

PROJECT TITLE: Commercial Canola Variety Performance Evaluation under No-Till, Dryland, Chemical Fallow Conditions near Havre, Montana. (Exp. 07-OC01-CN).

PROJECT LEADERS: Peggy F. Lamb, Agronomy Research Associate, Havre
Gregg R. Carlson, Agronomist, Havre

PROJECT PERSONNEL: Eleri Morgan-Jones, Agronomy Research Assistant, Havre

OBJECTIVES:

To provide canola growers in north central Montana with a reliable, unbiased, up-to-date source of information that will permit valid dryland seed production comparisons among improved canola hybrids submitted for testing by participating commercial entities. Over time, this information should help canola producers in north central Montana select hybrids best suited to this region of the state.

METHODS:

In 2007, three sponsors submitted eight canola hybrids for testing under no-till, dryland, chemical fallow conditions near Havre, MT (Table 2). The trial was seeded in replicated, 22-foot, 4-row plots with 12-inch row spacing utilizing a three-point-mounted `Hege 1000' plot drill equipped with `John Deere Tru-Vee' disk openers. Each plot was seeded with 4.58 grams, equal to seeding 5 lbs per acre. Seeding depth was $\frac{3}{4}$ ". Percent plant stand was determined by visually determining the amount of "open" space six-inches and larger between plants within all rows. Plants per acre were determined by counting the number of plants in six linear feet of the two center rows and then converting to a per acre basis. No post-emergence herbicides were applied, and all plots were kept weed free utilizing hand labor. Flowering date was recorded as the date when 50 percent of the plants within a plot had at least one open floret. Pod shatter was determined by visual assessment prior to harvest, and was recorded as a total percent in each plot. Tilled 4-foot alleys were used for plot differentiation, reducing the harvested area to 4 rows wide by 18 feet long. The 72 square-foot plots were direct harvested using a `Wintersteiger Elite 1541-21' plot combine. Seed samples were cleaned in the laboratory using a `Clipper Office Tester and Cleaner' and then weighed following cleaning to determine seed yield. Seed test weight (pounds per bushel) and percent grain moisture content were obtained for each plot using a `Dickey-john GAC 2100' grain analyzer. Recorded grain yields were adjusted to eight percent grain moisture content and are reported in pounds per acre. Grain oil percentages were determined using nuclear magnetic resonance (NMR) spectroscopy and then adjusted to 8% grain moisture. Trial management information is listed in Table 4.

RESULTS and SUMMARY:

The oilseed cropping environment in 2007 at the Research Center was categorized as good with higher than normal precipitation. At Havre, total annual growing season precipitation (9/1/06 through 8/31/07) was 12.42 inches, 4.46 percent more than the average for all years since 1916 (Table 1). April 1 through July 31 precipitation was 7.43 inches or 111 percent of the 92-year average. Heat units expressed as "Growing Degree Days" (GDD, base 50) from May through July were 1429.5, 109.7 percent of the average for the last 57 years (1951-2007). The last spring frost was 20 days early with the first fall frost 4 days early, resulting in 145 frost-free days, 16 days longer than the 92-year average. September 2006 through March 2007 precipitation was 116 percent of the long-term average. The April through June growing season saw an average daily temperature at 53.8 degrees F, 0.6 degrees above normal. July and August average temperatures were 6.9 percent higher than normal with the high for 2007 recorded on July 24 at 107 degrees F. There were 37 days 90 degrees F or above, and 8 days with temperatures 100 degrees F or above. Early growing season conditions were generally wetter than normal. The month of April started off cool and wet, delaying seeding in many areas and also delaying the emergence of early seeded crops. June and July were drier than normal. The overall growing season was on average warmer than the 92-year average. The minimum winter temperature was -25 degrees F on February 14 and 15. Although crop outlook was initially very good with adequate fallow-stored soil moisture and generally favorable conditions, spring crop performance was initially poorer than expected due to the prolonged cool temperatures and wet conditions in April followed by hotter and drier conditions than normal in June and July.

Contact information for canola seed sources submitted for this trial is summarized in Table 2. Company, ID, genetic herbicide resistance category, plant stand, plants per acre, flowering date, pod shatter, grain yield, test weight, grain moisture and grain oil data are summarized in Table 3.

Overall canola seed yield averaged 1516 lb/ac. The three submissions by Monsanto were statistically the highest yielding entries in the trial with 'Hyola 357 Magnum' at 1731 lb/ac, 'IS 7145 RR' at 1689 lb/ac and 'IS 3057 RR' at 1603 lb/ac. Test weights of all entries averaged over 52.2 lb/bu. There was minimal pod shatter with no statistical difference among varieties.

FUTURE PLANS:

With continued support from the canola industry, the no-till, dryland, fallow canola evaluations will continue in 2008 at Northern Agricultural Research Center, near Havre, Montana. If support exists for the project, multi-location canola trials throughout the state may be feasible for 2008.

Table 1. Summary of climatic data by months for the 2006-2007 crop year (September to August) and averages for the period 1916-2007 at the Northern Agricultural Research Center, Havre, Montana.

Month	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Crop Year
Year	2006	2006	2006	2006	2007	2007	2007	2007	2007	2007	2007	2007	
<u>Precipitation (inches)</u>													<u>Total</u>
Current Year	1.16	0.71	0.38	0.37	0.41	0.82	0.76	2.07	2.27	2.06	1.03	0.38	12.42
92-Year Average (1916 to 2006-07)	1.14	0.66	0.42	0.44	0.43	0.32	0.55	0.97	1.76	2.55	1.43	1.20	11.89
<u>Mean Temperature (°F)</u>													<u>Average</u>
Current Year	57.7	44.8	28.8	25.9	22.6	17.8	40.1	42.0	55.8	63.7	76.8	69.1	45.4
92-Year Average (1916 to 2006-07)	56.1	45.9	30.0	19.7	15.3	20.0	30.0	43.6	54.1	61.9	69.2	67.3	42.7

Last killing frost in spring*

2007 _____ April 22th
Ave. 1916-2007 _____ May 13th

First killing frost in fall*

2007 _____ September 15th
Ave. 1916-2007 _____ September 19th

Frost free period

2007 _____ 145 days
Ave. 1916-2007 _____ 129 days

Growing degree days (base 50)

May 1-Oct 31, 2007 _____ 2517.0
Ave. 1951-2007 _____ 2387.7

Maximum summer temperature _____ 107 on July 24th

Minimum winter temperature _____ -25 on February 14th & 15th

*In this summary 32° is considered a killing frost.

Table 2. Contact Information for Seed Sources of Eight Commercial Hybrid Canola Entries Tested On-Station Under No-Till Dryland Fallow Conditions. Northern Agricultural Research Center. Havre, (Exp. 07-OC01-CN)

COMPANY	HYBRIDS TESTED	CONTACT
Bayer CropScience	InVigor 5550	Mr. Kyle Schepp Bayer CropScience 700 24th Ave NW Minot, ND 58703 PH: 1-701-578-4063 FX: 1-701-852-9704 EM: kyle.schepp@bayercropscience.com
Croplan Genetics	HyClass 410 HyClass 712 HyClass 924 Python	Mr. Monte Reiner Croplan Genetics PO Box 1291 Minot, ND 58702 PH: 1-701-852-3556 FX: 1-701-852-3036 EM: mrreiner@landolakes.com
Interstate Seed/Monsanto	Hyola 357 Magnum IS 3057 RR IS 7145 RR	Mr. Jim Johnson Monsanto 304 Center St. West Fargo, ND 58078 PH: 1-800-437-4120 FX: 1-701-282-8218 EM: jjohnson@interstateseed.com

Table 3. Agronomic Performance of Commercial Canola Hybrids Grown under Dryland, Fallow, No-till Conditions near Havre. Northern Agricultural Research Center. Havre, MT. 2007. (Exp. 07-OC01-CN)

Company	ID	Herbicide Resistance	Plant Stand %	Plants Per Acre no.	Flowering Date		Pod Shatter %	Grain Yield lb/ac	Test Weight lb/bu	Grain Moisture %	Grain Oil %
					Julian no.	Calendar					
Croplan Genetics	HyClass 410	Roundup Ready	96.8	248,050	171.0	20-Jun	1.7	1376.1	52.5	4.3	41.4
Croplan Genetics	HyClass 712	Roundup Ready	96.3	291,610	171.0	20-Jun	2.3	1352.5	51.9	4.2	41.9
Croplan Genetics	HyClass 924	Roundup Ready	96.8	320,650	167.2	16-Jun	1.7	1369.2	51.3	4.1	43.2
Monsanto	Hyola 357 Magnum	Roundup Ready	96.4	225,060	165.3	14-Jun	1.0	1730.8**	52.5	4.5	40.9
Monsanto	IS 3057 RR	Roundup Ready	98.1	359,370	165.0	14-Jun	4.3	1602.6*	52.8	4.3	43.8
Monsanto	IS 7145 RR	Roundup Ready	95.4	264,990	169.3	18-Jun	3.0	1688.8*	52.8	4.1	43.5
Bayer Crop Science	InVigor 5550	Liberty Link	95.6	267,410	168.2	17-Jun	3.0	1575.1	52.9	4.3	41.9
Croplan Genetics	Python	Clearfield	95.4	298,870	169.3	18-Jun	1.7	1435.9	50.9	4.2	41.5
		Average	96.3	284,501	168.3	17-Jun	2.3	1516.4	52.2	4.2	42.2
		LSD (p=0.05)	ns	71,902	0.91		ns	137.90	0.25	0.13	1.38
		CV%	1.84	21.56	0.46		78.02	7.76	0.41	2.67	1.87

Grain yield is adjusted to 8 percent grain moisture content.

Grain oil is adjusted to 92 percent dry matter content.

** Indicates highest yielding cultivar within a column.

* Indicates cultivars yielding equal to the highest yielding entry based on Fisher's Protected LSD at the 0.05 probability level.

Field	A-6-3	Soil Texture 0-6"	CL-	Dry Surf Soil (in.) @ Plnt'g	0.25
Quarter	NW	Soil Texture 6-24"	CL-	2" Soil Temp (°F) @ Plnt'g	70
Section	33	Soil Texture 24-36"	CL	4" Soil Temp (°F) @ Plnt'g	66
Township	32N	Soil Texture 36-48"	CL	Fertilizer Formulation	none
Range	15E	Ca (ppm)	2005	Fertilizer Placement	na
Latitude	N48 29.554'	Init Zn (ppm) 0-6"	0.7	Fert. Rate (lbs/ac) N	na
Longitude	W109 47.947'	Init Mn (ppm) 0-6"	9.7	Fert. Rate (lbs/ac) P2O5	na
Soil Series	Telstad CLm	Init Mg (ppm) 0-6"	0	Fert. Rate (lbs/ac) K2O	na
pH 0-6"	7.5	Init Cu (ppm) 0-6"	1.3	Herbicide App. Date	na
Org.Matter (%) 0-6"	1.5	Init Fe (ppm) 0-6"	19.2	Herbicide Product	none
Init N (lbs/ac) 0-6"	31	CEC 0-6"	16.1	Herbicide Rate (/ac)	na
Init N (lbs/ac) 6-24"	120	Init PAW (in.) 0-6"	0.83	Precip (in.) Plnt'g-Harvest	5.41
Init N (lbs/ac) 24-36"	194	Init PAW (in.) 6-24"	4.00	Precip (>.1) Plnt'g-Harvest	4.82
Init N (lbs/ac) 36-48"	164	Init PAW (in.) 24-36"	1.98	Harvest Date	8/8
Init N (lbs/ac) 0-48"	509	Init PAW (in.) 36-48"	2.05	Rooting Depth (in.)	24
Init P (ppm) Olsen 0-6"	35	Init PAW (in.) 0-48"	8.86	Post PAW (in.) 0-6"	0.44
Init K (ppm) 0-6"	355	Cropping System	NT-ChmFlw	Post PAW (in.) 6-24"	2.26
Init S (ppm) 0-24"	122	Previous Crop	Barley	Post PAW (in.) 24-36"	1.61
Init Na (MEQ/100g) 0-6"	18.0	Planting Date	4/24	Post PAW (in.) 36-48"	1.25
SaltHaz (MMHOS/cm) 0-6"	0.1	Planting Depth (in.)	0.5	Post PAW (in.) 0-48"	5.56
SaltHaz (MMHOS/cm) 6-24"	-	Moist Soil Depth @ Plnt'g	48+	Precip (>.1) Hvst-Post	0.00