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

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

RESULTS:
1996 variety trials were planted no-till following barley. Crop year moisture was at its long term average through May, but above normal temperatures and below normal precipitation during June and July resulted in below average yields and test weights for all cereals. Only 1.58 inches of precipitation were received during June and July (32% of average).

Winter Wheat: Yields ranged from 34 to 25 bu/a with Rocky producing the highest yield. Test weights averaged 58.2 lbs/bu while proteins averaged 12.9%. Data for the winter wheat variety trial, and three year summary, are presented in Tables 1 & 2.

Barley: Yields ranged from 34 to 27 bu/a, with Steptoe producing the highest yield. Test weights averaged 45.5 lbs/bu, while proteins averaged 10.8%. Hector, Steptoe, and Chinook are varieties with long term high yields. Over the last five years, Baronesse has a 2 bu/a advantage over Hector. Data for the trial, and multi-year summary, are presented in Tables 3 & 4.

Spring Wheat: Yields ranged from 24 to 19 bu/a, with MT 9433 producing the highest yield. Newana and Amidon are long term high yielders. Over the last five years, McNeal has an average yield equal to Newana. Test weights averaged 58 lbs/bu, while proteins averaged 14.1%. McNeal and Stoa had very low test weights, at 56.1 and 56.7 lbs/bu, respectively. Data for the spring wheat trial, and multi-year summary, are presented in Tables 5 & 6.

Durum: Yields ranged from 24 to 20 bu/a, with Lloyd producing the highest yield. Test weights averaged 58.8 lbs/bu. Prior to this year, durum research had been conducted at Moccasin, but not since 1990. Data for the 1996 trial are presented in Table 7.

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Oats: Yields ranged from 2211 to 890 lbs/a. Rio Grande was the high yielder. Varieties with long term high yield performance are Robert and Monida. Otana has the long term high test weight. Data for the 1996 trial, and multi-year yield and test weight summaries, are presented in Tables 8-10.

SUMMARY:
Due to low rainfall in the June-August period, yields and test weights were low. However, they were better than expected, given the long dry period.

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

Table 1 1996 CARC No-Till Winter Wheat Variety Trial
Exp. 3870 Central Agricultural Research Center, Moccasin, MT.

Variety	Dockage *	Head Date	Plant Ht.	Grain Yield	Test Wt.	Protein Content
	%	d	"	bu/a	lbs/bu	%
ROCKY	.47	169	28	34.1	58.7	12.4
WESTON	.67	171	32	32.7	59.5	12.5
CENTURK	.30	169	28	32.6	59.2	11.9
MT 91192	.30	174	24	32.3	57.0	12.7
JUDITH	.40	170	29	31.1	56.1	13.4
MANNING	1.47	171	26	30.6	57.2	12.5
NEELEY	.87	174	28	30.6	59.0	12.1
NUWEST	.40	173	28	29.9	58.9	12.5
QT 542	.20	170	28	29.7	57.1	13.0
YUMA	.97	168	24	29.4	57.3	12.4
PROMONTORY	1.60	171	26	29.4	60.0	12.7
REDWIN	3.30	172	27	28.8	58.5	13.9
KESTREL	.23	174	25	28.7	55.1	12.8
TIBER	.50	174	28	28.7	59.2	13.7
MT 9222	.87	169	28	28.5	57.0	12.6
MCGUIRE	.67	169	28	28.1	58.7	13.7
ERHARDT	.07	172	24	28.0	59.9	13.0
AC READYMADE	.30	173	27	27.8	59.2	13.4
BIGHORN	.47	172	24	27.8	58.1	13.2
AGASSIZ	.47	173	31	27.8	57.6	13.3
VANGUARD	.70	170	27	27.5	58.3	13.2
RAMPART	.87	171	28	27.4	57.9	13.2
NORSTAR	.30	178	31	25.6	58.5	13.5
HAWK	12.80	169	25	25.2	58.5	13.3
TOMAHAWK @				28.6	59.5	12.3
EXPERIMENTAL MEANS	1.2	171.5	27.2	29.3	58.2	12.9
F TEST FOR VAR. df=46	1.1	68.6	4.9	2.1	4.3	3.4
C.V. 1: (S/MEAN)*100	353.0	.3	6.1	9.0	1.7	3.8
LSD (0.05)	7.0	.8	2.7	4.3	1.6	.8

*Dockage = % clean out after yield analysis. Dockage test was conducted to see if there was any difference in threshability.
@Tomahawk was planted on one end of nursery (not randomized).
Planted: 10-3-95 no-till on barley stubble
Harvested: 7-31-96
Fertilizer: 50# 18-46-0 w/seed, 80 units N broadcast spring 1996
Growing Season Precipitation (April-July): 5.66 inches.

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

Variety	1993	1995	1996	Ave.
		----------bu/a----------		
CENTURK	38	34	33	35
NORSTAR	39	33*	26	33
NEELEY	44	33	31	36
ROCKY	40	39	34	38
TIBER	45	36	29	37
JUDITH	36	40	31	36
HYBRITECH542	38	30	30	33
BIGHORN	35	40	28	34
HAWK	32	36	25	31
AGASSIZ	32	37	28	32
NUWEST		38	30	34
KESTREL	40	44	29	38
AC READYMADE	35	36	28	33
ERHARDT		35	28	31
VANGUARD		27*	27	27
RAMPART		36	27	31
McGUIRE		31	28	29
Mean	37.1	35.6	29.3	

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

Table 3 1996 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
		"	d	bu/a	lbs/bu	%
CI 15229	Steptoe	20	180	34.3	40.9	9.9
CI 15856	Lewis	22	183	33.4	47.7	10.5
N1123111	Logan	20	182	33.3	47.3	10.4
NS 78054	Baronesse	19	187	33.2	44.7	10.9
PI483237	Bowman	22	180	32.8	47.5	10.5
CI 9558	Piroline	21	181	32.6	47.1	10.5
ND 9866	Stark	23	181	32.1	47.9	10.2
SK 76333	Harrington	19	183	30.9	44.7	10.6
PI491534	Gallatin	22	181	30.5	46.6	10.2
CI 15514	Hector	21	184	29.8	44.9	11.2
H1851195	H1851195	20	184	29.0	44.8	11.6
MT886610	MT886610	21	184	28.2	44.9	11.1
PI591823	Chinook	20	186	28.1	45.5	11.3
PI537438	Targhee	19	185	27.9	43.7	11.2
H3860224	H3860224	20	186	27.4	45.6	11.3
MN 56	Stander	18	182	26.9	43.9	11.0
EXPERIMENTAL MEANS		20.42	183.08	30.64	45.48	10.78
F TEST FOR VAR. df=30		4.48	17.79	2.14	11.55	3.34
C.V. 1: (S/MEAN)*100		5.18	.52	9.64	2.09	4.16
LSD (0.05)		1.76	1.58	4.93	1.58	.75

Planted: 4-18-96 no-till on barley stubble.
Fertilizer: 50# 18-46-0 w/seed, 60 units N as Urea broadcast.
Harvested: 8-8-96.
Growing Season Precipitation (April-July): 5.66"
88 yr. ave. = 8.68"

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

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

*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 1996 CARC No-Till Recrop Spring Wheat Variety Trial
Exp. 9970 Central Agricultural Research Center, Moccasin, MT.

Variety	Head Date	Plant Ht.	Grain Yield	Test Wt.	Protein Content
	d	"	bu/a	lbs/bu	%
MT 9433	182	26	23.9	59.1	14.0
MCNEAL	183	25	23.7	56.1	14.0
MT 9565	180	29	23.7	58.1	14.3
PIONEER 2375	179	24	23.3	58.5	13.5
NEWANA	183	22	23.0	58.6	13.4
WESTBRED 936	180	24	22.8	57.7	14.0
WESTBRED 926	179	25	22.8	58.1	14.7
MTHW9420	181	25	22.7	56.7	13.9
GLENMAN	183	23	22.7	57.8	13.3
WESTBRED EXPRESS	180	25	22.6	58.3	13.8
HI-LINE	180	25	22.3	58.1	14.4
AMIDON	182	25	22.1	58.8	14.0
FORTUNA	181	26	21.8	59.1	13.4
VANNA	181	23	21.6	53.6	13.2
MT 9410	180	26	21.5	59.5	13.5
LEN	182	25	21.3	57.1	15.2
RAMBO	183	23	21.3	58.0	13.7
MTHW9503	180	25	21.2	57.7	14.5
STOA	182	28	21.1	56.7	14.7
TRENTON	182	26	20.7	58.1	14.3
FERGUS	180	25	20.4	58.9	14.7
MT 9311	185	23	20.4	60.9	13.9
GRANDIN	181	26	20.4	58.1	13.9
ERNEST	182	27	20.0	58.6	14.6
LEW	183	25	19.2	58.1	14.6
COPPER*			22.0	55.5	13.5
EXPERIMENTAL MEANS	181.32	25.11	21.86	58.01	14.07
F TEST FOR VAR. df=48	29.61	4.12	1.89	13.54	4.04
C.V. 1: (S/MEAN)*100	.25	5.63	7.25	1.09	3.25
LSD (0.05)	.75	2.32	2.60	1.04	.75

*Copper was planted on one end of trial (not randomized).
Planted: 4-18-96 no-till on barley stubble.
Fertilizer: 50# 18-46-0 w/seed, 90 units N as Urea broadcast.
Harvested: 8-12-96.
Growing Season Precipitation (April-July): 5.66"
88 yr. ave. = 8.68"

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

Variety	1989	1990	1992	1993	1994	1995	1996	Ave.	Newana Same Yrs
	bu/a								
AMIDON	39	20	35	55	23	40	22	33	34
LEN	34	19	27	47	23	45	21	31	34
STOA	40	20	31	46	21	36	21	31	34
GLENMAN	43	21	36	47	24	39	23	33	34
WESTBRED 926		20	29	51	23	42	23	31	33
GRANDIN		22	30	54	20	40	20	31	33
FORTUNA	35	15	27	44	24	35	22	29	34
RAMBO	39	21	34	43	23	39	21	31	34
LEW	36	18	34	46	20	36	19	30	34
NEWANA	42	19	35	48	25	47	23	34	--
HI-LINE	39	19	29	49	21	39	22	31	34
MCNEAL			39	52	22	45	24	36	36
FERGUS						41	20	30	35
WB EXPRESS						39	23	31	35
Mean	39.6	20.4 *	31.1	48.1	22.4	40.4	21.9		

*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 1996 CARC No-Till Recrop Durum Variety Trial
Exp. 9976 Central Agricultural Research Center, Moccasin, MT.

Variety		Head Date	Plant Ht.	Grain Yield	Test Wt.
		d	"	bu/a	lbs/bu
PI476211	LLOYD	183	22	24.2	58.8
PI478289	MONROE	180	29	23.4	58.9
WPBLAKER	LAKER	185	23	23.2	58.9
DT 433	MEDORA	182	30	22.7	59.5
D87130	D8024/MONROE	182	27	22.6	60.0
PI510696	RENVILLE	182	27	22.3	58.7
CI 15892	WARD	182	29	21.7	60.2
CANKYLE	KYLE	184	28	21.3	58.1
CI 17789	VIC	183	28	21.1	58.3
AGPVOSS	VOSS	183	22	20.8	59.5
CANPLENT	PLENTY	183	28	20.3	58.6
NDMUNICH	MUNICH	182	24	20.2	58.4
CI 17282	CROSBY	185	21	19.9	57.1
EXPERIMENTAL MEANS		182.79	26.00	21.81	58.85
F TEST FOR VAR. df=24		42.38	17.46	1.18	7.88
C.V. 1: (S/MEAN)*100		.19	4.90	9.95	.87
LSD (0.05)		.59	2.15	3.66	.87

Planted: 4-18-96 no-till on barley stubble.
Fertilizer: 50# 18-46-0 w/seed, 90 units N as Urea broadcast.
Harvested: 8-12-96.
Growing Season Precipitation (April-July): 5.66".
88 yr. ave. = 8.68"

Table 8 1996 CARC Recrop Oat Variety Trial
Exp. 0407 Central Agricultural Research Center, Moccasin, MT.

ID#	Variety	Plant Ht.	Head Date	Test Wt.	Grain ---Yield---	
		"	d	lbs/bu	bu/a	lbs/a
81AB5792	Rio Grande	23	183	31.3	69.1	2211
CI 9252	Otana	29	185	35.4	65.7	2102
90AB1322	80Ab988/Monida	19	186	30.4	63.0	2016
NEWDAK	Newdak	25	181	33.4	63.0	2016
CI 8263	Cayuse	25	185	30.8	62.8	2010
86AB4582	Monida Reselection	25	185	32.2	62.4	1997
ND860416	Otana/Valley	25	184	37.1	62.2	1990
83AB3250	Cayuse/Monida	21	187	30.5	61.3	1962
ND870258	Whitestone	21	186	34.3	57.8	1850
CI483126	Monida	24	187	31.5	57.8	1850
CI 9297	Appaloosa	22	187	31.2	57.7	1846
82AB1142	Ajay	18	184	33.9	57.7	1846
CI467882	Border	22	187	30.6	55.4	1773
86AB1616	79Ab3811/S7884	23	189	40.9	43.2	1382
ND862915	Paul	28	187	43.2	32.7	1046
88AB3073	Pennlo/PI 447276	21	188	47.9	27.8	890
EXPERIMENTAL MEANS		23.17	185.65	34.65	56.23	
F TEST FOR VAR. df=30		5.48	67.14	32.30	5.79	
C.V. 1: (S/MEAN)*100		9.53	.23	4.55	14.88	
LSD (0.05)		3.68	.70	2.63	13.95	

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

Planted: 4-18-96 no-till on recrop barley ground.
Fertilizer: 50# 18-46-0 w/seed
Harvested: 8-7-96
Growing Season Precipitation (April-July): 5.66"
88 yr. ave. = 8.68"

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

Variety	1992	1993	1994	1995	1996	Ave.
	---------- Grain Yield - lbs/ac ----------					
Appaloosa	3657	2747	1776	3024	1846	2610
Border	3595	2662	1951	3418	1773	2680
Cayuse *	3447	2875	2324	3302	2010	2792
Monida *	3728	3251	1809	3360	1850	2800
Newdak	3432	2892	2155	3379	2016	2775
Otana *	3521	2917	1838	3402	2102	2756
Rio Grande	3318	3098	1860	3405	2211	2778
Robert	3603	3591	2313	3670		3294
Ajay	3295	2378	1483	3322	1846	2465
80Ab988/Monida			1935	3366	2016	2439
Whitestone				3373	1850	2611
Paul #				2010	1046	1528
Pennlo/PI 447276 #				1549	890	1219
Mean	3426	2800	1926	3041	1799	

Table 10 Recrop Oats Multi-Year Test Weight Summary
Central Agricultural Research Center, Moccasin, MT.

Variety	1992	1993	1994	1995	1996	Ave.
Appaloosa	35.1	32.9	33.6	32.4	31.2	33.0
Border	35.7	29.5	34.4	33.0	30.6	32.6
Cayuse *	35.8	34.3	34.0	34.9	30.8	34.0
Monida *	36.0	31.3	35.4	33.1	31.5	33.5
Newdak	32.9	31.3	35.9	34.0	33.4	33.5
Otana *	36.8	31.1	37.1	35.5	35.4	35.2
Rio Grande	38.0	32.3	35.3	35.8	31.3	34.5
Robert	34.7	33.0	34.9	32.5		33.8
Ajay	37.8	30.5	33.7	36.6	33.9	34.5
80Ab988/Monida			36.1	34.8	30.4	33.8
Whitestone				34.9	34.3	34.6
Paul #				35.9	43.2	39.5
Pennlo/PI 447276				35.4	47.9	41.6

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