

PROJECT TITLE: Evaluation of winter and spring cereals under a no-till recrop environment at Moccasin.

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

PROJECT PERSONNEL: P.L. Bruckner, W.W. Breeder, Bozeman
 T.K. Blake, Barley Breeder, Bozeman
 L.E. Talbert, Spr. Wheat Breeder, Bozeman
 J.E. Berg, W.W. Research Assoc., Bozeman
 P.F. Hensleigh, Barley Res.Assoc., Bozeman
 S.P. Lanning, Spr.Wheat Res.Assoc. Bozeman
 K.E. Neill, Research Associate, Moccasin
 J. Vavrovsky, Research Spec., Moccasin

OBJECTIVES:

To evaluate the agronomic performance of winter wheat, barley, spring wheat, and oat varieties under no-till recrop at Moccasin.

RESULTS:

1997 Nurseries were planted no-till following barley. The winter wheat trial was planted on land continuously cropped for 7 years (4 yr. of barley, followed by winter wheat, barley, and winter wheat). An inch of precipitation in mid-September 96 provided favorable seeding conditions after the record dry summer of 1996. Crop year moisture was below average until June. Abundant rainfall through the remainder of the growing season resulted in above average yields and test weights for all cereals.

Winter Wheat: Yields ranged from 73 to 51 bu/a with Rocky producing the high yield. Test weights averaged 61.8 lbs/bu. Rocky and Neeley have the high four year average yields. Data for the trial, and four year summary, are presented in Tables 1 & 2.

Barley: Yields ranged from 86 to 60 bu/a, with Steptoe producing the high yield. Test weights were above average at 53.0 lbs/bu, while proteins were below average at 8.3%. Varieties with long term high yields are Steptoe, Hector, Lewis, and Chinook. Baronesse has a 2 bu/a advantage over Hector during six years of evaluation in this trial. Steptoes test weight was below standard even in a high test weight year. Data for the 1997 trial, and multi-year summary, are presented in Tables 3 & 4.

Spring Wheat: Yields ranged from 73 to 47 bu/a, with Vanna, a WPB soft white variety, producing the high yield. Test weights averaged 62.2 lbs/bu. Many varieties have long term average yields of 33 to 36 bu/a. McNeal has a 3 bu/a advantage over Newana during six years of testing in the trial. Data for 1997 and multi-year summary are presented in Tables 5 & 6.

Oats: Yields ranged from 3809 to 2978 lbs/a and test weights averaged 37.4 lbs/bu. 86AB4582 produced the high yield. Monida and Otana have the high long term yield. Robert (a variety not entered in 1996 & 97) previously had the high long term yield. Otana has the high long term test weight. Data for 1997 and multi-year summary are presented in Tables 7-9.

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SUMMARY:

Crop year moisture was nearly one inch below normal through May, but by the end of July moisture conditions were two inches above average. June and July precipitation totals varied around the area. The above average yields and test weights experienced in the variety trials were indicative of area yields. Volunteer winter wheat (2 yr old shatter) caused some interference with the winter wheat nursery. Volunteer wheat and invading perennial grasses are one of the challenges for continuous cropping fields.

FUTURE PLANS:

The no-till recrop winter and spring cereal variety trials will be continued on station at CARC, Moccasin.

Table 1 1997 CARC No-Till Winter Wheat Variety Trial
Exp. 3870 Central Agricultural Research Center, Moccasin, MT.

Variety	Head Date	Plant Ht.	Grain Yield	Test Wt.
	day	"	bu/a	lbs/bu
ROCKY	170	36	73.1	61.6
NEELEY	175	39	69.2	62.6
QT 542	170	36	66.4	62.2
MT 9432	174	37	65.0	63.3
CENTURK	171	36	64.8	61.5
BIGHORN	171	31	64.6	61.6
MT 9222	169	35	64.3	62.0
JUDITH	172	35	63.2	60.4
ERHARDT	174	33	63.1	62.7
MT 91192	177	32	61.5	60.6
PROMONTORY	172	32	60.8	62.6
YUMA	167	28	59.9	61.2
HAWK	167	32	59.5	61.2
VANGUARD	177	34	59.1	61.8
ALLIANCE	166	31	57.9	61.1
TIBER	176	37	55.7	60.5
AGASSIZ	174	39	55.5	62.3
MANNING	173	33	55.2	61.0
NORSTAR	179	42	53.8	62.8
REDWIN	177	35	53.5	61.4
MCGUIRE	168	32	52.7	62.3
KESTREL*	177	39	51.5	61.3
NUWEST*	177	36	51.3	60.2
RAMPART*	177	35	54.6	62.2
EXPERIMENTAL MEANS	172.30	34.52	60.90	61.76
F-VALUE FOR VAR. df=40	31.60	5.32	2.48	8.70
C.V. 1: (S/MEAN)*100	.67	6.98	9.83	.76
LSD (0.05)	1.92	3.98	9.88	.78

*Data for Kestrel, Nuwest, and Rampart are from one rep only and not included in the trial means. A high incidence of volunteer winter wheat on one end of the trial resulted in the loss of the other two reps of these varieties. For comparison purposes, Nuwest yield of 51.3 bu/a was below the rep ave. of 60.8 bu/a. Yields of Kestrel (51.5 bu/a) and Rampart (54.6 bu/a) compare with the rep ave. of 59.7 bu/a.

Planted: 9-30-1997 no-till recrop on barley stubble.

Harvested: 8-25-1997.

Fertilizer: 90 units N as Urea broadcast 4-23-1997.

Growing Season Precipitation (April-July): 11.30"

89 yr. ave. = 8.64"

Table 2 CARC Recrop Winter Wheat Multi-Year Summary
 Central Agricultural Research Center, Moccasin, MT.

Variety	1993	1995	1996	1997	Ave.	Neeley Same yrs
	-----bu/a-----					
CENTURK	38	34	33	65	42	44
NORSTAR	39	33*	26	54	38	44
NEELEY	44	33	31	69	44	--
ROCKY	40	39	34	73	46	44
TIBER	45	36	29	56	41	44
JUDITH	36	40	31	63	42	44
HYBRITECH542	38	30	30	66	41	44
BIGHORN	35	40	28	65	42	44
HAWK	32	36	25	59	38	44
AGASSIZ	32	37	28	55	38	44
NUWEST		38	30	51@	40	44
KESTREL	40	44	29	51@	41	44
ERHARDT		35	28	63	42	44
VANGUARD		27*	27	59	38	44
RAMPART		36	27	55@	39	44
McGUIRE		31	28	53	37	44
YUMA			29	60	44	50
PROMONTORY			29	61	45	50
Mean	37.1	35.6	29.3	60.9		

All trials were seeded no-till on barley stubble.
 1994 trial was abandoned due to variable stand resulting from
 extremely wet conditions at seeding.
 *Suspected low germination resulted in low yields.
 @Yields from one rep only.

Table 3 1997 CARC No-Till Spring Barley Trial
 Exp. 3670 Central Agricultural Research Center, Moccasin, MT.

ID#	Variety	Plant Ht.	Head Date	Grain Yield	Test Wt.	Protein Content
		"	day	bu/a	lbs/bu	%
CI 15229	Steptoe	29	177	85.6	47.9	8.2
PI537438	Targhee	33	186	80.0	54.2	8.3
H1851195	H1851195	33	182	78.2	52.6	8.2
MN 56	Stander	31	180	76.0	51.6	8.2
CI 15856	Lewis	31	185	76.0	54.6	8.5
H3860224	H3860224	29	186	74.2	53.6	7.9
PI568246	Baronesse	27	186	73.1	53.4	7.6
PI591823	Chinook	32	184	73.1	53.6	8.0
SK 76333	Harrington	31	185	70.6	53.0	7.9
ND 9866	Stark	32	180	70.0	54.0	8.8
CI 15514	Hector	32	184	68.8	53.3	8.4
MT886610	MT886610	31	184	66.9	54.0	8.1
PI491534	Gallatin	32	182	66.9	53.9	8.2
ND 11055	Foster	30	178	65.1	50.8	8.1
PI483237	Bowman	33	179	63.8	53.9	9.5
N1123111	Logan	29	181	59.7	53.7	8.5
EXPERIMENTAL MEANS		30.94	182.48	71.75	53.01	8.28
F TEST FOR VAR. df=30		2.75	16.53	2.81	19.16	5.76
C.V. 1: (S/MEAN)*100		5.96	.71	9.54	1.25	3.84
LSD (0.05)		3.08	2.15	11.42	1.11	.53

Planted: 4-23-1997 no-till on barley stubble.
 Fertilizer: 60 units N as Urea broadcast.
 Harvested: 8-20-1997.
 Growing Season Precipitation (April-July: 11.30"
 89 yr. ave. = 8.64"

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

Variety	1989	1990	1992	1993	1994	1995	1996	1997	Ave.	Hector Same Yrs
	-----bu/a-----									
HECTOR	48	31	58	66	47	66	30	69	52	--
PIROLINE	45	30	52	60	39	67	33		47	49
HARRINGTON	45	25	45	62	44	65	31	71	48	52
LEWIS	41	34	55	66	44	58	33	76	51	52
BOWMAN	40	29	56	62	35#	63	33	64	48	52
STEPTOE	46	33	52	71	38	66	34	86	53	52
GALLATIN	39	34	53	58	48	56	30	67	48	52
CHINOOK	43	38	48	68	40	68	28	73	51	52
STARK		35	58	60	38	58	32	70	50	52
BARONESSE			59	76	44	63	33	73	58	56
TARGHEE						70	28	80	59	55
H3860224						64	27	74	55	55
H1851195						66	29	78	58	55
MT886610						64	28	67	53	55
Mean	44.1	31.9	52.6	64.3	42.1	63.5	30.6	71.7		

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*1990 Variety trial was planted on fallow, all other years recrop no-till.
1991 Variety trial on no-till barley stubble experienced severe hail damage.
#Bowman experienced animal damage in 1994 trial.

Table 5 1997 CARC Recrop Spring Wheat Variety Trial
Exp. 9970 Central Agricultural Research Center, Moccasin, MT.

ID#	Variety	Head Date	Plant Ht.	Grain Yield	Test Wt.
		day	"	bu/a	lbs/bu
BZ684-23	VANNA	182	32	72.9	61.6
MTHW9420	MT8182/MT8289	178	32	66.2	63.1
PI574642	MCNEAL	181	35	62.6	62.0
MTHW9520	CAN1/MT8182	184	35	58.8	62.6
WB 926	WESTBRED 926	178	32	58.3	61.7
PI483235	GLENMAN	182	33	57.0	62.4
WBEXPRES	WESTBRED EXPRESS	178	28	57.0	61.8
PI549275	HI-LINE	178	32	56.8	62.3
TR983239	FERGUS	179	34	56.5	62.2
PNR 2375	PIONEER 2375	177	36	55.9	62.1
ND 673	TRENTON	180	43	54.9	62.8
C982-324	RAMBO	184	32	54.8	61.9
WB 936	WESTBRED 936	179	30	52.7	61.4
CI 17429	LEW	184	40	52.1	63.1
ND 626	GRANDIN	179	36	51.9	62.8
ND 606	AMIDON	181	40	51.7	61.9
MT 9433	MT8808/MARBERG	184	39	51.5	62.4
ND 582	STOA	179	39	49.3	61.5
CI 17430	NEWANA	184	32	48.9	62.7
CI 13596	FORTUNA	180	40	48.2	62.4
ND 677	ERNEST	182	40	48.0	62.2
CI 17790	LEN	182	33	47.6	61.1
MT 9508	FORTUNA/PONDERA//PONDERA	178	32	46.6	62.5
EXPERIMENTAL MEANS		180.64	35.04	54.80	62.20
F TEST FOR VAR. df=44		10.86	30.15	5.74	2.43
C.V. 1: (S/MEAN)*100		.71	3.45	8.34	.97
LSD (0.05)		2.12	1.99	7.52	.99

Planted: 4-23-1997 no-till on barley stubble.

Harvested: 8-28-1997.

Fertilizer: 90 units of N as Urea broadcast postplant.

Growing Season Precipitation (April-July): 11.30"
89 yr. ave. = 8.64"

Table 6 Moccasin Off-Station Spring Wheat Multi-Year Summary
Central Agricultural Research Center, Moccasin, MT.

Variety	1989	1990	1992	1993	1994	1995	1996	1997	Ave.	Newana Same Yrs
	-----bu/a-----									
AMIDON	39	20	35	55	23	40	22	52	36	36
LEN	34	19	27	47	23	45	21	48	33	36
STOA	40	20	31	46	21	36	21	49	33	36
GLENMAN	43	21	36	47	24	39	23	57	36	36
WESTBRED 926		20	29	51	23	42	23	58	35	35
GRANDIN		22	30	54	20	40	20	52	34	35
FORTUNA	35	15	27	44	24	35	22	48	31	36
RAMBO	39	21	34	43	23	39	21	55	34	36
LEW	36	18	34	46	20	36	19	52	33	36
NEWANA	42	19	35	48	25	47	23	49	36	--
HI-LINE	39	19	29	49	21	39	22	57	34	36
MCNEAL			39	52	22	45	24	63	41	38
FERGUS						41	20	56	39	40
WB EXPRESS						39	23	57	40	40
VANNA						44	22	73	46	40
ERNEST						40	20	48	36	40
WESTBRED 936						43	23	53	40	40
PIONEER 2375						40	23	56	40	40
MT 9433							24	51	37	36
MTHW 9420							23	66	44	36
Mean	39.6	20.4	31.1	48.1	22.4	40.4	21.9	54.8		

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*1990 Variety trial on fallow, all other years recrop no-till.
1991 Variety trial on no-till barley stubble experienced severe hail damage.

Table 7 1997 CARC Recrop Oat Variety Trial
Exp. 0407 Central Agricultural Research Center, Moccasin, MT.

ID#	Variety	Plant	Head	Grain		Test
		Ht.	Date	---Yield---		Wt.
		"	day	bu/a	lbs/a	lbs/bu
86AB4582	Monida/Reselection	39	186	119.0	3809	38.6
90Ab1322	80Ab1322/Monida	34	188	115.1	3682	38.5
ND860416	Otana/Valley	44	187	112.2	3591	38.8
CI483126	Monida	43	190	111.6	3570	37.9
ABSP 9-2	83/Ab3119/Monida	36	186	111.1	3556	38.4
ND870258	Whitestone	40	189	110.0	3519	37.8
86AB664	Ogle/75Ab861	38	188	107.3	3434	36.6
87AB5125	Ogle/75Ab861	35	189	106.7	3415	37.2
83AB3250	Powell	34	190	105.7	3382	35.7
CI 9252	Otana	45	186	101.9	3262	39.3
81Ab5792	Rio Grande	35	184	98.6	3156	36.3
CELSIA	Celsia	41	189	97.5	3119	36.2
PRAIRIE	Prairie	37	183	96.2	3077	35.0
82Ab1142	Ajay	29	189	93.1	2978	37.4
EXPERIMENTAL MEANS		37.88	187.48	106.14		37.40
F TEST FOR VAR. df=26		19.04	21.14	1.87		4.73
C.V. 1: (S/MEAN)*100		4.62	.45	9.22		2.76
LSD (0.05)		2.94	1.41	16.42		1.73

Oat grain yield (bu/a) based on 32 lb/bu as standard test weight.

Planted: 4-23-1997 no-till on barley stubble.

Fertilizer:

Harvested: 8-22-1997.

Growing Season Precipitation (April-July): 11.30"

89 yr. ave. = 8.64"

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

Variety	1992	1993	1994	1995	1996	1997	Ave.	Otana same yrs
----- Grain Yield - lbs/ac -----								
Appaloosa	3657	2747	1776	3024	1846		2610	2756
Border	3595	2662	1951	3418	1773		2680	2756
Cayuse *	3447	2875	2324	3302	2010		2792	2756
Monida *	3728	3251	1809	3360	1850	3570	2928	2840
Newdak	3432	2892	2155	3379	2016		2775	2756
Otana *	3521	2917	1838	3402	2102	3262	2840	----
Rio Grande	3318	3098	1860	3405	2211	3156	2841	2840
Robert	3603	3591	2313	3670			3294	2919
Ajay	3295	2378	1483	3322	1846	2978	2550	2840
90Ab1322			1935	3366	2016	3682	2750	2651
Whitestone				3373	1850	3519	2914	2922
Powell				3101	1962	3382	2815	2922
ND860416					1990	3591	2790	2682
86AB4582					1997	3809	2903	2682
Mean	3426	2800	1926	3041	1799	3396		

Table 9 Recrop Oats Multi-Year Test Weight Summary
Central Agricultural Research Center, Moccasin, MT.

Variety	1992	1993	1994	1995	1996	1997	Ave.	Otana same yrs
----- lbs/bu -----								
Appaloosa	35.1	32.9	33.6	32.4	31.2		33.0	35.2
Border	35.7	29.5	34.4	33.0	30.6		32.6	35.2
Cayuse *	35.8	34.3	34.0	34.9	30.8		34.0	35.2
Monida *	36.0	31.3	35.4	33.1	31.5	37.9	34.2	35.9
Newdak	32.9	31.3	35.9	34.0	33.4		33.5	35.2
Otana *	36.8	31.1	37.1	35.5	35.4	39.3	35.9	----
Rio Grande	38.0	32.3	35.3	35.8	31.3	36.3	34.8	35.9
Robert	34.7	33.0	34.9	32.5			33.8	35.1
Ajay	37.8	30.5	33.7	36.6	33.9	37.4	35.0	35.9
90Ab1322			36.1	34.8	30.4	38.5	34.9	36.8
Whitestone				34.9	34.3	37.8	35.7	36.7
Powell				32.1	30.5	35.7	32.8	36.7
ND860416					37.1	38.8	37.9	37.3
86AB4582					32.2	38.6	35.4	37.3

*Recommended Variety
#Hull-less Varieties
All trials planted recrop no-till.