

Project Title: Statewide Camelina Variety Evaluation - 2010

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Objective: To evaluate seed yield and agronomic performance of 18 camelina varieties in northwestern Montana.

#### Results:

Eighteen camelina varieties were included in the 2010 statewide evaluations; four commercially available varieties, six varieties developed by Sustainable Oils (SO) and five varieties developed by Great Plains-The Camelina Company (GP) (Table 1). Camelina was seeded on May 6, 2010 into Creston sandy loam at a rate of 5 lb/a and at a depth of 0.5 in under conventional tillage and dryland conditions. Fertilizer (27-30-120-24) was broadcast and incorporated prior to planting. The plots were direct combine harvested on September 7, 2010.

Good camelina stand establishment was obtained with an average of 28 plants/ft<sup>2</sup>. The time to flowering for camelina varieties averaged 50 days after planting (June 26), with the crop reaching average harvest maturity approximately 48 days later (August 12), a total of 98 days after planting. Plant height averaged 37.5 in, ranging from 35.0 to 39.3 in. Lodging and shatter were moderate, yet higher than in previous years due to above average in-season precipitation. Lodging averaged 5.8 (on a scale of 0-9) and shatter 21.9% (Table 1).

Differences in seed yield and test weight were significant among varieties included in this year's evaluation. On average, camelina yielded 2,313 lb/ac, and test weights were 52.5 lb/bu. The three highest yielding varieties were SO-9 (49.7 bu/ac), Ligena (48.4 bu/ac), and SO-5 (48.2 bu/ac). Differences in oil yield and content among varieties were also significant. Average oil yield among all varieties was 754 lb/ac. The three highest oil yielding varieties were SO-9 (858 lb/ac), SO-5 (827 lb/ac), and GP-10 (819 lb/ac). Oil content of camelina seed averaged 32.6%, ranging from 31.8% to 33.7%.

Fatty acid composition of varieties differed for all variables (Table 2). Overall, camelina oil was comprised of approximately 46% polyunsaturated fat, 42% monounsaturated fat and 7% saturated fat.

#### Summary:

Camelina seed yields were slightly higher than in 2009 (2,106 lb/a) despite an increase in lodging and shatter. 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 this growing region.

Table 1. Seed yield and agronomic characteristics of varieties grown in the 2010 Statewide Camelina Variety Evaluation at Northwestern Agricultural Research Center, Kalispell, MT.

Variety	Seed Yield <i>bu/ac</i>	Seed Yield <i>lb/ac</i>	Oil Yield <i>lb/ac</i>	Test Weight <i>lb/bu</i>	Protein <i>%</i>	Oil <i>%</i>	Moisture <i>%</i>	Shatter <i>%</i>	Plant Height <i>in</i>	Lodging <i>0-9</i>	Plant Count <i>per ft<sup>2</sup></i>	Days to Flower <i>days after planting</i>	Harvest Maturity <i>days after planting</i>
SO-9	<b>49.7</b> <sup>++</sup>	2629	858	52.94	27.08	32.6	9.0	23.8	38.8	5.5	24	51	99
Ligena	<b>48.4</b> <sup>+</sup>	2509	806	51.88	27.58	32.2	9.2	17.5	38.3	6.3	25	52	102
SO-5	<b>48.2</b> <sup>+</sup>	2562	827	53.18	27.26	32.3	9.2	21.3	38.8	5.8	29	51	98
SO-7	<b>47.3</b> <sup>+</sup>	2445	795	51.74	26.97	32.5	9.6	16.3	39.0	5.5	18	51	101
SO-8	<b>47.1</b> <sup>+</sup>	2453	792	52.06	27.19	32.3	9.5	27.5	37.0	5.5	26	50	100
GP-10	<b>46.6</b> <sup>+</sup>	2479	819	53.24	27.21	33.1	9.1	25.0	37.8	6.0	31	51	98
Blaine Creek	<b>44.9</b> <sup>+</sup>	2372	777	52.85	27.20	32.9	9.6	21.3	37.5	4.8	28	51	96
Calena	<b>44.9</b> <sup>+</sup>	2374	755	52.90	27.36	32.0	9.2	18.8	37.3	5.8	33	51	100
GP-07	44.0	2286	769	51.93	28.05	33.7	8.7	11.3	35.0	4.5	29	44	94
GP-43	43.7	2333	770	53.36	27.18	33.0	9.1	23.8	37.8	6.3	32	51	96
GP-69	43.1	2253	724	52.23	27.32	32.1	9.7	25.0	36.8	6.0	27	50	95
GP-12	43.0	2274	730	52.87	27.70	32.1	9.2	28.8	36.5	5.8	25	52	97
GP-42	42.8	2274	746	53.07	27.13	32.8	9.0	21.3	39.3	6.0	29	50	99
Suneson	41.4	2216	703	53.55	27.57	31.8	9.4	21.3	38.5	6.3	29	51	98
SO12	40.8	2133	699	52.33	27.05	32.7	9.3	22.5	38.8	6.0	35	53	103
SO-11	40.5	2078	687	51.34	27.02	33.1	9.1	25.0	36.5	6.3	25	50	96
GP-68	39.4	2056	669	52.13	27.55	32.6	9.2	23.8	37.0	5.8	27	50	96
GP-73	36.8	1909	641	51.93	26.90	33.6	9.0	21.3	35.5	5.8	30	44	95
Average	44.0	2313	754	52.53	27.29	32.6	9.2	21.9	37.5	5.8	28	50	98
F test	**	**	**	**	*	**	**	**	**	*	<i>ns</i>	**	**
LSD	5.12	269.1	90.8	0.413	0.584	0.98	0.40	6.07	1.83	0.99	10.6	1.5	2.9

( $\alpha=0.05$ )  
Seed and oil yields, and test weights are adjusted to 8% moisture content. Grain protein, grain oil and oil yield are reported on a dry matter basis.

<sup>++</sup> Indicates highest yielding variety

<sup>+</sup> Indicates varieties yielding equal to the highest yielding variety based on Fisher's protected LSD at the 0.05 probability level.

\*\*\* Effects are significant at  $P<0.05$ ,  $P<0.01$ , respectively; *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 composition of the varieties grown in the 2010 Statewide Camelina Variety Evaluation.

Variety	Saturated	Mono-unsaturated	Poly-unsaturated	Palmitic Acid C16:0	Stearic Acid C18:0	Oleic Acid C18:1	Linoleic Acid C18:2	$\alpha$ -Linolenic Acid C18:3	Arachidic Acid C20:0	Gadoleic Acid C20:1	Behenic Acid C22:0	Erucic Acid C22:1	Nervonic Acid C24:1
	%	%	%	%	%	%	%	%	%	%	%	%	%
Blaine Creek	7.2	<b>43.3<sup>+</sup></b>	44.4	3.2	2.0	21.5	5.2	43.1	1.9	20.3	0.5	4.4	0.5
Calena	7.3	41.2	46.2	3.5	2.0	20.1	7.4	42.4	1.9	19.9	0.4	4.3	0.5
GP-07	6.9	38.8	<b>48.4<sup>++</sup></b>	3.3	2.0	17.8	8.2	43.8	1.8	19.0	0.4	4.0	0.6
GP-10	<b>7.6</b>	41.3	45.9	3.6	2.0	20.2	7.9	40.9	1.9	19.6	0.5	4.3	0.5
GP-12	7.3	41.9	45.5	3.6	2.1	21.4	7.1	42.1	1.7	19.6	0.4	4.1	0.5
GP-42	<b>7.8<sup>++</sup></b>	40.6	46.5	3.7	2.0	19.7	9.4	40.2	2.0	19.3	0.5	4.2	0.5
GP-43	<b>7.6<sup>+</sup></b>	41.8	45.5	3.5	2.0	20.6	7.6	41.2	2.0	19.8	0.5	4.3	0.5
GP-68	7.5	<b>43.2<sup>+</sup></b>	44.4	3.4	2.0	21.6	6.1	41.7	1.9	19.9	0.5	4.5	0.5
GP-69	7.0	<b>43.7<sup>++</sup></b>	44.2	3.2	2.0	22.0	4.9	43.4	1.9	20.5	0.5	4.4	0.4
GP-73	7.5	42.3	45.1	3.4	2.0	20.4	7.5	41.6	2.0	20.1	0.5	4.4	0.5
Ligena	7.4	40.7	46.5	3.6	2.0	19.8	8.3	41.5	2.0	19.6	0.4	4.3	0.5
SO-11	<b>7.7<sup>+</sup></b>	41.3	46.0	3.7	2.1	20.3	9.2	40.4	1.8	19.2	0.4	4.2	0.5
SO-12	7.4	41.0	46.1	3.7	2.1	20.9	7.9	41.2	1.8	19.6	0.4	4.0	0.5
SO-5	<b>7.6<sup>+</sup></b>	41.3	46.0	3.6	1.9	20.1	8.2	40.9	2.0	19.9	0.5	4.3	0.5
SO-7	7.3	42.6	45.0	3.3	1.9	20.6	7.3	41.9	2.1	20.1	0.5	4.6	0.5
SO-8	7.5	42.5	44.8	3.5	2.1	21.0	6.7	41.3	2.0	20.7	0.5	4.5	0.5
SO-9	<b>7.8<sup>++</sup></b>	41.4	45.7	3.8	2.1	20.6	8.2	40.1	2.0	20.0	0.5	4.3	0.5
Suneson	7.5	41.5	45.8	3.6	2.0	20.6	7.8	41.6	2.0	19.7	0.5	4.2	0.5
Average	7.4	41.7	45.7	3.5	2.0	20.5	7.5	41.6	1.9	19.8	0.5	4.3	0.5
F test	**	**	**	**	**	**	**	**	**	**	**	**	**
LSD ( $\alpha=0.05$ )	0.23	0.80	0.65	0.18	0.06	0.56	1.10	1.02	0.09	0.64	0.01	0.13	0.03

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

<sup>++</sup> Indicates highest yielding cultivar.

<sup>+</sup> Indicates cultivars yielding equal to the highest yielding cultivar based on Fisher's protected LSD at the 0.05 probability level.

\*\* Effects are significant at P<0.01.