

PROJECT TITLE: Camelina Variety Performance Evaluations near Conrad, Havre, Huntley, Kalispell, and Moccasin, Montana. (Exps. 08-CM18-CM, 08-CM05-CM, 80-CM02-CM, 08-CM08-CM, 08-CM05-CM & 08-CM07-CM).

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OBJECTIVES:

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

METHODS:

In 2008, two sponsors submitted a total of twelve camelina lines for testing in comparison to four check entries near Conrad, Kalispell, Havre, Huntley and Moccasin, MT (Table 6).

Central Agricultural Research Center, Moccasin: The trial was seeded into tilled fallow on March 23, 2008 in replicated, 14-foot, 5-row plots with 11-inch row spacing utilizing a three-point-mounted custom made plot drill equipped with double-disk openers. Each plot was seeded at a rate of 3.0 lbs per acre and at a depth of 0.0" to 0.25". At the time of seeding, the soil surface was very dry and powdery. Soil conditions did not improve until late April. Nitrogen was top-dressed at a rate of 30 lbs per acre. Due to prolonged and erratic plant emergence, flowering dates could not be accurately assessed. Plant counts were taken at harvest due to the prolonged emergence. Plant canopy heights were measured prior to grain harvest. The trial was straight-cut harvested on August 8, 2008 using a 'Wintersteiger Elite' 5'-header, plot-combine equipped with a 6mm shaker. Plots were weighed following harvest to determine seed yield. Grain protein and oil were determined via near-infrared reflectance using a Perten DA7200 scanning spectrophotometer.

Northern Agricultural Research Center, Havre: Sixteen entries were seeded on March 13, 2008 under no-till, dryland, chemical fallow conditions 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 2.75 grams, equal to seeding 3.0 lbs per acre. Seeding depth was 0.25". Percent plant stand was determined by visually estimating the amount of "open" space six-inches and larger between plants within all rows. 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. Plant heights were measured from the ground to the top of the canopy. 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 ft² 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 and protein percentages were determined via near-infrared reflectance using a Perten DA7200 scanning spectrophotometer. Trial management information for the trial located at NARC is listed in Table 9.

Northwestern Agricultural Research Center, Kalispell: The trial was seeded on April 9, 2008 under conventional tillage and dryland conditions following spring barley. Prowl was pre-plant incorporated at 4 pints/acre on April 4 for weed control. The cultivars were seeded in replicated 15-foot, 7-row plots with 6-inch row spacing utilizing a 'Hege' plot drill equipped with disk openers and packer wheels. Each plot was seeded with 2.34 grams, equal to seeding 3 lbs per acre. Seeding depth was 0.25". Plant stand was determined by counting the number of emerged plants per 3' section of row in 3 randomly selected locations of each plot. 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. Plant heights were measured from the ground to the top of the canopy. Pod shatter was minimal. The 75 ft² plots were direct harvested using a Hege plot combine. Seed samples were cleaned in the laboratory using a 'Carter-Day Dockage tester' 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 2100b' grain analyzer. Recorded grain yields are reported in pounds per acre. Grain protein and oil were determined via near-infrared reflectance using a Perten DA7200 scanning spectrophotometer. Oil fatty acid profiles were analyzed with a Shimadzu 17A gas chromatograph with a flame ionization detector (FID).

Southern Agricultural Research Center, Huntley: The trial was seeded on March 12, 2008 under no-till, dryland conditions. Test plots with four replications consisted of 30-foot, 4-row plots with a 14-inch row spacing. Seeding rate used was 5 lbs per acre. Plant height was measured in inches from the soil surface to the top flower. Flowering date was recorded when 50% of plants in a plot had flowered. Flowering dates were recorded in Julian days (number of days from January 1) for statistical purposes. Pod shatter was determined by visual assessment prior to harvest, and was recorded as a total percent in each plot. Rows of each test plot were trimmed 36 inches and harvested using an experimental-plot combine. 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 and protein percentages were determined for every entry on all replications using Diode Array 7200 NIR (near-infrared) spectroscopy and are reported on a dry matter basis.

Western Triangle Agricultural Research Center, Conrad: Sixteen entries were seeded into fallow with a six-row, double-disk, no-till plot seeder with 12-inch row spacing. Nitrogen, potassium and chloride were broadcast and phosphorus was placed with the seed at planting. Each 150 ft² plot was seeded into very dry soil using a rate of 4.0 lbs per acre at a 0 to 0.75" seeding depth. Due to poor seeding and weather conditions, plant stands were extremely reduced and erratic in emergence. This trial had to be abandoned mid-season, once it was determined that the plots would not produce any viable information.

RESULTS and SUMMARY:

Contact information for camelina seed sources submitted for this trial is summarized in Table 6.

Central Agricultural Research Center, Moccasin: The oilseed cropping environment in 2008 at Moccasin was categorized as poor with lower than normal precipitation. Total annual growing season precipitation (9/1/07 through 8/31/08) was 12.52 inches, 18.17 percent less than the average for all years since 1909 (Table 1). April 1 through July 31 precipitation was 8.15 inches or 95 percent of the 100-year average. The last spring frost was 16 days late with the first fall frost 10 days early, resulting in 105 frost-free days, 6 days shorter than the 100-year average. September 2007 through March 2008 precipitation was 68 percent of the long-term average. The April through June growing season saw an average daily temperature at 47.7 degrees F, 1.9 degrees below normal. July and August average temperatures were 2.5 percent higher than normal with the high for 2008 recorded on August 25 at 100 degrees F. April growing conditions were drier and cooler than normal resulting in delayed emergence of early seeded crops. Hail damage was received on June 10, pounding the crop to the ground, followed by frost on June 11 and 2" of snow on June 12. The minimum winter temperature was -26 degrees F on January 29. Oilseed crop outlook was initially not very good with March and April conditions drier and cooler than normal. Early season drought and cool temperatures, coupled with hail, frost and snow during the second week in June resulted in the 2008 growing season being far less than ideal.

Overall camelina seed yield at CARC ranged between 574 and 303 lb/ac. Due to the harsh growing season environment, camelina seed yield averaged 415 lb/ac with no statistical difference between entries and a high coefficient of variability. Grain oil for the camelina grown at CARC averaged 40.1 percent.

Company, entry identification, plant count, grain yield, grain moisture, plant height, grain protein and grain oil data are summarized for CARC in Table 7.

Northern Agricultural Research Center, Havre: The oilseed cropping environment in 2008 at Havre was categorized as good with higher than normal precipitation. Total annual growing season precipitation (9/1/07 through 8/31/08) was 12.21 inches, 2.69 percent more than the average for all years since 1916 (Table 2). April 1 through July 31 precipitation was 8.09 inches or 120 percent of the 93-year average. Heat units expressed as "Growing Degree Days" (GDD, base 50) from May through July were 1182.5, or 91 percent of the average for the last 58 years (1951-2008). The last spring frost was 2 days early with the first fall frost 20 days late, resulting in 151 frost-free days, 22 days longer than the 93-year average. September 2007 through March 2008 precipitation was 85 percent of the long-term average. The April through June growing season saw an average daily temperature at 51.1 degrees F, 2.1 degrees below normal. July and August average temperatures were 1.3 percent higher than normal with the high for 2008 recorded on August 8 at 100 degrees F. There were 27 days 90 degrees F or above, and 1 day with temperatures 100 degrees F or above. April growing conditions were drier and cooler than normal resulting in delayed emergence of early seeded crops. May and June were wetter and cooler than normal resulting in phenomenal oilseed production at NARC. Overall, the growing season was warmer than the 93-year average. The minimum winter temperature was -29 degrees F on January 29. Oilseed crop outlook was initially not very good with March and April conditions drier and cooler than normal. Rainfall during May, coupled with adequate fallow-stored soil moisture resulted in spring crop performance that was substantially better than anticipated.

Overall camelina seed yield at NARC ranged from 1843 and 2342 lb/ac. Due to above average moisture during May and June, camelina seed yield averaged 2097 lb/ac. The highest yielding entry was the Montana State University release 'Blaine Creek'. Six other entries, including two submitted by Great Plains – The Camelina Company and three submitted by Sustainable Oils, LLC produced seed yields statistically equal to that of Blaine Creek. Grain oil for the camelina grown at NARC averaged 37.6 percent.

Company, entry identification, plant stand, plant count, grain yield, test weight, grain moisture, flowering date, maturity date, plant height, pod shatter, lodging, grain protein and grain oil data are summarized for NARC in Table 8.

Northwestern Agricultural Research Center, Kalispell: The oilseed cropping environment in 2008 at Kalispell was categorized as good with slightly lower than normal precipitation. Total annual growing season precipitation (9/1/07 through 8/31/08) was 19.05 inches, 5.6 percent less than the average for all years since 1980 (Table 3). April 1 through July 31 precipitation was 10.68 inches or 117 percent of the 29-year average. Heat units expressed as "Growing Degree Days" (GDD, base 50) from April through August were 1419.0. The last spring frost was 9 days early with the first fall frost 2 days late, resulting in 126 frost-free days, 7 days longer than the 29-year average. September 2007 through March 2008 precipitation was 73 percent of the long-term average. The April through June growing season saw an average daily temperature at 46.8 degrees F, 4 degrees below normal. July and August average temperatures were close to normal with the high for 2008 recorded on August 19 at 96 degrees F. April growing conditions were drier and cooler than normal resulting in delayed emergence of early seeded crops. Overall, the growing season was warmer than the 29-year average. The minimum winter temperature was -22 degrees F on January 21. Oilseed crop outlook was initially not very good with March and April conditions drier and cooler than normal. Reduced rainfall during April and May, coupled with a later than recommended seeding date resulted in spring camelina yield performance that was substantially lower than anticipated.

Overall camelina seed yield at NWARC ranged from 867 and 1139 lb/ac. The average seed yield was 954 lb/ac. There were no statistical differences in seed yield between entries tested. Grain oil for the camelina grown at NWARC averaged 41.1 percent.

Company, entry identification, plant count, grain yield, test weight, grain moisture, flowering date, maturity date, plant height, lodging, grain protein and grain oil data are summarized for NWARC in Table 10.

Southern Agricultural Research Center, Huntley: The oilseed cropping environment in 2008 at Huntley was categorized as mediocre with lower than normal precipitation. Total annual growing season precipitation (9/1/07

through 8/31/08) was 12.65 inches, 4.31 percent less than the average for all years since 1911 (Table 4). April 1 through July 31 precipitation was 4.79 inches or 89.7 percent of the 97-year average. Heat units expressed as "Growing Degree Days" (GDD, base 50) from May through July, were 1910, or 102 percent of the average for the last 97 years. The last spring frost was 13 days early with the first fall frost 11 days early, resulting in 127 frost-free days, 2 days longer than the 97-year average. September 2007 through March 2008 precipitation was 90 percent of the long-term average. The April through June growing season saw an average daily temperature at 52.9 degrees F, 1.7 degrees below normal. July and August average temperatures were 2.4 percent higher than normal with the high for 2008 recorded on August 26 at 105 degrees F. April growing conditions were much drier and cooler than normal resulting in delayed emergence of early seeded crops. May was wetter and than normal resulting in average oilseed production at SARC. Overall, the growing season was warmer than the 97-year average. The minimum winter temperature was -18 degrees F on January 29. Oilseed crop outlook was initially not very good with March and April conditions drier and cooler than normal. Rainfall during May, coupled with adequate fallow-stored soil moisture resulted in spring crop performance that was better than anticipated.

Overall camelina seed yield at SARC averaged 1435 lb/ac and ranged between 1299 and 1646 lb/ac. The highest yielding entry was 'GP48' submitted by Great Plains – The Camelina Company. Three check entries and two additional Great Plains entries yielded statistically equal to the highest yielding entry. Grain oil for the camelina grown at SARC averaged 34.3 percent.

Company, entry identification, plant count, grain yield, test weight, grain moisture, flowering date, maturity date, plant height, pod shatter, lodging, grain protein and grain oil data are summarized for SARC in Table 11.

Western Triangle Agricultural Research Center, Conrad: The camelina cropping environment in 2008 at Conrad was categorized as fair with lower than normal precipitation during spring crop establishment in March and April. Total annual growing season precipitation (9/1/07 through 8/31/08) was 11.89 inches, 5.1 percent more than the average for all years since 1986 (Table 5). April 1 through July 31 precipitation was 7.79 inches or 111 percent of the 23-year average. The last spring frost was 26 days late with the first fall frost 16 days late, resulting in 118 frost-free days, 10 days shorter than the 23-year average. September 2007 through March 2008 precipitation was 119 percent of the long-term average. The April through June growing season saw an average daily temperature at 48.6 degrees F, 3.3 degrees below normal. July and August average temperatures were normal with the high for 2008 recorded on July 1 and August 19 at 95 degrees F. May was wetter and cooler than normal resulting in descent oilseed production at WTARC. Overall, the 2008 growing season was cooler than the 23-year average. The minimum winter temperature was -25 degrees F on January 29.

This trial was abandoned mid-season due to very erratic germination.

Camelina seed yields are summarized for all locations in Table 12.

FUTURE PLANS:

With continued support from the camelina industry, multi-location camelina evaluations will continue in 2009 at selected sites across Montana.

Table 1. Summary of climatic data by months for the 2007-2008 crop year (September to August) and averages for the period 1909-2008 at the Central Agricultural Research Center, Moccasin, Montana.

Month Year	Sep 2007	Oct 2007	Nov 2007	Dec 2007	Jan 2008	Feb 2008	Mar 2008	Apr 2008	May 2008	Jun 2008	Jul 2008	Aug 2008	Crop Year
<u>Precipitation (inches)</u>													<u>Total</u>
Current Year	1.11	0.93	0.91	0.02	0.19	0.21	0.11	0.44	4.32	2.94	0.45	0.89	12.52
100-Year Average (1909 to 2007-08)	1.40	0.89	0.56	0.55	0.55	0.45	0.72	1.19	2.55	3.16	1.68	1.60	15.30
<u>Mean Temperature (°F)</u>													<u>Average</u>
Current Year	56.4	47.6	34.5	26.1	22.0	28.6	32.9	37.1	49.6	56.5	66.7	67.0	43.8
98-Year Average (1911 to 2007-08)	54.7	44.8	32.8	25.1	21.4	24.6	30.3	40.8	50.2	57.9	65.8	64.8	42.8

Last killing frost in spring*

2008 _____ June 11th (31 F)
 Ave. 1909-2008 _____ May 27th

First killing frost in fall*

2008 _____ September 24th (32 F)
 Ave. 1909-2008 _____ September 15th

Frost free period

2008 _____ 105 days
 Ave. 1909-2008 _____ 111 days

Maximum summer temperature _____ 100° on August 25th
Minimum winter temperature _____ -26° on January 29th

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

Table 2. Summary of climatic data by months for the 2007-2008 crop year (September to August) and averages for the period 1916-2008 at the Northern Agricultural Research Center, Havre, Montana.

Month Year	Sep 2007	Oct 2007	Nov 2007	Dec 2007	Jan 2008	Feb 2008	Mar 2008	Apr 2008	May 2008	Jun 2008	Jul 2008	Aug 2008	Crop Year
Precipitation (inches)													Total
Current Year	1.76	0.26	0.07	0.31	0.17	0.69	0.12	0.35	3.01	3.57	1.16	0.74	12.21
93-Year Average (1916 to 2007-08)	1.15	0.66	0.42	0.44	0.43	0.33	0.54	0.97	1.78	2.57	1.42	1.19	11.89
Mean Temperature (°F)													Average
Current Year	57.3	48.0	33.6	21.1	18.2	20.6	34.6	39.7	53.1	60.4	69.8	68.6	43.7
93-Year Average (1916 to 2007-08)	56.1	45.9	30.0	19.7	15.3	20.0	30.0	43.6	54.1	61.8	69.2	67.3	42.8

Last killing frost in spring*

2008 _____ May 11th
Ave. 1916-2008 _____ May 13th

First killing frost in fall*

2008 _____ October 9th (21°)
Ave. 1916-2008 _____ September 19th

Frost free period

2008 _____ 151 days
Ave. 1916-2008 _____ 129 days

Growing degree days (base 50)

May 1-Oct 31, 2008 _____ 2220.5
Ave. 1951-2008 _____ 2384.8

Maximum summer temperature _____ 100° on August 8th
Minimum winter temperature _____ -29° on January 29th

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

Table 3. Summary of Climatic Data by Months for the 2007-2008 Crop Year - September 2007 - August 2008 and Averages for the period 1980-2008 at the Northwestern Agricultural Research Center Kalispell, Montana

ITEM	Sept. 2007	Oct. 2007	Nov. 2007	Dec. 2007	Jan. 2008	Feb. 2008	Mar. 2008	Apr. 2008	May 2008	June 2008	July 2008	Aug. 2008	Total or Average
Precipitation (inches) Current Year	1.28	1.11	1.02	1.13	1.31	0.76	0.61	0.9	2.33	3.65	3.8	1.15	19.05
Avg. 1980-81 to 2006-08	1.67	1.30	1.60	1.46	1.35	1.17	1.32	1.80	2.45	3.20	1.69	1.18	20.19
Average Temperature (F) Current Year	53.6	40.3	32.6	26.2	19.4	30.2	32.9	37.8	47.0	55.6	65.1	63.6	42.0
Avg. 1980-81 to 2007-2008	53.5	42.2	32.4	24.4	24.6	37.2	35.0	43.2	51.5	57.6	64.3	63.4	44.1
<u>Last killing frost in spring</u>													
Spring 2008	May 10 28°F												
Median for 1980-2008	May 20												
<u>First killing frost in fall</u>													
Fall 2008	Sept. 14 32°F												
Median for 1980-2008	Sept. 17 30°F												
Frost Free Period	126												
Avg. 1980-2008	119												
Growing Degree Days (base 50):	1,419.0 growing degree days, April - August 2008												
Growing Degree Days (base 40):	2,402.5 growing degree days, April - August 2008												
Growing Degree Days (base 32):	3,432.5 growing degree days, April - August 2008												
Maximum summer temperature	96°F August 19												
Minimum winter temperature	-22°F January 21												

In this summary 32 degrees is considered a killing frost.

Table 4. Summary of climatic data by months for the 2007-2008 cropping year (September-August) compared to averages for the period of record from 1911 to 2005 at the Southern Agricultural Research Center near Huntley, Montana.

	2007				2008								Year
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	
<u>Precipitation (inches)</u>													<u>Total</u>
Current Year (2007-2008)	1.40	2.06	0.55	0.14	0.33	0.10	0.21	0.22	5.44	0.43	1.32	0.45	12.65
Average (1911-2005)	1.29	1.04	0.63	0.59	0.55	0.46	0.78	1.35	2.09	2.38	1.15	0.92	13.22
Difference	+0.11	+1.02	-0.08	-0.45	-0.22	-0.36	-0.57	-1.13	+3.35	-1.95	+0.17	-0.47	-0.57
<u>Mean Temperature (°F)</u>													<u>Average</u>
Current Year (2007-2008)	60.7	48.7	36.5	26.5	21.5	30.2	37.0	42.1	54.4	62.2	72.0	70.6	46.9
Average (1911-2005)	57.8	46.9	33.5	23.9	20.4	25.4	33.8	45.5	54.9	63.3	70.5	68.6	45.4
Difference	+2.9	+1.8	+3.0	+2.6	+1.1	+4.8	+3.2	-3.4	-0.5	-1.1	+1.5	+2.0	+1.5

∞	<u>Last Killing Frost in Spring</u> ^{1/}	2008	May 3 (26 °F)
		Average (1911-2005)	May 16
	<u>First Killing Frost in the Fall</u> ^{1/}	2008	September 8 (32 °F)
		Average (1911-2005)	September 19
	<u>Frost-free period</u>	2008	127 days
		Average (1911-2005)	125 days
	<u>Growing Degree Days (Base 50)</u> ^{2/}	2008	1,910 GDD (°F)
		Average (1911-2005)	1,865 GDD (°F)
	<u>Growing Degree Days (Base Corn)</u> ^{2/}	2008	1,934 GDD (°F)
		Average (1911-2005)	1,997 GDD (°F)
	<u>Maximum Summer Temperature</u>	105 °F on August 26, 2008	
	<u>Minimum Winter Temperature</u>	-18 °F on January 29, 2008	

1/ In this summary, 32 °F is considered a killing frost. Average last and first killing frost dates are calculated on a 50% probability of a minimum temperature occurring below a threshold temperature of 32.5 °F based on observations from 1911 to 2005.

2/ Growing degree days calculated from temperatures observed during the frost free period from May 4 through September 8 for 2008, and for the same 127 day interval from the period of record of 1911 to 2005.

Table 5. Summary of climatic data by months for the 2007-2008 crop year (September to August) and averages for the period 1986-2008 at the Western Triange Agricultural Research Center, Conrad, Montana.

Month Year	Sep 2007	Oct 2007	Nov 2007	Dec 2007	Jan 2008	Feb 2008	Mar 2008	Apr 2008	May 2008	Jun 2008	Jul 2008	Aug 2008	Crop Year
Precipitation (inches)													Total
Current Year	2.51	0.56	0.00	0.06	0.19	0.14	0.19	0.35	4.11	2.43	0.90	0.45	11.89
23-Year Average (1986 to 2007-08)	1.17	0.61	0.29	0.16	0.18	0.22	0.44	0.94	1.84	2.91	1.30	1.26	11.31
Mean Temperature (°F)													Average
Current Year	54.4	45.9	33.8	23.8	19.3	25.5	33.6	37.2	50.8	57.8	66.9	66.3	42.9
23-Year Average (1986 to 2007-08)	56.9	45.2	32.2	25.2	23.2	24.9	33.4	43.4	52.4	59.8	67.2	66.2	44.2

Last killing frost in spring*

2008 _____ June 12th
Ave. 1986-2008 _____ May 18th

First killing frost in fall*

2008 _____ October 9th
Ave. 1986-2008 _____ September 23rd

Frost free period

2008 _____ 119 days
Ave. 1986-2008 _____ 129 days

Maximum summer temperature _____ 95° on July 1st and August 19th

Minimum winter temperature _____ -25° on January 29th

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

**Table 6. Contact Information for Industry Seed Sources of Twelve Camelina Lines Tested near Conrad, Havre, Huntley, Kalispell and Moccasin, MT. 2008.
(Exps. 08-CM18-CM, 08-CM02-CM, 08-CM08-CM, 08-CM05-CM and 08-CM07-CM).**

COMPANY	LINES TESTED	CONTACTS	CONTACTS
Great Plains Oil & Exploration The Camelina Company	GP07 GP11 GP42 GP48 GP67 GP69	Mr. Sam Huttenbauer, Jr Chief Development Officer 1 Enfield Street Cincinnati, OH 45218 PH: 1-513-825-8770 FX: 1-513-825-8830 EM: shuttenbauer@gpo-e.com	Dr. Duane Johnson VP, Agricultural Development 6850 HWY 35 Bigfork, MT 59911 PH: 1-406-471-0671 FX: EM: duane@camelinacompany.com
Sustainable Oils, LLC	SO-1 SO-2 SO-3 SO-4 SO-5 SO-6	Mr. Jack Kiser Research Manager 2815 Eastlake Ave. East Suite 300 Seattle, WA 98102 PH: 1-503-750-3776 FX: 1-503-758-3993 EM: jack.kiser@susoils.com	Mr. Mike Waring Territory Sales Manager 2907 9th Street N.E. Great Falls, MT 59404 PH: 1-406-788.2433 FX: 1-406-761-7213 EM: mike.waring@susoils.com

Table 7. 08CM07: Moccasin Tilled, Fallow, Dryland Statewide Camelina Trial, 2008. Central Agricultural Research Center.

ID	Sponsor	Plant	Plant	Grain	Test	Grain	Flowering Date		Maturity Date		Plant	Pod	Lodging	Grain	Grain
		Stand	Count	Yield	Weight	Moisture	Julian	Calendar	Julian	Calendar	Height	Shatter		Protein	Oil
		%	/ sq ft	lb/ac	lb/bu	%	day	date	day	date	inches	%	0-9	%	%
Blaine Creek	MSU - Check	-	1.6	303	-	4.1	-	-	-	-	26.2	-	-	26.9	39.7
Calena	MSU - Check	-	3.0	458	-	4.2	-	-	-	-	24.0	-	-	27.9	39.4
GP07	Great Plains	-	3.0	337	-	4.0	-	-	-	-	23.0	-	-	30.3	40.0
GP11	Great Plains	-	2.4	421	-	4.1	-	-	-	-	24.5	-	-	27.7	39.6
GP42	Great Plains	-	2.7	387	-	4.0	-	-	-	-	27.2	-	-	27.1	40.6
GP48	Great Plains	-	3.6	474	-	4.0	-	-	-	-	27.2	-	-	26.4	40.7
GP67	Great Plains	-	2.1	574	-	4.1	-	-	-	-	26.4	-	-	26.6	40.5
GP69	Great Plains	-	3.2	499	-	4.1	-	-	-	-	26.1	-	-	28.6	39.1
Ligena	MSU - Check	-	2.1	376	-	3.9	-	-	-	-	25.3	-	-	28.2	40.2
SO-1	Sustainable Oils	-	2.6	511	-	3.9	-	-	-	-	27.1	-	-	27.0	41.5
SO-2	Sustainable Oils	-	2.4	470	-	3.9	-	-	-	-	25.7	-	-	28.4	40.1
SO-3	Sustainable Oils	-	2.4	476	-	4.1	-	-	-	-	26.5	-	-	28.2	39.2
SO-4	Sustainable Oils	-	2.6	339	-	4.1	-	-	-	-	23.5	-	-	28.1	39.8
SO-5	Sustainable Oils	-	2.3	346	-	3.9	-	-	-	-	24.6	-	-	27.8	40.6
SO-6	Sustainable Oils	-	2.9	345	-	3.9	-	-	-	-	24.8	-	-	27.6	40.6
Suneson	MSU - Check	-	2.0	321	-	4.0	-	-	-	-	24.2	-	-	27.5	40.1
Average		-	2.5	415	-	4.0	-	-	-	-	25.4	-	-	27.8	40.1
LSD (p=0.05)		-	ns	ns	-	0.2	-	-	-	-	ns	-	-	1.5	1.2
CV % (S/Mean)*100		-	39.7	36.0	-	2.9	-	-	-	-	8.2	-	-	3.8	2.2

Grain yield, protein and oil is adjusted to 8 percent grain moisture content.

Percent grain protein and oil content presented on a dry matter basis.

** 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.

ns denotes no significant difference between cultivars within a column at the 0.05 probability level.

Seeded: 3/23/2008, Tilled Fallow

Fertilizer: 30 lbs top dress N

Weed Control: Hand weeding

Harvested: 8-Aug-08

Table 8. 08CM02: Havre No-till, Fallow, Dryland Statewide Camelina Trial, 2008. Northern Agricultural Research Center.

ID	Sponsor	Plant	Plant	Grain	Test	Grain	Flowering Date		Maturity Date		Plant	Pod	Lodging	Grain	Grain
		Stand	Count	Yield	Weight	Moisture	Julian	Calendar	Julian	Calendar	Height	Shatter		Protein	Oil
		%	/ sq ft	lb/ac	lb/bu	%	day	date	day	date	inches	%	0-9	%	%
Blaine Creek	MSU - Check	97.2	6.0	2,342 **	52.3	4.5	156.0	Jun 4	203.0	Jul 21	33.4	1.0	0.0	30.3	37.1
Calena	MSU - Check	95.1	5.1	2,106	53.2	4.6	158.5	Jun 7	203.5	Jul 22	34.5	5.5	0.0	28.5	38.3
GP07	Great Plains	93.8	5.5	1,939	52.4	4.4	154.5	Jun 3	202.5	Jul 21	29.8	0.5	0.0	32.5	36.9
GP11	Great Plains	97.2	4.9	2,121 *	53.2	4.4	154.5	Jun 3	202.5	Jul 21	33.8	3.0	0.0	29.6	37.5
GP42	Great Plains	94.8	4.8	2,096	52.3	4.7	155.5	Jun 4	202.5	Jul 21	34.9	3.0	0.0	29.6	36.5
GP48	Great Plains	97.2	5.5	2,139 *	52.9	4.5	157.0	Jun 5	203.5	Jul 22	34.2	3.0	0.0	29.3	36.4
GP67	Great Plains	89.6	5.9	1,919	51.9	4.5	157.5	Jun 6	203.0	Jul 21	32.8	5.5	0.0	29.4	38.0
GP69	Great Plains	96.9	6.0	1,843	53.3	4.6	155.5	Jun 4	202.0	Jul 20	35.7	12.5	0.0	30.1	36.9
Ligena	MSU - Check	94.4	5.3	2,209 *	51.2	4.6	157.5	Jun 6	206.0	Jul 24	32.2	3.0	0.0	29.4	37.3
SO-1	Sustainable Oils	98.3	5.2	2,099	52.6	4.5	154.5	Jun 3	202.5	Jul 21	35.0	3.0	0.0	28.5	38.8
SO-2	Sustainable Oils	97.9	4.9	2,230 *	53.1	4.5	155.0	Jun 3	204.5	Jul 23	36.0	1.0	0.0	28.4	39.0
SO-3	Sustainable Oils	97.6	5.2	2,168 *	51.8	4.5	154.5	Jun 3	204.0	Jul 22	36.9	5.0	0.0	29.5	37.7
SO-4	Sustainable Oils	97.2	5.9	2,001	52.0	4.5	154.5	Jun 3	204.0	Jul 22	32.2	3.0	0.0	29.4	37.1
SO-5	Sustainable Oils	95.8	5.1	2,201 *	53.2	4.5	157.5	Jun 6	204.0	Jul 22	36.6	3.0	0.0	28.9	37.9
SO-6	Sustainable Oils	94.4	5.8	2,043	51.9	4.4	155.5	Jun 4	204.0	Jul 22	34.5	5.0	0.0	29.2	37.8
Suneson	MSU - Check	95.8	5.6	2,095	52.7	4.5	154.5	Jun 3	203.0	Jul 21	34.8	5.0	0.0	29.6	37.8
Average		95.8	5.4	2,097	52.5	4.5	155.8	Jun 4	203.4	Jul 21	34.2	3.9	0.0	29.5	37.6
LSD (p=0.05)		ns	ns	226	ns	ns	1.9	-	ns	-	2.6	4.5	-	0.8	ns
CV % (S/Mean)*100		2.2	16.5	5.1	1.2	4.7	0.6	-	0.6	-	3.5	53.9	-	1.3	2.6

Grain yield, protein and oil is adjusted to 8 percent grain moisture content.

Percent grain protein and oil content presented on a dry matter basis.

** 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.

ns denotes no significant difference between cultivars within a column at the 0.05 probability level.

Seeding Date: March 13, 2008
 Harvest Date: July 31, 2008
 Fertility: None
 Herbicide: None
 Precip (Apr 1- July 31): 8.09"

Table 9. Site Resource and Management Data: HAVRE ONLY (Exp. 08-CM02-CM)								
Field	A-7-2	K (ppm) 0-6	358	Init PAW (in.) 0-6"	0.47	Fert. Rate (lbs/ac) P2O5	n/a	
Quarter	NW	Ca (ppm) 0-6	3461	Init PAW (in.) 6-24"	2.07	Fert. Rate (lbs/ac) K2O	n/a	
Section	33	Mg (ppm) 0-6	562	Init PAW (in.) 24-36"	1.69	Herbicide App. Date	none	
Township	32N	Na (ppm) 0-6	19	Init PAW (in.) 36-48"	1.75	Herbicide Product	n/a	
Range	15E	SaltHaz (MMHOS/cm) 0-6	0.54	Init PAW (in.) 0-48"	5.99	Herbicide Rate (/ac)	n/a	
Latitude	N48 29.616'	SaltHaz(MMHOS/cm) 6-24	0.57	Cropping System	NT-ChmFlw	Precip (in.) Plnt'g-Harvest	8.18	
Longitude	W109 47.987'	S (ppm) 0-24	146	Previous Crop	SB	Precip (>.1) Plnt'g-Harvest	7.51	
Soil Series	Scobey CLm	Zn (ppm) 0-6	0.53	Planting Date	3/13	Harvest Date	7/31	
pH 0-6	8.0	Fe (ppm) 0-6	8.50	Planting Depth (in.)	0.125	Rooting Depth (in.)	30"	
Org.Matter (%) 0-6	1.0	Mn (ppm) 0-6	2.93	Moist Soil Depth @ Plnt'g	48+	Post PAW (in.) 0-6"	0.47	
N (lbs/ac) 0-6	82	Cu (ppm) 0-6	0.98	Dry Surf Soil (in.) @ Plnt'g	1.0	Post PAW (in.) 6-24"	2.07	
N (lbs/ac) 6-24	162	CEC 0-6	22.90	2" Soil Temp (°F) @ Plnt'g	56	Post PAW (in.) 24-36"	1.69	
N (lbs/ac) 24-36	58	Soil Texture 0-6	CL	4" Soil Temp (°F) @ Plnt'g	44	Post PAW (in.) 36-48"	1.75	
N (lbs/ac) 36-48	76	Soil Texture 6-24	CL	Fertilizer Formulation	none	Post PAW (in.) 0-48"	5.99	
N (lbs/ac) 0-48	378	Soil Texture 24-36	CL	Fertilizer Placement	n/a	Precip (>.1) Hvst-Post	0.00	
P (ppm) Olsen 0-6	37	Soil Texture 36-48	CL	Fert. Rate (lbs/ac) N	n/a			

Table 10. 08CM05: Kalispell Tilled, Re-crop, High Rainfall Dryland Statewide Camelina Trial, 2008. Northwestern Agricultural Research Center.

ID	Sponsor	Plant Stand %	Plant Count / sq ft	Grain Yield lb/ac	Test Weight lb/bu	Grain Moisture %	Flowering Date		Maturity Date		Plant Height inches	Pod Shatter %	Lodging 0-5	Grain Protein %	Grain Oil %
							Julian	Calendar	Julian	Calendar					
Blaine Creek	MSU - Check	-	4.9	999	51.4	7.8	167	Jun 15	207	Jul 25	34.8	-	1.0	22.1	40.8
Calena	MSU - Check	-	4.6	1,139	51.6	8.4	167	Jun 15	207	Jul 25	38.3	-	1.8	20.8	41.8
GP07	Great Plains	-	4.3	867	50.6	7.8	165	Jun 13	207	Jul 25	35.5	-	1.3	22.1	40.6
GP11	Great Plains	-	4.6	955	51.8	7.6	165	Jun 13	207	Jul 25	38.0	-	1.0	21.5	40.8
GP42	Great Plains	-	4.5	960	51.7	7.3	167	Jun 15	207	Jul 25	37.0	-	1.0	21.8	41.4
GP48	Great Plains	-	4.8	1,014	51.8	7.5	165	Jun 13	207	Jul 25	39.0	-	1.0	21.4	41.0
GP67	Great Plains	-	5.3	875	51.2	8.0	166	Jun 14	207	Jul 25	36.5	-	1.3	21.5	41.0
GP69	Great Plains	-	4.0	876	49.5	8.3	167	Jun 15	207	Jul 25	36.5	-	1.5	21.6	40.8
Ligena	MSU - Check	-	3.8	970	51.4	8.1	166	Jun 14	207	Jul 25	37.5	-	1.8	21.4	40.8
SO-1	Sustainable Oils	-	3.6	883	51.6	8.0	166	Jun 14	208	Jul 26	36.3	-	1.0	20.9	41.2
SO-2	Sustainable Oils	-	2.8	983	51.9	7.8	166	Jun 14	207	Jul 25	38.3	-	1.0	21.0	41.8
SO-3	Sustainable Oils	-	4.8	898	51.3	7.8	166	Jun 14	207	Jul 25	39.0	-	1.5	20.7	41.3
SO-4	Sustainable Oils	-	2.7	886	51.5	8.0	165	Jun 13	208	Jul 26	34.3	-	1.8	21.3	40.8
SO-5	Sustainable Oils	-	3.0	1,019	51.5	7.9	167	Jun 15	207	Jul 25	36.8	-	1.0	21.4	40.9
SO-6	Sustainable Oils	-	4.1	1,038	50.9	8.1	166	Jun 14	207	Jul 25	37.8	-	1.0	21.2	40.8
Suneson	MSU - Check	-	7.3	907	52.5	7.8	165	Jun 13	207	Jul 25	37.5	-	1.0	21.1	41.4
Average		-	4.3	954	51.4	7.9	167	Jun 14	207	Jul 25	37.0	-	1.2	21.4	41.1
LSD (0.05)		-	ns	ns	1.4	ns	ns	-	ns	-	ns	-	ns	-	-
CV % (S/Mean)*100		-	40.4	17.8	1.9	8.5	0.0	-	0.0	-	6.2	-	49.9	-	-

Grain yield is adjusted to 8 percent grain moisture content.

/1 Lodging Severity: 1=upright, 5=flat.

ns denotes no significant difference between cultivars within a column at the 0.05 probability level.

Seeding Date: 4/9/08

Harvest Date: 8/7/08

Fertilizer: 3/31/08 - 11 lbs/a N, 52 lbs/a P₂O₅ (PPI)

Pesticide: 4/4/08 - Pursuit 5 oz/a (PPI)

Crop Year Precip (9/07-8/08): 16.78"

MaxTemp: 97.2°F - 8/17/08

MinTemp: -22.0°F -1/08

GrowingDegreeDays(base 50): Apr-Aug, 1447.3

Table 11. 08CM08: Huntley No-till, Fallow, Dryland Statewide Camelina Trial, 2008. Southern Agricultural Research Center.

ID	Sponsor	Plant Stand	Plant Count	Grain Yield	Test Weight	Grain Moisture	Flowering Date		Maturity Date		Plant Height	Pod Shatter	Lodging	Grain Protein	Grain Oil
							Julian	Calendar	Julian	Calendar					
		%	/ sq ft	lb/ac	lb/bu	%	day	date	day	date	inches	%	0-9	%	%
Blaine Creek	MSU - Check	-	8.2	1,515 *	51.2	5.6	156.0	Jun 4	193.3	Jul 11	33.8	0.0	0.0	27.6	35.7
Calena	MSU - Check	-	8.3	1,449 *	51.5	6.3	155.8	Jun 3	193.3	Jul 11	33.6	0.0	0.0	28.3	34.0
GP07	Great Plains	-	8.3	1,401	51.7	5.6	154.8	Jun 2	192.3	Jul 10	31.1	0.0	0.8	29.4	35.5
GP11	Great Plains	-	8.7	1,402	52.1	5.6	155.5	Jun 3	193.3	Jul 11	32.8	0.0	1.3	29.1	34.0
GP42	Great Plains	-	8.4	1,554 *	52.2	5.8	155.5	Jun 3	193.8	Jul 11	35.2	0.0	0.5	27.8	34.7
GP48	Great Plains	-	8.0	1,646 **	51.2	6.3	155.8	Jun 3	194.0	Jul 12	34.2	0.0	0.8	28.1	33.6
GP67	Great Plains	-	8.7	1,546 *	50.5	5.8	155.5	Jun 3	193.3	Jul 11	34.3	0.0	0.5	28.4	34.3
GP69	Great Plains	-	8.9	1,321	52.1	5.9	156.3	Jun 4	193.0	Jul 11	32.4	0.0	0.0	29.1	34.1
Ligena	MSU - Check	-	8.1	1,588 *	49.7	7.7	156.3	Jun 4	194.5	Jul 12	34.5	0.0	1.0	27.7	33.5
SO-1	Sustainable Oils	-	7.8	1,322	51.1	5.5	155.3	Jun 3	192.3	Jul 10	31.7	0.0	0.5	27.3	35.3
SO-2	Sustainable Oils	-	7.9	1,375	51.5	7.4	156.0	Jun 4	194.0	Jul 12	33.5	0.0	0.8	27.3	33.6
SO-3	Sustainable Oils	-	7.5	1,402	49.6	7.5	156.5	Jun 4	193.5	Jul 11	34.0	0.0	0.3	27.1	33.8
SO-4	Sustainable Oils	-	7.7	1,319	50.2	6.1	155.8	Jun 3	193.5	Jul 11	31.5	0.0	1.3	28.2	34.1
SO-5	Sustainable Oils	-	9.0	1,437	51.8	6.4	156.3	Jun 4	194.3	Jul 12	34.6	0.0	0.0	26.7	34.5
SO-6	Sustainable Oils	-	7.7	1,299	50.6	5.8	155.5	Jun 3	193.0	Jul 11	33.2	0.0	0.8	27.1	34.8
Suneson	MSU - Check	-	8.5	1,383	52.5	6.2	155.8	Jun 3	193.0	Jul 11	33.4	0.0	1.0	28.3	34.0
Average		-	8.2	1,435	51.2	6.2	155.8	Jun 3	193.4	Jul 11	33.4	0.0	0.6	28.0	34.3
PLSD (p=0.05)		-	ns	202	0.9	ns	ns	-	0.7	-	2.4	-	ns	1.2	0.8
CV % (S/Mean)*100		-	11.2	9.9	1.2	18.0	0.4	-	0.3	-	5.1	-	109.9	3.0	1.7

Grain yield is adjusted to 8 percent grain moisture content.

Percent grain protein and oil content presented on a dry matter basis.

Lodging visually estimated on a score from 0 to 9 (0=none, 9=all plants flat).

** 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.

ns denotes no significant difference between cultivars within a column at the 0.05 probability level.

Planted - March 12, 2008

Harvested - July 22, 2008

Fertility - 100 N-40 P2O5-20 K2O, ppi, 11/14/07

Herbicide - Roundup Ultra, 16 oz/ac; Prowl EC, 16 oz/ac, March 20, 2008

(It took a while for the camelina to germinate, so field was sprayed for weeds pre-emergence.)

Insecticide - none

Previous crop - chem. fallow

Irrigation - none

Precipitation - 7.1 inches

Table 12. 08CMxx: Statewide Camelina Yield Trial Summary for Central, Northern, Northwestern, Southern and Western Triangle Agricultural Research Centers. 2008.

ID	Sponsor	CARC	NARC	NWARC	SARC	WTARC
		Grain Yield	Grain Yield	Grain Yield	Grain Yield	Grain Yield
		lb/ac	lb/ac	lb/ac	lb/ac	lb/ac
Blaine Creek	MSU - Check	303	2342**	999	1515*	
Calena	MSU - Check	458	2,106	1,139	1449*	trial
GP07	Great Plains	337	1,939	867	1,401	abandoned
GP11	Great Plains	421	2121*	955	1,402	
GP42	Great Plains	387	2,096	960	1554*	
GP48	Great Plains	474	2139*	1,014	1646**	
GP67	Great Plains	574	1,919	875	1546*	
GP69	Great Plains	499	1,843	876	1,321	
Ligena	MSU - Check	376	2209*	970	1588*	
SO-1	Sustainable Oils	511	2,099	883	1,322	
SO-2	Sustainable Oils	470	2230*	983	1,375	
SO-3	Sustainable Oils	476	2168*	898	1,402	
SO-4	Sustainable Oils	339	2,001	886	1,319	
SO-5	Sustainable Oils	346	2201*	1,019	1,437	
SO-6	Sustainable Oils	345	2,043	1,038	1,299	
Suneson	MSU - Check	321	2,095	907	1,383	
Average		415	2,097	954	1,435	
LSD (p=0.05)		ns	226	ns	202	
CV%		36.0	5.1	17.8	9.9	

Grain yield is adjusted to 8 percent grain moisture 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.

ns denotes no significant difference between cultivars within a column at the 0.05 probability level.