PROJECT TITLE: Evaluation of agronomic performance of winter wheat, spring wheat, and barley varieties under no-till and tilled recrop near Moccasin, Denton, and Geraldine, Montana.

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OBJECTIVES

Evaluate the relative agronomic performance of cereal grain varieties and development lines under no-till and recrop environments in central Montana.

METHODS

Trials are seeded with a five row double disk drill designed for no-till applications with serrated offset disk openers. Row spacing is 11 inches (accommodates a 4 ft header). The target seed depth is ½ to 1 inch into the soil. Starter, "pop-up", fertilizer is placed with the seed at a rate of NPKS: 10+10+10+05 lbs per acre. Top dress nitrogen is applied by the grower and at the rate the grower uses in the surrounding field. Pesticides are applied by the grower when treating the surrounding field. This provides for more closely evaluating the cereal varieties in the controlled conditions the producer would use. When possible, the nursery seeding date is within a day or two of the producer's seeding date. Harvest is typically after the producer has harvested the surrounding field. Yield is determined from three replications, test weight from two reps, and protein content from one rep per nursery.

RESULTS

The 2008 crop year was generally droughty with a wet May. The droughty weather coupled with cold windy March-April days caused some mortality in winter wheat and hindered spring crop germination and emergence. Sawfly damage was greater in the Denton and Geraldine spring nurseries than has been experienced in past nurseries. Overall, 2008 data would be considered weak for variety comparison purposes because factors affecting uniformity of stand and plant available soil water.

Winter wheat stands were not 100 percent at any of the three locations. The Denton location, which followed a camelina crop, was very heavily infested with late fall and early spring with downy brome and was abandoned without any data collected. The Moccasin location experienced significant plant mortality for which causing agent was not determined. A combination of factors, including wire worms, cutworms, and spring stress from mid-late April freezing and wind blasting, are suspected. The plots were trimmed to five foot lengths to obtain sufficient stand uniformity for harvesting.

Moccasin no-till continuous crop winter wheat yields ranged from Bynum's 24.4 bu/a to Yellowstone's 38.6 bu/a acre (Table 1). Test weights were much more variable than is typical within variety trials. The average protein level of 11.5 % is below the minimum target of 12% considered necessary for accurate variety yield potential evaluations.

The Geraldine winter wheat variety nursery averaged 61.1 bu/a acre on no-till fallow wheat ground with `Neeley' producing the highest mean yield at 69.1 bu/a and `Rampart' the lowest yield at 48.2 bu/a.. The straw residue at seeding was quite heavy and did inhibit the plant establishment of some seedlings. Even though sawfly damage was very severe on nearby spring wheat trials, sawfly stem cutting was less than 12 percent for all entries and averaged 4.3 % for the nursery (Table 2). The nursery grain protein mean was 12.2 percent with `Bynum', `Hyalite' and `Rampart' all having $\geq$13 percent protein. `Yellowstone' has multi-year yield means greater than all other entries across four and three harvest years at Moccasin and Denton, respectively (Tables 3 & 4). Led by `Wahoo', at 66.3 bu/a, there are six varieties with four year mean yields greater than Yellowstone's 64.5 bu/a at Geraldine (Table 5). `Jagalene' has consistently had the highest test weight in winter wheat variety performance trials in central Montana and averaged 61.4 lbs/bu across ten no-till and recrop location years (Table 6). Bynum, followed by Hyalite and Rampart, had the high mean protein content at 13.9 across eleven location years (Table 7). `Falcon' and `Pryor' average multi-location height was 30 inches and two inches shorter than the next three shortest varieties (Table 8).

Spring wheat variety trials in no-till and continuous crop are conducted near Moccasin, Denton and Geraldine. At Moccasin and Denton the trials typically follow grain lentils. At Geraldine the trial usually follows winter wheat. The 2008 crop year was difficult for spring wheat due to cold dry spring weather with below average precipitation from early June through crop maturity. The short lentil stubble at Moccasin trapped the April wind driven snow in varying depths which caused variable plant available soil water and variable seedling emergence. Low protein contents for the amount of nitrogen applied and yields obtained suggest there was N loss from the top dress urea.

Spring wheat yield differences at Moccasin and Denton were not statistically significant which reflects the variable April snow depths coupled with the drought reduced low yields. At Moccasin, `Hank', an early to head variety, produced 24.6 bu/a for the high yield and `Freyr' had the low yield at 13.7 (Table 9). Only five of 20 entries had test weights greater than 59 lbs/bu. `Choteau's grain had the highest protein content at 14.8% and `Vida' had the lowest protein content at 13.2%.

There was significant sawfly cutting at Denton (Table 10). However, most of the cut stems were picked up at harvest with cutting height of slightly more than 3 inches. `ONeal' , `Jedd' and Vida produced more than 18 bu/a. Kelby and Jedd had test weights greater than 61 lbs/bu. Fortuna and Choteau topped the nursery protein levels with 14.6 % and 14.5%, respectively.

Sawfly cutting was very severe in the Geraldine spring wheat. The nursery averaged 33 cut stems per 10 foot of row. Conan, Corbin and Vida had the lowest amount of cut stems with 10, 11, and 11, respectively, in ten feet row (Table 11). Most of the cut stems were pickup at harvest with a three to four inch cutting height, so yields do not reflect the degree of stem cutting. Geraldine yields were about 30% better than Denton locations yields, but were still much below the 30 bu/a yield goal. Kelby grain had the highest protein content at 13.0%.

In multi-year spring wheat yield comparisons by location, McNeal's mean yield exceeded all other entries at Moccasin, except `Vida' (Table 12). At Denton, five entries had multi-year yield means greater than `McNeal's mean yield (Table 13). The two and three year mean yields of all entries exceeded the mean yield of `McNeal' at Geraldine (Table 14). `Agawan' and `Freyr' had the highest test weights across 10 location years and `Conan' the highest across 13 location years (Table 15). Conan and McNeal had 13 location years mean protein contents $\geq$ 15.0%, while all spring wheat entries had multi-location protein means $\geq$ 14.0% (Table 16). The mean plant height had a six inch range between Choteau at 26.4 inches and Fortuna at 32.5 inch height (Table 17).

Barley variety performance trials in central Montana are conducted near Moccasin, on the CARC, and near Denton. The Moccasin location is established no-till following winter wheat and the Denton location follows either lentils or winter wheat. This nursery has recently been expanded from a 16 entry trial to a 20 entry trial to accommodate evaluation of both feed and malt barley varieties. Seeding date at the Denton location is seeded later in the spring (late April) to provide for better control of downy brome.

2008 Was not conducive to optimum barley performance due to extreme cold temperatures in late April and dry mid-June through July drought. The no-till recrop barley yields at Moccasin and Denton were about 10 bushels below yield goals. `Boulder' had the high grain yield at Moccasin with 46.8 bu/a (Table 18). `Baronesse' and `Merit' were the high producers at Denton (Table 19). `Haxby' had the high test weight, 52.2 and 53.4, respectively, at both Moccasin and Denton. Protein contents were too high for malt at both locations. Sieve size has not been determined for 2008 harvest.

`Haxby' is used as the standard for multi-year barley mean yield comparisons. With the exception of `Boulder' at Denton, Haxby's mean yields for the 2005 to 2008 crop years exceeded the mean yields of all other barley entries at Moccasin and Denton (Table 20 & 21). `Haxby' and `Craft' had the high test weight mean across multi-locations and years (Table 22). `Merit' and `Metcalfe' had the high overall mean grain protein content.

SUMMARY:

2008 Growing season weather contributed to a high degree of variability in performance for both winter and spring cereal crops. Yellowstone continues to set a high winter wheat yield standard for the Moccasin and Denton locations. At Geraldine, Pryor, CDC Falcon, Genou, Norris, Jagalene and Wahoo have 4y yield means greater than Yellowstone. Spring wheat sawfly damage was measurable at both Denton and Geraldine with Conan, Choteau, Vida, Corbin, and ONeal exhibiting less stem cutting. McNeal is still the yield standard at Moccasin, but is intermediate producer at Denton and lower yielder at Geraldine. Haxby barley continues to be a top yielder and high test weight barley in central Montana with Boulder showing similar potential.

FUTURE PLANS:

These trials will be continued in 2009 provided funding is available.

Table 1 2008 Moccasin no-till recrop winter wheat performance evaluations.
Exp 387008 Central Agricultural Research Center. Moccasin, Montana

Cultivar/Line	Origin/Pedigree	Entry	Plant Height	Grain Yield	Test weight	Protein Content
			"	bu/ac	lb/bu	%
Yellowstone	Montana 2005	10	28	38.6	57.1	11.3
Rocky	Agripro, 1978	8	31	35.3	57.7	11.2
Norris (CL)	Montana/WestBred, 2005	16	30	35.3	58.6	11.0
CDC Falcon	Sask/WestBred, 1999	2	24	35.1	57.4	11.0
MT0495	MT9640/NB1133	20	26	34.9	58.3	10.8
Jagalene	AgriPro, 2002	6	26	34.0	58.5	11.3
Carter	WestBred, 2006	24	24	32.1	58.1	11.7
Jerry	North Dakota, 2001	13	31	31.9	57.2	11.1
MT0552	(Wesley sib, N95L159)/CDC Clair	23	25	31.8	57.0	11.6
Pryor	WestBred, 2002	9	25	31.5	60.4	10.8
Promontory	Utah, 1990	11	26	30.6	57.3	10.6
Wahoo	Nebraska, 2001	14	27	30.2	57.1	12.4
NuSky (HWW)	Montana, 2001	12	30	29.8	59.2	11.5
Hyalite (CL, HWW)	Montana/WestBred, 2005	15	28	28.3	57.6	11.1
Neeley	Idaho, 1980	4	30	28.1	56.7	10.8
Rampart	Montana, 1996	3	28	27.2	57.5	11.8
MTS0531 (HWW)	L'Govskaya 167/Rampart//MT9409	21	27	26.1	57.2	11.2
Tiber	Montana, 1988	7	33	26.0	58.1	12.5
Genou	Montana, 2004	1	29	25.8	56.6	11.9
MTS04120	L'Govskaya 167/Rampart	19	29	25.0	58.6	12.2
Ledger	WestBred, 2004	5	27	24.9	58.1	10.6
Bynum (CL)	Montana/WestBred, 2005	17	28	24.4	58.4	12.4
MTS04114 (HWW)	L'Govskaya 167/Rampart//MT9409	18	26	24.3	57.5	12.7
MTS0532 (HWW)	L'Govskaya 167/Rampart//MT9409	22	26	23.6	59.5	11.6
Average			28.0	29.8	57.9	11.5
P-value (Varieties)				<.0001	0.3169	
C.V. (%)				7.9	2.05	
LSD (0.05)				3.9 1/	ns	

Seed date: 18-Sept-07 no-till recrop on grain barley stubble.
Fertilizer: NPKS w/seed 10+10+10+05 Top dress urea N 80 lbs/a.
Soil: moisture probe depth; 5" temp.at 2"depth: 16C Harvest: 8-Aug-08
Comment: 1/ There was major stand loss in several plots. Cause not pin pointed.
Cutworms or wire worms suspected.
Wind driven snow and temperatures below zero, April 22, killed weak wheat seedlings.
Hail on 10-June caused some damage to wheat plants.

Table 2 **2008 Geraldine winter wheat performance evaluations.**

Exp 387208 **Central Agricultural Research Center. Moccasin, Montana**

Cultivar/Line	Origin/Pedigree	Entry	Plant height	Sawfly cutting	Grain Yield	Test weight	Protein
			in	%	bu/ac	lb/bu	%
MTS0532 (HWW)	L'Govskaya 167/Rampart//MT940	22	31.9	1.0	70.2**	62.6	12.3
Neeley	Idaho, 1980	4	36.2	11.0	69.1*	62.8	11.8
NuSky (HWW)	Montana, 2001	12	36.6	5.0	68.8*	62.8	12.2
MTS0531 (HWW)	L'Govskaya 167/Rampart//MT940	21	32.7	3.3	67.8*	62.6	12.5
Pryor	WestBred, 2002	9	29.9	2.3	67.6*	62.7	11.5
Tiber	Montana, 1988	7	39.8	11.7	67.5*	63.0	12.4
Rocky	Agripro, 1978	8	37.4	1.3	67.5*	63.7	10.9
MT0552	(Wesley sib, N95L159)/CDC Clair	23	29.9	2.3	67.0*	63.2	12.6
MTS04114 (HWW	L'Govskaya 167/Rampart//MT940	18	31.9	2.7	64.6*	62.8	12.2
Promontory	Utah, 1990	11	31.9	8.7	63.1*	63.9	11.1
Wahoo	Nebraska, 2001	14	32.3	5.3	62.1*	61.1	11.8
MT0495	MT9640/NB1133	20	31.1	3.0	61.6*	61.3	11.6
Ledger	WestBred, 2004	5	31.9	5.7	60.9*	62.7	11.6
Yellowstone	Montana 2005	10	33.9	5.3	59.5*	61.4	11.7
Genou	Montana, 2004	1	34.6	1.0	59.1*	62.3	12.3
Norris (CL)	Montana/WestBred, 2005	16	36.6	5.0	59.1*	63.2	12.2
Carter	WestBred, 2006	24	28.7	0.7	57.6	62.1	12.5
CDC Falcon	Sask/WestBred, 1999	2	29.5	2.0	57.3	62.4	12.0
MTS04120	L'Govskaya 167/Rampart	19	35.4	2.3	56.0	62.5	12.2
Jagalene	AgriPro, 2002	6	31.5	1.7	54.0	64.5	12.6
Hyalite (CL, HWW	Montana/WestBred, 2005	15	33.5	9.3	53.6	62.8	13.3
Bynum (CL)	Montana/WestBred, 2005	17	33.9	2.0	52.4	62.4	13.6
Jerry	North Dakota, 2001	13	35.8	8.0	51.7	61.5	11.9
Rampart	Montana, 1996	3	34.3	1.7	48.2	61.7	13.1
Average			33.4	4.3	61.1	62.6	12.2
P-value				<.0001	0.0042	<.0001	
C.V. (%)				54.3	11.4	0.5	
LSD (0.05)				3.8	11.4	0.7	

Seeded: 19-Sept-07 no-till in wwht stubbl **Soil:** temp: 13.5 C Moist Depth: 10 inches

Fertilizer: NPKS w/seed 10+10+10+05 Topdress N= 60 **Havest Date:** 20-Aug-08

Comment: Harvest delayed >10 days after ripe. Yet,sawed off stems minimal.

High straw residue at seeding-impacted stand some thus impacted yields.

Table 3 **2008 Moccasin NTRC multi-year winter wheat variety performance**
Exp. 3870 **Central Agriculutral Research Center. Moccasin, Montana.**

Cultivar	2005	2006	2007	2008	Ave	Yellowstone same Yrs.
				bu/a		
Yellowstone	37.7	52.2	58.4	38.6	46.7	46.7
Bynum (CL)	27.1	38.6	43.1	24.4	33.3	46.7
CDC Falcon	35.1	44.3	50.9	35.1	41.4	46.7
Genou	21.8	44.9	42.6	25.8	33.8	46.7
Hyalite (CL,HW)	40.3	46.6	46.1	28.3	40.3	46.7
Jagalene	27.6	42.1	52.8	34.0	39.1	46.7
Jerry	35.7	41.8	45.8	31.9	38.8	46.7
Ledger		40.8	50.2	24.9	38.6	49.4
Morgan	31.8	40.4	45.2		39.1	49.7
Neeley	29.1	54.2	43.3	28.1	38.7	46.7
Norris (CL)	34.2	47.4	44.4	35.3	40.3	46.7
NuSky (HW)	27.6	46.3	40.6	29.8	36.1	46.7
Promontory	34.0	48.3	52.6	30.6	41.4	46.7
Pryor	28.4	48.8	45.0	31.5	38.4	46.7
Rampart	29.1	40.8	40.0	27.2	34.3	46.7
Rocky	31.9	44.4	49.4	35.3	40.3	46.7
Tiber	30.7	50.7	37.7	26.0	36.3	46.7
Wahoo	35.7	43.1	53.3	30.2	40.6	46.7
Average	31.0	45.7	46.7	29.8		

2008 had either cut worm or wire worm followed by Jun 10 hail damage.

Table 4 **2008 Denton NTRC multi-year winter wheat variety performance**
Exp. 3871 **Central Agricultural Research Center. Moccasin, Montana.**

Cultivar	2005	2006	2007	2008	Ave	Yellowstone same Yrs.
				bu/a		
Yellowstone	36.9	50.3	49.6	downy	45.6	45.6
Bynum (CL)	21.8	39.5	40.6	brome	34.0	45.6
CDC Falcon	30.8	46.6	46.7	battle	41.4	45.6
Genou	28.5	49.1	45.5	lost	41.0	45.6
Hyalite (CL,HW)	22.6	45.2	40.3		36.0	45.6
Jagalene	32.0	42.7	48.7		41.1	45.6
Jerry	28.0	45.7	43.0		38.9	45.6
Ledger		38.9	48.3		43.6	50.0
Morgan	32.3	49.4	46.2		42.6	45.6
Neeley	29.1	54.0*	47.9		38.5	45.6
Norris (CL)	32.8	48.5	45.3		42.2	45.6
NuSky (HW)	31.9	49.7	44.0		41.9	45.6
Promontory	32.4	49.4	54.2		45.3	45.6
Pryor	35.1	55.0*	46.3		40.7	45.6
Rampart	22.3	44.0	45.3		37.2	45.6
Rocky	30.2	46.0	42.3		39.5	45.6
Tiber	30.8	50.3	46.4		42.5	45.6
Wahoo	31.1	42.5	51.3		41.6	45.6
Average	28.8	47.6	46.2			

Table 5 2008 Geraldine winter wheat varieties multi-year yield performance.
Exp 3872 Central Agricultural Research Center. Moccasin, Montana.

Variety	2005	2006	2007	2008	average	Yellowstone same yrs.
				bu/a		
Yellowstone	49	98	41	70	64.5	64.5
Bynum (CL)	47	88	41	63	59.6	64.5
CDC Falcon	56	91	47	72	66.3	64.5
Genou	59	86	45	70	65.1	64.5
Hyalite (CL,HW)	55	87	45	69	64.0	64.5
Jagalene	45	100	50	71	66.4	64.5
Jerry	43	85	42	69	59.4	64.5
Ledger		93	41	65	66.2	69.6
Morgan	55	90	46		63.6	62.61
Neeley	50	90	39	76	63.6	64.5
Norris (CL)	53	94	42	74	65.6	64.5
NuSky (HW)	43	79	44	68	58.4	64.5
Promontory	50	89	35	73	61.6	64.5
Pryor	52	92	46	73	65.8	64.5
Rampart	53	86	44	56	59.5	64.5
Rocky	54	95	44	58	62.6	64.5
Tiber	56	86	36	66	60.8	64.5
Wahoo	60	99	43	64	66.4	64.5
Mean	50.9	90.5	43.3	67.5		

2007 had marginal stand and was hailed prior to harvest.

Table 6. Grain test weight of winter wheat varieties grown at three locations across four years.

Exp 3800	NTRC	Dntn	Grld	NTRC	Dntn	Grld	NTRC	Dntn	Grld	NTRC	Grld	
Cultivar	2005	2005	2005	2006	2006	2006	2007	2007	2007	2008	2008	Ave
						lbs/bu						
Yellowstone	51.8	59.1	59.1	62.1	62.9	62.9	53.1	59.2	58.9	57.1	61.4	58.9
Bynum (CL)	52.7	60.2	61.2	63.4	63.0	64.3	57.8	59.6	60.3	58.4	62.4	60.3
CDC Falcon	50.9	59.7	60.8	63.2	64.0	64.3	53.7	59.7	59.8	57.4	62.4	59.6
Genou	51.7	60.0	60.5	63.3	64.9	64.7	55.1	59.9	60.4	56.6	62.3	59.9
Hyalite (CL, HWW)	51.7	60.3	61.6	62.0	64.4	63.0	55.1	57.5	60.7	57.6	62.8	59.7
Jagalene	54.3	62.1	63.0	63.5	65.2	63.8	56.5	62.2	62.0	58.5	64.5	61.4
Jerry	52.5	60.4	58.6	64.0	63.2	65.5	52.5	59.2	59.0	57.2	61.5	59.4
Ledger				62.2	64.4	62.9	56.6	60.7	60.3	58.1	62.7	61.0
Morgan	51.2	61.2	58.0	62.5	64.0	64.1	54.3	59.6	59.6			59.4
Neeley	51.4	60.6	59.4	63.3	63.4	64.3	52.1	59.9	59.6	56.7	62.8	59.4
Norris (CL)	53.2	61.5	60.8	63.3	64.4	64.3	53.8	59.7	60.6	58.6	63.2	60.3
NuSky (HWW)	52.5	61.7	58.4	62.7	63.6	63.0	53.9	59.3	61.0	59.2	62.8	59.8
Promontory	53.6	62.1	61.6	64.6	64.7	64.9	57.0	61.3	61.3	57.3	63.9	61.1
Pryor	53.3	61.4	59.7	63.8	64.7	64.7	52.6	58.5	58.6	60.4	62.7	60.0
Rampart	52.4	59.2	60.2	63.0	63.7	64.1	56.4	59.5	59.9	57.5	61.7	59.8
Rocky	53.0	61.4	62.4	64.4	64.5	65.1	56.9	61.4	61.2	57.7	63.7	61.1
Tiber	52.6	62.2	60.5	63.6	64.3	64.0	55.1	60.2	60.0	58.1	63.0	60.3
Wahoo	50.8	59.7	60.5	62.9	63.7	64.0	54.6	59.1	58.0	57.1	61.1	59.2
Average	52.24	60.5	59.84	63.1	63.9	64.1	54.9	59.7	60.0	57.9	62.6	59.9

NTRC - Moccasin no-till recrop Dntn- no-till recrop Grld - Geraldine no-till

NTRC 2005 test weights were reduced by nematodes.First verification of this species of nematodes in Montana.

Table 7. Grain protein content of winter wheat varieties grown at three locations across four years.

Exp 3800	NTRC	Dntn	Grld	NTRC	Dntn	Grld	NTRC	Dntn	Grld	NTRC	Grld	
Cultivar	2005	2005	2005	2006	2006	2006	2007	2007	2007	2008	2008	Ave
						%						
Yellowstone	17.2	11.9	15.0	14.4	10.5	12.4	15.2	11.2	12.8	11.3	11.7	13.1
Bynum (CL)	18.4	12.4	15.6	15.8	11.9	13.0	15.5	11.3	12.9	12.4	13.6	13.9
CDC Falcon	18.1	11.4	14.5	13.8	9.9	10.8	16.2	14.5	14.0	11.0	12.0	13.3
Genou	19.4	12.1	15.3	15.1	10.6	11.8	15.5	10.9	13.0	11.9	12.3	13.4
Hyalite (CL, HWW)	18.3	11.9	15.1	15.2	10.8	13.2	16.3	11.7	13.0	11.1	13.3	13.6
Jagalene	15.7	11.9	15.8	15.3	10.2	11.2	15.2	14.6	13.1	11.3	12.6	13.4
Jerry	17.5	12.8	15.4	15.1	11.6	12.9	15.1	10.9	12.6	11.1	11.9	13.4
Ledger				15.1	11.4	11.6	17.2	11.3	13.8	10.6	11.6	12.8
Morgan	17.5	11.2	14.9	13.9	10.0	12.3	14.8	10.9	12.3			13.1
Neeley	18.9	11.5	14.8	13.9	9.8	11.6	14.9	10.8	12.0	10.8	11.8	12.8
Norris (CL)	16.7	11.6	13.5	14.3	9.5	12.0	17.4	11.8	14.2	11.0	12.2	13.1
NuSky (HWW)	17.5	11.7	15.3	14.6	9.8	10.0	16.1	12.3	13.9	11.5	12.2	13.2
Promontory	16.2	12.4	13.8	14.5	10.7	11.7	15.7	10.6	12.7	10.6	11.1	12.7
Pryor	16.5	10.9	14.6	13.5	8.3	11.5	14.3	11.6	11.9	10.8	11.5	12.3
Rampart	18.7	12.7	15.9	15.5	10.5	11.8	15.6	11.3	12.5	11.8	13.1	13.6
Rocky	17.6	11.9	14.7	14.5	10.9	13.4	16.5	11.6	14.2	11.2	10.9	13.4
Tiber	18.3	11.1	14.9	14.5	9.7	12.8	15.2	10.9	12.8	12.5	12.4	13.2
Wahoo	18.0	10.8	14.9	14.4	10.5	11.5	17.2	13.5	13.1	12.4	11.8	13.5
Average	17.7	11.9	14.9	14.6	10.4	12.2	15.7	11.7	13.0	11.5	12.2	13.3

NTRC - Moccasin no-till recrop Dntn- no-till recrop Grld - Geraldine no-till

Table 8. Plant height of winter wheat varieties grown at three locations across four years.

Exp 3800	NTRC	Dntn	Grld	NTRC	Dntn	Grld	NTRC	Dntn	Grld	NTRC	Grld	
Cultivar	2005	2005	2005	2006	2006	2006	2007	2007	2007	2008	2008	Ave
						inches						
Yellowstone	36	32	36	34	30	41	42	32	34	28	34	34
Bynum	35	28	34	32	28	39	43	35	35	28	34	34
CDC Falcon	30	25	29	28	30	38	36	31	34	24	30	30
Genou	37	29	37	32	31	39	43	29	30	29	35	34
Hyalite (CL, HWW)	33	30	36	32	22	38	42	33	35	28	34	33
Jagalene	32	32	34	28	26	38	37	31	32	26	32	32
Jerry	38	32	33	36	26	43	44	33	34	31	36	35
Ledger				31	24	35	39	30	34	27	32	32
Morgan	35	29	39	35	32	43	42	32	31			35
Neeley	35	29	36	34	28	41	43	31	32	30	36	34
Norris (CL)	38	29	38	32	27	41	42	32	29	30	37	34
NuSky (HWW)	33	30	36	35	31	44	42	30	35	30	37	35
Promontory	34	30	30	35	28	40	41	33	33	26	32	33
Pryor	29	26	31	27	23	37	37	29	32	25	30	30
Rampart	35	32	33	33	29	39	42	37	31	28	34	34
Rocky	36	35	38	33	29	43	43	34	32	31	37	35
Tiber	36	33	40	35	26	44	45	38	33	33	40	37
Wahoo	32	26	33	31	24	39	38	32	33	27	32	32
Average	34.2	29.5	34	32.6	27.9	40.3	41.2	32.5	32.7	28.0	33.4	33.4

NTRC - Moccasin no-till recr Dntn- no-till recrop Grld - Geraldine no-till

Table 9 **2008 Moccasin no-till CC spring wheat variety performance evaluations.**
Exp 387208 **Central Agricultural Research Center. Moccasin, Montana**

Cultivar/Line	Entry	Head Date	Plant height	Grain Yield	Test weight	Protein
		d of y	in	bu/ac	lb/bu	%
Fortuna	1	182	30	23.8	58.1	14.5
McNeal	2	184	26	18.2	57.5	14.6
Conan	3	184	23	15.4	59.6	14.5
Reeder	4	184	23	18.2	58.7	14.2
Outlook	5	185	24	15.5	57.3	13.2
Choteau	6	183	22	16.5	58.6	14.8
Vida	7	185	23	15.5	58.8	12.8
Hank	8	181	23	24.6	56.9	13.5
NorPro	9	183	23	21.1	59.9	13.7
Freyr	10	183	24	13.7	59.5	13.7
Corbin	11	183	22	13.9	58.6	14.6
Kelby	12	183	21	16.2	58.6	14.7
Kuntz	13	183	24	19.5	58.4	13.7
Volt	14	183	25	22.9	59.8	13.9
Jedd	15	181	21	16.0	58.8	13.5
ONeal	16	182	24	16.1	59.4	13.7
PF906408	17	183	21	15.5	56.7	14.3
Explorer	18	180	25	20.8	57.9	14.4
MTHW0471	19	185	24	17.6	58.6	14.1
MT 0415	20	184	24	20.5	58.9	14.8
Mean		183.1	23.6	18.08	58.51	14.06
P value		0.000	0.001	0.212	0.000	
CV1		0.3518	8.055	26.81	0.8972	
LSD 0.05		1.065	3.1368	ns	1.099	

Seed Date: 15-Apr-08 in no-till C Soil: 2inch temp: 6 C Moist probe depth: 8"
Fertilizer: NPKS w/seed 10+10· Top dress N: 45 lbs N as urea
Comment: The lentil stubble had little to no winter snow catch.
Late April snowdrifting was highly variable in nursery area.
10-June hail, pre-jointing set the spring wheat caused some damage.

Table 10 2008 Denton spring wheat variety performance evaluations.
Exp 387208 Central Agricultural Research Center. Moccasin, Montana

Cultivar/Line	Entry	Sawfly cutting 1/	Plant height	Grain Yield	Test weight	Protein
	#	#	in	bu/ac	lb/bu	%
Fortuna	1	0.7	28	17.0	59.6	14.6
McNeal	2	10.7	24	17.1	58.7	13.9
Conan	3	0.3	20	14.6	60.3	14.0
Reeder	4	11.3	21	16.0	60.7	12.7
Outlook	5	2.3	20	14.3	59.0	12.8
Choteau	6	0.3	21	13.9	59.6	14.5
Vida	7	4.3	22	18.1	60.0	13.1
Hank	8	10.7	26	16.4	58.1	13.3
NorPro	9	16.3	25	14.6	60.7	13.6
Freyr	10	10.7	26	15.5	60.4	13.0
Corbin	11	0.7	22	16.2	58.8	13.9
Kelby	12	19.7	22	15.4	61.2	15.0
Kuntz	13	23.3	24	17.0	60.9	12.4
Volt	14	22.3	22	16.5	61.5	13.0
Jedd	15	9.7	21	18.3	61.2	13.2
ONeal	16	0.3	26	18.8	60.5	13.7
PF906408	17	0.7	22	17.3	59.1	13.3
Explorer	18	7.3	25	16.7	60.0	14.4
MTHW0471	19	2.0	26	19.0	61.1	13.1
MT 0415	20	11.0	23	18.3	59.3	13.9
Mean		8.2	23.3	16.56	60.01	13.6
P value		0		0.4329	0.0149	
CV1		50.41		15.37	1.356	
LSD 0.05		6.86		ns	1.703	

1/ fallen cut stems in 10 feet of a 2/ Cutting height > 4 inches.
Seed Date: 29-Apr-08 no-till into RC lentil stubble.
Fertilizer: NPKS w/seed 10+10 Top dress N: 60 lbs
Soil: 2 inch temp 12 C Moist.probe depth: 14"

Table 11 2008 Geraldine spring wheat variety performance evaluations.
Exp 387208 Central Agricultural Research Center. Moccasin, Montana

Cultivar/Line	Entry	Sawfly 1/ cutting	Plant height	Grain 2/ Yield	Test weight	Protein
	#	#	in	bu/ac	lb/bu	%
Fortuna	1	15	30	25.3	60.8	11.4
McNeal	2	36	28	21.7	60.6	12.0
Conan	3	10	26	23.1	61.6	12.6
Reeder	4	30	26	26.6	62.2	11.7
Outlook	5	30	29	24.3	60.8	11.8
Choteau	6	15	27	28.3	61.4	11.8
Vida	7	11	27	27.7	62.1	11.7
Hank	8	53	26	24.8	60.5	11.1
NorPro	9	53	25	19.2	60.5	11.4
Freyr	10	53	28	20.3	61.6	12.4
Corbin	11	11	27	25.5	61.4	11.5
Kelby	12	52	22	15.4	61.8	13.0
Kuntz	13	60	22	18.5	60.5	11.3
Volt	14	51	24	22.0	62.3	11.9
Jedd	15	38	22	21.0	62.5	10.5
ONeal	16	15	28	29.1	62.0	10.8
PF906408	17	23	24	26.3	60.6	10.6
Explorer	18	43	27	20.6	60.6	11.0
MTHW0471	19	28	28	19.6	61.5	10.7
MT 0415	20	39	27	22.3	61.4	12.0
Mean		33.3	26.3	23.1	61.3	11.6
P value		0	0	0	0.015	
CV1		21.1	0	12.64	0.95	
LSD 0.05		11.6	0	4.823	1.216	

1/ fallen cut stems in 10 feet of a ; 2/ Cutting height was 3 to 4 inches.
Seed Date: 29-Apr-08 into tilled recropburned winter wheat stubble.
Fertilizer: NPKS w/seed 10+10+ Top dress N: 60 lbs
Soil: 2 inch temp: 11.5C Moist Probe depth 13"
Comment: Sawfly cutting was the most severe of any CARC nursery in 24 yrs. observed in any CARC research plots in the past 24 years and maybe longer. Nursery was surrounded by barley, which may have affected sawfly cutting.

Table 12 Moccasin multi-year performance of spring wheat varieties under no-till CC.
Exp 9970 Central Agricultural ResearchCenter. Moccasin, Montana.

Cultivar	2003	2004	2005	2006	2007	2008	average	McNeal Same Yrs
					bu/a			
McNeal	23	28	28	25	33	18	25.9	25.9
Agawam			28	24	30		27.2	28.8
Choteau	21	28	22	25	32	17	24.1	25.9
Conan	17	28	30	24	31	15	24.2	25.9
Corbin					33	14	23.4	25.8
Ernest	18	24	28	23	29		24.4	27.4
Explorer	17	26	27	23	30	21	24.1	25.9
Fortuna	22	28	24	24	30	24	25.2	25.9
Freyr				21	33	14	22.4	25.5
Hank	17	30	28	25	32	25	26.1	25.9
Knudsen			23	24	29		24.9	28.8
NorPro			27	28	29	21	27.9	28.8
Outlook	22	31	26	22	32	16	24.6	25.9
Reeder	20	30	26	24	31	15	24.5	25.9
Scholar	19	28	29	25	29		26.0	27.4
Vida		30	31	28	31	16	27.0	26.6
WB 926	19	27	31	23	31		26.1	27.4
Means	19.3	27.9	27.6	24.6	31.2	18.1		

Table 13 Denton multi-year No-Till CC spring wheat varieties yield performance.
Exp 9971 Central Agricultural Research Center. Moccasin, Montana.

Pedigree	2003	2004	2005	2006	2007	2008	Average	McNeal Same Yrs.
					bu/a			
McNeal	15	32	26	24	24	17	23.1	23.1
Fortuna	18	29	26	26	19	17	22.4	23.1
Ernest	16	28	23	24	21		22.3	24.3
WB926	17	35	29	24	24		26.0	24.3
Conan	17	32	25	24	22	15	22.5	23.1
Scholar	18	32	23	24	23		24.0	24.3
Reeder	17	36	26	25	21	16	23.5	23.1
Outlook	18	36	27	25	23	14	23.8	23.1
Choteau	16	34	24	22	22	14	22.0	23.1
Vida	17	37	29	27	25	18	25.3	23.1
Hank		34	28	25	24	16	25.3	24.6
NorPro			26	25	22	15	21.8	22.7
Knudsen			22	23	23		22.6	23.3
Freyr				24	24	16	20.9	21.8
Corbin					23	16	19.6	20.5
Explorer	18	33	24	23	23	17	22.9	23.1
Agawam			29	28	23		26.6	23.3
Mean	16.9	32.8	25.9	24.9	22.7	16.6		

Table 14 Multi-year spring wheat variety performance near Geraldine.
Exp 9972 Central Agriucultural Research Center. Moccasin, Montana.

Variety	ID code	2005 Yield	2007 Yield	2008 Yield	3 Year Ave. Yld	McNeal same Yrs
				bu/a		
McNeal	PI574642	13.2	30.9	21.7	22.0	22.0
Agawam	BZ996472	15.8	41.2		28.5	22.1
Choteau	PI633974	12.2	40.3	28.3	26.9	22.0
Conan	BZ992588	13.0	41.7	23.1	25.9	22.0
Corbin	BZ996434		38.5	25.5	32.0	26.3
Ernest	PI592761	12.4	35.7		24.1	22.1
Explorer	PI619086	12.2	33.9	20.6	22.2	22.0
Fortuna	CI 13596	13.8	34.0	25.3	24.4	22.0
Freyr	AGRIPRO3		44.3	20.3	32.3	26.3
Hank	BZ992322	12.3	37.2	24.8	24.8	22.0
Knudsen	AGRIPRO2	11.9	36.6		24.3	22.1
NorPro	AGRIPRO1	9.6	38.9	19.2	22.6	22.0
Outlook	PI632252	11.4	39.6	24.3	25.1	22.0
Reeder	ND 695	12.4	39.5	26.6	26.2	22.0
Scholar	PI607557	11.0	44.7		27.8	22.1
Vida	PI642366	15.3	49.5	27.7	25.9	22.0
WB 926	WB 926	13.2	42.0		27.6	22.1
Mean		12.6	39.79	23.08		

Table 15. Test weights of spring wheat varieties across four years and four locations

Cultivar	NTRC 2005	Dntn 2005	Grld 2005	Wnfrd 2005	NTRC 2006	Dntn 2006	Moor 2006	NTRC 2007	Dntn 2007	Grld 2007	NTRC 2008	Dntn 2008	Grld 2008	Ave
							lbs/bu							
Agawan	57.8	62.4	52.2	59.0	63.0	63.1	55.2	55.4	58.8	61.5				58.8
Choteau	54.3	59.7	47.4	56.7	60.5	60.4	54.1	53.7	55.9	59.3	58.6	59.6	61.4	57.0
Conan	57.4	60.0	51.1	58.1	59.5	59.5	52.9	53.9	56.5	59.5	59.6	60.3	61.6	57.7
Corbin								52.4	55.7	59.7	58.6	58.8	61.4	57.7
Ernest	56.9	59.6	48.3	57.8	59.0	59.8	53.4	53.5	56.9	58.8				56.4
Explorer	55.2	59.6	45.9	55.8	59.5	59.8	52.7	52.9	56.1	58.9	57.9	60.0	60.6	56.5
Fortuna	55.95	59.7	51.4	59.2	59.5	60.8	54.1	53.9	56.0	58.4	58.1	59.6	60.8	57.5
Freyr					62.0	61.3	53.4	52.9	57.6	59.7	59.5	60.4	61.6	58.7
Hank	52.9	57.5	46.6	53.4	58.0	59.0	51.3	50.7	53.7	56.2	56.9	58.1	60.5	55.0
Knudson	55.35	60.2	49.3	57.6	59.5	61.1	54.7	53.5	57.5	59.8				56.8
McNeal	54.4	59.0	47.4	56.6	57.5	57.3	53.1	52.3	56.1	57.6	57.5	58.7	60.6	56.0
NorPro	55.3	59.9	45.9	53.6	59.0	60.9	50.8	50.9	55.7	59.1	59.9	60.7	60.5	56.3
Outlook	54.2	58.3	44.0	54.6	58.5	58.4	53.7	51.4	54.9	57.9	57.3	59.0	60.8	55.6
Reeder	54.8	59.9	48.1	56.5	61.0	60.3	52.4	54.0	56.5	59.8	58.7	60.7	62.2	57.3
Scholar	56.9	60.2	49.5	58.3	60.5	60.3	54.6	54.4	57.8	60.3				57.3
Vida	55.4	59.8	50.1	55.1	59.0	59.7	52.3	53.5	56.9	58.5	58.8	60.0	62.1	57.0
WestBred 926	54.9	57.6	47.4	57.4	58.5	58.1	51.8	50.7	55.0	57.4				54.9
Mean	55.45	59.8	48.25	56.45	59.92	60.27	53.19	53.21	56.43	59.05	58.51	60.01	61.31	57.1

NTRC Moccasin , Dntn - Denton , Grld-Geraldine , Moor- Moore, Wnfrd -Winifred

Table 16. Grain protein content of spring wheat varieties across four years and four locations.

Cultivar	NTRC 2005	Dntn 2005	Grld 2005	Wnfrd 2005	NTRC 2006	Dntn 2006	Moor 2006	NTRC 2007	Dntn 2007	Grld 2007	NTRC 2008	Dntn 2008	Grld 2008	Ave
Agawan	14.5	12.6	15.7	14.5	10.9	13.1	16.1	14.4	14.1	13.9				14.0
Choteau	16.5	13.6	17.9	15.1	11.6	14.2	17.1	14.6	15.5	15.4	14.8	14.5	11.8	14.8
Conan	16.0	14.0	18.2	14.8	13.7	14.9	17.3	15.2	15.9	15.2	14.5	14.0	12.6	15.1
Corbin								15.9	14.7	14.7	14.6	13.9	11.5	14.2
Ernest	16.6	14.3	19.2	15.7	13.9	14.7	17.1	15.7	15.5	16.4				15.9
Explorer	15.6	13.5	19.6	16.0	11.2	13.9	17.5	15.7	15.4	15.2	14.4	14.4	11.0	14.9
Fortuna	15.3	13.4	16.6	14.4	12.9	14.3	16.2	14.9	17.0	16.5	14.5	14.6	11.4	14.8
Freyr					11.1	13.1	17.9	15.5	14.9	15.0	13.7	13.0	12.4	14.1
Hank	16.4	13.0	19.2	16.1	11.7	13.2	18.0	15.8	15.0	15.7	13.5	13.3	11.1	14.8
Knudson	16.6	14.8	17.3	15.4	11.4	13.5	17.5	15.5	15.3	14.5				15.2
McNeal	16.4	15.1	18.6	14.7	12.5	14.3	17.1	15.1	15.0	16.2	14.6	13.9	12.0	15.0
NorPro	16.0	12.6	17.7	15.5	11.2	13.0	17.9	15.3	15.1	14.9	13.7	13.6	11.4	14.5
Outlook	15.9	13.4	18.3	15.0	11.5	13.2	16.4	14.5	15.3	15.0	13.2	12.8	11.8	14.3
Reeder	16.5	14.1	18.2	16.2	12.5	13.8	17.4	14.9	15.3	15.3	14.2	12.7	11.7	14.8
Scholar	16.0	13.8	18.9	15.9	12.5	14.0	17.3	15.9	15.2	16.0				15.6
Vida	16.2	12.7	17.0	15.4	11.1	12.9	18.1	14.9	14.2	15.4	12.8	13.1	11.7	14.3
WstBrd 926	16.2	13.6	18.9	14.8	12.9	14.3	17.5	15.8	15.8	15.7				15.6
Mean	16.0	13.3	18.0	15.2	11.95	13.7	17.2	15.3	15.1	15.4	14.06	13.6	11.6	14.7

NTRC Moccasin , Dntn - Denton , Grld-Geraldine , Moor- Moore, Wnfrd -Winifred

Table 17. Spring wheat variety plant heights across four years and five locations.

Cultivar	NTRC 2005	Dntn 2005	Grld 2005	Wnfrd 2005	NTRC 2006	Dntn 2006	Moor 2006	NTRC 2007	Dntn 2007	Grld 2007	NTRC 2008	Dntn 2008	Grld 2008	Ave
							inches							
Agawan	28	27	30	29	30	24	27	32	28	26				28.2
Choteau	25	24	27	31	30	24	27	32	26	28	22	21	27	26.4
Conan	27	26	26	26	31	26	26	31	27	30	23	20	26	26.6
Corbin								32	29	28	22	22	27	26.7
Ernest	32	34	33	31	37	32	31	37	32	37				33.5
Explorer	28	30	27	31	30	26	29	34	29	28	25	25	27	28.3
Fortuna	32	32	33	33	37	32	32	38	31	36	30	28	30	32.5
Freyr					32	28	28	32	30	30	24	26	28	28.7
Hank	27	25	26	30	31	26	26	32	29	28	23	26	26	27.3
Knudson	25	26	27	32	31	26	26	32	29	28				28.2
McNeal	29	28	31	29	34	28	25	33	29	31	26	24	28	28.8
NorPro	27	24	25	28	31	26	25	30	28	29	23	25	25	26.5
Outlook	26	27	26	30	31	26	28	33	29	30	24	20	29	27.7
Reeder	28	29	25	33	31	27	26	32	29	31	23	21	26	27.8
Scholar	34	31	30	34	37	32	31	37	32	35				33.1
Vida	29	29	28	34	33	24	26	30	30	28	23	22	27	27.8
WstBrd 926	30	28	27	27	32	27	24	29	31	29				28.2
Mean	27.6	28.3	27.8	31.0	32.5	27.0	27.5	32.9	29.3	30.1	23.6	23.3	26.3	28.2

NTRC Moccasin , Dntn - Denton , Grld-Geraldine , Moor- Moore, Wnfrd -Winifred

Table 18 2008 Moccasin no-till recrop spring barley variety performance evaluations.
Exp 3670 Central Agricultural Research Center. Moccasin, Montana.

ID code	Pedigree	Entry	Head Date	Plant Height	Grain Yield	Test Weight	Protein Content
		#	d of y	cm	bu/a	lbs/bu	%
MT950186	Haxby	1	182	63	42.5	52.2	12.6
BZ596117	Boulder	2	179	74	46.8	50.5	13.3
MT960228	Eslick	3	183	63	39.9	48.8	13.8
BZ594-19	WPB Xena	4	181	69	39.5	49.1	13.2
SK 76333	Harrington	5	180	66	40.9	47.7	14.0
2B965057	Conrad	6	183	66	41.0	49.2	14.2
2B914947	Merit	7	183	61	29.9	46.9	15.2
TR232	Metcalfe	8	182	71	30.2	49.7	15.2
MT910189	Hockett	9	179	64	45.2	49.4	13.2
MT960101	Geraldine	10	183	64	43.7	49.0	13.7
MT970116	Craft	11	179	74	37.3	51.9	12.8
ND 15477	Drummond	12	176	80	42.5	48.1	13.1
6B932978	Legacy	13	179	72	39.3	44.9	13.0
6B952482	Tradition	14	179	76	45.3	49.1	12.9
PI639694	Stellar-ND	15	176	68	35.8	46.9	12.3
PI568246	Baronesse	16	181	66	38.7	47.1	12.9
MT010158	MT920041/Harringtor	17	181	68	36.9	48.9	13.3
YU501385	Champion	18	181	74	45.3	51.7	13.0
MT020155	MT960225/H1851195	19	176	79	48.8	49.3	13.2
MT020204	MTLB 32/H1851195	20	179	73	50.1	50.5	13.3
Mean			180.1	69.43	40.97	49.02	13.4
P-value			0.000	0.000	0.000	0.003	
CV 1			0.6868	5.81	11.7	2.725	
LSD(0.05)			2.04	6.67	7.92	2.80	

Seed date: 07-Apr-08 in no-till CC winter wheat stubble. Contiuous no-till recrop since 1996.
Fertilzer NPKS 10-10-10-5 w/seed Topdress: 60N as urea
Harvest: 20-Aug-08 Soil: 2inch temp: 4C Moist probe depth: 12"
Comment: The growing season started cold and dry and ended hot and dry with a wetter than average May. The nursery received significant hail on 10-June which beat down the near jointing plants. Variable snow drifting from an 22-April storm contributed to variable plant available water.

Table 19 2008 Denton spring barley variety performance evaluations.
Exp 3671 Central Agricultural Research Center. Moccasin, Montana.

ID code	Pedigree	Entry	Plant Height	Grain Yield	Test Weight	Protein Content
		#	cm	bu/a	lbs/bu	%
MT950186	Haxby	1	63	36.1	53.4	13.4
BZ596117	Boulder	2	72	37.6	50.6	13.7
MT960228	Eslick	3	64	37.0	51.1	13.6
BZ594-19	WPB Xena	4	67	36.3	52.0	12.4
SK 76333	Harrington	5	65	33.0	52.3	13.6
2B965057	Conrad	6	66	34.9	49.9	13.7
2B914947	Merit	7	60	38.5	49.4	13.7
TR232	Metcalfe	8	69	35.5	51.2	14.0
MT910189	Hockett	9	64	38.0	51.5	13.2
MT960101	Geraldine	10	63	36.9	51.1	14.2
MT970116	Craft	11	72	35.0	53.2	14.1
ND 15477	Drummond	12	75	34.2	50.8	13.7
6B932978	Legacy	13	72	36.3	49.1	13.1
6B952482	Tradition	14	75	33.3	50.3	13.8
PI639694	Stellar-ND	15	67	33.3	48.6	12.7
PI568246	Baronesse	16	65	38.7	50.0	13.7
MT010158	MT920041/Harrington	17	67	34.2	51.8	14.5
YU501385	Champion	18	73	38.1	52.4	13.3
MT020155	MT960225/H1851195	19	77	36.9	50.1	13.5
MT020204	MTLB 32/H1851195	20	72	35.1	49.1	13.9
Mean			68	35.94	50.87	13.59
P-value				0.6369	0.0041	
CV 1				9.362	2.02	
LSD(0.05)				ns	2.151	

Seed Date: 29-April-08 no-till recrop into lentil stubble with double disk drill
Fertilzer: NPKS 10-10-10-5 w/seed Preplant topdress N:
Harvest: 26-Agust 08 Soil: 2 inch temp 12 C Moist.probe depth: 14"
Comment: Dry growing season preceding and after a wet May. March -April cool to col

Table 20 Multi-year NTCC barley variety grain yields near Moccasin.
Exp 3670 Cental Agricultural Research Center. Moccasin, Montana

Selected entries	2005	2006	2007	2008	average	Haxby Same Yrs
				bu/a		
Haxby	50	no	48	42	46.7	46.7
Boulder	46	harvest	46	47	46.3	46.7
Eslick	42		47	40	43.0	46.7
Xena	47		51	40	46.0	46.7
Harrington	36		38	41	38.2	46.7
Conrad	42		39	41	40.7	46.7
Merit	36		33	30	32.8	46.7
Metcalfe	37		34	30	33.7	46.7
Hockett	39		34	45	39.3	46.7
Geraldine	41		45	44	43.1	46.7
Craft	43		47	37	42.2	46.7
Drummond	43	no	38	42	41.0	46.7
Legacy	44	harvest	35	39	39.3	46.7
Tradition	50		41	45	45.4	46.7
Stellar			39	36	37.6	45.1
Means	41.8	no harv	40.8	41.0		

Table 21 Multi-year NTCC barley variety grain yields near Denton.
Exp 36701 Cental Agricultural Research Center. Moccasin, Montana

Selected entries	2005	2006	2007	2008	average	Haxby Same Yrs
				bu/a		
Haxby	55	40	28	36	39.8	39.8
Boulder	54	41	38	38	42.6	39.8
Eslick	53	36	29	37	38.8	39.8
Xena		36	28	36	33.4	34.8
Harrington	56	29	27	33	36.0	39.8
Conrad	50	34	29	35	37.2	39.8
Merit	43	34	25	39	35.0	39.8
Metcalfe	44	35	29	36	35.8	39.8
Hockett	33	38	28	38	34.0	39.8
Geraldine	44	38	31	37	37.5	39.8
Craft	51	32	28	35	36.4	39.8
Drummond	50	38	33	34	38.7	39.8
Legacy	52	32	36	36	39.3	39.8
Tradition	50	35	33	33	37.7	39.8
Stellar		29	34	33	32.1	34.8
Mean	49.4	34.5	30.0	35.9		

Varieties with multi-year mean yields ≥ than Haxby for the same years.

Table 22 Spring barley test weights at Moccasin and Denton over four years.

Exp. 3600 Cultivar	NTRC 2005	Dntn 2005	Dntn 2006	NTRC 2007	Dntn 2007	NTRC 2008	Dntn 2008	Ave.
				lbs/bu				
Baronesse	45.3	48.3				47.1	50.0	47.7
Boulder	49.5	53.3	54.1	52.9	48.2	50.5	50.6	51.3
Conrad	46.1	50.9	50.4	52.0	46.1	49.2	49.9	49.2
Craft	49.7	54.6	54.1	55.0	51.2	51.9	53.2	52.8
Drummond	48.2	50.0	51.9	50.7	47.3	48.1	50.8	49.6
Eslick	46.6	51.2	51.6	52.9	47.6	48.8	51.1	50.0
Geraldine	48.9	49.4	53.2	52.3	46.7	49.0	51.1	50.1
Harrington	46.8	50.7	49.6	51.3	46.8	47.7	52.3	49.3
Haxby	51.3	53.3	54.8	54.6	50.2	52.2	53.4	52.8
Hays	44.3	49.0	45.4	49.9	43.0			46.3
Hockett	50.2	53.1	54.3	52.7	49.6	49.4	51.5	51.5
Legacy	45.7	48.8	50.6	50.9	44.5	44.9	49.1	47.8
Merit	47.6	46.6	52.2	49.9	45.1	46.9	49.4	48.2
Metcalfe	47.4	49.0	52.0	51.5	47.0	49.7	51.2	49.7
Tradition	50.8	52.2	51.7	51.6	46.5	49.1	50.3	50.3
WPB Xena	47.9	51.1	51.7	51.4	47	49.1	52.0	50.0
Mean		50.73	51.59	51.93	46.98	49.02	50.87	

Table 23 Spring barley grain protein at Moccasin and Denton over four years.

Exp. 3600 Cultivar	NTRC 2005	Dntn 2005	Dntn 2006	NTRC 2007	Dntn 2007	NTRC 2008	Dntn 2008	Ave.
				%				
Baronesse	16.1	14.2				12.9	13.7	14.2
Boulder	14.8	13.0	13.5	15.6	14.8	13.3	13.7	14.1
Conrad	16.8	14.3	14.0	16.0	16.5	14.2	13.7	15.1
Craft	16.3	12.9	13.4	15.5	13.6	12.8	14.1	14.1
Drummond	16.5	14.3	13.3	15.0	13.8	13.1	13.7	14.2
Eslick	14.8	13.4	12.0	14.0	14.0	13.8	13.6	13.7
Geraldine	17.6	13.7	14.0	16.4	15.3	13.7	14.2	15.0
Harrington	17.0	14.3	13.0	15.5	15.7	14.0	13.6	14.7
Haxby	14.0	13.1	12.6	13.8	13.7	12.6	13.4	13.3
Hays	14.9	13.6	13.7	16.7	15.4			14.9
Hockett	16.0	13.4	12.9	15.8	13.5	13.2	13.2	14.0
Legacy	13.7	13.5	13.5	15.2	13.3	13.0	13.1	13.6
Merit	18.0	15.2	14.5	17.4	14.4	15.2	13.7	15.5
Metcalfe	17.3	15.1	13.3	17.3	15.0	15.2	14.0	15.3
Tradition	14.5	12.7	12.5	14 . 9	13.4	12.9	12.9	13.4
WPB Xena	13.9	12.7	12.2	14.4	14.2	13.2	13.2	13.4
Mean	15.8	13.69	13.5	15.51	14.36	13.4	13.59	

Table 24 Spring barley heights at Moccasin and Denton over four years.

Exp. 3600 Cultivar	NTRC 2005	Dntn 2005	NTRC 2006	Dntn 2006	NTRC 2007	Dntn 2007	NTRC 2008	Dntn 2008	Ave.
					inches				
Baronesse	26	28					26	26	26.7
Boulder	27	26	34	27	32	27	30	29	29.1
Conrad	26	26	34	29	33	30	26	26	28.8
Craft	33	30	39	34	40	32	30	29	33.2
Drummond	30	32	39	32	33	30	32	30	32.2
Eslick	27	28	35	28	33	28	25	26	28.7
Geraldine	26	24	33	28	35	30	26	25	28.4
Harrington	25	29	32	26	34	30	26	26	28.6
Haxby	28	30	33	28	33	27	25	25	28.5
Hays	27	27	30	24	28	22			26.2
Hockett	27	27	36	28	33	30	25	26	29.0
Legacy	32	26	37	33	35	33	29	29	31.8
Merit	25	25	35	29	35	29	24	24	28.3
Metcalfe	28	28	38	29	34	30	28	28	30.4
Tradition	30	29	37	30	34	32	30	30	31.5
WPB Xena	26	26	34	27	35	29	28	27	29.0
Mean	27.5	27.3	11.6	29.0	33.9	29.2	27.8	27.2	