Project Title: Evaluation of agronomic performance of winter wheat, spring wheat, and barley cultivars in recrop near Moccasin, Denton, and Geraldine, Montana.

Project Leader: D. M. Wichman — CARC Research Agronomist, Moccasin, MT

Project Personnel:

P.L. Bruckner	MAES W. Wheat Breeder, Bozeman, MT
L.E. Talbert	MAES Spr Wheat Breeder, Bozeman, MT
T.K. Blake	MAES Barley Breeder, Bozeman, MT
J.E. Berg	MAES Res. Assoc WW Breeder, Bozeman, MT
S.P. Lanning	MAES Res Assoc. SW Breedr, Bozeman, MT
S.R. Bates	MAES Res. Assoc. Bly Breedr, Bozeman, MT
J. Vavrovsky	CARC Res. Spec., Moccasin, MT
S.J. Dahlhausen	CARC Seasonal Field Tech, Moccasin, MT

Objective:

Evaluate the performance of winter and spring cereal grain varieties in continuous crop and re-crop environments near Moccasin, Denton and Geraldine.

Results:

The management strategy utilized for the off-station trial sites is for CARC staff to establish, monitor, harvest, record and process the data. The producer includes the research site plot area in general field operations including weed control and broadcasting fertilizer. Special pest management operations would need to be reviewed prior to including the plot area. It may be that some varieties possess resistance to particular pathogen or insect. Field operations are to be conducted perpendicular to plot rows so that all wheel tracks, etc. impact all the plots within a replication. The concept is to evaluate the cultivars under the conditions in which the producers are going to be raising them.

The 2010 central Montana continuous crop cereal grain yields were generally above average do to more plentiful precipitation distributed more evenly across the growing season. In some cases, winter wheat and spring crop yields were limited by weather caused delays in seeding date. Late seeded winter wheat experienced early and mid-spring stand losses due to weak seedlings being exposed driving winds and some soil movement around the plant crowns. Sawfly was not as great of a factor in the winter wheat, except for some late seeded stands. While sawfly was a significant factor in spring wheat, the cutting generally was not as great as that experienced in 2009. Sawfly was less of a factor in the 2010 barley crop, also.

Winter Wheat:

Recrop/continuous crop winter wheat yields were generally above average. However, some late seeded, November 2009 seedings, stands were very poor stand. Those marginal stands had much below average yields. Also, some later seeded winter wheat stands had higher levels of sawfly cutting. Some of the wheat quality was often sub-standard due to weather conditions. Other cases, insufficient N was applied for the amount of growth potential the crop plants had with volume of plant available water. The frequency and volume of May-June rains led to shallow rooting depth of annual crops combined with water leaching the N deeper into the soil, so the plants did not utilize the N that had been applied. The cool growing season weather and in some cases delayed seeding dates, led to mid-late August ripening, when 2010 late summer rains occurred. The rain on the ripened grain contributed to nutrient leaching from the seed and initialization of seed germination in head which resulted in lower grain protein and lower falling numbers. An interesting, but not surprising, event was the later (September) ripening wheat had better quality than mid-late August ripening wheat. The 2010 fall weather conditions were conducive to increased potential for wheat streak mosaic and yellow dwarf to infect the 2011 crops and raised the possibility of Russian Wheat aphids returning as significant pest.

The Moccasin no-till continuous crop trial yields were 5 to 7 bushels above average with a nursery mean of 57 bu/a and the late seeded Denton trial was about eight to 10 bushels below average. Yellowstone was the high grain producer with Jagalene, Wahoo, Decade and five other entries having statistically similar yields at Moccasin (Table 1). Top producing varieties at Denton were the same as the Moccasin location with Decade being tops. Test weights were near normal with Jagalene and Promontory having higher test weights. Genou had the site high protein content. There was almost a seven day interval in heading date between early heading Wahoo and MTS0826. Sawfly was not an issue in the Moccasin trial, but did cause significant stem cutting at Denton. Moccasin and Denton multi-year (5y) winter wheat performance data for yield, test weight, grain protein, and plant height are presented in Tables 3 to 9 with exception of Denton multi-year yields. Events with downy brome infestations marginalized the available yield data in two recent years.

Spring wheat:
2010 was a good spring wheat year, provided one was able to get the crop seeded in a timely fashion. Even some late seeded spring wheat performed well with the cooler temperatures and late season rains. The three off-station recrop spring wheat variety trials average around 30 bushels per acre, which is above average for central Montana. The spring wheat test weights were near standard which is heavier than normal for the shallower soils at Moccasin and south Denton. All three locations had sufficient sawfly cutting to provide some separation for sawfly tolerance amongst entries.

Because of its yield potential and surprising tolerance to sawfly, Vida is providing a good yield standard for central Montana spring wheat nurseries. Choteau, Corbin, Conan, ONeal, Mott, and Outlook along with some experimental lines were the top yielders across the three locations in 2010(see Tables 10-12). In general, entries with some degree stem solidness and associated reduced sawfly stem cutting had the higher yields. Oneal, Kelby and Volt were consistently near the top for test weight. Mott and Kelby had higher protein content. Freyr, Kuntz and Volt generally had much higher levels of stem cutting then other nursery entries. Multi-year summary tables compare the mean performance for selected spring wheat varieties to Vida's performance for the same years for yield, test weight, grain protein, plant height and saw fly cutting (Tables 13 to 23).

Barley:
Barley production acreage, in central Montana, continues to lag compared to the acreage over the past two to four decades. Many growers are looking for markets which would allow them to shift some of their wheat acres back to barley. Yields of timely seeded barley were quite good in central Montana. Barley thrives with cooler conditions and increased moisture. However, at times it appears that barley may favor till plant over no-till. Goldeneye, a two year entry in the off-station nursery was the top grain yielder at both the Moccasin and Denton no-till recrop locations (Tables 24 & 25). Harrington faltered ranking last for yield at Moccasin and second to last at Denton. For the second year in a row, test weights were outstanding with trial means of 51.4 and 53.6, respectively, for the Moccasin and Denton locations. Post harvest seed dormancy was evaluated in late October. Post 96 h, in a 50^{o}F incubator, germination numbers for Conrad, Geraldine, Goldeneye, Hockett, an dChampion at one or both locations show that some cautioned should be used prior to using these varieties extensively in a dryland continuous crop system. Higher numbers for post 96h germination, in a 50^{o}F incubator, indicate an increased chance of seed laying dormant on the soil through the winter and producing volunteer plants the in the following spring and contaminating the following crop. Even varieties that have what might be considered to be a slight increase in delayed seed germination, over check varieties like Harrington, have had a field history of increased volunteer plants. Gallatin is such a variety.

Multi-year summary tables, for barley trials at Moccasin and Denton, compare the mean performance for selected barley varieties to Haxby's performance for the same years for yield, test weight, grain protein, plant height and saw fly cutting (Tables 26-29).

Summary:

2010 was a somewhat stressful year, for the crop producer, due to the multitude of atypical weather events that occurred across the crop year starting with extreme cold and wet conditions in October 2009. While not all cereal crops were successful, those crops that had good stands generally produced good to outstanding yields. Sawfly cutting was sufficient to provide a good evaluation of spring wheat varieties and late seeded winter wheat varieties for tolerance, yet were not so severe as to wipe out any chance for useable yield data.

Funding Summary:

Expenditure information to be provided by OSP.
No other grant support was provided for this project.

MWBC FY2011 Grant Submission Plans:

It is planned to submit this project for funding consideration in the next fiscal year.

Table 1 2010 Moccasin off-station winter wheat trial in no-till continuous crop.
Exp387010 Central Agricultural Research Center. Moccasin, Montana.

Entry	Cultivar\Line	Origin/Pedigree	Heading Date	Grain Yield	Test Weight	Protein Content
			Julian	bu/ac	lb/bu	%
2	Yellowstone	Montana 2005	177.0	**66.5****	59.8	13.3
6	Jagalene	AgriPro, 2002	175.7	**63.6***	61.3	12.9
14	Wahoo	Nebraska, 2001	173.0	**62.2***	56.9	13.4
17	Decade	Montana/North Dakota, 2010	174.3	**60.6***	60.7	13.4
15	Hyalite (CL, HWW)	Montana/WestBred, 2005	175.3	**60.1***	61.0	13.3
7	Jerry	North Dakota, 2001	175.7	**58.6***	58.0	13.4
22	MTS0721	DMS/Rampart//Pronghorn/3/2*Rampart	175.3	**58.3***	61.0	13.4
13	Carter	WestBred, 2006	175.0	**57.1***	60.2	13.5
19	MT06103	MT9409/(W94-137, Ontario mother line)	175.0	**57.0***	61.6	13.8
8	Pryor	WestBred, 2002	177.0	56.0	59.2	13.8
24	MTS0832	92X73E70/MTW9911	178.0	55.4	58.2	13.4
9	Promontory	Utah, 1990	175.3	54.5	62.3	12.1
10	Neeley	Idaho, 1980	178.0	54.3	58.5	13.5
16	MTS0532 (HWW)	L'Govskaya 167/Rampart//MT9409	176.0	54.2	59.5	13.4
11	Norris (CL)	Montana/WestBred, 2005	174.3	54.0	61.2	12.7
20	MTS0713	93X312E14/NuHorizon	175.0	53.6	59.0	13.7
18	Accipiter	CDC Raptor/CDC Falcon	177.7	52.7	59.3	13.8
3	CDC Falcon	Sask/WestBred, 1999	176.0	52.3	60.6	13.4
21	MTS0705	MT9524/G15048//Rampart	177.3	51.9	61.2	13.4
4	Ledger	WestBred, 2004	175.7	51.3	60.1	12.8
1	Genou	Montana, 2004	176.3	51.0	57.7	14.5
12	Bynum (CL)	Montana/WestBred, 2005	175.0	50.9	60.5	14.3
23	MTS0826	MT9524/G15048//Rampart	179.7	48.2	58.9	14.3
5	Rampart	Montana, 1996	176.3	47.9	59.8	13.7
	Average		176.0	55.5	59.9	13.5
	LSD (0.05)		1.1	9.6		
	C.V. (%)		0.4	10.5		
	P-value (Varieties)		<.0001	0.0263		

** = indicates highest value within a column * indicates values similar to highest value Fischer Protected LSD (0.05)

Seeded: 26-Sep-09 No-till into continuous crop barley stubble.
Harvest: 9 August 2010.
Fertilizer: 5-26-0 NPK w/seec 90 N topdress as urea
Weed Control: 2 pints bronate in early May.
Comment: Stands acceptable. However, there are some short blanks in some rows.
past. Wire worms are suspected but none were observed.

Table 2 2010 Denton off-station winter wheat trial in no-till re-crop .
Exp387110 Central Agricultural Research Center. Moccasin, Montana.

Entry	Cultivar\Line	Origin/Pedigree	Plant Height	Grain Yield	Test Weight	Protein Content	Sawfly Stems Cut
			in	bu/ac	lb/bu	%	#
17	Decade	Montana/North Dakota, 2010	27.6	34.1	**57.1***	11.8	4.0
4	Ledger	WestBred, 2004	27.2	33.4	**57.0***	11.8	3.0
8	Pryor	WestBred, 2002	28.3	33.4	**57.1***	11.2	5.0
3	CDC Falcon	Sask/WestBred, 1999	26.4	32.4	**57.0***	11.4	6.0
24	MTS0832	92X73E70/MTW9911	29.1	32.3	55.9	12.1	1.0
6	Jagalene	AgriPro, 2002	28.7	31.8	**59.1****	10.9	3.0
2	Yellowstone	Montana 2005	30.3	31.4	55.6	11.5	25.0
23	MTS0826	MT9524/G15048//Rampart	28.3	30.8	55.6	13.0	0.5
20	MTS0713	93X312E14/NuHorizon	27.6	30.6	**58.1***	11.3	1.5
22	MTS0721	DMS/Rampart//Pronghorn/3/2*Rampart	30.7	30.3	**57.2***	11.1	1.0
21	MTS0705	MT9524/G15048//Rampart	34.6	30.1	56.3	12.9	1.0
15	Hyalite (CL, HWW)	Montana/WestBred, 2005	30.7	29.7	**58.2***	11.3	10.0
13	Carter	WestBred, 2006	25.2	29.5	56.6	10.9	2.5
16	MTS0532 (HWW)	L'Govskaya 167/Rampart//MT9409	28.7	28.8	**58.2***	10.9	1.0
5	Rampart	Montana, 1996	29.9	28.2	56.4	12.3	2.0
9	Promontory	Utah, 1990	27.6	27.9	**58.4***	11.2	30.0
18	Accipiter	CDC Raptor/CDC Falcon	28.7	27.2	56.3	11.7	8.0
19	MT06103	MT9409/(W94-137, Ontario mother line)	31.1	27.2	**57.6***	11.2	2.5
1	Genou	Montana, 2004	30.3	27.1	55.1	11.5	2.0
14	Wahoo	Nebraska, 2001	27.6	26.8	55.4	10.7	7.5
12	Bynum (CL)	Montana/WestBred, 2005	33.1	26.4	56.3	12.6	3.0
11	Norris (CL)	Montana/WestBred, 2005	29.1	26.4	**58.5***	10.6	11.5
7	Jerry	North Dakota, 2001	28.7	23.5	56.0	12.0	17.5
10	Neeley	Idaho, 1980	31.9	20.6	55.4	12.0	17.5
	Average		29.2	29.2	56.9	11.6	6.9
	LSD (0.05)			ns	2.1		6.2
	C.V. (%)			13.3	1.8		43.2
	P-value (Varieties)			0.215	0.0171		<.0001

** = indicates highest value within a column * indicates values similar to highest value Fischer Protected LSD (0.05)

Seed Date: 5-Nov-09 into pea stubble. Soil conditions were good.

Soil: two inch temp: 5C Soil moisture probe depth: 30 inches

Comment: While seeding conditions were good, the late seeding date led to freeze drying which mallowed surface soils facilitating wind movement of the soil. Weather conditions during spring green up caused stand loss in the trial and elsewhere in the Judith Basin.

Table 3 Moccasin NTRC multi-year winter wheat variety yield performance

Cultivar	2006	2007	2008	2009	2010	Mean	Yellowstone same Yrs.
				bu/a			
Yellowstone	52.2	58.4	38.6	33.3	**66.5**	49.8	49.8
Bynum (CL)	38.6	43.1	24.4	27.6	50.9	36.9	49.8
Carter			32.1	32.0	**57.1**	40.4	46.1
CDC Falcon	44.3	50.9	35.1	28.6	52.3	42.2	49.8
Decade			31.8	29.0	**60.6**	40.5	46.1
Genou	44.9	42.6	25.8	29.0	51.0	38.7	49.8
Hyalite (CL,HW)	46.6	46.1	28.3	25.5	**60.1**	41.3	49.8
Jagalene	42.1	52.8	34.0	31.7	**63.6**	44.8	49.8
Jerry	41.8	45.8	31.9	28.0	**58.6**	41.2	49.8
Ledger	40.8	50.2	24.9	26.9	51.3	38.8	49.8
Neeley	54.2	43.3	28.1	29.3	54.3	41.8	49.8
Norris (CL)	47.4	44.4	35.3	31.9	54.0	42.6	49.8
Promontory	48.3	52.6	30.6	26.6	54.5	42.5	49.8
Pryor	48.8	45.0	31.5	26.3	56.0	41.5	49.8
Rampart	40.8	40.0	27.2	25.4	47.9	36.3	49.8
Wahoo	43.1	53.3	30.2	26.2	**62.2**	43.0	49.8
Average	45.7	46.7	29.8	29.2	55.5		

Varieties with multi-year means ≥ than Yellowstone for the same years are in **bold**.

Table 4. Multi-year winter wheat test weight for the NTRC at Moccasin.

Exp 3870 Cultivar / year:	2006	2007	2008	2009	2010	Mean	Yellowstone Same Years
				lbs/bu			
Yellowstone	62.1	53.1	57.1	59.4	59.8	58.7	58.7
Bynum (CL)	63.4	57.8	58.4	60.1	60.5	**60.8**	58.7
Carter			58.1	57.4	60.2	**59.8**	59.4
CDC Falcon	63.2	53.7	57.4	58.6	60.6	**59.1**	58.7
Decade			57.0	59.0	60.7	**59.7**	59.4
Genou	63.3	55.1	56.6	58.8	57.7	**59.5**	58.7
Hyalite (CL, HWW	62.0	55.1	57.6	58.4	61.0	**59.3**	58.7
Jagalene	63.5	56.5	58.5	57.1	61.3	**60.0**	58.7
Jerry	64.0	52.5	57.2	57.9	58.0	58.7	58.7
Ledger	62.2	56.6	58.1	60.3	60.1	**60.2**	58.7
Neeley	63.3	52.1	56.7	57.4	58.5	58.6	58.7
Norris (CL)	63.3	53.8	58.6	60.7	61.2	**60.0**	58.7
Promontory	64.6	57.0	57.3	62.2	62.3	**61.2**	58.7
Pryor	63.8	52.6	60.4	59.8	59.2	**59.8**	58.7
Rampart	63.0	56.4	57.5	50.6	59.8	58.2	58.7
Wahoo	62.9	54.6	57.1	60.5	56.9	**59.3**	58.7
Average	63.1	54.9	57.9	58.8	59.9		

Varieties with multi-year means ≥ than Yellowstone for the same years are in **bold**.

Table 5. Multi-year winter wheat grain test weights near Denton.

Exp 3871						Yellowstone
Cultivar / year:	2006	2007	2009	2010	Ave	Same Years
				lb/bu		
Yellowstone	62.9	59.2	58.3	57.1	59.4	59.4
Bynum (CL)	63.0	59.6	57.9	56.3	59.2	59.4
Carter			58.5	56.6	57.6	57.7
CDC Falcon	64.0	59.7	58.1	57.0	**59.7**	59.4
Decade			59.0	55.1	57.1	57.7
Genou	64.9	59.9	57.1	58.2	**60.0**	59.4
Hyalite (CL, HWW)	64.4	57.5	59.1	59.1	**60.0**	59.4
Jagalene	65.2	62.2	58.5	56.0	**60.5**	59.4
Jerry	63.2	59.2	57.9	57.0	59.3	59.4
Ledger	64.4	60.7	58.4	55.4	**59.7**	59.4
Neeley	63.4	59.9	57.8	58.5	**59.9**	59.4
Norris (CL)	64.4	59.7	59.1	58.4	**60.4**	59.4
Promontory	64.7	61.3	58.8	57.1	**60.5**	59.4
Pryor	64.7	58.5	59.1	56.4	**59.7**	59.4
Rampart	63.7	59.5	57.7	55.4	59.1	59.4
Wahoo	63.7	59.1	57.3	55.6	58.9	59.4
Average	63.9	59.7	58.5	56.9		

Varieties with multi-year means ≥ than Yellowstone for the same years are in **bold**.

Table 6. Multi-year winter wheat grain protein near Moccasin.

Exp 3800 / Loc:							Yellowstone
Cultivar / Year:	2006	2007	2008	2009	2010	Ave	same Years
				%			
Yellowstone	14.4	15.2	11.3	15.9	13.3	14.0	14.0
Bynum (CL)	15.8	15.5	12.4	15.0	14.3	14.6	14.0
Carter			11.7	15.0	13.5	13.4	13.5
CDC Falcon	13.8	16.2	11.0	14.7	13.4	13.8	14.0
MT0552			11.6	16.0	13.4	13.7	14.0
Genou	15.1	15.5	11.9	14.7	14.5	14.3	14.0
Hyalite (CL, HWW)	15.2	16.3	11.1	15.1	13.3	14.2	14.0
Jagalene	15.3	15.2	11.3	14.5	12.9	13.8	14.0
Jerry	15.1	15.1	11.1	15.0	13.4	13.9	14.0
Ledger	15.1	17.2	10.6	14.0	12.8	13.9	14.0
Neeley	13.9	14.9	10.8	14.7	13.5	13.6	14.0
Norris (CL)	14.3	17.4	11.0	13.4	12.7	13.8	14.0
Promontory	14.5	15.7	10.6	13.0	12.1	13.2	14.0
Pryor	13.5	14.3	10.8	15.0	13.8	13.5	14.0
Rampart	15.5	15.6	11.8	15.4	13.7	14.4	14.0
Wahoo	14.4	17.2	12.4	14.2	13.4	14.3	14.0
Average	14.6	15.7	11.5	14.7	13.5		

Varieties with multi-year means ≥ than Yellowstone for the same years are in **bold**.

Table 7. Multi-Year winter wheat grain protein content near Denton.

Exp 3871 Cultivar / Year:	2006	2007	2008	2009	2010	Ave	Yellowstone same Years
Yellowstone	10.5	11.2		13.3	11.5	11.6	11.6
Bynum (CL)	11.9	11.3		15.2	12.6	12.8	11.6
Carter				14.2	10.9	12.6	12.4
CDC Falcon	9.9	14.5		13.4	11.4	12.3	11.6
Decade				14.2	11.5	12.9	12.4
Genou	10.6	10.9		14.1	11.8	11.9	11.6
Hyalite (CL, HWW)	10.8	11.7		14.8	11.3	12.2	11.6
Jagalene	10.2	14.6		13.9	10.9	12.4	11.6
Jerry	11.6	10.9		13.3	12.0	12.0	11.6
Ledger	11.4	11.3		13.1	11.8	11.9	11.6
Neeley	9.8	10.8		14.1	12.0	11.7	11.6
Norris (CL)	9.5	11.8		14.2	10.6	11.5	11.6
Promontory	10.7	10.6		12.8	11.2	11.3	11.6
Pryor	8.3	11.6		12.3	11.2	10.9	11.6
Rampart	10.5	11.3		13.8	12.3	12.0	11.6
Wahoo	10.5	13.5		13.0	10.7	11.9	11.6
Average	10.4	11.7		13.7	11.6		

Varieties with multi-year means $\geq$ than Yellowstone for the same years are in **bold**.

Table 8. 2010 Multi-year winter wheat plant height for Moccasin, NTRC.

Exp 3870 Cultivar	2006	2007	2008	2009	2010	Ave.	Yellowstone Same Years
				inches			
Yellowstone	**34**	**42**	**28**	**25**		**32.2**	**31.0**
Bynum	32	43	28	26	oops	32.2	31.0
Carter			24	24		**24.1**	26.5
CDC Falcon	28	36	24	23		**27.7**	31.0
Decade			25	24		**24.3**	26.5
Genou	32	43	29	25		32.1	31.0
Hyalite (CL, HWW)	32	42	28	23		31.5	31.0
Jagalene	28	37	26	24		**28.7**	31.0
Jerry	36	44	31	26		34.4	31.0
Ledger	31	39	27	23		**29.9**	30.2
Neeley	34	43	30	25		33.0	31.0
Norris (CL)	32	42	30	26		32.5	31.0
Promontory	35	41	26	26		32.2	31.0
Pryor	27	37	25	21		**27.4**	31.0
Rampart	33	42	28	25		31.9	31.0
MT0552			25	24		**24.3**	24.6
Wahoo	31	38	27	25		**30.1**	31.0
Average	32.6	41.2	28.0	24.4		31.6	

Varieties with multi-year means $\leq$ than Yellowstone for the same years are in **bold**.

Table 9. Multi-year plant height of winter wheat near Denton.

Exp 3871 Cultivar	2006	2007	2008	2009	2010	Ave.	Yellowstone Same Years
Yellowstone	**30**	**32**		**21**	**30.3**	**28.2**	**28.2**
Bynum	28	35		23	33.1	28.5	28.2
Carter				20	25.2	**19.5**	27.5
CDC Falcon	30	31		18	26.4	**26.5**	28.2
Decade				19	30.3	**18.9**	27.5
Genou	31	29		21	27.6	**27.0**	28.2
Hyalite (CL, HWW	22	33		21	30.7	**25.5**	28.2
Jagalene	26	31		20	28.7	**25.6**	28.2
Jerry	26	33		25	28.7	**27.9**	28.2
Ledger	24	30		20	27.2	**24.8**	28.2
Neeley	28	31		23	31.9	**27.3**	28.2
Norris (CL)	27	32		24	29.1	**27.6**	28.2
Promontory	28	33		24	27.6	**28.2**	28.2
Pryor	23	29		18	28.3	**23.5**	28.2
Rampart	29	37		23	29.9	29.6	28.2
Wahoo	24	32		22	27.6	**26.2**	28.2
Average	27.9	32.5		21.64	29.2		

Varieties with multi-year means ≤ Yellowstone are in bold.

Table 10 2010 Moccasin no-till CC spring wheat variety performance trial.
Exp 997010 Central Agricultural Research Center. Moccasin, Montana.

Variety	ID code	Entry	Head Date	Plant Height	Grain Yield	Test Weight	Protein Content	Sawfly cutting
			Julian	cm	bu/a	lbs/bu	%	score
AP604 CL	AGRIPRO8	9	185	81	26.2	58.8	12.9	8.7
CHOTEAU	PI633974	6	186	70	26.5	59.8	12.6	1.3
MT 0827	CHOTEAU/MT0249	18	**184**	79	**33.3**	**61.6**	12.5	4.0
MT 0832	CHOTEAU/MT0249	19	**184**	79	**29.9**	58.1	13.2	1.0
CONAN	BZ992588	3	186	75	**31.8**	59.4	13.2	1.7
CORBIN	BZ996434	11	186	74	**31.1**	59.0	12.8	1.7
FORTUNA	CI 13596	1	188	**93**	**33.7**	59.8	12.7	1.7
FREYR	AGRIPRO3	10	187	81	25.1	59.4	12.6	10.0
HANK	BZ992322	8	186	75	27.3	56.2	12.6	7.7
JEDD	BZ9M1044	15	185	69	**28.8**	58.9	13.4	4.0
KELBY	AGRIPRO6	12	185	**71**	24.9	60.1	**13.7**	5.3
KUNTZ	AGRIPRO7	13	187	72	21.8	59.5	12.8	6.0
MCNEAL	PI574642	2	187	79	**29.8**	59.1	12.9	4.0
MOTT	NDSW0449	17	**188**	80	**32.9**	59.0	**13.7**	1.0
MT 0852	MT0249/CHOTEAU	20	188	79	**33.5**	60.1	13.4	1.0
ONEAL	BZ999592	16	187	76	**33.0**	**60.4**	12.9	1.7
OUTLOOK	PI632252	5	188	77	**32.8**	58.7	12.0	5.7
REEDER	ND 695	4	187	75	28.1	**60.6**	12.4	5.3
VIDA	PI642366	7	188	75	**30.4**	59.7	11.7	2.0
VOLT	ACS52610	14	187	75	23.7	**60.6**	**13.7**	**15.0**
Mean			186.5	76.83	29.25	59.41	12.88	4.43
P-value			0.00	0.00	0.00	0.00		0.00
CV1			7.1	4.093	12.19	1.025		26.11
LSD (0.05)			1.046	5.198	5.891	1.275		1.914

Seed Date: 12-Apr-10 Lentil stubble
Soil Temp.: 2 inch depth 6 C
Fertilizer: w/seed 50 11-52-0 Topdres: 60 N as urea
Crop Year Precipitation (Sept-Aug.) 17.65 inches

Table 11 2010 Denton no-till CC spring wheat variety performance trial.
Exp 997010 Central Agricultural Research Center. Moccasin, Montana.

Variety	ID code	Entry	Head Date	Plant Height	Grain Yield	Test Weight	Protein Content	Sawfly cutting
			Julian	cm	bu/a	lbs/bu	%	score
AP604 CL	AGRIPRO8	9		84	28.0	**61.1**	14.2	**9.0**
Choteau	PI633974	6		68	**37.0**	60.4	13.9	**4.0**
MT 0827	CHOTEAU/MT0249	18		78	**37.1**	**61.9**	13.0	**5.5**
MT 0832	CHOTEAU/MT0249	19		73	**36.5**	59.5	13.5	**1.0**
Conan	BZ992588	3		72	32.0	60.7	13.9	**1.5**
Corbin	BZ996434	11		75	**35.1**	60.1	13.3	**1.5**
Fortuna	CI 13596	1		93	32.0	60.1	13.2	**2.0**
Freyr	AGRIPRO3	10		79	25.5	60.4	13.4	12.5
Hank	BZ992322	8		73	24.1	58.2	13.7	13.5
Jedd	BZ9M1044	15		67	31.0	60.7	13.3	**7.0**
Kelby	AGRIPRO6	12		66	24.1	60.8	13.7	12.5
Kuntz	AGRIPRO7	13		69	20.6	58.9	12.9	29.0
McNeal	PI574642	2		79	30.2	59.0	13.2	**3.5**
Mott	NDSW0449	17		84	32.5	59.9	14.1	**1.0**
MT 0852	MT0249/CHOTEAU	20		78	**38.6**	**61.1**	13.9	**0.5**
Oneal	BZ999592	16		78	**37.5**	**61.3**	13.1	**2.5**
Outlook	PI632252	5		70	31.8	58.6	12.9	**7.5**
Reeder	ND 695	4		71	28.0	60.3	13.5	10.5
Vida	PI642366	7		74	**36.4**	59.7	13.1	**2.0**
Volt	ACS52610	14		72	22.2	**61.7**	12.9	32.5
Mean				75.2	31	60.2	13.43	7.95
P value					0	0		0
CV 1					10.7	0.6		57.1
LSD (0.05)					5.461	0.7748		9.506

Seed Date: 21 April 2010 No-till into continuous crop (CC) lentil stubble.
Soil .: Two inch temp: 16 C Moisture Probe depth: 23 inches
Fertilizer: w/seed 50 11-52-0 Topdress: 60 N as urea
Crop Year Precipitation was above average

Table 12 2010 Geraldine no-till crop-crop-fallow spring wheat variety performance trial. Exp 997210 Central Agricultural Research Center. Moccasin, Montana.

Variety	ID code	Entry	Head Date	Plant Height	Grain Yield	Test Weight	Protein Content	Sawfly cutting
			Julian	cm	bu/a	lbs/bu	%	score
AP604 CL	AGRIPRO8	9		79	24.0	58.5	15.2	7.3
Choteau	PI633974	6		75	32.0	57.1	15.1	2.3
MT 0827	CHOTEAU/MT0249	18		69	35.0	60.4	14.5	3.7
MT 0832	CHOTEAU/MT0249	19		71	33.6	57.2	14.3	1.7
Conan	BZ992588	3		74	31.6	59.3	14.9	3.0
Corbin	BZ996434	11		73	35.9	58.2	14.9	2.3
Fortuna	CI 13596	1		100	33.7	59.3	14.7	1.3
Freyr	AGRIPRO3	10		78	24.3	58.4	14.3	17.7
Hank	BZ992322	8		70	24.7	56.9	15.1	12.7
Jedd	BZ9M1044	15		60	27.5	58.9	14.6	9.3
Kelby	AGRIPRO6	12		68	30.1	59.3	15.8	4.0
Kuntz	AGRIPRO7	13		64	20.2	57.4	14	22.0
McNeal	PI574642	2		79	25.6	57.6	14.8	7.7
Mott	NDSW0449	17		73	33.2	58.6	15.4	2.7
MT 0852	MT0249/CHOTEAU	20		76	38.8	60.0	14.6	0.7
Oneal	BZ999592	16		72	35.3	59.6	14.5	3.0
Outlook	PI632252	5		73	30.7	56.9	14.1	8.7
Reeder	ND 695	4		77	27.6	59.1	15.2	6.3
Vida	PI642366	7		74	34.9	57.3	13.8	3.3
Volt	ACS52610	14		70	23.3	60.2	13.5	27.7
Mean				73.8	30.1	58.48	14.67	7.37
P-Value					0.00	0.00		0.00
CV1					9.42	1.17		67.6
LSD (0.05)					4.68	1.43		8.23

Seed Date: 21 April 2010 into winter wheat stubble
Fertilizer: Pre Plant 50 N as urea W/Seed : 5.5 +26+0+0 as 11-52-(Post: 45 N as urea
Soil: 2 inch temp: 12.5 C Moist probe depth: 33 inches
Comment:

Table 13 Multi-year spring wheat variety yields under no-till CC near Moccasin.

Exp 9970							Vida
	2006	2007	2008	2009	2010	Mean	Same Yrs
				bu/a			
AP604 CL				16	26	21.0	28.5
Choteau	25	32	17	26	27	25.1	26.3
Conan	24	31	15	25	32	25.5	26.3
Corbin		33	14	23	31	25.2	25.8
Fortuna	24	30	24	26	34	25.2	26.3
Freyr	21	33	14	24	25	23.4	26.3
Hank	25	32	25	20	27	25.8	26.3
Jedd			16	24	29	22.9	24.1
Kelby			16	18	25	19.5	24.1
Kuntz			19	21	22	20.7	24.1
McNeal	25	33	18	28	30	**26.9**	26.3
ONeal			16	28	33	**25.8**	24.1
Outlook	22	32	16	29	33	26.1	26.3
Reeder	24	31	15	24	28	24.5	26.3
Vida	**28**	**31**	**16**	**27**	**30**	**26.3**	**26.3**
Volt			23	21	24	22.6	24.1
Means	24.6	31.2	18.1	23.4	29.25		

Varieties with multi-year means ≥ Vida are bold.

Table 14 Multi-year spring wheat variety yields on NTCC near Denton.

Exp 9971							Vida
Pedigree	2006	2007	2008	2009	2010	mean	Same Yrs.
				bu/a			
AP604CL				25.8	28.0	25.8	35.8
Choteau	22.5	22.5	13.9	25.6	37.0	21.1	28.2
Conan	23.6	22.2	14.6	25.9	32.0	21.6	28.2
Corbin		23.0	16.2	28.3	35.1	22.5	28.6
Fortuna	25.9	18.5	17.0	25.6	32.0	21.8	28.2
Freyr	23.8	23.5	15.5	25.5	25.5	22.1	28.2
Hank	24.7	23.6	16.4	31.7	24.1	24.1	28.2
Jedd			18.3	30.8	31.0	24.6	29.9
Kelby			15.4	22.2	24.1	18.8	29.9
Kuntz			17.0	30.2	20.6	23.6	29.9
McNeal	24.3	24.0	17.1	22.2	30.2	21.9	28.2
ONeal			18.8	32.6	37.5	25.7	29.9
Outlook	25.1	22.8	14.3	28.1	31.8	22.6	28.2
Reeder	25.4	21.1	16.0	27.2	28.0	22.4	28.2
Vida	**26.7**	**24.6**	**18.1**	**35.2**	**36.4**	**35.8**	**28.2**
Volt			16.5	28.6	22.2	22.5	29.9
Mean	24.9	22.68	16.56	27.8	31.0	23.0	

Varieties with multi-year means ≥ Vida are in bold.

Table 15 Multi-year spring wheat variety grain yields near Geraldine.

Exp 9972 Variety	2007	2008	2009	2010	mean	Vida same Yrs
			bu/a			
AP604CL			23.8	24	23.9	33.4
Choteau	40.3	28.3	25.7	32.0	31.6	36.0
Conan	41.7	23.1	23.6	31.6	30.0	36.0
Corbin	38.5	25.5	25.0	35.9	31.2	36.0
Fortuna	34.0	25.3	22.8	33.7	29.0	36.0
Freyr	44.3	20.3	23.1	24.3	28.0	36.0
Hank	37.2	24.8	23.6	24.7	27.6	36.0
Jedd		21.0	23.9	27.5	24.2	31.5
Kelby		15.4	19.4	30.1	21.6	31.5
Kuntz		18.5	21.9	20.2	20.2	31.5
McNeal	30.9	21.7	26.1	25.6	26.1	36.0
ONeal		29.1	28.9	35.3	31.1	31.5
Outlook	39.6	24.3	24.0	30.7	29.7	36.0
Reeder	39.5	26.6	27.3	27.6	30.3	36.0
Vida	**49.5**	**27.7**	**31.9**	**34.9**	**36.0**	**36.0**
Volt		22.0	30.3	23.3	25.2	31.5
Mean	39.79	23.08	25.44	30.18	27.7	

Varieties with multi-year means > Vida are in bold.

Table 16 Multi-Year spring wheat variety test weights near Moccasin.

Exp 9970 Entry	2007	2008	2009	2010	Mean	Vida Same Yrs
			lbs/bu			
AP604 CL			59.8	58.8	59.3	59.5
Choteau	53.7	58.6	58.7	59.8	57.7	57.8
Conan	53.9	59.6	60.8	59.4	**58.4**	57.8
Corbin	52.4	58.6	60.5	59.0	57.6	57.8
Fortuna	53.9	58.1	59.2	59.8	57.7	57.8
Freyr	52.9	59.5	60.4	59.4	58.0	57.8
Hank	50.7	56.9	59.4	56.2	55.8	57.8
Jedd		58.8	60.7	58.9	**59.4**	59.3
Kelby		58.6	59.8	60.1	**59.5**	59.3
Kuntz		58.4	59.7	59.5	59.2	59.3
McNeal	52.3	57.5	59.8	59.1	57.2	57.8
ONeal		59.4	61.2	60.4	**60.3**	59.3
Outlook	51.4	57.3	58.9	58.7	56.5	57.8
Reeder	54.0	58.7	60.7	60.6	**58.5**	57.8
Vida	**53.5**	**58.8**	**59.3**	**59.7**	**57.8**	**57.8**
Volt		59.8	60.9	60.6	**60.4**	59.3
Means	53.21	58.51	59.98	59.41		

Varieties with multi-year means > Vida are in bold.

Table 17 Multi-year spring wheat variety test weight near Denton .

Exp 9971 Entry	2007	2008	2009	2010	Mean	Vida Same Yrs
			lbs/bu			
AP604CL			62.9	61.1	**62.0**	60.7
Choteau	55.9	59.6	61.7	60.4	59.4	59.6
Conan	56.5	60.3	62.5	60.7	**60.0**	59.6
Corbin	55.7	58.8	61.9	60.1	59.1	59.6
Fortuna	56.0	59.6	62.4	60.1	59.5	59.6
Freyr	57.6	60.4	63.3	60.4	**60.4**	59.6
Hank	53.7	58.1	62.2	58.2	58.0	59.6
Jedd		61.2	63.0	60.7	**61.6**	60.5
Kelby		61.2	63.0	60.8	**61.7**	60.5
Kuntz		60.9	62.7	58.9	**60.8**	60.5
McNeal	56.1	58.7	61.9	59.0	**58.9**	59.6
ONeal		60.5	62.3	61.3	**61.3**	60.5
Outlook	54.9	59.0	62.7	58.6	58.8	59.6
Reeder	56.5	60.7	63.4	60.3	**60.2**	59.6
Vida	**56.9**	**60.0**	**61.8**	**59.7**	**59.6**	**59.6**
Volt		61.5	63.0	61.7	**62.0**	60.5
Mean	56.43	60.01	62.54	60.2	59.8	

Varieties with multi-year means $\geq$ Vida are in bold.

Table 18 Multi-year spring wheat variety test weights near Geraldine.

Exp 9972 Variety	2007	2008	2009	2010	Mean	Vida same Yrs
			lbs/bu			
AP604CL			61.3	58.5	**59.9**	58.8
Choteau	59.3	61.4	59.9	57.1	59.4	59.6
Conan	59.5	61.6	61.0	59.3	**60.3**	59.6
Corbin	59.7	61.4	60.3	58.2	**59.9**	59.6
Fortuna	58.4	60.8	59.1	59.3	59.4	59.6
Freyr	59.7	61.6	61.3	58.4	**60.2**	59.6
Hank	56.2	60.5	60.0	56.9	58.4	59.6
Jedd	59.8	62.5	61.3	58.9	**60.6**	59.6
Kelby	57.6	61.8	60.6	59.3	**59.8**	59.6
Kuntz	57.9	60.5	60.6	57.4	59.1	59.6
McNeal	57.6	60.6	60.1	57.6	**58.9**	59.6
Oneal		62.0	61.7	59.6	**61.1**	59.9
Outlook	57.9	60.8	59.0	56.9	58.6	59.6
Reeder	59.8	62.2	60.7	59.1	**60.5**	59.6
Vida	58.5	62.1	60.4	57.3	58.8	59.6
Volt		62.3	62.7	60.2	**61.7**	59.9
Mean	59.05	61.31	60.62	58.48	59.9	

Varieties with multi-year means $\geq$ Vida are in bold.

Table 19 Multi-Year spring wheat variety protein content near Moccasin.

Exp 9970 Variety	2007	2008	2009	2010	Mean	Vida Same Year
			%			
AP604 CL			17.8	12.9	**15.4**	14.5
Choteau	14.6	14.8	17.6	12.6	**14.9**	14.2
Conan	15.2	14.5	16.3	13.2	**14.8**	14.2
Corbin	15.9	14.6	18.1	12.8	**15.4**	14.2
Fortuna	14.9	14.5	16.2	12.7	**14.6**	14.2
Freyr	15.5	13.7	16.8	12.6	**14.7**	14.2
Hank	15.8	13.5	18.5	12.6	**15.1**	14.2
Jedd		13.5	17	13.4	**14.6**	14.0
Kelby		14.7	15.2	13.7	**14.5**	14.0
Kuntz		13.7	15.7	12.8	**14.1**	14.0
McNeal	15.1	14.6	17.5	12.9	**15.0**	14.2
ONeal		13.7	17.3	12.9	**14.6**	14.0
Outlook	14.5	13.2	16.3	12.0	14.0	14.2
Reeder	14.9	14.2	16.3	12.4	**14.5**	14.2
Vida	**14.9**	**12.8**	**17.4**	**11.7**	**14.2**	**14.2**
Volt		13.9	16	13.7	**14.5**	14.0
Means	15.26	14.06	16.94	12.88	14.8	

Varieties with multi-year means ≥ Vida are in bold.

Table 20 Multi-year spring wheat variety protein content near Denton.

Exp 9971 Pedigree	2007	2008	2009	2010	Mean	Vida Same Yrs.
			%			
AP604CL			14.8	14.2	**14.5**	13.5
Choteau	15.5	14.5	15.0	13.9	**14.7**	13.6
Conan	15.9	14.0	15.2	13.9	**14.8**	13.6
Corbin	14.7	13.9	14.6	13.3	**14.1**	13.6
Fortuna	17.0	14.6	14.6	13.2	**14.9**	13.6
Freyr	14.9	13.0	14.4	13.4	**13.9**	13.6
Hank	15.0	13.3	13.3	13.7	**13.8**	13.6
Jedd		13.2	13.4	13.3	13.3	13.4
Kelby		15.0	16.8	13.7	**15.2**	13.4
Kuntz	15.0	12.4	13.4	12.9	13.4	13.6
McNeal		13.9	14.2	13.2	**13.8**	13.4
ONeal	15.3	13.7	13.7	13.1	**14.0**	13.6
Outlook	15.3	12.8	13.8	12.9	**13.7**	13.6
Reeder	15.2	12.7	14.3	13.5	**13.9**	13.6
Vida	**14.2**	**13.1**	**13.9**	**13.1**	**13.6**	**13.6**
Volt		13.0	13.4	12.9	13.1	13.4
Mean	15.1	13.6	14.4	13.43		

Varieties with multi-year means ≥ Vida are in bold.

Table 21 Multi-Year spring wheat variety protein content near Geraldine.

Exp 9972 Variety	2007	2008	2009	2010	Mean	Vida Same Yrs
	%	%	%	%		
AP604CL			14.1	15.2	**14.7**	13.6
Choteau	15.4	11.8	14.3	15.1	**14.2**	13.6
Conan	15.2	12.6	15.3	14.9	**14.5**	13.6
Corbin	14.7	11.5	14.3	14.9	**13.9**	13.6
Fortuna	16.5	11.4	14.5	14.7	**14.3**	13.6
Freyr	15.0	12.4	14.4	14.3	**14.0**	13.6
Hank	15.7	11.1	13.6	15.1	**13.9**	13.6
Jedd		10.5	13.6	14.6	12.9	13.0
Kelby		13.0	16.0	15.8	**14.9**	13.0
Kuntz		11.3	13.4	14.0	12.9	13.0
McNeal	16.2	12.0	14.7	14.8	**14.4**	13.6
Oneal		10.8	13.6	14.5	**13.0**	13.0
Outlook	15.0	11.8	14.8	14.1	**13.9**	13.6
Reeder	15.3	11.7	14.0	15.2	**14.1**	13.6
Vida	**15.4**	**11.7**	**13.4**	**13.8**	**13.6**	**13.6**
Volt		11.9	13.5	13.5	**13.0**	13.0
Mean	15.4	11.6	14.3	14.7	14.0	

Varieties with multi-year means ≥ Vida are in bold.

Table 22 Multi-year sawfly stem cutting CARC near Moccasin.

Exp 9970 Entry	2009	2010	mean	Vida Same Yrs
	#	#	#	
AP604 CL	1.7	8.7	5.2	1.0
Choteau	0.0	1.3	**0.7**	1.0
Conan	0.0	1.7	**0.8**	1.0
Corbin	0.0	1.7	**0.8**	1.0
Fortuna	0.0	1.7	**0.8**	1.0
Freyr	1.7	10.0	5.8	1.0
Hank	2.0	7.7	4.9	1.0
Jedd	1.0	4.0	2.5	1.0
Kelby	1.3	5.3	3.3	1.0
Kuntz	2.7	6.0	4.3	1.0
McNeal	0.3	4.0	2.2	1.0
ONeal	0.0	1.7	**0.8**	1.0
Outlook	0.0	5.7	2.8	1.0
Reeder	1.3	5.3	3.3	1.0
Vida	**0.0**	**2.0**	**1.0**	**1.0**
Volt	2.3	15.0	8.7	1.0
Means	0.85	4.43	3.0	

Cut stems per ten foot of row

Varieties with multi-year means ≤ Vida are in bold.

Table 23 Multi-Year spring wheat variety sawfly stem cutting near Denton.

Exp 9971 Entry	2007	2008	2009	2010	Mean	Vida Same Yrs.
			score			
AP604CL	minimal		Minimal	9.0	9.0	2.0
Choteau	Cutting	0.3	Cutting	4.0	2.2	3.2
Conan		0.3		1.5	0.9	3.2
Corbin	No	0.7	No	1.5	1.1	3.2
Fortuna	Sawfly	0.7	Sawfly	2.0	1.3	3.2
Freyr	Rating	10.7	Rating	12.5	11.6	3.2
Hank		10.7		13.5	12.1	3.2
Jedd		9.7		7.0	8.3	3.2
Kelby		19.7		12.5	16.1	3.2
Kuntz		23.3		29.0	26.2	3.2
McNeal		10.7		3.5	7.1	3.2
ONeal		0.3		2.5	1.4	3.2
Outlook		2.3		7.5	4.9	3.2
Reeder		11.3		10.5	10.9	3.2
Vida		4.3		2.0	3.2	3.2
Volt		22.3		32.5	27.4	3.2
Mean		8.2		7.95		

Score: cut stems per 10 feet of row

Varieties with multi-year means ≤ Vida are in bold.

Table 24 Multi-Year spring wheat variety sawfly stem cutting near Geraldine.

Exp 9972 Variety	2007	2008	2009	2010	Mean	Vida Same Yrs
	#	#	#	#	#	#
AP604CL			2.0	7.3	4.7	1.65
Choteau	1.7	15	0.0	2.3	4.8	4.1
Conan	1.7	10	0.0	3.0	**3.7**	4.1
Corbin	1.7	11	0.3	2.3	**3.9**	4.1
Fortuna	1.7	15	0.7	1.3	4.6	4.1
Freyr	2.3	53	5.0	17.7	19.6	4.1
Hank	1.7	53	1.3	12.7	17.3	4.1
Jedd		38	1.3	9.3	16.3	4.7
Kelby		52	2.0	4.0	19.2	4.7
Kuntz		60	4.3	22.0	28.8	4.7
McNeal	2.0	36	1.3	7.7	11.8	4.1
Oneal		15	0.7	3.0	6.1	4.7
Outlook	2.7	30	1.0	8.7	10.6	4.1
Reeder	2.3	30	2.7	6.3	10.4	4.1
Vida	**2.0**	**11**	**0.0**	**3.3**	**4.1**	**4.1**
Volt		51	4.0	27.7	27.4	4.7
Mean	1.3	33.3	1.5	7.4		

= cut stems per ten foot of row.

Varieties with multi-year means ≤ Vida are in bold.

Table 25 2010 No-till recrop off-station **barley** variety performance near **Moccasin**.
exp 367010 Central Agricultural Research Center. Moccasin, Montana.

		Head	Plant	Grain	Test	Protein	Kernel Size			Seeds Germinated	
ID	Entry	Date	Height	Yield	Weight	Content	Plump	Regular	Thin	96h	>96h
		Julian	cm	bu/a	lbs/bu	%	%	%	%	#	#
Goldeneye	1	182	79	60.2	49.0	11.1	68	22	10	24	23
Harrington	2	185	70	39.7	50.5	12.1	70	20	10	45	5
Haxby	3	181	78	58.8	53.2	10.9	76	18	6	39	11
Metcalfe	4	183	79	45.7	50.7	11.6	76	18	7	35	11
Hockett	5	183	75	56.4	52.4	12.0	83	13	4	39	13
Geraldine	6	188	75	55.5	51.5	12.1	61	27	12	28	16
Conrad	7	186	71	55.9	50.5	12.8	82	14	4	26	17
Champion	8	184	74	51.1	51.3	11.1	75	19	6	38	12
Pinnacle	9	181	80	51.6	51.3	10.1	90	7	3	39	9
MT010158	10	181	77	48.1	51.0	11.8	75	18	8	31	11
MT030042	11	181	77	64.5	53.2	11.0	77	17	6	40	6
MT020155	12	183	77	53.1	50.7	12.3	78	16	6	40	7
MT050030	13	180	81	58.5	52.3	11.1	86	11	3	44	6
BZ596117	14	184	79	63.1	52.8	10.7	90	6	4	43	7
Gallatin	15	183	77	59.6	51.1	10.9	64	23	13	39	11
MT010160	16	184	81	62.5	52.2	10.3	67	21	12	45	4
Mean		183.1	76.9	55.27	51.45	11.37	76.1	16.8	7.1	36.9	10.4
P-value		0.00	0.35	0.10	0.00					0.00	0.04
CV1		0.5	6.8	16.2	1.3					11.1	41.8
LSD (0.05)		1.42	8.69	14.91	1.44					8.7	9.2
count per mean		3	3	3	2	1	1	1	1	2	2

Seed date: 12-Apr- 2010 No-till recrop into winter wheat stubbl harvest Date:17 Aug 2010
Soil: two inch temp.: Soil Moist Probe: 17" Crop Year Precipitation (Sept-A 17.65 inches
Fertilizer: w/seed 50 11-5 Topdress: 60 N as urea Weed Control: 2 pints bronate

Table 26 2010 No-till continuous crop off-station barley variety performance near **Denton**.
exp 367110 Central Agricultural Research Center. Moccasin, Montana.

		Plant	Grain	Test	Protein	Kernel Size			Seeds Germinated	
ID	Entry	Height	Yield	Weight	Content	Plump	Regular	Thin	96h	>96h
		cm	bu/a	lbs/bu	%	%	%	%	#	#
BZ596117	14	70	58.0	54.1	13.1	**93**	6	2	42	8
Champion	8	66	50.0	54.9	12.4	85	9	7	47	2
Conrad	7	67	56.1	53.0	12.5	78	19	3	39	**11**
Gallatin	15	76	51.5	53.5	12.7	75	17	8	46	4
Geraldine	6	67	50.7	53.0	13.3	51	**34**	**16**	39	**11**
Goldeneye	1	72	**58.8**	51.1	12.8	58	27	15	47	3
Harrington	2	77	47.2	53.1	**13.9**	70	22	8	46	4
Haxby	3	63	58.4	54.2	12.1	70	25	5	44	6
Hockett	5	72	46.7	53.9	12.2	76	17	8	45	5
Metcalfe	4	72	48.6	52.8	13.4	61	28	11	**49**	1
MT010158	10	73	57.8	54.5	13.4	87	9	5	47	3
MT010160	16	**74**	53.3	**54.8**	12.3	81	14	5	48	2
MT020155	12	69	52.6	53.3	12.2	82	13	5	45	5
MT030042	11	**65**	50.4	54.2	11.8	64	23	13	41	8
MT050030	13	66	54.7	53.8	11.3	87	10	3	43	7
Pinnacle	9	73	55.9	54.3	11.6	91	5	4	44	6
Mean		70.1	53.17	53.62	12.56	75.5	17.2	7.3	44.3	5.3
P-value			0.00	0.01					0.59	0.53
CV1			6.9	1.3					10.0	80.9
LSD(0.05)			6.15	1.52					9.4	9.1
Counter per mean		1	3	2	1	1	1	1	2	2

Seed date: 21 April 2010 No-till recrop into lentil stubble Harvest Date: 27Aug 10
Soil: Two inch depth temp.: 16 C / 61F Moist Probe depth: 23 inches
Fertilizer: W/seed 50 lbs 11-52-0 Topdress: 60 N as urea

Table 27 Multi-year barley variety grain yields near **Moccasin**.

Exp 3670 entries	2006	2007	2008	2009	2010	Haxby average	Haxby Same Yrs
				bu/a			
Champion			45	49	51	48.5	49.9
Conrad	no	39	41	51	56	46.7	49.4
Geraldine	harvest	45	44	47	56	47.8	49.4
Goldeneye				50	60	**55.2**	53.6
Harrington		38	41	46	40	41.2	49.4
Haxby		**48**	**42**	**48**	**59**	**49.4**	**49.4**
Hockett		34	45	41	56	44.0	49.4
Metcalfe		34	30	42	46	37.9	49.4
MT020155			49	51	53	**50.9**	49.9
MT010158			51	53	48	**50.7**	49.9
Means		40.8	41.0	47.9	55.27	46.2	

Varieties with multi-year mean > than Haxby are in **bold.**

Table 28 Multi-year spring barley variety grain yields near **Denton.**

Exp 36701 entries	2006	2007	2008	2009	2010	average	Haxby Same Yrs
				bu/a			
Champion			38	58	50	**48.7**	44.7
Conrad	34	29	35	41	56	39.0	40.5
Geraldine	38	31	37	45	51	40.2	40.5
Goldeneye				44	59	**51.4**	49.1
Harrington	29	27	33	38	47	34.7	40.5
Haxby	**40**	**28**	**36**	**40**	**58**	**40.5**	**40.5**
Hockett	38	28	38	46	47	39.2	40.5
Metcalfe	35	29	36	42	49	38.0	40.5
MT020155			37	41	53	43.6	44.7
MT010158			34	41	58	44.5	44.7
Mean	34.5	30.0	35.9	43.4	53.2	42.0	

Varieties with multi-year mean > than Haxby are in **bold.**

Table 29 Multi-year barley variety grain test weight near **Moccasin**.

Exp 3670 entries	2006	2007	2008	2009	2010	average	Haxby Same Yrs
				lbs/bu			
Champion			51.7	54.2	51.3	52.4	53.3
Conrad	no	52	49.2	52.9	50.5	51.2	51.5
Geraldine	harvest	52.3	49.0	53.3	51.5	**51.5**	51.5
Goldeneye				50.8	49.0	49.9	53.9
Harrington		51.3	47.7	53.1	50.5	50.7	51.5
Haxby		**54.6**	**52.2**	**54.6**	**53.2**	**53.9**	**51.5**
Hockett		52.7	49.4	54.3	52.4	**52.2**	51.5
Metcalfe		51.5	49.7	54.1	50.7	51.5	51.5
MT020155			49.3	52.6	50.7	50.9	53.3
MT010158			50.5	53.4	51.0	51.6	53.3
Means		51.93	49.0	53.6	51.45	51.50	

Varieties with multi-year mean > than Haxby are in **bold.**

Table 30 Multi-year spring barley variety test weights near **Denton.**

Exp 36701 entries	2006	2007	2008	2009	2010	Mean	Haxby Same Yrs
				lbs/bu			
Champion			52.4	56.5	54.9	**54.6**	**54.2**
Conrad	50.4	46.1	49.9	55.0	53.0	50.9	53.5
Geraldine	53.2	46.7	51.1	54.3	53.0	51.7	53.5
Goldeneye				52.2	51.1	51.7	54.6
Harrington	49.6	46.8	52.3	55.4	53.1	51.4	53.5
Haxby	**54.8**	**50.2**	**53.4**	**55.0**	**54.2**	**53.5**	**53.5**
Hockett	54.3	49.6	51.5	55.8	53.9	53.0	53.5
Metcalfe	52.0	47.0	51.2	55.6	52.8	51.7	53.5
MT020155			50.1	52.7	53.3	52.0	54.2
MT010158			51.8	55.9	54.5	54.1	54.2
Mean	51.59	46.98	50.87	55.0	53.6		

Varieties with multi-year mean > than Haxby are in **bold.**

Table 31 Multi-year barley variety grain protein near **Moccasin**.

Exp 3670 entries	2006	2007	2008	2009	2010	Haxby average	Haxby Same Yrs
				%			
Champion			13.0	14.2	11.1	12.8	12.8
Conrad	no	16.0	14.0	16.1	12.8	**14.7**	13.0
Geraldine	harvest	16.4	13.7	15.0	12.1	**14.3**	13.0
Goldeneye				13.3	11.1	12.2	12.9
Harrington		15.5	14.0	15.0	12.1	**14.2**	13.0
Haxby		**13.8**	**12.6**	**14.8**	**10.9**	**13.0**	**13.0**
Hockett		15.8	13.2	14.4	12.0	**13.9**	13.0
Metcalfe		17.3	15.2	15.5	11.6	**14.9**	13.0
MT020155			13.2	15.0	12.3	**13.5**	12.8
MT010158			13.3	15.4	11.8	**13.5**	12.8
Means		15.51	13.10	14.60	11.37		

Varieties with multi-year mean > than Haxby are in **bold.**

Table 32 Multi-year barley variety protein content near **Denton.**

Exp 36701 entries	2006	2007	2008	2009	2010	Haxby average	Haxby Same Yrs
				%			
Champion			13.3	13.4	12.4	13.0	13.1
Conrad	14.0	16.5	13.7	15.0	12.5	**14.3**	13.1
Geraldine	14.0	15.3	14.2	14.1	13.3	**14.2**	13.1
Goldeneye				12.1	12.8	12.5	12.9
Harrington	13.0	15.7	13.6	14.4	13.9	**14.1**	13.1
Haxby	**12.6**	**13.7**	**13.4**	**13.7**	**12.1**	**13.1**	**13.1**
Hockett	12.9	13.5	13.2	13.5	12.2	13.1	13.1
Metcalfe	13.3	15.0	14.0	14.9	13.4	**14.1**	13.1
MT020155			13.5	13.7	12.2	13.1	13.1
MT010158			14.5	14.8	13.4	**14.2**	13.1
Mean	13.50	14.36	13.59	13.80	12.56		

Varieties with multi-year mean > than **Haxby** are in **bold.**