OILSEED SPECIALTY CROPS SECTION

Canola, Mustards, Safflower, and Sunflower Investigations

PROJECT TITLE: 2001 Canola variety and hybrid performance evaluations.

PROJECT LEADER: D.M. Wichman, CARC.

PROJECT PERSONNEL: G.L. Sharp, Research Associate, CARC

OBJECTIVES:
To conduct field evaluations to learn the relative yield performance of spring canola varieties adapted to the northern plains and intermountain regions.

METHODS:
Twenty-three canola entries, using a 4 rep RCB design, were seeded into no-till recrop following barley at CARC and tilled recrop following spring wheat on the Tyler Ranch southwest of Moore. A double disk plot drill equipped with Accruplant modules was used at both sites. The surface soil was dry and mallow at both sites with decent moisture in the upper 15" of soil. The CARC nursery was seeded no-till into recrop barley stubble with a Seed bed preparation included: 0.75 lbs ai granular ethalfluralin and a fertilizer blend of 90 N+20 P+ 20 K + 10 S /a were applied. After the ethalfluralin application, the soil surface was stirred with a rolling harrow (Phoenix). In early April, the land was again harrowed with the rolling harrow. Just prior to seeding, pre-plant glyphosate at 12 floz material was applied. Popup fertilizer,10 N+10 P+ 10 K + 5 S/a, was placed with the seed.

RESULTS:
Emergence was slow and very erratic due to dry weather conditions that persisted till early June at both locations. The Moore site was very slow to emerge with much of the emergence occurring in early June. Tyler seeded with a hoe drill and more uniform and much earlier emergence. The delayed emergence contributed to low yield levels at both locations. Extremely high levels of evaporative demand in July were also detrimental to the canola trial yields (See Tables sc35 and sc36). The Moccasin trials were further impacted by ground sparrows and Cashin finch feeding on the seed pods prior and during ripening. Intermountain 223 RR and 357 RR lines were top performers in both trials. These lines have been good performers other years as well.

SUMMARY:
Late seeding and unusually dry weather with high evaporative demand resulted below average canola yields. The variation within the study due to factors other than the characteristics of the varieties themselves reduced the value of both variety evaluation nurseries.

FUTURE:
If possible, evaluation and development of better cultural methods for producing canola would be more productive than variety comparisons at this time. With current methods, canola production is a highly inconsistent proposition in these areas with shallow soils, moderate precipitation levels, and high winds (high evaporative demands).

Table SC35 2001 Spring canola variety trial at Moccasin on no-till recrop after spring wheat
Exp SC01 Central Agricultural Research Center. Moccasin, Montana.

Trt	ID	PEDIGREE	Seed Yield	30-30-JunBlt	June 30-JunFlwr	Plant Height	Oil Content	Oil Yield
#			labs/a	%	%	"	%	lbsoil/a
1	GOLIATH	Cropland Genetics	398.8	21	60	39	34.7	138
2	HUDSON	Cropland Genetics	625.5	35	20	38	32.9	206
3	MINOTRR	Cropland Genetics, O.I	647.5	25	35	35	32.8	212
4	CL2061RR	Cropland Genetics	512	35	6	38	33.7	173
5	KAB 36	Cropland Genetics	577.3	35	10	42	33.8	195
6	RIDERRR	Monsanto	558.9	20	30	37	34.4	192
7	DK2338RR	Monsanto	552.5	30	25	34	34.7	192
8	CA1812RR	Canterra Seed	479.7	10	35	37	34.7	166
9	223RR	Interstate Seed	801.5	30	70	38	33.6	269
10	5034	Interstate Seed	743.7	35	45	35	33.9	252
11	46 NR	Interstate Seed	602.5	35	50	37	32.2	194
12	243CL	Interstate Seed	310.7	10	40	43	32.8	102
13	357RR	Interstate Seed	764.7	50	60	33	32.7	250
14	401	Interstate Seed	559.2	15	15	30	32.6	182
15	IMC105	Intermountain Canola	571.1	20	40	38	33.3	190
16	IMC203RR	Intermountain Canola	354.2	20	30	37	33.2	118
17	IMC205	Intermountain Canola	636.3	20	7.5	36	35.2	224
18	IMC302	Intermountain Canola	370.8	45	10	42	31.5	117
19	IMC206RR	Intermountain Canola	445.7	25	10	36	33.1	148
20	IMC207	Intermountain Canola	579.9	55	40	36	34.7	201
23	CA1867	Canntera Seed	496.8	20	10	34	33.1	164
Mean			551.9	28.12	30.88	36.9	33.5	185
CV (s/mean)% =			23.14	50.87	49.9			
LSD(0.05 by t)=			180.7	29.84	32.14			

Seeded: 24-Apr-01 Emergence slow due to dry surface duff layer. Harvested direct cut 21-Aug
Bird damage was significant as the ground sparrows and finches (from shelterbelts) fed on some varieties prior to ripening.

Table SC36 2001 Spring canola variety evaluations near Moore.
Exp SCYT Central Agricultual Research Center, Moccasin, Montana.

Entry	Variety	Company	Plant Ht.	Bolted 4-Jul-01	Bloom 4-Jul-01	Oil Cntnt Dry Basis	Seed Yield	Oil Yield
#			inches	%	%	%	lbs/a	lbs/a
1	GOLIATH	Cropland G	39	20.5	60	36.1	443.7	160.2
2	HUDSON	Cropland G	38	35	20	34.9	650.4	227.0
3	MINOTRR	Cropland G	35	25	35	36.2	731.7	264.9
4	CL2061RR	Cropland G	38	35	6	36.4	577.6	210.2
5	KAB 36	Cropland G	42	35	10	36.5	648.1	236.6
6	RIDERRR	Monsanto	37	20	30	36.1	611.6	220.8
7	DK2338RR	Monsanto	34	30	25	36.1	595.1	214.8
8	CA1812RR	Canterra	37	10	35	36.5	616.5	225.0
9	223RR	Interstate	38	30	70	35.5	859.6	305.2
10	5034	Interstate	35	35	45	36.6	766.7	280.6
11	46 NR	Interstate	37	35	50	33.3	608.9	202.8
12	243CL	Interstate	43	10	40	34.2	414.1	141.6
13	357RR	Interstate	33	50	60	35.4	834.8	295.5
14	401	Interstate	30	15	15	34.2	615.2	210.4
15	IMC105	InterMntn	38	20	40	34.1	653.8	222.9
16	IMC203RR	InterMntn	37	20	30	34.1	394.6	134.6
17	IMC205	InterMntn	36	20	7.5	36.6	687.7	251.7
18	IMC302	InterMntn	42	45	10	32.1	456.2	146.4
19	IMC206RR	InterMntn	36	25	10	33.2	503.0	167.0
20	IMC207	InterMntn	36	55	40	34.1	610.7	208.2
23	CA1867	Canntera	34	20	10	32.2	540.4	174.0
OVERALL MEAN			36.9	28.12		35.0	610.5	213.5
CV (S/MEAN) %				50.87	49.9		16.99	
LSD(0.05 by t)				29.84	32.14		171.1	

Seeded: 27-Apr-01 Into tilled recrop after winter wheat. Harvest: 24-Aug Direct cut
Rep two was not included in the data analysis. Field tillage effect increased variability.
Comments: Dry surface layer at seeding delayed and varied emergence. High evaporative demand in July cause significant plant stress.

PROJECT TITLE: 2001 Initial canola like Brassica juncea evaluations.

PROJECT LEADER: D.M. Wichman, CARC.

PROJECT PERSONNEL: G.L. Sharp, Research Associate, CARC

OBJECTIVES:
Conduct initial adaptation evaluation of Brassica juncea varieties that have been bred for canola oil qualities.

METHODS:
Four B. juncea lines were planted along with along a B. napus canola check in RCB, 4 rep nursery. The nursery was seeded no-till into recrop barley stubble with a double disk plot drill equipped with Accruplant modules. Seed bed preparation included: 0.75 lbs ai granular ethalfluralin and a fertilizer blend of 90 N+20 P+ 20 K + 10 S /a were applied. Post ethalfluralin application, the soil surface was stirred with a rolling harrow (Phoenix). In early April, the land was again harrowed with the rolling harrow. Just prior to seeding, pre-plant glyphosate at 12 floz material was applied. Popup fertilizer,10 N+10 P+ 10 K + 5 S/a, was placed with the seed. Surface soil was dry with good moisture in the upper 15" of soil.

RESULTS:
Emergence was slow and very erratic due to dry weather conditions that persisted till early June contributed to low Brassica juncea seed yields (See Table 1). The Brassica seedlings exhibited excellent growth in mid-late June. The plants, in general, appeared to be very robust. The leaves were noticeably large. After receiving four inches of precipitation in June, conditions turned hot and dry through July. Extremely high levels of evaporative demand, as much as 0.55" of pan evaporation, were experienced in July. Yield levels were quite dismal. Had it been known the dry conditions would persist through May, the Brassicas could have been seeded with a hoe drill and the seed placed into moist soil. Yields probably would have been higher had germination and emergence occurred right after seeding. Grass hoppers and birds invaded the nursery in mid-late July. Ground sparrows, finches and some English sparrows were attracted to the nursey. They fed on the pods while the pods were still green.

SUMMARY:
The Brassica juncea exhibited good robust growth. Yield levels were significantly impacted by pest. The large leaf area may make the B. juncea more susceptible to heat and moisture stress. Earlier emergence probably would have enhanced yields significantly if it would have led to flowering and seed fill at cooler temperatures.

Table sc37 2001 Performance of Brassica Juncea at Moccasin.

Variety	Species	Plt Density		1-Jul Bloom		Plt Ht		Seed Yield	
		%		%		inches		lbs/a	
JM16	B. juncea	77.5	ab	80	c	45.0	b	166.4	ab
8696	B. juncea	67.5	ab	50	b	43.3	b	215.1	bc
7873	B. juncea	86.3	b	83	c	38.5	a	125.7	a
Q2	B. napus	72.5	ab	14	a	38.3	a	248.1	c
PC98-44	B. juncea	65.0	ab	58	b	37.8	a	168.6	abc
MEAN		73.75		56.8		40.55		184.8	
CV (S/MEAN) %		17.37		22.55		6.379		28.04	
LSD(0.05 by t)		19.74		19.72		3.985		79.84	

FUTURE: In spite of the dismal results, we have an interest in evaluating the Brassica juncea further. 2001 was an extremely dry year and in particular the months of April and May which is a critical time for cool season crops.

PROJECT TITLE: 2001 Evaluation of primed spring canola seeded no-till after continuous crop barley.

PROJECT LEADER: G.D. Jackson, WTARC and D.M. Wichman, CARC

PROJECT PERSONNEL: G.L. Sharp Research Associate , CARC

OBJECTIVES:
Determine if priming seed would provide an agronomic advantage for the canola plant.

METHODS:
The canola seed was received pre-primed and seeded immediately into standing stubble with a double disk drill on April 27, 2001 at a rate of 6 lbs per acre, using a RCB design. Seed bed preparation included: Fall applied 0.75 lbs ai granular ethalfluralin+ rolling harrow (Phoenix) and fertilizer: 90 N+20 P+ 20 K + 10 S. Spring rolling harrow, pre-plant glyphosate at 12 material, and fertilizer w/seed: 10 N+10 P+ 10 K + 5 S. Surface soil was dry with good moisture in the surface in the top 15".

RESULTS:
Emergence was slow and very erratic due to dry weather conditions that persisted till early June. The canola had excellent growth through June, but experienced extremely high levels of evaporative demand in July. Yield levels were quite dismal. Had it been known the dry conditions would persist through May, the canola could have been seeded with a hoe drill and placed in moist soil. Yields probably would have been higher had germination and emergence occurred right after seeding.

SUMMARY:
Priming did not provide any an advantage to the canola for enhancing germination and emergence, flowering, yield or plant height. We expected a good response to priming considering the adverse growing condition in the spring of 2001.

FUTURE:
Dependent on results elsewhere. If some positive results were obtained this study may be continued.

Table sc38 2001 Evaluation of primed spring canola seeded no-till after barley.
Exp.CanPrm Central Agricultural Research Center, Moccasin, Montana.

Classification	Reps	Seed Ylds	25-May Row One	25-May Row Five	30-Jun Bloom	14-Aug Plant Ht.
Variety		lbs/a	plts/m	plts/m	%	inches
LG3235	8	419.8	6.6	5.9	41.3	32.3
MINOT	8	479.0	6.5	3.3	30.0	32.0
357	8	454.1	9.4	8.8	56.3	30.5
RIDER	8	452.1	6.9	7.3	38.1	32.9
Mean	n= 32	451.2	7.34	6.28	41.4	31.94
Treatment						
PRIME	16	446.6	7.4	6.4	41	31.6
CONTROL	16	455.9	7.3	6.2	42	32.3
Mean	n=32	451.2	7.34	6.28	41.4	31.94

PROJECT TITLE: 2001 Evaluation spring canola response to N, P and S fertilizer.

PROJECT LEADER: G.D. Jackson, WTARC and D.M. Wichman, CARC.

PROJECT PERSONNEL: G.L. Sharp Research Associate , CARC

OBJECTIVES:
Determine spring canola response to N, P and S fertilizer.

METHODS:
The canola seeded into tilled recrop following winter wheat. Trifluralin, at 1 lb/a ai was pre-plant double incorporated with sweeps. The phosphorus was banded with the seed. Nitrogen and sulfur were broadcast post emerge.

RESULTS:
Emergence was slow and very erratic due to dry weather conditions that persisted till early June. A canola seedling response to phosphorus was observed early on, but notes were not recorded. The canola had excellent growth through June, but experienced extremely high levels of evaporative demand in July. Yield levels were quite dismal. Had it been known the dry conditions would persist, the canola would have been seeded with a hoe drill into moist soil. Yields would have been higher had germination and emergence occurred right after seeding. Nitrogen rate had little effect on the canola yield (See Table 2). This is attributed to two reasons. High residual N. Due to the dry 2000 crop year, the previous winter wheat crop did not use up all of the residual N. The nursery was seeded prior to receiving soil test results. Secondly, the 2001 crop did not have a high N demand because of dry conditions. Application of P had a significant effect on yield. However, there was no significant difference between P rates of 10 to 30 lbs/a. Application of sulfur had

Table sc39 Plot area soil test results. Sampled May 7, 2000.

Plot Area	Depth	pH	O.M.	NO3	P	K	S	Na	Salt
			%	ppm	ppm	ppm	ppm	meg/100g	MMHOS/ Cm
SW	0" - 6"	7.3	3.1	6	15	306	17	0.04	
	6" - 12"			5			11		
	12"- 24"			2			9		
	24" - 33"			1			11		
SE	0" - 6"	7.1	2.9	8	12	321	16	0.05	
	6" - 12"			14			21		
	12"- 24"			3			21		
	24" - 36"			1			25		
NW	0" - 6"	7.4	2.7	6	15	241	14	0.04	0.64
	6" - 12"			15			5		0.88
	12"- 24"			7			13		
	24" - 28"			1			16		
NE	0" - 6"	7.2	2.7	12	12	260	13	0.05	0.76
	6" - 12"			26			8		0.8
	12"- 22"			43			16		

no effect on yield (see entries 12 & 13 Table 3).

SUMMARY:
This study re-affirmed the need to apply phosphorus. The site was not suitable for good N and S evaluations. More lead time would provide time to find a site with more suitable soils.

FUTURE:
Improved cultural methods to make canola a more viable crop need to be identified prior to more effort being placed on canola variety trials.

Table sc40 2001 Spring canola fertilizer response evaluation under tilled recrop
Exp Canfrt Central Agricultural Research Center, Moccasin, Montana.

		01-Jul-01	Seed	Yield
		Flowering	indirt	clean
Phosphorus Rate (lbs/a)		plts /plot	lbs/a	lbs/a
30		1.167 a	362.1 b	333.2 b
20		2.000 a	351.4 b	325.0 b
10		1.250 a	338.9 b	313.3 b
0		1.000 a	280.9 a	252.0a
Mean		1.354	333.3	305.9
SE for mean		0.4357	15.01	13.61
SE for difference		0.6162	21.23	19.25
LSD (0.05)		1.254	43.19	39.16
DIF 0.9 power		2.062	71.05	64.42
Nitrogen Rate (lbs/a)				
15		1.625 a	315.7 a	286.9 a
30		1.125 a	339.7 a	314.5 a
45		1.313 a	344.6 a	316.3 a
Mean		1.354	333.3	305.9
SE for mean		0.3773	13	11.79
SE for difference		0.5336	18.38	16.67
LSD (0.05)		1.086	37.4	33.92
DIF 0.9 power		1.786	61.53	55.79
N + P+ S (lbs/a)	Trt #	01-Jul Flow	indirt yield	clean yield
0+15+18	1	1.3	257	224.5
10+15+18	2	1.8	346.7	317.5
20+15+18	3	2.5	325.1	297.8
30+15+18	4	1.0	334.1	307.7
0+30+18	5	1.3	298	266.1
10+30+18	6	1.3	296.9	278
20+30+18	7	1.5	372.9	351.8
30+30+18	8	0.5	390.9	361.9
0+45+18	9	0.5	287.7	265.2
10+45+18	10	0.8	373	344.4
20+45+18	11	2.0	356.3	325.4
30+45+18	12	2.0	361.4	330.1
30+45+ 0	13	1.8	365.8	334.3
OVERALL MEAN		1.39	335.8	308.1
CV (S/MEAN) %		106	15.33	15.07
LSD(0.05 by t)		2.105	73.84	66.56

PROJECT TITLE: 2001 Montana Uniform Safflower Variety Trial
and 2001 Sunflower Hybrid Trial.

PROJECT LEADER: D.M. Wichman, Research Agronomist, CARC, Moccasin, MT.

PROJECT PERSONNEL: G.L. Sharp Research Associate , CARC, Moccasin, MT.
J.W. Bergman, Safflower Breeder, EARC, Sidney, MT.

OBJECTIVES:
Evaluate safflower variety performance in relatively high elevation (4300') at Moccasin and sunflower hybrids south of Denton (3800'). Cool temperature effect on oil quality factors is one of the primary reasons for growing safflower at this locations. The acid composition was not shared with us. I doubt we would understand had it been shared with us.

METHODS:
The safflower seeded into tilled recrop following spring wheat. Trifluralin, at 1 lb/a ai was pre-plant double incorporated with sweeps. The phosphorus was banded with the seed. Nitrogen broadcast post emerge. Sunflowers were seeded into tilled wheat stubble in 5 row plots with 11" row spacing.

RESULTS:
Safflower emergence was slow and very erratic due to dry weather conditions that persisted till early June. Field effect, soil plant available moisture, caused variable response in appearance mid-late in the season. The severe drought was very detrimental to yields as heat units were not a limiting factor due above average heat units and later fall frost (see Table sc 41).

Sunflowers stand was acceptable though slightly thinner than preferred for an dry year. There was considerable stem breakage and heads had fallen on the were counted (see Table 42). Sunflower yields were much higher than anticipated and higher than the grower received. The heads on the ground may have contributed to some of the difference in yield between this trial and what the producer harvested.

FUTURE:
We will continue this safflower nursery so long as we can handle the work as it contributes to a potential growth area in diversifying Montana agriculture.

The sunflower nursery will probably be discontinued as it added enough extra work that it was not monitored as closely as it should have been. Nor was it harvested nearly as soon as it could have bee. Sunflower acreage has dropped off this past two years due to drought and reduced local prices.

Table sc 41 2001 Montana Uniform Safflower Variety Trial
Exp. 770701 Central Agricultural Research Center, Moccasin, Montana.

Trt	ID	Pedigree	Stand	% Flower	Plant Ht	Seed Yield	Oil Content	Oil Yield
#			(%)	28-Jun	(in)	lbs/a	%	lbs/a
1	91B3842	99MDSVT #203/201	83	18	26	344	42.4	146
2	91B6429	99MDSVT #210/102	73	20	27	377	38.4	146
3	95B3538	99MDSVT #104	75	9	26	490	36.1	178
4	95B6894	99MDSVT #306/105	72	30	26	289	40.3	117
5	95B7174	99MDSVT #222/106	68	17	24	391	38.6	151
6	95B7181	99MDSVT #228/107	67	35	24	413	37.0	153
7	95B7446	99MDSVT #218/108	75	30	25	420	39.0	165
8	96B6054	99MDSVT #109	70	33	24	196	41.5	81
9	96B6527	99MDSVT #317/111	70	18	24	419	37.2	157
10	96B6731	99 DOL2 #125	67	33	23	247	36.1	89
11	96B7261	99MDSVT #204/119	63	25	25	342	36.5	125
12	96B2590	99DL11 #114	65	17	26	406	38.4	158
13	97B1214	99DL11 #123	69	23	25	245	33.6	83
14	97B1286	99MDSVT #311/120	58	17	25	505	38.7	197
15	97B1744	99DL12 #319/107	60	30	26	318	35.4	112
16	97B1962	99DL12 #236/111	77	20	24	403	36.5	148
17	98B1475	99DL12 #316/130	57	33	26	382	36.3	138
18	HIPRO	99DL11 #207/126	50	19	27	420	44.6	189
19	Erlin	99MDSVT #324/130	73	22	28	531	40.0	213
20	Centennial	Will 95 FL	75	27	25	437	43.9	193
21	MT2000	Will 95 FL	78	4	28	788	43.4	345
22	Finch	Will 95 FL	73	14	24	657	36.5	245
23	MT2001	Huntley 971-912	73	13	27	434	37.0	166
24	Morlin	99MDSVT #135	67	13	25	538	35.8	193
25	MT2003	Calif 9104	50	25	26	587	39.3	235
26	MT2003S	Calif	73	35	25	470	38.5	185
27	S-518	Will	80	11	28	477	40.3	198
28	S-541	Will	73	27	24	305	42.4	129
29	98B8459	Huntley	80	13	25	350	35.5	124
30	97B6936	Flynn	68	28	25	338	32.3	110
OVERALL MEAN =			69.46	22.01	25.49	417.3	38.38	162.3
F-RATIO df=58			2.019	0.876	1.023	1.457	8.553	1.515
P-VALUE TRTS =			0.011	0.6469	0.4584	0.1092	0	0.0874
CV (S/MEAN) % =			14.4	71.02	8.973	42.53	4.637	46.95
LSD(0.05 by t)=			16.34	25.55	3.738	290.1	2.909	124.5

Date seeded: 4/26/2001 w/double disk plot drill. Harested: 22-Sep-01
Fertilizer: 50 lbs 20-20-20-0 w/seed 40 lbs N topdress as urea
Weed control: 1 qt of Treflan 4 ec PPI. Seed bed dry. Emergence erratic. Field effect visible
Previous crop: Fortuna spring wheat Severe drought stress impacted yields severely.

Table sc42 2001 Sunflower variety seeded on continuous crop eight miles N of Benchland.
ExpSunF Central Agricultural Research Center, Moccasin, Montana.

Hybrid	Company	Seed Yield Indirt		Clean		Plant Ht.		Standing Heads		Downed Heads	
		lbs/a		lbs/a		inches		#		#	
3790	DeKalb	767.7	AE	653.3	AB	41	B	10	A	4	B
270	Cargill	940	B	825.1	B	40.75	B	13.75	A	2.25	AB
120	Cargill	864.5	B	771.0	B	42.88	B	11.5	A	2	AB
6039	Interstate	612.0	AE	533.7	AB	37	A	11	A	3.5	B
4049	Interstate	518.3	A	427.1	A	40.63	AB	12.25	A	0.25	A
Mean		740.5		642		40.45		11.7		2.4	
C.V. 1		30.17		31.81		5.918		25.29		57.56	
LSD(0.05 by t)=		344.2		314.6		3.688		4.56		2.128	

Seeded: 5/16/2001 Fertilzer: 50 lbs 20-20-20-10 with seec Harve 10-Oct-01 Top Dress: ??
In one plot,105, Interstate 4049 had six stalks with out heads IS4049 had a higher harvest moisture.
Heads were hand harvested then run through stationary plot combine.