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PROJECT TITLE: Evaluation of barley, spring wheat, winter wheat and oat variety performance under a no-till recrop environment at Moccasin.

PROJECT LEADER: D.M. Wichman, Agronomist, Moccasin

PROJECT PERSONNEL: T.L. Blake, Barley Breeder, Bozeman
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OBJECTIVES:

To evaluate the performance of spring and winter grain varieties in no-till recrop environment at Moccasin. To determine yield potential of barley, spring wheat, winter wheat, and oat varieties under recrop environment.

RESULTS:

Above normal precipitation resulted in average to above average yields for spring grains under recrop conditions at Moccasin. Winter wheat yields were below average, due to a combination of low levels of available nitrogen as well as mid-spring moisture stress. Grain quality was adversely affected. Although barley test weights averaged 48 lbs/bu, winter and spring wheat averaged below 60 lbs/bu. Annual crop year precipitation (Sept. 1992-Aug. 1993) was 20.52 inches, or 132% of normal. While precipitation was 71% of normal through May 1993, it totalled 14.17 inches, or 217% of normal from June through August. Baronesse was the top yielding barley variety, with barley yields ranging from 76 to 54 bu/a. Spring wheat yields ranged from 64 to 41bu/a. Penawawa and Owens, two soft white wheats, were the top yielding spring wheat varieties. Proteins were below normal, averaging 11.43%. The top yielding winter wheat varieties were Tiber and Neeley. Yields ranged from 45 to 26 bu/a, while proteins averaged 12.62%. Oat yields were very good. In addition to the recrop oat trial on station, an oat variety trial was also grown on recrop near Grass Range. The top yielding varieties were Robert and Monida. Data for the 1993 variety trials, as well as multi-year summaries, are presented in Tables 1-9.

SUMMARY:

At Moccasin, cereal varieties which perform well under crop-fallow conditions tend to perform well under recrop conditions. The performance of a variety on a given year was more a factor of that year's weather than whether it was planted on recrop or fallow.

FUTURE PLANS:

Winter and spring cereal no-till variety trials will be continued on station.

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 Table 1 1993 CARC Off-Station Recrop Spring Barley Trial
 Exp 3671 Central Agricultural Research Center, Moccasin, MT.

ID#	Variety	Plant Heading		Grain Yield	Test Weight	Plump *	Thin @
		Ht.	Date				
		"	day	bu/a	lbs/bu	%	%
NS 78054	Baronesse	30	180	76.1	49.6	92	3
MT890008	MT890008	30	182	71.7	47.6	90	4
CI 15229	Steptoe	33	176	70.6	43.5	83	5
MT851195	MT851195	32	178	69.3	47.8	87	4
MT140523	MT140523	32	179	68.1	48.6	84	5
CI 15856	Lewis	33	179	66.0	50.1	88	4
MT 81161	MT 81161	32	178	65.9	46.0	82	6
CI 15514	Hector	34	179	65.8	49.6	86	5
MT860756	MT860756	32	179	64.8	49.3	88	4
PI531228	Bearpaw	32	182	62.8	46.6	86	4
PI483237	Bowman	32	174	62.5	48.1	91	3
SK 76333	Harrington	32	180	62.1	47.6	89	3
MT851032	MT851032	33	180	61.8	49.2	91	2
CI 9558	Piroline	34	177	60.5	50.2	88	3
ND 9866	Stark	33	177	60.5	50.3	94	2
PI491534	Gallatin	32	178	58.4	48.6	79	7
CI 15857	Clark	34	180	56.7	48.0	82	6
PI537967	Colter	32	175	54.3	42.7	59	18
EXPERIMENTAL MEANS		32.33	178.67	64.32	47.97	85.48	4.94
F TEST FOR VAR. df=34		3.10	27.84	6.14	43.14		
C.V. 1: (S/MEAN)*100		3.28	.39	6.01	1.17		
LSD (0.05)		1.76	1.15	6.42	.93		

*Plump>6/64

@Thin<5.5/64

Planted: 4-15-93 on No-till barley stubble (3rd consecutive barley crop).

Harvested: 8-20-93

Fertilizer: 50 lbs/ac 18-46-0 applied with seed, 45 lbs/ac of N as Urea broadcast prior to seeding.

Growing Season Precipitation (April-July): 12.10 inches.

Cooperator: D. Wichman, J. Vavrovsky, T. Blake, P. Hensleigh.

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Table 2 Moccasin Off-Station Barley Multi-Year Summary
Central Agricultural Research Center, Moccasin, MT.

VARIETY	1983 *	1984 *	1985 *	1985 **	1989 **	1990	1992 **	1993 **	Ave.
	----- bu/a -----								
HECTOR	42	27	26	18	48	31	58	66	39
PIROLINE	43	27	22	18	45	30	52	60	37
HARRINGTON	39	26	8	6	45	25	45	62	32
CLARK	45	25	17	12	40	32	49	57	35
LEWIS	43	26	20	16	41	34	55	66	38
BOWMAN			26	26	40	29	56	62	40
STEPTOE			25	23	46	33	52	71	42
GALLATIN		30	18	15	39	34	53	58	35
BEARPAW					44	34	49	63	
MT 81161					53		54	66	
MT 140523					43	38	48	68	
STARK						35	58	60	
BARONESSE							59	76	
Mean	39.3	26.2	17.6	14.6	44.1	31.9	52.6	64.3	

* Recrop

** No-Till

1991 Variety trial on no-till barley stubble experienced severe hail damage.

Table 3 1993 CARC Recrop Spring Wheat Variety Trial
Exp.9907 Central Agricultural Research Center, Moccasin, MT.

ID#	Variety	Heading Date	Plant Height	Grain Yield	Test Weight	Grain Protein
		d	"	bu/a	lbs/bu	%
WA 6920	PENAWAWA	180	34	63.8	57.7	9.6
CI 17904	OWENS	180	34	60.4	58.5	9.6
ND 606	AMIDON	180	39	54.9	59.8	11.6
ND 626	GRANDIN	179	35	53.9	60.4	10.9
MT 8849	RS6880/MT7819	181	36	51.9	59.4	10.6
WPB 926	WESTBRED 926	177	31	50.6	57.4	11.3
MT 8402	HI-LINE	178	33	48.5	59.1	11.3
CI 17430	NEWANA	182	33	48.2	58.1	9.9
PI483235	GLENMAN	182	36	47.1	58.1	10.7
CI 17790	LEN	182	34	46.7	58.9	12.3
CI 17429	LEW	183	38	46.5	61.1	11.0
ND 582	STOA	180	39	46.5	58.4	12.4
CI 13596	FORTUNA	179	33	44.4	58.2	11.9
CI 15930	OLAF	180	33	44.3	57.9	12.7
CANLANC	LANCER	181	39	43.9	60.2	12.3
CI 17828	PONDERA	178	32	43.2	59.6	11.6
ND 618	GUS	181	35	42.6	59.0	13.2
C982-324	RAMBO	180	33	42.6	59.5	11.4
NDCUT	CUTLESS	179	34	41.6	59.1	12.3
PI486139	KLASIC	173	22	41.3	56.1	11.2
EXPERIMENTAL MEANS		179.72		48.15	58.82	11.43
F TEST FOR VAR. df=38		42.55		6.96	17.67	12.10
C.V. 1: (S/MEAN)*100		.33		8.45	.81	4.39
LSD (0.05)		.97		6.72	.78	.83

Proteins run on hard red curve. Protein of soft whites Penawawa & Owens may not be accurate.

Planted: 4-15-93 on No-till barley stubble (3rd consecutive barley crop).

Harvested: 9-18-93

Fertility: 45 lbs/ac N as Urea broadcast prior to planting,
50 lbs/ac 18-46-0 applied with seed.

Growing Season Precipitation (April-July): 12.10 inches.

Cooperator: D. Wichman, J. Vavrovsky, L. Talbert, S. Lanning

Table 4 Moccasin Off-Station Spring Wheat Multi-Year Summary
Central Agricultural Research Center, Moccasin, MT.

VARIETY	1983	1984	1985	1985	1989	1990	1992	1993	AVG. NEWANA	
	*	*	*	**	**		**	**	SAME YRS	
	-----bu/a-----									
OLAF	22	15			39	18	24	44	27	31
AMIDON					39	20	35	55	37	36
PENAWAWA					45	24	39	64	43	36
LEN					34	19	27	47	32	36
OWENS		15			48	23	32	60	36	32
STOA		17	14	14	40	20	31	46	26	27
GLENMAN	26	18	15	13	43	21	36	47	27	27
WESTBRED 926R						20	29	51	33	34
GRANDIN						22	30	54	35	34
LANCER					33	24	32	44	33	36
FORTUNA	23	15	10	9	35	15	27	44	22	27
RAMBO					39	21	34	43	34	36
LEW	26	18	12	12	36	18	34	46	25	27
PONDERA	23	16			39	19	31	43	28	31
GUS						24	26	43	31	34
NEWANA	25	17	14	15	42	19	35	48	27	--
CUTLESS					36	23	24	42	31	36
HI-LINE					39	19	29	49	34	36
MT 8849							39	52	45	41
Mean	24.2	16.8	12.9	12.6	39.6	20.4	31.1	48.1		

* Recrop
** No-till

1991 Variety trial on no-till barley stubble experienced severe hail damage.

Table 5 1993 Moccasin Off-Station Winter Wheat Trial-Recrop
Exp.3872 Central Agricultural Research Center, Moccasin, MT.

ID#	Variety	Heading Date	Plant Ht.	Grain Yield	Test Weight	Protein Content
		d	"	bu/a	lbs/bu	%
PI517194	TIBER	167	34	45.3	60.9	11.6
CI 17860	NEELEY	168	31	44.4	59.8	11.3
CI 17844	REDWIN	167	34	42.2	60.9	11.7
ID 279	BLIZZARD	170	32	40.6	57.6	12.3
CI 17879	ROCKY	165	33	40.4	61.5	12.7
S86-15	KESTREL	168	34	39.8	59.3	11.0
ND 8002	SEWARD	169	34	39.7	59.8	11.6
CI 17735	NORSTAR	170	39	38.7	59.5	11.4
QT 542	HYBRITECH	165	34	38.2	60.0	12.9
CI 17902	WINRIDGE	169	33	38.2	58.3	11.4
CI 17846	MANNING	166	31	38.1	57.2	12.6
CI 15075	CENTURK	165	33	37.7	60.8	12.6
PI491532	CREE	168	36	36.9	60.2	12.4
MT 8039	JUDITH	166	35	35.8	59.1	13.1
RDW(sel)	AC READYMADE	168	34	35.2	59.2	12.8
CI 17727	WESTON	166	32	35.0	60.1	13.7
RH78W296	BIGHORN	166	30	34.9	58.6	13.7
CI 17940	ARCHER	163	29	34.6	59.6	13.0
CI 13670	WINALTA	167	37	33.1	60.6	13.5
CI 13190	WARRIOR	165	35	32.9	59.6	13.7
PI478771	AGASSIZ	168	38	32.4	59.2	13.3
CI 17952	HAWK	162	30	31.9	60.8	13.0
PI518591	ARAPAHO	161	31	26.5	58.5	15.0
EXPERIMENTAL MEANS		166.45	33.39	37.07	59.62	12.62
F TEST FOR VAR.		54.64	13.35	6.51	4.76	17.89
C.V. 1: (S/MEAN)*100		.34	3.64	7.87	1.44	3.24
LSD (0.05)		.94	2.00	4.80	1.42	.67

Planted: 9-30-92 on No-till barley stubble (winter wheat followed two barley crops).

Harvested: 8-20-93. Some varieties had numerous sucker heads and had to be oven dried.

Fertilizer: 45 lbs N broadcast as Urea. 50 lbs 18-46-0 w/seed.
Growing Season Precipitation (April-July): 12.10 inches.

Spring growth was good. The trial experienced moisture stress in late May. Available nitrogen was probably a yield limiting factor.

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Table 6 1993 CARC Off-Station Oats Recrop Trial
Exp 0407 Central Agricultural Research Center, Moccasin, MT.

ID#	Variety	Plant Height "	Head Date d	Grain		Test Weight lbs/bu
				--- Yield---	---	
				lbs/a	bu/a	
W 82056	Robert	43	185	3591	112.2	33.0
CI483126	Monida	45	184	3251	101.6	31.3
OT 308	Calibre	42	182	3172	99.1	33.8
81AB5792	Rio Grande	34	180	3098	96.8	32.3
W 80474	Riel	47	182	2954	92.3	31.6
CI 9252	Otana	44	181	2917	91.2	31.1
NEWDAK	Newdak	44	179	2892	90.4	31.3
CI 8263	Cayuse	41	181	2875	89.8	34.3
DERBY	Derby	43	182	2769	86.5	32.2
CI 9297	Appaloosa	46	181	2747	85.8	32.9
CI467882	Border	44	181	2662	83.2	29.5
PI548769	Troy	42	179	2628	82.1	30.3
CI 9401	Ogle	43	178	2609	81.5	30.2
ND820603	Valley	40	180	2596	81.1	33.2
CI 6611	Park	43	182	2484	77.6	31.6
SD820045	Settler	44	178	2410	75.3	29.3
82AB1142	Ajay	39	177	2378	74.3	30.5
HYTEST	Hyttest	45	177	2371	74.1	34.0
EXPERIMENTAL MEANS		42.78	180.43		87.51	31.81
F TEST FOR VAR.		1.19	2.17		1.47	1.90
C.V. 1: (S/MEAN)*100		10.73	1.44		16.84	6.02
C.V. 2: (S OF MEAN/MEAN)*100		6.20	.83		9.72	3.47
LSD (0.05)		7.62	4.32		24.45	3.18

Grain yield (bu/a) based on 32 lb/bu as standard test weight.
Planted: 4-15-93 on No-till barley stubble (3rd consecutive
barley crop).

Harvested: 8-20-93

Fertilizer: 45 lbs/ac N as Urea broadcast Fall 1992.

50 lbs/ac 18-46-0 applied with seed.

Growing Season Precipitation (April-July): 12.10 inches.

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Table 7 1993 Grass Range Off-Station Oats Recrop Trial
Exp#0475 Central Agricultural Research Center, Moccasin, MT.

ID#	Variety	Plant	Grain		Test
		Height	---Yield---		Weight
		"	lbs/a	bu/a	lbs/bu
CI483126	Monida	35	3146	98.3	37.9
CI 9297	Appaloosa	34	3030	94.7	36.9
CI467882	Border	34	2918	91.2	37.4
CI 8263	Cayuse	35	2912	91.0	37.6
81AB5792	Rio Grande	30	2838	88.7	37.9
OT 308	Calibre	42	2810	87.8	39.3
CI 9252	Otana	42	2774	86.7	39.3
DERBY	Derby	42	2703	84.5	38.0
W 82056	Robert	40	2549	79.7	36.2
NEWDAK	Newdak	35	2543	79.5	34.0
82AB1142	Ajay	25	2527	79.0	37.2
CI 6611	Park	39	2521	78.8	36.6
ND820603	Valley	34	2463	77.0	35.3
PI548769	Troy	36	2460	76.9	36.4
CI 9401	Ogle	32	2342	73.2	35.4
W 80474	Riel	37	2209	69.0	35.9
HYTEST	Hyttest	32	2100	65.6	39.5
SD820045	Settler	31	1913	59.8	38.3
EXPERIMENTAL MEANS				81.18	37.17
F TEST FOR VAR. df=34				4.68	9.83
C.V. 1: (S/MEAN)*100				10.08	2.22
C.V. 2: (S OF MEAN/MEAN)*100				5.82	1.28
LSD (0.05)				13.58	1.37

Grain Yield (bu/a) based on 32 lb/bu as standard test weight.

Planted: 4-16-93

Harvested: 8-31-93

Fertilizer: 50 lbs 18-46-0 with seed.

Producer: Larry, Pat, and Dennis Descheemaeker, Grass Range, Mt.

AR040793.OAD

Table 8 CARC Off-Station Recrop Oats Multi-Year Summary
Central Agricultural Research Center, Moccasin, MT.

Variety	1992	1993	Ave.
	----- Grain Yield - lbs/ac -----		
Appaloosa	3657	2747	3202
Border	3595	2662	3128
Calibre	3938	3172	3555
Cayuse *	3447	2875	3161
Derby	3746	2769	3257
Monida *	3728	3251	3489
Newdak	3432	2892	3162
Ogle	2886	2609	2747
Otana *	3521	2917	3219
Park *	3346	2484	2915
Riel	3378	2954	3166
Rio Grande	3318	3098	3208
Robert	3603	3591	3597
Valley	3072	2596	2834
Mean	3426.1	2800.3	

Table 9 Grass Range Off-Station Recrop Oats Multi-Year Summary
Central Agricultural Research Center, Moccasin, MT.

Variety	1992	1993	Ave.
	----- Grain Yield - lbs/ac -----		
Appaloosa	1796	3030	2413
Border	1857	2918	2387
Calibre	1773	2810	2291
Cayuse *	1543	2912	2227
Derby	2081	2703	2392
Monida *	1799	3146	2472
Newdak	1415	2543	1979
Ogle	1466	2342	1904
Otana *	1786	2774	2280
Park *	1597	2521	2059
Riel	1671	2209	1940
Rio Grande	1600	2838	2219
Robert	1773	2549	2161
Valley	1472	2463	1967
Mean	1645.1	2597.8	

*Recommended Variety

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