

Project Title: Statewide Camelina Variety Evaluation
Project Leader: Heather Mason
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Project Objective: To evaluate seed yield and agronomic performance of 15 camelina varieties in northwestern Montana.

Results:

Fifteen camelina varieties were included in the 2011 statewide evaluations; six commercially available varieties, four varieties developed by Sustainable Oils (SO) and three varieties developed by Great Plains-The Camelina Company (GP) (Table 1). Camelina was seeded on April 26, 2011 into Creston sandy loam at a rate of 4 lb/a and at a depth of 0.5 in under conventional tillage and dryland conditions. Fertilizer (150-30-120-24) was broadcast and incorporated prior to planting. The plots were direct combine harvested on August 15, 2011.

Good camelina stand establishment was obtained with an average of 30 plants/ft². The time to flowering for camelina varieties averaged 63 days after planting (June 28), with the crop reaching average harvest maturity approximately 35 days later (August 2), a total of 98 days after planting. Plant height averaged 42.0 inches, ranging from 38.8 to 43.8 inches. There was little to no shatter observed in the entire evaluation. Lodging was minimal, with an average of 1.3, ranging from 1.0 to 1.8 (on a scale of 0-9).

Differences in seed yield and test weight were significant among varieties included in this year's evaluation. On average, camelina yielded 2,303 lb/ac, and test weights were 51.8 lb/bu. The three highest yielding varieties were GP-10 (50.1 bu/ac), GP-42 (49.7 bu/ac), and Blaine Creek (48.5 bu/ac). Differences in oil yield and content among varieties were also significant. Average oil yield among all varieties was 778 lb/a. The three highest oil yielding varieties were GP-10 (895 lb/ac), GP-42 (873 lb/ac), and Blaine Creek (865 lb/ac). Oil content of camelina seed averaged 33.8%, ranging from 32.7% to 34.6%.

Fatty acid composition of varieties differed for all variables (Table 2). Overall, camelina oil was comprised of approximately 48% polyunsaturated fat, 39% monounsaturated fat and 9% saturated fat.

Summary:

Camelina seed yields in 2011 (2303 lb/ac) are comparable with those from 2010 (2313 lb/ac). Above average precipitation and cooler temperatures may have helped to increase the length of the seed-filing period, resulting in higher camelina seed yield.

Future Plans:

With continued variety development and release, evaluations will be conducted in order to identify varieties best suited to northwest Montana.

2011 Statewide Camelina Variety Evaluation Kalispell, MT

Seed Date:	04/26/2011	Soil Type:	Sandy loam	Harvest Date:	08/15/2011
Seeding Rate:	4 lb/ac in 6-in rows	Soil Test:	NA		
Previous Crop:	Barley	Fertilizer:	150-30-120-24 spring broadcast application		
Tillage:	Converntional	Herbicides:	None		
Irrigation:	None	Insecticides:	None		

Table 1. Performance of camelina varieties tested in the 2011 Montana Statewide Camelina Variety Evaluation at Northwestern Agricultural Research Center, Kalispell, MT

Variety	Seed Yield	Test Weight	Seed Yield	Oil	Oil Yield	Moisture	Protein	Plant Height	Lodging	Plant Count	Days to Flower	Harvest Maturity
	<i>lb / ac</i>	<i>lb / bu</i>	<i>bu / ac</i>	<i>%</i>	<i>lb / ac</i>	<i>%</i>	<i>%</i>	<i>in</i>	<i>0 - 9</i>	<i>per ft²</i>	<i>days after planting</i>	
GP-10	2633 ^{††}	52.6	50.1	33.9	895	7.2	27.0	44	2	35	63	98
GP-42	2609	52.4	49.7	33.5	873	7.1	26.8	43	2	30	63	98
Blaine Creek	2519	52.0	48.5	34.3	865	7.0	27.2	43	1	34	62	98
Calena	2409	52.2	46.2	34.2	824	6.6	26.9	40	1	33	62	98
C10-BZ-SB7-7	2373	52.1	45.5	33.9	802	7.1	27.4	42	1	27	66	98
GP-12	2351	51.5	45.6	34.4	808	6.3	27.8	39	1	34	62	98
Ligena	2333	51.5	45.4	33.6	782	7.5	27.3	43	2	29	63	98
SO-60	2331	51.2	45.5	32.7	760	7.8	26.9	41	1	27	60	98
Clearwater Hy 101	2267	51.4	44.1	34.0	771	7.2	26.7	41	1	34	63	98
SO-30	2233	52.4	42.6	33.4	746	7.2	26.7	44	2	25	64	98
SO-50	2181	52.2	41.8	33.4	727	6.9	27.0	42	1	25	64	98
Suneson	2172	52.2	41.7	34.0	736	6.9	27.1	42	2	26	62	98
SO-40	2148	51.0	42.1	33.8	726	7.0	26.9	44	1	34	63	98
C10-BZ-SB7-6	2048	50.1	40.9	34.6	708	6.3	27.1	40	2	27	62	98
Yellowstone	1911	51.6	37.0	33.2	631	7.3	28.2	44	2	22	65	98
Average	2303	51.8	44.5	33.8	778	7.0	27.1	42	1	30	63	98
LSD ($\alpha=0.05$)	332.2	0.68	6.34	0.86	55.1	0.72	0.50	5.6 ns	0.6 ns	31.8 ns	2.0	ns

Seed and oil yields, and test weights are adjusted to 8% moisture content.

Seed protein, seed oil and oil yield are reported on a dry matter basis.

^{††} Indicates highest yielding variety.

bold indicates varieties yielding equal to highest yielding variety based on Fisher's protected LSD at P< 0.05.

ns denotes non-significant effects.

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

Table 2. Fatty acid constituents of camelina varieties tested in the 2011 Montana Statewide Camelina Variety Evaluation at Northwestern Agricultural Center, Kalispell, MT

Variety	Palmitic Acid C16:0 %	Stearic Acid C18:0 %	Arachidic Acid C20:0 %	Behenic Acid C22:0 %	Oleic ³ Acid C18:1 %	Gadoleic ³ Acid C20:1 %	Erucic ³ Acid C22:1 %	Nervonic ³ Acid C24:1 %	Linoleic ² Acid C18:2 %	α -Linolenic ¹ Acid C18:3 %	Saturated %	Mono- unsaturated %	Poly- unsaturated %
Blaine Creek	4.10	2.3	2.0	0.4	19.3	17.5	3.8	0.6	12.0	37.6	8.5	40.1	46.9
C10-BZ-SB7-6	4.73	2.4	1.8	0.4	18.3	15.9	3.2	0.6	16.5	34.6	9.1	37.5	48.9
C10-BZ-SB7-7	4.20	2.3	1.9	0.4	18.2	17.6	3.6	0.6	12.8	38.1	8.4	38.4	48.4
Calena	4.42	2.3	2.0	0.4	18.1	17.1	3.7	0.6	13.9	36.6	8.7	38.1	48.5
Clearwater Hy 101	4.08	2.2	2.0	0.4	19.5	17.8	3.9	0.6	11.9	37.6	8.4	40.4	46.6
GP-10	4.35	2.2	2.0	0.4	19.2	17.6	3.7	0.6	13.9	36.2	8.8	39.3	47.4
GP-12	4.58	2.4	1.8	0.4	18.8	16.2	3.3	0.6	14.5	35.9	8.8	37.8	48.6
GP-42	4.48	2.2	2.1	0.4	18.8	17.4	3.7	0.6	14.5	35.5	8.9	38.7	47.8
Ligena	4.25	2.2	2.0	0.4	18.7	17.6	3.7	0.6	13.9	36.9	8.5	39.0	47.8
SO-30	4.44	2.2	2.2	0.5	18.8	17.6	3.9	0.6	14.2	35.6	8.8	38.9	47.7
SO-40	4.28	2.1	2.1	0.4	18.7	17.2	3.9	0.6	13.9	36.3	8.7	39.3	47.6
SO-50	4.63	2.3	2.1	0.4	18.9	17.4	3.7	0.6	14.7	34.8	9.0	38.5	48.0
SO-60	4.18	2.2	2.1	0.5	19.9	18.6	4.0	0.6	12.4	37.1	8.5	40.5	46.5
Suneson	4.39	2.2	2.0	0.4	18.9	17.0	3.6	0.6	14.1	36.2	8.7	38.9	47.8
Yellowstone	4.09	2.1	1.9	0.4	19.7	17.1	3.5	0.6	13.1	38.7	8.1	39.1	47.7
Average	4.35	2.2	2.0	0.4	18.9	17.3	3.7	0.6	13.8	36.5	8.7	38.9	47.8
LSD ($\alpha=0.05$)	0.28	0.09	0.10	0.02	0.71	1.00	0.28	0.03	1.65	1.37	0.33	1.31	1.03

Fatty acid composition reported on a dry matter basis of the whole seed.

^{1,2,3} Omega-3, omega-6 and omega-9 fatty acids, respectively.