Project Title: Off-station winter wheat cultivar performance on fallow in central Montana.

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Project Personnel:

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Objectives:
Evaluate relative performance winter wheat cultivars and development lines in central Montana crop environments.

Results:
The 2010 growing season conditions were generally optimal for wheat production. However, fall seeding conditions were challenging if the seeding was not accomplished prior to early October. For many, a combination of events led to early to mid-November seeding of winter wheat. Late seeding coupled with late April cold driving winds caused some marginal winter wheat stands. Generally, plentiful growing season precipitation helped off-set some of the stand deficiencies.

Yellowstone, Jagalene and Wahoo along with the new comer Decade continued to be top yield performers on fallow at Geraldine and Winifred (Tables 1 and 2). Test weights and protein contents were near average at Geraldine where precipitation was near average. The much above average precipitation at Winifred contributed to high test weights and low protein. The wet conditions at Winifred led to shallow rooting depth. The sawfly did not cause a significant impact at either site. A near by Geraldine spring trial did have sawfly cutting.

Five year summaries, of selected entries, for yield, test weight, protein content and plant height are present in tables 3 to 8. Plant height has been an increasing in importance as the number of years in no-till continuous crop increases. CDC Falcon, Carter, Jagalene and Pryor are consistently 1 to 3 inches shorter than the yield standard, Yellowstone.

Summary:
Winter wheat continues to produce much higher yields than spring wheat at the Geraldine location. A spring wheat trial is not established at Winifred. In 1990 trials, at Winifred, there were often large yield differences between the spring wheat and winter wheat so the spring wheat trial was discontinued. Winter wheat will continue to be the crop of choice in these areas.

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 Geraldine off-station winter wheat trial in no-till fallow in crop-crop-fallow.
Exp387210 Central Agricultural Research Center. Moccasin, Montana.

Entry	Cultivar\Line	Origin/Pedigree	Plant Height	Grain Yield	Test Weight	Protein Content	Lodging note
			cm	bu/ac	lb/bu	%	#
2	Yellowstone	Montana 2005	41	**82.8****	60.1	12.3	
14	Wahoo	Nebraska, 2001	43	**77.0***	59.7	12.0	none to very
6	Jagalene	AgriPro, 2002	39	**76.8***	60.8	12.0	low incidence
8	Pryor	WestBred, 2002	38	74.9	58.5	11.6	sawfly
17	Decade	Montana/North Dakota, 2010	41	74.3	61.3	12.0	of
4	Ledger	WestBred, 2004	42	73.5	59.8	12.6	cutting
3	CDC Falcon	Sask/WestBred, 1999	37	72.8	59.4	12.9	
13	Carter	WestBred, 2006	40	72.6	59.9	12.7	
9	Promontory	Utah, 1990	42	70.2	60.1	12.2	
20	MTS0713	93X312E14/NuHorizon	41	68.0	59.5	12.8	
18	Accipiter	CDC Raptor/CDC Falcon	38	67.2	60.3	12.4	
22	MTS0721	DMS/Rampart//Pronghorn/3/2*Rampart	43	67.2	58.6	13.1	
16	MTS0532 (HWW)	L'Govskaya 167/Rampart//MT9409	39	66.4	56.3	15.1	
15	Hyalite (CL, HWW)	Montana/WestBred, 2005	40	66.3	61.3	12.7	
24	MTS0832	92X73E70/MTW9911	43	65.4	58.4	13.2	
7	Jerry	North Dakota, 2001	45	65.1	58.7	13.4	
19	MT06103	MT9409/(W94-137, Ontario mother line)	46	64.4	59.9	13.4	
12	Bynum (CL)	Montana/WestBred, 2005	36	62.6	60.3	13.9	15% @ 60
10	Neeley	Idaho, 1980	43	57.4	59.0	13.4	
21	MTS0705	MT9524/G15048//Rampart	42	56.9	59.7	13.8	60% @ 60
11	Norris (CL)	Montana/WestBred, 2005	44	56.1	60.9	16.1	
1	Genou	Montana, 2004	44	54.9	60.1	13.5	40% @ 60
23	MTS0826	MT9524/G15048//Rampart	40	54.9	60.4	14.1	
5	Rampart	Montana, 1996	43	54.7	59.6	14.7	
	Average		41	66.8	59.7	13.2	
	LSD (0.05)			6.9	ns		
	C.V. (%)			6.3	2.3		
	P-value (Varieties)			<.0001	0.2900		

** = indicates highest value within a column. * indicates values similar to highest value Fischer Protected LSD (0.05)
Seed Date: 24 Sept 09 into chem fallow barley stubble.
Soil: two inch temp.: 26 C Soil moisture probe depth: > 40 inches Surface very dry.

Table 2 2010 Winifred off-station winter wheat trial in no-till fallow in crop-crop-fallow.
Exp3874 Central Agricultural Research Center. Moccasin, Montana.

Entry	Cultivar\Line	Origin/Pedigree	Plant Height	Grain Yield	Test Weight	Protein Content
			inches	bu/ac	lb/bu	%
19	MT06103	MT9409/(W94-137, Ontario mother line)	36.5	**84.7****	**64.5***	10.0
9	Promontory	Utah, 1990	35.7	**80.0***	**64.7****	10.1
17	Decade	Montana/North Dakota, 2010	34.1	**79.2***	63.1	9.5
14	Wahoo	Nebraska, 2001	34.9	75.9	61.6	9.5
6	Jagalene	AgriPro, 2002	33.3	75.1	**64.2***	9.2
24	MTS0832	92X73E70/MTW9911	40.2	74.5	62.4	9.1
11	Norris (CL)	Montana/WestBred, 2005	39.6	74.3	63.8	9.4
2	Yellowstone	Montana 2005	35.4	74.0	61.6	9.3
22	MTS0721	DMS/Rampart//Pronghorn/3/2*Rampart	35.6	73.6	63.5	10.2
18	Accipiter	CDC Raptor/CDC Falcon	33.5	72.9	63.9	9.4
8	Pryor	WestBred, 2002	31.5	71.8	62.6	8.2
10	Neeley	Idaho, 1980	37.9	70.2	63.3	9.6
23	MTS0826	MT9524/G15048//Rampart	37.5	69.9	**64.2***	9.9
15	Hyalite (CL, HWW)	Montana/WestBred, 2005	35.7	69.2	63.4	9.1
20	MTS0713	93X312E14/NuHorizon	33.6	67.0	63.6	8.7
4	Ledger	WestBred, 2004	32.2	65.1	63.8	10.2
13	Carter	WestBred, 2006	29.8	64.0	**64.0***	10.3
3	CDC Falcon	Sask/WestBred, 1999	32.4	63.8	62.7	8.8
5	Rampart	Montana, 1996	39.6	63.5	63.3	10.7
1	Genou	Montana, 2004	38.7	62.4	63.7	9.4
21	MTS0705	MT9524/G15048//Rampart	39.4	62.0	**64.4***	10.6
7	Jerry	North Dakota, 2001	37.0	61.0	61.7	9.2
16	MTS0532 (HWW)	L'Govskaya 167/Rampart//MT9409	34.5	60.2	63.3	10.6
12	Bynum (CL)	Montana/WestBred, 2005	39.5	59.1	**64.3***	10.7
	Average		35.8	69.7	63.4	9.7
	LSD (0.05)		2.5	6.9	0.7	
	C.V. (%)		4.2	6.0	0.6	
	P-value (Varieties)		<.0001	<.0001	<.0001	

** = indicates highest value within a column. * indicates values similar to highest value LSD (0.05)
Seed Date 26Sept 09 into chem fallow stubble.
Soil: two inch temp.: 16 C Soil moisture probe depth: > 40 inche Surface very dry.
Fertilizer 5-26-0 lbs NPK w/seed and 60 N topdress urea.

Table 3. 2010 Geraldine winter wheat varieties multi-year yield performance.
Exp 3872 Central Agricultural Research Center. Moccasin, Montana.

Variety	2006	2007	2008	2009	2010	average	Yellowstone same yrs.
				bu/a			
Yellowstone	**98.1**	**40.6**	**70.2**	**32.5**	**82.8**	**64.8**	**64.8**
Bynum (CL)	88.0	40.9	62.7	25.0	62.6	55.8	64.8
Carter			57.6	31.9	72.6	54.0	61.8
CDC Falcon	90.9	46.6	72.1	32.7	72.8	63.0	64.8
Genou	86.3	45.1	69.8	34.8	74.3	62.1	64.8
Hyalite (CL,HW)	87.4	45.1	68.7	33.8	54.9	58.0	64.8
Jagalene	99.7	49.7	71.1	23.2	66.3	62.0	64.8
Jerry	84.6	41.9	68.6	34.9	76.8	61.4	64.8
Ledger	93.2	40.8	64.5	26.4	65.1	58.0	64.8
Neeley	89.7	38.9	75.5	26.3	73.5	60.8	64.8
Norris (CL)	94.3	41.5	73.8	39.5	57.4	61.3	64.8
Promontory	89.3	34.6	72.9	27.3	56.1	56.0	64.8
Pryor	92.2	45.5	73.2	30.4	70.2	62.3	64.8
Rampart	85.5	43.9	55.6	26.2	74.9	57.2	64.8
MT0552			67.0	33.6	54.7	51.8	61.8
Wahoo	98.6	42.8	63.9	33.2	77.0	63.1	64.8
Mean	90.5	43.3	67.5	32.19	66.8	66.8	

2007 had marginal stand and was hailed prior to harvest.

Table 4. 2010 Winifred winter wheat variety multi-year yield performance
Exp 3874 Central Agricultural Research Center. Moccasin, Montana.

Cultivar	2006	2007	2008	2009	2010	Average	Yellowstone same Yrs.
				bu/a			
Yellowstone	**60.7**	**71.1**	**70.2**	**48.9**	**74.0**	**65.0**	**65.0**
Bynum (CL)	53.2	55.2	62.7	40.5	59.1	54.1	65.0
Carter			61.7	47.8	64.0	57.8	64.4
CDC Falcon	52.1	62.5	72.1	42.7	63.8	58.6	65.0
Decade			79.5	50.1	79.2	**69.6**	64.4
Genou	56.6	63.1	69.8	39.7	62.4	58.3	65.0
Hyalite (CL,HW	59.5	64.6	68.7	49.3	69.2	62.3	65.0
Jagalene	54.6	59.1	71.1	51.7	75.1	62.3	65.0
Jerry	54.2	58.3	68.6	44.0	61.0	57.2	65.0
Ledger	59.4	59.2	64.5	41.7	65.1	58.0	65.0
Neeley	57.1	65.8	75.5	40.4	70.2	61.8	65.0
Norris (CL)	58.1	58.6	73.8	41.6	74.3	61.3	65.0
Promontory	51.4	61.9	72.9	46.3	80.0	62.5	65.0
Pryor	59.8	67.9	73.2	45.5	71.8	63.6	65.0
Rampart	52.8	59.8	55.6	40.7	63.5	54.5	65.0
Wahoo	65.2	73.1	63.9	49.7	75.9	**65.6**	65.0
Average	56.9	61.5	67.5	45.5	69.7		

MY means $\geq$ the mean of Yellowstone are in bold.

Table 5. 2010Multi-year winter wheat test weight at Geraldine.
Exp 3800 Central Agricultural Research Center. Moccasin, Montana.

Cultivar	2006	2007	2008	2009	2010	Mean	Yellowstone Same Yr
				lbs/bu			
Yellowstone	**62.9**	**58.9**	**61.4**	**59.6**	**60.1**	**60.6**	**60.6**
Bynum (CL)	64.3	60.3	62.4	59.3	60.3	**61.3**	60.6
Carter			62.1	58.9	59.9	60.3	60.4
CDC Falcon	64.3	59.8	62.4	59.5	59.4	**61.1**	60.6
Decade			63.2	59.9	61.3	**61.5**	60.4
Genou	64.7	60.4	62.3	59.4	60.1	**61.4**	60.6
Hyalite (CL, HWW	63.0	60.7	62.8	60.2	61.3	**61.6**	60.6
Jagalene	63.8	62.0	64.5	61.1	60.8	**62.4**	60.6
Jerry	65.5	59.0	61.5	58.6	58.7	**60.7**	60.6
Ledger	62.9	60.3	62.7	59.1	59.8	**61.0**	60.6
Neeley	64.3	59.6	62.8	59.4	59.0	**61.0**	60.6
Norris (CL)	64.3	60.6	63.2	60.8	60.9	**62.0**	60.6
Promontory	64.9	61.3	63.9	61.0	60.1	**62.2**	60.6
Pryor	64.7	58.6	62.7	59.8	58.5	**60.9**	60.6
Rampart	64.1	59.9	61.7	59.3	59.6	**60.9**	60.6
Wahoo	64.0	58.0	61.1	59.0	59.7	60.4	60.6
Mean	64.1	60.0	62.6	59.91	59.7		

MY means > the mean of Yellowstone are in bold.

Table 6. 2010 Multi-year winter wheat test weight at Winifred.
Exp 3800 Central Agricultural Research Center. Moccasin, Montana.

Cultivar	2006	2007	2008	2009	2010	Mean	Yellowstone Same Yrs.
				lbs/bu			
Yellowstone	**62.4**	**58.1**	**61.2**	**60.4**	**61.6**	**60.7**	**60.7**
Bynum (CL)	63.8	60.0	61.4	59.7	64.3	**61.8**	60.7
Carter			61.0	58.8	64.0	**61.3**	61.1
CDC Falcon	63.7	60.6	60.6	58.5	62.7	**61.2**	60.7
MT0552			61.7	61.4	63.1	**62.1**	61.1
Genou	63.8	59.8	61.2	58.0	63.7	**61.3**	60.7
Hyalite (CL, HWW	64.0	60.2	62.3	61.4	63.4	**62.3**	60.7
Jagalene	65.2	62.3	63.2	62.3	64.2	**63.4**	60.7
Jerry	61.8	59.3	60.5	58.3	61.7	60.3	60.7
Ledger	63.5	59.7	61.4	59.6	63.8	**61.6**	60.7
Neeley	62.4	60.1	61.6	58.5	63.3	**61.2**	60.7
Norris (CL)	64.4	60.6	62.5	60.4	63.8	**62.3**	60.7
Promontory	64.4	61.5	63.0	61.3	64.7	**63.0**	60.7
Pryor	60.9	59.7	61.5	59.1	62.6	**60.8**	60.7
Rampart	62.7	59.8	61.0	58.8	63.3	**61.1**	60.7
Wahoo	62.9	58.9	59.2	58.6	61.6	60.2	60.7
Average	63.1	60.0	61.5	59.9	63.4		

MY means > the mean of Yellowstone are in bold.

Table 7. 2010 Multi-year winter wheat grain protein at Geraldine.
Exp 3800 Central Agricultural Research Center. Moccasin, Montana.

Cultivar	2006	2007	2008	2009	2010	Mean	Yellowstone same Yrs
				%			
Yellowstone	**12.4**	**12.8**	**11.7**	**12.8**	**12.3**	**12.4**	**12.4**
Bynum (CL)	13.0	12.9	13.6	13.0	13.9	**13.3**	12.4
Carter			12.5	13.1	12.7	**12.8**	12.3
CDC Falcon	10.8	14.0	12.0	12.6	12.9	**12.5**	12.4
Decade			12.6	12.0	12.0	12.2	12.3
Genou	11.8	13.0	12.3	12.7	13.5	**12.7**	12.4
Hyalite (CL, HV	13.2	13.0	13.3	12.6	12.7	**13.0**	12.4
Jagalene	11.2	13.1	12.6	12.0	12.0	12.2	12.4
Jerry	12.9	12.6	11.9	12.3	13.4	**12.6**	12.4
Ledger	11.6	13.8	11.6	12.6	12.6	**12.4**	12.4
Neeley	11.6	12.0	11.8	12.7	13.4	12.3	12.4
Norris (CL)	12.0	14.2	12.2	13.2	16.1	**13.5**	12.4
Promontory	11.7	12.7	11.1	13.0	12.2	12.1	12.4
Pryor	11.5	11.9	11.5	12.2	11.6	11.7	12.4
Rampart	11.8	12.5	13.1	12.4	14.7	**12.9**	12.4
Wahoo	11.5	13.1	11.8	11.7	12.0	12.0	12.4
Average	12.2	13.0	12.2	12.6	13.2		

MY means ≥ the mean of Yellowstone are in bold.

Table 8. 2010 Multi-year winter wheat grain protein at Winifred.
Exp 3800 Central Agricultural Research Center. Moccasin, Montana.

Cultivar	2006	2007	2008	2009	2010	Ave.	Yellowstone Same Yrs.
				%			
Yellowstone	**10.2**	**12.7**	**11.8**	**12.7**	**9.3**	**11.3**	**11.3**
Bynum (CL)	12.8	13.7	12.2	13.1	10.7	**12.5**	11.3
Carter			11.4	13.1	10.3	**11.6**	11.3
CDC Falcon	11.8	12.4	10.3	13.6	8.8	**11.4**	11.3
Decade			10.7	12.6	9.5	10.9	11.3
Genou	12.6	13.3	10.7	13.3	9.4	**11.9**	11.3
Hyalite (CL, HV	10.0	13.1	11.6	11.4	9.1	11.0	11.3
Jagalene	12.3	13.6	10.8	13.5	9.2	**11.9**	11.3
Jerry	12.3	13.9	10.3	13.4	9.2	**11.8**	11.3
Ledger	11.6	12.2	11.0	12.1	10.2	**11.4**	11.3
Neeley	12.5	11.1	10.9	11.4	9.6	11.1	11.3
Norris (CL)	9.9	11.6	11.6	12.7	9.4	11.0	11.3
Promontory	11.0	12.1	10.3	12.4	10.1	11.2	11.3
Pryor	12.0	11.8	10.5	13.4	8.2	11.2	11.3
Rampart	13.5	13.3	12.0	12.7	10.7	**12.4**	11.3
Wahoo	11.2	13.0	12.6	12.1	9.5	**11.7**	11.3
Average	11.5	12.7	11.4	12.6	9.7		

MY means ≥ the mean of Yellowstone are in bold.

Table 9. 2010 Multi-year winter wheat plant height at Geraldine.
Exp 3800 Central Agricultural Research Center. Moccasin, Montana.

Cultivar	Grld 2006	Grld 2007	Grld 2008	Grld 2009	2010	Mean	Yellowsone Same Yrs
		inches					
Yellowstone	41	34	34	26	41	35	35
Bynum	39	35	34	28	36	**34**	35
Carter			29	25	40	**31**	34
CDC Falcon	38	34	30	24	37	**32**	35
MT0552			30	28	41	**33**	34
Genou	39	30	35	26	44	**35**	35
Hyalite (CL, HW	38	35	34	27	40	**34**	35
Jagalene	38	32	32	23	39	**33**	35
Jerry	43	34	36	28	45	37	35
Ledger	35	34	32	25	42	**34**	35
Neeley	41	32	36	27	43	**36**	35
Norris (CL)	41	29	37	29	44	**36**	35
Promontory	40	33	32	29	42	**35**	35
Pryor	37	32	30	26	38	**33**	35
Rampart	39	31	34	20	43	**34**	35
Wahoo	39	33	32	28	43	**35**	35
Average	40.3	32.7	33.4	26.2	41		

MY means ≤ the mean of Yellowstone are in bold.

Table 10. 2010 Multi-year winter wheat plant height at Winifred.
Exp 3800 Central Agricultural Research Center. Moccasin, Montana.

Cultivar	2006	2007	2008	2009	2010	Ave.	Yellowstone Same Yrs.
				inches			
Yellowstone	**35**	**36**	**28**	**28**	**35**	**33**	**33**
Bynum	40	37	35	30	40	36	33
Carter			26	24	30	**27**	31
CDC Falcon	31	32	27	24	32	**29**	33
Decade			30	24	34	**30**	31
Genou	37	40	33	28	39	35	33
Hyalite (CL, HW	39	38	31	28	36	34	33
Jagalene	34	34	28	26	33	**31**	33
Jerry	39	42	32	33	37	37	33
Ledger	38	32	29	27	32	**32**	33
Neeley	42	42	34	30	38	37	33
Norris (CL)	38	44	31	31	40	37	33
Promontory	35	33	32	33	36	**34**	33
Pryor	36	36	29	25	32	**32**	33
Rampart	39	39	33	32	40	37	33
Wahoo	33	34	27	29	35	**32**	33
Average	37.9	38.1	31	28.7	35.8		

MY means ≤ the mean of Yellowstone are in bold.