

**PROJECT TITLE:** Evaluation of oilseed crop varieties under dryland recrop in central Montana.

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**OBJECTIVE:**

Determine the relative yield potential of varieties of canola, flax and safflower under recrop.

**METHODS:**

Entries are seeded in 5'x 14' plots using an RCB plot arrangement with 3-4 reps. Harvesting is accomplished by direct cutting with a self-propelled plot combine. Nitrogen fertilizer (N) rates were 90 lbs/a for canola, 66 lbs/a for flax, and 50 lbs/a for safflower.

**RESULTS:**

**Canola** was established on recrop under no-till and till plant at CARC and till plant at Moore. An irrigated nursery was established at WTARC, Conrad. Seeding into a drier till plant seed bed with a two week delay in top-dress fertilizer application drastically reduced till plant canola yields compared to no-till plant (Table 1). Mid-summer temperature extremes, including frost on June 26 and July 15, and below average precipitation at Moccasin severely stressed annual crops. The Moore location had near average growing conditions. However, Moore yields were probably lower than the potential with the seeding date being delayed until mid-May. Flowering date information is presented in tables 2 & 3. The Hyola lines were generally the higher yielding entries on both dryland and irrigation. Helix seed treatment appeared to enhance performance on dryland.

Blister beetles fed on some of the early maturing entries at Moccasin. Damage was undermined. Area producers experience blister beetle damage also. Conrad irrigated ave. 2931 lbs/a (Table 4).

**Flax** performance was reduced by frost and moisture stress at Moccasin and late seeding at Moore (Table 5). The frost caused some flower abortion and stimulated basal re-growth.

**Safflower** seed yields at Moccasin were reduced due to frost and a general lack of heat units. Severe moisture shortage severely limited yields at Geraldine. At Moccasin, early maturing selections weathered the mid-summer frost better than the oilseed varieties (Table 6 & 7).

**SUMMARY:**

**Canola** yield levels were near expectations at CARC considering the growing conditions and yields were similar to those obtained by area producers. Yields at Moore would have been enhanced with a earlier seeding date, as the producer, Paul Tyler, had yields around 1000 lbs per acre and higher. Irrigated yields at Conrad were near expected levels.

**Flax** results at the Moore location are probably more indicative of expected relative performance as the frost damage at Moccasin cannot be accurately assessed.

**Safflower** results illustrate how the crop responds to severe drought stress and cool seasons. The short season selections produced higher yields at CARC and show potential for selecting forage or birdseed type safflower for short season areas.

**FUTURE PLANS:**

Canola entries were all paid entries and the future of this nursery will be dependent on industry interest. Flax and safflower evaluation will continue one more year.

Table 1 1999 Spring canola variety performance on recrop at CARC and Moore.  
Exp. SC99 Central Agricultural Research Center, Moccasin, Montana.

ID	Variety	Company	CARC No-Till			CARC Till-Plant			Moore Till-Plant			3 Location Average		
			Grain Yield	Oil Cntnt	Oil Yield	Grain Yield	Oil Cntnt	Oil Yield	Grain Yield	Oil Cntnt	Oil Yield	Grain Yield	Oil Cntnt	Oil Yield
			lbs/a	%	lbs/a	lbs/a	%	lbs/a	lbs/a	%	lbs/a	%	lbs/a	
SC9931	Hyola401 Helix	Interstate	864	35.2	304	489	36.1	177	925	37.0	342	759.3	36.1	274.3
SC9925	Hyola223 RR B/G	Interstate	920	35.1	323	543	37.1	201	751	37.5	282	738.0	36.6	268.7
SC9929	Hyola401 B/G	Interstate	843	35.2	297	454	33.9	154	849	37.5	318	715.3	35.5	256.3
SC9928	Hyola308 B/G	Interstate	909	34.2	311	418	33.9	142	809	37.3	302	712.0	35.1	251.4
SC9930	Hyola401 Benalate	Interstate	765	34.6	265	462	35.1	162	797	38.5	307	674.7	36.1	244.6
SC9927	Hyola420 B/G	Interstate	725	36.7	266	375	36.1	135	828	38.4	318	642.7	37.1	239.8
SC9924	Hyola357 RR B/G	Interstate	768	34.8	267	487	36.7	179	633	37.8	239	629.3	36.4	228.4
SC9904	LG3369	LimaGrain	590	37.2	219	434	37.4	162	600	40.3	242	541.3	38.3	207.9
SC9921	CL2078	Cenex Seed	649	34.8	226	373	35.2	131	579	36.3	210	533.7	35.4	189.1
SC9932	IMC-105 BMX726	IMC	644	35.6	229	292	34.0	99	631	37.5	237	522.3	35.7	188.4
SC9918	Eagle	Integra	535	35.7	191	316	34.6	109	676	36.6	247	509.0	35.6	182.6
SC9902	Cavalier	Cargill	565	35.1	198	319	33.8	108	622	37.1	231	502.0	35.3	179.0
SC9915	70.1 Hybrid	Integra	559	37.2	208	273	36.4	99	671	37.4	251	501.0	37.0	186.1
SC9907	LG3235	LimaGrain	531	35.6	189	402	35.7	144	568	37.4	212	500.3	36.2	181.7
SC9935	IMC-108 BMX842	IMC	573	37.8	217	269	36.4	98	655	38.9	255	499.0	37.7	189.8
SC9903	LG3333	LimaGrain	540	35.7	193	301	35.5	107	637	38.8	247	492.7	36.7	182.3
SC9905	LG3275	LimaGrain	456	34.8	159	314	35.1	110	698	37.9	265	489.3	35.9	177.8
SC9919	Minot RR	Cenex Seed	590	36.7	217	313	36.0	113	562	38.2	215	488.3	37.0	181.3
SC9909	LG3345 (RR3665)	LimaGrain	525	36.1	190	282	35.2	99	657	38.3	252	488.0	36.5	180.1
SC9913	CrackerJack	Svalof Webull	538	36.3	195	268	35.3	95	647	37.3	241	484.3	36.3	177.1
SC9911	PR 5292	LimaGrain	519	35.6	185	311	36.0	112	619	38.9	241	483.0	36.8	179.2
SC9920	Hudson	Cenex Seed	572	35.3	202	327	36.1	118	539	38.4	207	479.3	36.6	175.6
SC9908	LG3311 (RR5269)	LimaGrain	513	36.2	186	320	37.2	119	600	38.5	231	477.7	37.3	178.6
SC9910	RR 5296	LimaGrain	580	35.9	208	245	34.1	84	594	36.3	216	473.0	35.4	169.1

Table 1 continued:

SC9934	IMC-107RR FID822	IMC	563	35.5	200	296	34.0	101	557	36.3	202	472.0	35.3	167.6
SC9923	Arrow RR B/G	Interstate	573	36.2	207	305	35.2	107	529	37.2	197	469.0	36.2	170.5
SC9906	LG3295	LimaGrain	534	35.3	189	261	34.0	89	575	37.0	213	456.7	35.4	163.3
SC9917	Advantage	Integra	601	35.5	213	240	35.2	84	484	36.8	178	441.7	35.8	158.6
SC9912	Ebony	LimaGrain	529	36.4	193	209	37.0	77	582	38.7	225	440.0	37.4	165.0
SC9922	Quest RR B/G	Interstate	526	36.3	191	236	35.9	85	554	38.1	211	438.7	36.8	162.2
SC9936	IMC-203RR BAZ850	IMC	502	36.1	181	276	35.5	98	536	37.2	199	438.0	36.3	159.5
SC9937	PIONEER 45A51RR	Pioneer	456	35.7	163	203	34.4	70	589	38.3	226	416.0	36.1	152.7
SC9916	Battleford	Integra	634	37.0	235	250	36.1	90	326	36.8	120	403.3	36.6	148.3
SC9926	Q2 B/G	Interstate	503	36.3	183	228	36.2	83	459	38.0	174	396.7	36.8	146.5
SC9933	IMC-106RR FID810	IMC	382	34.9	133	201	35.2	71	555	39.3	218	379.3	36.5	140.7
SC9914	SW Raider RR	Svalof We	459	35.8	164	188	35.4	67	451	37.9	171	366.0	36.4	133.9
SC9901	Roseau	Cargill	466	37.8	176	180	37.4	67	384	39.9	153	343.3	38.4	132.2
Mean			595	35.8	213	315	35.5	112	615	37.8	233	508.0	36.4	185.9
F-var df=36			9.6			4.63			4.87					
C.V. s/mean			9.9			19.18			15.79					
LSD(0.05)			119.6			122.7			158.1					
Cropping System			No-Till recrop			Till-Plant recrop			Till-Plant recrop					
Seeding Date			4-24-1999			4-24-1999			5-14-1999					
Harvest Date (direct cut)			8-17 to 8-22-99			8-22 to 8-25-99			8-26-99					
Previous Crop			barley			barley			barley					
Fertilizer			100# 21-0-0-24 150# 46-0-0			100# 21-0-0-24 150# 46-0-0								
Precipitation			A-1.24, M-1.87, J-1.80, J-1.67, A-3.55						A-1.0, M-0.76, J-5.56, J-3.92, A-3.32					
Comments			Frost 6-26 & 7-15-99			Frost 6-26 & 7-15-99								
Plant Height (inches)			33-40"			28-34"			33-39"					
Flowering Initiation			June 21			June 23								
Termination			July 12-16			July 15-19								

Table 5 1999 Flax variety trials at four locations in Central Montana .  
Exp. FLXS. Central Agricultural Research Center, Moccasin, Montana

Id	Variety/Line	<u>Moore</u>			<u>Moccasin 1 (SE3)</u>			<u>Moccasin 2 (SE4)</u>			<u>Moccasin 3 (SW4)</u>			<u>1999 Average</u>		
		Grain Yield (lbs/a)	Test Weight (lbs/bu)	Oil Cont. (%)	Grain Yield (lbs/a)	Test Weight (lbs/bu)	Oil Cont. (%)	Grain Yield (lbs/a)	Test Weight (lbs/bu)	Oil Cont. (%)	Grain Yield (lbs/a)	Test Weight (lbs/bu)	Oil Cont. (%)	Grain Yield (lbs/a)	Oil Cont. (%)	Oil Yield (lbs/a)
X8	Nече	1085	46.7	40.4	494	50.4	35.8	711	50.3	36.5	507	50.2	37.4	699	37.5	262
X3	A.C. Emerson	989	45.3	37.8	522	51.8	35.6	543	48.2	36.3	528	50.7	36.4	646	36.5	236
X4	Norman	1035	45.6	38.2	446	51.6	38.5	565	49.1	36.8	519	49.6	37.2	641	37.7	241
X7	Rahab 94	998	46.2	41.5	405	49.6	37.6	506	49.9	36.5	617	50.6	37.6	632	38.3	242
X5	McDuff	953	45.7	41.7	484	51.7	36.5	520	49.0	38.2	559	51.4	40.2	629	39.2	246
X10	Flanders	952	45.8	39.6	322	50.8	37.0	713	49.0	37.3	518	49.3	36.8	626	37.7	236
X6	Li Flax	1016	46.0	40.6	439	51.6	36.9	498	50.1	37.3	545	51.7	37.6	625	38.1	238
X2	Prompt	999	45.4	39.0	502	52.3	36.7	504	49.5	36.5	487	51.3	37.5	623	37.4	233
X9	Norlin	997	46.9	37.8	385	49.5	36.9	454	49.2	35.3	610	50.9	35.8	612	36.5	223
X11	Omega	923	46.2	41.5	509	52.4	37.3	458	50.6	38.3	532	51.4	38.3	606	38.9	235
X1	McGregor	944	46.0	37.6	447	50.8	35.8	378	49.1	37.5	495	51.2	36.2	566	36.8	208
Experimental Mean		990.1	46.0	39.61	450.4	51.1	36.78	531.7	49.5	36.95	537.8	50.8	37.4	627.7	37.7	237
CV1: (s/mean)*100		5.4	-		14.7	-		19.6	-		18.3	-				
F-Test Var. (df=10)		2.3	-		2.6	-		2.9	-		0.6	-				
LSD (0.05)		90.3	-		113.0	-		177.1	-		167.8	-				
Cropping System		Till-plant Re-Crop			Till-plant Re-Crop			No-Till Re-Crop			Till-plant Fallow					
Seeding Date		5/14/1999			5/21/1999			4/24/1999			4/24/1999					
Harvest Date		8/26/1999			9/23/1999			8/31/1999			8/31/1999					
Previous crop		Barley			Safflower			Barley			1997=Spring Triticale					
Fertilizer					100# 21-0-0-24			100# 21-0-0-24			100# 21-0-0-24					
					100# 46-0-0			100# 46-0-0								
Precipitation		Above Avg.			Below Avg.			Below Avg.			Below Avg.					
Comments					Frost: 6/26/99			Frost: 6/26/99			Frost: 6/26/99					
					7/15/99			7/15/99			7/15/99					
Plant Height (inches)		22-24			18-22			22-26			22-26					
Approx Flowering Time					7/18/99			7/1/1999			7/1/1999					

Table 6 1999 Moccasin Safflower Variety Trial - No-till Recrop after Hayed Winter Wheat.  
Exp.7707 Central Agricultural Research Center, Moccasin, Montana.

ID	Variety/Pedigree	Plant Height	Seed Yield	Oil Yield	Test Weight	Oil Content	Frost Damage
		inches	Lbs/a	lbs/a	lbs/bu	%	
GW9025	97California	27.7	455.1	96.9	34.4	21.3	0
GW9023	97 California	28.3	388.5	75.8	34.9	19.5	0
MORLIN	MTCERT.#971-916	24.7	357.5	71.5	33.0	20	1
95B7181	96DOL5#224/115	25.0	342.9	67.9	34.5	19.8	3
GW9024	97California	27.3	254.8	52.2	36.5	20.5	0
S-518	97Williston	25.3	254.0	68.6	33.1	27	0
97B1286	98WLi1#328/130	25.3	207.9	43.0	33.0	20.7	0
96B7261	98DOL5#119	26.0	204.8	56.7	35.9	27.7	1
MONT2000	CA#97A-6911-7081	22.7	197.4	47.0	34.3	23.8	5
96B7026	98DOL5#102	23.3	191.8	42.0	35.8	21.9	1
95B7446	98DOL1#127	27.0	181.6	36.9	34.6	20.3	2
96B6985	98DOL4#127	22.7	180.7	33.6	32.5	18.6	4
96B6527	98DOL3#119	24.7	165.8	38.3	33.6	23.1	4
95B2896	98MDSVT#107	25.3	157.7	36.4	35.6	23.1	3
97B7017	98WOL7#329/117	22.3	148.2	38.7	35.4	26.1	2
96B7005	98DOL4#130	24.0	141.3	27.6	33.7	19.5	3
97B7185	98WOL7#302/124	23.7	128.8	30.1	33.5	23.4	2
96B7018	97DOL7#212/130	24.0	124.2	34.6	36.1	27.9	2
95B6894	98DOL1#124	27.7	116.2	25.9	32.1	22.3	1
96B6170	97DOL2#118	23.3	115.5	33.0	39.5	28.6	4
96B6862	98DOL4#123	24.7	113.5	28.7	38.5	25.3	3
95B7174	96DOL5#114	25.3	113.2	30.0	34.5	26.5	5
95B3538	97DLi1#126	26.3	105.9	23.3	36.8	22	0
MONT2003	96DOL5#130(95B7348	24.3	101.8	24.0	33.0	23.6	3
ERLIN	MTCert.#951-900	23.3	95.5	24.3	36.3	25.4	0
97B6712	98DLO6#123	27.0	91.0	21.5	32.1	23.6	1
CENTENNL	CSF#95/24W	24.3	65.8	16.6	32.5	25.3	1
91B*6429	98MDSVT#106	24.7	54.6	11.4	29.1	20.9	2
97B1333	98WLi2#304/101	23.3	49.0	13.4	ES	27.4	0
96B6749	98DOL4#109	26.7	48.0	9.1	ES	18.9	1
MONT2001	MTCERT.#971-912	23.3	45.6	12.1	ES	26.6	2
96B6054	97DOL1#109	23.7	42.8	13.5	ES	31.5	3
96B6798	97DOL6#211/110	22.7	42.7	11.6	ES	27.2	3
97B6821	98DLO6#125	25.0	40.1	10.6	ES	26.4	1
FINCH	NDFS#95/21W	25.0	39.2	8.2	ES	20.8	1
91B3842	96DLi2#316/113	24.7	28.5	8.2	ES	28.7	3
MEANS		24.85	149.78	40.2		26.87	
F		3.86	2.1				
LSD		2.28	206				

Seeded: 4-24-1999 No-Till Recrop

Fertilizer: 46 lbs N as urea Post plant broadcast, 20 lbs N and 24 lbs S ammonium sulfate

Harvested: 9-28-1999

Frosted: June 26 and July 15 w/ varying damage Rated 7-27 0-no brown leaves 5-severe

Precipitation: April-1.24, May-1.87, June-1.80, July-1.67, August -3.55

Spineless 15 selections yielded between 436 and 830 lbs/a with 20% - 23.2% oil content.

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Table 7 1999 Geraldine Safflower Variety Trial on Tilled Recrop.  
Exp.7707 Central Agricultural Research Center, Moccasin, Montana.

ID	Variety/Pedigree	Plant Height	Seed Yield	Oil Yield	Test Weight	Oil Content
		inches	Lbs/a	lbs/a	lbs/bu	%
97B 1286	98 WLi1 #328/130	17	997	321		32.5
GW 9023	97 California	18	875	269		30.9
95B 3538	97 DLi1 #126	18	874	261		30.3
97B 7185	98 WOL7 #302/124	16	873	326		37.3
96B 7005	98 DOL4 #130	17	868	285		32.8
95B 7181	96 DOL5 #224/115	15	860	288		33.4
GW 9025	97 California	16	844	251		29.8
95B 7174	96 DOL5 #114	18	827	298		36.2
MONT2001	MT CERT. #971-912	18	801	258		32.2
96B 7026	98 DOL5 #102	15	791	277		34.9
MONT2000	CA #97A-6911-7081	16	770	285		37.1
96B 6527	98 DOL3 #119	16	769	262		34.1
MONT2003	96 DOL5 #130(95B7348)	18	769	270		35.1
FINCH	ND FSF #95/21W	15	766	242		31.7
GW 9024	97 California	19	763	249		32.6
S-518	97 Williston	18	756	269		35.9
96B 7261	98 DOL5 #119	16	747	264		35.3
96B 6862	98 DOL4 #123	17	737	239		32.3
96B 7018	97 DOL7 #212/130	16	731	257		35.1
91B*6429	98 MDSVT #106	18	710	246		34.6
96B 6170	97 DOL2 #118	20	706	252		35.6
96B 6798	97 DOL6 #211/110	15	685	255		37.1
95B 2896	98 MDSVT #107	17	683	247		36.2
96B 6749	98 DOL4 #109	18	678	239		35.2
97B 6821	98 DLO6 #125	16	677	231		34.0
ERLIN	MT Cert. #951-900	17	676	236		34.9
97B 7017	98 WOL7 #329/117	15	666	261		39.1
95B 7446	98 DOL1 #127	16	653	223		34.2
91B 3842	96 DLi2 #316/113	16	647	257		39.6
96B 6985	98 DOL4 #127	14	617	218		35.2
MORLIN	MT CERT. #971-916	16	617	204		33.1
CENTENN	CSF #95/24W	16	610	226		36.9
95B 6894	98 DOL1 #124	14	607	209		34.6
96B 6054	97 DOL1 #109	12	572	237		41.3
97B 6712	98 DLO6 #123	18	514	178		34.6
97B 1333	98 WLi2 #304/101	14	398	150		37.7
Mean			726.0	251.1		34.81
F-VAR.			2.54	1.97		11.34
CVS/MEAN			17.44	17.03		3.73
LSD0.05			206.16	69.63		2.12

Seeded: 5-5-1999 recropped into tilled wheat stubble. Season was very dry.

Harvested: September 17, 1999

Twelve spineless safflower selection yields averaged 707 lbs/a and ranged 484 to 1168 lbs/a.

Oil content of nine spineless selections: 29.1, 25.4, 25.6, 25.6, 25.8, 26.1, 27.5, and 17.1.