

Title (4W6089): 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 27 percent of the 2011-2015 statewide cereal production totals (43 percent for winter wheat and 23 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 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 on chemical fallow in 2016 in two northern Montana counties.

Dryland Winter Wheat Trials:

- | | |
|------------------------------------|------------|
| 1. Cederberg Farm, Blaine County | 13-36N-25E |
| 2. McKeever Farms, Chouteau County | 29-27N-10E |

Both winter wheat trials consisted of 25 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 feet with a three-point rototiller. Plant height was measured from the soil surface to the top of the head, excluding awns, and percent sawfly cutting was visually 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 for yield determination. Protein, test weight and moisture content were determined using a Foss Infratec 1241 near infrared analyzer. Falling number was determined using a Perten FN1700 according to the FGIS Directive 9180.38. Other variables specific to each individual trial are listed with the current year data tables.

Results:

Please note that research trial yield results recorded under wheat stem sawfly pressure are likely much higher than a producer should expect. Small plot variety trials are managed to assess maximum yield potential and are harvested in such a way that all stems and heads are picked up by the combine, regardless of lodging or cutting due to sawfly. Pickup guards coupled with an extremely slow ground speed and an exceptionally low cutting height help researchers collect all heads in order to assess seed yield potential. If you are a producer in a wheat stem sawfly environment, although hollow stemmed varieties may be high yielding in research trials in your area, we strongly recommend against growing those hollow stemmed varieties. Please be aware that if you seed hollow stemmed varieties with wheat stem sawfly present, you are only creating a breeding ground for future generations of sawfly in your area and not helping combat the pest population.

Cropping environments in 2016 started out below average to marginal with warmer early spring temperatures and lower than normal precipitation across north central Montana. The Loma location was seeded in ground recently

taken out of CRP. Fall seeding conditions were moderately dry, however, timely spring rains saved the winter wheat crop and boosted yields in comparison to previous years. Turner had good seeding conditions and above average precipitation throughout the year resulting in good stands and above average winter wheat yields.

At Havre, annual growing season precipitation (9/1/15 through 8/31/16) was 18.86 inches, 6.84 inches higher than the average for all years since 1916. April 1 through July 31 precipitation was 12.24 inches or 177 percent of the 101-year average. Heat units expressed as "Growing Degree Days" (GDD, base 50) from May through July totaled 1201, or 93 percent of the average for the last 66 years (1951-2016). The last spring frost was on May 14 and the first fall frost of 2016 was on September 13, resulting in 122 frost-free days. The minimum winter temperature was -15 degrees F on December 26, 2015. Overall, the 2015-2016 average crop year temperatures mirrored the long-term average. The April through July growing season saw an average daily temperature of 57.6 degrees F, similar to historical temperatures. July and August average temperatures were one degree F lower than long-term averages with the high for 2016 recorded on July 23 at 96 degrees F. There were 13 days with temperatures 90 degrees F or above, with no days over 100 degrees F.

Following a summer of timely rainfall, winter wheat yields at Turner averaged just under 60 bu/ac (Table 1). An experimental breeding line from Montana State University, 'MT1356', was the highest yielding entry at nearly 71 bu/ac. 'Colter', 'Cowboy', 'Judee', 'WB-Quake' and 'Yellowstone' along with four other experimental lines produced yields ranging from 63 to 67 bu/ac, statistically equal to that of MT1356. Test weight of all entries averaged 59 lb/bu. Sawfly cutting was nonexistent in the winter wheat at Turner. Stand percent, plant height, yield, test weight, moisture, protein, falling number and sawfly cutting data for the 2016 Turner dryland winter wheat trial are summarized in Table 1.

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 three years of data is necessary to be included in comparable average calculation. Five-year comparable averages for seed yield and test weight at Turner are summarized in Table 2, while five-year comparable averages for sawfly cutting are summarized in Table 3.

Loma winter wheat yields averaged just under 41 bu/ac with 'Keldin', a 2011 WestBred release, producing the highest yield at just under 52 bu/ac (Table 4). Cowboy, 'SY Wolf' and three other experimental lines all yielded statistically equal to Keldin. Sawfly cutting was low this year in the Loma small plots, with cutting in the winter wheat trial averaging just over two percent. Stand percent, plant height, yield, test weight, moisture, protein, falling number, sawfly cutting and Hessian fly damage data for the 2016 Loma dryland winter wheat trial are summarized in Table 4. Ten-year comparable averages for seed yield and test weight at Loma are summarized in Table 5, while ten-year comparable averages for sawfly cutting are summarized in Table 6.

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 seventh 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 4W6089 is to be provided by Montana State University, Office of Sponsored Programs. There is no other grant support for this project.

MWBC CY2017 Grant Submission Plans:

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

Recognition:

This research would not have been possible without the assistance of the following summertime hourly employees: Kasee Clark, Kyla McNamara, Nicole Parsons and John Perodin.

TABLE 1. Dryland Fallow Winter Wheat Cultivar Evaluation Nursery Grown Off-Station at the Leon Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 2016. (Exp# 16-3851-WW)

ID	CULTIVAR or SELECTION	STAND %	PLNT HT Inches	1/	TEST WT Lbs/Bu	MOISTURE %	2/	3/	4/
				YIELD Bu/Ac			PROTEIN %	FN seconds	SAWFLY %
Bearpaw	Montana, 2011	97.1	29.3	60.8	57.2	10.8	11.2	320	0.0
Broadview	Alberta, 2009 (Meridian Seeds)	89.7	30.1	49.3	58.3	10.6	10.5	330	0.0
CDC Falcon	Sask/WestBred, 1999	95.7	27.9	57.3	58.9	10.3	11.4	323	0.0
Colter	Montana, 2013	92.6	32.1	65.1	59.7	10.8	11.4	334	0.0
Cowboy	Wyoming/Colorado, 2012	96.8	30.0	65.2	58.0	10.6	9.9	292	0.0
Decade	Montana/North Dakota, 2010	96.7	29.9	52.7	58.2	10.7	11.5	319	0.0
Jerry	North Dakota, 2001	94.1	32.7	37.3	56.7	10.6	10.9	315	0.0
Judee	Montana, 2011	93.9	29.7	63.8	60.4	10.6	11.7	312	0.0
Keldin	WestBred, 2011	87.9	29.8	48.3	59.3	11.0	11.0	297	0.0
Loma	Montana, 2016 (formerly, MTS1224)	96.8	29.0	59.8	60.2	10.6	11.4	309	0.0
Northern	Montana, 2015	88.7	28.9	59.0	60.2	10.7	12.0	342	0.0
Rampart	Montana, 1996	93.2	34.4	56.8	58.6	10.5	11.9	313	0.0
SY Clearstone 2CL	Montana/Syngenta, 2012	95.5	31.8	60.6	59.4	10.9	11.2	333	0.0
SY Wolf	Syngenta (AgriPro), 2010	93.6	30.2	57.6	59.1	10.9	11.0	295	0.0
Warhorse	Montana, 2013	95.2	29.6	59.9	59.7	10.8	12.1	349	0.0
WB3768	Montana/WestBred, 2013	95.4	31.7	56.9	60.8	10.5	11.6	322	0.0
WB-Quake	WestBred, 2011	94.9	31.7	66.3	58.8	10.5	11.8	311	0.0
Yellowstone	Montana 2005	91.8	29.7	65.0	59.7	10.6	10.8	322	0.0
MT1138	W99-194/2*Yellowstone	93.4	30.5	59.6	59.9	10.7	11.5	328	0.0
MT1257	Yellowstone/Krichauff	92.7	31.1	60.9	59.9	10.5	11.8	330	0.0
MT1265	Yellowstone*4/KS96WGRC40 (Lr41, wcm)	94.2	33.0	66.6	59.6	10.5	11.1	327	0.0
MT1332	Yellowstone/00X52E99//Yellowstone	91.1	32.4	65.2	60.2	10.8	11.4	333	0.0
MT1348	PI572290/BigSky	95.5	31.2	65.9	59.3	10.5	11.1	330	0.0
MT1354	MT08184//MT08188/MT08175	92.1	32.5	64.6	59.8	10.5	11.3	324	0.0
MT1356	MT08184//MT08185/MT08177	95.5	30.9	70.6	59.6	10.8	11.2	317	0.0
EXPERIMENTAL MEANS		93.8	30.8	59.8	59.3	10.6	11.3	321	0.0
LSD (0.05)		6.3	2.8	7.6	0.5	0.5	0.6	10.6	-
C.V.%		4.1	5.6	7.7	0.5	2.7	3.3	2.0	-
P-VALUE (Varieties)		0.2377	0.0052	<.0001	<.0001	0.3068	<.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 13 percent grain moisture.

3/ FN is the falling number value reported in seconds.

4/ 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 (16-3851-WW)

Seeding Date: September 23, 2015
Harvest Date: August 22, 2016
Fertility: 100-20-10 side banded
System: no till
Herbicide: Brox-M, 24 oz/ac
Insecticide: none
Previous Crop: Chemical Fallow - Durum
Precipitation: 11.43" (April 1 - July 30)

TABLE 2. Five-Year Yield and Test Weight Summary of Selected Entries from Dryland Fallow Winter Wheat Variety Nurseries Grown Off-Station at the Leon Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 2011-2016. (Exp# 3851-WW)

2/ VARIETY or SELECTION	No. of YEARS TESTED 4/	1/ YIELD (Bushels Per Acre)							TEST WEIGHT (Pounds Per Bushel)							
		2012	2013	3/ 2014	2015	2016	AVE. for YEARS TESTED 4/	% of CHECK YIELD 5/	5-YR COMP. AVE. YIELD 6/	2012	2013	3/ 2014	2015	2016	AVE. for YEARS TESTED 4/	% of CHECK TEST WT 5/
MT00159	YELLOWSTONE (+)	5	24.0	63.0	40.7	65.0	48.5	100.0	48.5	58.8	61.5	59.4	59.7	60.1	100.0	60.1
BZ9W05-2043	WB-QUAKE (P+)	5	24.4	56.9	38.3	66.3	48.0	99.0	48.0	59.2	62.0	58.9	58.8	59.9	99.6	59.9
MTS0721	BEARPAW (+)	5	24.4	57.6	40.4	60.8	47.0	96.9	47.0	59.5	61.1	58.3	57.2	59.5	98.9	59.5
MTW08168	WB3768 (P+,HW)	3		60.2	44.6	56.9	53.9	95.8	46.4		62.4	59.5	60.8	60.9	101.1	60.8
MT08172	COLTER (+)	4	25.0	50.1	42.8	65.1	45.8	95.0	46.0	59.2	62.0	60.3	59.7	60.3	100.7	60.6
MTCL1077	SY CLEARSTONE 2CL (P+)	4	23.6	59.9	38.4	60.6	45.6	94.7	45.9	58.7	61.5	59.1	59.4	59.7	99.7	60.0
S94-4	CDC FALCON (P+)	5	21.1	55.3	40.3	57.3	45.8	94.5	45.8	58.7	61.0	59.1	58.9	59.5	99.0	59.5
MTS0713	JUDEE (+)(saw fly tol)	5	23.7	49.0	39.2	63.8	45.7	94.2	45.7	60.4	62.5	61.0	60.4	61.1	101.7	61.1
MTS0031	GENOU (+)(saw fly tol)	4	24.5	49.8	40.8		41.7	94.0	45.6	59.6	62.0	59.4		60.5	100.4	60.4
MT0552	DECADE (+)	5	20.9	52.1	42.8	52.7	43.7	90.1	43.7	60.0	61.0	59.3	58.2	60.1	99.9	60.1
MT0978	NORTHERN (++)	3		54.7	38.3	59.0	50.7	90.1	43.7		61.9	59.2	60.2	60.4	100.4	60.4
MTS0808	WARHORSE (+)	5	25.1	52.1	34.6	59.9	42.0	86.6	42.0	59.5	62.2	59.4	59.7	60.7	100.9	60.7
PI593889	RAMPART (saw fly tol)	5	22.5	45.4	31.1	56.8	39.9	82.3	39.9	59.4	61.7	58.2	58.6	60.0	99.8	60.0
ND9257	JERRY	5	22.7	45.2	38.7	37.3	39.2	80.9	39.2	58.5	60.6	57.8	56.7	58.9	98.0	58.9
MEANS (For Entries Listed)			23.5	53.7	39.4	58.6			44.8	59.3	61.7	59.2				60.1
7/ Growing Season Precipitation (in.)			7.5	n/a	17.6	n/a	11.4	11.2								
Soil PAW (in.) to SD @ Planting			8.9	7.8	8.5	3.6	7.9	7.5								
Total Plant Available Water (in.)			16.4	n/a	26.2	n/a	19.4	19.6								
Soil NO3 (lbs.) to SD at Planting			15	11	93	27	26	38								
Fertilizer Applied		(# N)	70	100	100	100	100	90								
		(# P ₂ O ₅)	40	20	20	20	20	27								
		(# K ₂ O)	25	10	10	10	10	15								

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 Pending, CL = Clearfield Tolerant, HW = Hard White.

3/ No harvest in 2014 due to hail.

4/ Only the most recent 5 years show n, but summary calculations include all years noted.

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

6/ 5-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 = 5-Yr average yield or test weight for the check variety Yellow stone.

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

TABLE 3. Five-Year Sawfly Summary of Selected Entries from Dryland Fallow Winter Wheat Variety Nurseries Grown Off-Station at the Leon Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 2012-2016. (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/	5-YR COMP. AVE. SWFLY 5/	
			2011	2012	2013	3/ 2014	2015				2016
MTS0808	WARHORSE (+)	5	1.0	2.3	0.7		0.0	0.0	0.8	20.9	0.8
MT0978	NORTHERN (++)	3			1.0		0.0	0.0	0.3	25.0	1.0
P1593889	RAMPART (saw fly tol)	5	1.0	11.7	2.3		0.3	0.0	3.1	80.0	3.1
MTS0713	JUDEE (+)(saw fly tol)	5	7.0	8.3	0.7		0.0	0.0	3.2	83.5	3.2
MTCL1077	SY CLEARSTONE 2CL (P+)	4		18.3	1.0		0.3	0.0	4.9	102.9	3.9
S94-4	CDC FALCON (P+)	5	2.3	18.3	3.7		0.3	0.0	4.9	128.7	4.9
MTS0721	BEARPAW (+)	5	3.7	20.0	1.0		0.0	0.0	4.9	128.7	4.9
MTS0031	GENOU (+)(saw fly tol)	4	1.0	18.3	1.0		0.0		5.1	132.6	5.1
MT08172	COLTER (+)	4		21.7	6.7		0.7	0.0	7.3	151.7	5.8
BZ9W05-2043	WB-QUAKE (P+)	5	20.0	10.0	0.7		0.3	0.0	6.2	161.8	6.2
MTW08168	WB3768 (P++,HW)	3			6.7		0.3	0.0	2.3	175.9	6.7
MT0552	DECADE (+)	5	11.7	23.3	2.0		0.3	0.0	7.5	194.8	7.5
MT00159	YELLOWSTONE (+)	5	20.0	18.3	6.7		0.0	0.0	9.0	234.8	9.0
ND9257	JERRY	5	13.7	26.7	5.3		0.7	0.0	9.3	241.8	9.3
MEANS (For Entries Listed)			8.1	16.4	2.8		0.2				5.1
6/ Growing Season Precipitation (in.)			8.3	7.5	n/a	17.6	n/a	11.4	11.2		
Soil PAW (in.) to SD @ Planting			8.2	8.9	7.8	8.5	3.6	7.9	7.5		
Total Plant Available Water (in.)			16.5	16.4	n/a	26.2	n/a	19.4	19.6		
Soil NO3 (lbs.) to SD at Planting			55	15	11	93	27	26	38		
Fertilizer Applied											
			(# N)	70	70	100	100	100	90		
			(# P ₂ O ₅)	40	40	20	20	20	27		
			(# K ₂ O)	25	25	10	10	10	15		

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, winter hardiness, disease resistance, etc. before making cultivar selection decisions.

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

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/ 5-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 = 5-Yr average saw fly rating for the check variety Rampart.

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

TABLE 4. Dryland Fallow Winter Wheat Cultivar Evaluation Nursery Grown Off-Station at McKeever Farm & Seed, Inc., Loma. Northern Agricultural Research Center. Havre, Montana. 2016. (Exp# 16-3853-WW)

ID	CULTIVAR or SELECTION	STAND	PLNT HT	1/ YIELD	TEST WT	MOISTURE	2/ PROTEIN	3/ FN	4/ SAWFLY	5/ HESSIAN
		%	Inches	Bu/Ac	Lbs/Bu	%	%	seconds	%	%
Bearpaw	Montana, 2011	98.1	30.0	37.0	53.3	10.2	16.6	328	0.0	0.0
Broadview	Alberta, 2009 (Meridian Seeds)	97.7	32.3	38.4	55.0	10.0	17.3	367	2.3	0.0
CDC Falcon	Sask/WestBred, 1999	98.4	30.8	43.5	53.9	10.0	17.5	373	1.0	1.7
Colter	Montana, 2013	98.7	29.8	38.2	54.5	10.1	17.5	369	0.7	0.0
Cowboy	Wyoming/Colorado, 2012	98.1	31.5	47.1	54.8	10.1	15.7	340	0.3	0.0
Decade	Montana/North Dakota, 2010	98.4	30.5	35.4	53.5	10.1	17.2	353	5.0	1.7
Jerry	North Dakota, 2001	97.4	32.8	31.0	52.2	10.1	17.6	348	1.0	25.0
Judee	Montana, 2011	96.5	31.8	42.1	53.8	9.9	18.3	335	0.7	0.0
Keldin	WestBred, 2011	96.1	34.6	51.6	56.3	9.9	16.6	376	6.7	3.3
Loma	Montana, 2016 (formerly, MTS1224)	97.4	27.2	28.1	53.3	10.3	17.4	341	3.7	0.0
Northern	Montana, 2015	98.7	33.1	41.3	51.6	10.1	18.3	374	2.3	0.0
Rampart	Montana, 1996	97.8	32.0	39.4	56.2	10.0	17.4	330	0.0	0.0
SY Clearstone 2CL	Montana/Syngenta, 2012	97.4	34.7	40.6	54.1	10.4	17.1	368	3.7	1.7
SY Wolf	Syngenta (AgriPro), 2010	98.4	32.4	45.6	55.4	10.2	16.6	341	1.0	1.7
Warhorse	Montana, 2013	98.1	29.9	36.2	55.9	10.0	17.0	369	0.0	0.0
WB3768	Montana/WestBred, 2013	97.7	33.9	37.9	55.6	10.0	17.0	378	5.3	0.0
WB-Quake	WestBred, 2011	97.1	29.9	36.8	54.8	9.9	16.5	319	2.0	0.0
Yellowstone	Montana 2005	97.7	33.1	44.1	54.5	10.2	17.0	377	2.3	0.0
MT1138	W99-194/2*Yellowstone	95.8	35.1	45.3	54.1	10.3	16.8	371	3.3	1.7
MT1257	Yellowstone/Krichauff	97.1	33.6	42.7	53.8	10.3	17.2	367	5.3	1.7
MT1265	Yellowstone*4/KS96WGRC40 (Lr41, wcm)	97.4	32.8	44.8	55.7	10.2	16.4	374	0.7	0.0
MT1332	Yellowstone/00X52E99//Yellowstone	96.1	36.5	47.2	54.0	10.2	17.4	374	2.3	0.0
MT1348	PI572290/BigSky	97.4	31.2	45.8	54.7	10.3	16.0	355	0.7	3.3
MT1354	MT08184//MT08188/MT08175	97.4	32.0	43.5	55.6	10.2	16.9	375	0.7	0.0
MT1356	MT08184//MT08185/MT08177	96.8	32.0	39.4	55.1	10.1	17.0	379	2.0	0.0
EXPERIMENTAL MEANS		97.5	32.1	40.9	54.5	10.1	17.1	359	2.1	1.7
LSD (0.05)		3.1	1.9	6.3	1.3	0.2	0.6	9.7	3.8	5.4
C.V.%		2.0	3.6	9.4	1.4	1.1	2.2	1.6	108.2	197.6
P-VALUE (Varieties)		0.9540	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0160	<.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 13 percent grain moisture.

3/ FN is the falling number value reported in seconds.

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

5/ Hessian Fly rating is reported as the percentage of infested, damaged 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 (16-3853-WW)

Seeding Date: September 24, 2015
Harvest Date: August 1, 2016
Fertility: 100-20-10 side banded
System: no till
Herbicide: Goldsky, 2p/ac
Insecticide: none
Previous Crop: Chemical Fallow - Spring Wheat
Precipitation: 8.02" (April 1 - July 30)

TABLE 5. Ten-Year Yield and Test Weight Summary of Selected Entries from Dryland Fallow Winter Wheat Variety Nurseries Grown Off-Station at McKeever Farm and Seed Inc., Loma. Northern Agricultural Research Center. Havre, Montana. 2007-2016. (Exp# 3853-WW)

2/ VARIETY or SELECTION	No. of YEARS TESTED 3/	1/ YIELD (Bushels Per Acre)								TEST WEIGHT (Pounds Per Bushel)								
		2012	2013	2014	2015	2016	AVE. for YEARS TESTED 3/	% of CHECK YIELD 4/	10-YR COMP. AVE. YIELD 5/	2012	2013	2014	2015	2016	AVE. for YEARS TESTED 3/	% of CHECK TEST WT 4/	10-YR COMP. AVE. TEST WT 5/	
MTS0978	NORTHERN (++)	4		72.5	44.5	55.3	41.3	53.4	100.6	58.1		58.8	62.2	57.4	51.6	57.5	100.0	57.2
MT00159	YELLOWSTONE (+)	10	59.0	66.9	46.2	46.2	44.1	57.8	100.0	57.8	56.7	57.8	61.2	56.6	54.5	57.3	100.0	57.3
S94-4	CDC FALCON (P+)	10	52.0	68.4	42.1	55.1	43.5	56.6	98.0	56.6	55.6	58.0	61.8	57.2	53.9	57.2	99.9	57.2
MTCL1077	SY CLEARSTONE 2CL (P+)	5	56.8	62.6	48.4	47.5	40.6	51.2	97.6	56.4	55.6	57.2	61.2	56.9	54.1	57.0	99.4	56.9
MTW08168	WB3768 (P+,HW)	4		60.9	43.6	48.3	37.9	47.7	93.8	54.2		58.0	61.5	57.3	55.6	58.1	101.0	57.8
MTS0713	JUDEE (+)(saw fly tol)	8	49.5	65.6	45.3	43.2	42.1	51.1	93.8	54.2	56.5	59.8	62.8	56.7	53.8	58.1	101.3	58.0
MTS0808	WARHORSE (+)	6	53.8	61.3	45.4	44.8	36.2	50.4	93.2	53.8	56.0	59.8	62.5	56.8	55.9	58.4	100.8	57.7
W98-362	JAGALENE (P+)	8	49.4	56.6	43.3			56.3	92.4	53.4	59.5	59.7	63.6		59.9	103.8	59.4	
MT0552	DECADE (+)	9	53.8	58.7	34.4	45.4	35.4	52.2	91.8	53.0	57.3	58.5	62.3	56.2	53.5	57.5	100.7	57.6
BZ9W05-2043	WB-QUAKE (P+)	6	43.2	64.7	40.6	43.3	36.8	48.9	90.4	52.2	53.9	57.1	62.5	56.6	54.8	57.7	99.6	57.0
MT08172	COLTER (++)	5	55.3	58.8	42.9	41.5	38.2	47.3	90.2	52.1	58.1	58.0	61.4	55.9	54.5	57.6	100.4	57.5
MTS0721	BEARPAW (+)	7	52.9	57.3	38.2	50.9	37.0	48.9	87.5	50.5	56.8	58.8	62.1	56.8	53.3	57.4	100.5	57.6
DH0018196	ACCIPITER (+)	6	45.4	58.3	45.2			49.2	85.5	49.4	55.7	58.8	61.8			57.6	99.4	56.9
MTS0031	GENOU (+)(saw fly tol)	9	49.4	57.8	46.1	41.9		50.6	85.4	49.3	55.0	58.4	62.1	56.8		57.3	99.5	57.0
PI593889	RAMPART (saw fly tol)	10	40.8	56.7	37.6	49.1	39.4	48.8	84.5	48.8	55.3	58.3	62.2	58.7	56.2	58.0	101.3	58.0
ND9257	JERRY	10	43.7	55.0	36.5	46.5	31.0	48.4	83.8	48.4	55.4	58.3	61.0	55.9	52.2	56.5	98.7	56.5
MEANS (For Entries Listed)			50.4	61.4	42.5	47.1	38.7			53.0	56.2	58.5	62.0	56.8	54.2			57.5
6/ Growing Season Precipitation (in.)			9.4	8.8	6.0	n/a	8.0	8.2										
Soil PAW (in.) to SD @ Planting			7.9	9.1	10.4	3.6	8.7	8.6										
Total Plant Available Water (in.)			17.3	17.8	16.4	n/a	16.7	17.7										
Soil NO3 (lbs.) to SD at Planting			68	51	85	126	194	108										
Fertilizer Applied		(# N)	70	100	100	100	100	82										
		(# P ₂ O ₅)	40	20	20	20	20	32										
		(# K ₂ O)	25	10	10	10	10	19										

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 Pending, CL = Clearfield Line, HW = Hard White.

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 6. Ten-Year Sawfly Summary of Selected Entries from Dryland Fallow Winter Wheat Variety Nurseries Grown Off-Station at McKeever Farm and Seed Inc., Loma. Northern Agricultural Research Center. Havre, Montana. 2007-2016. (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/
			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016			
MTS0808	WARHORSE (+)	6					5.0	5.0	8.3	0.7	1.0	0.0	3.3	40.7	3.2
MTS0721	BEARPAW (+)	7				8.3	10.0	13.3	20.0	1.0	3.7	0.0	8.0	95.4	7.6
PI593889	RAMPART (saw fly tol)	10	0.0	3.7	16.7	10.0	10.0	16.7	16.7	0.7	5.0	0.0	7.9	100.0	7.9
BZ9W05-2043	WB-QUAKE (P+)	6					15.0	12.5	33.3	3.7	2.3	2.0	11.5	140.3	11.1
MT0978	NORTHERN (++)	4							16.7	3.7	15.0	2.3	9.4	168.4	13.4
MTS0713	JUDEE (+)(saw fly tol)	8			31.7	53.3	10.0	31.7	30.0	3.7	2.3	0.7	20.4	211.9	16.8
MTS0031	GENOU (+)(saw fly tol)	9	2.0	3.7	50.0	51.7	21.7	26.7	23.3	4.0	10.0		21.4	243.1	19.3
MTW08168	WB3768 (P+,HW)	4							28.3	11.7	26.7	5.3	18.0	321.9	25.5
MT0552	DECADE (+)	9		2.3	40.0	96.3	13.3	71.7	23.3	5.0	2.3	5.0	28.8	326.7	25.9
S94-4	CDC FALCON (P+)	10	0.7	1.0	63.3	99.7	15.0	86.7	10.0	3.7	5.3	1.0	28.6	360.8	28.6
MTCL1077	SY CLEARSTONE 2CL (P+)	5						97.7	20.0	3.7	18.3	3.7	28.7	367.2	29.1
MT08172	COLTER (+)	5						93.0	33.3	8.3	21.7	0.7	31.4	402.1	31.9
DH0018196	ACCIPITER (+)	6			60.0	97.7	28.3	90.0	6.7	5.3			48.0	407.4	32.3
W98-362	JAGALENE (P+)	8	5.3	2.3	71.3	99.7	28.3	86.7	21.7	3.7			39.9	428.9	34.0
ND9257	JERRY	10	6.7	8.3	76.3	96.7	30.0	88.3	20.0	5.0	13.3	1.0	34.6	435.5	34.6
MT00159	YELLOWSTONE (+)	10	2.3	10.0	85.0	99.3	21.7	97.7	15.0	5.0	15.0	2.3	35.3	445.2	35.3
MEANS (For Entries Listed)			2.8	4.5	54.9	71.3	17.4	58.4	20.4	4.3	10.1	1.8			22.3
5/ Growing Season Precipitation (in.)			6.9	8.9	n/a	n/a	9.4	9.4	8.8	6.0	n/a	8.0	8.2		
Soil PAW (in.) to SD @ Planting			n/a	10.5	10.1	7.5	9.6	7.9	9.1	10.4	3.6	8.7	8.6		
Total Plant Available Water (in.)			n/a	19.4	n/a	n/a	19.0	17.3	17.8	16.4	n/a	16.7	17.7		
Soil NO3 (lbs.) to SD at Planting			n/a	300	82	36	26	68	51	85	126	194	108		
Fertilizer Applied															
			(# N)	70	70	70	70	70	70	100	100	100	100	82	
			(# P ₂ O ₅)	40	40	40	40	40	40	20	20	20	20	32	
			(# K ₂ O)	25	25	25	25	25	25	10	10	10	10	19	

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 Pending, CL = Clearfield Line, HW = Hard White.

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.