

Title (4W5132): North Central Montana Off-Station Winter Wheat Variety Performance Evaluations

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Objectives:

Diverse cropping environments exist within the five-county area most closely served by Northern Agricultural Research Center. Winter wheat, spring wheat, barley, durum and oat production together in the five counties (Blaine, Chouteau, Hill, Liberty and Phillips) represents 33 percent of the 2009-2013 statewide totals (44 percent for winter wheat and 22 percent for spring wheat). Producers are keenly interested in variety performance data generated under local conditions. It is our objective, within budget and other resource limitations, to evaluate small grain variety performance, over time, under conditions representative of specific areas of northern Montana, yet differing from that of the Research Center. Growers in north central Montana are provided reliable, unbiased, up-to-date information to make comparisons among improved winter wheat varieties. This report provides producers in north central Montana the information necessary to select varieties best suited for their specific area and growing conditions.

Methods:

Standard off-station winter wheat variety performance trials were conducted in 2014 on chemical fallow at two locations in two northern Montana counties.

Dryland Winter Wheat Trials:

- | | | |
|------------------------------------|--------------|------------|
| 1. Cederberg Farm, Blaine County | (3NE Turner) | 13-36N-25E |
| 2. McKeever Farms, Chouteau County | (4NW Loma) | 21-27N-10E |

Both trials consisted of 24 entries and were seeded in replicated, 3-row, 22-foot plots on a 12-inch row spacing utilizing a self-propelled cone seeder with Atom Jet paired row openers. All rows of each plot were trimmed to a harvest length of 17.5 feet with a three-point rotary mower. Plant height was measured and percent sawfly cutting was estimated for each plot immediately prior to harvest. A 'Wintersteiger Classic' plot combine, funded in part by the Montana Wheat and Barley Committee, was used to harvest each 3-row plot. Seed was cleaned prior to measuring plot weight, test weight and moisture content. Protein content was determined using a Foss Infratec 1241 near infrared analyzer. Other variables specific to each individual trial are listed with the current year data tables.

Results:

Cropping environments in 2014 started out average to marginal with lower than normal early spring precipitation across north central Montana. The Loma location went into the fall dryer than normal with poor seeding conditions and did not receive enough timely precipitation in the spring resulting in below average winter wheat yields. Turner had average seeding conditions, however winter kill followed by spring flooding through the plot area resulted in reduced stands. Turner received higher than average precipitation during the spring and summer, but was also the recipient of several hail storms which ultimately destroyed the plots.

At Havre, annual growing season precipitation (9/1/13 through 8/31/14) was 13.34 inches, 11 percent higher than the average for all years since 1916. April 1 through July 31 precipitation was 4.87 inches or 71 percent of the 99-year average. Heat units expressed as "Growing Degree Days" (GDD, base 50) from May through July totaled 1176, 91 percent of the average for the last 64 years (1951-2014). The last spring frost was on May 13 and the first fall frost of 2014 was on September 12, resulting in 121 frost-free days. The minimum winter temperature was -33 degrees F on December 7, 8 and 9. Overall, 2013-2014 crop year temperatures were very close to the long-term average. The April through July growing season saw an average daily temperature of 56.4 degrees F, only 1 degree below normal. July and August average temperatures were slightly higher than normal with the high for 2014 recorded on July 31 at 96

degrees F. There were 15 days with temperatures 90 degrees F or above, with no days over 100 degrees F.

Following winter kill issues, spring flooding, and a summer of substantial rainfall and minor hail storms, unfortunately the winter wheat trial at Turner was hit by a devastating season ending hail storm on August 28. The winter wheat plots at the 2014 Cederberg dryland site were not salvageable for any data collection.

Comparable averages are calculated using a standard long-term check variety when not all entries are present in a specific trial for all years. Variety means are adjusted by multiplying the actual check mean by the ratio of the individual variety mean compared to the check mean for the same years as tested. All varieties are then directly comparable to each other when in the same nursery. A minimum of 3 years of data is necessary to be included in comparable average calculation. Three-year comparable averages for seed yield and test weight at Turner are summarized in Table 1, while three-year comparable averages for sawfly cutting are summarized in Table 2.

Loma winter wheat yields averaged 44 bu/ac with Montana State University experimental line 'MT1090' producing the highest yield at 51 bu/ac (Table 3). 'SY Clearstone', 'Yellowstone', 'Genou', 'Warhorse', 'Judee' and 'Accipiter' along with four other experimental lines all yielded statistically equal to MT1090. Sawfly cutting was very low this year in the Loma area with cutting in the winter wheat trial averaging 4.4 percent. Plant height, yield, moisture, test weight, protein and sawfly cutting data for the 2014 Loma dryland winter wheat trial are summarized in Table 3. Ten-year comparable averages for seed yield and test weight at Loma are summarized in Table 4, while ten-year comparable averages for sawfly cutting are summarized in Table 5.

Summary:

This work has been strongly supported by producers near each of the locations, and by the Northern Agricultural Research Center Advisory Council. With budget and other resources allowing, it is planned to continue off-station cereal variety investigations in the five-county area. The Blaine County location near Turner is entering its fifth year of winter wheat testing, while the Chouteau County location, between Big Sandy and Loma, has been used for various trials since 1998.

Funding Summary:

Expenditure information for grant index 4W5132 is to be provided by Montana State University, Office of Sponsored Programs. There is no other grant support for this project.

MWBC FY2016 Grant Submission Plans:

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

TABLE 1. Three-Year Yield and Test Weight Summary of Selected Entries from Dryland Fallow Winter Wheat Variety Nurseries Grown Off-Station at the Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 2011-2014 (Exp# 3851-WW)

2/ VARIETY or SELECTION	No. of YEARS TESTED	1/ YIELD (Bushels Per Acre)							TEST WEIGHT (Pounds Per Bushel)							
		2011	2012	2013	3/ 2014	2015	AVE. for YEARS TESTED	% of CHECK YIELD 4/	3-YR COMP. AVE. YIELD 5/	2011	2012	2013	3/ 2014	2015	AVE. for YEARS TESTED	% of CHECK TEST WT 4/
MT00159	YELLOWSTONE (++)	3	49.7	24.0	63.0		45.5	100.0	45.5	61.3	58.8	61.5		60.5	100.0	60.5
WB-Quake	WB-QUAKE (P+)	3	54.0	24.4	56.9		45.1	99.0	45.1	60.7	59.2	62.0		60.6	100.2	60.6
Bearpaw	BEARPAW (P+)	3	51.7	24.4	57.6		44.6	97.8	44.6	61.2	59.5	61.1		60.6	100.1	60.6
S94-4	CDC FALCON (P+)	3	54.9	21.1	55.3		43.8	96.1	43.8	59.9	58.7	61.0		59.9	98.9	59.9
Accipiter	ACCIPITER	3	47.4	23.9	55.1		42.1	92.4	42.1	60.4	59.0	62.2		60.5	100.0	60.5
MTS 0031	GENOU (saw fly res)(++)	3	51.7	24.5	49.8		42.0	92.2	42.0	60.9	59.6	62.0		60.8	100.5	60.8
Judee	JUDEE (P+)	3	52.6	23.7	49.0		41.8	91.7	41.8	61.4	60.4	62.5		61.4	101.5	61.4
Decade	DECADE (++)	3	50.0	20.9	52.1		41.0	90.0	41.0	61.9	60.0	61.0		61.0	100.7	61.0
ND9257	JERRY	3	52.2	22.7	45.2		40.0	87.9	40.0	60.9	58.5	60.6		60.0	99.2	60.0
MTCL0316	NORRIS (P, CL++)	3	44.2	20.0	54.2		39.5	86.7	39.5	62.6	60.1	62.0		61.6	101.7	61.6
MTS0808	WARHORSE (P+)	3	38.1	25.1	52.1		38.5	84.4	38.5	62.5	59.5	62.2		61.4	101.5	61.4
JAGALENE	JAGALENE (P+)	3	46.1	18.8	46.9		37.2	81.7	37.2	63.2	61.0	62.7		62.3	102.9	62.3
P1593889	RAMPART (saw fly res)	3	43.6	22.5	45.4		37.2	81.6	37.2	62.1	59.4	61.7		61.1	100.9	61.1
Ledger	LEDGER (P+)	3	41.2	23.4	38.1		34.2	75.1	34.2	60.8	59.6	61.0		60.5	99.9	60.5

MEANS (For Entries Listed) 48.4 22.8 51.5 40.9 61.4 59.5 61.7 60.9

6/ Growing Season Precipitation (in.)		3.7	7.5	n/a	n/a	5.6
Soil PAW (in.) to SD @ Planting		8.6	8.9	7.8	8.5	8.4
Total Plant Available Water (in.)		12.3	8.9	n/a	n/a	10.6
Soil NO3 (lbs.) to SD at Planting		80	15	11	93	50
Fertilizer Applied	(# N)	70	70	100	100	85
	(# P ₂ O ₅)	40	40	20	20	30
	(# K ₂ O)	25	25	10	10	18

Check Variety is Yellow stone.

1/ See MCES Bulletin 1098 or the Plant Sciences & Plant Pathology website at <http://plantsciences.montana.edu/> for evaluation of other important variety performance characteristics to include protein, quality, winter hardiness, disease resistance, etc. before making cultivar selection decisions.

2/ P = Private Variety, + = Protected Variety, ++ = PVP Title 5 or Title 5 Pending, HW = Hard White Wheat, CL = Clearfield Tolerant.

3/ No harvest in 2014 due to hail.

4/ Percent of Yellow stone yield or test weight for the same data years as those in which a given entry was tested.

5/ 3-Yr Comparable Average = (x/y) * z where x = average yield or test weight of a given entry for years tested, y = average yield or test weight for Yellow stone for the same years, and z = 3-Yr average yield or test weight for the check variety Yellow stone.

6/ May 3 to 14 days prior to harvest maturity.

TABLE 2. Three-Year Sawfly Summary of Selected Entries from Dryland Fallow Winter Wheat Variety Nurseries Grown Off-Station at the Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 2011-2014. (Exp# 3851-WW)

2/ VARIETY or SELECTION	No. of YEARS TESTED	1/ SAWFLY RATING (% of cut and lodged stems)					AVE. for YEARS TESTED	% of CHECK SWFLY 4/	3-YR COMP. AVE. SWFLY 5/
		2011	2012	2013	3/ 2014	2015			
MTS0808 WARHORSE (P+)	3	1.0	2.3	0.7			1.3	26.7	1.3
PI593889 RAMPART (saw fly res)	3	1.0	11.7	2.3			5.0	100.0	5.0
Judee JUDEE (P+)	3	7.0	8.3	0.7			5.3	106.7	5.3
MTS 0031 GENOU (saw fly res)(++)	3	1.0	18.3	1.0			6.8	135.6	6.8
S94-4 CDC FALCON (P+)	3	2.3	18.3	3.7			8.1	162.2	8.1
Bearpaw BEARPAW (P+)	3	3.7	20.0	1.0			8.2	164.4	8.2
WB-Quake WB-QUAKE (P+)	3	20.0	10.0	0.7			10.2	204.4	10.2
Decade DECADE (++)	3	11.7	23.3	2.0			12.3	246.7	12.3
MT00159 YELLOWSTONE (++)	3	20.0	18.3	6.7			15.0	300.0	15.0
Ledger LEDGER (P+)	3	25.0	15.0	5.3			15.1	302.2	15.1
ND9257 JERRY	3	13.7	26.7	5.3			15.2	304.4	15.2
MTCL0316 NORRIS (P, CL++)	3	11.7	30.0	5.0			15.6	311.1	15.6
Accipiter ACCIPITER	3	26.7	18.3	2.3			15.8	315.6	15.8
JAGALENE JAGALENE (P+)	3	21.7	25.0	3.7			16.8	335.6	16.8
MEANS (For Entries Listed)		11.9	17.5	2.9					10.8
6/ Grow ing Season Precipitation (in.)		3.7	7.5	n/a	n/a		5.6		
Soil PAW (in.) to SD @ Planting		8.6	8.9	7.8	8.5		8.4		
Total Plant Available Water (in.)		12.3	8.9	n/a	n/a		10.6		
Soil NO3 (lbs.) to SD at Planting		80	15	11	93		50		
Fertilizer Applied	(# N)	70	70	100	100		85		
	(# P ₂ O ₅)	40	40	20	20		30		
	(# K ₂ O)	25	25	10	10		18		

Check Variety is Rampart.

- 1/ See MCES Bulletin 1098 or the Plant Sciences & Plant Pathology website at <http://plantsciences.montana.edu/> for evaluation of other important variety performance characteristics to include protein, quality, winter hardiness, disease resistance, etc. before making cultivar selection decisions.
- 2/ P = Private Variety, + = Protected Variety, ++ = PVP Title 5 or Title 5 Pending, HW = Hard White Wheat, CL = Clearfield Tolerant.
- 3/ No harvest in 2014 due to hail.
- 4/ Percent of Rampart saw fly rating for the same data years as those in which a given entry was tested.
- 5/ 3-Yr Comparable Average = (x/y) * z where x = average saw fly rating of a given entry for years tested, y = average saw fly rating for Rampart for the same years, and z = 3-Yr average saw fly rating for the check variety Rampart.
- 6/ May 3 to 14 days prior to harvest maturity.

TABLE 3. Dryland Fallow Winter Wheat Cultivar Evaluation Nursery Grown Off-Station at McKeever Farm & Seed, Inc., Loma. Northern Agricultural Research Center. Havre, Montana. 2014. (Exp# 14-3853-WW)

ID	CULTIVAR or SELECTION	STAND %	PLNTH T Inches	1/	MOISTURE %	TEST WT Lbs/Bu	2/	3/
				YIELD Bu/Ac			PROTEIN %	SAWFLY %
Accipiter	Saskatchewan, 2008	95.9	24.6	45.2	8.7	61.8	13.7	5.3
Bearpaw	Montana, 2011	96.4	20.9	38.2	8.4	62.1	15.5	1.0
CDC Falcon	Sask/WestBred, 1999	96.8	24.8	42.1	8.7	61.8	14.5	3.7
Colter	Montana, 2013	96.6	24.9	42.9	8.4	61.4	14.9	8.3
Decade	Montana/North Dakota, 2010	96.0	24.0	34.4	8.6	62.3	15.6	5.0
Genou	Montana, 2004	97.4	24.2	46.1	8.7	62.1	14.3	4.0
Jagalene	AgriPro, 2002	96.2	24.0	43.3	8.8	63.6	14.6	3.7
Jerry	North Dakota, 2001	95.0	25.9	36.5	8.5	61.0	15.5	5.0
Judee	Montana, 2011	96.8	24.2	45.3	8.8	62.8	15.0	3.7
MT0978	MT9982//MTW0072/NW97S151	95.6	23.6	44.5	8.4	62.2	15.3	3.7
MT1078	MT02113*4//MTS0359	96.2	25.1	46.0	8.8	61.3	14.1	2.3
MT1090	Reeder/6*Yellowstone	95.8	27.9	51.0	8.4	61.3	14.2	3.7
MT1117	Yellowstone*3//KS96WGRC40	94.9	27.2	44.8	8.6	61.8	14.9	5.0
MT1138	W99-194/2*Yellowstone	92.5	27.6	44.7	8.6	60.9	14.5	8.3
MT1286	Yellowstone*2//NE99445	96.8	26.3	46.2	8.7	61.7	14.4	7.0
MTCS1204	MTCL0510/4//Paul/3//98X96C16cl/CDC Teal 1	94.0	27.2	43.2	8.8	62.2	14.9	3.7
MTS0826-63	MT9524//G15048//Rampart	95.6	27.0	45.4	8.6	61.9	14.6	2.3
MTS1024	MT02113*4//MTS0359	95.9	24.1	45.5	8.4	60.5	14.3	3.7
MTW08168	MTW0047//2*MT9982	97.8	27.0	43.6	8.9	61.5	14.8	11.7
Rampart	Montana, 1996	96.9	25.0	37.6	8.5	62.2	15.2	0.7
SY Clearstone 2CL	Yellowstone*4//3//MTCL01158//CDC Teal 11A//	95.2	28.0	48.4	8.6	61.2	14.1	3.7
WB-Quake	WestBred, 2011	96.0	24.9	40.6	8.6	62.5	14.2	3.7
Warhorse	Montana, 2013	97.1	25.3	45.4	8.5	62.5	14.8	0.7
Yellowstone	Montana, 2005	96.8	25.9	46.2	8.6	61.2	14.3	5.0
EXPERIMENTAL MEANS		96.0	25.4	43.6	8.6	61.8	14.7	4.4
LSD (0.05)		2.5	2.7	5.9	0.2	0.6	0.7	3.7
C.V.%		1.6	6.6	8.2	1.7	0.6	2.8	51.1
P-VALUE (Varieties)		0.0661	0.0006	0.0002	0.0006	<.0001	<.0001	<.0001

1/ Volumetric yields are based on plot weights adjusted to uniform 12 percent grain moisture and 60 lbs/bu as the standard test weight for wheat.

Minor hail damage occurred in the winter wheat on several occasions during the growing season.

2/ Protein values are adjusted to 12 percent grain moisture.

3/ Sawfly rating is reported as the percentage of cut stems.

Bold indicates highest value within a column.

Bold indicates varieties with values equal to highest variety within a column based on Fisher's protected LSD (p=0.05).

Management Information (14-3853-WW)

Seeding Date: October 7, 2013
 Harvest Date: August 12, 2014
 Fertility: 100-20-10 side banded
 System: no till
 Herbicide: Goldsky
 Insecticide: none
 Previous Crop: Chemical Fallow - Spring Wheat
 Precipitation: 5.97"

TABLE 4. Ten-Year Yield and Test Weight Summary of Selected Entries from Dryland Fallow Winter Wheat Variety Nurseries Grown Off-Station at McKeever Farms, Loma. Northern Agricultural Research Center. Havre, Montana. 2005-2014. (Exp# 3853-WW)

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre)							TEST WEIGHT (Pounds Per Bushel)								
		2010	2011	2012	2013	2014	AVE. YEARS TESTED 3/	% of CHECK YIELD 4/	10-YR COMP. AVE YIELD 5/	2010	2011	2012	2013	2014	AVE. YEARS TESTED 3/	% of CHECK TEST WT 4/	10-YR COMP. AVE TEST WT 5/
MT00159 YELLOWSTONE (++)	10	66.6	62.2	59.0	66.9	46.2	61.5	100.0	61.5	52.7	60.3	56.7	57.8	61.2	58.3	100.0	58.3
MTCL1077 SY CLEARSTONE 2CL (P+)	3			56.8	62.6	48.4	55.9	97.5	60.0			55.6	57.2	61.2	58.0	99.1	57.8
S94-4 CDC FALCON (P+)	10	56.0	57.1	52.0	68.4	42.1	59.1	96.2	59.1	52.3	60.3	55.6	58.0	61.8	58.5	100.4	58.5
MTS0713 JUDEE (saw fly res)(++)	6	55.1	62.6	49.5	65.6	45.3	53.9	93.6	57.5	53.0	61.5	56.5	59.8	62.8	59.0	101.9	59.4
BZ96-919 PRY OR (P+)	8	51.8	55.3	52.3			58.4	93.1	57.3	53.2	58.8	56.6			58.1	100.1	58.4
MT0552 DECADE (++)	7	61.5	55.2	53.8	58.7	34.4	55.6	92.3	56.7	53.7	59.6	57.3	58.5	62.3	58.2	101.2	59.0
JAGALENE JAGALENE (P+)	10	57.0	52.5	49.4	56.6	43.3	56.3	91.7	56.3	55.0	61.3	59.5	59.7	63.6	60.5	103.8	60.5
MT08172 COLTER	3			55.3	58.8	42.9	52.3	91.3	56.1			58.1	58.0	61.4	59.1	101.0	58.9
WB-Quake WB-QUAKE (P+)	4		64.9	43.2	64.7	40.6	53.3	91.1	56.0		61.0	53.9	57.1	62.5	58.6	99.4	57.9
BZ96-788 LEDGER (P+)	8	62.2	49.2	55.4	57.2		56.2	88.9	54.6	54.5	60.4	59.4	59.5		59.0	102.3	59.7
MTS0808 WARHORSE	4		60.8	53.8	61.3	45.4	55.3	88.3	54.3		59.3	56.0	59.8	62.5	59.4	101.9	59.4
MTCL0316 NORRIS (P, CL++)	9	52.8	45.2	44.3	54.3		55.7	88.2	54.2	52.4	60.1	55.6	59.2		59.0	101.8	59.3
MTS 0031 GENOU (saw fly res)(++)	10	51.6	49.1	49.4	57.8	46.1	54.0	87.9	54.0	51.9	59.7	55.0	58.4	62.1	58.2	99.8	58.2
DH001819 ACCIPITER	6	46.8	53.2	45.4	58.3	45.2	49.2	85.5	52.5	51.1	59.1	55.7	58.8	61.8	57.6	99.4	58.0
MTS0721 BEARPAW (++)	5	54.7	51.2	52.9	57.3	38.2	50.9	84.5	52.0	54.1	59.8	56.8	58.8	62.1	58.3	101.1	58.9
ND9257 JERRY	10	41.9	53.6	43.7	55.0	36.5	51.4	83.7	51.4	49.7	59.2	55.4	58.3	61.0	57.9	99.3	57.9
PI593889 RAMPART (saw fly res)	10	52.7	55.0	40.8	56.7	37.6	51.0	83.0	51.0	52.8	60.7	55.3	58.3	62.2	58.7	100.8	58.7
MEANS (For Entries Listed)		54.7	55.1	50.4	60.0	42.3			55.6	52.8	60.1	56.4	58.6	62.0			58.8
6/ Growing Season Precipitation (in.)		n/a	9.4	9.4	8.8	6.0	8.3										
Soil PAW (in.) to SD @ Planting		10.1	9.6	7.9	9.1	10.4	8.2										
Total Plant Available Water (in.)		10.1	19.4	7.9	n/a	16.1	12.6										
Soil NO3 (lbs.) to SD at Planting		82	26	68	51	85	150										
Fertilizer Applied	(# N)	70	70	70	100	100	76										
	(# P ₂ O ₅)	40	40	40	20	20	36										
	(# K ₂ O)	25	25	25	10	10	22										

Long-term check variety is Yellow stone.

1/ See MCES Bulletin 1098 or the Plant Sciences & Plant Pathology website at <http://plantsciences.montana.edu/> for evaluation of other important variety performance characteristics to include protein, quality, winter hardiness, disease resistance, etc. before making cultivar selection decisions.

2/ P = Private Variety, + = Protected Variety, ++ = PVP Title 5 or Title 5 Pending, HW = Hard White Wheat, CL = Clearfield Line.

3/ Only the most recent 5 years shown, but summary calculations include all years noted.

4/ Percent of Yellow stone yield or test weight for the same data years as those in which a given entry was tested.

5/ 10-Yr Comparable Average = (x/y) * z where x = average yield or test weight of a given entry for years tested, y = average yield or test weight for Yellow stone for the same years, and z = 10-Yr average yield or test weight for the check variety Yellow stone.

6/ April 1 to 14 days prior to harvest maturity.

TABLE 5. Ten-Year Sawfly Summary of Selected Entries from Dryland Fallow Winter Wheat Variety Nurseries Grown Off-Station at McKeever Farms, Loma. Northern Agricultural Research Center. Havre, Montana. 2005-2014. (Exp# 3853-WW)

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ SAWFLY RATING (% of cut and lodged stems)										AVE. for YEARS TESTED	% of CHECK SWFLY 3/	10-YR COMP. AVE SWFLY 4/	
			2005	2006	2007	2008	2009	2010	2011	2012	2013	2014				
MTS0808	WARHORSE	4							5.0	5.0	8.3	0.7	4.7	43.1	3.2	
MTS0721	BEARPAW (++)	5						8.3	10.0	13.3	20.0	1.0	10.5	97.5	7.2	
P1593889	RAMPART (saw fly res)	10	0.0	0.0	0.0	3.7	16.7	10.0	10.0	16.7	16.7	0.7	7.4	100.0	7.4	
WB-Quake	WB-QUAKE (P+)	4							15.0	12.5	33.3	3.7	16.1	146.4	10.9	
MTS0713	JUDEE (saw fly res)(++)	6						31.7	53.3	10.0	31.7	30.0	3.7	26.7	226.8	16.9
MTS0031	GENOU (saw fly res)(++)	10	0.0	0.0	2.0	3.7	50.0	51.7	21.7	26.7	23.3	4.0	18.3	246.0	18.3	
BZ96-919	PRYOR (P+)	8	1.7	0.3	0.3	1.0	28.3	70.0	6.7	76.7			23.1	324.5	24.1	
MT0552	DECADE (++)	7				2.3	40.0	96.3	13.3	71.7	23.3	5.0	36.0	338.8	25.2	
MTCL1077	SY CLEARSTONE 2CL (P+)	3								97.7	20.0	3.7	40.4	356.5	26.5	
BZ96-788	LEDGER (P+)	8		0.0	3.7	4.0	38.3	100.0	26.7	68.3	25.0		33.2	360.9	26.8	
S94-4	CDC FALCON (P+)	10	0.0	0.3	0.7	1.0	63.3	99.7	15.0	86.7	10.0	3.7	28.0	376.9	28.0	
MT08172	COLTER	3								93.0	33.3	8.3	44.9	395.6	29.4	
DH001819	ACCIPITER	6						60.0	97.7	28.3	90.0	6.7	5.3	48.0	407.4	30.3
JAGALENE	JAGALENE (P+)	10	5.0	2.3	5.3	2.3	71.3	99.7	28.3	86.7	21.7	3.7	32.6	438.8	32.6	
ND9257	JERRY	10	1.7	0.7	6.7	8.3	76.3	96.7	30.0	88.3	20.0	5.0	33.4	448.7	33.4	
MT00159	YELLOWSTONE (++)	10	0.0	0.7	2.3	10.0	85.0	99.3	21.7	97.7	15.0	5.0	33.7	452.7	33.7	
MTCL0316	NORRIS (P, CL++)	9	1.7	0.3	11.7	18.3	91.7	93.0	45.0	86.7	28.3		41.8	511.0	38.0	
MEANS (For Entries Listed)			1.3	0.5	3.6	5.5	54.4	75.1	19.1	61.7	20.9	3.8			23.1	
5/ Growing Season Precipitation (in.)			n/a	8.6	6.9	8.9	n/a	n/a	9.4	9.4	8.8	6.0	8.3			
Soil PAW (in.) to SD @ Planting			4.0	7.6	n/a	10.5	7.5	10.1	9.6	7.9	9.1	10.4	8.5			
Total Plant Available Water (in.)			4.0	16.2	n/a	19.4	7.5	10.1	19.4	7.9	n/a	16.1	12.6			
Soil NO3 (lbs.) to SD at Planting			514	192	n/a	300	36	82	26	68	51	85	150			
Fertilizer Applied																
		(# N)	70	70	70	70	70	70	70	70	100	100	76			
		(# P ₂ O ₅)	40	40	40	40	40	40	40	40	20	20	36			
		(# K ₂ O)	25	25	25	25	25	25	25	25	10	10	22			

Long-term check variety is Rampart.

1/ See MCES Bulletin 1098 or the Plant Sciences & Plant Pathology website at <http://plantsciences.montana.edu/> for evaluation of other important variety performance characteristics to include protein, quality, disease resistance, etc. before making cultivar selection decisions.

2/ P = Private Variety, + = Protected Variety, ++ = PVP Title 5 or Title 5 Pending, HW = Hard White Wheat, CL = Clearfield Line.

3/ Percent of Rampart cut for the same data years as those in which a given entry was tested.

4/ 10-Yr Comparable Average = (x/y) * z where x = average saw fly rating of a given entry for years tested, y = average saw fly rating for Rampart for the same years, and z = 10-Yr average saw fly rating for the check variety Rampart.

5/ April 1 to 14 days prior to harvest maturity.