TITLE: North Central Montana Off-Station Winter Wheat Variety Performance Evaluations (NARC, 4W4144).

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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 29.7 percent of the 2007-2011 statewide totals (43 percent for winter wheat and 19 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 spring 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 variety performance trials were conducted in 2012 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	(12N Loma)	20-27N-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 16.5 feet with a 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 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. Other variables specific to each individual trial are listed with the current year data tables.

RESULTS:

Cropping environments in 2012 were fair across north central Montana. Both the Turner and Loring locations had higher than normal precipitation early in the spring; however, the rainfall was untimely and not spread across critical growth stages. At Havre, annual growing season precipitation (9/1/11 through 8/31/12) was 9.46 inches, 21 percent lower than the average for all years since 1916. April 1 through July 31 precipitation was 7.33 inches or 108 percent of the 97-year average. Heat units expressed as "Growing Degree Days" (GDD, base 50) from May through July totaled 1092, 85 percent of the average for the last 62 years (1951-2012). The last spring frost and first fall frost of 2012 were both later than the 97–year average resulting in 125 frost-free days. The minimum winter temperature was -22 degrees F on January 18. Overall, the growing season was warmer than normal. Crop outlook was initially very good with adequate fallow-stored soil moisture and generally favorable conditions. Winter wheat crop performance in some areas was poorer than expected due to lack of timely precipitation in June followed by steady winds and higher than normal temperatures. The April through July growing season saw an average daily temperature of 58.4 degrees F, 1.2 degrees above normal. July and August average temperatures were 3.5 percent higher than normal with the high for 2012 recorded on July 10, 24, 25 and August 7 at 98 degrees F. There were 29 days with temperatures 90 degrees F or above, with no days over 100 degrees F.

Following a substantially damaging hailstorm during the first week of June and another minor hail event in August,

winter wheat yields at Turner averaged 24 bu/ac (Table 1). After the June hailstorm, it looked as though the winter wheat would be a total loss; however the crop recovered and was harvested for yield. 'Pyror' was the highest yielding entry at 31.5 bu/ac, followed by the experimental line 'MTS0819' at 29.5 bu/ac. No other entry in the trial yielded statistically equal to the top two. Sawfly cutting was moderate at Turner averaging 18 percent. 'Norris CL' was most severely cut at 30 percent and experimental line 'MTS0808' was least cut in the small plot situation, at 2.3 percent.

Loma winter wheat yields averaged 51 bu/ac with 'Overland', a 2007 release from Nebraska, producing the highest yield at 61.4 bu/ac (Table 2). 'Decade', 'Ledger', 'SY Clearstone' and 'Yellowstone', along with three experimental lines all yielded statistically equal to Overland. Sawfly cutting was severe again this year in the Loma area with cutting in the winter wheat trial averaging 65.4 percent. Yellowstone and SY Clearstone were most severely cut at 98 percent. In the small plot situation, 'Bearpaw', 'MTS0808', 'MTS0819' and 'WB Quake' were all cut less than 15 percent.

Stand percent, plant height, yield, moisture, test weight, protein and sawfly cutting data, where appropriate, for the 2012 Cederberg (Turner) and 2012 McKeever (Loma) dryland winter wheat trials are summarized in Tables 1 and 2, respectively.

FUNDING SUMMARY:

Expenditure information for grant index 4W4144 is to be provided by Montana State University, Office of Sponsored Programs. There is no other grant support for this project.

MWBC FY2013 GRANT SUBMISSION PLANS:

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

This work has been strongly supported by producers near each of the locations, and by the Northern Ag 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 third year of winter wheat testing, while the Choteau County location, located between Big Sandy and Loma, has been used for various trials since 1998.

TABLE 1. Dryland Fallow Winter Wheat Cultivar Evaluation Nursery Grown Off-Station at the Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, MT. 2012. (Exp# 12-3851-WW)

ID	Release or Selection	Stand %	Plant Ht Inches	1/ Yield Bu/Ac	Moisture %	Test Wt Lbs/Bu	2/ Protein %	3/ Sawfly %
Accipiter	CDC Raptor/CDC Falcon	98.1	22.4	23.9	8.6	59.0	8.9	18.3
AP503 CL2	AgriPro, 2007	91.3	21.6	20.6	8.5	60.7	11.1	23.3
Bearpaw	Montana, 2011	96.4	20.1	24.4	8.5	59.5	9.5	20.0
CDC Falcon	Sask/WestBred, 1999	93.3	21.9	21.1	8.7	58.7	9.7	18.3
Decade	Montana/North Dakota, 2010	97.7	20.1	20.9	8.7	60.0	9.5	23.3
Genou	Montana, 2004	90.9	22.4	24.5	8.5	59.6	9.6	18.3
Jagalene	AgriPro, 2002	97.8	20.5	18.8	8.7	61.0	9.7	25.0
Jerry	North Dakota, 2001	93.6	22.4	22.7	8.5	58.5	10.1	26.7
Judee	Montana, 2011	91.8	22.4	23.7	8.8	60.4	9.9	8.3
Ledger	WestBred, 2004	97.7	21.8	23.4	8.6	59.6	10.0	15.0
MT08172	MT9982*2/BZ9W96-895	95.7	23.0	25.0	8.4	59.2	9.1	21.7
MT0871	MT9982//MTW0072/NW97S15	96.7	22.0	28.1	8.4	59.6	10.6	20.0
MTCL1067	Yellowstone*4/3/MTCL01158/	89.5	23.2	23.4	8.4	58.7	9.7	26.7
MTS0808	MT9908//Nuplains/MTS9862	98.7	23.4	25.1	8.7	59.5	9.5	2.3
MTS0819	93X312E14/NuHorizon	95.6	21.4	**29.5***	8.6	60.2	9.6	12.0
MTS0826	MT9524/G15048//Rampart	95.3	21.5	26.8	8.7	60.8	9.8	16.7
MTS0832	92X73E70/MTW9911	96.7	23.0	25.7	8.7	60.6	9.2	21.7
Norris (CL)	Montana/WestBred, 2005	92.9	22.5	20.0	8.6	60.1	9.7	30.0
Overland	Nebraska, 2007	98.1	21.7	25.2	8.7	59.5	10.6	21.7
Pryor	WestBred, 2002	96.3	23.6	**31.5****	8.5	59.3	11.4	11.7
Rampart	Montana, 1996	90.2	21.9	22.5	8.4	59.4	9.5	11.7
SY Clearstone	Syngenta, 2012	95.0	23.5	23.6	8.4	58.7	10.4	18.3
WB-Quake	Rampart/Kestrel (WestBred, 2011	96.3	22.8	24.4	8.4	59.2	9.4	10.0
Yellowstone	Montana 2005	98.6	21.6	24.0	8.5	58.8	10.0	18.3
EXPERIMENTAL MEANS		95.2	22.1	24.1	8.6	59.6	9.9	18.3
LSD (0.05)		6.4	1.8	3.0	0.3	0.6	-	8.5
C.V.%		4.1	5.0	7.5	1.8	0.6	-	28.3
P-VALUE (Varieties)		0.0945	0.0054	<.0001	0.0135	<.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.
2/ Protein values are adjusted to 12 percent grain moisture.
3/ Sawfly rating is reported as the percentage of cut stems.
** = indicates highest value within a column.
* = indicates varieties with values equal to highest variety within a column based on Fisher's protected LSD (p=0.05).

Management Information (12-3851-WW)

Seeding Date:	September 22, 2011
Harvest Date:	August 27, 2012
Fertility:	70-40-25 side banded
System:	no till
Herbicide:	none
Insecticide:	none
Previous Crop:	Chemical Fallow - Durum
Precipitation:	not available

TABLE 2. Dryland Fallow Winter Wheat Cultivar Evaluation Nursery Grown Off-Station at McKeever Farm & Seed, Inc., Loma. Northern Agricultural Research Center. Havre, Montana. 2012. (Exp# 12-3853-WW)

ID	CULTIVAR or SELECTION	STAND %	PLNT HT Inches	1/ YIELD Bu/Ac	MOISTURE %	TEST WT Lbs/Bu	2/ PROTEIN %	3/ SAWFLY %
Accipiter	CDC Raptor/CDC Falcon		29.9	45.4	7.6	55.7	9.3	90.0
AP503 CL2	AgriPro, 2007		26.9	46.4	7.8	59.1	10.7	81.7
Bearpaw	DMS/Rampart//Pronghorn/3/2*Rampart		28.8	52.9	8.1	56.8	9.1	13.3
CDC Falcon	Sask/WestBred, 1999		28.1	52.0	7.7	55.6	9.7	86.7
Colter	MT9982*2/BZ9W96-895		27.6	**55.3***	7.6	58.1	10.5	93.0
Decade	Montana/North Dakota, 2010		29.5	**53.8***	8.0	57.3	9.4	71.7
Genou	Montana, 2004		30.7	49.4	7.9	55.0	10.3	26.7
Jagalene	AgriPro, 2002		28.3	49.4	8.2	59.5	10.1	86.7
Jerry	North Dakota, 2001		31.5	43.7	7.7	55.4	11.1	88.3
Judee	93X312E14/NuHorizon		30.0	49.5	8.3	56.5	10.1	31.7
Ledger	WestBred, 2004		30.0	**55.4***	8.5	59.4	9.9	68.3
MT0871	MT9982//MTW0072/NW97S151		28.5	**59.9***	7.4	56.8	11.8	96.0
MTCL1067	Yellowstone*4/3/MTCL01158/CDC Teal 11A//Jagalene		29.4	53.4	7.5	56.9	9.4	96.0
MTS0819	93X312E14/NuHorizon		28.9	46.9	7.7	53.4	9.9	13.3
MTS0826	MT9524/G15048//Rampart		30.1	48.0	7.9	56.1	10.8	66.7
MTS0832	92X73E70/MTW9911		28.5	48.4	7.9	57.1	9.6	71.7
Norris (CL)	Montana/WestBred, 2005		27.8	**44.3**	7.4	55.6	8.7	86.7
Overland	Nebraska, 2007		27.8	**61.4****	8.1	59.0	9.9	96.0
Pryor	WestBred, 2002		30.1	52.3	7.9	56.6	10.3	76.7
Rampart	Montana, 1996		30.9	40.8	7.9	55.3	9.6	16.7
SY Clearstone	Yellowstone*4/3/MTCL01158/CDC Teal 11A//Jagalene		31.3	56.8*	7.6	55.6	8.8	97.7
Warhorse	MT9908//Nuplains/MTS9862		28.9	53.8*	8.1	56.0	11.1	5.0
WB-Quake	Rampart/Kestrel (WestBred, 2011)		29.4	**43.2**	7.6	53.9	9.8	12.5
Yellowstone	Montana 2005		28.1	**59.0***	7.4	56.7	9.7	97.7
EXPERIMENTAL MEANS			29.2	50.9	7.8	56.6	10.0	65.4
LSD (0.05)			2.4	7.6	0.4	2.6	-	17.4
C.V.%			5.1	9.1	3.3	2.8	-	16.2
P-VALUE (Varieties)			0.0182	<.0001	<.0001	0.0006	-	<.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.
2/ Protein values are adjusted to 12 percent grain moisture.
3/ Sawfly rating is reported as the percentage of cut stems.
** = indicates highest value within a column.
* = indicates varieties with values equal to highest variety within a column based on Fisher's protected LSD (p=0.05).

Management Information (12-3853-WW)

Seeding Date:	October 11, 2011
Harvest Date:	August 14, 2012
Fertility:	70-40-25 side banded
System:	no till
Herbicide:	Goldsky, 16 oz/ac
Insecticide:	none
Previous Crop:	Chemical Fallow - Spring Wheat
Precipitation:	not available

TABLE 3. 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. 2003-2012. (Exp# 3853-WW)

2/ VARIETY or SELECTION		No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre) 2008	2009	2010	2011	2012	AVE. for YEARS TESTED 3/	% of CHECK YIELD 4/	**10-YR COMP. AVE. YIELD 5/**	TEST WEIGHT (Pounds Per Bushel) 2008	2009	2010	2011	2012	AVE. for YEARS TESTED 3/	% of CHECK TEST WT 4/	**10-YR COMP. AVE. TEST WT 5/**
PI619098	WAHOO (++)	8	75.5	54.9	68.6	50.3		66.9	100.7	**64.6**	55.8	57.8	51.2	55.6		57.4	98.7	**57.0**
MT00159	YELLOWSTONE (++)	10	76.5	44.6	66.6	62.2	59.0	64.2	100.0	**64.2**	55.1	59.1	52.7	60.3	56.7	57.8	100.0	**57.8**
MT0552	DECADE (++)	5	77.0	48.6	61.5	55.2	53.8	59.2	95.9	**61.6**	56.8	59.5	53.7	59.6	57.3	57.4	101.1	**58.4**
PI555458	PROMONTORY	8	75.9	48.2	58.6			62.0	95.2	**61.1**	59.7	60.1	54.2			59.6	103.4	**59.7**
MTCL0306	HYALITE (P, CL++)	6	78.6	45.7	46.4			59.8	94.2	**60.5**	58.3	59.7	52.6			59.2	102.3	**59.1**
S94-4	CDC FALCON (P+)	10	78.6	45.8	56.0	57.1	52.0	60.5	94.2	**60.5**	56.1	57.8	52.3	60.3	55.6	57.7	99.9	**57.7**
JAGALENE	JAGALENE (P+)	9	79.5	49.4	57.0	52.5	49.4	61.8	94.2	**60.5**	57.9	59.9	55.0	61.3	59.5	60.4	104.3	**60.3**
MTW 9441	NUSKY (HW)	7	75.1	44.2				60.7	93.5	**60.0**	57.4	59.9				59.3	101.6	**58.7**
CI 17860	NEELEY	8	62.4	42.3	56.1			60.8	93.3	**59.9**	55.0	58.2	52.4			57.4	99.7	**57.6**
CI 17879	ROCKY (P)	7	71.7	41.7				60.2	92.7	**59.5**	58.0	60.2				60.4	103.5	**59.8**
BZ96-919	PRYOR (P+)	10	66.4	45.1	51.8	55.3	52.3	59.2	92.3	**59.2**	54.6	58.9	53.2	58.8	56.6	57.6	99.7	**57.6**
MTS0713	JUDEE (saw fly res)(++)	4		45.2	55.1	62.6	49.5	53.1	91.4	**58.7**		60.6	53.0	61.5	56.5	57.9	101.3	**58.5**
BZ022060	CARTER (P++)	3	63.9	45.7	59.3			56.3	90.0	**57.8**	56.8	58.3	54.7			56.6	101.8	**58.8**
BZ96-788	LEDGER (P+)	7	62.3	46.9	62.2	49.2	55.4	56.1	89.4	**57.4**	57.5	58.6	54.5	60.4	59.4	58.9	102.3	**59.1**
MTCL0316	NORRIS (P, CL++)	8	70.3	41.2	52.8	45.2	44.3	55.9	89.2	**57.3**	57.6	60.5	52.4	60.1	55.6	59.0	101.7	**58.8**
ND9257	JERRY	10	74.3	41.0	41.9	53.6	43.7	55.4	86.3	**55.4**	57.8	57.5	49.7	59.2	55.4	57.4	99.3	**57.4**
MTCL0318	BYNUM (sf res)(P, CL++)	7	65.5	37.3	60.4	51.2		54.6	86.3	**55.4**	59.5	58.4	55.2	61.1		59.5	102.2	**59.1**
MTS 0031	GENOU (saw fly res)(++)	10	58.5	42.8	51.6	49.1	49.4	54.9	85.6	**54.9**	55.4	57.4	51.9	59.7	55.0	57.6	99.6	**57.6**
MTS0721	BEARPAW (++)	3			54.7	51.2	52.9	52.9	84.6	**54.3**			54.1	59.8	56.8	56.9	100.7	**58.2**
DH001819	ACCIPITER	4		46.3	46.8	53.2	45.4	47.9	82.5	**53.0**		59.3	51.1	59.1	55.7	56.3	98.4	**56.9**
PI593889	RAMPART (saw fly res)	10	55.9	41.1	52.7	55.0	40.8	52.4	81.6	**52.4**	57.3	58.9	52.8	60.7	55.3	58.3	100.9	**58.3**
MEANS (For Entries Listed)			70.4	44.9	55.8	53.5	49.8			**58.5**	57.0	59.0	53.0	59.8	56.6			**58.4**
6/ Growing Season Precipitation (in.)			8.9	n/a	n/a	9.4	9.4	8.0										
Soil PAW (in.) to SD @ Planting			10.5	7.5	10.1	9.6	7.9	7.9										
Total Plant Available Water (in.)			19.4	7.5	10.1	19.4	7.9	12.2										
Soil NO3 (lbs.) to SD at Planting			300	36	82	26	68	186										
Fertilizer Applied	(# N)		70	70	70	70	70	70										
	(# P_2O_5)		40	40	40	40	40	40										
	(# K_2O)		25	25	25	25	25	25										

Long-term check variety is Yellowstone.

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 selecton 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 Yellowstone 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 Yellowstone for the same years, and z = 10-Yr average yield or test weight for the check variety Yellowstone.

6/ May to 14 days prior to harvest maturity.

TABLE 4. 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. 2003-2012. (Exp# 3853-WW)

2/ VARIETY or SELECTION		No. of YEARS TESTED	1/ SAWFLY RATING (% of cut and lodged stems) 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	AVE. for YEARS TESTED	% of CHECK SWFLY 3/	**10-YR COMP. AVE. SWFLY 4/**
MTS0721	BEARPAW (++)	3								8.3	10.0	13.3	10.6	86.4	**6.5**
PI593889	RAMPART (sawfly res)	10	17.9	0.0	0.0	0.0	0.0	3.7	16.7	10.0	10.0	16.7	7.5	100.0	**7.5**
MTS0031	GENOU (sawfly res)(++)	10	18.5	0.0	0.0	0.0	2.0	3.7	50.0	51.7	21.7	26.7	17.4	232.5	**17.4**
MTS0713	JUDEE (sawfly res)(++)	4							31.7	53.3	10.0	31.7	31.7	237.5	**17.8**
CI 17879	ROCKY (P)	7	16.1	0.0	1.7	0.7	2.3	5.3	66.3				13.2	241.7	**18.1**
MTW9441	NUSKY (HW)	7	18.1	1.7	0.0	0.3	1.0	3.7	71.7				13.8	252.2	**18.9**
BZ96-919	PRYOR (P+)	10	18.4	0.0	1.7	0.3	0.3	1.0	28.3	70.0	6.7	76.7	20.3	271.5	**20.3**
MTCL0318	BYNUM (sf res)(P, CL++)	7			0.0	2.3	2.3	8.3	56.3	63.3	13.3		20.9	361.9	**27.1**
S94-4	CDC FALCON (P+)	10	17.9	0.0	0.0	0.3	0.7	1.0	63.3	99.7	15.0	86.7	28.5	379.9	**28.5**
MT0552	DECADE (++)	5						2.3	40.0	96.3	13.3	71.7	44.7	392.4	**29.4**
BZ96-788	LEDGER (P+)	7				0.0	3.7	4.0	38.3	100.0	26.7	68.3	34.4	422.7	**31.7**
ND9257	JERRY	10	17.5	1.7	1.7	0.7	6.7	8.3	76.3	96.7	30.0	88.3	32.8	437.6	**32.8**
MT00159	YELLOWSTONE (++)	10	16.9	0.0	0.0	0.7	2.3	10.0	85.0	99.3	21.7	97.7	33.4	445.3	**33.4**
BZ022060	CARTER	3						3.7	38.3	96.0			46.0	454.9	**34.1**
CI 17860	NEELEY	8	18.3	0.0	1.7	2.3	7.0	10.3	86.3	96.3			27.8	460.8	**34.5**
PI619098	WAHOO (++)	8		0.0	3.3	0.7	5.3	10.0	76.7	98.3	38.3		29.1	504.6	**37.8**
PI555458	PROMONTORY	8	17.1	3.3	3.3	3.7	11.7	15.0	94.7	100.0			31.1	515.7	**38.6**
DH001819	ACCIPITER	4							60.0	97.7	28.3	90.0	69.0	517.5	**38.8**
JAGALENE	JAGALENE (P+)	9		1.7	5.0	2.3	5.3	2.3	71.3	99.7	28.3	86.7	33.6	530.9	**39.8**
MTCL0316	NORRIS (P, CL++)	8			1.7	0.3	11.7	18.3	91.7	93.0	45.0	86.7	43.5	611.0	**45.8**
MTCL0306	HYALITE (P, CL++)	6			1.7	2.0	3.7	8.7	84.7	100.0			33.4	661.4	**49.5**
MEANS (For Entries Listed)			17.7	0.7	1.4	1.0	4.1	6.6	61.4	80.5	21.2	64.7			**29.0**
5/ Growing Season Precipitation (in.)			4.0	7.4	n/a	8.6	6.9	8.9	n/a	n/a	9.4	9.4	7.8		
Soil PAW (in.) to SD @ Planting			8.0	5.7	4.0	7.6	n/a	10.5	7.5	10.1	9.6	7.9	7.9		
Total Plant Available Water (in.)			12.0	13.1	4.0	16.2	n/a	19.4	7.5	10.1	19.4	7.9	12.2		
Soil NO3 (lbs.) to SD at Planting			170	286	514	192	n/a	300	36	82	26	68	186		
Fertilizer Applied	(# N)		70	70	70	70	70	70	70	70	70	70	70		
	(# P_2O_5)		40	40	40	40	40	40	40	40	40	40	40		
	(# K_2O)		25	25	25	25	25	25	25	25	25	25	25		

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 selecton 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 sawfly rating of a given entry for years tested, y = average sawfly rating for Rampart for the same years, and z = 10-Yr average sawfly rating for the check variety Rampart.

5/ May to 14 days prior to harvest maturity.