labs
Esso/Imperial Oil
Grow Tec Ltd.
Limagrain Canada Seeds Inc.
Monsanto Canada Inc.
Proven Seed
Rhône-Poulenc Canada Inc.
Saskatchewan Wheat Pool
United Farmers of Alberta
United Grain Growers
Zeneca Agro

This project is supported by the following provincial organizations:

Alberta Canola Producers Commission
Alberta Agriculture Food and Rural Development (Farming for the Future Program)
British Columbia Peace River Grain Industry Development Council
- (Peace River Agricultural Development Fund)
Manitoba Canola Growers Association
Saskatchewan Canola Development Commission
Saskatchewan Canola Growers Association

In 1999 the Canola Production Centre program was also supported by the following Contract Research participants:

Advanta Seeds
AgPro Grain Inc.
AgrEvo Canada Inc.
Agricore
BASF Canada Inc.
CanAmera Foods
Cyanamid Canada Inc.
Dow AgroSciences Canada Inc.
DuPont Canada Inc.
Gustafson
IMC Cargill
Limagrain Canada Seeds Inc.
Monsanto Canada Inc.
Novartis Crop Protection
Oseco Inc.
Saskatchewan Wheat Pool
United Farmers of Alberta
Value Added Seeds
Zeneca Agro

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I SITE DESCRIPTION

The Program is supported locally by the following individuals and organizations that have donated products and/or services to the Canola Production Centres:

MANITOBA REGION – Derwyn Hammond, Agronomist

Location: Carman, MB - 70 acres

Land: Roy Wood (Co-operator)

Seed and Seed Treatment: Advanta Seeds
Canadian Seed Coaters Ltd.
Cyanamid Canada Inc. - Counter 5G
Limagrain Canada Seeds Inc.
Proven Seed
Rhône-Poulenc Canada Inc.

Fertilizer: Esso (Carmagro) - Granular fertilizer (80 acres)

Herbicides and Fungicides: AgrEvo Canada Inc. - Liberty (10 acres)
Cyanamid Canada Inc. - Odyssey (10 acres)
Dow AgroSciences Canada Inc. - Lontrel (78 acres)
DuPont Canada Inc. - Muster Gold II (80 acres), Freedom Gold (5 acres)
Monsanto Canada Inc. - Roundup (40 acres)
Rhône Poulenc Canada Inc. - Rovral flo (80 acres)

Equipment and Labour: Enviro-Test Labs - soil test analysis
Roy Wood, Ken Rutter - cultivator & harrows, tractors, grain trucks

Photocopying & Faxing: Manitoba Canola Growers Association

Tours: Dow AgroSciences Canada Inc., Johnston Farm Supplies Ltd. - Lunch. Thanks also to Kevin Cutting (MCGA Executive Director) & Murray Froebe (MCGA Regional Director) for assistance in promoting the tour.

Location: Russell, MB - 90 acres

Land: James Ungrin (Co-operator)

Gold Level Sponsors ($500 or more)

- The Rural Municipality of Russell
- Town of Russell

Silver Level Sponsors ($250 - $499)

- CanAmera Foods, Harrowby
- Clement Farm Supply Ltd., Russell
- The Rural Municipality of Silver Creek

Bronze Level Sponsors (less than $250)

- Jackson Seeds, Inglis
- Prairie Concrete, Foxwarren
- The Russell Inn
- Thunder Creek Farms

Seed and Seed Treatment: Advanta Seeds
Canadian Seed Coaters
Cyanamid Canada Inc. - Counter 5G
Proven Seed
Rhône-Poulenc Canada Inc.

Fertilizer: Simplot Canada Ltd. - Granular N (90 acres)

Herbicides and Fungicides: AgrEvo Canada Inc. - Liberty (10 acres)
BASF Canada inc. - Accord (5 acres), Ronilan EG (36 acres)
Cyanamid Canada Inc. - Odyssey (10 acres)
Dow AgroSciences Canada Inc. - Lontrel (78 acres)
DuPont Canada Inc. - Muster (80 acres)
Monsanto Canada Inc. - Roundup (40 acres)
Rhône-Poulenc Canada Inc. - Select (80 acres)

Equipment and Labour: Jim Ungrin - grain truck and auger
Cam's Aerial Spraying - herbicide application on conventional trials
CanAmera Foods - grain hauling
Greenfields Equipment Ltd. - tractor and air seeder for banding fertilizer, tractor for tour, combine
Enviro-Test labs - soil test analysis

Photocopying & Faxing: Manitoba Agriculture

Tours: Cyanamid Canada Inc., Limagrain Canada Seeds Inc. - Lunch
Thanks also to the Jeff Kostuik and the Parkland Crop Diversification Foundation for co-ordinating their tour with ours, to John Derkach for hosting lunch and to Luanne Berjian (Ag Rep) for her efforts in promotion and organization.

Location:	**Kelburn Farm, St. Adolphe, MB - 4 acres**

Land, Fertilizer, Herbicides, Fungicide Application & Harvest Equipment:
James Richardson International

Seed and Seed Treatment: Advanta Seeds
Cyanamid Canada Inc. - Counter 5G
Proven Seed

Herbicides and Fungicides: BASF Canada Inc. - Ronilan EG (3 acres)

Tours: Thanks to JRI for including our satellite trial in their farm tours throughout the summer.

As the agronomist responsible for the Canola Production Centre program in Manitoba, I would also like to take the opportunity to thank my technicians **Neil Hruska, Sherri McAuley and Warren Robak** for their dedicated technical assistance throughout the season!

EASTERN SASKATCHEWAN - David Vanthuyne, Agronomist

Location:	**Grenfell, SK - 88 acres**

Land: Lloyd Wolfe (Co-operator)
Mainline Rural Economic Development Association

Seed and Seed Treatment: Advanta Seeds
Canadian Seed Coaters
Cyanamid Canada Inc. - Counter 5G
Limagrain Canada Seeds Inc.
Rhône-Poulenc Canada Inc.
Proven Seed

Fertilizer: Saskatchewan Wheat Pool, Whitewood - granular phosphate (88 acres)
Indian Head - liquid nitrogen and sulphur (88 acres)

Herbicides and Fungicides: AgrEvo Canada Inc. - Liberty (10 acres)
Dow AgroSciences Canada Inc. - Lontrel (80 acres)
DuPont Canada Inc. - Muster (80 acres)
Monsanto Canada Inc. - Roundup Transorb (100 acres)
Rhône-Poulenc Canada Inc. - Select (80 acres) and Rovral flo (60 acres)
Zeneca Agro - Venture 25 DG (10 acres)

Equipment and Labour:	Agricore - Mainline Fertilizers (Bill Kent) - herbicide storage and liquid coulter applicator Lloyd Wolfe - grain truck, swath roller, harrow packers, storage, shop use and tools. Mike and Doug Kent - equipment storage Paul Urschel - custom spraying Tim Schmit- grain truck Wilber Assman - 34 foot Morris vibrashank, Case 2090 and 4490 tractors for pre-working, banding and seeding
Photocopying & Faxing:	Mainline Rural Economic Development Association
Tours:	CanAmera Foods - sponsored BBQ dinner CJGX - radio advertisement Monsanto Canada Inc. - sponsored BBQ dinner Town of Grenfell - bleachers for tour Tour help - Grenfell and District Canola Production Centre committee

Location:	**Watson, SK - 96 acres**
Land:	ADM Agri-Industries Ltd. (Co-operators)
Seed and Seed Treatment:	Advanta Seeds
Fertilizer:	Saskatchewan Wheat Pool - Anhydrous ammonia and granular for 96 acres Greenland Fertilizers (Agricore) - elemental sulphur
Herbicides and Fungicides:	DuPont Canada Inc. - Muster (50 acres) Dow AgroSciences Canada Inc. - Lontrel (60 acres) Rhône Poulenc Canada Inc. - Select (60 acres) Monsanto Canada Inc. - Roundup Transorb (90 acres)
Equipment and Labour:	Berchiminsky Farms - auger, tractor, grain and equipment storage
Tours:	ADM Agri-Industries Ltd. - co-ordination of tour activities Saskatchewan Wheat Pool - co-ordination of tour activities

Location:	**Naicam, SK - 55 acres**
Land:	Eric Cropper (Co-operator) Naicam Marketing Club (Co-operator) Ron Loyns (Co-operator)

Seed and Seed Treatment: Advanta Seeds
Canadian Seed Coaters
Cyanamid Canada Inc. - Counter 5G
Limagrain Canada Seeds Inc.
Rhône-Poulenc Canada Inc.
Proven Seed

Fertilizer: Pratchler Agro Services, Esso, Naicam - anhydrous ammonia and granular (55 acres)

Herbicides and Fungicides: AgrEvo Canada Inc. - Liberty (10 acres)
BASF Canada Inc. - Ronilan EG (40 acres)
Dow AgroSciences Canada Inc. - Lontrel (50 acres)
DuPont Canada Inc. - Muster (40 acres) and Freedom Gold (20 acres)
Monsanto Canada Inc. - Roundup Transorb (60 acres)
Rhône-Poulenc Canada Inc. - Select (80 acres) and Rovral flo (60 acres)
Zeneca Agro - Venture 25 DG (10 acres)

Equipment and Labour: Cropper Motors Ltd. - 80 foot Degelman heavy harrows, Case IH 9370 tractor for banding nitrogen and harrowing
Dauk Farms - grain truck and shop use and equipment storage
Hetland Seeds - seed storage
Pratchler Agro Services - anhydrous ammonia applicator

Tours: CJGX - radio advertisement
Naicam Marketing Club - tour help and tour wagons
Rhône-Poulenc Canada Inc - BBQ sponsorship

Comments: A special **THANK-YOU** to **Barry Hurd**, **Aaron Chicilo and Neil Hruska** for their hard work, dedication and patience throughout the year. Job well done!

BATTLE RIVER REGION - David Blais, Agronomist

Location:	**Delmas, SK - 60 acres**

Land: Andre Blais (Co-operator)

Seed and Seed Treatment: Advanta Seeds
AgrEvo Canada Inc.
Canadian Seed Coaters
Cyanamid Canada Inc. - Counter 5G
Limagrain Canada Seeds Inc.
Proven Seed
Rhône-Poulenc Canada Inc.

Fertilizer:	Greenland Fertilizers (Agricore) - elemental sulphur Maidstone Agro, Maidstone - Granular Fertilizer (63 acres) Multi Crop Services, Delmas - Liquid Fertilizer (60 acres)
Herbicides and Fungicides:	AgrEvo Canada Inc. - Liberty (20 acres) BASF Canada Inc. - Accord (2 acres), Liberty (7 acres), Ronilan EG (2 acres) Cyanamid Canada Inc. - Odyssey (20 acres) Dow AgroSciences Canada Inc. - Lontrel (60 acres) DuPont Canada Inc. - MusterGold (60 acres) Monsanto Canada Inc. - Roundup Original (80 acres)
Equipment and Labour:	Andre Blais - grain auger and grain storage Gilbert Michaud - shop use and tools Guy Michaud - technical assistance Leo Blais - all terrain vehicle, grain truck, swath roller, storage, shop use and tools Multi Crop Services - coulter and band wagon
Tours:	Alberta Agriculture - Call of the Land radio announcement Norbert and Mitch Michaud - bales for trailer

Location: Vegreville, AB - 80 acres

Land:	Durlowe Farm - James and Grant Durie (Co-operators)
Seed and Seed Treatment:	Advanta Seeds Canadian Seed Coaters Limagrain Canada Seeds Inc. Proven Seeds Rhône-Poulenc Canada Inc.
Fertilizer:	Agricore, Vegreville - Granular (10 acres) United Grain Growers, Vegreville - Sulphur (80 acres)
Herbicides and Fungicides:	AgrEvo Canada Inc. - Liberty (20 acres) Cyanamid Canada Inc. - Odyssey (20 acres) DuPont Canada Inc. - MusterGold (80 acres) Dow AgroSciences Canada Inc. - Lontrel (80 acres) Monsanto Canada Inc. - Roundup Original (40 acres)
Equipment and Labour:	Durlowe Farm -spring cultivation, fertilizer application, swather grain truck, grain auger, grain storage, equipment storage and shop tools Leo Blais **-** all terrain vehicle

Tours: Alberta Agriculture - Call of the Land radio announcement
CFCW Radio
Norbert and Mitch Michaud - bales for trailer

Comments: A special **THANK-YOU** to **Blair Michaud** for his valued technical assistance throughout the summer.

CHINOOK REGION – Doug Moisey, Agronomist

Location: Lethbridge, AB (Dryland) - 50 acres

Land: Rod & Ike Lanier

Seed and Seed Treatment: Canadian Seed Coaters
Canbra Foods Ltd.

Fertilizer: AgPro Grain , Wilson Siding - granular (50 acres)
Ober's Agriservice, Esso Fertilizer, Coaldale - anhydrous ammonia (50 acres)
Southern Agriservice, Agrium Inc., Coaldale - granular (6 acres)

Herbicides and Fungicides: AgrEvo Canada Inc. - Liberty (4 acres)
Cyanamid Canada Inc. - Odyssey (5 acres)
Dow AgroSciences Canada Inc. - Lontrel (33 acres)
DuPont Canada Inc. - Muster Gold II (33 acres)
Monsanto Canada Inc. - Roundup Transorb (60 acres)

Equipment and Labour: Rod Lanier - custom spraying (pre-seeding burnoff)

Location: Lethbridge, AB (Irrigation) - 53 acres

Land: Tom & Joe Shigehiro

Seed and Seed Treatment: AgrEvo Canada Inc.
Canadian Seed Coaters
Canbra Foods Ltd.
Dow AgroSciences Canada Inc.
Limagrain Canada Seeds Inc.

Fertilizer: AgPro Grain, Wilson Siding - granular (53 acres)
Cargill AgHorizons, Lethbridge - granular (53 acres)
Southern Agri-Service, Agrium Inc., Coaldale - granular (6 acres)

Herbicides and Fungicides: AgrEvo Canada Inc. - Liberty (3 acres)
Dow AgroSciences Canada Inc. - Lontrel (48 acres)
DuPont Canada Inc. - Muster Gold II (40 acres), Benlate (53 acres)
Monsanto Canada Inc. - Roundup Transorb (40 acres)

Equipment and Labour: AgPro Grain - Fertilizer Spreader

Location:	**Innisfail, AB - 83 acres**

Land: County of Red Deer (rented)

Seed and Seed Treatment: Canadian Seed Coaters
Limagrain Canada Seeds Inc.

Fertilizer: Innisfail Farm Store Co-op, Esso Fertilizer - granular (83 acres)
Southern Agri-Service, Agrium Inc., Coaldale - granular (6 acres)

Herbicides and Fungicides: AgrEvo Canada Inc. - Liberty (3 acres)
BASF Canada Inc.- Accord (2 acres), Ronilan EG (2 acres)
Dow AgroSciences Canada Inc. - Lontrel (83 acres)
DuPont Canada Inc. - Muster Gold (80 acres)
Monsanto Canada Inc. - Roundup Transorb (83 acres)
Rhône-Poulenc Canada Inc. - Rovral Flo (60 acres)
Zeneca Agro - Touchdown (40 acres)

Comments: A special thanks to **Alan Colic** and **Brad Johnson** for their technical assistance over the summer and also to Dr. Lloyd Dosdall and Rob Dunn of Alberta Agriculture Food and Rural Development for their technical assistance.

PEACE RIVER REGION - **Garry Coy, Agronomist**

Location:	**Wanham, AB - 70 acres**

Land: Dan Lane (Shane Farms) rented

Seed and Seed Treatment: Canadian Seed Coaters
United Farmers of Alberta

Fertilizer: United Grain Growers, Wanham - seed-placed fertilizer (70 acres)

Herbicides and Fungicides: AgrEvo Canada Inc. - Liberty (10 acres)
BASF - Ronilan EG (2 acres)
Cyanamid Canada Inc. - Odyssey (10 acres)
DuPont Canada Inc. - Muster Gold (40 acres)
Monsanto Canada Inc. - Roundup Transorb (40 acres)
Zeneca Agro - Venture 25 DG (10 acres)

Equipment and Labour: CSC Crop Services Ltd. - spraying of Ronilan on sclerotinia trial with high clearance sprayer
Leon and Judy Gouchee - loan of trike during seeding operations
Shane Farms - Cultivation and fall anhydrous N application, Tandem grain truck

Tours: Ag-Depot, Agri-Link, BASF, Flexicoil Canada, Novartis, Proven Seeds, United Farmers of Alberta

Location: Rolla, BC - 41 acres

Land: Gene Vipond (Borek Farms) rented

Seed and Seed Treatment: Canadian Seed Coaters
United Farmers of Alberta

Fertilizer: Esso Fertilizer (Jerri Rude AgriSales, Dawson Creek)

Herbicides and Fungicides: AgrEvo Canada Inc. - Liberty (10 acres)
BASF Canada Inc. - Ronilan (2 acres), Accord (6 acres)
Cyanamid Canada Inc. - Odyssey (10 acres)
Dow AgroSciences Canada Inc. - Lontrel (40 acres)
DuPont Canada Inc. - Muster Gold II (15 acres)
Monsanto Canada Inc. - Roundup Transorb (25 acres)
Zeneca Agro - Venture 25 DG (10 acres)

Equipment and Labour: Borek Farms (Cultivation, fall anhydrous N application, grain truck
Rolla Ag - spraying of Ronilan on sclerotinia trial with high clearance sprayer

Tours: Peace River Soil Conservation Association, BC Grain Industry Development Council and Proven Seeds

Comment: In addition, I wish to thank **Lorraine Harrison** (Plant Pathologist with Alberta Agriculture), **Darlene Bray** of the Peace River Soil Conservation Association (BC)**, Hector Goudreau, Dale Seward, and John Huffman,** Crop Specialists with Alberta Agriculture Food & Rural Development, **Ken Nickel,** Crop Specialist with the BC Ministry of Agriculture Food and Fisheries, and **Jack Dobb (BC Grain Producers Assoc.)** for their valuable help with extension activities over the summer.

Special thanks are extended to **Shelagh Coy** and **Michael Coy** for their dedicated technical assistance with the Canola Production Program over the growing season.

Canola Production Centre Thank You

The Canola Production Centre program continues to be a success only through the co-operation and collaboration of the entire Crop Production team across the Prairies, including; JoAnne Buth, Jim Bessel, John Mayko, David Blais, Garry Coy, Derwyn Hammond, Barry Hurd, Doug Moisey, Warren Robak and Dave Vanthuyne. The crop production team would like to thank the Head Office Staff in Winnipeg, and in particular Nicole Heroux, for their valuable assistance and support. Once again, thanks to all of the Canola Production Centre supporters, both national and local!!

Thank-You All !!

II INTRODUCTION

The Canola Council of Canada initiated Canola Production Centres to address the ongoing need for canola production technology transfer as identified during the Grow with Canola program. The Canola Production Centres are a joint effort between producer groups, industry representatives and provincial governments and their extension personnel. The continuing co-operation of these groups, co-ordinated by the Canola Council of Canada, ensures the ongoing success of the Canola Production Centres.

The goal of the Canola Production Centre program is to improve the quality and yield of the Canadian canola crop, thereby improving profitability for both producers and processors. The Canola Production Centres provide a focal point for the transfer of canola production technology, thus enhancing interaction among the various industry participants. The specific goals of the program are to increase the yield of oil and protein, and to increase the margin per unit of production.

The program consists of four components:

1. Canola Production Centres operate on a field scale, addressing a wide range of agronomic topics of regional and national interests. Typical plot sizes are 20-40 feet wide by 300-400 feet long. All trials are replicated and randomized.
2. Satellite locations operate on a field scale, addressing one or two topics of interest to the local community.
3. Communications through distribution of the results from the Canola Production Centres in annual regional reports and multi-year summaries; and extension activities.
4. Agronomic research conducted by either public or private research organizations in conjunction with the activities of the Canola Council at Canola Production Centres.

A series of summer tours were held throughout the growing season at the main Canola Production Centres that allowed the opportunity to view the various projects. All sites were signed and copies of site plans were available at the entrances to allow for self-guided tours at any time other than scheduled tour dates.

Quantitative information obtained from the Canola Production Centres included many agronomic factors such as early season plant counts, crop yields and lodging ratings on varieties.

Note: The material contained in this report is a collection of agronomic information from a specific location and only from one site year. Therefore, it should be observed and understood accordingly.

III DEFINITIONS

Brassica napus varieties: Argentine varieties

Brassica rapa varieties: Polish varieties

Break-even/cost per bushel: The price needed per bushel to cover the variable costs at the stated yield per acre of production.

Co-efficient of variation (CV): The standard deviation expressed as a percentage of the mean.

Contribution margin: The amount of total revenue less variable costs that directly relate to the business operation available to contribute to fixed costs and return on investment, labour and management.

Contribution margin per bushel: The extra revenue per unit of production which is available to service fixed costs. This illustrates to the producer the importance of a well planned marketing strategy.

Contribution margin per acre: The amount of revenue remaining per acre after variable costs have been serviced, allowing the producer to manage other financial commitments, such as fixed costs.

Damaged seed: The percentage of seeds that were damaged, including green and brown seed, determined by a crush strip test.

Days to maturity: Actual calendar days from the date of seeding to approximately 30% seed colour change.

Fixed costs: Costs that remain relatively unchanged regardless of the volume of production (eg land taxes, mortgage interest and machinery depreciation).

Growing degree days (GDD): Heat accumulated above canola's base temperature. The heat accumulated each day is determined by adding the maximum and minimum temperatures and dividing the total by two to obtain a daily average. The base temperature for canola of 5°C is subtracted from the average to arrive at the number of growing degree days. The total growing degree days required for Argentine canola on average is 1040 growing degree days. Polish canola on average requires 850 growing degree days.[1]

Least significant difference (LSD): The difference required for one treatment to be statistically different from another at the 90% confidence level, expressed in identical units. For example, if Variety A yielded 30 bu/ac and Variety B yielded 34 bu/ac and the LSD for that trial was 2.25, then Variety A is statistically different from Variety B because 34-30= 4, which is greater than 2.25. If the difference was less than 2.25, then the varieties would not be statistically different from each other.

1 Source: Canola Growers Manual

Lodging ratio: Crop canopy height divided by actual plant length. A measure of the lodging resistance of a particular variety.

Opportunity costs: The opportunity cost of a resource is the return the resource can earn when put to its best alternative.

Variable costs: Costs that vary directly with the volume of production or activity (eg. seed, fertilizer, fuel and repairs).

Definitions provided by the ROYAL BANK in consultations with the Canola Council with reference from the Farm Accounting Standardisation Manual©.

IV ECONOMIC ANALYSIS

A Canola Pricing System

GRADE	GREEN SEED (%)	TOTAL DAMAGED & GREEN SEED ALLOWED (%)	$/BU
# 1	0 – 2.0	3.0	6.00
# 2	2.1 – 6.0	10.0	5.73
# 3A	6.1 – 10.0	15.0	5.43
# 3B	10.1 – 20.0	20.0	4.87
Sample	Over 20.0	Over 20.0	3.75

Note 1: ***The damaged and green, includes all frost, brown and green seed. This was determined by using a 500 seed crush strip test done on each sample from every treatment within a particular project trial.***

Note 2: ***High erucic acid varieties (eg. Millennium) are assigned a premium of $.91 bu.***

Note 3: ***Specialty oil varieties (eg. IMC 105) are assigned a premium of $.34 bu.***

B. Cost Calculations & Assumptions

The following costs were used in calculating economic returns for the various trials and treatments. Fertilizer and crop protection product prices were obtained from various dealers throughout the region. Prices reflect the western Canadian average for spring 1999. Equipment costs were obtained from agrologists with the Royal Bank and are actual equipment variable costs from producers across Western Canada. There has been no value allocated for capital and fixed costs.

CANOLA ARGENTINE VARIETY SEED COSTS					
B. napus	**$/LB**	**Distributor**	***B. napus***	**$/LB**	**Distributor**
Hyola 401	4.32	Advanta Seeds	Option 501	2.25	Advanta Seeds
Hylite 201	3.20	Advanta Seeds	Exceed	2.60	Agricore
Battleford	2.25	AgPro Grain Inc.	SW Arrow	2.25	Agpro Grain Inc.
SW RideR	3.99	Agricore	LG Dawn	3.49	Agricore
InVigor 2273	5.25	AgrEvo Canada Inc.	InVigor 2153	4.95	AgrEvo Canada Inc.
InVigor 2473	5.25	AgrEvo Canada Inc.	InVigor 2463	5.25	AgrEvo Canada Inc.
Millennium 01	1.95	Can-Amera Foods	AC Excel	1.19	Canadian Seed Coaters
Nexera 500	2.89	Dow AgroSciences Canada Inc.	IMC 03	1.99	Inter-Mountain Canola
IMC 106	3.25	Inter-Mountain Canola	IMC 105	2.40	Inter-Mountain Canola
IMC 108	2.40	Inter-Mountain Canola	IMC 107	3.25	Inter-Mountain Canola
IMC 202	2.40	Inter-Mountain Canola	IMC 201	2.40	Inter-Mountain Canola
LG3295	3.25	Limagrain Canada Seeds Inc.	LG3235	3.70	Limagrain Canada Seeds Inc.
45A71	3.25	Proven Seed	46A73	3.40	Proven Seed
Exceed	2.25	SK Wheat Pool	45A02	2.55	Proven Seed
Magnum	1.85	Value Added Seeds	Quantum	2.25	SK Wheat Pool
Sentry	1.85	Value Added Seeds			

CANOLA POLISH VARIETY SEED COSTS					
B. rapa	**$/LB**	**Distributor**	***B. rapa***	**$/LB**	**Distributor**
Reward	1.10	Canadian Seed Coaters	Chinook	1.54	Limagrain Canada Seeds Inc.
41P55	1.85	Proven Seeds			

Note: Seed cost may vary from location to location.

PRODUCT INFORMATION			
Product	**Common Name**	**Manufacturer/ Distributor**	**$/Unit Cost**
Accord	quinclorac	BASF Canada Inc.	173.00/1.1Kg
Assure	quizalofop ethyl	DuPont Canada Inc.	330.00/8L
Benlate 50WP	benomyl	DuPont Canada Inc.	51.50/Kg
Counter 5G	terbufos	Cyanamid Canada Inc.	76.00/20Kg
Decis	deltamethrin	AgrEvo Canada Inc.	300.00/3L
Edge	ethalfluralin	Dow AgroSciences Canada Inc.	41.00/25Kg
Freedom Gold	quizalofop ethyl +	DuPont Canada Inc.	878.00/ca
	thifensulfuron methyl		
Fusion	fenoxaprop-p-ethyl + fluazifop-p-butyl	AgrEvo Canada Inc.	239.00/ca
Liberty	glufosinate ammonium	AgrEvo Canada Inc.	229.50/13.5L
Lontrel 360	clopyralid	Dow AgroSciences Canada Inc.	610.00/4.45L
Lorsban	chlorpyrifos	Dow AgroSciences Canada Inc.	155.00/10L
Muster	ethametsulfuron methyl	DuPont Canada Inc.	598.00/320g
Muster Gold	ethametsulfuron methyl + quizalofop-ethyl	DuPont Canada Inc.	390.00/ca
Muster Gold II	ethametsulfuron methyl + quizalofop-p-ethyl	DuPont Canada Inc.	780.00/ca
Odyssey	imazamox + imazethapyr	Cyanamid Canada Inc.	1048.00/ca
Poast Ultra	sethoxydim	BASF Canada Inc.	690.00/ca
Pursuit	imazethapyr	Cyanamid Canada Inc.	835.40/3.3L
Rival 10G	trifluralin	AgrEvo Canada Inc.	71.00/22.7Kg
Ronilan EG	vinclozolin	BASF Canada Inc.	61.21/Kg
Roundup Regular	glyphosate	Monsanto Canada Inc.	89.90/10L
Roundup Transorb	glyphosate	Monsanto Canada Inc.	97.90/10L
Rovral flo	iprodione	Rhône-Poulenc Can. Inc.	194.00/8.4L
Select	clethodim	Rhône-Poulenc Can. Inc.	699.00/ca
Touchdown	glyphosate	Zeneca Agro	95.00/10L
Venture 25 DG	fluazifop-butyl	Zeneca Agro	450.00/ca

Note: ca - case

Numerous references to pesticide applications will be found in this report. We advise everyone to consult with provincial recommendations and product labels for complete instructions.

CANOLA FERTILIZER COSTS			
Fertilizer	**Analysis**	**$/Tonne**	**$/LB.**
Anhydrous Ammonia	82-0-0	410	0.23
Ammonium Nitrate	34-0-0	236	0.32
Ammonium Sulphate	21-0-0-24	273	N=0.25
Ammonium Sulphate	21-0-0-24	273	S=0.31
Elemental Sulphur	0-0-0-90	415	0.21
Liquid Nitrogen	28-0-0	177	0.29
Liquid Phosphate	10-34-0	350	0.38
Liquid Sulphur	15-0-0-20	218	0.28
Phosphate	11-52-0	395	0.29
Potash	0-0-60	183	0.14
Urea	46-0-0	252	0.25

Crop and Hail Insurance:

Prices will vary from site to site.

Machinery Cost:

- Conventional tillage: $20.50/acre
- Direct seeding: subtract $ 6.00/acre
- Straight combining: subtract $ 2.00/acre

Additional Machinery Costs: (Spraying Application)

- Aerial $ 4.00/acre
- Ground $ 3.50/acre

Note: Machinery costs reflect the average operating cost (such as fuel, lubrication and repairs) across western Canada (source Royal Bank of Canada).

Marketing Cost:($.25/Bu)

This cost was assigned to the variable cost using the Options Marketing System. In 1999 a put option was purchased at $11.00 per tonne.

Interest/Opportunity Cost:

This cost calculation demonstrates the cost of money borrowed (at the current prime rate +1%) and charged on crop inputs and machinery operating costs. In 1999, 7.5% per annum over six months was used.

C. Economic Results Report (example)

Site: ***Naicam, SK***

B. napus Variety Trial: AC Excel

CALCULATION OF VALUE OF PRODUCTION				
Yield (bu/ac)	**X**	**Price ($/bu)**	**=**	**Value of Production**
42.2	X	$6.00	=	$253.20

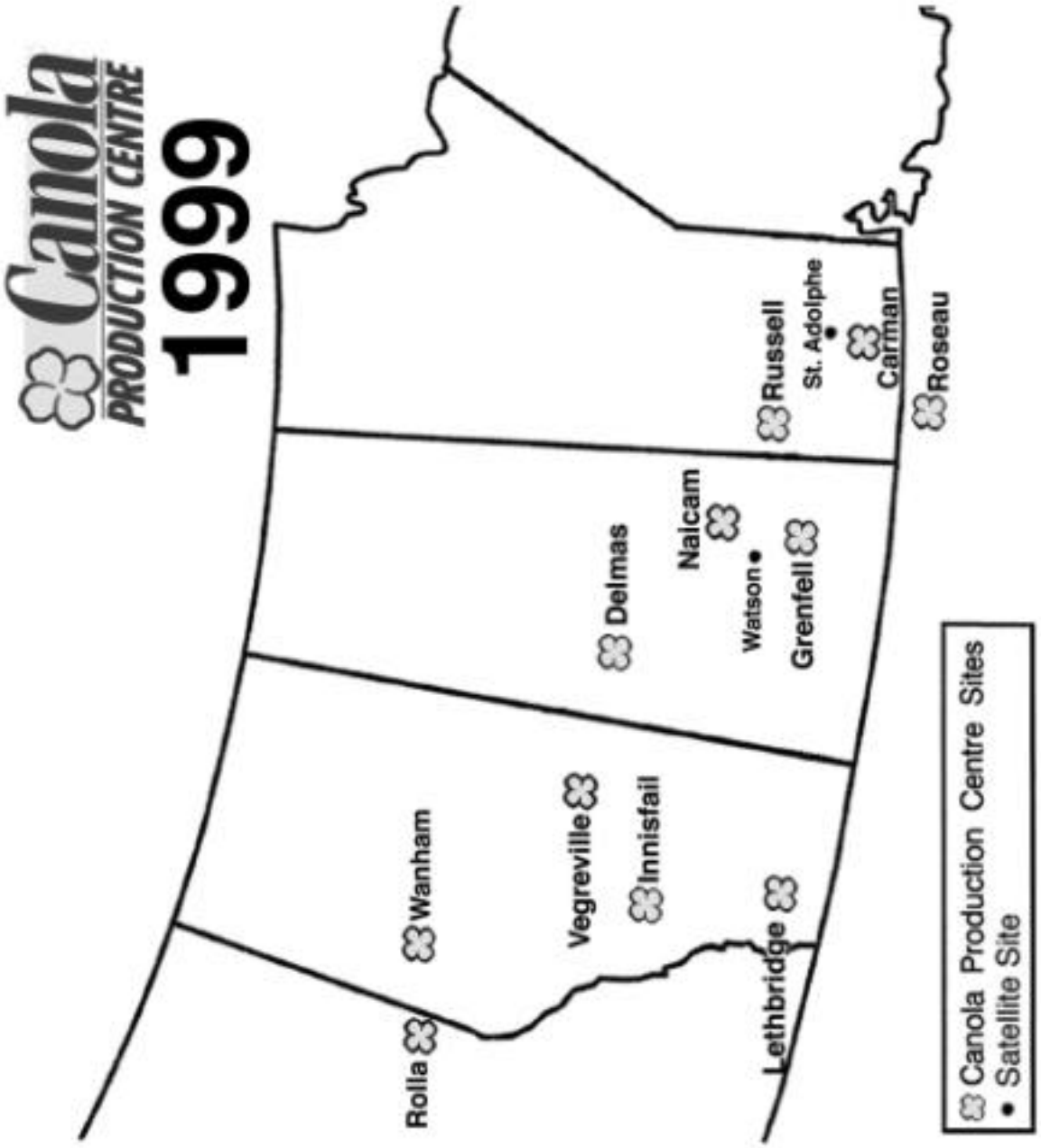
CALCULATION OF VARIABLE COSTS ($/ac)	
Seed	7.74
Fertilizer	28.66
Herbicides/Fungicides	86.61
Insecticides	11.25
Machinery	20.50
Insurance	4.95
Marketing	10.55
Interest/opportunity	5.80
Total Variable Costs	$176.06

CALCULATION OF CONTRIBUTION MARGIN				
Value of Production ($/ac)	**-**	**Variable Costs ($/ac)**	**=**	**Contribution Margin ($/ac)**
253.20	**-**	176.06	**=**	$77.14

Contribution Margin ($/ac)	**/**	**Yield (bu/ac)**	**=**	**Contribution Margin ($/bu)**
77.14	**/**	42.2	**=**	$1.83

This example was developed and prepared with assistance from Royal Bank agrologists.

V SITE LOCATION MAP



VI SITE INFORMATION

THIS IS GENERAL SITE INFORMATION THAT MAY CHANGE FOR SPECIFIC TRIALS.

Location: **Carman, MB**

Co-operator: Roy Wood

Previous crop: Fall Rye

Soil Test Results: (Enviro-Test Labs)

Organic matter content: 4.2 %

Macronutrient Levels: (0-6", 6-24")

Nitrogen -	40 lb/ac
Phosphorus-	46 lb/ac
Potassium -	510+ lb/ac
Sulphur -	72 lb/ac

Micronutrient Levels: (0-6")

Boron -	2.4 lb/ac
Copper -	3.4 lb/ac
Iron -	108 lb/ac
Zinc -	3.6 lb/ac
Chlorine -	60 lb/ac
Manganese -	27 lb/ac

Recommended Fertilizer Applications - (lb/ac of actual nutrient):

Target Yield (bu/ac)	Probability of Precip. (%)	Precip. Required (Inches)	Nitrogen	Phosphate	Potash	Sulphur
45	25	10.6	105-115	20-25	0-15	25-30
37	50	8.3	100-110	15-20	0-15	20-25
27	75	5.3	85-95	5-10	0-15	15-20

Target yield: 40 bu/ac

Fertilizer applied: N - 115 lb/ac P - 23 lb/ac K - 10 lb/ac S - 25 lb/ac

Soil Association/Zone: Moist Black Central

Soil Texture: Clay

Soil pH: 7.2

Salinity: Non-saline (conductivity 0.6 mS/cm)

Tillage operations: The field was cultivated in spring to control volunteer fall rye and to dry out soil. N, K, and S were broadcast and then incorporated by cultivator and harrowed.

Seeding method: The entire site was seeded with a Morris MH-3100 hoe press drill with 7 1/2-inch spacing. The phosphate was seed-placed for all trials.

Date: May 18-June 7
Depth: 1/2" – 3/4"
Rate: 5.8 lb/ac for ***B. napus*** varieties

Herbicides applied: In crop application with Assure II (0.25 L/ac), Muster (8 g/ac) and Lontrel (0.17 L/ac)

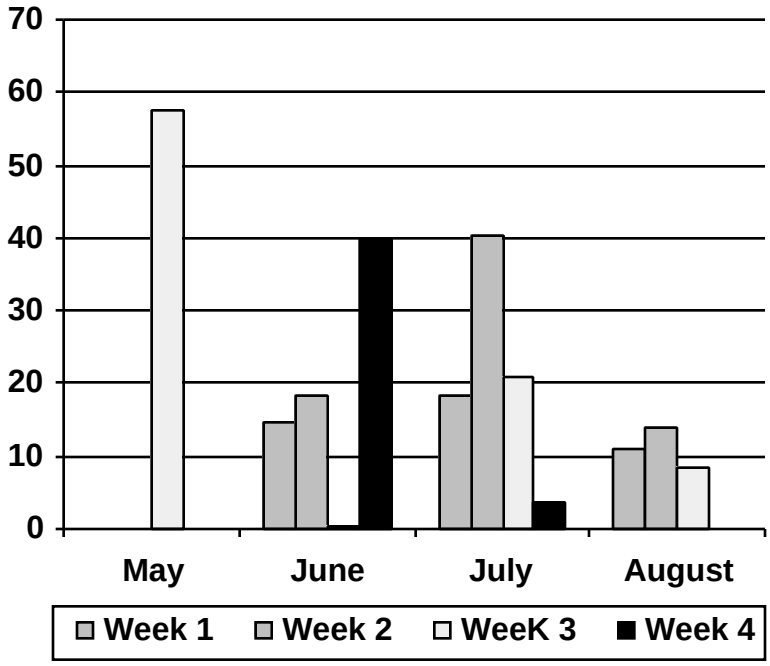
Fungicides applied: Rovral flo (0.8 L/ac)

Swathing: Started: August 17 Finished: September 2

Combining: Started: September 16 Finished: September 20

Comments: Seeding of the majority of the trials was delayed until May 30 due to wet soil conditions and frequent rainfall. Conditions at seeding were good, with ample moisture and warm soil temperatures resulting in rapid emergence. Three earlier seeded trials (May 18 & 19) were stressed by soil crusting as a result of heavy rains, requiring re-seeding (June 7) of 1 of the trials. Excessive rainfall stressed the crop significantly early in the growing season. This contributed to the potential for high sclerotinia pressure. Lack of rainfall from end of flowering through harvest limited disease development. Flea beetles, lygus bugs and root maggots were observed but levels of damage were low.

Rainfall



Total accumulated moisture = 247.6 mm (9.7 Inches)

Location:	**Russell, MB**

Co-operator: James Ungrin

Previous crop: Wheat

Soil Test Results: (Enviro-Test Labs)

Organic matter content: NA

Macronutrient Levels:(0-6", 6-24")

Nitrogen -	52 lb/ac
Phosphorus -	10 lb/ac
Potassium -	538 lb/ac
Sulphur -	33 lb/ac

Micronutrient Levels: (0-6")

Boron -	3.2 lb/ac
Copper -	1.5 lb/ac
Iron -	44 lb/ac
Zinc -	4.5 lb/ac
Chlorine -	17 lb/ac
Manganese -	32 lb/ac

Recommended Fertilizer Applications - (lb/ac of actual nutrient):

Target Yield (bu/ac)	Probability of Precip. (%)	Precip. Required (Inches)	Nitrogen	Phosphate	Potash	Sulphur
45	25	9.7	75-85	40-45	0-15	25-30
37	50	7.7	70-80	35-40	0-15	20-25
27	75	4.7	55-65	20-25	0-15	15-20

Target yield: 40 bu/ac

Fertilizer applied: N - 85 lb/ac P - 39 lb/ac K - 15 lb/ac S - 24 lb/ac

Soil Association/Zone: Moist Black Northwest

Soil Texture: Clay loam

Soil pH: 7.6

Salinity: Non-saline (conductivity 0.4 mS/cm)

Tillage operations: All fertilizer (with the exception of some of the phosphate) was banded in the spring with a 40-foot John Deere air seeder. The field was worked once the previous fall.

Seeding method: All trials were seeded with a Morris MH-3100 hoe press drill with a 7 1/2 inch spacing. Some of the phosphate fertilizer (24 lb/ac actual) was seed placed.

Date: May 27-28
Depth: 3/4
Rate: 5.8 lb/ac for ***B. napus*** varieties
Soil Temp: 11°C

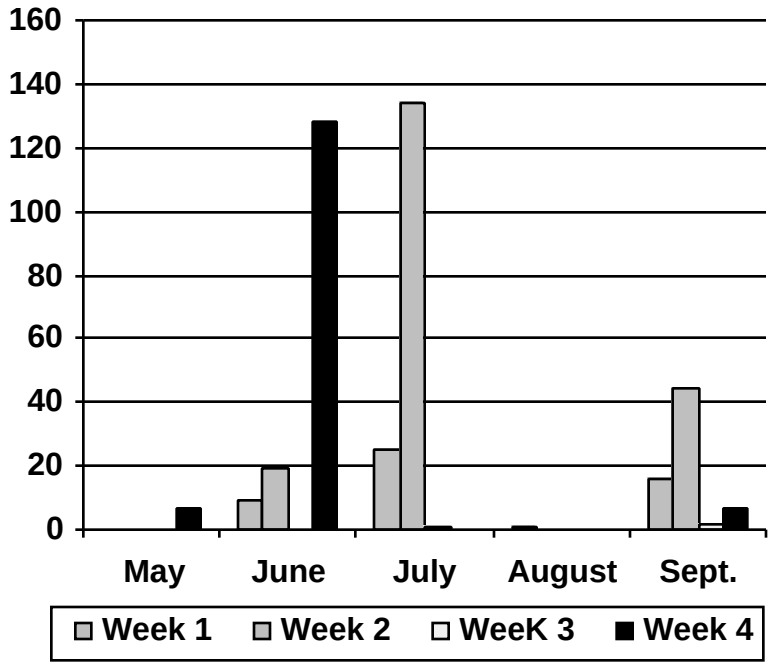
Herbicides applied: In crop application with Select (0.08 L/ac), Muster (8 g/ac) and Lontrel (0.17 L/ac)

Swathing: Started: August 16 Finished: September 9

Combining: Started: September 23 Finished: September 30

Comments: While rains early in May delayed seeding, conditions were ideal when seeding took place. Excellent moisture and warm soil temperatures resulted in rapid emergence. Rainfall was frequent over much of the growing season, which hampered herbicide applications and other activities. Weeds were present in high numbers, and included Canada thistle, wild mustard, wild oats and a few cleavers. Sclerotinia pressure was low and no damage due to insect pressure was observed.

Rainfall



Total accumulated moisture = 392.4 mm (15.4 Inches)

Location:	**Kelburn Farm, St. Adolphe, MB**

Co-operator: James Richardson International

Previous crop: Wheat

Target yield: 40 bu/ac

Fertilizer applied: N - 107 lb/ac P - 30 lb/ac K - 0 lb/ac S - 5 lb/ac

Soil Texture: Red River clay

Tillage operations: All fertilizer (with the exception of the phosphate) was broadcast as liquid prior to seeding. The field had been pre-worked.

Seeding method: The trial was seeded with a Morris MH-3100 hoe press drill with a 7 1/2 inch spacing. The phosphate fertilizer was seed-placed.

Date: June 2
Depth: 1/2 inch
Rate: 5.8 lb/ac

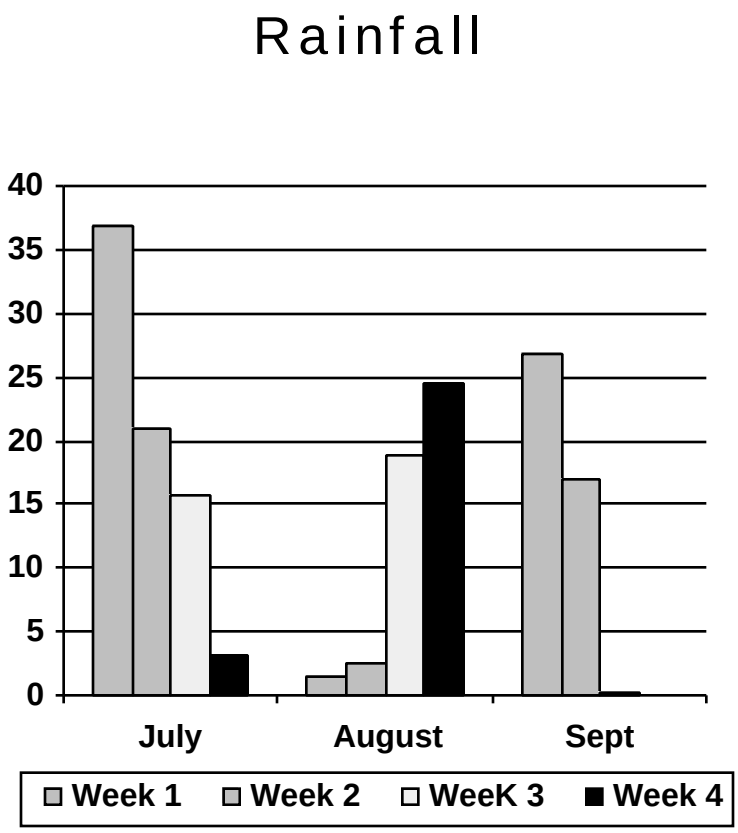
Herbicides applied: Select (0.08 L/ac) and Muster (8 g/ac)

Fungicide applied: Ronilan EG (0.3 kg/ac)

Swathing: August 28

Combining: September 20

Comments: Rains in May delayed seeding, and soil conditions when seeding finally took place were very moist. Emergence was uniform across all treatments and began about 5 days after seeding. Rainfall was frequent over much of the early part of the growing season, which hampered herbicide applications. Fungicide treatments were sprayed July 22. Wet conditions early in the season resulted in high levels of sclerotinia petal infection, but drier conditions following flowering reduced disease development. No significant damage due to insect pressure was observed.



Total accumulated moisture = 168.0 mm (6.6 Inches)

Location: Grenfell, SK

Co-operator: Lloyd Wolfe

Previous crop: Wheat

Soil Test Results: (Enviro-Test Labs)

Organic matter content: 3.4 % (0-12")

Macronutrient Levels:(0-12")		***Micronutrient Levels:(0-12")***	
Nitrogen -	26 lb/ac	Boron -	6.0 lb/ac
Phosphorus -	31 lb/ac	Copper -	5.0 lb/ac
Potassium -	1015 lb/ac	Iron -	89 lb/ac
Sulphur -	86+ lb/ac	Zinc -	3.0 lb/ac
		Manganese -	47 lb/ac
		Chlorine -	16 lb/ac

Recommended Fertilizer Applications - (lb/ac of actual nutrient):

Target Yield (bu./ac)	Probability of Precip. (%)	Precip. Required (Inches)	Nitrogen	Phosphate	Potash	Sulphur
40	<25	12.4	110-120	25-30	0-15	10-15
29	25	9.0	60-70	25-30	0-15	10-15
22	50	6.8	50-60	20-25	0-15	10-15

Target yield: 29 bu/ac

Fertilizer applied: N - 71 lb/ac P - 28 lb/ac K - 0 lb/ac S - 15 lb/ac

Soil Association/Zone: Oxbow/Black

Soil Texture: Clay Loam

Soil pH: 7.8

Salinity: Non saline (conductivity 0.5mS/cm)

Tillage operations: Site was cultivated, banded with a liquid coulter, cultivated again then harrow packed.

Seeding method: Seeded with a JD 9450 Hoe Press Drill on 7 inch row spacing:

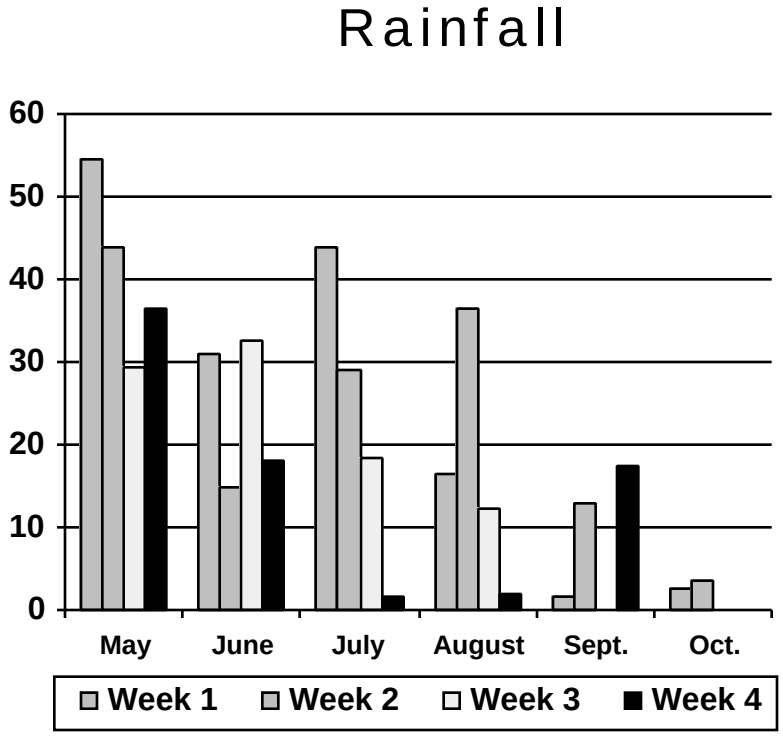
Date:	June 10, 14 and 15
Depth:	3/4 to 1"
Rate:	6.5 lb/ac for ***B. napus*** varieties
	5.0 lb/ac for InVigor ***B. napus*** varieties
Soil Temp:	13 - 17ºC to a depth of 1 1/2 "

Herbicides applied: Pre-seeding burn off with Roundup on June 5 at 1.0 L/ac. In crop application with Select (0.08 L/ac or 40 ac/case), Muster (12 g/ac or 26 ac/pouch) was applied at the 2 to 3 leaf stage over a 2 day period.

Swathing: Started: September 8 Finished: September 17

Combining: Started: September 22 Finished: October 8

Comments: The site received a tremendous amount of rainfall during the spring, resulting in a late seeding date. Crop emergence was rapid but uneven. Weed competition did not hamper early crop development. Weed competition was from volunteer wheat, redroot pigweed and wild buckwheat. The excessive moisture resulted in a shallow rooting system. This raised concerns about the possible effects of leaching and denitrification of nutrients. Petal test results indicated heavy infection levels of sclerotinia (80%). Given drier conditions at flowering and uneveness of the crop stand, a decision not to apply a fungicide was made. There was little evidence of blackleg or alternaria black spot. Diamondback moth, bertha armyworm and lygus bug levels were low. No apparent damage was evident. Flea beetles were evident during mid to late June but damage was minor.



Total accumulated moisture = 459 mm (18.4 inches)

Location: **Watson, SK**

Co-operator: ADM Agri-Industries Ltd.

Previous crop: Wheat/Canola

Soil Test Results: (Enviro-Test Labs)

Organic matter content: 6.3 % (0-6")

Macronutrient Levels: (0 - 12")		***Micronutrient Levels: (0 - 12")***	
Nitrogen -	28 lb/ac	Boron -	5.3 lb/ac
Phosphorus-	30 lb/ac	Copper -	3.0 lb/ac
Potassium -	907 lb/ac	Iron -	135 lb/ac
Sulphur -	19 lb/ac	Zinc -	4.5 lb/ac
		Manganese -	45 lb/ac
		Chlorine -	14 lb/ac

Recommended Fertilizer Applications - (lb/ac of actual nutrient):

Target Yield (bu/ac)	Probability of Precip. (%)	Precip. Required (Inches)	Nitrogen	Phosphate	Potash	Sulphur
40	<25	12.4	105-115	25-30	0-15	25-30
29	25	9.0	55-65	25-30	0-15	25-30
22	50	6.8	45-55	20-25	0-15	20-25

Target yield: 32 bu/ac

Fertilizer applied: N - 85 lb/ac P - 26 lb/ac K - 0 lb/ac S - 25 lb/ac

Soil Association/Zone: 70% - Oxbow, 30% - Yorkton/Black to Thick Black

Soil Texture: Silty Clay Loam to Clay Loam

Salinity: 10% strong salinity occurring throughout depressions and slough edges (conductivity 8 -16 mS/cm), balance of the field non saline (conductivity 0.2 mS/cm)

Tillage operations: Anhydrous ammonia was banded with a Bourgault chisel plow into standing stubble then harrowed.

Seeding method: Seeded with a Bourgault air drill and JD 9450 hoe press drill

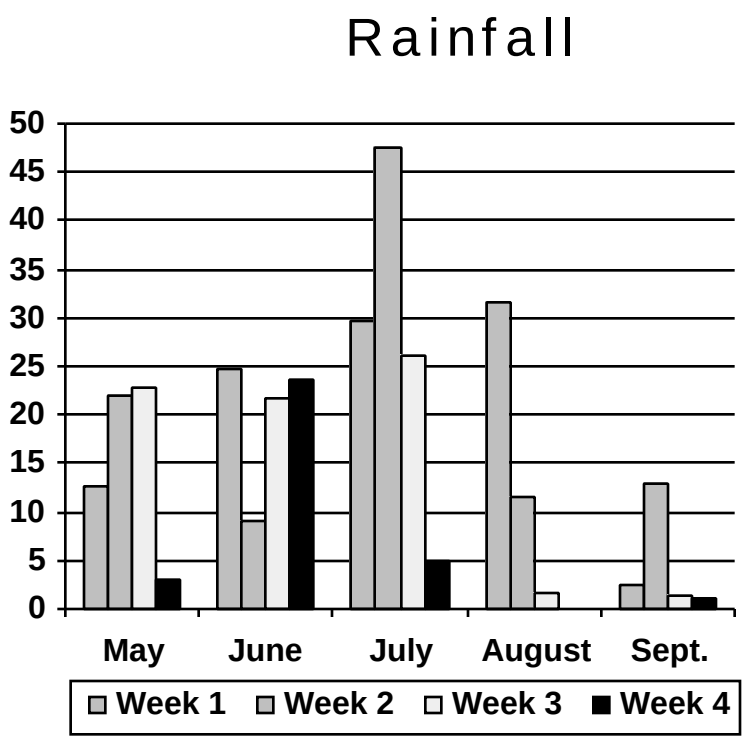
Date: May 27 and 29
Depth: Wheat 1 to 2", canola 3/4 to 1"
Rate: Wheat 1.5 bu/ac, canola 6.5 lb/ac
Soil Temp: 14.1ºC to a depth of 1.5"

Herbicides applied: Pre-seeding burn off of Roundup was applied on May 20 at 1.0 L/ac. In crop application with Buctril M (0.405 L/ac or 20 ac/jug) was applied at the 5 leaf stage, followed by Lontrel (0.14 L/ac or 32 ac/jug) for the wheat. In crop application with Select (0.08 L/ac or 40 ac/case), Muster (12 g/ac or 40 ac/pouch) tank mix at the 4 leaf stage for the canola. Lontrel (0.17 L/ac or 26 ac/jug) was applied 4 days later.

Swathing: Started: September 7 Finished: September 15

Combining: Started: September 30 Finished: September 30

Comments: Canola emergence was patchy due to heavy wheat residue. Wheat emergence was good. Canada and sow thistle, stinkweed, wild mustard, volunteer canola and wheat were abundant. The site received above average precipitation and average heat units. Petal test kits indicated a moderate level of sclerotina stem rot infestation. Due to reduced emergence (60 plants/metre square) no fungicide was applied. Harvest conditions were good.



Total accumulated moisture = 310 mm (12.4 inches)

Location:	**Naicam, SK**

Co-operators: Eric Cropper
Naicam Marketing Club
Ron Loyns

Previous crop: Barley

Soil Test Results: (Enviro-Test Labs)

Organic matter content: 6.2% (0-12")

Macronutrient Levels: (0-12")		***Micronutrient Levels: (0-12")***	
Nitrogen -	42 lb/ac	Boron -	6.4 lb/ac
Phosphorus -	28 lb/ac	Copper -	3.8 lb/ac
Potassium -	656 lb/ac	Iron -	158 lb/ac
Sulphur -	62 lb/ac	Zinc -	5.2 lb/ac
		Manganese -	42 lb/ac
		Chlorine -	18 lb/ac

Recommended Fertilizer Applications - (lb/ac of actual nutrient):

Target Yield (bu/ac)	Probability of Precip. (%)	Precip. Required (Inches)	Nitrogen	Phosphate	Potash	Sulphur
40	<25	11.6	65-75	25-30	0-15	10-15
33	25	9.5	30-40	25-30	0-15	10-15
24	50	7.0	20-25	20-25	0-15	10-15

Target yield: 40 bu/ac

Fertilizer applied: N - 79 lb/ac P - 26 lb/ac K - 0 lb/ac S - 12 lb/ac

Soil Association/Zone: Oxbow, Black Chernozemic soils formed in loamy glacial till/Black
Soil Texture: Loam

Salinity: Non saline (conductivity 0.2mS/cm)

Tillage operations: Anhydrous ammonia was applied with 3/4" knife opener into standing stubble and then heavy harrowed

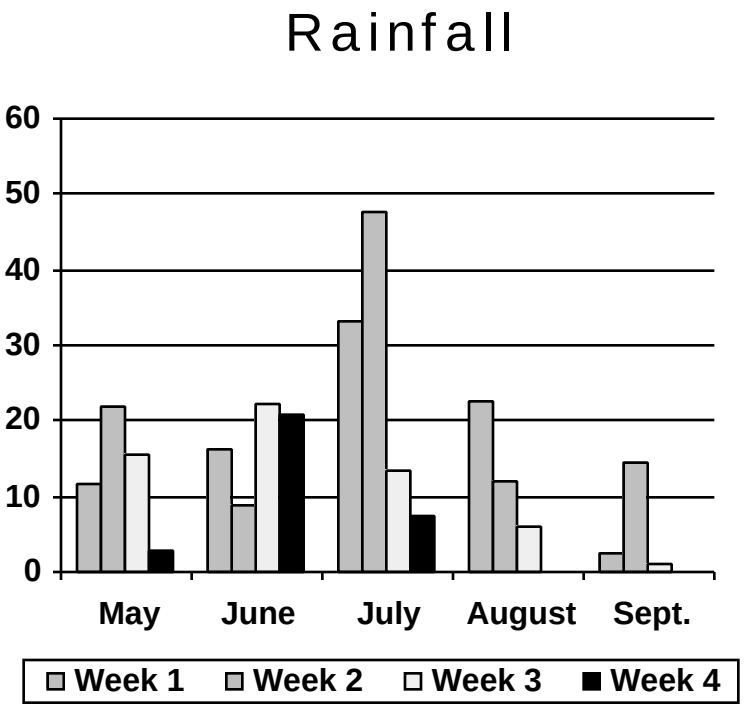
Seeding method: Seeded with a JD 9450 Hoe Press Drill with 7 inch row spacing.
Date: May 8 to 10
Depth: 3/4 to 1"
Rate: 6.5 lb/ac for ***B. napus*** varieties
5.0 lb/ac for InVigor ***B. napus*** varieties
Soil Temp: 5ºC to 7ºC at a depth of 1 1/2″

Herbicides applied: Post seeding burn off with Roundup on May 14 at a 1/2 L/ac. In crop application with Select (0.08 L/ac or 40 ac/case), Muster (12 g/ac or 26 ac/pouch) and Lontrel (0.22 L/ac or 20 ac/jug) at the 1 to 2 crop leaf stage. Either Ronilan EG or Rovral flo were applied at approximately the 35 to 45 percent bloom stage.

Swathing: Started: August 19 Finished: September 1

Combining: Started: September 9 Finished: September 10

Comments: Cool soil temperatures delayed crop emergence until the third week of May. Emergence was excellent throughout the field. Some patchy emergence occurred in areas with heavy quack grass pressure. Volunteer barley and quackgrass were the predominant weeds. Petal test results indicated sclerotinia stem rot was heavy (90%). Adequate rainfall, warm temperatures and a heavy crop canopy required fungicides to be applied. There was little evidence of blackleg or alternaria black spot. Diamondback moth, bertha armyworm, root maggots and lygus bug levels were low. Flea beetle pressure was high during emergence and tapered off by the second week of June. Damage was most apparent in treatments next to 1998 canola stubble and field edges.



Total accumulated moisture = 281mm (11.2 inches)

Location:	**Delmas, SK**

Co-operator: Andre Blais

Previous crop: Canary Seed

Soil Test Results: (Enviro-Test Labs) 0-12" sample

Organic matter content: ***3.9***%

Macronutrient Levels:(0-12")		***Micronutrient Levels: (0-12")***	
Nitrogen -	26 lb/ac	Copper -	2.2 lb/ac
Phosphorus -	60 lb/ac	Iron -	226 lb/ac
Potassium -	1132 lb/ac	Zinc -	19.8 lb/ac
Sulphur -	20 lb/ac	Manganese -	74 lb/ac
		Boron -	5.3 lb/ac
		Chloride -	8.0 lb/ac

Recommended Fertilizer Applications - (lb/ac of actual nutrient):

Target Yield (bu/ac)	Probability of Precip. (%)	Precip. Required (Inches)	Nitrogen	Phosphate	Potash	Sulphur
32	25	9.0	75-85	20-25	0-15	25-30
25	50	6.8	65-75	15-20	0-15	20-25
15	75	3.7	40-50	5-10	0-15	15-20

Target yield: 32 bu/ac

Fertilizer applied: Spring: N - 85 lb/ac P - 20 lb/ac K - 15 lb/ac S - 30 lb/ac

Soil Association/Zone: Cutknife/Black

Soil Texture: Loam

Salinity: Non-Saline (conductivity 0.2 mS/cm)

Tillage operations: spring banding with coulter

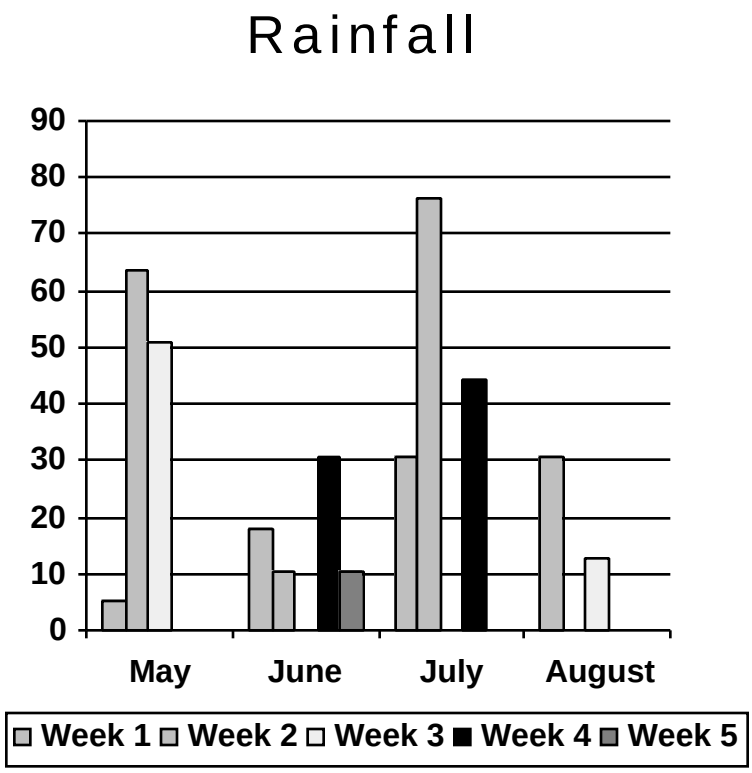
Seeding method: Seeded with a John Deere 9450 hoe press drill with 7" spacings
Date: May 18 to 20
Depth: 3/4"
Rate: 6 lbs/ac ***B. napus***

Herbicides applied: Pre-seeding burn off with Roundup at 1.0 L/ac. In crop application with Assure (0.4 L/ac) and Lontrel (0.23 L/ac)

Swathing: Started: August 27 Finished: September 10

Combining: Started: September 25 Finished: September 30

Comments: Rainy weather delayed seeding until the third week in May. Rapid crop emergence occurred evenly throughout the field. Heavy wild oat infestations and dry conditions in early June hampered crop development. Crop conditions improved quickly with frequent rains at the end of June and early July. A hail storm on July 12 caused approximately fifty percent damage to all plots. Crop development was delayed due to cool weather and hail damage. Hail damaged plants matured unevenly and some problems with green seed were experienced.



Total accumulated moisture = 15.0 inches (381 mm)

Location:	**Vegreville, AB**

Co-operator: Durlowe Farm

Previous crop: Wheat

Soil Test Results: (Enviro-Test Labs) 0-12" sample

Organic matter content: ***6.5***%

Macronutrient Levels:(0-12")		***Micronutrient Levels: (0-12")***	
Nitrogen -	36 lb/ac	Copper -	2.6 lb/ac
Phosphorus -	70 lb/ac	Iron -	585 lb/ac
Potassium -	979 lb/ac	Zinc -	31.6 lb/ac
Sulphur -	32 lb/ac	Manganese -	66 lb/ac
		Boron -	7.7 lb/ac
		Chloride -	12.0 lb/ac

Recommended Fertilizer Applications - (lb/ac of actual nutrient):

Target Yield (bu/ac)	Probability of Precip. (%)	Precip. Required (Inches)	Nitrogen	Phosphate	Potash	Sulphur
34	25	9.5	70-80	20-25	0-15	15-20
27	50	7.5	60-70	15-20	0-15	10-15
19	75	4.8	45-55	5-10	0-15	5-10

Target yield: 34 bu/ac

Fertilizer applied: Spring: N - 70 lb/ac P - 20 lb/ac K - 10 lb/ac S - 20 lb/ac

Soil Association/Zone: 40% - Angus Ridge, 30% - Ponoka, 15% - Camrose, 10% - sloughs/Black

Soil Texture: Clay Loam

Salinity: Non-Saline (conductivity 0.3 mS/cm)

Tillage operations: Fall cultivation, spring cultivation/banding

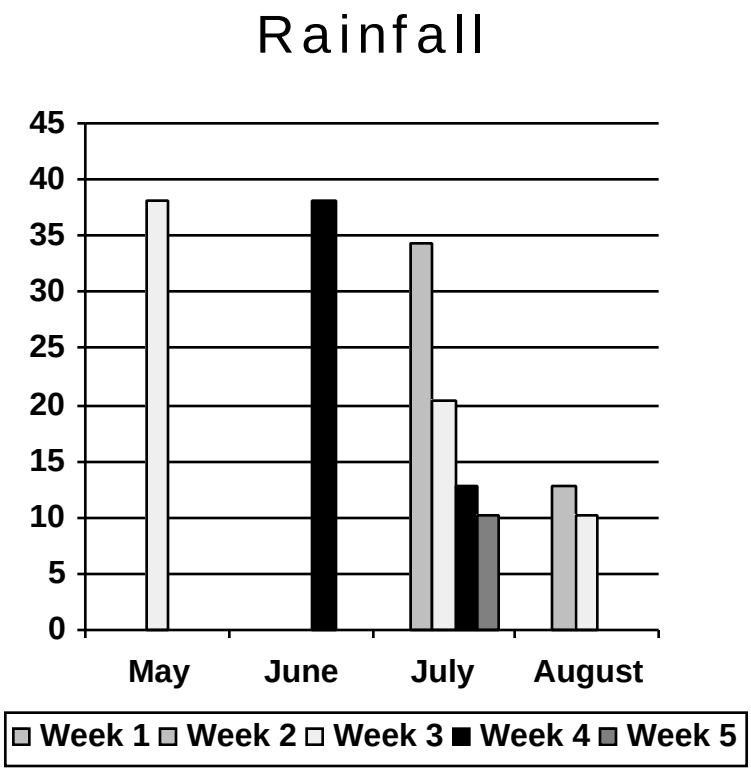
Seeding method: Seeded with a John Deere 9450 hoe press drill with 7" spacings
Date: May 6 and May 22 to 23
Depth: 3/4"
Rate: 6 lbs/ac ***B. napus***

Herbicides applied: In crop application with Assure (0.3L/ac) and Muster (8 g/ac) and an application of Lontrel (0.23L/ac) 5 days later.

Swathing: Started: August 27 Finished: September 6

Combining: Started: September 21 Finished: September 23

Comments: Rainy weather delayed seeding until the third week in May. Rapid crop emergence occurred evenly throughout the field. Dry weather throughout the growing season produced light crop stands. The crop was able to compensate because of cool temperatures and low disease pressure. Yields were excellent. Lygus bug numbers were below threshold numbers.



Total accumulated moisture = 6.55 inches (166mm)

Location: Lethbridge, AB (Irrigation)

Co-operator: Tom & Joe Shigehiro

Previous crop: Wheat

Soil Test Results: (Enviro-Test Labs)

Organic matter content: 1.9% (0-6")

Macronutrient Levels: (0-12")		***Micronutrient Levels: (0-12")***	
Nitrogen -	43 lb/ac	Boron -	1.5 lb/ac
Phosphorus -	29 lb/ac	Copper -	2.3 lb/ac
Potassium -	540 lb/ac	Iron -	18 lb/ac
Sulphur -	32 lb/ac	Zinc -	0.9 lb/ac
Sulphur- (12-24")	96 lb/ac	Manganese -	5 lb/ac

Recommended Fertilizer Applications - (lb/ac of actual nutrient):

Target Yield (bu/ac)	Probability of Precip. (%)	Precip. Required (Inches)	Nitrogen	Phosphate	Potash	Sulphur
60	na	22.4	100-110	25-30	0-15	20-25
48	na	18.1	60-75	25-30	0-15	20-25
43	na	16.1	60-70	25-30	0-15	0-15

Target yield: 60 bu/ac

Fertilizer applied: N - 121 lb/ac P - 28 lb/ac K - 0 lb/ac S - 24 lb/ac

Soil Association/Zone: 60% Lethbridge lacustrine, 40% Ready made till/Brown

Soil Texture: Clay Loam

Salinity: Non saline (conductivity 0.2 mS/cm)

Tillage operations: Cultivated and heavy harrowed in the fall of 1998. Urea and ammonium sulphate was spring broadcast and incorporated. Then harrow packed prior to seeding.

Seeding method: Seeded with a JD 9450 Hoe Press Drill with 7" spacings
Date: May 7 and 8
Depth: 1/2 to 3/4"
Rate: 5.0 lbs/ac ***B. napus***
Soil Temp: 12°C at a depth of 1"

Herbicides applied: In-crop application with Muster Gold II (10 g/ac Muster, 200 ml/ac Assure), and Lontrel (170 ml/ac).

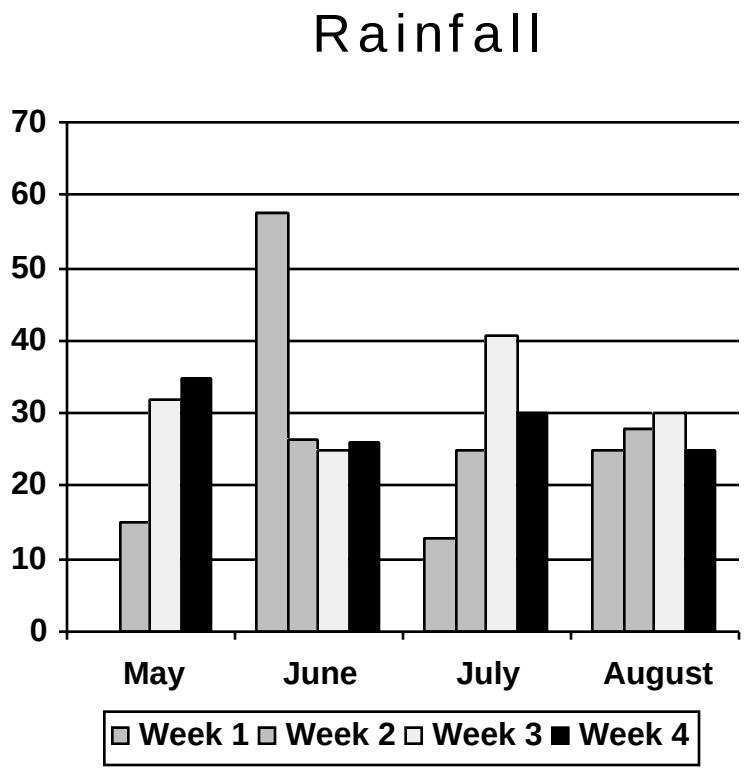
Fungicides/Insecticides: Benlate (0.4 kg/ac)

Swathing: Started: August 28 Finished: August 30

Combining: Started: September 22 Finished: September 24

Comments:

Good subsurface moisture along with snow and rain after seeding resulted in even emergence. Minimal crop residue allowed for greater warming of the soil surface, preventing damage from an early June frost that occurred in the area. Cool conditions during the growing season slowed development of the crop. The cabbage seedpod weevil was present at the site feeding on emerging flowers. This feeding resulted in blanks on the main stem. The canola plants were able to compensate because of good moisture and fertility. As a result of these observations spraying for the weevil was not done. Petal testing for sclerotinia was done at early flower. The test revealed a 23% infection level. It was decided, because of dense canopy cover and high yield potential, that a fungicide be applied. Benlate was applied on July 7. As swathing time approached, newly emerged cabbage seedpod weevil adults were observed to be feeding on the maturing pods. Examination of the seeds within the pod showed that where the weevil had fed only an outer shell of the seed was present. Losses due to the feeding were estimated to be below 10%. The canola crop matured rapidly because of hot dry conditions. Most swathing was completed in the evening to reduce the risk of green seed due to rapid dry down.



Total accumulated moisture = 433 mm (Irrigation - 207mm, 8.2 inches) + (rainfall - 226.9 mm, 8.9 inches)

Location: Lethbridge, AB (Dryland)

Co-operators: Rod & Ike Lanier

Previous crop: Wheat

Soil Test Results: (Enviro-Test Labs)

Organic matter content: 2.6% (0-6")

Macronutrient Levels: (0-12")		***Micronutrient Levels: (0-12")***	
Nitrogen -	17 lb/ac	Copper -	2.1 lb/ac
Phosphorus -	45 lb/ac	Iron -	92 lb/ac
Potassium -	510 lb/ac	Zinc -	1.7 lb/ac
Sulphur -	29 lb/ac	Manganese -	33 lb/ac
Sulphur (12-24") -	46 lb/ac	Boron -	1.2 lb/ac

Recommended Fertilizer Applications - (lb/ac of actual nutrient):

Target Yield (bu/ac)	Probability of Precip. (%)	Precip. Required (Inches)	Nitrogen	Phosphate	Potash	Sulphur
16	50	6.1	15-25	15-20	0-15	10-15
22	25	8.2	30-40	20-25	0-15	15-20
35	25	12.5	60-70	20-25	0-15	15-20

Target yield: 35 bu/ac

Fertilizer applied: N - 79 lb/ac P - 22 lb/ac K - 0 lb/ac S - 18 lb/ac

Soil Association/Zone: 85% Lethbridge lacustrine, 15% Ready made till/Brown

Soil Texture: Loam

Salinity: Non saline (conductivity 0.3 mS/cm)

Tillage operations: Anhydrous ammonia at 60 lbs N per acre was banded with a coulter applicator into standing stubble in the fall of 1998. The field was spring harrowed, then direct seeded.

Seeding method: Seeded with a JD 9450 Hoe Press Drill with 7" spacings

Date: April 22 - May 5
Depth: 3/4"
Rate: 6.0 lbs/ac ***B. napus***
Soil Temp: 1ºC (April 22) - 12ºC (May 5)

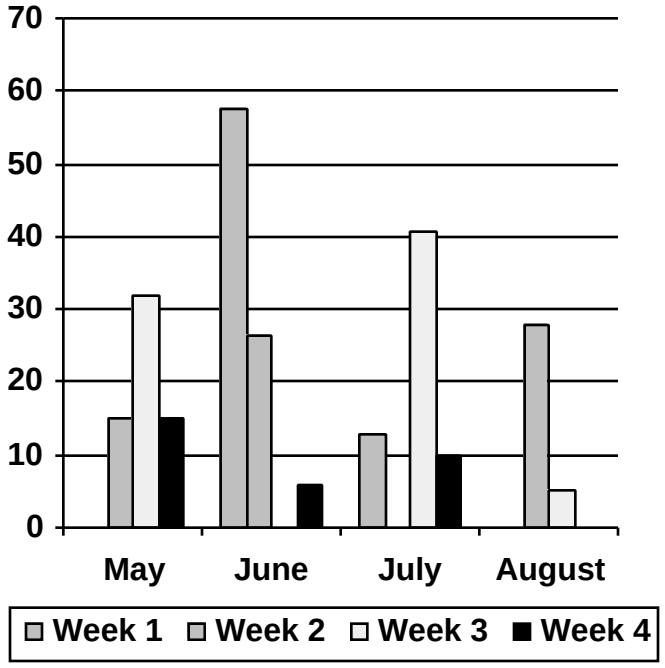
Herbicides applied: Pre-seeding burn off with Roundup Transorb at a rate of 500 ml/ac. In crop application of Muster Gold II (Assure 200 ml/ac, Muster 10 g/ac), Lontrel spot application (170 ml/ac)

Swathing: Started: August 17 Finished: August 25

Combining: Started: September 20 Finished: September 22

Comments: Good spring soil moisture resulted in even emergence. Cool conditions and heavy crop residue kept soil temperatures cool, which resulted in slow growth. A frost on June 7 resulted in variable crop damage at the site. It was observed that plants growing in areas with heavy crop residue had more visible damage than plants that had more exposed soil surrounding them. Recovery from the frost was slow but no plant losses were observed. Although the frost did not kill many plants, it was observed that the plants with the greatest frost damage did not fully recover (short and spindly plants). Cabbage seedpod weevils were noticed early in the season feeding on emerging buds. This created blanks on the main stem. Control measures were not used, as ongoing research of the seedpod weevil was being conducted on site. As the crop was nearing maturity, examination of pods on the main stem revealed damage from the emerging weevil larvae. The damage was assessed as moderate. Holes in the pods allowed for fungal infection to occur, damaging the remaining seeds in the pods. The cooler conditions during the growing season delayed maturity at the site. This allowed emerging seedpod weevil adults to feed on maturing seeds. Damage from the adults is similar to lygus bug. At swathing time, it was noticed that just an empty outer shell of the seed was left inside the pod where the weevil attacked. It was estimated that 20% of the yield potential for the site was lost. Premature ripening and shelling of pods occurred as a result of the weevil damage and associated fungal infection. Shelling was minimal. Premature ripening of the affected pods made judging the best time to swath challenging. To maximize yield of the site, swathing occurred when the majority of the plants were at 30-40% seed colour change, leaving the damaged pods to shell. Most swathing was done at night to minimize green seed. Conditions after swathing were poor with very little moisture or humidity to clear chlorophyll.

Rainfall



Total accumulated moisture = 226.9 mm (8.9 inches)

Location:	**Innisfail, AB**

Previous crop: Barley

Soil Test Results: (Enviro-Test Labs)

Organic matter content: 7.3% (0-6")

Macronutrient Levels: (0-12")		***Micronutrient Levels: (0-12")***	
Nitrogen -	56 lb/ac	Copper -	1.9 lb/ac
Phosphorus -	24 lb/ac	Iron -	134 lb/ac
Potassium -	353 lb/ac	Zinc -	5.5 lb/ac
Sulphur -	86 lb/ac	Manganese -	14 lb/ac
Sulphur (12-24") -	44 lb/ac	Boron -	2.1 lb/ac

Recommended Fertilizer Applications - (lb/ac of actual nutrient):

Target Yield (bu/ac)	Probability of Precip. (%)	Precip. Required (Inches)	Nitrogen	Phosphate	Potash	Sulphur
23	75	5.3	35-45	10-15	0-15	5-10
33	50	8.3	50-60	20-25	0-15	10-15
41	25	10.6	55-65	25-35	0-15	10-15

Target yield: 35 bu/ac

Fertilizer applied: N - 56 lb/ac P - 27 lb/ac K - 10 lb/ac S - 10 lb/ac

Soil Association/Zone: Black

Soil Texture: Clay

Salinity: Non saline (conductivity 0.6 mS/cm)

Tillage operations: Fall cultivated and harrowed. Spring broadcast and incorporation of urea (50 lbs N/ac), potash (10 lbs K/ac) and sulphate (10 lbs/ac). Harrow packed then seeded.

Seeding method: Seeded with a JD 9450 Hoe Press Drill with 7" spacings

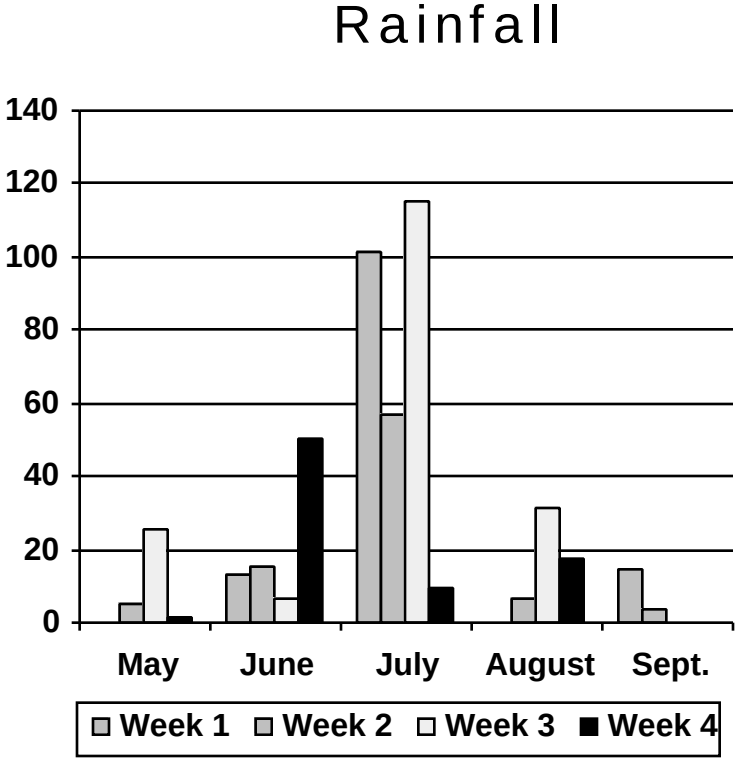
Date: May 17, 18 and 24
Depth: 1/2 - 3/4"
Rate: 5.5 lbs/ac ***B. napus***
Soil Temp: 12ºC

Herbicides applied: Fall applied Roundup Transorb (1.0 L/ac). In crop application with Muster Gold II (Assure 200 ml/ac, Muster 12 g/ac) and Lontrel (190 ml/ac). Rovral flo (400 g/ac) for sclerotinia.

Swathing: Started: September 13 Finished: September 15

Combining: Started: October 5 Finished: October 8

Comments: Initial spring soil moisture conditions were good. Emergence was even. Weed pressures at the site were heavy with high populations of volunteer cereals and wild oats. A hail storm at the site in early July resulted in stripped leaves but no stem breakage. Ten inches of rain over a 14 day period in July created flooding problems, resulting in drowned out areas and stressed plants. Plants at the site were short and spindly with shallow root systems in most areas. The exceptions were the hilltops, which were lush and heavily lodged. Insect problems were minimal. Maturity at the site was slow due to cool conditions during the season.



Total accumulated moisture = 468.4 mm (18.4 inches)

Location:	**Wanham, AB**

Co-operator: Dan Lane (Shane Farms)

Previous crop: Winter wheat

Soil Test Results: (*Enviro-Test Labs*)

Organic matter content:

Macronutrient Levels: (0-6", 6-12")

Nitrogen -	65 lb/ac
Phosphorus -	54+ lb/ac
Potassium -	293 lb/ac
Sulphur (0-24") -	90+ lb/ac

Micronutrient Levels: (0-6")

Boron -	1.1 lb/ac
Copper -	1.5 lb/ac
Zinc -	6.0 lb/ac
Manganese -	30 lb/ac
Chlorine -	58 lb/ac
Iron -	293 lb/ac

Recommended Fertilizer Applications - (lb/ac of actual nutrient):

Target Yield (bu/ac)	Probability of Precip. (%)	Precip. Required (Inches)	Nitrogen	Phosphate	Potash	Sulphur
37	25	9.2	75	22	10	12
29	50	6.9	60	18	10	12
21	75	4.2	45	7	10	7

Target yield: 37 bu/ac

Fertilizer applied: Fall: N - 72 lb/ac
Spring: N - 15 lb/ac P - 16 lb/ac K - 8 lb/ac S - 12 lb/ac

Soil Association/Zone: Moist Dark Grey

Soil Texture: Clay Loam (0-6 in), Clay Loam (6-24 in)

Salinity: Non-Saline (0.4 mS/cm, 1:2 soil/water)

Tillage operations: Fall heavy duty cultivated with anhydrous ammonia
Spring 1999 - heavy harrowed twice

Seeding method: Melroe Hoe Press Drill (7 inch spacing)

Herbicides applied: Fill area of the site sprayed with Roundup Transorb (0.5 L/ac) on June 7 (see trials for specifics when herbicide use was a primary component of the trial).

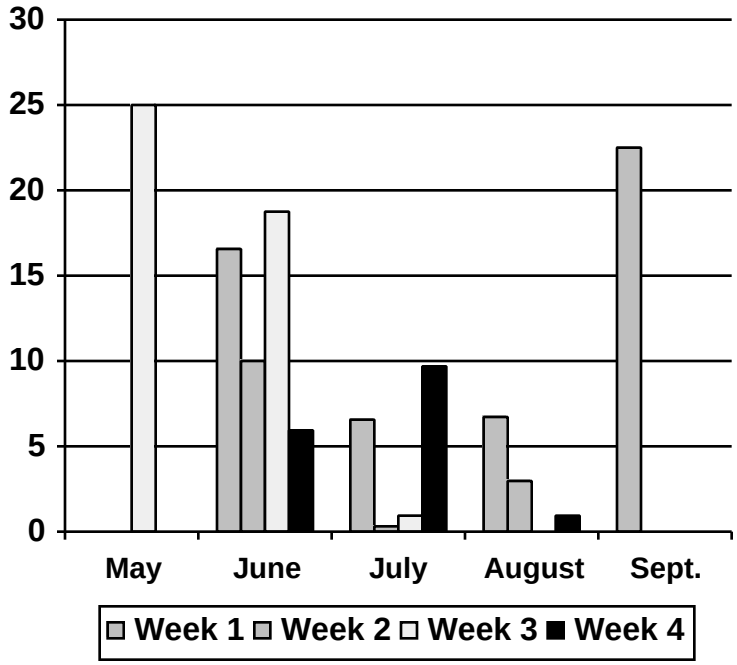
Insecticides applied: None

Swathing: Started: August 9 Finished: August 26

Combining: Started: September 10 Finished: September 14

Comments: Seeding occurred in dry soil conditions. Germination was good because 25mm of rain was received shortly after seeding was completed. The site was affected by hot, dry and windy conditions during the growing season. There were no significant insect or disease problems at this site. Dry periods during July and August limited flowering and pod development.

Rainfall



Total accumulated moisture = 136 mm (5.4 inches)

Location:	**Rolla, BC**

Co-operator: Gene Vipond (Borek Farms)

Previous crop: Spring Wheat

Soil Test Results: (*Enviro-Test Labs*)

Macronutrient Levels: (0-6", 6-12")	
Nitrogen -	166 lb/ac
Phosphorus -	60+ lb/ac
Potassium -	264 lb/ac
Sulphur (0-24") -	69 lb/ac

Micronutrient Levels: (0-6")	
Copper -	1.4 lb/ac
Iron -	358 lb/ac
Zinc -	11.9 lb/ac
Manganese -	62 lb/ac
Chlorine -	25 lb/ac
Boron -	1.2 lb/ac

Recommended Fertilizer Applications - (lb/ac of actual nutrient):

Target Yield (bu/ac)	Probability of Precip. (%)	Precip. Required (Inches)	Nitrogen	Phosphate	Potash	Sulphur
34	25	8.7	0	10	10	12
27	50	6.5	0	10	10	12
19	75	3.8	0	5	5	7.5

Target yield: 34 bu/ac

Fertilizer applied: Fall: 90 lb/ac of N (as anhydrous ammonia)
Spring: N -14 lb/ac P - 17 lb/ac K - 8 lb/ac S - 12 lb/ac

Soil Zone: Moist Dark Grey

Soil Texture: (0-6") Loam, (6-12") Clay Loam

Salinity: Non Saline (0.2 mS/cm)

Soil pH: (0-6") 5.2, (6-12") 5.9

Tillage operations: Fall 1998: heavy harrowed twice
Fall 1998: heavy duty cultivator with anhydrous (90 lb/ac of N)
Spring 1999: vibrashank with mounted harrows

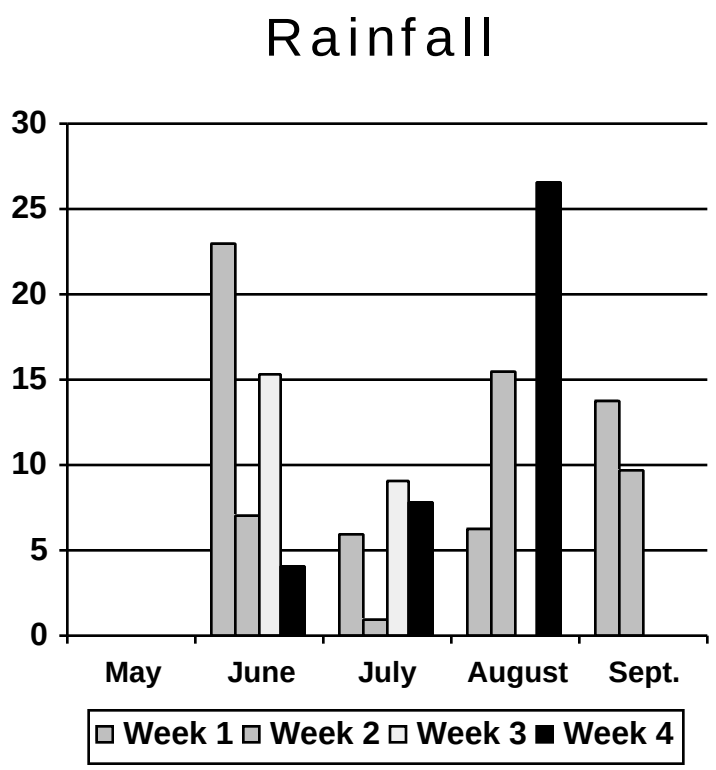
Seeding method: Melroe hoe press drill (7 inch spacing)

Herbicides applied: Roundup Transorb sprayed (June 15) on all non-plot areas. Herbicide tolerant canolas sprayed (with herbicide appropriate to variety) on June 13 -14. Conventional canola sprayed with Muster Gold II and Lontrel on June 13.

Swathing: Started: August 30 Finished: September 9

Combining: Started: September 22 Finished: September 27

Comments: The Rolla site experienced a severe hail storm in August of 1998, which shelled out the standing wheat at that time. This was the major "weed" at this site. Conditions were cool and windy until late June, and then hot and windy until well into July. Flower blasting from the hot and dry conditions limited pod development. There were no serious insect or disease problems.



Total accumulated moisture = 141.3 mm (5.7 Inches)

VII VARIETY TRIAL - *B. napus*

Objective: To evaluate agronomic differences between newly registered and recommended varieties in a given area as submitted by the seed trade.

Background: The number of varieties available makes choosing a variety for a specific farm challenging. Yield, crop quality and disease resistance are important variety traits to consider in the selection process. However, other agronomic factors such as lodging resistance and harvestability are also important factors. Varieties in the trial are selected and submitted by the seed trade. ***B. napus*** varieties are compared against two check varieties (AC Excel and Quantum). Quantum is a check commonly used by a number of seed trade participants.

Methodology: All varieties were treated pedigreed seed. The trial was made up of four replicates in a randomized block design. Identical agronomic practices were used for all varieties. The entire trial was seeded on the same day. Swathing commenced when seed colour change was 30% to 40% and harvest was completed when suitable conditions existed.

Western Canadian Summary:

Differences in yield, contribution margins, growing degree days, maturity and oil content were noted among ***B. napus*** varieties at most locations. The relative differences among varieties varied from site to site. This is expected, because of the regional adaptability of some varieties. Certain varieties may have speciality oil contracts. Therefore, check on specific premiums associated with those varieties.

Weather conditions (frost, excessive moisture, hail, drought) directly affected the yield and related contribution margins at a number of locations.

CARMAN

Observations: Seeding of this trial was delayed until May 31 by frequent rainfall and wet soil conditions. However, by seeding time the soil had dried sufficiently to provide a reasonably good seedbed, and warm temperatures resulted in rapid and uniform emergence. Weed competition was high (green foxtail, wild oats, smartweed, Canada & sow thistle, wild mustard, redroot pigweed). Frequent rains throughout the early part of the growing season stressed the crop and delayed herbicide applications until the 4 leaf stage. Assessments using the sclerotinia stem rot checklist (Canola Growers Manual, p. 1054), sclerotinia petal test kit, and moist conditions at flowering indicated a need for fungicide application. Rovral flo was applied at 40% bloom. Root maggots were present, but caused low levels of damage (see ***B. napus*** Root Maggot Monitoring Trial).

Results:

B. NAPUS VARIETY TRIAL YIELD, ECONOMIC & QUALITY RESULTS Carman, MB						
Treatment	**Yield (%)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Growing Degree Days**	**Days To Maturity**
Hyola 401	124	30.2	(5.09)	46.2	1055	84
Option 501	115	27.9	(5.85)	48.3	1087	86
Quantum	113	27.5	(8.15)	45.9	1055	84
Nexera 500	103	25.0	(26.36)	45.3	1102	87
AC Excel	100	24.3	(20.17)	47.0	1041	83
Millennium 01	98	23.7	(6.63)	49.0	1070	85
LSD		2.86		1.59		
CV %		8.7		2.7		

Note: Brackets in the contribution margin reflect a negative value.

Discussion: Three varieties tested provided a significant yield advantage compared to the check variety (AC Excel). Hyola 401 gave the highest yield and contribution margin. All varieties graded #1, so contribution margins reflected only differences in yield and seed cost. The contribution margin for the variety Millennium 01 also reflects a premium of $0.93/bu for its high erucic acid content. The negative contribution margin resulted from a combination of high input costs, low canola price and the fact that this trial was situated on part of the site which suffered from greater moisture stress and thus limited yields. Evidence of this stress included spindly stems and little branching of the plants.

The days to maturity ranged from a low of 83 for AC Excel to a high of 87 for Nexera 500. Oil contents also varied significantly, with the specialty oil variety Millennium 01 providing the most oil at 49% and Hyola 401 providing the least at 46.2%.

RUSSELL

Observations: Frequent rainfall and wet soil conditions delayed seeding of this trial until May 28, but the ample moisture and warm soil temperatures resulted in good emergence and rapid seedling growth. Weed competition was high (wild oats, Canada thistle, sow thistle, wild mustard, wild buckwheat). Frequent rains throughout the early part of the growing season stressed the crop and delayed herbicide applications until the 4 leaf stage. Assessments using the sclerotinia stem rot checklist (Canola Growers Manual, p. 1054) and sclerotinia petal test kit indicated low levels of risk for infection in spite of moist conditions at flowering. No fungicide was applied, and no significant levels of infection were noted at swathing. No significant insect damage was noted.

Results:

***B. NAPUS* VARIETY TRIAL YIELD, ECONOMIC & QUALITY RESULTS Russell, MB**							
Treatment	**Yield (%)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Growing Degree Days**	**Days To Maturity**	**Grade**
Hyola 401	124	36.7	47.47	43.1	1102	98	1
Quantum	123	36.3	57.63	45.9	1108	99	1
Nexera 500	120	35.4	39.05	44.3	1130	102	2
Option 501	113	33.4	31.93	46.9	1130	102	2
AC Excel	100	29.6	25.48	45.0	1083	95	1
Millennium 01	92	27.1	31.19	47.1	1070	94	1
LSD CV %		4.88 12.3		1.59 2.9			

Discussion: Three varieties tested provided a significant yield advantage compared to the check variety (AC Excel). Hyola 401 gave the highest yield, but Quantum provided the greatest economic return due to lower seed costs. Contribution margins reflected differences in yield, seed cost and grade (Option 501 & Nexera 500). The contribution margin for the variety Millennium 01 also reflects a premium of $0.91/bu for its high erucic acid content.

The days to maturity ranged from a low of 94 for Millennium 01 to a high of 102 for Nexera 500 and Option 501. Oil contents also varied significantly, with Millennium 01 and Option 501 providing significantly more oil than the check and Hyola 401 providing significantly less.

GRENFELL

Observations: Wet soil moisture conditions hampered seeding operations. As a result, seeding did not take place until June 14. Crop emergence was rapid but uneven. Excessive rainfall during May and June caused localized flooding in some treatments over the growing season. Herbicides applied at the 2 to 3 leaf stage of the crop resulted in good control of target weeds. With nearly ideal growing conditions, late flushes of weeds (volunteer wheat and wild buckwheat) were evident. Maturity was uneven in all treatments. Light infestations of blackleg and alternaria were observed. Some root maggot damage was evident. Sclerotinia stem rot infection levels were high, but did not warrant spraying due to uneven emergence. Lygus bug sweeps indicated very low numbers during flowering. Lygus bug counts increased during later stages of crop development and maturity, and resulted in minimal seed damage.

Results:

B. NAPUS VARIETY TRIAL YIELD, ECONOMIC & QUALITY RESULTS Grenfell, SK							
Treatment	**Yield (%)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Growing Degree Days**	**Days To Maturity**	**Grade**
Magnum	107	27.4	21.61	48.8	1029	94	2
Quantum	105	27.0	24.01	49.1	1040	95	1
AC Excel	100	25.6	23.10	50.2	1029	94	1
Nexera 500	99	25.4	10.49	49.3	1029	94	1
Option 501	93	23.7	(1.37)	49.9	1040	95	2
Sentry	90	23.0	3.70	49.8	1029	94	1
Millennium 01	84	21.6	14.64	50.7	1012	90	1
LSD		3.18		1.35			
CV %		10.5		2.2			

Note: Brackets in the contribution margin reflect a negative value.

Discussion: Among the ***B. napus*** varieties only Millennium 01 yielded significantly different than the check variety (AC Excel). In contrast, two varieties (Millennium 01 and Sentry) yielded significantly lower than the industry check (Quantum). Only yield differences of 3.18 bu/ac or more are significant. Although Millennium 01 yielded significantly less than the check, the $0.91/bu premium paid on high erucic acid varieties resulted in a comparable contribution margin. Contribution margins reflect differences in yield and seed cost and in the case of Magnum and Option 501, grade.

Days to maturity (30% seed colour change) ranged from 90 to 95 days. The oil contents varied from 48.8% to 50.7%.

NAICAM

Observations: This trial was seeded May 8 into excellent soil moisture. Cool soil temperatures delayed emergence until May 26. Weed pressure was moderate to heavy, and included volunteer wheat, stinkweed, wild mustard and Canada thistle. Cleavers were also identified, but in very low numbers. Herbicides applied at the 1 to 2 leaf stage of the crop resulted in good control of target weeds. With ideal growing conditions, late flushes of weeds (volunteer wheat and Canada thistle) were evident. Maturity was even for all treatments.

Disease and insect infestations were low. A petal test kit was used and this together with adequate rainfall and heavy crop canopy indicated a high potential for sclerotinia infection (90%). Fungicide (Rovral flo) was applied at approximately 45% bloom, which was later than the recommended 30% bloom stage due to rain delays. As a result sclerotinia stem rot lesions were highly evident at swathing.

Results:

***B. NAPUS* VARIETY TRIAL YIELD, ECONOMIC & QUALITY RESULTS Naicam, SK**							
Treatment	**Yield (%)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Growing Degree Days**	**Days To Maturity**	**Grade**
IMC 105	110	46.5	109.52	45.7	1080	108	1
Option 501	104	44.0	68.46	46.4	1080	108	2
Quantum	104	43.8	79.19	46.4	1049	106	1
Nexera 500	101	42.8	69.12	46.3	1099	109	1
Magnum	101	42.5	62.94	46.9	1099	109	2
AC Excel	100	42.2	77.14	46.6	1080	108	1
Sentry	99	41.9	70.96	45.9	1080	108	1
Millennium 01	87	37.4	78.45	47.7	1019	104	1
LSD		1.86		1.32			
CV %		3.6		2.3			

Discussion: Yield differences of 1.86 bu/ac or more are significant. Only one variety (IMC 105) yielded significantly higher than AC Excel and Quantum. Although Millennium 01 yielded significantly less than the check, the $0.91/bu premium paid for high erucic acid varieties resulted in a comparable contribution margin. The contribution for IMC 105 was substantially higher due to a speciality oil premium of $0.34 per bushel. Contribution margins reflect differences in yield, seed cost and in the case of Magnum and Option 501, grade.

Days to maturity (30% seed colour change) ranged from 104 to 109. There were no significant differences in oil content.

DELMAS

Observations: This trial was seeded on May 18 into excellent soil moisture and crop emergence was rapid and uniform. Early wild oat pressure reduced yield. Hail appeared to cause more damage in early flowering varieties than in later flowering varieties. Hail damage and cool growing conditions delayed maturity and caused some green seed problems.

Results:

***B. NAPUS* VARIETY TRIAL YIELD, ECONOMIC & QUALITY RESULTS Delmas, SK**						
Treatment	**Yield (%)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Days to Maturity**	**Grade**
Quantum	111	32.4	51.28	45.9	112	2
Nexera 500	109	31.6	42.92	46.4	115	2
Magnum	105	30.6	34.73	45.4	115	3
IMC 105	102	29.7	50.02	44.4	106	1
AC Excel	100	29.1	47.65	46.4	113	1
Option 501	100	29.1	24.47	47.4	115	3
Sentry	93	27.2	32.62	44.8	112	1
Millennium 01	90	26.1	42.38	46.6	112	2
LSD CV %		2.77 7.5		0.79 1.6		

Discussion: Maturity of all varieties was delayed due to hail damage in July. Calculating seed colour change to determine when to swath was difficult. Some plants had a relatively undamaged main raceme with over mature pods while other plants had no main raceme with new side branches and immature pods. Green seed problems occurred in varieties that had the greatest variability in maturity due to hail damage. Maturity ranged from 106 days for IMC 105 to 115 days for Nexera 500, Magnum and Option 501.

Quantum was significantly higher yielding than all varieties except Nexera 500 and Magnum. Quantum also had the highest contribution margin. Nexera 500 and Magnum were significantly higher yielding than Sentry and Millennium 01. Yield potential of all varieties was affected by the hail. Oil content ranged from 44.4 to 47.4%.

VEGREVILLE

Observations: This trial was seeded on May 22 into excellent soil moisture. Crop emergence was rapid and uniform. Dry conditions after seeding caused variability in crop stands. This variability may have masked treatment differences. Cool weather and low disease pressure allowed the canola to compensate for the dry conditions.

Results:

***B. NAPUS* VARIETY TRIAL YIELD, ECONOMIC & QUALITY RESULTS Vegreville, AB**						
Treatment	**Yield (%)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Growing Degree Days**	**Days to Maturity**
IMC 03	105	42.8	133.69	46.5	1189	100
Hyola 401	104	42.7	113.56	44.5	1189	100
Nexera 500	104	42.4	109.28	46.9	1218	105
Quantum	103	42.1	122.99	44.8	1203	103
AC Excel	100	40.9	122.69	45.7	1203	103
IMC 202	97	39.7	121.76	46.6	1189	100
Option 501	97	39.5	108.04	46.8	1218	105
IMC 105	91	37.4	107.75	45.0	1189	100
LSD CV %		2.63 5.6		0.90 1.4		

Discussion: Maturity ranged from 100 to 105 days for the varieties tested. IMC 03 and Hyola 401 yielded significantly higher than IMC 202, Option 501 and IMC 105. Nexera 500 yielded significantly higher than Option 501 and IMC 105. Quantum and AC Excel yielded significantly higher than IMC 105. Low seed costs and premiums paid on oil help IMC 03 attain the highest contribution margin. Contribution margins reflect differences in yield and seed cost.

LETHBRIDGE (DRYLAND)

Observations: The trial was direct seeded into wheat stubble on May 4. Seedbed moisture was good. Prior to emergence the site received 6 inches of snow. Emergence was rapid and even on all varieties**.** Cool conditions after emergence and an early June frost affected growth of the varieties (see ***Site Information***).

Results:

B. NAPUS VARIETY TRIAL YIELD, ECONOMIC & QUALITY RESULTS Lethbridge, AB (Dryland)							
Treatment	**Yield (%)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Growing Degree Days**	**Days To Maturity**	**Grade**
Nexera 500	106	29.4	63.00	47.8	989	111	1
Quantum	105	29.1	65.26	46.0	989	111	1
Option 501	103	28.5	54.12	47.7	998	112	2
AC Excel	100	27.6	63.25	47.2	989	111	1
Hyola 401	99	27.2	41.47	45.8	972	109	1
Prominent	96	26.4	42.64	46.5	989	111	2
LSD CV %		3.14 9.1		0.62 1.1			

Discussion: Cool growing conditions until early pod fill resulted in greater days to maturity than previously seen in this region. Hot weather near swathing minimized maturity differences between varieties. Rapid dry down and hot weather following swathing did not allow the crop to cure properly, which resulted in higher green seed levels. There were no significant differences in yield between varieties. Significant differences in oil content were noted when comparing Hyola 401 and Quantum with Option 501, Nexera 500, and AC Excel.

LETHBRIDGE (IRRIGATION)

Observations: This site was seeded on May 7 into good soil moisture. Prior to emergence this site received 6 inches of snow. Emergence was even across all treatments. Cool conditions after emergence slowed down crop growth (see ***Site Information***). At flowering, sweeps were conducted to evaluate insect levels. Lygus bugs were well below threshold levels. Cabbage seedpod weevil levels were below the threshold level of three per sweep. High temperatures at crop maturity required swathing in the evenings. This was done to minimize the chances of locking in green seed as a result of rapid dry down.

Results:

B. NAPUS VARIETY TRIAL YIELD, ECONOMIC & QUALITY RESULTS Lethbridge, AB (Irrigation)							
Treatment	**Yield (%)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Growing Degree Days**	**Days to Maturity**	**Grade**
Hyola 401	115	58.2	167.26	43.7	1070	113	1
Quantum	110	55.6	163.08	43.6	1099	115	1
Nexera 500	108	54.6	154.02	46.0	1087	114	1
Option 501	106	53.4	136.03	46.1	1120	117	2
Prominent	104	52.2	129.46	44.2	1130	118	2
IMC105	101	51.1	136.47	44.7	1099	115	1
IMC 201	100	50.6	133.60	45.9	1087	114	1
AC Excel	100	50.4	138.72	44.7	1087	114	1
IMC 202	89	44.7	99.73	45.3	1096	116	1
LSD CV %		2.85 4.5		0.88 1.6			

Discussion: Yield differences of 2.85 bu/ac or more are significant. Hyola 401, Quantum, Nexera 500 and Option 501 were significantly higher yielding than the check (AC Excel). IMC 202 yielded significantly lower than AC Excel. Oil contents ranged from 46.1% for Option 501 to 43.7% for Hyola 401. The days to maturity ranged from 113 days for Hyola 401 to 118 days for Prominent.

INNISFAIL

Observations: Seeding occurred on May 17 into good soil moisture conditions. High volunteer barley pressure warranted early herbicide application (1-2 leaf crop stage). Cool growing conditions through the summer hampered crop development (see ***Site Information***). Excessive moisture at the site resulted in shallow root development on all varieties. Cool growing conditions throughout the growing season delayed maturity. Most varieties were swathed at 20 % seed colour change due to risk of frost.

Results:

B. NAPUS VARIETY TRIAL YIELD, ECONOMIC & QUALITY RESULTS Innisfail, AB							
Treatment	**Yield (%)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Growing Degree Days**	**Days to Maturity**	**Grade**
Hyola 401	121	39.4	64.11	49.7	986	118	1
Nexera 500	112	36.3	55.22	49.9	1007	120	1
Option 501	104	33.8	35.73	48.6	1017	122	2
Quantum	104	33.3	41.98	50.2	1007	120	1
AC Excel	100	32.5	43.99	48.4	1007	120	1
Millennium 01	84	27.2	14.27	49.6	986	118	1
LSD CV %		3.35 8.0		0.98 1.6			

Discussion: Yield differences of 3.35 bu/ac or more are significant. Hyola 401 and Nexera 500 yielded significantly higher than the check (AC Excel). Millennium yielded significantly lower than AC Excel. Oil contents were significantly different, ranging from 48.6% to 50.2%. All varieties had higher oil contents than AC Excel. With the exception of Option 501, all varieties graded # 1.

WANHAM

Observations: (See ***Site Information***: Wanham, for effects of weeds, climate and insect pests at this site). Initial soil moisture conditions were reasonably good since there had been no spring cultivation, only a heavy harrowing. Plots were seeded on May 7 (soil temperature 9^{o}C, 1 inch depth). On May 13-14 one inch of rain was received which enhanced germination. Even emergence was noted for all treatments. Weed pressure was light to moderate, and the predominant weeds were volunteer winter wheat, stinkweed, hempnettle, and toadflax. All plots were sprayed with Muster Gold (Muster 8 g/ac, Assure 0.4 L/ac or 20 ac/cs rate) on June 4. Rainfall at the site was very limited during the growing season, and was usually followed by hot dry winds. The plots were swathed beginning August 17 and all were combined on September 12. The long period between swathing and combining was due to the extremely slow rate of chlorophyll clearing brought about by the dry conditions.

Results:

ARGENTINE (*B. NAPUS*) VARIETY TRIAL
YIELD, ECONOMIC & QUALITY RESULTS
Wanham, AB

Treatment	Yield (%)	Yield (bu/ac)	Contribution Margin ($/ac)	Oil (%)	Growing Degree Days	Days to Maturity	Grade
Hyola 401	124	36.9	99.42	45.1	694	100	1
Nexera 500	111	33.1	87.89	47.8	683	98	1
Quantum	103	30.7	79.28	45.6	694	100	1
IMC 108	102	30.3	88.49	47.6	683	98	1
AC Excel	100	29.8	81.43	46.2	735	102	1
Option 501	97	29.0	68.93	46.8	735	102	1
LSD CV %		1.93 4.9		1.30 2.3			

Discussion: There were significant differences in yields and oil contents. Hyola 401 produced the highest yield and contribution margin. Nexera 500 produced the highest oil content. Mean temperatures for the day during June and July were often in the single digits. Growing degree days (GDD) were lower than would normally be expected for ***B. napus*** (approximately 1040). This was likely due to the combination of cool temperatures and very dry conditions. However, days to maturity were normal for ***B. napus***.

ROLLA

Observations: (See ***Site Information*** for influence of climate, weeds, and insects). Plots were seeded on May 17 (soil temperature 12^{o} C, 1 inch depth) into dry soil. Emergence was slow and uneven. Weed pressure was moderate, with the predominant weed species being volunteer spring wheat, wild buckwheat, wild oats, cleavers and a few thistles. The plots were sprayed with Muster Gold II (Muster 8 g/ac, Assure II 0.2 L/ac or 40 ac/cs) and Lontrel (227 ml/ac) on June 13. Weed control was good to excellent. The months of June and July received very little rainfall and frequent drying winds. On July 16 the mean temperature for the day was 4.6^{o}C. Freezing temperatures were recorded in each of the months of May through August. Flower blasting by the drought was evident across the plots, which subsequently limited pod set and seed development. The plots were swathed beginning August 30, and combined on September 27.

Results:

ARGENTINE (*B. NAPUS*) VARIETY TRIAL
YIELD, ECONOMIC & QUALITY RESULTS
Rolla, BC

Treatment	Yield (%)	Yield (bu/ac)	Contribution Margin ($/ac)	Oil (%)	Growing Degree Days	Days to Maturity	Grade
Option 501	111	29.8	69.20	43.2	798	108	2
Nexera 500	109	29.1	52.55	42.5	798	108	2
AC Excel	100	26.8	52.61	42.4	849	112	2
IMC 108	91	24.3	40.59	43.5	768	105	2
Quantum	88	23.7	34.13	41.0	768	105	2
LSD CV %		1.65 4.9		1.26 2.4			

Discussion: There were significant differences in yield and oil content between the varieties. Option 501 produced the highest yield and contribution margin. IMC 108 produced the highest oil content. Growing degree days were low for B. napus (approximately 1040 normally). This was likely due to the combination of cool temperatures and very dry soil conditions. This also exaggerated the differences in days to maturity between the varieties.

VIII HARVESTABILITY TRIAL

Objective: To compare the harvestability of varieties entered in the variety trials.

Background: A number of varieties have very similar yield and quality traits. In choosing a variety a grower needs to consider additional traits like lodging and harvestability. Harvestability is the measurement of swathing and combining ease. Currently, there is no meaningful scientific measurement for harvestability. Therefore, we use standardized criteria for a subjective measurement.

Methodology: Harvestability was evaluated as swathing and combining, were completed on the variety and systems trials. Swathing and combining were each evaluated on a scale of one to five with AC Excel (the check) being three. The following criteria were considered; lodging, height, straw stiffness, straw strength, uniformity of stand, swath fluffiness (pod dispersion), tendency to clump, flowability, feeding and speed of operation.

The following ratings are subjective. The machine operator, crop conditions, weather and time of day can affect the harvestability of a variety.

Ratings:
1 = much better than check
2 = better than check
3 = check
4 = worse than check
5 = much worse than check

Western Canadian Summary:

Harvestibility is a very subjective evaluation and there are often differences in the ease of operation experienced by the operator of the equipment. Factors in swathing include the uniformity of stand, plant height, straw stiffness and lodging. When combining, a uniform stand usually translates into an even swath that feeds smoothly. Any difficulties when swathing are usually magnified at combining time. Some varieties (eg. Hyola 401) were consistently easier to harvest at a number of locations.

CARMAN

Observation: Lodging varied visibly among the varieties. Swathing was most difficult in the varieties with the greatest amount of lodging. Combining ease was related more closely to the amount of plant material. The plots were swathed with an 18' Versatile 400 swather equipped with a bat reel, and harvested with a Gleaner N5 combine.

Results:

HARVESTABILITY TRIAL
B. napus
Carman, MB

Variety	Lodging Ratio	Swathing Rating	Combinability Rating
45A71	.76	3	3
46A73	.87	2	3
AC Excel	**.77**	**3**	**3**
Exceed	.84	3	3
Hyola 401	.91	2	2
InVigor 2273	.68	4	4
InVigor 2463	.72	3	4
InVigor 2473	.70	4	4
LG Dawn	.59	4	3
Millennium 01	.75	4	3
Nexera 500	.83	3	3
Option 501	.78	4	4
Quantum	.89	2	2
SW RideR	.82	3	3

Discussion: The severity of the lodging among varieties at this site ranged from 0.59 to 0.91, where 1.00 would be a stand in which there was no lodging. The swathability was largely related to the degree of lodging, but also to amount of plant material. Tall plants that were quite lodged were the most difficult to swath. The combinability was related more to the amount of plant material that had to be put through the machine.

RUSSELL

Observation: The plots were swathed with an 18' Versatile 400 swather equipped with a bat reel, and harvested with a Massey Ferguson 860 combine. The crop canopy ranged from moderate to heavy with little lodging. The differences in ratings would be mainly due to the amount of plant material.

Results:

HARVESTABILITY TRIAL
B. napus
Russell, MB

Variety	Lodging Ratio	Swathing Rating	Combinability Rating
45A71	.87	4	3
46A73	.89	2	3
AC Excel	**.80**	**3**	**3**
Exceed	.88	3	3
Hyola 401	.69	2	2
InVigor 2273	.69	4	4
InVigor 2463	.76	3	3
InVigor 2473	.81	4	4
LG3235	.78	2	3
LG3295	.81	4	4
LG Dawn	.76	3	3
Millennium	.76	3	3
Nexera 500	.76	3	3
Option 501	.89	3	3
Quantum	.84	3	3
SW RideR	.85	3	3

Discussion: As lodging was not severe in any of the varieties the greatest difficulties in swathing and combining occurred in varieties with a combination of moderate lodging and tall plants which produced a heavy crop canopy.

GRENFELL

Observation: The treatments were swathed with an 18' Versatile 400 swather equipped with a bat reel, and harvested with a New Holland TR 85 combine. Uniformity of the crop stand varied within treatments due to uneven emergence. Lower lying areas had more plant material than elevated areas. This resulted in some tendency to clump during swathing and reduced speed at combining in lower lying areas.

Results:

HARVESTABILITY TRIAL
B. napus
Grenfell, SK

Variety	Lodging Ratio	Swathing Rating	Combinability Rating
AC Excel	**.81**	**3**	**3**
Exceed	.80	3	2
IMC 107	.79	3	3
InVigor 2273	.88	3	3
InVigor 2463	.85	4	4
InVigor 2473	.86	4	4
LG Dawn	.82	3	3
LG3235	.84	2	2
LG3295	.80	3	3
Magnum	.85	3	3
Millennium 01	.75	2	2
Nexera 500	.85	3	3
Option 501	.83	3	3
Quantum	.88	3	3
Sentry	.85	3	3
SW RideR	.83	3	3

Discussion: The uniformity of crop stand, and little if any lodging, made for few problems with swathing and combining. Ratings were generally a reflection of plant height and canopy density. Crop characteristics such as the amount of plant material, straw stiffness, plant height and initial podding height contributed to the differences in swathability. Millennium 01 and LG3235 were notably shorter with the podding zone lower on the plant. This resulted in a more even swath than other varieties. The lower combinabilty ratings of InVigor 2463 and 2473 were the result of poor flowability and variable speed of operation.

NAICAM

Observation: The treatments were swathed with a 20' Versatile 4400 swather equipped with a pick-up reel, and harvested with a New Holland TR 85 combine. Lodging was not an issue. Although a pick-up reel was used, there was a distinct leaning of the crop to the east which made swathing in that direction more difficult. Taller varieties were considerably more difficult to swath. Uniformity of the stand varied within the treatment. Low lying areas had considerably more plant material than elevated areas.

Results:

HARVESTABILITY TRIAL
B. napus
Naicam, SK

Variety	Lodging Ratio	Swathing Rating	Combinability Rating
45A71	.71	2	3
46A73	.75	3	3
AC Excel	**.73**	**3**	**3**
Exceed	.70	3	3
IMC 105	.74	3	3
IMC 106	.73	3	3
IMC 107	.72	3	3
InVigor 2273	.71	4	3
InVigor 2463	.70	4	4
InVigor 2473	.69	4	5
LG Dawn	.74	2	3
LG3235	.75	2	2
LG3295	.73	3	3
Magnum	.64	4	3
Millennium 01	.64	3	3
Nexera 500	.73	3	2
Option 501	.68	3	2
Quantum	.62	4	5
Sentry	.65	4	3
SW RideR	.74	3	3

Discussion: There were notable differences in the harvestability of a number of the ***B. napus*** varieties. Crop characteristics such as the amount of plant material, plant height, straw stiffness and initial podding height contributed to the differences in swathability. The taller varieties (Quantum, Magnum, InVigor 2273, 2463, 2473 and Sentry) and stiffer stemmed variety Quantum were considerably harder to swath. They had a tendency to hang up in the throat of the swather. LG3235, Option 501 and Nexera 500

had better combinability ratings due to threshability. Poor flowability and reduced speed of operation, due to clumping, resulted in lower combinabilty rating for a number of varieties.

DELMAS

Observation: Slight differences in plant height were observed. These differences allowed higher cutting height but did not hinder the ease of swathing. There was a slight lean of all plots across the direction of swathing that did not slow swathing. Crop canopy was even throughout the trial.

Results:

HARVESTABILITY TRIAL
B. napus
Delmas, SK

Variety	Swathing Rating	Combinability Rating
45A71	3	3
46A73	3	3
AC Excel	**3**	**3**
Exceed	3	3
IMC 105	3	3
IMC 106	3	3
IMC 107	3	3
InVigor 2273	3	3
InVigor 2463	3	3
InVigor 2473	3	3
LG Dawn	3	3
LG3235	3	3
LG3295	3	3
Magnum	3	3
Millennium 01	3	3
Nexera 500	3	3
Option 501	3	3
Quantum	3	3
Sentry	3	3
SW RideR	3	3

Discussion: There were no noticeable differences in ease of harvestability among the varieties tested. Hail damage was extensive throughout the trial and all plots seemed to have equal amounts of material to put through the combine.

VEGREVILLE

Observation: Differences in crop canopy were more variable within plots than between plots. Crop stands were very uneven due to the variability of moisture throughout the field. Higher areas had very short stands and lower areas had medium to tall stands. All plots were leaning slightly to the east.

Results:

HARVESTABILITY TRIAL
B. napus
Vegreville, AB

Variety	Swathing Rating	Combinability Rating
45A71	4	3
46A73	3	3
AC Excel	**3**	**3**
Exceed	3	3
Hyola 401	3	3
IMC 03	4	3
IMC 105	3	3
IMC 202	3	3
InVigor 2153	3	3
InVigor 2273	3	3
InVigor 2463	3	3
LG Dawn	4	3
Nexera 500	3	3
Option 501	3	3
Quantum	3	3
SW RideR	3	3

Discussion: There were very little noticeable differences in ease of harvestability amoung the varieties tested. Ease of swathing and combining varied more within plots than between plots. IMC 03, 45A71 and LG Dawn have lower swathing ratings because they were slightly more difficult to swath when travelling with the way they were lodged. Combine speed was constant for all varieties.

LETHBRIDGE (DRYLAND)

Observation: Lodging was minimal in this trial. Plant height was notably shorter than in previous years. This contributed to the ease of swathing.

Results:

HARVESTABILITY TRIAL *B. napus* Lethbridge, AB (Dryland)			
Variety	**Lodging Ratio**	**Swathing Rating**	**Combinability Rating**
45A71	na	3	3
46A73	na	3	3
AC Excel	**.86**	**3**	**3**
Exceed	na	3	3
Hyola 401	.88	1	1
InVigor 2273	na	2	3
InVigor 2463	na	2	2
InVigor 2473	na	2	2
LG Dawn	na	2	2
LG3235	na	2	2
LG3295	na	2	2
Nexera 500	.89	2	2
Option 501	.92	2	2
Prominent	.92	2	2
Quantum	.88	2	2
SW RideR	na	2	2

LETHBRIDGE (IRRIGATION)

Observation: Lodging at the site was moderate. Most of the varieties had longer straw, which slowed swathing.

Results:

HARVESTABILITY TRIAL *B. napus* Lethbridge, AB (Irrigation)			
Variety	**Lodging Ratio**	**Swathing Rating**	**Combinability Rating**
AC Excel	**.79**	**3**	**3**
Hyola 401	.79	1	1
IMC 105	.77	2	2
IMC 201	.74	4	3
IMC 202	.66	4	3
InVigor 2273	na	2	2
InVigor 2463	na	3	2
InVigor 2473	na	2	3
Nexera 500	.87	2	2
Option 501	.74	2	2
Prominent	.96	2	2
Quantum	.85	3	2

INNISFAIL

Observation: Lodging in this trial was minimal. Crop height on all varieties was short. This allowed for improved swathing and combining ease.

Results:

HARVESTABILITY TRIAL *B. napus* Innisfail, AB			
Variety	**Lodging Ratio**	**Swathing Rating**	**Combinability Rating**
AC Excel	**.96**	**3**	**3**
Hyola 401	.98	1	2
Millennium 01	.76	4	2
Nexera 500	.98	2	2
Option 501	.98	2	2
Quantum	.94	3	2

Discussion: The results show that the majority of the newer varieties are better than the check with regards to harvestability.

WANHAM

Observation: Drought conditions at the Wanham site contributed to shorter than normal plants and an uneven stand. Plant heights ranged from 65-100 cm, which is below normal for ***B. napus***. Swathing was negatively affected by the plant stand (density was low). Combining was negatively affected by the uneven swath.

Results:

HARVESTABILITY TRIAL
B. napus
Wanham, AB

Variety	Lodging Ratio	Swathing Rating	Combinability Rating
AC Excel	**.92**	**3**	**3**
Hyola 401	.91	3	2
IMC 108	.91	2	4
Nexera 500	.95	4	3
Option 501	.90	4	3
Quantum	.93	3	3

Discussion: The primary factor in swathing was uniformity of stand (height and density). Lodging ratios were for the most part very close to 1.00. This indicates that there was very little lodging, which is a function of the short growth resulting from the drought conditions at this site.

ROLLA

Observation: Drought conditions at the Rolla site contributed to shorter than normal plants and an uneven plant stand. Plant heights ranged from 65-90 cm, which is below normal for the ***B. napus***. Wind scattered swaths made combining ratings difficult.

Results:

HARVESTABILITY TRIAL *B. Napus* Rolla, BC			
Variety	**Lodging Ratio**	**Swathing Rating**	**Combinability Rating**
AC Excel	**.88**	**3**	**3**
IMC 108	.90	2	3
Nexera 500	.86	4	3
Option 501	.93	4	3
Quantum	.91	3	3

Discussion: At the Rolla site the stands were even, for the most part, and could be swathed readily without difficulty. Subjective differences in combining characteristics were negated by wind disturbed swaths.

IX SEED TREATMENT TRIAL

Objective: To evaluate the impact of seed treatments on agronomic characteristics of canola such as yield, quality and contribution margins.

Background: The most widespread problem in canola production is stand establishment. Poor stand establishment may be caused by a seedling disease complex, which includes pathogens such as ***Rhizoctonia solani*** along with ***Pythium*** and ***Fusarium*** species. In addition to fungal pathogens of emerging canola, insects may also cause economic yield loss. Harmonization of crop protection chemicals between Canada and the U.S. has resulted in a voluntary withdrawal of lindane (insecticide) from the market. Three of the seed treatments tested here contain replacement (new*) chemistry for lindane.

Methodology: The seed treatment trial consisted of seven treatments in a randomized block system: Not all treatments were used at all sites.

A) Foundation Lite (does not contain an insecticide)
B) Foundation (contains lindane)
C) Gaucho*
D) Helix*
E) Premiere Z*
F) Counter and Foundation Lite
G) Counter and Foundation

The seed source was Option 501 (same seed lot for all treatments), treated by each of the respective companies involved in the trial.

The damage ratings used for flea beetle are derived from the ***"BASF Flea Beetle Rating System",*** which uses the following criteria:

A) 0= no damage
B) 1= 1-25% damage
C) 2= 26-50% damage
D) 3= 51-75% damage

Prices used in the contribution margin analysis were Foundation at $0.47/lb of treated seed and Foundation Lite at $0.32/lb of treated seed.

Western Canadian Summary:

At sites with flea beetle pressure, canola treated with Foundation Lite experienced greater levels of flea beetle damage than treatments containing insecticides. This usually translated into a yield loss although the losses were often not significant. There were no clear trends among the seed treatments containing insecticides. All "new" seed treatments appear to offer similar protection to existing seed treatments containing lindane.

CARMAN

Observations: The plots were seeded on May 30, and 24 lb/ac of actual P_2O_5 was seed-placed. Emergence counts were taken 7, 14 and 21 days after emergence (DAE). Flea beetle assessments were taken at 7 and 28 DAE. The plots were sprayed with Muster Gold II and Lontrel for weed control, and Rovral flo for sclerotinia control. Excessive rainfall early in the growing season was a significant stress (see ***Site Information***). Root maggot damage was very low. The plots were swathed on August 27 and combined on September 18.

Results: ***Table 1. Average number of emerged plants/m^2***

Treatment	7 DAE	14 DAE	21 DAE
Foundation Lite	107	106	89
Foundation	108	107	79
Gaucho	108	107	81
Counter & Foundation Lite	121	116	85
Counter & Foundation	111	106	85

DAE = Days After Emergence

Table 2. Flea beetle damage assessment (% of leaf damage)

Treatment	7 DAE	28 DAE
Foundation Lite	1-25	0
Foundation	0	0
Gaucho	0	0
Counter & Foundation Lite	0	0
Counter & Foundation	0	0

DAE = Days After Emergence

Table 3. Yield and Seed Quality

SEED TREATMENT TRIAL Carman, MB			
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**
Foundation Lite	28.8	2.81	49.0
Foundation	30.0	8.52	47.7
Gaucho	28.1	(1.90)*	49.1
Counter & Foundation Lite	26.7	(19.09)	49.4
Counter & Foundation	30.1	(1.33)	48.8
LSD CV %	3.91 10.8		0.78 1.3

Note 1: Brackets in the contribution margin reflect a negative value.

Note 2: *At the time of writing, no cost figures were available for these seed treatments. These calculations were done assuming the cost for seed treatment to be the same as for Foundation. Once actual costs are known, the contribution margin should be adjusted to reflect the added costs over the check treatment.

Discussion: No significant differences in yield were observed. The major stresses on this crop were related to environmental conditions and weeds. Insect pressure was very low, therefore the insecticide components of the treatments other than Foundation Lite would not be expected to provide significant benefits.

RUSSELL

Observations: The plots were seeded on May 28, and 24 lb/ac of actual P_2O_5 was seed-placed. Emergence counts were planned for 7, 14 and 21 days after emergence but rapid growth of the crop made it difficult to locate the flags marking count locations at 21 DAE. Flea beetle assessments were taken at 7 and 28 DAE. The plots were sprayed with Select, Muster and Lontrel for weed control. No significant insect damage was noted during the growing season. The plots were swathed on September 6-9 and combined September 29.

Results:

Table 1. Average number of emerged plants/m^2

Treatment	7 DAE	14 DAE
Foundation Lite	117	99
Foundation	115	103
Gaucho	162	128
Helix	144	116
Premiere Z	136	115
Counter & Foundation Lite	131	100
Counter & Foundation	125	110

DAE = Days After Emergence

Table 2. Flea beetle damage assessment (% of leaf damage)

Treatment	7 DAE	28 DAE
Foundation Lite	1-25	0
Foundation	0	0
Gaucho	0	0
Helix	0	0
Premiere Z	0	0
Counter & Foundation Lite	0	0
Counter & Foundation	0	0

DAE = Days After Emergence

Table 3. Yield and Seed Quality

SEED TREATMENT TRIAL Russell, MB			
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**
Foundation Lite	29.2	20.18	48.4
Foundation	32.8	39.04	47.2
Gaucho	32.0	34.66*	47.0
Helix	31.5	31.92*	47.2
Premiere Z	28.6	16.03*	45.9
Counter & Foundation Lite	30.9	19.10	47.3
Counter & Foundation	31.2	19.88	48.0
LSD	1.37		1.20
CV %	3.05		1.8

Note: *At the time of writing, no cost figures were available for these seed treatments. These calculations were done assuming the cost for seed treatment to be the same as for Foundation. Once actual costs are known, the contribution margin should be adjusted to reflect the added costs over the check treatment.

Discussion: None of the seed treatments provided significant increases in yield as compared to the check treatment, Foundation. The Foundation Lite and Premiere Z had significantly lower yields, in spite of no apparent differences in plant stands and very little insect damage. The major stresses on this crop were related to environmental conditions and weeds. The low insect pressure would have made any benefits from the insecticide components of the treatments other than Foundation Lite unlikely.

GRENFELL

Observations: This trial was seeded June 14 at 6.5 lb/ac into wet soil moisture conditions. An average soil temperature of 18.5ºC resulted in rapid emergence. No disease symptoms were evident. Low numbers of flea beetles were present at the time of emergence. There were slight differences between treatments in terms of growth during the growing season. An increase in overall plant material and height was visible in the Helix and Gaucho treatments.

Results: ***Table 1. Average number of emerged plants/m^2***

Treatment	4 DAE	14 DAE	22 DAE
Foundation Lite	82	86	na
Foundation	82	85	na
Gaucho	83	87	na
Helix	84	90	na
Premiere Z	83	87	na
Counter & Foundation Lite	83	87	na
Counter & Foundation	84	86	na

DAE = Days After Emergence
na = not available

Table 2. Flea beetle damage assessment (% of leaf damage)

Treatment	4 DAE	14 DAE	22 DAE
Foundation Lite	1-25	1-25	na
Foundation	0	0	na
Gaucho	0	0	na
Helix	0	0	na
Premiere Z	0	0	na
Counter & Foundation Lite	0	0	na
Counter & Foundation	0	0	na

DAE = Days After Emergence
na = not available

Table 3. Yield and Seed Quality

SEED TREATMENT TRIAL Grenfell, SK			
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**
Foundation Lite	24.1	10.34	48.7
Foundation	24.8	13.16	49.7
Gaucho	24.3	10.42*	49.0
Helix	27.3	26.86*	50.9
Premiere Z	25.1	14.80*	49.4
Counter & Foundation Lite	25.4	5.79	49.3
Counter & Foundation	25.7	6.42	49.2
LSD CV %	1.27 3.4		1.25 1.7

Note: *At the time of writing, no cost figures were available for these seed treatments. These calculations were done assuming the cost for seed treatment to be the same as for Foundation. Once actual costs are known, the contribution margins should be adjusted to reflect the added costs over the check treatment.

Discussion: There were slight differences in emergence between treatments, with Helix having the highest counts over the growing season. Flea beetle damage was slight (< 5%) on the Foundation Lite treatments. One treatment (Helix) yielded significantly higher than the check (Foundation). There were no significant differences in oil content. All treatments graded number two, therefore contribution margins reflected yield and seed treatment costs.

NAICAM

Observations: This trial was seeded May 10 into excellent soil moisture conditions. Cool soil conditions delayed emergence until May 27. Elevated flea beetle numbers during 1998, canola stubble and field edges provided excellent conditions for migration. Flea beetle pressure was high during emergence and tapered off by the third week of June. There were no visible growth differences observed during the growing season in Foundation and Premiere Z treatments. An increase in overall plant material and height was visible in Gaucho. Foundation Lite was delayed by ten days during early plant development due to severe flea beetle damage. Maturity (30% seed colour change), however, was only delayed by one day. Ronilan EG was applied to control sclerotinia stem rot.

Results:

Table 1. Average number of emerged plants/m^2

Treatment	6 DAE	14 DAE	24 DAE
Foundation Lite	92	93	na
Foundation	100	97	na
Gaucho	108	104	na
Premiere Z	100	97	na

DAE = Days After Emergence
na = not available

Table 2. Flea beetle damage assessment (% of leaf damage)

Treatment	6 DAE	14 DAE	24 DAE
Foundation Lite	51-75	1-25	na
Foundation	26-50	0	na
Gaucho	1-25	0	na
Premiere Z	26-50	0	na

DAE = Days After Emergence
na = not available

Table 3. Yield and Seed Quality

SEED TREATMENT TRIAL Naicam, SK			
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**
Foundation Lite	30.6	41.04	48.1
Foundation	34.8	64.18	48.8
Gaucho	33.3	55.55 *	49.3
Premiere Z	34.4	61.88 *	49.0
LSD	1.16		0.42
CV %	2.7		0.7

Note: *At the time of writing, no cost figures were available for these seed treatments. These calculations were done assuming the cost for seed treatment to be the same as for Foundation. Once actual costs are known, the contribution margins should be adjusted to reflect the added costs over the check treatment.

Discussion:

There were some differences in terms of emergence between treatments, with Gaucho having the highest plant counts over the growing season. Flea beetle damage was severe (up to 75%) in Foundation Lite treatments. Flea beetle damage was moderate in Foundation and

Premiere Z treatments. Two treatments (Foundation Lite and Gaucho) yielded significantly lower than the check (Foundation). Reduced leaf area at early plant development from flea beetle damage resulted in a significantly lower yield for the Foundation Lite treatment. All treatments graded number one. Contribution margins reflect yield variation and seed treatment costs.

DELMAS

Observations: This trial was seeded on May 20. Emergence was rapid and even across all treatments. Flea beetle ratings were conducted at 7, 14 and 28 days after emergence (DAE). Flea beetles were not noticed until 14 DAE. Most damage was on Foundation Lite treatments. Damage appeared to be more severe on the ends of the plots near the edge of the field and lessened towards the center of the plots. There were no noticeable differences in crop maturity.

Results:

Table 1. Flea beetle damage assessment (% of leaf damage) and number of plants emerged/square meter.

Treatment	7 DAE	14 DAE	28 DAE	Plants/m^2
Foundation Lite	0	26-50	1-25	81
Foundation	0	1-25	1-25	81
Gaucho	0	0	1-25	81
Premiere Z	0	1-25	1-25	83

DAE = Days After Emergence

Table 2. Yield and Seed Quality

SEED TREATMENT TRIAL Delmas, SK			
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**
Foundation	28.7	32.78	48.0
Foundation Lite	26.8	23.87	47.6
Gaucho	28.5	31.74*	48.0
Premiere Z	27.9	28.63*	48.1
LSD	1.88		0.61
CV %	5.2		1.6

Note: *At the time of writing, no cost figures were available for these seed treatments. These calculations were done assuming the cost for seed treatment to be the same as for Foundation. Once actual costs are known, the contribution margin should be adjusted to reflect the added costs over the check treatment.

Discussion: The increased flea beetle pressure on the Foundation Lite treatments did reduce yield slightly, but the differences were not significant. There was little to no flea beetle damage on insecticide treated plots at 14 DAE. As insecticides deteriorated, flea beetle activity became constant across all treatments.

VEGREVILLE

Observations: This trial was seeded on May 23. Emergence was rapid and even across all treatments. Flea beetle ratings were conducted at 7, 14 and 28 days after emergence (DAE). Some flea beetle damage occurred on Foundation Lite treatments. Lygus bug sweeps were conducted and numbers were low. There were no differences in crop maturity.

Results: ***Table 1. Flea beetle damage assessment (% of leaf damage) and number of plants emerged/square meter.***

Treatment	7 DAE	14 DAE	28 DAE	Plants/m^2
Foundation Lite	0	1-25	0	129
Foundation	0	0	0	128
Gaucho	0	0	0	129

DAE = Days After Emergence

Table 2. Yield and Seed Quality

SEED TREATMENT TRIAL Vegreville, AB			
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**
Foundation	37.4	127.61	45.9
Foundation Lite	38.3	133.72	45.9
Gaucho	38.5	133.93*	46.6
LSD	2.72		0.78
CV%	5.2		1.2

Note: *At the time of writing, no cost figures were available for these seed treatments. These calculations were done assuming the cost for seed treatment to be the same as for Foundation. Once actual costs are known, the contribution margin should be adjusted to reflect the added costs over the check treatment.

Discussion: There were no significant differences in yield between treatments. Flea beetle activity was low, even on the Foundation Lite treatment.

LETHBRIDGE (IRRIGATION)

Observations: The plots were seeded on May 7. Emergence was even across all treatments. Flea beetle damage was noted on the Foundation Lite and Premiere Z treatments. Growing conditions allowed for plants to recover. Lygus bug sweeps were done on all plots on July 5. Lygus bug levels were well below threshold levels. At swathing, the Foundation Lite treatment was 2 days behind in maturity. Maturities of the other treatments were similar.

Results: ***Table 1. Average number of emerged plants/meter row***

Treatment	7 DAE	14 DAE	21 DAE
Foundation Lite	33	28	25
Foundation	31	28	26
Gaucho	31	29	23
Helix	30	28	22
Premiere Z	25	26	21

DAE = Days After Emergence

Table 2. Flea beetle damage assessment (% of leaf damage)

Treatment	7 DAE	21 DAE
Foundation Lite	26-50	1-25
Foundation	0	0
Gaucho	0	0
Helix	0	0
Premiere Z	1-25	1-25

DAE = Days After Emergence

Table 3. Yield and Seed Quality

SEED TREATMENT TRIAL Lethbridge, AB (Irrigation)				
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Grade**
Foundation Lite	48.9	109.75	46.2	2
Foundation	51.3	122.10	46.2	2
Gaucho	51.4	122.65*	45.4	2
Helix	51.3	122.10*	45.8	2
Premiere Z	50.8	119.37*	45.8	2
LSD CV %	2.66 4.2		0.64 1.1	

Note: *At the time of writing, no cost figures were available for these seed treatments. These calculations were done assuming the cost for seed treatment to be the same as for Foundation. Once actual costs are known, the contribution margins should be adjusted to reflect the added costs over the check treatment.

Discussion: Historically, damage from flea beetles in southern Alberta has been isolated. In this trial, flea beetle populations were high enough to cause damage when left untreated. The results of the flea beetle damage assessment indicate the new seed treatments provide control of flea beetles. Damage assessment at 7 days after emergence was highest in the Foundation Lite treatment (26-50%). There were no discernible differences in plant populations between treatments. Foundation Lite yielded lower than the other treatments but was not significantly different. Even with good moisture and fertility the Foundation Lite treatment did not recover from early damage by the flea beetle.

INNISFAIL

Observations: The plots were seeded on May 17 and emergence was even throughout the trial. Flea beetle pressure was light. Cool conditions combined with rainfall may have contributed to this. Lygus bug sweeps were conducted July 20 on all plots. Lygus bugs were found to be well below threshold levels in all treatments. Growth, and ultimately yield, was limited by cool conditions and excessive moisture at the site. Maturity was the same for all treatments. Swathing started at 20% seed color change due to risk of frost.

Results: ***Table 1. Average number of emerged plants/meter row***

Treatment	7 DAE	14 DAE	21 DAE
Foundation Lite	29	27	26
Foundation	31	27	26
Gaucho	34	31	28
Premiere Z	35	31	26

DAE = Days After Emergence

Table 2. Flea beetle damage assessment (% of leaf damage)

Treatment	7 DAE	21 DAE
Foundation Lite	1-25	0
Foundation	0	0
Gaucho	0	0
Premiere Z	1-25	0

DAE = Days After Emergence

Table 3. Yield and Seed Quality

SEED TREATMENT TRIAL Innisfail, AB				
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Grade**
Foundation Lite	35.5	31.75	48.7	2
Foundation	33.0	17.29	48.7	2
Gaucho	35.9	33.16*	48.5	2
Foundation Lite	35.5	31.75	48.7	2
Premiere Z	37.0	39.17*	49.3	2
LSD	2.89		1.18	
CV %	5.32		1.87	

Note: *At the time of writing, no cost figures were available for these seed treatments. These calculations were done assuming the cost for seed treatment to be the same as for Foundation. Once actual costs are known, the contribution margins should be adjusted to reflect the added costs over the check treatment.

Discussion: Damage from the beetles was light, with only minor damage on the Foundation Lite and Premiere Z treatments at 7 days after emergence. Assessments at 21 days after emergence found no damage across all treatments. Premiere Z yielded significantly higher than the Foundation treatment. Yield results show that with low flea beetle pressure, insecticides are not required. However, it is important to realize that there may be benefits from the fungicide portion of seed treatments in the control of various seed and soil borne fungal diseases.

WANHAM

Observations: The plots were seeded on May 11, with 15-16-8-12 applied with the seed. The Premiere Z treatment did not arrive in time for seeding and therefore Premiere Plus was substituted. Emergence counts and flea beetle assessments were carried out at 7, 14 and 21 days after emergence. The plots were sprayed with Muster Gold (Muster 8 g/ac, Assure 0.4 L/ac or 20 ac/cs rate) on June 4. Lygus bug sweeps were done on all plots on July 6 and 10. No differences in lygus numbers were observed between treatments. Growth, and ultimately yield, were limited by dry conditions at the site (see ***Site Information***). The plots were swathed on August 26 and combined September 13-14.

Results: ***Table 1. Average number of emerged plants/meter row***

Treatment	7 DAE	14 DAE	21 DAE
Foundation Lite	21	27	29
Foundation	22	24	28
Gaucho	24	26	31
Helix	23	27	31
Premiere Plus	22	25	28

DAE = Days After Emergence

Table 2. Flea beetle damage assessment (% of leaf damage)

Treatment	7 DAE	14 DAE	21 DAE
Foundation Lite	1-25	1-25	1-25
Foundation	0	0	0
Gaucho	0	0	0
Helix	0	0	0
Premiere Plus	0	0	0

DAE = Days After Emergence

Table 3. Lygus bug assessment (#'s of lygus per 10 sweeps)

Treatment	July 6	July 10
Foundation Lite	8	7
Foundation	9	8
Gaucho	9	8
Helix	7	6
Premiere Plus	6	8

Table 4. Yield and Seed Quality

SEED TREATMENT TRIAL Wanham, AB			
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**
Foundation Lite	31.7	85.53	46.8
Foundation	33.7	95.99	46.8
Gaucho	31.7	84.45*	46.9
Helix	33.0	91.93*	46.8
Premiere Plus	32.6	90.20	46.6
LSD	1.8		0.5
CV%	4.3		0.9

Note: *At the time of writing, no cost figures were available for these seed treatments. These calculations were done assuming the cost for seed treatment to be the same as for Foundation. Once actual costs are known, the contribution margins should be adjusted to reflect the added costs over the check treatment.

Discussion:

There were no differences in emergence between seed treatments during the 3 weeks of seedling assessment in the spring. All treatments showed a small increase in plant numbers over this same period. The only treatment to show any damage from flea beetles was Foundation Lite (which does not contain an insecticide). The flea beetle damage was light.

There were significant yield differences between treatments. Foundation and Helix gave the highest yields. Foundation Lite and Gaucho were significantly lower in yield than Foundation and Helix. There were no differences in oil content noted for any treatment.

X SEEDING DATE & TIME OF WEED REMOVAL TRIAL

Objective: To compare the effects of various seeding dates and times of weed removal on yield and quality of Roundup Ready canola.

Background: High yielding canola varieties require a long growing season to reach their full potential. In the past, early seeding has not been popular because of the danger of the increased risk of yield and quality reduction due to spring frost, cold soil temperatures and poor weed control. Cold soil temperatures will reduce and delay germination. Since canola is slow growing and slow to cover the ground in the early growth stages, it is not a strong weed competitor. Research at the University of Manitoba, Agriculture and Agri-Food Canada, along with trials conducted by the Canola Council has shown that early seeded canola that has undergone a hardening process can withstand some frost. The advancement of herbicide tolerant canola varieties has increased weed control options. Previously, many winter annual weeds have been controlled by delayed seeding and tillage. Early seeding programs offer producers in the short season growing areas the opportunity to take advantage of disease, root maggot resistance and other advantages of high yielding canola varieties. Producers in long growing seasons could see the advantage of flowering occurring prior to major heat stress. Weed removal and the proper time to remove them has been a constant source of frustration to producers across western Canada. Work conducted by Harker, et al (Agriculture & Agri-Food Canada), has shown the economic benefits of removing weeds early in the crop's development.

Methodology: The seeding date trial and weed removal trial consisted of the following treatments:

A) Early seeding date and early spray (1-3 leaf stage)
B) Early seeding date and normal spray (4-6 leaf stage)
C) Normal seeding date and early spray (1-3 leaf stage)
D) Normal seeding date and normal spray (4-6 leaf stage)

The Roundup Ready variety LG3235 was used as the seed source.

Western Canadian Summary:

There was no yield advantage to early seeding at most locations this year. This was probably due to the extended cool weather experienced across all sites. These results contradict the overall trend from previous years. Producers considering early seeding must realize there are certain risks (eg. cool soil temperatures and frost) and employ appropriate management practices to maximize yield.

The second component of this trial looked at the time of weed removal at various stages of crop development. At low weed densities, there was no yield advantage to early removal. Where densities were higher, there was an economic and yield advantage in removing the weeds early in crop development. Early spraying has the potential to increase yields and contribution margins with no increase in expenses.

RUSSELL

Observations: The early seeding date was seeded April 30, about 3 weeks ahead of the majority of canola in the area. Fertilizer (77-10-19-24 lb/ac) was banded for the entire trial prior to the early treatment. An additional 31 lb/ac of phosphate was seed-placed. Emergence was uniform for both the early and normal seeding dates. The normal seeding date was delayed until May 27 due to frequent rains. The majority of the weed pressure came from wild oats, wild mustard, and some Canada and sow thistle. Roundup Transorb (0.5 L/ac) was applied to each treatment at the prescribed growth stage of the crop. Delaying herbicide applications slowed early crop development as a result of the multitude of weeds present. This was more pronounced in the early seeding date, due to slower initial growth caused by cooler and wetter conditions. Sclerotinia petal test kits were used on each treatment to assess the risk of sclerotinia, but petal infection was low and fungicide was not required. At swathing time, no significant levels of sclerotinia were visible in any of the treatments.

Results:

SEEDING DATE & TIME OF WEED REMOVAL TRIAL
Russell, MB

Treatment	Seeding Date	Swath Date	Weed Biomass (g/m^2)	Yield (bu/ac)	Oil (%)	Contribution Margin ($/ac)
Early (1-3)	April 30	Aug 13	57.4	43.0	46.0	87.43
Early (4-6)	April 30	Aug 13	81.7	34.7	46.3	39.70
Normal (1-3)	May 27	Aug 27	49.1	40.0	45.7	70.18
Normal (4-6)	May 27	Aug 27	76.4	39.2	46.3	65.58
LSD CV %				5.52 7.8	0.93 1.6	

Discussion: Seeding date had no significant impact on yield. Early herbicide application at the 1 to 3 leaf stage significantly improved yield only for the early seeded treatments. Under these conditions of high weed pressure and cool wet weather, it appeared that the weeds competed more aggressively with the early seeded treatments. Slower growth of these treatments meant a longer period of time between the 1-3 and 4-6 leaf stages, and more opportunity for the weeds to impact yield. Since all treatments graded #1, contribution margins directly reflected yield. These

results emphasise the importance of timing of management practices in maximizing economic returns. There was no significant impact on oil content.

NAICAM

Observations: The early seeding date treatments were seeded up to 14 days ahead of half the canola seeded in the area. Emergence was even for all treatments. Weed pressure was not an issue until early June. All treatments received an in-crop application of Roundup Transorb (0.5 L/ac). Predominant weeds included volunteer barley, quackgrass, wild oats, stinkweed and wild mustard. Weed densities were moderate to heavy. Weed control was good for all treatments. Early seeded treatments flowered the longest. Ronilan EG was applied to control sclerotinia stem rot.

Results: (a) Yield and seed quality data

SEEDING DATE & TIME OF WEED REMOVAL TRIAL
Naicam, SK

Treatment	Seeding Date	Swath Date	Combine Date	Yield (bu/ac)	Oil (%)	Contribution Margin ($/ac)
Early (1-3)	May 8	Aug 19	Sept 10	38.4	46.4	79.63
Early (4-6)	May 8	Aug 19	Sept 10	36.0	46.3	65.83
Normal (1-3)	May 21	Aug 26	Sept 10	35.3	44.7	61.80
Normal (4-6)	May 21	Aug 26	Sept 10	34.2	45.9	55.48
LSD CV %				1.94 4.2	1.88 3.2	

Results: (b) Weed Data

SEEDING DATE & TIME OF WEED REMOVAL TRIAL Naicam, SK					
Treatment	**Emergence Counts Plants/m^2**	**Spray Date**	**Broadleaf Weeds (#/m^2)**	**Grassy Weeds (#/m^2)**	**Dry Wt. (g/m^2) total**
Early (1-3)	111	June 3	44	62	68.9
Early (4-6)	112	June 16	39	77	100.6
Normal (1-3)	101	June 16	36	61	88.1
Normal (4-6)	102	June 26	40	69	94.8

Discussion: Contribution margins reflect differences in yield. When comparing time of weed removal, weeds removed at the 4-6 leaf stage in the early seeding date treatments resulted in a significant yield reduction. Early (1-3 leaf stage) times of weed removal treatments were better able to utilize available moisture and nutrients than the late time of weed removal treatments. Early seeding significantly improved yields. Oil content was highest in the early seeded treatments.

VEGREVILLE

Observations: The early seeded treatments were seeded at the same time as much of the canola in the area. Seeding of the normal seeded treatments was delayed until the third week in May due to weather related delays. Soil temperature was approximately 12°C on the early seeding date. Early seeded treatments emerged evenly and were approximately two weeks ahead of the normal seeding date throughout the growing season. Yield potential of early seeded treatments was reduced due to dry conditions in June. Weed pressure was heaviest in low-lying areas of the trial with predominant weeds being wild oats, stinkweed, and Canada thistle.

Results:

SEEDING DATE & TIME OF WEED REMOVAL TRIAL Vegreville, AB						
Treatment	**Seeding Date**	**Swath Date**	**Combine Date**	**Yield (bu/ac)**	**Oil (%)**	**Contribution Margin ($/ac)**
Early (1-3)	May 6	Aug 17	Sept 22	46.1	44.6	171.41
Early (4-6)	May 6	Aug 17	Sept 22	45.4	45.3	167.38
Normal (1-3)	May 22	Aug 30	Sept 22	50.3	45.0	195.56
Normal (4-6)	May 22	Aug 30	Sept 22	48.1	44.9	182.10
LSD				2.73	1.03	
CV %				4.4	1.8	

Discussion: The May 22 seeding date with early weed removal was significantly higher yielding than both May 6 seeding date treatments. On both seeding dates, removing weeds early resulted in higher yields and ultimately, higher contribution margins. These higher contribution margins are attained with simple management practices and are of no extra cost to the producer.

LETHBRIDGE (DRYLAND)

Observation:

A single in-crop application of Roundup Transorb (0.5 L/ac) was used in all treatments. Prior to spraying, three 1/4 m^2 samples of weeds per replicate were hand picked, dried and weighed to determine weed bio-mass. The weed pressures were moderate. The predominant weeds were volunteer cereals, wild oats and stinkweed. Cabbage seed pod weevil damage was observed in all seeding dates but was highest in the early seeding dates. The June 7 frost appeared to cause more damage on the early seeded treatments. At the time of the frost the early seeded treatments were farther advanced (5-6 leaf) than the normal seeded treatments (1-2 leaf). A difference of 11 days between seeding dates narrowed to 5 days at harvest.

Results:

SEEDING DATE & TIME OF WEED REMOVAL TRIAL Lethbridge, AB (Dryland)							
Treatment	**Seeding Date**	**Swath Date**	**Weed Biomass (lbs/ac)**	**Yield (bu/ac)**	**Oil (%)**	**Contribution Margin ($/ac)**	**Grade**
Early (1-3)	April 22	Aug 17	226	27.9	44.8	56.98	2
Early (4-6)	April 22	Aug 17	340	27.7	44.8	55.89	2
Normal (1-3)	May 4	Aug 22	243	33.9	46.6	89.91	2
Normal (4-6)	May 4	Aug 22	308	29.7	45.9	66.83	2
LSD CV %				3.91 10.1	0.62 1.1		

Discussion:

Results show normal seeding with early weed removal yielded significantly higher than the other treatments. This is the first time in 4 years of this trial being conducted at Lethbridge that has shown a higher yield response with normal seeding over early seeding. Potential advantages to early seeding may have been lost as a result of greater cabbage seedpod weevil damage and frost.

The weed removal component of the trial shows the highest yield advantage for the normal seeding date 1-3 leaf stage. No yield differences occurred between weed removal stages at the early seeding date. This can be attributed to the fact that the weeds, although high in population, were very slow growing. Oil contents varied significantly. The normal seeding with early weed removal had the highest oil content.

XI RE-SEEDING TRIAL

Objective: To assess the impact of re-seeding on yield, quality and economic returns when initial plant densities are below recommended thresholds.

Background: Canola is a very flexible crop in that wide variations in plant populations have very little effect on the final yield, although these variations can affect maturity. Research has shown (***Canola Growers Manual - Crop Establishment section***) that as plant populations decline below 5.6 plants/ft^2 (60 plants/m^2) yields tend to decline. The recommended threshold for re-seeding is 3.7 plants/ft^2 (40 plants/m^2). The effect of plant density on maturity is more pronounced under cool summer conditions than warm conditions.

Methodology: This trial was seeded on May 19 with 46A73 and was originally intended to be a time of weed removal trial. Heavy rains resulted in saturated conditions and soil crusting reduced emergence to less than the recommended threshold for plant stands. Therefore, a re-seeding trial was established. One treatment was cultivated and re-seeded on June 7, while the other was left. The treatments were placed in a randomized block design.

Observations: Both treatments were sprayed with Odyssey (17 g/ac) and Lontrel (0.17 L/ac) at about the 2 leaf stage. Weed control was good for both treatments.

Results:

RE-SEEDING TRIAL
Carman, MB

Treatment	Yield (bu/ac)	Contribution Margin ($/ac)	Oil (%)	Plant Counts (plants/m^2)
Seeded May 19	32.7	6.97	45.1	32
Re-seeded June 7	35.8	(7.11)	43.5	90
LSD	3.27		0.95	
CV%	7.9		1.7	

Discussion: Re-seeding did not improve yields significantly. In spite of the extremely low plant stand, the crop was able to compensate for much of the reduced yield potential. As a result, the re-seeded crop was not able to offset the added cost for seed and cultivation. Early weed control was no doubt critical to this success. The plots that were re-seeded produced lower oil contents.

XII TIME OF WEED REMOVAL TRIAL

Objective: To compare the effects of time of weed removal on yield and quality of ***Smart*** canola using Odyssey herbicide.

Background: Determining the proper time for weed removal has been a constant source of frustration to producers across Western Canada. Producers will often delay post emergent herbicide application in an attempt to avoid late flushes of weeds. The concern is that these late flushes of weeds may add to the bank of weed seeds in the soil or require additional herbicide applications and increased input costs. Work conducted by Harker, et al (Agriculture and Agri-Food Canada) along with Canola Production Centre data has shown there are economic benefits to removing weeds early in crop development.

Methodology: The seeding date trial and weed removal trial consisted of three treatments based on a normal seeding date:

A) 1 to 2 leaf stage of the canola (1 week after emergence)
B) 3 to 5 leaf stage of the canola (2 weeks after emergence)
C) 6 to 7 leaf stage of the canola (3 weeks after emergence)

The Smart variety 46A73 was used for all trials.

Western Canadian Summary:

In general, delaying spraying reduced yields and contribution margins at most sites. Early spraying did not appear to increase dockage levels. This data supports previous data collected at Canola Production Centres for date of seeding and time of weed removal. Early spraying has the potential to increase yields and contribution margins with no increase in expenses.

CARMAN

Observations: This trial was initially seeded May 19 but had to be cultivated up and re-seeded on June 7 as a result of a pounding rain shortly after seeding. One plot in each rep was left to assess benefits of reseeding (see page 94). Emergence after the second seeding date was good and growth was rapid and lush resulting in canopy closure prior to the last spray stage. Weed pressure was heavy, particularly in two of the four reps. In these reps, efficacy was visibly reduced in the last spray stage. Lontrel (0.17 L/ac) was also applied as a tank mix at each stage for thistle control.

Results:

TIME OF WEED REMOVAL TRIAL Carman, MB				
Treatment	**Weed Biomass (g/m^2)**	**Yield (bu/ac)**	**Oil (%)**	**Contribution Margin ($/ac)**
1 to 2 leaf	24.2	35.8	43.5	29.98
3 to 5 leaf	31.4	31.2	42.4	3.53
6 to 7 leaf	63.4	28.1	42.6	(14.29)
LSD CV %		3.27 7.9	0.95 1.7	

Note: Brackets in the contribution margin reflect a negative value.

Discussion: Early herbicide application dramatically improved both yield and economic return, due to the high density and rapid growth of the weeds at this site. There was a reduction in oil content after the first spraying stage.

RUSSELL

Observations: The entire trial was seeded on the same day and the fertilizer was banded prior to seeding. Weed pressure was very high which included wild oats, Canada thistle, dandelions and a few cleavers. Spray dates were June 16 for the early treatment (2 leaf stage), June 25 for the mid treatment (5 leaf stage), and June 29 (6 leaf stage) for the late treatment. Weed biomass was collected and was much higher in later sprayed treatments. The canola in the 6 to 7 leaf stage spray treatment was noticeably thinner and shorter than the other two treatments. Also, there were more wild oat escapes in the later sprayed treatments. There was no difference in maturity among the three treatments.

Results:

TIME OF WEED REMOVAL TRIAL Russell, MB				
Treatment	**Weed Biomass (g/m^2)**	**Yield (bu/ac)**	**Oil (%)**	**Contribution Margin ($/ac)**
1 to 2 leaf	46.3	33.3	44.1	41.67
3 to 5 leaf	63.1	27.4	44.4	7.75
6 to 7 leaf	91.3	21.2	44.8	(28.48)
LSD CV %		2.69 7.2	0.62 1.0	

Note: Brackets in the contribution margin reflect a negative value.

Discussion: Yield and contribution margins were both reduced by delaying spraying. Delaying spraying by just under 2 weeks resulted in yield loss of over 12 bu/ac and a loss of $70.15. The heavy weed pressure at this site increased the magnitude of the differences in yield. These results emphasize the importance of timing of management practices. It is important to realize that there are no additional variable costs related to timing of herbicide application and therefore each additional bushel is all profit.

NAICAM

Observations: Emergence was even for all treatments. Weed pressure was not an issue until early June. All treatments received Odyssey (17 g/ac or 40 ac/case). Predominant weeds included volunteer barley, red root pigweed, wild oats, stinkweed and wild mustard. Weed densities were light to moderate. Weed control was good for all treatments. Volunteer barley control was reduced at the 6 to 7 leaf stage of the crop. Ronilan EG was applied to control sclerotinia stem rot.

Results: (a) Yield and seed quality data

TIME OF WEED REMOVAL TRIAL Naicam, SK						
Treatment	**Seeding Date**	**Swath Date**	**Combine Date**	**Yield (bu/ac)**	**Oil (%)**	**Contribution Margin ($/ac)**
1 to 2 leaf	May 9	Aug 25	Sept 10	40.6	46.4	88.55
3 to 5 leaf	May 9	Aug 25	Sept 10	38.5	46.9	75.33
6 to 7 leaf	May 9	Aug 25	Sept 10	36.8	46.5	66.70
LSD CV %				2.22 4.2	0.87 1.4	

Results: (b) Weed Data

TIME OF WEED REMOVAL TRIAL Naicam, SK					
Treatment	**Emergence Counts Plants/m^2**	**Spray Date**	**Broadleaf Weeds (#/m^2)**	**Grassy Weeds (#/m^2)**	**Dry Wt. (g/m^2) total**
1 to 2 leaf	98	June 2	14	22	12.8
3 to 5 leaf	101	June 11	19	27	24.5
6 to 7 leaf	96	June 19	18	31	25.7

Discussion: All treatments graded number one. Contribution margins only reflect differences in yield. The 1 to 2 leaf treatment yielded significantly higher than other treatments. Early (1 to 2 leaf) time of weed removal treatments were better able to utilize available moisture and nutrients than later time of weed removal treatments. Oil content varied only slightly between treatments.

DELMAS

Observations: This trial was seeded on May 20. Weed pressure was moderate to heavy with predominant weeds being wild oats and Canada thistle. An application of Odyssey (17 g/ac) was applied when the canola was at the 1 to 2 leaf stage (June 6), at the 3 to 5 leaf stage (June 8) and at the 6 to 7 leaf stage (June 22). Weed counts and weed biomass samples were taken prior to spraying each treatment. Samples were taken from each plot, dried and then weighed.

Results:

TIME OF WEED REMOVAL TRIAL Delmas, SK						
Treatment	**Weeds (#/m^2)**	**Weed Biomass (g/m^2)**	**Dockage (%)**	**Yield (bu/ac)**	**Oil (%)**	**Contribution Margin ($/ac)**
1 to 2 leaf	38	7	1.4	37.7	46.4	105.72
3 to 5 leaf	43	26	1.9	35.6	46.7	93.64
6 to 7 leaf	23	39	2.0	35.7	46.1	94.22
LSD CV %				3.40 6.8	0.77 1.2	

Discussion: The earliest time of spraying had the highest contribution margin although differences in yields were not significant.

VEGREVILLE

Observations: This trial was seeded on May 23. Weed pressure was light with the predominant weeds being stinkweed, wild oats and Canada thistle. An application of Odyssey (17 g/ac) was applied when the canola was at the 1 to 2 leaf stage (June 11), at the 3 to 5 leaf stage (June 14) and at the 6 to 7 leaf stage (June 22). Weed counts and weed biomass samples were taken prior to spraying each treatment. Samples were taken from each plot, dried and then weighed.

Results:

TIME OF WEED REMOVAL TRIAL Vegreville, AB						
Treatment	**Weeds (#/m^2)**	**Weed Biomass (g/m^2)**	**Dockage (%)**	**Yield (bu/ac)**	**Oil (%)**	**Contribution Margin ($/ac)**
1 to 2 leaf	79	33	1.7	37.6	44.3	115.44
3 to 5 leaf	99	19	1.6	38.9	44.4	122.91
6 to 7 leaf	84	11	1.5	37.7	44.5	116.01
LSD CV %				3.20 6.1	0.73 1.2	

Discussion: There were no significant differences in yield between the treatments. Differences in contribution margins reflect the slight differences in yield. When weed pressures are low, timing of weed removal is not as critical as when weed pressures are high. Dockage levels were low for all treatments.

WANHAM

Observations: The plots were seeded on May 6 at 7.2 lb/acre. All plots showed good emergence and there were no insect problems or diseases noted. Weed information was gathered just prior to spraying. Three 1/4 m^2 counts were carried out for grassy and broadleaf weeds per plot. Weed control was good to excellent in all cases, following spraying. Subsequent canola growth was limited by the dry conditions at the site. The plots showed no differences in maturity and all plots were swathed on August 26.

Results: (a) Yield and seed quality data

TIME OF WEED REMOVAL TRIAL Wanham, AB						
Leaf stage	**Spraying Date**	**Swath Date**	**Combine Date**	**Yield (bu/ac)**	**Oil (%)**	**Contribution Margin ($/ac)**
1 to 3 leaf	June 2	Aug 26	Sept 12	38.2	45.2	107.11
3 to 5 leaf	June 11	Aug 26	Sept 12	37.2	45.1	101.36
5 to 7 leaf	June 24	Aug 26	Sept 12	29.2	45.0	55.36
LSD CV %				2.59 5.4	0.17 0.3	

Results: (b) Weed Data

TIME OF WEED REMOVAL TRIAL Wanham, AB					
Leaf Stage	**Emergence Plants/meter row**	**Spray Date**	**Broadleaf Weeds (g/m^2)**	**Grassy Weeds (g/m^2)**	**Dry Wt. (g/m^2) total**
1 to 3 leaf	21	June 2	2.9	23.9	26.8
3 to 5 leaf	22	June 11	7.0	68.8	75.8
6 to 7 leaf	21	June 24	17.7	89.2	106.9

Discussion: Yield differences were significant between the two early leaf stages and the later leaf stage. There was a significant difference in oil content between the 1 to 3 and 6 to 7 leaf stages. The most abundant weeds were grassy (mostly volunteer winter wheat) and outweighed the broadleaf weeds by at least a factor of 4 in every case. Spraying early increased both yield and contribution margin. Spraying at the later stage (6 to 7 leaf stage) significantly reduced yield and contribution margin.

ROLLA

Observations: The plots were seeded on May 17 at 7.2 lb/acre. All plots emerged well. Weed information was gathered just prior to spraying with Odyssey (17 g/ac) at the 1 to 3 and the 5 to 7 leaf stage treatments. The 3 to 5 leaf stage treatment was not sprayed until the same time as the 5 to 7 leaf stage, due to high winds that made it impossible to spray. Therefore there are eight replicates (rather than the usual four) of the 5 to 7 leaf stage plots. The biomass determinations however, were made at the appropriate time for all three treatments. The most abundant weeds were grassy (mostly volunteer wheat) and outnumbered the broadleaf weeds by at least a factor of 20 in every case. Three 1/4 m^2 counts were carried out for grassy and broadleaf weeds per plot. Weed control was good to excellent in all cases. The 3 to 5 leaf and 5 to 7 leaf stage treatments showed obvious stand reduction due to weed competition, prior to spraying. Subsequent canola growth was limited by the dry conditions at the site. The plots showed no differences in maturity. All plots were swathed on September 9.

Results: (a) Yield and seed quality data

TIME OF WEED REMOVAL TRIAL
Rolla, BC

Leaf stage	Spraying Date	Swath Date	Combine Date	Yield bu/ac	Oil (%)	Contribution Margin
1 to 3 leaf	June 14	Sept 9	Sept 25	32.4	43.9	60.68
5 to 7 leaf	July 3	Sept 9	Sept 25	20.8	43.2	(2.89)
LSD CV %				1.93 5.7	0.49 0.8	

Note: Brackets in the contribution margin reflect a negative value.

Results: (b) Weed Data

TIME OF WEED REMOVAL TRIAL Rolla, BC					
Treatment	**Emergence Plants/meter row**	**Spray Date**	**Broadleaf Weeds (g/m^2)**	**Grassy Weeds (g/m^2)**	**Dry Wt. (g/m^2) total**
1-3 leaf	21.3	June 14	2.8	59.9	62.7
3-5 leaf	20.1	July 3	8.7	200.6	209.3
5-7 leaf	21.3	July 3	27.5	413.7	441.2

Discussion: Yields of canola at this site were limited by moisture availability. Yield differences were significant between the 1 to 3 leaf stage and the 5 to 7 leaf stage. Oil content was higher in the 1 to 3 leaf stage. Spraying early increased yield, oil and contribution margin.

XII SULPHUR SOURCE TRIAL

Objective: To compare the use efficiency of elemental vs sulphate forms of sulphur fertilizer as it relates to yield and quality of ***B. napus*** canola.

Background: Maintaining proper levels of sulphur in a balanced fertility program is essential in maximizing the yield potential of any given canola variety. Sulphur availability during the growing season is critical during flowering, seed set and protein formation. With different sulphur forms available, total amounts of plant available sulphur vary during the growing season. Questions have been raised as to what the effects of the various forms of sulphur on canola yields are in the year of application.

Methodology: Elemental sulphur vs ammonium sulphate sulphur trial consisted of 4 treatments:

1. Check - no sulphur applied
2. Ammonium sulphate - applied at soil test recommendations
3. Elemental sulphur - applied at soil test recommendations
4. 50/50 (Elemental/Sulphate)

Western Canadian Summary:

High yielding canola crops require sulphur in the sulphate form for plant uptake. In this years data, the response to sulphate sulphur was both positive and neutral as a result of soil and environmental conditions. There were no positive yield responses to elemental sulphur, demonstrating that elemental sulphur, when applied at the time of seeding, is inappropriate as a sulphur source for canola production. Oil contents and days to maturity varied from site to site.

Elemental sulphur is a good source of inexpensive, high analysis sulphur fertilizer, but it should be applied at least one year ahead of crop requirements so that the conversion of elemental to the sulphate form, mediated by soil bacteria, can take place.

CARMAN

Observation: The soil test recommendation for sulphur was 25 lb/ac. With the exception of the phosphate all fertilizer was broadcast incorporated prior to seeding. The phosphate was seed-placed. The trial was seeded May 18 into adequate soil moisture. Frequent rainfall in the early part of the growing season, and high weed populations, resulted in spindly, minimally branched canola plants. However, no visible differences were observed among treatments throughout the growing season.

Results:

ELEMENTAL VS SULPHATE SULPHUR TRIAL
Carman, MB

Treatment	Yield (bu/ac)	Contribution Margin ($/ac)	Oil (%)
Check	24.9	(15.41)	48.1
Sulphate S	19.8	(54.23)	46.8
Elemental S	25.4	(17.98)	48.2
LSD	2.53		1.31
CV %	7.9		2.0

Note: Brackets in the contribution margin reflect a negative value.

Discussion: Sulphate sulphur application caused unexpected but significant reductions in yield, oil content and economic return. The negative contribution margins resulted from a combination of factors including low yields (from excess moisture and weed pressure), the low canola price and high input costs.

RUSSELL

Observation: The recommended addition of sulphur at this site was 24 lb/ac. With the exception of the phosphate, all of the fertilizer was banded prior to seeding. The phosphate was seed placed. Seeding took place on May 27. Weed pressure was extremely high, and herbicide application was delayed by wet and windy weather. As a result the yields were limited by weed competition. No visible differences were observed among the treatments.

Results:

ELEMENTAL VS SULPHATE SULPHUR TRIAL Russell, MB			
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**
Check	21.4	(25.01)	44.9
Sulphate S	18.1	(48.83)	44.8
Elemental S	19.1	(43.46)	45.1
50/50	18.0	(47.74)	44.8
LSD CV %	3.59 13.8		3.69 0.8

Note: Brackets in the contribution margin reflect a negative value.

Discussion: There were no significant differences in yield or oil content among treatments. The negative contribution margins are a reflection of low price, differences in fertilizer costs and limited yields as a result of weather and weed competition.

DELMAS

Observation: (See ***Site information***). This trial was seeded on May 18. All nutrients were banded with the drill prior to seeding. Heavy wild oat pressure and dry conditions hindered crop development in early June. Sulphur deficiencies appeared in the check and elemental sulphur treatments at the rosette stage. Growth stages of these treatments were behind the sulphate treatment throughout the growing season. Variability within deficient treatments was also observed. Deficient treatments recovered with ample moisture in July and the deficiency symptoms were barely noticeable at full bloom.

Results:

ELEMENTAL VS SULPHATE SULPHUR TRIAL Delmas, SK				
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Days To Maturity**
Check	32.8	68.82	46.1	108
Sulphate S	32.3	58.82	46.1	102
Elemental S	30.8	50.78	46.9	108
LSD CV %	2.47 5.6		0.66 1.0	

Discussion: There were no significant differences in yield among treatments.

WANHAM

Observations: The plots were seeded May 11 (soil temp 14.8^{o}C). Fertilizer added at the time of seeding was 15-16-8-12, where the sulphur source in the blend was appropriate to the treatment. The check treatment received no sulphur (15-16-8-0). Emergence was good for all plots. The plots were monitored throughout the growing season and no insects or diseases of any significance were noted. No differences in maturity were observed.

Results:

SULPHUR SOURCE TRIAL
Wanham, AB

Treatment	Yield (bu/ac)	Contribution Margin ($/ac)	Oil (%)	Grade
Check	32.3	104.85	46.7	1
Sulphate S	33.6	109.05	46.4	1
Elemental S	31.3	96.05	46.5	1
LSD	1.22		0.86	
CV%	2.8		1.3	

Discussion: There was a significant difference in yield between the check and ammonium sulphate treatments. There were no differences in oil content or grade among treatments. Yield potential at this site was limited by drought conditions, and crop response to added sulphur was minimal.

ROLLA

Observations: The plots were seeded May 18 (soil temp 14.8^{o}C). Fertilizer added at the time of seeding was 14-15-8-20, where the sulphur source in the blend was appropriate to the treatment. The 50/50 treatment received 10 lb/ac each of elemental and sulphate sulphur sources. The check treatment received no sulphur (14-15-8-0). Emergence was rated as fair to good. The plots were monitored throughout the growing season and no insects or diseases of any significance were noted. No differences in maturity were observed.

Results:

SULPHUR SOURCE TRIAL Rolla, BC				
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Grade**
Check	27.9	62.72	42.9	1
Sulphate S	24.9	39.05	42.7	1
Elemental S	25.8	46.30	43.1	1
50/50	26.1	46.93	43.1	1
LSD CV%	2.16 6.3		0.42 0.8	

Discussion:

The sulphate sulphur source gave a significantly lower yield than the check treatment. There were no significant differences among the remaining treatments. Differences in contribution margins reflect the added cost of the sulphur source in each case. There were no significant differences in oil content or grade among treatments. Canola at this site did not respond to additional sulphur.

XIII TOP DRESSED SULPHUR AND NITROGEN TRIAL

Objective: To compare the effectiveness of top-dressed sulphur and nitrogen fertilizer (10lb/ac of each of N and S) applied at different times.

Background: There are two different cropping situations that suggest an increased economic value in using top dressed fertilizer on an emerged crop. In one situation, the spring soil conditions (and market outlook, or individual economic situation) may not favour using the full rate of applied fertilizer at the time of seeding. In the second situation, a canola crop may experience ideal growing conditions (timely rainfall and moderate temperatures) requiring additional fertilizer to optimize crop yield.

Methodology: The top dressed trial consisted of five treatments in a randomized complete block experimental design:

A) Check: no extra sulphur or nitrogen after seeding
B) 10 lb/ac N and 10 lb/ac S at 7 days after emergence
C) 10 lb/ac N and 10 lb/ac S at 14 days after emergence
D) 10 lb/ac N and 10 lb/ac S at 21 days after emergence
E) 10 lb/ac N and 10 lb/ac S at 7 & 21days after emergence

The additional fertilizer was broadcast onto an established stand of canola that was seeded with a recommended fertilizer rate for the site.

Western Canadian Summary:

In 1999 top dressed fertilizer was effective at only one of the five sites. Top dressing is a management tool for split applications of nitrogen and sulphur, which can be used to optimize yields when conditions are appropriate. More work needs to be done in this area.

LETHBRIDGE (IRRIGATION)

Observations: The plots were seeded using the variety Hyola 401 on May 6 (soil temp 12 ^{o}C). The base treatment of fertilizer for all treatments was pre-seed incorporation (121 lbs/ac nitrogen, 24 lbs/ac sulphur). The phosphate (25 lbs/ac) was seed placed. Stand establishment was excellent. Additions of N and S (approximately 10 lb/ac each) were broadcast (using ammonium sulphate) on June 5, June 12, and June 19. There were no differences observed in maturity times.

Results:

TOP DRESSED SULPHUR AND NITROGEN TRIAL Lethbridge, AB (Irrigation)				
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Grade**
Check	57.4	162.67	43.7	1
At 7 days	57.3	156.29	42.7	1
At 14 days	57.7	158.58	42.6	1
At 21 days	57.7	158.58	43.6	1
At 7 & 21 days	58.2	155.64	42.9	1
LSD CV%	1.26 1.7		1.28 2.4	

Discussion: There were no significant differences in yield or oil content among the treatments. The check treatment illustrated the best economic return.

LETHBRIDGE (DRYLAND)

Observations: The plots were seeded with Option 501 on May 6 (soil temp 4 ^{o}C). Prior to seeding, 60 lbs/ac nitrogen was banded. A blend of 12 lb N, 22 lb P_2O_5 , and 18 lb SO_3 was seed placed. Stand establishment was good. Frost and cool growing conditions at the site limited development (see ***Site Description***). Broadcasting ammonium sulphate (50 lb/ac of 21-0-0-24) was completed on May 29, June 5, and June 12. There were no differences observed in maturity.

Results:

TOP DRESSED SULPHUR AND NITROGEN TRIAL Lethbridge, AB (Dryland)				
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Grade**
Check	33.1	79.29	48.2	2
At 7 days	32.7	71.29	48.1	2
At 14 days	33.0	72.93	48.1	2
At 21 days	34.5	81.14	48.1	2
At 7 & 21 days	33.9	72.05	47.6	2
LSD CV%	1.93 4.6		0.44 0.7	

Discussion: There were no significant differences in yield or oil content. The best economic return for applying ammonium sulphate was at 21 days after

emergence. With the exception of the 7 & 21 day treatment there were no significant differences in oil content.

INNISFAIL

Observations: The plots were seeded with Option 501 on May 17 (soil temp 11.5 ^{o}C). Prior to seeding 56 lbs/ac nitrogen, 10 lbs/ac sulphur, and 10 lbs/ac potassium was banded. Phosphate (27 lbs/ac) was seed placed. Stand establishment was good. Cool conditions and excessive moisture at the site limited growth (see ***Site Information***). Shallow root systems were noted in all treatments. Random root measurements averaged 4-5 inches in length. N and S (approximately 10 lb/ac of each) were broadcast as ammonium sulphate on June 9, June 16, and June 23. There were no differences observed in maturity times.

Results:

TOP DRESSED SULPHUR AND NITROGEN TRIAL
Innisfail, AB

Treatment	Yield (bu/ac)	Contribution Margin ($/ac)	Oil (%)	Grade
Check	37.8	57.61	48.9	2
At 7 days	39.8	62.74	49.0	2
At 14 days	40.2	64.93	48.7	2
At 21 days	39.9	63.29	44.8	2
At 7 and 21 days	41.2	64.59	48.1	2
LSD CV%	2.13 4.3		4.28 7.1	

Discussion: Significant yield differences occurred among the check, 14 day and 7 & 21 day treatments. The 7 & 21 day treatment gave the highest yields, but the added yield did not cover the extra cost of fertilizer. The 14 day treatment gave the best contribution margin. There were no significant differences in oil content among treatments.

WANHAM

Observations: The plots were seeded with Hyola 401 on May 8 (soil temp 11.5 ^{o}C). Stand establishment was fair. Dry conditions at the site limited growth (see ***Site Information***). N and S (approximately 10 lb/ac of each nutrient) were broadcast as ammonium sulphate on May 26, June 2, and June 11.

Weekly growth staging was recorded. There were no differences observed in maturity times.

Results:

TOP DRESSED SULPHUR AND NITROGEN TRIAL Wanham, AB				
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Grade**
Check	35.5	90.46	43.8	1
At 7 days	35.0	77.00	44.4	1
At 14 days	36.0	82.75	44.3	1
At 21 days	35.6	80.45	44.1	1
At 7 & 21 days	35.4	68.71	43.7	1
LSD	1.28		0.63	
CV%	2.9		1.1	

Discussion: There were no significant differences in yield or oil content among treatments. The dry conditions at this site precluded any requirement for additional fertilizer to increase yields. The contribution margins reflect the additional cost of added top dressed fertilizer.

ROLLA

Observations: The plots were seeded with IMC 108 on May 17 (soil temp 11.9 ^{o}C). Stand establishment was fair. Dry conditions at the site limited growth (see ***Site Information***). Additions of N and S (approximately 10 lb/ac of each nutrient) were achieved by broadcasting ammonium sulphate on June 13, June 22, and July 6. Weekly growth staging was recorded. There were no differences observed in maturity times.

Results:

TOP DRESSED SULPHUR AND NITROGEN TRIAL Rolla, BC				
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Grade**
Check	25.6	21.88	44.6	1
At 7 days	24.7	5.72	44.4	1
At 14 days	25.0	7.58	44.7	1
At 21 days	25.6	11.29	44.7	1
At 7 & 21 days	22.2	(20.34)	43.9	1
LSD	1.89		0.59	
CV%	6.1		1.1	

Note: Brackets in the contribution margin reflect a negative value.

Discussion: The 7 & 21 day treatment gave a significantly lower yield and oil content than all other treatments. The contribution margins reflect the added cost of the supplemental fertilizer. No advantage was gained in yield, oil or seed quality, by top dressing canola at this site under the drought conditions experienced.

XIV FERTILIZER RATE AND VARIETY TRIAL - HYBRID AND OPEN POLLINATED VARIETIES

Objective: To compare various nitrogen rates on yield, quality and contribution margins of hybrid and open pollinated canola using soil test recommendations as a guide.

Background: In a number of field crops, hybrid varieties have a different fertilizer response curve than open pollinated varieties. Growers and researchers suspect that this may also be the case in canola. In the past, fertilizer recommendations were based on research conducted on older open pollinated varieties. The development of high yielding hybrid lines may require additional fertilizer to optimize yield, quality and contribution margin.

Methodology: The fertility treatments for this trial were based on variable nitrogen rates and maintaining a 5:1 nitrogen to sulphur ratio, as per the protocol provided by AgrEvo. Phosphorus and potash rates were constant for all treatments. This trial consisted of 6 treatments:

Hybrid Variety (InVigor 2153 or 2273)
A) 100% nitrogen level (available + applied nutrients*)
B) 150% (of treatment A)
C) 200% (of treatment A)

Open Pollinated Variety (Exceed)
A) 100% nitrogen level (available + applied nutrients*)
B) 150% (of treatment A)
C) 200% (of treatment A)
* as per soil test recommendations

Western Canadian Summary:

The most consistent trend among these trials was higher yields from the InVigor varieties, compared to the open pollinated variety Exceed, at each fertility level. This yield difference tended to be greater at higher fertility levels leading to better contribution margins for the InVigor varieties than Exceed.

Weather conditions were dry at two sites and seeding was late at the third site. Therefore, these conditions likely limited yield responses resulting in poor contribution margins at higher fertility levels.

Oil contents tended to decrease with increases in fertility level, since the increase of supply of nitrogen favoured protein formation at the expense of fat synthesis.

GRENFELL

Observations: Wet soil moisture conditions hampered seeding operations. Fertilizer rates were based on the total amount of applied and available nutrients. A base application of liquid nitrogen and sulphur was banded (June 7) prior to seeding (June 11). 11-52-0 was seed placed to meet phosphate requirements. Fertility levels were as follows:

Fertility Level	Nitrogen (lbs/ac)		Phosphorus (lbs/ac)		Potassium (lbs/ac)		Sulphur (lbs/ac)	
	Applied	Available +Applied	Applied	Available +Applied	Applied	Available +Applied	Applied	Available +Applied
100%	61	87	28	59	0	1015	13	99+
150%	105	131	28	59	0	1015	20	106+
200%	148	174	28	59	0	1015	26	112+

InVigor 2273 was seeded at 5.0 lb/ac and Exceed at 6.5 lb/ac. Two visual ratings, early season vigour and canopy closure, were evaluated. Early season vigour was evaluated (InVigor 2273 = 2 and Exceed = 3) on a scale of 1 to 5, with 1 being excellent, 3 being average and 5 being very poor. In terms of canopy closure, on July 1, Exceed covered 15% and InVigor 2273 covered 20% of the ground surface. On July 15, prior to stem elongation, Exceed covered 75% and InVigor 2273 covered 90% of the ground surface. Complete canopy closure occurred on July 21 for InVigor 2273 and July 24 for Exceed. The level of fertility did not have an effect on early season vigour or canopy closure. All treatments were sprayed with a Liberty/Venture tank mix. Initial weed control was good but a light second flush of volunteer wheat was noted midway through the season. A delay in maturity of 3 days (150% treatments) and 6 days (200% treatments) was observed.

Results:

FERTILIZER RATE & VARIETY TRIAL Grenfell, SK				
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Grade**
100% fertility level*				
InVigor 2273	26.7	18.93	49.7	1
Exceed	25.2	19.71	50.4	1
150% fertility level				
InVigor 2273	36.1	58.04	48.8	1
Exceed	32.1	35.77	49.3	2
200% fertility level				
InVigor 2273	36.8	46.09	47.6	1
Exceed	35.1	36.24	47.6	2
LSD for fert. rate	1.51		0.75	
LSD for variety	1.78		0.67	
CV%	5.3		1.7	

*100% fertility level = 87N - 59P - 1015K - 99+S

Discussion: Increases in rates of applied nitrogen significantly increased yield for all treatments except 200% fertility level for InVigor 2273. InVigor 2273 yielded significantly higher than Exceed at the 150% fertility level. Contribution margins reflect yield differences, seed costs and the cost of additional fertilizer. The 150% above soil test recommendation treatments resulted in the highest economic return for InVigor 2273. The yield advantages for the 200% above treatments marginally compensated for the additional fertilizer cost for Exceed.

The results also indicate that increased rates of applied fertilizer have a significant (negative) impact on oil content. This is a commonly observed response to increased fertility.

VEGREVILLE

Observations: The trial was seeded on May 6. All fertilizer was banded with the drill prior to seeding. Localized weed problems were noticed in areas of the trial. Fertility levels were as follows:

Fertility Level	Nitrogen (lbs/ac)		Phosphorus (lbs/ac)		Potassium (lbs/ac)		Sulphur (lbs/ac)	
	Applied	Available +Applied	Applied	Available +Applied	Applied	Available +Applied	Applied	Available +Applied
100%	70	106	20	90	10	989	20	52
150%	120	156	20	90	10	989	20	52
200%	171	207	20	90	10	989	20	52

InVigor 2273 covered the ground quicker than Exceed at all levels of fertility. Visual differences between fertility levels were slight. Treatments with higher fertility produced lusher stands. The 150% and 200% treatments matured 3 to 4 days later than the 100% treatment. Moisture stress had a bigger impact on the crop than fertility levels.

Results:

FERTILIZER RATE & VARIETY TRIAL
Vegreville, AB

Treatment	Yield (bu/ac)	Contribution Margin ($/ac)	Oil (%)
100% fertility level*			
InVigor 2273	41.1	142.43	47.6
Exceed	42.1	148.88	47.2
150% fertility level			
InVigor 2273	48.3	159.21	47.0
Exceed	42.9	139.21	46.9
200% fertility level			
InVigor 2273	48.0	144.26	45.9
Exceed	47.6	132.59	46.2
LSD for fert. rate	4.70		0.61
LSD for variety	5.34		0.40
CV%	10.7		1.3

*100% fertility level = 106N - 90P - 989K - 52S

Discussion:

InVigor 2273 significantly out yielded Exceed at the 150% fertility level. For InVigor 2273, the 100% fertility level was significantly lower yielding than the 150 and 200% fertility levels. With InVigor 2273, the highest contribution margin was at the 150% fertility level. There was an added return of approximately $17/acre, with only a $2/acre added return at the 200% fertility level. With Exceed, it did not pay to add fertilizer past the 100% level. The results also indicate that increased rates of applied fertilizer have a negative impact on oil content. This is a commonly observed response to increased fertility.

WANHAM

Observations: The actual amount of nutrients added to achieve a target yield of 37 bu/acre is listed below:

Fertility Level	Nitrogen (lbs/ac)		Phosphorus (lbs/ac)		Potassium (lbs/ac)		Sulphur (lbs/ac)	
	Applied	Available +Applied	Applied	Available +Applied	Applied	Available +Applied	Applied	Available +Applied
100%	87	152	16	70	8	308	12	102+
150%	143	208	16	70	8	308	12	102+
200%	199	264	16	70	8	308	20	110+

Most of the added fertilizer was banded prior to seeding (a blend of 15-16-8-12 was added with the seed for all treatments). This soil was dry and this disturbance aggravated the situation. Emergence of all plots was negatively affected by the dry soil conditions, and germination was patchy and uneven. All plots were spayed with Liberty (1.35 L/ac) and Venture 25 DG (200 g/ac) on June 5. Crop growth was monitored on a weekly basis. Differences in maturity were recorded. Swathing dates were: InVigor 100% and 150% August 19, InVigor 200% August 21, Exceed 100% August 25, Exceed 150% August 26, and Exceed 200% August 27.

Results:

FERTILIZER RATE & VARIETY TRIAL
Wanham, AB

Treatment	Yield (bu/ac)	Contribution Margin ($/ac)	Oil (%)	Grade
100% fertility level*				
InVigor 2153	39.5	102.33	46.6	1
Exceed	39.1	108.88	48.0	1
150% fertility level				
InVigor 2153	42.0	98.77	45.7	1
Exceed	40.0	96.12	47.2	1
200% fertility level				
InVigor 2153	41.8	85.28	45.5	1
Exceed	41.2	90.68	46.5	1
LSD CV%	2.82 5.1		0.39 0.6	

*100% fertility level = 152N - 70P - 308K - 102+S

Discussion: Maturities were delayed with increased fertility. There were no significant differences in yield between varieties or treatments. Contribution margins show that the recommended rate of fertility (100% soil test recommended) gave the best economic return to investment. Contribution margins decreased at higher rates of nutrient addition due to the added cost of additional fertilizer relative to the crop yield return.

Oil content decreased with an increase in fertilizer rate for both varieties. Exceed produced significantly higher oil than InVigor 2153 at each fertility level.

XVII SYSTEMS COMPARISON TRIAL

Objective: To establish agronomic criteria for choosing between varieties and herbicide options.

Background: The introduction of canola with novel traits for herbicide tolerance has given producers many options for herbicide and variety selection. The greatest return will occur by choosing the most appropriate combination of variety and herbicide for each field. Factors to consider beyond the performance of the variety include weed population, weed spectrum, tillage system and herbicide rotation. Entries in the systems comparison trial were on a contract basis.

Methodology: Each treatment was replicated four times in an incomplete split plot design. To avoid the impact of spray drift, all varieties within the system were seeded in a common block. The canola varieties with novel traits for herbicide tolerance were compared to a conventional variety AC Excel with a conventional herbicide program. All varieties were sprayed with their appropriate herbicide.

Varieties used were:

- Roundup Ready -LG3235, LG3295, LG Dawn, IMC 106, IMC 107 SW RideR and SW Arrow
- Smart - 45A71, 46A73 (Odyssey)
- Smart - 45A71, 46A73 (Freedom Gold)
- Liberty Link - InVigor 2153, 2273, 2463, 2473 and Exceed
- Conventional - AC Excel, Battleford and Quantum

Note: not all system or varieties were entered at all sites

Western Canadian Summary:

In comparing overall yields across Western Canada, Liberty Link hybrids yielded higher than the open-pollinated Exceed and the check (AC Excel). Most of the Roundup Ready varieties and the conventional variety Quantum also out yielded AC Excel. Smart (Odyssey) treatments tended to out yield the Smart (Freedom Gold) treatments. The differences in performance of the varieties among sites are in part a reflection of the systems' ability to control the weed spectrum and density. Contribution margins tended to be the highest with the Roundup Ready varieties at most locations.

Differences in oil contents varied from variety to variety and from site to site. Weed conditions and growing conditions varied greatly, and the ideal combination of herbicide system and variety varied accordingly. The ideal system (in terms of variety and herbicide package) for one grower is not necessarily the best combination for a neighbour. A grower must consider the spectrum of weeds present, typical growing conditions for their area, disease concerns, crop rotation, herbicide rotation and genetic potential of the varieties before making the choice of one particular system for a field.

Also important, is the role of proper record keeping in terms of varieties and herbicide systems used. This is crucial in planning the weed control strategy for the entire rotation, and in reducing the chances of developing weed resistance to specific herbicides or classes of herbicides that may be frequently used in the rotation.

CARMAN

Observation: The site was cultivated in mid-May to control volunteer fall rye and dry the soil (see ***Site Information***). Granular N, K, and S fertilizer was broadcast and then the site was cultivated and harrowed prior to seeding on May 31. Emergence was good for all treatments. The weed pressure was high at this site. Predominant weeds included green foxtail, wild oats, wild buckwheat, lady's thumb, wild mustard, redroot pigweed, and a scattering of Canada thistle and sow thistle. The conventional system was sprayed with Muster Gold II (Muster 8 g/ac and Assure II 0.2 L/ac or 40 ac/case) and Lontrel (0.17 L/ac). An additional 0.05 L/ac of Assure II was added with the Muster Gold II due to high densities of grassy weeds and advanced stage of early emerged weeds. The Smart (Freedom Gold) system was sprayed with Freedom Gold II (Freedom 8 g/ac and Assure II 0.2 L/ac or 40 ac/case), while the Smart (Odyssey) system was sprayed with Odyssey (17 g/ac), and both also received 0.17 L/ac of Lontrel. The Roundup Ready system received Roundup Transorb (0.5 L/ac) and the Liberty Link system was sprayed with Liberty (1.35 L/ac). All treatments were sprayed at the 3 to 4 leaf stage of the canola. Weed control appeared to be more rapid in the Liberty Link and Roundup Ready systems, particularly for the grasses. Weed control was very good in all treatments.

Results:

SYSTEMS COMPARISON TRIAL Carman, MB						
System	**Yield (%)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Growing Degree Days**	**Days To Maturity**
Conventional						
Quantum	112	33.9	28.65	45.3	1070	85
AC Excel	100	30.4	14.90	46.4	1070	85
Liberty Link						
InVigor 2463	114	34.6	39.50	47.0	1070	85
InVigor 2473	107	32.6	28.00	45.8	1056	84
InVigor 2273	103	31.4	21.10	46.8	1041	83
Exceed	97	29.5	26.12	47.8	1056	84
Roundup Ready						
LG Dawn	109	33.0	44.05	46.6	1087	86
SW RideR	108	32.9	40.47	46.9	1070	85
Smart (Freedom Gold)						
46A73	107	32.5	17.14	45.2	1102	87
45A71	98	29.8	0.80	45.8	1056	84
Smart (Odyssey)						
46A73	108	32.9	13.86	44.8	1102	87
45A71	108	32.7	13.61	45.4	1070	85
LSD CV%		2.38 6.2		0.69 1.3		

Discussion: The potential of the varieties in this trial did not appear to suffer as much from excess moisture as the varieties in the conventional variety trial, as evidenced by a 6.1 bu/ac higher yield of the same check variety (AC Excel). (Refer to ***B.napus Variety Trial*** table for Carman page 52). Five varieties achieved significantly higher yields than the check (AC Excel), including at least one from each system. There were no significant differences among them. None of the varieties yielded significantly above Quantum, the other variety in the conventional system. The contribution margins of the conventional, Smart (Freedom Gold) and Smart (Odyssey) systems suffered from additional costs related to thistle control, and as a result the Roundup Ready varieties and InVigor 2463 provided the greatest returns. All of the varieties graded #1. Exceed provided significantly more oil content than any other variety, while Quantum and 46A73 were significantly below the check. The variety 46A73 was the latest in maturity.

RUSSELL

Observation: Seeding was delayed until May 28 by frequent rainfall, but the soil was not excessively wet at seeding time and emergence was quick and fairly uniform. Weed pressure was extremely high and included lots of wild ones (oats, mustard, buckwheat), Canada thistle and sow thistle in excess of 4 per square metre, and a few cleavers, dandelion and night flowering catchfly. Herbicides were applied at about the 4 leaf stage. The conventional varieties were sprayed with Select (0.08 L/ac or 40 ac/case), Muster (8 g/ac) and Lontrel (0.17 L/ac). The Smart (Odyssey) system was sprayed with Odyssey (17 g/ac) and Lontrel (0.17 L/ac). Roundup Ready varieties received Roundup Transorb (0.5 L/ac) and the Liberty Link system received Liberty (1.35 L/ac). As a result of wind followed by heavy rain, the spraying of the systems other than Roundup Ready were delayed by 3 days. When the other systems were finally sprayed on a calm morning, a rain followed about 4 hours later. These less than ideal conditions no doubt had an impact on the efficacy of the conventional, Smart (Odyssey) and Liberty Link systems. In particular, Liberty had trouble controlling Canada thistle and wild mustard, although it did a good job of controlling the grasses.

Results:

SYSTEMS COMPARISON TRIAL Russell, MB						
System	**Yield (%)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Growing Degree Days**	**Days to Maturity**
Conventional						
Quantum	112	35.2	51.30	46.7	1102	98
AC Excel	100	31.4	35.83	46.6	1060	93
Liberty Link						
InVigor 2473	96	30.0	38.56	46.0	1060	93
InVigor 2273	95	29.9	37.99	46.9	1091	96
InVigor 2463	89	28.1	27.64	46.7	1060	93
Exceed	87	27.4	39.56	48.7	1060	93
Roundup Ready						
LG3235	118	36.9	90.73	45.7	1040	91
SW RideR	113	35.6	81.51	44.8	1060	93
LG Dawn	109	34.1	75.90	45.2	1051	92
LG3295	103	32.2	66.41	45.3	1060	93
Smart (Odyssey)						
46A73	102	32.0	34.20	44.6	1108	99
45A71	93	29.3	19.58	44.6	1028	90
LSD CV%		3.61 9.5		1.23 2.2		

Discussion: Three varieties had significantly higher yields than the check (AC Excel), including SW RideR, LG3235 and Quantum. There were no significant differences among them. Only Exceed yielded significantly below the check. None of the varieties yielded significantly above Quantum, the other variety in the conventional system. The contribution margins reflect differences in yield as well as seed and/or herbicide costs. All of the varieties graded number one. Exceed provided significantly more oil content than any other variety, while five varieties were significantly below the check. Quantum and 46A73 were the latest to mature. While the weed control in the Roundup Ready varieties was excellent, at least part of the generally better performance of this system must be attributed to the difference in spraying date. (Refer to ***Time of Weed Removal Trials***, page 95***)***

GRENFELL

Observations: Wet soil moisture conditions hampered seeding operations. As a result, seeding did not take place until June 14. Crop emergence was rapid but uneven. Excessive rainfall during the growing season caused crop stress. The three Liberty Link hybrid varieties (InVigor 2273, 2463 and 2473) covered the ground more rapidly than other varieties. Herbicides applied at the 2 to 3 leaf stage of the crop resulted in good control of target weeds. With nearly ideal growing conditions, late flushes of weeds (volunteer wheat and wild buckwheat) were evident. Maturity was uneven in all treatments. Roundup Ready varieties received a single in-crop application of Roundup Transorb (0.5 L/ac). Liberty Link varieties received a tank mix of Liberty (1.35 L/ac or 10.5 ac/cs) and Venture (160 g/ac or 40 ac/cs). The conventional varieties (AC Excel and Quantum) were sprayed with Select (0.08 L/ac or 40 ac/cs) and Muster (12 g/ac or 26 ac/cs) tank mix. LG3235 matured 4 days earlier than most other varieties.

Results:

SYSTEMS COMPARISON TRIAL
Grenfell, SK

Treatment	Yield (%)	Yield (bu/ac)	Contribution Margin ($/ac)	Oil (%)
Conventional				
Quantum	118	27.2	25.16	49.0
AC Excel	100	23.1	8.73	49.3
Liberty Link				
InVigor 2273	127	29.4	31.34	49.5
InVigor 2463	127	29.4	31.34	49.7
InVigor 2473	125	28.9	28.47	50.0
Exceed	110	25.4	17.74	50.1
Roundup Ready				
LG3235	126	29.1	39.33	48.7
SW RideR	124	28.6	34.49	49.3
LG3295	119	27.6	33.73	48.9
LG Dawn	115	26.5	25.79	49.5
IMC 107	110	25.4	29.72	50.5
LSD		2.14		1.18
CV%		5.6		1.7

Discussion: Yield differences greater than 2.14 bu/ac were statistically significant. All varieties yielded significantly higher than the check (AC Excel). InVigor

2273 and 2463 yielded significantly higher than Quantum. There were no significant differences in oil content among varieties.

Contribution margins reflect differences in yield, seed and herbicide costs and oil premiums (IMC 107). All varieties graded number one. Weed control in relation to herbicide costs for each system directly affected contribution margins.

NAICAM

Observations: This trial was seeded on May 9 into excellent soil moisture. Cool soil temperatures delayed emergence until May 26. Flea beetle pressure was heavy during emergence (see ***Site Information***). Weed pressure was moderate to heavy, and included volunteer barley, stinkweed, wild mustard and quackgrass. Cleavers and Canada thistle were also identified, but in very low numbers. Herbicides applied at the 1 to 2 leaf stage of the crop resulted in good control of target weeds. The three Liberty Link hybrid varieties (InVigor 2273, 2463 and 2473) covered the ground more rapidly than other varieties. Roundup Ready varieties received a single in-crop application of Roundup Transorb (0.5 L/ac). Liberty Link varieties received a tank mix of Liberty (1.35 L/ac or 10.5 ac/cs) and Venture (80 g/ac). Smart (Odyssey) treatments were sprayed with Odyssey (17 g/ac or 40 ac/case) and Smart (Freedom Gold) treatments were sprayed with Freedom Gold II (Assure II at 0.2 L/ac and Freedom at 8 g/ac). The conventional varieties (AC Excel and Quantum) were sprayed with Select (0.08 L/ac or 40 ac/cs) and Muster (12 g/ac or 26 ac/cs) tank mix. With ideal growing conditions, late flushes of weeds (volunteer barley and re-growth of Canada thisle and quackgrass) were evident. Ronilan EG was applied at the 40% bloom stage based on a high risk of sclerotinia. Maturity on Smart (Freedom Gold) treatments were delayed by 2 days in comparison to the Smart (Odyssey) system.

Results:

SYSTEMS COMPARISON TRIAL Naicam, SK				
Treatment	**Yield (%)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**
Conventional				
Quantum	107	39.6	83.28	47.8
AC Excel	100	36.9	74.90	48.1
Liberty Link				
InVigor 2273	113	41.7	94.77	48.6
InVigor 2463	111	41.0	90.75	48.9
InVigor 2473	110	40.6	88.45	48.0
Exceed	101	37.2	78.26	49.8
Roundup Ready				
SW RideR	108	40.0	86.87	48.1
LG Dawn	104	38.2	79.89	47.5
LG3235	104	38.2	78.48	47.1
LG3295	100	37.0	74.61	47.0
IMC 106	98	36.3	82.92	49.5
IMC 107	97	35.7	79.27	47.8
Smart (Freedom Gold)				
45A71	99	36.4	69.08	45.6
46A73	98	36.1	66.35	46.1
Smart (Odyssey)				
45A71	105	38.9	79.78	47.9
46A73	104	38.2	74.75	47.2
LSD CV%		2.95 6.5		0.99 1.7

Discussion: Yield differences greater than 2.95 bu/ac were statistically significant. InVigor 2273, 2463, 2473 and SW RideR yielded significantly higher than AC Excel. No variety yielded significantly higher than Quantum. However, IMC 106, Smart (Freedom Gold) treatments and IMC 107 were significantly lower. Exceed and IMC 106 were significantly higher in oil content than the check (AC Excel), while Smart (Freedom Gold) treatments and LG3295 were significantly lower. Contribution margins reflect differences in yield, herbicide costs and oil premiums (IMC 106 and 107). All varieties graded number one.

DELMAS

Observations: Warm, moist soil allowed for rapid, even germination across all treatments. Heavy wild oat infestations and drier conditions in early June hindered crop development. Conventional treatments were sprayed with Assure (0.4 L/ac) and Lontrel (0.23 L/ac). Liberty Link treatments were sprayed with Liberty (1.35 L/ac). Roundup Ready treatments were sprayed with a

single (0.5 L/ac) application of Roundup Original. Smart (Odyssey) treatments were sprayed with Odyssey (17 g/ac) and Smart (Freedom Gold) treatments were sprayed with Freedom Gold II (Assure II @ 0.2 L/ac and Freedom @ 8 g/ac). All treatments were sprayed when the canola was at the 2 leaf stage with the exception of those sprayed with Freedom Gold II. Smart (Freedom Gold) treatments were sprayed at the 3 leaf stage of the canola. At swathing, wild oat control appeared to be most effective in the Odyssey treated plots and Liberty Link treated plots with InVigor varieties.

Results:

SYSTEMS COMPARISON TRIAL
Delmas, SK

Treatment	Yield (%)	Yield (bu/ac)	Contribution Margin ($/ac)	Oil (%)	Grade
Conventional					
Quantum	108	33.5	57.31	45.8	2
AC Excel	100	31.1	59.15	45.7	1
Liberty Link					
InVigor 2273	106	32.9	74.63	46.3	1
InVigor 2473	104	32.4	71.75	45.8	1
InVigor 2463	101	31.4	63.00	46.3	1
Exceed	95	29.6	61.88	47.6	1
Roundup Ready					
IMC 106	103	32.0	82.28	46.6	2
SW RideR	101	31.4	71.98	45.9	1
LG3295	100	31.2	75.43	45.8	1
IMC 107	100	31.1	77.04	47.9	2
LG3235	98	30.4	68.03	45.4	1
LG Dawn	94	29.3	55.10	45.5	2
Smart (Freedom Gold)					
46A73	95	29.5	53.67	45.7	2
45A71	87	27.0	41.46	44.7	2
Smart (Odyssey)					
46A73	109	34.4	75.26	45.7	2
45A71	100	31.1	68.70	45.1	1
LSD		1.93		1.03	
CV%		5.2		1.9	

Discussion: 46A73 treated with Odyssey had the highest yield, significantly higher than all other varieties except for Quantum and InVigor 2273. There were small differences in oil content between treatments.

Contribution margins reflect differences in yield, grade, seed costs, herbicide costs, and premiums paid on oil (IMC 106 and IMC 107). Weed control in relation to herbicide costs for each system directly affected contribution margins.

VEGREVILLE

Observations: Warm, moist soil allowed for rapid, even germination across all treatments. Weed pressure was moderate with predominant weeds being wild oats, stinkweed and Canada thistle. Conventional treatments were sprayed with Assure (0.3 L/ac) and Muster (8 g/ac) followed by a Lontrel (0.23 L/ac) application five days later. Liberty Link treatments were sprayed with Liberty (1.35 L/ac). Roundup Ready treatments were sprayed with a single (0.5 L/ac) application of Roundup Original. Smart (Odyssey) treatments were sprayed with Odyssey (17 g/ac) and Smart (Freedom Gold) treatments were sprayed with Freedom Gold II (Assure II @ 0.2 L/ac and Freedom @ 8 g/ac). All treatments were sprayed when the canola was at the 2 leaf stage with the exception of those sprayed with Freedom Gold. Smart (Freedom Gold) treatments were sprayed on canola at the 3 leaf stage. Weed control was good across all treatments.

Results:

SYSTEMS COMPARISON TRIAL Vegreville, AB					
Treatment	**Yield (%)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Grade**
Conventional					
Quantum	107	43.9	133.34	45.8	1
AC Excel	100	41.1	123.84	45.5	1
Liberty Link					
InVigor 2153	112	46.2	162.38	45.9	1
InVigor 2463	105	43.0	143.00	46.5	1
InVigor 2273	97	39.9	114.40	46.1	2
Exceed	96	39.4	133.65	46.0	1
Roundup Ready					
SW RideR	116	47.8	176.58	45.4	1
LG Dawn	107	43.9	157.27	46.8	1
Smart (Freedom Gold)					
45A71	109	44.6	160.24	45.9	1
46A73	107	44.1	159.88	46.0	1
Smart (Odyssey)					
45A71	111	45.7	162.95	45.7	1
46A73	110	45.3	159.71	46.9	1
LSD CV%		5.02 9.6		1.44 2.6	

Discussion: SW RideR was signifcantly higher yielding than AC Excel, InVigor 2273 and Exceed. The only significant difference in oil content was between SW RideR and 46A73 sprayed with Odyssey.

Contribution margins reflect differences in yield, grade, seed and herbicide costs. Weed control in relation to herbicide costs for each system directly affected contribution margins.

LETHBRIDGE (DRYLAND)

Observation: This trial was seeded on May 5. Emergence was even among all treatments. Weed pressures (primarily wild oats and volunteer wheat) in the trial were variable, with some moderate to heavy patches.

All treatments were sprayed on June 1. Cool conditions and a frost on June 7 damaged the canola and slowed herbicide activity. The conventional system was sprayed with Muster Gold II (Muster 8 g/ac and Assure II 0.2 L/ac or 40 acre case rate). The Smart (Odyssey) system was sprayed with Odyssey (17 g/ac). Roundup Transorb (0.5 L/ac) was

sprayed on the Roundup Ready system. The Liberty Link system was sprayed with Liberty (1.35 L/ac). Weed control was good to excellent on the Roundup Ready treatments. Some escapes of stinkweed and wild oats were noted in the conventional treatments. Broadleaf control in the Liberty and Smart (Odyssey) systems was good. Control of wild oat and volunteer wheat in the Smart and Liberty Link systems was fair and had to be re-sprayed on June 18 with Assure (190 ml/ac).

Results:

SYSTEMS COMPARISON TRIAL
Lethbridge, AB (Dryland)

Treatment	Yield (%)	Yield (bu/ac)	Contribution Margin ($/ac)	Oil (%)	Grade
Conventional					
Quantum	104	30.0	70.43	46.1	1
AC Excel	100	28.8	70.14	46.9	1
Liberty Link					
InVigor 2473	105	30.3	47.59	45.8	1
InVigor 2463	105	30.1	46.45	48.0	1
InVigor 2273	102	29.4	42.43	48.1	1
Exceed	98	28.1	46.05	48.5	2
Roundup Ready					
SW RideR	120	34.5	97.80	47.2	1
LG3235	119	34.2	97.88	46.5	1
LG Dawn	114	32.7	90.58	48.2	1
LG3295	109	31.4	84.61	46.2	1
Smart (Odyssey)					
45A71	95	27.5	44.07	45.7	1
46A73	88	25.4	24.23	45.4	2
LSD CV%		3.54 9.8		0.69 1.2	

Discussion: Yield differences greater than 3.54 bu/ac were statistically significant. SW RideR and LG3235 were significantly higher yielding than other varieties. The Roundup Ready system returned the highest contribution margins. The lower yields and contribution margins of the Smart (Odyssey) and Liberty Link systems are a reflection of the extra cost to re-spray with a grass herbicide and the length of time the weeds were

able to compete against the crop. Oil contents vary significantly with Exceed having the highest oil content.

LETHBRIDGE (IRRIGATION)

Observation: This trial was seeded on May 7. Emergence was even but slow due to cool conditions. All post emergent herbicides were applied at the 2 leaf stage of the crop. The conventional system was sprayed with Muster Gold II (Muster 8 g/ac and Assure II 0.2 L/ac or 40 ac/case rate), and Lontrel (190 mL/ac). The Liberty Link system was sprayed with Liberty (1.35 L/ac). Weed control for all systems was excellent.

Results:

SYSTEMS COMPARISON TRIAL
Lethbridge, AB (Irrigation)

Treatment	Yield (%)	Yield (bu/ac)	Contribution Margin ($/ac)	Oil (%)	Grade
Conventional					
Quantum	105	52.3	144.13	43.0	1
AC Excel	100	49.6	120.74	43.9	2
Liberty Link					
InVigor 2473	106	53.0	144.79	43.4	1
InVigor 2273	105	52.3	140.77	45.1	1
InVigor 2463	104	51.7	137.33	44.6	1
LSD CV%		3.49 5.4		0.63 1.1	

Discussion: There were no significant differences in yield. Contribution margins reflect yield, grade, seed and herbicide costs. InVigor 2473 had the highest contribution margin. Oil contents vary significantly with InVigor 2273 having the highest oil content.

WANHAM

Observation: See ***Site Information*** for background on soil and climate conditions. All plots were seeded on May 6 and 7. The soil temperature (at 2.5 cm) averaged 11^{o}C over the two days of seeding. On May 13 and 14 the site received 25 mm of rain. Air temperatures remained cool for the next two weeks, and emergence was slow for all plots. The predominant weeds were volunteer winter wheat, buckwheat, toadflax, stinkweed, narrow-leaved hawksbeard and wild oats. Crop stage and rate of herbicide use

was: Liberty Link: 3 to 4 leaf stage, with Liberty (1.35 L/ac), plus Venture (200 g/ac), Roundup Ready: 3 to 4 leaf stage, with Roundup Transorb (0.5 L/ac), Smart (Odyssey): 3 to 4 leaf stage, with Odyssey (17g/ac). Conventional canola: 2-3 leaf stage, with Muster Gold (Muster 8 g/ac and Assure 0.2 L/ac or 20 ac/cs rate). Ten gallons of water per acre was used as the application rate for all herbicides. Weed control was very good to excellent for all plots. The earliest and latest maturing varieties were InVigor 2153, and 46A73 respectively. All plots were combined September 12.

Results:

SYSTEMS COMPARISON TRIAL
Wanham, AB

Treatment	Yield (%)	Yield (bu/ac)	Contribution Margin ($/ac)	Oil (%)	Grade
Conventional					
AC Excel	100	37.2	123.98	45.8	1
Quantum	89	33.2	93.08	44.3	1
Battleford	87	32.5	89.05	46.6	1
Liberty Link					
InVigor 2273	108	40.1	92.27	46.4	1
InVigor 2463	106	39.5	88.82	46.2	1
InVigor 2153	97	36.2	72.08	45.5	1
Roundup Ready					
LG3235	102	37.8	108.31	45.9	1
LG Dawn	101	37.6	108.72	45.2	1
SW RideR	101	37.5	104.42	45.9	1
LG3295	98	36.5	104.19	45.6	1
SW Arrow	94	34.8	101.87	44.8	1
Smart (Odyssey)					
45A71	94	35.0	89.83	45.4	1
46A73	92	34.3	84.68	44.7	1
LSD CV%		1.56 3.6		0.60 1.1	

Discussion: Significant differences in yields and oil contents were observed among treatments. Note that the highest yields did not give rise to the highest contribution margins. This is a reflection of the cost related to each system. The highest contribution margin was achieved with AC Excel, which is a conventional open-pollinated variety that was sprayed with Muster Gold.

ROLLA

Observations: See ***Site Information*** for background on soil and climate conditions. All plots were seeded on May 17. The soil temperature (at 2.5 cm) averaged 10.6^{o}C over the day. Air temperatures remained cool for the next two weeks and emergence was slow for all plots. The predominant weed species recorded were volunteer spring wheat, buckwheat, toadflax, stinkweed, cleavers and wild oats. Crop stage and rate of herbicide use was: Liberty Link: 3 to 4 leaf stage, with Liberty (1.35 L/ac), plus Venture (200 g/ac), Roundup Ready: 3 to 4 leaf stage, with Roundup Transorb (0.5 L/ac), Smart (Odyssey): 3 to 4 leaf stage, with Odyssey (17g/ac). Conventional canola: 2 to 3 leaf stage, with Muster Gold II (Muster 8 g/ac and Assure II 0.2 or 40 ac/cs rate). Ten gallons of water per acre was used as the application rate for all herbicides. Weed control was very good to excellent for all plots. The earliest and latest maturing varieties were InVigor 2153, and 46A73 respectively (August 30, and September 9). All plots were combined on September 24.

Results:

SYSTEMS COMPARISON TRIAL
Rolla, BC

Treatment	Yield (%)	Yield (bu/ac)	Contribution Margin ($/ac)	Oil (%)	Grade
Conventional					
Battleford	106	29.0	64.60	42.6	1
Quantum	105	28.7	62.88	42.3	1
AC Excel	100	27.4	63.60	43.1	1
Liberty Link					
InVigor 2463	145	39.7	85.64	43.5	1
InVigor 2273	130	35.5	51.90	43.0	2
InVigor 2153	127	34.9	60.27	42.8	1
Roundup Ready					
SW RideR	147	40.3	116.19	43.2	1
LG Dawn	138	37.9	106.12	42.7	1
SW Arrow	119	32.7	85.46	41.9	1
LG3295	117	32.1	74.56	42.1	1
LG3235	117	32.0	70.63	42.6	1
Smart (Odyssey)					
46A73	127	34.9	74.38	43.4	2
45A71	124	34.0	79.75	42.4	1
LSD CV%		2.80 7.0		0.96 1.9	

Discussion: Significant differences in yields and oil contents were found among treatments. Grades also varied. Contribution margins reflect the differences in yield, grade and seed and herbicide costs. The highest contribution margin was achieved with SW RideR. The lowest yielding varieties were the conventional varieties.

XVIII BASF WEED AND DISEASE CONTROL TRIALS

Objective: To assess the effect of additional pest control products on Liberty Link canola systems, with respect to yield, quality and contribution margins of ***B. napus*** canola.

Background Broad spectrum weed control is an essential part of canola production. Each of the systems currently available, including conventional and novel trait, has their own unique strengths and weaknesses in terms of the spectrum of weeds that they can effectively control. In the case of the Liberty Link system, it may have less success in controlling perennial and flushing weeds because it is primarily a contact herbicide. Cleavers is a noxious weed that can produce multiple flushes during the growing season, and has been a problem for producers and the canola industry for many years. BASF has introduced a new chemical called Accord that controls cleavers, in addition to green foxtail, barnyard grass and volunteer flax. This product is presently registered for use in cereals and its potential use in canola is currently under review. It is possible that a tank mix of Accord with Liberty may improve cleaver control in this system. In addition, the InVigor hybrids in the Liberty Link system tend to have good seedling vigour resulting in early canopy closure. They tend to produce tall, dense stands, which can be ideal for sclerotinia development. The fungicide Ronilan EG from BASF can be used to limit potential losses from this disease.

Methodology: The purpose of these trials was to evaluate the impact of a herbicide tank mix of Accord and Liberty, and its control of cleavers in Liberty Link canola, as compared to Liberty alone. An additional treatment with Ronilan EG was also included to assess potential benefits in limiting losses to sclerotinia.

The following three treatments were included in a randomized block design:

A) Liberty (1.35 L/ac)
B) Liberty (1.35 L/ac) & Accord (55 g/ac)
C) Liberty (1.35 L/ac) & Ronilan EG (0.3 kg/ac)

Weed levels were assessed before and after treatment. One of the InVigor hybrids was selected for use in this trial.

RUSSELL

Observation: InVigor 2473 was and seeded on May 28. Weed pressure was heavy for all treatments (wild oats, Canada thistle, sow thistle, and wild buckwheat), however few cleavers were present. The variety chosen produced a dense stand that lodged considerably. Wet conditions early in the season could have led to problems with sclerotinia. Conditions during flowering were dry which resulted in low levels of sclerotinia infection.

Results:

BASF TRIAL Russell, MB			
Treatment	**Yield (bu/ac)**	**Oil (%)**	**Contribution Margin ($/ac)**
Liberty (check)	35.6	46.9	70.76
Liberty & Accord	35.3	46.9	60.06
Liberty & Ronilan	35.8	46.9	49.36
LSD CV %	3.32 6.8	0.71 1.1	

Discussion: There were no significant differences in yield or oil content. Contribution margins reflect differences in pesticide costs.

DELMAS

Observation: This trial was seeded on May 19 with the variety InVigor 2273. No cleavers were found in the field. The predominant weed was wild oat with a small number of Canada thistle and sow thistle. A Liberty (1.35 L/ac) and Accord (54 g/ac) tank mix was applied on June 9. There was no visible crop damage after herbicide application.

Sclerotinia control was also included in this trial. An application of Ronilan EG (300 g/ac) was applied on July 20. Sclerotinia levels were very low in the field.

Results:

BASF TRIAL Delmas, SK			
Treatment	**Yield (bu/ac)**	**Oil (%)**	**Contribution Margin ($/ac)**
Liberty	30.4	48.4	70.64
Liberty + Accord	29.3	48.2	55.34
Liberty + Ronilan	30.5	48.4	52.16
LSD CV %	3.02 7.3	0.56 0.9	

Discussion: There were no significant differences in yield between treatments. Products in this trial were not tested to their full potential due to low cleavers pressure and low incidence of sclerotinia.

INNISFAIL

Observation: This trial was seeded on May 17 with InVigor 2153. Emergence was rapid and even. Prior to herbicide application, three m^2 quadrants within the plots were flagged and weed counts including cleaver population numbers were recorded. Cleaver populations averaged 10 plants/m^2 across all treatments. Spraying occurred at the 3 - 4 leaf stage of the crop and the 3 whorl stage for cleavers. The check treatment was sprayed with Liberty (1.35 l/ac) while the Accord treatment was sprayed with Liberty (1.35 l/ac), and Accord (55 g/ac). Assessments after spraying were done at 7 and 21 days to determine control of cleavers. Control of cleavers was assessed on the check treatment at 76%. In the Accord treatment, 96% control of cleavers was achieved. Frequent rains and humid conditions were favourable for sclerotinia spore production in mid July. Petal test kits were used to evaluate the level of infection before fungicide applications. Ronilan EG (0.30 kg/ac) was applied on July 26 at 30 - 40% bloom.

Evaluation Method	Average Infection
Petal Test – July 7 (15-20% bloom)	48%

A sclerotinia stem rot check list was used to evaluate the sclerortinia risk prior to and during flowering. This indicated a moderate to high level of infection. Canopy cover was thin due to excessive rain. Weather conditions after spraying turned warm and dry. Infection levels of the untreated plots averaged 11 %.

Results:

BASF TRIAL Innisfail, AB							
Treatment	**Yield (%)**	**Yield (bu/ac)**	**Grade**	**Oil (%)**	**Cleavers /m_ before spray**	**Cleavers /m_ after spray**	**Contribution Margin ($/ac)**
Liberty	100	37.2	1	48.4	9	3	98.32
Liberty & Accord	98	36.7	1	48.2	11	1	87.15
Liberty & Ronilan	-	37.8	1	48.1	-	-	73.36
LSD CV %		4.92 7.6		1.07 1.3			

Discussions:

The wet conditions during flowering were replaced by drier conditions in early August. As a result, disease development in the check treatments was not as widespread as expected. Yield losses in the check compared to the fungicide treatment were not statistically significant. There was no effect on oil content as a result of the control measures.

There were no significant yield or oil differences between the treatments. This new chemistry gives producers another option in controlling a hard to control weed. The advantages in controlling cleavers other than yield, are lower dockage levels and lower inseparable weed counts. Increased numbers of cleaver seeds can downgrade the crop resulting in an economic loss.

XIX SCLEROTINIA CONTROL TRIAL

Objective: To evaluate various sclerotinia control options on yield, quality and economic return on ***B. napus*** and apetalous canola.

Background: Sclerotinia stem rot is caused by the fungus ***Sclerotinia sclerotiorum*** which occurs in all canola growing areas of Canada. The disease is usually most severe in wetter areas. Severity of sclerotinia stem rot varies from year to year, and even from field to field within a region. With the right combination of crop density and weather conditions or irrigation, heavy infections can develop. In some cases half the potential yield of a crop may be lost to sclerotinia. The recent introduction of apetalous canola (Hylite 201) may provide an alternative to fungicide use for reducing potential yield loss from this disease. However, it is unclear which of these tools is most cost effective.

Methodology: The sclerotinia stem rot check list was completed and a petal test was done on the conventional variety. This trial consisted of the following four treatments:

A) Hylite 201 - no fungicide
B) Hylite 201 - fungicide applied
C) Petalled variety - no fungicide
D) Petalled variety - fungicide applied

Western Canadian Summary:

Under appropriate crop and environmental conditions, sclerotinia stem rot can result in substantial yield losses. Climate and crop conditions (prior to the application of a fungicide) were favourable for the development of sclerotinia stem rot at some locations. Environmental conditions (hot and dry) after fungicide application, reduced the expression of the disease. The sclerotinia check list should be used to evaluate the sclerotinia risk for a particular field. A petal test can be a management tool to evaluate the economic level of infection.

CARMAN

Observation: Frequent rains and humid conditions were favourable for sclerotinia spore production in late June and early July. Petal test kits were used to evaluate the level of infection before fungicide application. Ronilan EG (0.30 kg/ac) was applied at 30 - 40% bloom stage (petalled variety).

Evaluation Method	Average Infection
Petal Test	55%

While the petal infection was relatively high, dry conditions in late July and early August limited disease development. Assessments at swathing indicated that 10 to 15% of plants were infected in the petalled variety without fungicide, < 5% infection in the Hylite 201 without fungicide, and very little infection in the fungicide treatments.

Results:

SCLEROTINIA STEM ROT CONTROL TRIAL Carman, MB			
Treatment	**Yield (bu/ac)**	**Oil (%)**	**Contribution Margin ($/ac)**
Petalled - w/ fungicide	30.2	46.2	0.45
Petalled - w/o fungicide	28.9	45.6	12.15
Hylite 201- w/ fungicide	26.7	44.5	(18.47)
Hylite 201- w/o fungicide	25.3	44.5	(7.35)
LSD	2.29	0.95	
CV %	3.7	1.3	

Discussions: Yield loss and oil content were not impacted by fungicide application. This was expected since disease development in the untreated plots was limited by dry conditions in the latter part of the growing season. However, the petalled variety did provide a significantly higher yield and oil content and better economic returns than the apetalous Hylite 201 at this site.

KELBURN FARM, ST. ADOLPHE

Observation: Frequent rains and humid conditions were favourable for sclerotinia spore production in late June and early July. Petal test kits were used to evaluate the level of infection before fungicide application. Ronilan EG (0.30 kg/ac) was applied at 40% bloom stage (petalled variety).

Evaluation Method	**Average Infection**
Petal Test (July 16)	60%

While the petal infection was relatively high, dry conditions in late July and early August limited disease development. Assessments at swathing indicated about 5% of plants were infected in the untreated petalled variety, and little if any infection in the other treatments.

Results:

SCLEROTINIA STEM ROT CONTROL TRIAL Kelburn Farm - St. Adolphe, MB			
Treatment	**Yield (bu/ac)**	**Oil (%)**	**Contribution Margin ($/ac)**
Petalled - w/ fungicide	36.5	41.8	54.21
Petalled - w/o fungicide	36.0	42.1	70.38
Hylite 201- w/ fungicide	38.2	43.7	65.19
Hylite 201- w/o fungicide	38.4	43.6	85.39
LSD CV %	2.54 5.5	0.71 1.4	

Discussions: Neither the use of a fungicide nor growing an apetalous variety had a significant impact on yield, as compared to the petalled variety without fungicide applied. This was expected since disease development in the untreated plots was limited by dry conditions in the latter part of the growing season. The apetalous Hylite 201 did provide significantly higher oil content than the petalled variety at this site. Differences in contribution margin were mainly a reflection of fungicide costs and small differences in yield.

NAICAM

Observation: Growing conditions and heavy crop canopy were favourable for sclerotinia spore production in July. Petal test kits were used to evaluate the level of sclerotinia stem rot infection. Ronilan EG (0.35 kg/ac) was applied on July 9 at approximately 40% bloom on the petalled variety.

Evaluation Method	Location 1	Location 2	Location 3
Petal Test July 8 (35 % bloom)*	93%	95%	90%

*Petal Test average = 93% infection level

A sclerotinia stem rot check list was used to evaluate the sclerortinia risk prior to and during flowering. Infected stem counts at swathing were 9% (applied fungicide) and 10% (no fungicide applied) for the variety Hylite 201, compared to the petalled variety which averaged 24% (applied fungicide) and 34% (no fungicide applied).

Results:

SCLEROTINIA STEM ROT CONTROL TRIAL Naicam, SK			
Treatment	**Yield (bu/ac)**	**Oil (%)**	**Contribution Margin ($/ac)**
Petalled - w/ fungicide	38.4	45.6	68.63
Petalled - w/o fungicide	36.1	46.9	74.45
Hylite 201 - w/ fungicide	29.7	46.0	19.95
Hylite 201 - w/o fungicide	30.7	45.2	44.74
LSD CV %	1.17 1.6	1.28 1.6	

Discussions: Ronilan EG significantly increased yield of the petalled variety. Ronilan EG did not affect yield of Hylite 201. Contribution margins reflect differences in seed costs, yield, fungicide and application costs. All treatments graded number one.

WANHAM

Observations: The plots were seeded May 6 (soil temp = 12.0^{o}C) with 15-16-8-12 applied with the seed. Emergence was good despite dry soil conditions. Weed control was achieved with appropriate herbicides. A petal test for sclerotinia was carried out on July 7, just prior to spraying with Ronilan EG. The infection rate in the petalled variety was 7.5%. Growth, and ultimately yield, was limited by dry conditions at the site (see ***Site Information:*** Rainfall).

Results:

SCLEROTINIA CONTROL TRIAL Wanham, AB			
Treatment	**Yield (bu/ac)**	**Oil (%)**	**Contribution Margin ($/ac)**
Petalled - w/ fungicide	40.9	44.7	103.63
Petalled - w/o fungicide	36.3	44.8	91.68
Hylite 201- w/ fungicide	27.6	41.0	34.79
Hylite 201 - w/o fungicide	26.3	41.3	46.32
LSD CV%	2.32 3.6	0.91 1.0	

Discussion: There were significant differences between the sprayed and unsprayed treatments for the petalled variety, but not for Hylite 201. This suggests that Hylite 201 either had a lower level of infection with sclerotinia, or has the ability to avoid infection. Whether sprayed or unsprayed, the petalled variety gave higher yields (and contribution margins) than Hylite 201. Differences in contribution margins reflect the additional input costs, as well as yield. No significant differences in oil content are noted for the two varieties used.

ROLLA

Observations: The plots were seeded on May 17, (soil temp 11.9^{o}C) with 14-17-8-12 applied with the seed. Emergence was fair due to dry soil conditions. Weeds were controlled with appropriate herbicides. A petal test for sclerotinia was carried out on July 15, just prior to spraying with Ronilan. The infection rate in the petalled variety was 27.5%. Growth, and ultimately yield, was limited by dry conditions at the site (see ***Site Information***: Rainfall). In addition, lygus bugs caused a limited amount of bud blasting in replicates 1 and 2 of both treatments.

Results:

SCLEROTINIA CONTROL TRIAL
Rolla, BC

Treatment	Yield (bu/ac)	Oil (%)	Contribution Margin ($/ac)
Hylite 201 - w/ fungicide	16.0	40.8	(36.24)
Hylite 201 - w/o fungicide	17.8	40.1	(6.88)
Petalled - w/ fungicide	22.8	40.8	(10.93)
Petalled - w/o fungicide	26.9	41.8	30.54
LSD	3.20	0.78	
CV%	10.5	1.3	

Discussion: Yields of the petalled variety and Hylite 201 appear to be negatively affected by the application of the fungicide. This difference is statistically significant for the petalled variety, but not for Hylite 201, and is due to lygus bug infestation in replicates 1 and 2 of the trial in both instances. Replicates 1 and 2 for each variety were at the same end of the block, which was located close to the edge of the field. No conclusions about the efficacy of Ronilan, or the sclerotinia resistance of Hylite 201 can be drawn from this data.

XX DIAMONDBACK MOTH EVALUATION TRIAL

Objective: To determine the level of diamondback moths as it relates to establishing a forecasting model.

***Background*:** Previous work completed by Agriculture & Agri-Food Canada, Environment Canada and the Canola Council of Canada has shown there to be a need in establishing a migration forecasting model for diamondback moths. The importance of establishing the deposit points and numbers of diamondbacks present are essential in ground truthing this forecasting model. The number of diamondback moths recorded help establish the migration-forecasting model.

***Methodology*:** Trap counts were completed as follows:

A) Recorded moth counts
B) Recorded other insects
C) Changed lures and trap inserts weekly
D) Phoned in moth counts using ON TAP system.

Observations: Low numbers of diamondback moths were caught in the traps. No leaf, bud or pod damage was evident in a number of sample locations. Lures and trap inserts were changed every ten days to two weeks. The trap inserts caught other insects. The traps themselves were difficult to keep in place (4 feet above ground). Unlike 1998, the traps did not deteriorate over the growing season due to the addition of a wax coating.

Results: All information was forwarded to Agriculture and Agri-Food Canada.

Discussion: Diamondback moth counts were low at the 10 Canola Production Centres over the growing season. Diamondback moth numbers in excess of 90/week were not observed in 1999. Results will be combined with results from Agriculture and Agri-Food Canada to develop a comprehensive map of diamondback moth infestation levels this year.

XXI ROOT MAGGOT MONITORING TRIAL

Objective: To compare and rate root maggot damage on varieties entered in the variety trials.

Background: Root maggots have been identified as a major pest of ***B. rapa*** in the parkland area of Alberta. Work at the University of Alberta and the Alberta Environmental Centre has shown that root maggots can reduce canola yield by up to 50%. Susceptibility to root maggot differs between ***B. rapa*** and ***B. napus*** types. However, there may also be different degrees of root maggot resistance within each species.

Methodology: The variety trials (***B. napus***) were used in the root maggot monitoring trial. Thirty representative plants were collected from each plot within two days of swathing. Root maggot ratings were made immediately after collection.

Ratings:
0 = no root damage,
1 = feeding channels <10% root surface area,
2 = feeding channels 11-25%,
3 = feeding channels 26-50%,
4 = feeding channels 51-75%,
5 = feeding channels 76-100% or root is completely severed.

Western Canadian Summary:

Root maggot damage in 1999 was very light across all sites.

CARMAN

Observation: Based on past experience at this location and an initial random sampling of plants it was suspected that the damage levels would be low. Therefore, in the interest of time, only 1 bulk sample of 40 plants (10 per plot) was taken for each variety. The samples were taken immediately after swathing, and stored in a cool dry place until they were washed and rated (within 2 days).

Results:

ROOT MAGGOT MONITORING TRIAL *B. napus* Carman, MB			
Treatment	**Rating**	**Treatment**	**Rating**
45A71	0.7	InVigor 2473	1.5
46A73	0.9	LG Dawn	1.4
AC Excel	0.5	Millennium	1.0
Exceed	1.0	Nexera 500	0.4
Hyola 401	0.6	Option 501	0.4
InVigor 2273	0.9	Quantum	1.2
InVigor 2463	1.1	SW RideR	0.8

Discussion: All varieties rated low for root maggot damage. This was expected since seeding of the site was late due to wet weather, and conditions were dry at the site during the latter half of the growing season.

RUSSELL

Observation: No damage from root maggots was observed.

Results: Root maggot ratings were not recorded due to low levels of damage.

GRENFELL

Observation: Root maggot damage was initially assessed in six locations throughout the field. Only 18 plants out of 300 showed any signs of root maggot damage. The damage on the sampled plants rated 1 or less. Sampling took place after swathing.

Results: Root maggot ratings were not recorded due to very low levels of damage.

NAICAM

Observation: Root maggot damage was initially assessed in eight locations throughout the field. 160 plants out of 400 showed any signs of root maggot damage. The damage on the sampled pants ranged from 1 to 3. Seventy two percent rated number 1, Eighteen percent rated number 2 and ten percent rated number 3 plants. Sampling took place prior to swathing.

Results: Root maggot ratings were not recorded due to low levels of damage.

XXII CABBAGE SEEDPOD WEEVIL TRIAL

Objective: To evaluate the effectiveness of management tools, such as seeding date and variety choice, to minimize cabbage seedpod weevil damage.

Background: ***History:*** The cabbage seedpod weevil (***Ceutorhynchus astrictis***) was first introduced into the lower mainland of British Columbia from Europe in the 1930's. From there, the insect spread into the Pacific Northwest region (PNW) of the United States. Up until 1995, with the exception of a few reports of spraying for the weevil in the Creston valley of British Columbia, it was believed that the insect remained isolated in the PNW region. Yield losses in the Pacific Northwest from the weevil have been as high as 35%. In 1996, the larvae of the weevil were found feeding on seeds during an examination of pods at the Lethbridge Canola Production Centre (Canola Council Agronomist: Doug Moisey). Bob Byers and Rick Butts of Agriculture Canada later identified the larvae as ***Ceutorhynchus astrictis***. Since 1996, pod weevil numbers have steadily increased. According to Alberta Agriculture surveys the weevil has spread as far north as Olds, Alberta and as far east as Medicine Hat, Alberta.

Life Cycle: The cabbage seedpod weevil attacks plants within the ***Brassica*** family. In the early spring over-wintering adults emerge and begin feeding on stinkweed, flixweed, volunteer canola and wild mustard. The weevils begin to move into the fields once canola reaches the bud stage. Damage is inflicted by both adults and larvae. The adult weevils first feed on the flower by piercing the centre of the bud. The resulting damage can either be an aborted flower or damage to petals on fertile flowers. Feeding continues until females reach sexual maturity.

They then begin to search for developing (1-2 cm long) pods and begin egg laying. Each female will lay between 60 - 70 eggs. Eggs are typically laid on one side of the pod, but can be laid on both sides of the septum. The larvae hatch within the pod and begin to feed on developing seeds. Each larva consumes approximately six seeds. They then burrow out of the pod, leaving an exit hole. Infection of the pod from fungal agents can occur depending on environmental conditions.

Larvae migrate to the ground to pupate in the soil. A week to 10 days later emergence of the next generation of adults begins. Under normal conditions these new adults feed on late maturing canola and other host plants. If the crop is delayed in maturity, the new adults will begin feeding on the immature seeds within the pods. The adults extract the nutrients from the centre of the seed leaving an outer shell.

Control: Presently the only method is to apply an insecticide at early bud or bloom stage. Seed treatments and varietal resistance are being examined.

Methodology: Three varieties, Hylite 201, Hyola 401, and Option 500 were seeded on April 22 and May 4. The trial was made up of four replicates in a randomized complete block design. Each of the treatments was monitored over the growing season for weevil populations and exit holes. Emergence traps were set up within each treatment to monitor populations of new adults.

LETHBRIDGE (DRYLAND)

Observations: The trial was direct seeded into wheat stubble. Seedbed moisture was good. Emergence was even on all varieties**.** Cool conditions after emergence and an early June frost affected growth. The frost damaged plants were short and spindly which resulted in delayed maturity. Over-wintered seedpod weevils fed on newly emerged buds creating blanks on the main stem. Conditions during pod filling were cool and humid. Exit holes in the pods, left by migrating pupae, allowed for the development of fungal diseases. As pods matured, fungal diseases destroyed the remaining seeds not eaten by the larvae. This caused premature shelling. As a result of delayed maturity, feeding by newly emerged adults on developing pods was observed. The majority of the pods affected were on the lower half of the main stem.

Results:

*****Table 1***

Cabbage Seedpod Weevil Damage Results
Lethbridge, AB (Dryland)

VARIETY	PODS/ PLANT*	PODS INFESTED	DAMAGE (%)	# OF PODS WITH 1-5 HOLES PER POD				
				1	2	3	4	5
Hylite 201 Early	129	42	32.9	35	6.0	1.2	0.1	0.0
Hylite 201 Normal	107	25	23.9	23	2.6	0.4	0.0	0.0
Hyola 401 Early	90	17	23.0	15	1.9	0.2	0.0	0.0
Hyola 401 Normal	58	10	19.3	9	0.5	0.0	0.0	0.0
Option 500 Early	94	24	26.2	20	2.0	0.1	0.0	0.0
Option 500 Normal	76	9	12.2	9	0.6	0.0	0.0	0.0

*Average of 40 plants per treatment
**Data supplied by Dr. Lloyd Dosdall

Table 2

CABBAGE SEEDPOD WEEVIL TRIAL **YIELD, ECONOMIC & QUALITY RESULTS** **Lethbridge, AB (Dryland)**				
Treatment	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**	**Grade**
Hylite 201 Early	21.8	17.44	43.6	2
Hylite 201 Normal	20.5	4.44	44.0	2
Option 500 Early	27.5	56.08	47.8	1
Option 500 Normal	29.8	68.71	47.9	1
Hyola 401 Early	29.8	56.40	45.8	1
Hyola 401Normal	26.2	35.73	45.1	1
LSD CV %	3.34 10.4		0.62 1.1	

Discussion:

Table 1: Normal treatments had the lowest number of exit holes. Option 500 had the least weevil damage of all varieties.

Table 2: There were no significant differences in yields due to seeding date within each variety. Yields of Hylite 201 were significantly lower than all other treatments. Oil contents varied significantly with Option 500 (normal) seeding date having the highest oil content at 47.9%. Hylite 201 (early) seeded had the lowest oil content at 43.6%

XXIII SEEDING RATE TRIAL

Objective: To compare the cost effectiveness of three different seeding rates on yield, quality and contribution margin of canola.

Background: Canola is a very flexible crop. Variations in seeding rate, or plant population, over a relatively wide range, normally have very little effect on the final yield. Differences in days to maturity may be negatively affected. Research has shown that as plant populations decline (below 60 plants/m^2), yields tend to decline. The effect of seeding rates on maturity is more pronounced under cool conditions.

Methodology: Three different rates of canola (LG3235) were seeded with a Melroe Hoe-Press Drill.

Treatments:
1) 6.2 lb/ac seeding rate
2) 7.1 lb/ac seeding rate
3) 8.3 lb/ac seeding rate

ROLLA

Observations: The plots were seeded on May 17 (soil temp 11.9^{o}C) with 14-17-8-12 applied with the seed. Emergence was good for all plots. The plots were sprayed with Roundup Transorb (0.5 L/ac) on June 13. Weed control was excellent for all plots. Canola growth was monitored over the growing season. No insect pests or diseases were noted. No differences in maturity were observed, and the plots were swathed Aug 30 and combined Sept 24.

Results:

SEEDING RATE TRIAL
Rolla, BC

Treatment	Yield (bu/ac)	Oil (%)	Contribution Margin ($/ac)	Grade
6.2 lb/ac	33.8	42.6	84.81	1
7.1 lb/ac	34.7	42.7	86.54	1
8.3 lb/ac	32.8	42.3	71.02	1
LSD CV%	3.93 8.9	0.62 1.1		

Discussion: Yields were not improved significantly by increasing the rate of seeding above 6.2 lb/ac. The highest seeding rate used gave a small, but non-significant decrease in yield and contribution margin. No differences in seed quality or oil content were found among the treatments. Given the dry conditions at the Rolla site in 1999, it is unlikely that the full potential of the plants was realized, and therefore no firm conclusions should be drawn from this data. However, this data does support earlier work that has shown a seeding rate of between 5 and 6 lb/ac to be adequate in achieving top yields.

XXIV BASF FAX BULLETIN

Objective: To provide timely information to growers and farm supply dealers on the progress of the 1999 canola crop at selected Canola Production Centres.

Background: A good canola crop cannot be obtained without proper management. Management decisions should be based on field observations and monitoring of the development of both crop and canola pests. Canola Council agronomists continuously monitored the progress of the crop and made these observations available to BASF for distribution to their retail network.

Methodology: Growth stage observations were recorded on each Monday throughout the growing season. The presence and stage of development of any pests was noted. Any unusual weather trends and recommendations on management opportunities were also done.

Results: All information was forwarded to BASF retailers across Western Canada weekly, during the summer.

Discussion: The fax was invaluable to both retailers and producers. It allowed our agronomic staff to give insight to environmental conditions, weed problems, crop stage and insect and disease updates. Extension is a very important part of our work. These fax sheets allow us to reach a broad spectrum of producers and inform them what is taking place on Canola Production Centres over the growing season.

XXV WATSON PRECISION FARMING TRIAL

Objective: To generate a yield map for canola and wheat at the Watson site, using field positioning information derived from Global Positioning Systems and yield monitoring equipment. To establish crop rotation parameters.

Background: Global positioning systems (GPS) are key pieces of technology available that make precision farming a possibility. GPS utilizes satellites, and equipment mounted receivers, to determine where you are (latitude, longitude and elevation) on your field. Position can be determined to within one foot, using a Differential GPS system (DGPS). The result is a detailed database of positional information. In combination with sensors (eg yield and grain moisture) on a particular piece of equipment (eg., combine), maps can be used to visualize and quantify crop variation.

Precision farming technology is a new name for an old concept. It involves combining new farming technology to measure yield and positional information, along with presently available techniques of soil sampling to locate yield variation. When this data is compiled, yield, product moisture, soil nutrient variation, topographical and other maps can be computer generated, allowing the producer to see more clearly the relationships between the various factors. Precision farming is all about finding out what your soil needs, where the weeds and insects are and then putting exactly the right amount of seed, fertilizer, herbicides and insecticide in the right spots. (Ron C. Johnson, Target Farming, A Practical Guide to Precision Agriculture).

Shortening canola rotations may have detrimental implications to increased disease, insect and weed pressure. Shortened rotations and the effects on yield may have a negative economic impact on producers. A better understanding of shortening crop rotations through pest management may be a valuable tool for producers.

Methodology: Canola and wheat were grown at the Watson site. A combine fitted with a yield monitor and GPS receiver (for positional information) was used to combine the swathed crops. The harvested yields of both crops were verified by weighing each hopper load to obtain a total weight of crop removed from the fields. These values were then compared with the yields calculated by the yield monitor. On-the-go yields, as determined by the yield monitor were plotted on a field map using positional information from the GPS receiver and GreenStar software. Total gross yields, weighed at the elevator, were compared to the total yield from the Green Star monitoring equipment. Disease, insect and weed pressure

were monitored throughout the growing season in the following rotation treatments:

A) One year rotation
B) Two year rotation
C) Three year rotation
D) Two year canola, two year cereal rotation
E) Continuous canola

Observations: This site was seeded May 27 and 29. Soil moisture conditions were ideal and emergence was rapid and even for both the wheat and canola. Poor environmental conditions delayed spaying until the six leaf stage for the wheat and 5 leaf stage for the canola. A thirty foot swath was cut to ensure better accuracy of the GPS combine. Yield monitoring equipment was easy to operate. Blackleg levels were low. Sclerotinia stem rot infection levels were moderate. Insect pressure was not evident.

Results: Yield mapping indicated a 25.7 bu/ac average for the wheat, and 22.7 bu/ac average for canola.

Discussion: There was some variation between yield monitoring equipment and elevator weight. A 3.5% yield difference was noted for canola and a 20.2% difference for wheat. Some possible reasons for this difference could be incorrect moisture calibration and operational error. Yield mapping in combination with global positioning is a useful tool for establishing a database for precision farming technology. With further data analysis a prescription for inputs can be developed. Disease and insect pressure was low on canola and wheat treatments.

XXVI SUMMARY

The Canola Production Centre program is a continuing success. In 1999, the program looked not only at new agronomic issues and management techniques brought forward to us by producers and industry, but ongoing trials. New trials included; fertilizer rate and variety (100%, 150% and 200% rates), seed treatments (ex. Helix, Gaucho), herbicide control, time of weed removal and sulphur form trials. Ongoing trials included; variety evaluation, root maggot control and monitoring, and systems comparisons trials. These trials were carried out in a non-biased, in depth, quality driven fashion that the Canola Council of Canada continuously strives for. The information outlined in this report should be used as a part of a complete information gathering process to make decisions on a producer's farm.

XXIII FIELD STAFF INFORMATION

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I ACKNOWLEDGEMENTS

APPENDIX - Minnesota Canola Production Centre Results

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

The Canola Council of Canada is the co-ordinating body of the Canola Production Centre (CPC) program across Canada, and provides expertise and supervisory support for the CPC in Minnesota. Funding for the Minnesota CPC program was appropriated by the Minnesota State Legislature in co-operation with the Minnesota Canola Council and the University of Minnesota.

Each year sponsors (both locally and nationally) help support the Canola Production Centre program. With their generous contributions, the Program has become an effective tool in technology transfer to all interested parties.

II SITE DESCRIPTION

The Program was supported locally by the following organizations that have donated products and/or services to the Canola Production Centre:

MINNESOTA

Location: Roseau, MN - 85 acres

Seed and Seed Treatment:
Agri-Tel Grain - LG 3260 (2 bags)
Croplan Genetics - CL 2070
Gustafson - Gaucho
Interstate Seed - Hyola 401, Q2, Quantum
Kaystar Seed - KC-701 (2 bags)
Wilber - Ellis

Fertilizer:
Cenex Land-O-Lakes Agronomy Co. and Allied Signal - granular fertilizer (85 acres)

Herbicides and Fungicides:
AgrEvo USA - Liberty (4 acres)
American Cyanamid - Raptor (4 acres)
Dow AgroSciences - Stinger (73 acres)
DuPont Agricultural Products- Assure II (73 acres)
FMC - Capture (105 acres)
Monsanto - Roundup Ultra (12 acres)
UAP Northern Plains, Ostlund - Herbimax (80 acres)
Zeneca Ag Products - Quadris (85 acres)

Equipment and Labor:
Cenex West Plant - soil testing, fertilizer spreading, equipment storage
Habstritt Farms - grain truck, use of truck scale
Pioneer Hi-Bred and Cenex West Plant - weigh wagon
Magnusson Farms - drying, storage and transport of crop, harrow, water truck
Rob and Tim Rynning - generator
Roseau Farm Service - tractor for planting, swath roller assembly
Salol Elevator - transport of crop to elevator
Slater Spraying Service - fungicide and insecticide application (97 acres)
Steve Dahl - straight header for combine
Wayne Bicker - use of drier

Photocopying & Faxing:
Roseau County Extension Office, Roseau
Polk County Extension Office, Crookston

Tours:

Border State Bank
Curt Nyegaard, Karen Andol and Bob Schaller
Roseau Dairy
Roseau Eagles Aerie 3882 (Orris Rasmusson & Duane Comstock)
Roseau Co. Fair Board and Geroy's Building Center
Wally's Supermarket
Wannaska 4H Club

III INTRODUCTION

The Canola Council of Canada initiated Canola Production Centres to address the ongoing need for canola production technology transfer as identified during the Grow with Canola program (1985-1990). The Canola Production Centres are a joint effort between producer groups, industry representatives, and government and extension personnel. The continuing co-operation of these groups ensures the ongoing success of the Canola Production Centres. Field scale agronomic trials utilizing commercial farm equipment are conducted at the sites, and the information generated is utilized for extension activities throughout the year.

Following tours of the Canola Production Centre near Carman, MB in 1996 and 1997, the Minnesota Canola Council sought funding for a joint project between the Minnesota Canola Council, University of Minnesota and Canola Council of Canada. The purpose of the project was to establish a Canola Production Centre site in Minnesota, and the role of the Canola Council of Canada was to provide expertise and supervisory support. This would help ensure that activities at this site would be consistent with activities at the Canadian CPCs. This allows the information from all sites to be easily shared. Funding for the project was approved in April 1998, and the Minnesota Canola Production Centre program was born.

In 1999, the field day tour was held on July 16 and included a barbeque lunch and tour of the site. All trials were signed and copies of site plans were available at the entrances to allow for self-guided tours at any time other than scheduled tour dates.

Information obtained from the Canola Production Centre includes many agronomic factors such as yield and quality data, early season plant counts, lodging indices and harvestability ratings on varieties.

It should be noted that the material contained in this report is a collection of agronomic information from a specific location and only from one site year. Therefore, it should be observed and understood accordingly.

IV DEFINITIONS

Please refer to the Definitions (Page 16) section of the report for the Canadian CPCs for clarification of any terms you are not familiar with.

V ECONOMIC ANALYSIS

A Canola Pricing System (Based on average prices at harvest, in U.S. dollars)

GREEN SEED (%)	$/100 LB AT ELEVATOR	PLUS $/100 LB LDP*	FINAL $/100 LB	FINAL $/BU
0 - 2.0	6.90	2.95	9.85	4.93
2.1 - 3.0	6.65	2.95	9.60	4.80
3.1 - 4.0	6.40	2.95	9.35	4.68
4.1 - 5.0	6.15	2.95	9.10	4.55
5.1 - 6.0	5.90	2.95	8.85	4.43
6.1 - 7.0	5.65	2.95	8.60	4.30
7.1 - 8.0	5.40	2.95	8.35	4.18
8.1 - 9.0	5.15	2.95	8.10	4.05
9.1 - 10.0	4.90	2.95	7.85	3.93

Note 1: The green seed was determined by using one 500 seed crush strip test done on each sample from every treatment within a particular project trial.
Note 2: * LDP = Loan Deficiency Program.

B Cost Calculations & Assumptions

The following costs were used in calculating economic returns for the various trials and treatments, and are expressed in **U.S. dollars**. Fertilizer and crop protection product prices were obtained from various dealers throughout the region. Prices reflect a northwestern Minnesota average for spring 1999.

Equipment costs were obtained from the Border State Bank of Badger, MN and are estimated equipment variable costs for northwestern Minnesota. There has been no value allocated for capital and fixed costs.

CANOLA ARGENTINE VARIETY SEED COSTS					
B. napus	**$/LB**	**Distributor**	***B. napus***	**$/LB**	**Distributor**
45A51	4.10	Pioneer Hi-Bred	KC-701	4.70	Kaystar Seed
45A71	3.50	Pioneer Hi-Bred	LG3260	3.50	Agri-Tel Grain
46A65	3.40	Pioneer Hi-Bred	LG3275	4.50	Agri-Tel Grain
46A76	3.90	Pioneer Hi-Bred	LG3345	3.44	Cargill Seeds
Cavalier	2.70	Cargill Hybrid Seeds	Minot	3.95	Croplan Genetics
CL2070	4.70	Croplan Genetics	Phoenix	3.40	AgrEvo USA
CL2078	4.20	Croplan Genetics	Q2	3.15	Interstate Seed.
Eagle	2.80	Wilber-Ellis	Quantum	3.15	Interstate Seed.
Ebony	3.63	Agri-Tel Grain	Quest	3.90	Interstate Seed
Golden Ready RR	4.20	Seeds 2000	Roseau	2.70	Cargill Hybrid Seeds
Hyola 401	4.85	Interstate Seed	SW Rider	4.20	Interstate Seed
InVigor 2373	4.96	AgrEvo USA			

Note: Seed cost may vary from location to location. Prices reflect the Minnesota average for Spring 1999 and include the cost of seed treatments (Benlate and Gaucho). Gaucho is the U.S. product for flea beetle control.

PRODUCT INFORMATION			
Product	**Active Ingredient**	**Manufacturer/ Distributor**	**$/Unit Cost**
Assure II	quizalofop-p-ethyl	DuPont Agriculture Products	121.7/gal
Ammonium Sulphate	ammonium Sulphate	Imperial	0.33/lb
Capture	bifenthrin	FMC Corporation	398.81/gal
Herbicide 273	endothall	Elf Atochem North America	44.62/gal
Quadris	azoxystrobin	Zeneca Ag Products	287.50/gal
Liberty	glufosinate ammonium	AgrEvo USA	99.11/gal
Herbimax	crop oil concentrate - 17%	Loveland Chemical	5.25/gal
Preference	non-ionic surfactant - 90%	Cenex Land - O - Lakes	17.80/gal
Raptor	imazamox	American Cyanamid	679.20/gal
Roundup Ultra *	glyphosate	Monsanto	40.60/gal
Stinger	clopyralid	Dow AgroSciences	485.13/gal

Note: $15/ac TUA includes first pint of Roundup Ultra.

Numerous references to pesticide applications will be found in this report. We advise everyone to consult with recommendations and product labels for complete instructions.

CANOLA FERTILIZER COSTS			
Fertilizer	**Analysis**	**$/Ton**	**$/LB of Nutrient**
Ammonium Sulphate	21-0-0-24	160.00	0.17 (of N)
Ammonium Sulphate	21-0-0-24	160.00	0.18 (of S)
Phosphate	18-46-0	245.00	0.20 (of P_20_5)
Potash	0-0-60	149.00	0.12
Urea	46-0-0	160.00	0.17

Machinery Cost:

- Conventional tillage: $11.50/acre
- Broadcast & Harrow Seed add $3.65/acre
- Straight combining: subtract $1.00/acre

Additional Machinery Costs: (Custom Application)

- Aerial $4.25/acre
- Broadcasting Seed $5.25/acre

Note: Machinery costs were obtained from the Border State Bank of Badger, MN and are estimated operating costs (such as fuel, lubrication and repairs) for northwestern Minnesota.

Minnesota State Check-off:

$0.05 per 100 pounds of canola.

Interest/Opportunity Cost:

This cost calculation demonstrates the cost of money borrowed and charged on crop inputs and machinery-operating costs. In 1999, 10.5% per annum over six months was used.

C Economic Results Report (example)

Site: **Roseau, MN**

B. napus Variety Trial: **Hyola 401**

CALCULATION OF VALUE OF PRODUCTION				
Yield (bu/ac)	**X**	**Price ($/bu)**	**=**	**Value of Production**
38.5	X	4.30	=	165.55

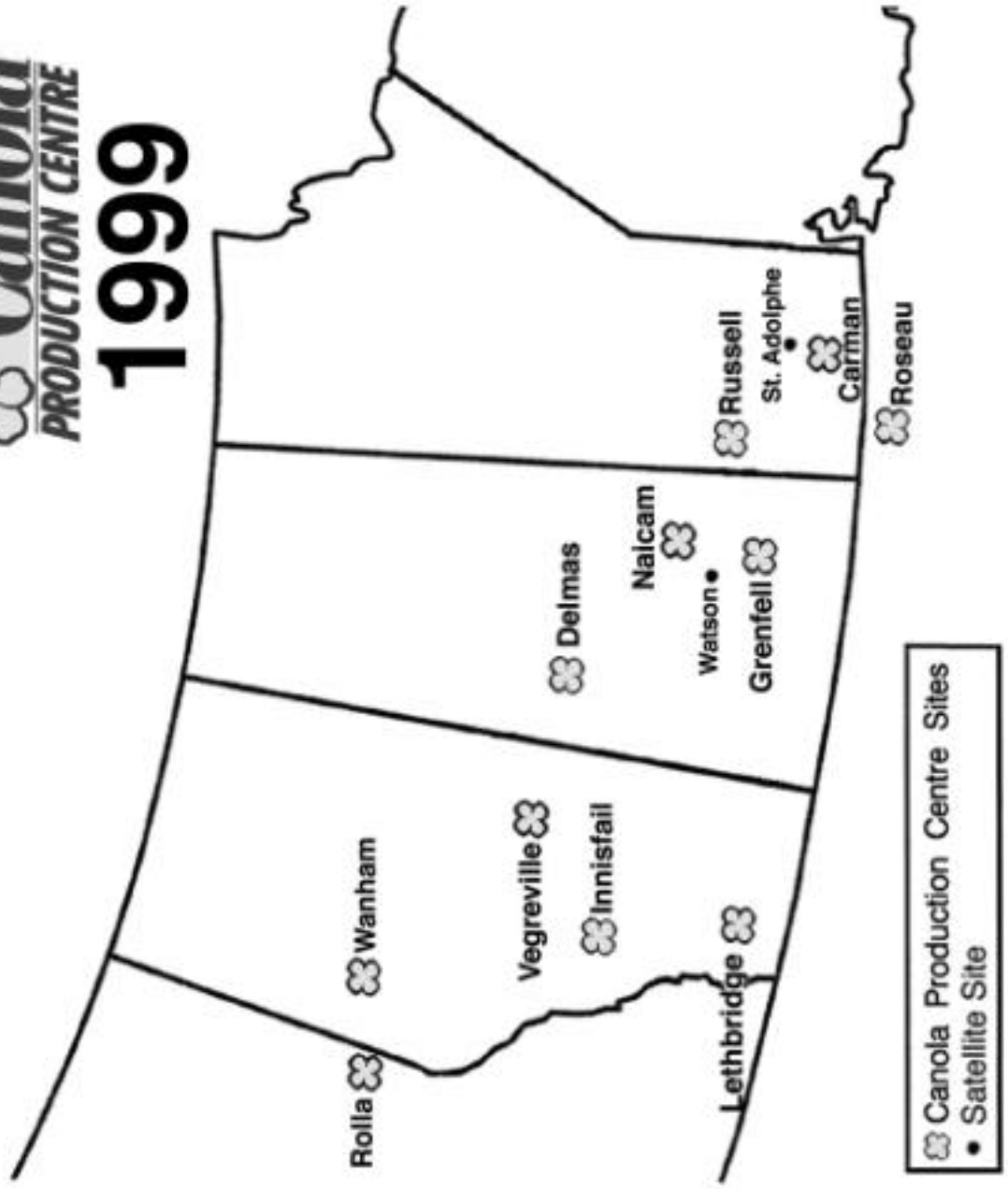
CALCULATION OF VARIABLE COSTS ($/ac)	
Seed	26.68
Fertilizer	35.88
Herbicides	25.33
Fungicides	22.46
Insecticides	7.79
Machinery	20.00
Insurance	0.00
Check-off	0.96
Interest/opportunity	6.20
Total Variable Costs	145.30

CALCULATION OF CONTRIBUTION MARGIN				
Value of Production ($/ac)	**-**	**Variable Costs ($/ac)**	**=**	**Contribution Margin ($/ac)**
165.55	-	145.30	=	20.25

Contribution Margin ($/ac)	**/**	**Yield (bu/ac)**	**=**	**Contribution Margin ($/bu)**
20.25	/	38.5	=	0.53

This example was developed and prepared with assistance from Royal Bank of Canada agrologists.

VI SITE LOCATION MAP



VII SITE INFORMATION

THIS IS GENERAL SITE INFORMATION THAT MAY CHANGE FOR SPECIFIC TRIALS.

Location:	**Roseau, MN**

Co-operator: Richard, John and Bob Magnusson

Previous crop: Wheat

Soil Test Results: (AgriSource Laboratories)

Organic matter content: 3.6 %

Macronutrient Levels: 0-6 inches; 0-24 inches (N and S)
Nitrogen - 19 lb/ac; 64 lb/ac
Phosphorus- 14 lb/ac
Potassium - 276 lb/ac
Sulphur - 74 lb/ac; 120 lb/ac

Micronutrient Levels: 0 - 6 inches
Calcium - 4400 ppm
Magnesium - 1230 ppm
Boron - 0.8 ppm
Zinc - 0.3 ppm
Manganese - 3.2 ppm
Copper - 0.5 ppm
Iron - 14.7 ppm

Target yield: 2200 lb/ac (44 bu/ac)

Fertilizer applied: N - 104 lb/ac P - 52 lb/ac K - 50 lb/ac S - 10 lb/ac

Soil Association/Zone: Wabanica - Fine Silty, Mixed Calcareous, Frigid Typic Endoaquolls

Soil Texture: Silt Loam (medium)

Soil pH: 8.2

Salinity: 0.3 mmho (slightly saline)

Tillage operations: The site was chisel-plowed and disked in the fall, and cultivated in the spring to incorporate broadcast fertilizer (100-40-50-10). After a three-week rain delay, it was cultivated again prior to seeding the second date. Twelve pounds of phosphate was seed-placed.

Seeding method: Seeded with a JD 9350 double disk press drill
Date: June 3, 19
Depth: 1/2 to 3/4 inch deep
Rate: 5.5 lb/ac ***B. napus***

Herbicides applied: **First Seeding Date:**
Seed treatment trial and early seeded Hyola 401 -Assure II (10 oz/ac) & Crop Oil (1 pt/ac) at the cotyledon to one leaf stage; Herbicide 273 (1.5 pts/ac) at the 2 to 6 leaf stage; Stinger (1/4 pt/ac) at 4 leaf to bolting

Second Seeding Date:
A) Conventional varieties and management trials - Assure II (10 oz/ac), Herbimax (1 pt/ac), Stinger (1/4 pt/ac) at 4 leaf stage
B) Liberty Link varieties - Liberty (34 oz/ac.), Ammonium Sulphate (3.0 lb/ac) at 4 leaf stage
C) Roundup Ready varieties - Roundup Ultra (1 pt/ac), Ammonium Sulphate (1.0 lb/ac) at 4 leaf stage
D) Raptor Tolerant varieties - Raptor (4 oz/ac), Non-ionic Surfactant (3.5 oz/ac), Ammonium Sulphate (2.5 lb/ac) at 4 leaf stage

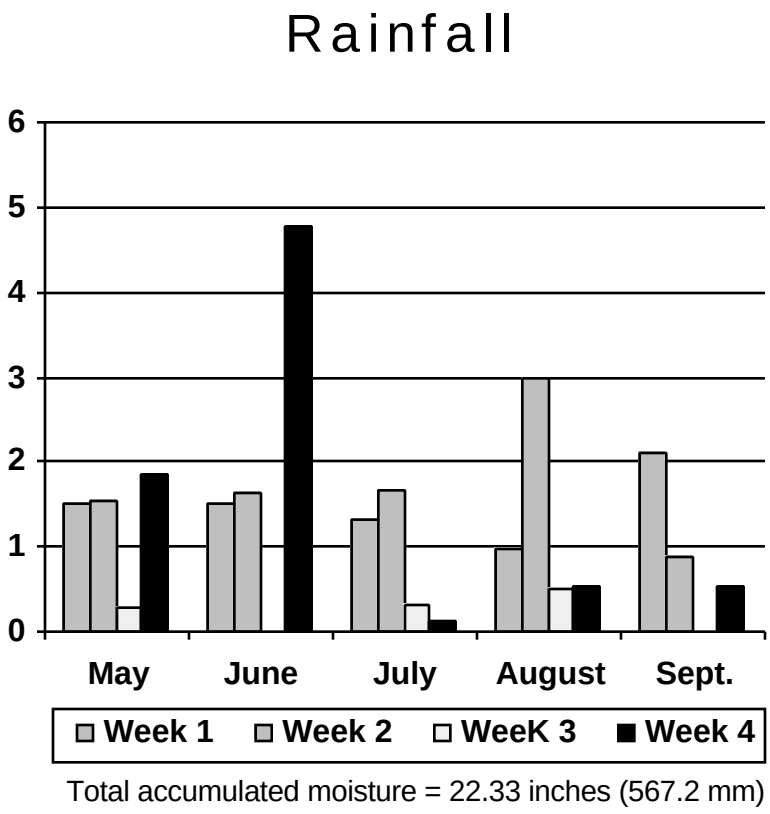
Fungicides applied: Quadris (10.0 oz/ac) at about 10-30 % bloom

Insecticides applied: Capture (2.5 oz/ac) July 22 on first seeding date and August 25 on the entire site.

Swathing: Started: August 31 Finished: September 28

Combining: Started: October 11 Finished: October 23

Comments: Due to the late spring, seeding was initiated under ideal to excessive moisture conditions. Heavy rains after seeding the Seed Treatment Trial and one treatment of the Variety Trial resulted in a 2 1/2 week delay in seeding. The excessive moisture resulted in uneven emergence in the earlier seeded trials. The rest of the site was seeded under ample moisture conditions and emergence was excellent. Very wet conditions throughout June and early July resulted in standing water on about one quarter of the site. Many areas of the field had standing water so long after planting that little or no canola was established in those areas. Many plots were shortened to eliminate drowned out and damaged areas. One replicate was discarded in three of the trials due to drowning. A moderately cool and dry July and August resulted in delayed maturity. Since most of the plots from the second planting date would not reach maturity until late September, all of the plots from the second planting date were swathed as soon as they reached 20% seed color change. The latest maturing varieties were cut on September 28, before reaching 20% seed color change, to allow curing time before it became too late to thresh in the fall.



Total accumulated moisture = 22.33 inches (567.2 mm)

VIII VARIETY TRIAL - B. NAPUS

Objective: To evaluate agronomic differences between newly registered and recommended conventional (non-herbicide tolerant) varieties in a given area as submitted by the seed trade.

Background: The increase in number of new varieties available over the past several years has made the task of choosing a variety for a specific farm challenging. Yield, crop quality and disease resistance are important variety traits to consider in the selection process. However, other agronomic factors such as lodging resistance and harvestability are also important factors. Varieties in the trial are selected and submitted by the seed trade.

Methodology: The variety trial was made up of four replicates in a randomized block design. Identical agronomic practices were used for all varieties. The trial was seeded on June 19 into adequate to excessive moisture conditions. Swathing commenced when seed color change (SCC) was 20% to 30% and harvest was completed when suitable conditions existed.

Observations: Emergence was good. One replicate was discarded due to flooding. The late planting date and cool growing conditions caused the varieties to mature late in the season. Varieties were swathed starting mid-September after reaching 20% seed color change to reduce the risk of frost and allow more time to cure. The latest maturing varieties were swathed on September 28. Some of these varieties were cut prior to 20% SCC because the cool conditions at the end of September did not allow the seed to change color and the swaths needed time to cure before winter. Individual plots that were cut prior to 20% SCC include Roseau, Ebony, CL 2078 and Quantum.

Results:

B. NAPUS VARIETY TRIAL YIELD, ECONOMIC & QUALITY RESULTS Roseau, MN								
Treatment	**Yield (%)**	**Yield (lb/ac)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Green Seed (%)**	**Oil (%)**	**Growing Degree Days**	**Days To Maturity**
Hyola 401	100	1925	38.5	20.25	6.1	43.9	1029	95
Ebony	82	1570	31.4	(14.48)	9.7	47.9	1050	102
46A65	80	1535	30.7	(4.70)	6.1	47.4	1029	95
Quantum	79	1520	30.4	(23.39)	11.6	45.1	1057	106
CL2078	77	1475	29.5	(36.59)	12.1	45.9	1050	102
Cavalier	74	1415	28.3	(3.83)	4.8	47.4	1021	94
Roseau	72	1395	27.9	(12.62)	6.3	48.1	1057	106
LSD CV%		1.96 8.7	3.92 8.7			1.45 2.1		

*****Note: Hyola 401 was used as a check in this trial.
Note: Bracket in contribution margin reflects a negative value.

Discussion: The check (Hyola 401) yielded significantly higher than the rest of the varieties. Hyola 401 had lower oil content than the other varieties except Quantum. Contribution margins reflect yield, green seed and seed costs. Hyola 401 had the highest contribution margin. The high green seed count of Ebony, Quantum and CL2078 contributed to the poor contribution margin. The days to maturity represent the calendar days from the date of seeding to 30% seed color change. Days to maturity were estimated for the late maturing varieties. The growing degree days, expressed in Celsius, represent the heat accumulation above canola's base temperature of 5°C (41°F). Cavalier exhibited the earliest maturity at this site, while CL2078, Roseau, Ebony and Quantum did not make it to maturity due to the late season and cool conditions at swathing.

IX HARVESTABILITY TRIAL

Objective: To compare the harvestability of varieties entered in the variety and systems trials.

Background: A number of varieties have very similar yield and quality traits. In choosing a variety a grower should also consider such characteristics as lodging, and harvestability. Harvestability is the measurement of swathing and combining ease. Currently, there is no standardized scientific measurement for harvestability. Therefore, a qualitative assessment is used.

Methodology: Harvestability was evaluated as swathing and combining were completed. Each variety was swathed and evaluated on a scale of 1 to 5, compared to the Check (Hyola 401) which was rated a 3. The following criteria were considered: lodging, height, straw stiffness, straw strength, uniformity of stand, swath fluffiness, tendency to clump, flowability, speed of operation and feeding.

Ratings:
1 = much better than Check
2 = better than Check
3 = Check
4 = Worse than Check
5 = Much worse than Check

These ratings are subjective. The machine operator, crop conditions, weather and time of day can affect the harvestability of a variety.

Observation: Lodging was variable among the varieties. Swathing was most difficult in the varieties with the uneven lodging. Combining ease was related more closely to the amount of clumping of the swath. The plots were swathed with an 18' Versatile 400 swather equipped with a pick-up reel, and harvested with a Massey Ferguson 760 combine.

Results:

HARVESTABILITY TRIAL *B. Napus* Roseau, MN			
Variety	**Lodging Ratio**	**Swathing Rating**	**Combinability Rating**
45A51	.85	4	3
45A71	.61	4	3
46A65	.69	3	3
46A76	.86	4	4
Cavalier	.84	3	2
CL2078	.96	3	3
Ebony	.94	4	4
Golden Ready	.68	4	3
Hyola 401	.85	3	3
InVigor 2373	.88	3	3
LG3275	.83	4	3
LG3345	.67	4	3
Minot	.76	3	3
Phoenix	.83	3	3
Quantum	.81	3	3
Quest	.65	5	4
Roseau	.96	3	3
SW RideR	.89	4	3

Discussion: The varieties varied in harvestability with 46A65 and Cavalier easier to swath and combine than the check (Hyola 401). Cavalier flowed smoothly into the combine. LG3345 and Quest were difficult to swath due to uneven lodging. Ebony and 46A76 were difficult to combine due to clumps in the swath.

XI RE-SEEDING TRIAL

Objective: To assess the impact of re-seeding on yield, quality and economic returns when initial plant densities are below recommended thresholds.

Background: Canola is a very flexible crop in that wide variations in plant populations have very little effect on the final yield, although these variations can affect maturity. Research has shown (***Canola Growers Manual - Crop Establishment section***) that as plant populations decline below 5.6 plants/ft^2 (60 plants/m^2) yields tend to decline. The recommended threshold for re-seeding is 3.7 plants/ft^2 (40 plants/m^2). The effect of plant density on maturity is more pronounced under cool summer conditions than warm conditions.

Methodology: This trial was seeded on June 3 with Hyola 401 and was originally intended to be a harvesting method trial. Heavy rains resulted in saturated conditions and soil crusting. This reduced emergence to 3.8 plants per square foot, which is the minimum recommended threshold for plant stands. Therefore, a re-seeding trial was established. One treatment was cultivated and re-seeded on June 19, while the other was left. The treatments were placed in a randomized block design.

Observations: The tremendous amount of rain received after June 3 resulted in water standing in all low spots and in the wheel tracks. These areas were so water logged that most of the seed did not germinate for a few days, resulting in two distinct flushes. The dry conditions that followed the rain created a crusting problem for the second flush, which slowed emergence. The June 3 seeding date was heavily infested with aster yellows (30% of plants showed signs of infection), whereas the June 19 seeding date was only lightly infected (13% of plants showed signs of infection). Aster yellows is caused by a mycoplasma-like organism, which results in bladdering of pods, stunted pods and reduced seed set. Aster yellows is transmitted by the six-spotted leafhopper (aster leafhopper), which is blown up from the southern U.S. with southern weather fronts. These weather fronts continued into late-July this year, which is later than usual. The June 3 seeding was sprayed with Capture (2.5 oz/ac) to control lygus bugs (average 12 lygus/10 sweeps at early flower) on July 22, before the June 19 seeding reached flowering. The June 3 seeding exhibited high levels of premature seed germination in healthy looking pods which were on plants infected with aster yellows. These seeds appeared to germinate when the seed and the pod were still green and weeks away from seed color change. At swathing these germinated seeds had dried down and shrivelled up to resemble flakes of pepper in healthy looking pods.

Results:

RE-SEEDING TRIAL Roseau, MN				
Treatment	**Yield (lb/ac)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Oil (%)**
Seeded June 3	910	18.2	(70.80)	40.9
Re-seeded June 19	1925	38.5	(10.54)	43.9
LSD	386	7.72		1.75
CV%	11.4	11.4		1.7

Note: Bracket in contribution margin reflects a negative value.

Discussion:

The large yield difference between the June 3 and June 19 planting dates is likely due to a number of factors. The poor growing conditions caused by water logged soils reduced yield potential of the canola seeded on June 3. As well, the high infestation of aster yellows on the canola seeded June 3 reduced yield. Contribution margins reflect yield, green seed and the cost of reseeding (canola seed and tillage). Normally an earlier seeding date is better than later. However, in this trial the insect pressure, disease pressure and excessive moisture conditions of this season favored the later (June 19) seeding date.

XII SEED PLACEMENT TRIAL

Objective: To determine the effects of various seed placements on stand establishment, yield, quality and contribution margin of ***B. napus*** canola.

Background: The small seed size of canola results in much lower seeding rates than many other crops. For growers utilizing seeding equipment such as double disc press drills, this can lead to difficulty in setting seeding rates low enough. Some growers have attempted to overcome this by blocking alternating drill runs and doubling their seed rate setting. However, this also doubles the row spacing (12 inch vs. 6 inch), which can delay canopy closure and maturity. Time to canopy closure may also be affected by the variety. Other growers have turned to alternative seeding methods such as broadcasting the seed and harrowing it in, but this can result in uneven emergence in dry conditions.

Methodology: Each treatment was replicated four times in a randomized block design. The canola varieties used were Q2 (open pollinated) and CL2070 (hybrid). The 6 and 12 inch row spacing treatments were seeded with a John Deere 9350 double disc press drill. The broadcast treatments were spread with a 15 foot Gandy granular applicator and harrowed once with a spike tooth drag. Starter fertilizer was also applied with the Gandy prior to harrowing.

The treatments were:
A) Q2 - 6 inch spacing
B) Q2 - 12 inch spacing
C) Q2 - Broadcast and harrowed
D) CL2070 - 6 inch spacing
E) CL2070 - 12 inch spacing
F) CL2070 - Broadcast and harrowed

Observation: Moist conditions at seeding provided good emergence for all the treatments. Continued rain resulted in flooding and loss of the fourth replicate. All the treatments had two emergence dates. The middle 1 to 3 feet of each broadcast and harrow treatment was double seeded due to overlap of the granular applicator. This created a dense stand in the middle of the plots, which resulted in thinner stems and increased lodging in the middle of those treatments. Most weeds were controlled with Assure II (10 oz/ac) and Stinger (1/4 pt/ac). The majority of this trial was swathed on September 28 to allow as much time as possible for curing. Seed color change ranged from 1 to 10% due to the late season and late maturing varieties. The Q2 - broadcast and harrowed treatment matured a few days sooner than the other treatments.

Results:

SEED PLACEMENT TRIAL Roseau, MN						
Treatment	**Yield (lb/ac)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Green Seed (%)**	**Oil (%)**	**Plant Counts (Pl/ft^2)**
Q2						
6 inch spacing	1585	31.7	(2.79)	7.7	42.3	8.7
12 inch spacing	1520	30.4	(30.99)	13.3	41.2	7.6
Broadcast & Harrowed	1570	31.4	(11.77)	8.7	41.3	8.8
CL2070						
6 inch spacing	1440	28.8	(38.20)	11.7	41.1	7.2
12 inch spacing	1405	28.1	(44.42)	13.0	41.5	7.8
Broadcast & Harrowed	1410	28.2	(58.15)	16.7	40.6	8.5
LSD	101.5	2.03			0.90	2.07
CV%	4.6	4.6			1.5	14.0

Note: Brackets in contribution margin reflect a negative value.

Discussion: There were no significant yield or stand differences among seed placement treatments within a variety. Contribution margins reflect differences in yield, green seed, seed cost and costs of seeding (JD 9350 press drill vs. custom broadcasting and harrowing). The increased cost of custom broadcasting and harrowing was not offset with increased yield. However, the broadcast treatment of Q2 had a better contribution margin than the 12 inch spacing due to lower green seed and slightly higher yield. The 12 inch spacing reached canopy closer 3 - 5 days later than the 6 inch spacing and broadcast treatments for both varieties, however it did not affect yield. The late season and late maturing varieties did not allow an accurate comparison of maturity differences between the 6 inch and 12 inch spacings because most of the plots were swathed before reaching maturity.

XIII SCLEROTINIA STEM ROT (WHITE MOLD) CONTROL TRIAL

Objective: To evaluate sclerotinia control using a fungicide on yield, quality and economic return on canola.

Background: Sclerotinia stem rot is caused by the fungus ***Sclerotinia sclerotiorum*** that occurs in most canola growing areas. The disease is usually most severe in wetter areas of the growing region. Severity of stem rot varies from year to year, and even from field to field within a region. With the right combination of crop density and weather conditions or irrigation, heavy infections can develop almost anywhere. In some cases half the potential yield of a crop may be lost to sclerotinia.

Methodology: The trial was seeded with the variety LG3260. Spraying was done using twin-jet nozzles at 75 psi. The treatments included:

A) Check - no treatment
B) Quadris - 9.6 oz./ac in 20 gal spray solution applied at 10 to 20% bloom
C) Quadris - 9.6 oz./ac in 20 gal spray solution applied at 40 to 50% bloom
D) Quadris - 9.6 oz./ac in 10 gal spray solution applied at 10 to 20% bloom

Infection readings were taken by sampling 100 nonswathed plants in three random areas of each plot along the edge of the swathed area.

Observation: The trial was originally seeded on June 3 with four replicates in a randomized block design. However, poor stands and crusted soil conditions required it to be cultivated and reseeded on June 19. Additional heavy rains in late June resulted in a thinner stand than desired. A petal test kit was conducted on July 28 at 10% bloom and showed 7% infection. Dry conditions before and during flowering resulted in low levels of infections. Green seed counts varied from 8 to 9%.

Results:

SCLEROTINIA STEM ROT CONTROL TRIAL Roseau, MN						
Treatment	**Yield (%)**	**Yield (lb/ac)**	**Yield (bu/ac)**	**Oil (%)**	**Plants Infected (%)**	**Contribution Margin ($/ac)**
Check (No fungicide)	100	1550	31.0	47.3	14.8	16.14
20 gal/10-20% bloom	101	1570	31.4	47.3	13.4	(10.14)
20 gal/40-50% bloom	95	1475	29.5	47.4	11.1	(17.78)
10 gal/10-20% bloom	99	1530	30.6	47.3	12.8	(9.38)
LSD		143.5	2.87	0.65	5.74	
CV%		7.2	7.2	1.1	27.0	

Note: Bracket in contribution margin reflects a negative value.

Discussion: None of the fungicide treatments significantly improved yield or reduced infection levels. The low disease pressure and dry conditions before and during flowering resulted in little development of sclerotinia. Contribution margins reflect the differences in yield and fungicide costs. The only treatment that resulted in a positive contribution margin was the untreated check.

XIV SEED TREATMENT TRIAL

Objective: To evaluate the impact of various seed treatments on yield, quality, protection from flea beetle and contribution margin of ***B. napus*** canola.

Background*:** The most widespread problem of canola production is poor stand establishment. A seedling disease complex including pathogens such as ***Rhizoctonia solani, along with ***Fusarium*** and ***Pythium*** species, can cause poor stand establishment. Seed treatment fungicides are used extensively in canola production as the first line of defence to control seedling disease. The application of an insecticidal seed treatment, in combination with the fungicidal seed treatment, may provide the added benefit of early season flea beetle control in areas where they are a problem. Benlate is a fungicide that has been available for canola in the U.S., primarily for control of seed borne blackleg. Gaucho is an insecticidal seed treatment primarily for control of flea beetles. Helix is a new seed treatment containing fungicides to control seedling diseases and an insecticide for flea beetle control.

***Methodology*:** The seed treatment trial consisted of two varieties, Eagle (open pollinated) and KC-701 (hybrid) and three seed treatments in a randomized block system. The treatments were:

A) Eagle treated with Benlate only
B) Eagle treated with Benlate & Gaucho
C) Eagle treated with Helix
D) KC-701 treated with Benlate only
E) KC-701 treated with Benlate & Gaucho
F) KC-701 treated with Helix

Observation: The trial was seeded on June 3 with four replicates. One replicate was lost due to flooding. A tremendous amount of rain after seeding resulted in water standing in all low spots and in the wheel tracks. These areas were so water logged that most of the seed did not germinate for a few days, resulting in two distinct flushes. The first flush was uniform but thin. The second flush emerged approximately 12 days after the first. The dry conditions that followed the rain created a crusting problem for the second flush, which slowed emergence and reduced overall stand. Flea beetle damage assessments were taken at 14 and 21 days after seeding and showed little to no damage. Weed control required a three-step approach. Assure II (10 oz/ac) was applied at emerging to 1 leaf stage to control a heavy infestation of wild oats. Herbicide 273 (1.5 pts/ac) was applied at the 2 to 5 leaf stage of the crop to control a heavy infestation of smartweed. Stinger (1/4 pt/ac) was applied at the 4 leaf to rosette stage of the crop to control a heavy infestation of biennial wormwood that the Herbicide 273 did not control. The entire trial was heavily infested with aster yellows, 30-50% of plants showed signs of infection (see Re-Seeding Trial Observations, for further information, page 174). The KC-701 treatments flowered later than the Eagle and appeared to be more heavily infected with aster yellows than the Eagle treatments. The trial was

sprayed with Capture (2.5 oz/ac) to control lygus bugs (average 12 lygus/10 sweeps at early flower) on July 22.

Results:

SEED TREATMENT TRIAL
Roseau, MN

Treatment	Yield (lb/ac)	Yield (bu/ac)	Contribution Margin ($/ac)	Green Seed (%)	Oil (%)	Seed Cost ($/ac)*	Plant Stand (Pl/ft^2)
Eagle							
Benlate	715	14.3	(68.00)	3.3	45.4	9.02	6.7
Benlate & Gaucho	1005	20.1	(45.30)	2.3	45.8	15.40	6.2
Helix	965	19.3	(48.93)	2.0	45.4	17.60	5.6
KC-701							
Benlate	615	12.3	(88.08)	3.7	45.5	19.25	3.3
Benlate & Gaucho	910	18.2	(67.56)	4.0	45.5	25.85	4.0
Helix	870	17.4	(73.60)	4.0	45.3	28.05	4.2
LSD	141.5	2.83			0.86		1.93
CV%	11.3	11.3			1.3		26.1

Note: Bracket in contribution margin reflects a negative value.
Note: *These prices are based on consultation with Industry representatives.

Discussion: Gaucho and Helix (insecticide seed treatments) provided significant yield increases compared to the Benlate only seed treatment. This was not expected due to the lack of flea beetle pressure at the site. However, there was some lygus bug pressure as well as high levels of six spotted (aster) leafhoppers. Contribution margins reflect the differences in yield, green seed, seed treatment and seed costs. Overall values are very low due to low yields and the intensive weed management program required to protect the crop. Plant stands of Eagle were higher than KC-701. However, seed treatments within each variety had no effect on plant stands.

XVI STRAIGHT COMBINING VS SWATHING *B. NAPUS* TRIAL

Objective: To determine the effects of swathing and straight combining of selected ***B. napus*** varieties on yield, quality and contribution margin. A secondary objective will determine what conditions mitigate harvest losses due to straight combining.

Background: Work at Canola Production Centres has shown that straight combining is generally not a viable option compared to swathing ***B. napus*** varieties. However, success of straight combining will be affected by environmental and crop factors.

Methodology: Two plots of selected varieties were seeded side by side within each replicate of the variety trial. One was swathed at 20-30% seed color change and the other was straight combined.

Observation: A Massey Ferguson 760 was used for harvesting this trial. Straight combining was done with a 20-foot header and pick-up reel. The straight combined and swathed Cavalier and the swathed Hyola 401 plots were harvested on October 11. The rest of the swathed plots were harvested on October 22 and the straight combined plots on October 23. Seed moisture varied among the varieties. The Cavalier straight combined plots averaged 2% more moisture than the swathed plots. The Ebony and Quantum straight combined plots averaged 4% less moisture than the swathed plots. The Cavalier straight combined plots were harvested before high winds came through the area. These showed little sign of shattering and fed nicely into the header. The rest of the straight combined plots were harvested after high winds (30-40 mph). This resulted in severe uneven lodging, which made harvesting difficult due to the crop bunching up on the header. These plots also showed evidence of shattering.

Results:

STRAIGHT COMBINING VS SWATHING *B. NAPUS* TRIAL Roseau, MN						
Treatment	**Yield (%)**	**Yield (lb/ac)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Green Seed (%)**	**Oil (%)**
Cavalier						
Straight Combined	106	1495	29.9	(18.46)	10.5	48.7
Swathed	100	1415	28.3	(3.83)	4.8	47.4
Ebony						
Straight Combined	59	920	18.4	(81.06)	16.3	48.2
Swathed	100	1570	31.4	(14.48)	9.7	47.9
Hyola 401						
Straight Combined	54	1035	20.7	(60.46)	8.5	45.3
Swathed	100	1925	38.5	20.25	6.1	43.9
Quantum						
Straight Combined	53	810	16.2	(86.88)	17.7	45.6
Swathed	100	1520	30.4	(23.39)	11.6	45.1
LSD for method within variety		164.0	3.28			1.04
CV%		9.2	9.2			1.4

Note: Bracket in contribution margin relfects a negative value.

Discussions: All yields were adjusted to 9% moisture. The straight combined Cavalier yielded more than the swathed plots. These increases are likely due to the ability of the later formed pods to finish filling after the swathing period (30% seed color change). The Cavalier straight combined plots were harvested before the rest of the varieties because they were the only plots ready and the weather forecast called for high winds. The straight combined Hyola 401, Quantum and Ebony resulted in yields which were significantly lower than the swathed plots. Contribution margins reflect differences in yield, seed costs and cost of swathing. Higher oil content in the straight combined plots is a common occurrence since oil is the last component produced in the seed. This trial resembles results observed in Canadian trials with ***B. napus***. In the majority of trials, straight combining resulted in significant losses compared to the swathed plots***.***

Straight combining of ***B. napus*** varieties appears to work well when weather conditions are favorable (no damaging storms or high winds) and when the plots are lodged and well knitted.

XIII SYSTEMS COMPARISON TRIAL

Objective: To establish agronomic criteria for choosing between varieties and herbicide options.

Background: The introduction of canola with novel traits for herbicide tolerance has given producers many options for herbicide and variety selection. The greatest return will occur by choosing the most appropriate combination of variety and herbicide for each field. Factors to consider beyond the performance of the variety include weed population, weed spectrum, tillage system and herbicide rotation. Entries in the systems comparison trial were on a contract basis.

Methodology: Each treatment was replicated four times in a randomized block design. The canola varieties with novel traits for herbicide tolerance were compared to the conventional varieties Hyola 401 and Quantum and a conventional herbicide program. Weeds were controlled using the appropriate herbicides for each system.

Varieties used were:

- Roundup Ready - 45A51, Golden Ready RR, LG3345, LG3275, Minot, Quest and SW RideR
- Smart (Raptor Tolerant) - 45A71, 46A76
- Liberty Link - InVigor 2373 and Phoenix
- Conventional - Hyola 401, Quantum

Chemicals used to control weeds were:

- Roundup Ready - Roundup Ultra (1 pt/ac), ammonium sulphate (1.0 lb/ac)
- Smart – Raptor (4 oz/ac), non-ionic surfactant (3.5 oz/ac), Ammonium Sulphate (2.5 lb/ac)
- Liberty Link - Liberty (34 oz/ac.), ammonium sulphate (3.0 lb/ac)
- Conventional - Assure II (10 oz/ac), Herbimax (1 pt/ac), Stinger (1/4 pt/ac)

Observation: The trial was seeded on June 19 into adequate to excessive moisture conditions. Emergence was good. Herbicides were applied at the 4-leaf stage of the crop. High winds prevented spraying until two hours before dark. Weed pressure was light with the primary weeds being biennial wormwood, green foxtail, wild oats, wild buckwheat, smartweed, and curly dock. All systems controlled weeds well. Liberty appeared to cause rapid browning of six inch biennial wormwood. Five weeks after spraying, six inch biennial wormwood appeared stunted in the Roundup, Raptor and conventional plots but were not present in the Liberty plots. The late planting date and cool growing conditions caused the varieties to mature late in the season. Swathing started in mid-September when varieties reached 20% seed color change to allow more time to cure. Quantum was the only variety swathed on September 28 at a seed color change of 10%. This was done because the cool conditions at the end of September did not allow the seed to change color and the swaths needed time to cure before winter.

Results:

SYSTEMS COMPARISON TRIAL Roseau, MN								
System	**Yield (%)**	**Yield (lb/ac)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Green Seed (%)**	**Oil (%)**	**Growing Degree Days**	**Days To Maturity**
Conventional								
Hyola 401	100	1760	35.2	23.74	3.0	44.5	1029	95
Quantum	88	1555	31.1	(17.10)	11.0	45.1	1050	103
Liberty Link								
InVigor 2373	99	1750	35.0	20.06	2.7	46.6	1029	95
Phoenix	83	1460	29.2	5.91	4.3	47.5	1029	95
Roundup Ready								
Minot	94	1650	33.0	20.98	5.0	46.5	1029	95
Quest	93	1630	32.6	23.70	3.5	46.1	1029	95
LG3345	90	1580	31.6	13.81	5.3	46.7	1021	94
45A51	88	1550	28.5	(0.25)	4.3	45.0	1013	93
LG3275	86	1510	30.2	1.51	5.3	45.8	1021	94
Golden Ready RR	84	1485	29.7	1.04	5.3	45.5	1033	96
SW RideR	80	1415	28.3	1.95	3.8	45.3	1033	96
Smart (Raptor Tolerant)								
46A76	98	1730	34.6	20.66	4.5	45.6	1037	97
45A71	81	1425	28.5	2.50	2.8	44.2	1033	96
LSD CV%		153.0 8.1	3.06 8.1			0.98 1.8		

Note: Bracket in contribution margin reflects a negative value.

Discussion: InVigor 2373, Minot, Quest and 46A76 all yielded similar to the check (Hyola 401). All the other varieties yielded similar to the other conventional variety (Quantum). Phoenix, LG3345, InVigor 2373, and Minot all had significantly higher oil content. Contribution margins reflect differences in seed cost, yield, green seed and chemical costs for weed control. InVigor 2373, Minot, Quest and 46A76 all provided similar contribution margins to the check (Hyola 401) and provided alternative methods of weed control.

XIV TIME OF WEED REMOVAL TRIAL

Objective: To compare the effect of time of weed removal on yield and quality of canola.

Background: Since canola is slow growing and slow to cover the ground in the early growth stages, it is not a strong weed competitor. Weed removal and the proper time to remove weeds has been a constant source of frustration to producers. Producers will often delay post-emergent herbicide applications in an attempt to avoid late flushes of weeds, which they feel will add to the bank of weed seeds in the soil or require additional herbicide applications and increased input costs. Work conducted by Harker, et al (Agriculture & Agri-Food Canada) along with previous work at the Canola Production Centres has indicated economic benefits of removing weeds early in the crop's development.

Methodology: The time of weed removal trial consisted of the following varieties and stages of herbicide application in a split plot design:

A) Conventional variety Quantum
- Assure II (10 oz/ac), Herbimax (1 pt/ac) & Stinger (1/4 pt/ac) applied at 1 to 3 leaf stage
- Assure II (10 oz/ac), Herbimax (1 pt/ac) & Stinger (1/4 pt/ac) applied at 4 to 6 leaf stage

B) Smart (Raptor tolerant) variety 45A71
- Raptor (4 oz/ac) non-ionic surfactant (3.5 oz/ac), ammonium sulphate (2.5 lb/ac) applied at 1 to 3 leaf stage
- Raptor (4 oz/ac) non-ionic surfactant (3.5 oz/ac), ammonium sulphate (2.5 lb/ac) applied at 4 to 6 leaf stage

C) Roundup Ready variety LG3345
- Roundup Ultra (1 pt/ac), ammonium sulphate (1.0 lb/ac) applied at 1 to 3 leaf stage
- Roundup Ultra (1 pt/ac), ammonium sulphate (1.0 lb/ac) applied at 4 to 6 leaf stage

The herbicides were applied at the above growth stages of the canola.

Observations: The trial was integrated with the Systems Trial (see previous section). Weed pressure was light with primary weeds being biennial wormwood, green foxtail, wild oats, wild buckwheat, smartweed, and curly dock.

Results:

TIME OF WEED REMOVAL TRIAL Roseau, MN					
Treatment	**Yield (lb/ac)**	**Yield (bu/ac)**	**Contribution Margin ($/ac)**	**Green Seed (%)**	**Oil (%)**
45A71					
1 to 3 leaf	1425	28.5	(4.61)	4.5	44.7
4 to 6 leaf	1425	28.5	2.50	2.8	44.2
LG3345					
1 to 3 leaf	1530	30.6	5.43	6.5	46.0
4 to 6 leaf	1580	31.6	13.81	5.3	46.7
Quantum					
1 to 3 leaf	1465	29.3	(20.08)	9.8	45.2
4 to 6 leaf	1555	31.1	(17.10)	11.0	45.1
LSD	204.8	4.10			1.03
CV%	13.1	13.1			1.5

Note: Bracket in contribution margin reflects a negative value.

Discussion: Time of weed removal had no effect on yield or oil content. Due to the low level of weed pressure, early weed removal did not show the yield benefits observed in other trials conducted previously. Under heavy weed pressure, early weed removal is important to reduce weed competition to allow the crop to reach its full yield potential.

XVIII SUMMARY

The second year of the Minnesota Canola Production Centre program has been a success. The trials at the Roseau site were chosen to demonstrate basic canola production principles as well as look at new technologies. While many of the trends in the trials reflected past results from the Canadian CPC program, others turned out different than long term trends. Future work will help reveal if these unexpected trends are regionally specific, or if they were just a feature of this year's growing conditions. All of the results will provide good focal points for discussions at extension meetings throughout the winter. This joint project has provided a unique opportunity to share information between Canadian and American growers. Planning for next year's program has already begun and the site for next year will be near Thief River Falls, Minnesota. If you have any questions or comments about the Minnesota CPC program please feel free to contact any of the people listed in the following Field Staff Information section.

XIX FIELD STAFF INFORMATION

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