

Title (4W6089): North Central Montana Off-Station Spring Wheat Variety Performance Evaluations

Principal Investigator: Peggy F. Lamb, Research Scientist, Northern Ag Research Center, Havre

Project Personnel: Luther E. Talbert, Breeder/Geneticist, Spring Wheat, Bozeman
Hwa Young Heo, Research Associate, Spring Wheat, Bozeman
Angela E. Sebelius, Research Associate, Havre
Jesse Fulbright, Liberty County Extension
Ben Hauptman, Blaine County Extension
Tyler Lane, Chouteau County Extension
Marko Manoukian, Phillips County Extension

Cooperators: Max Cederberg, Landowner, Turner
Kurt Kammerzell, Landowner, Chester
Pete Lumsden & John Flansaas, Landowners, Loring
Lyle McKeever & Terry McKeever, Landowners, Loma

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 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 spring wheat variety performance trials were conducted on chemical fallow in 2016 in four northern Montana counties.

Dryland Spring Wheat Trials:

- | | |
|-------------------------------------------|------------|
| 1. Cederberg Farm, Blaine County | 13-36N-25E |
| 2. Flansaas/Lumsden Farm, Phillips County | 24-35N-29E |
| 3. McKeever Farms, Chouteau County | 29-27N-10E |
| 4. Kammerzell Farm, Liberty County | 13-31N-05E |

All four spring 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 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 followed by heavy rainfall resulting in delayed spring seeding in many areas. Higher than normal rainfall was experienced at Turner and Loring resulting in good to excellent spring wheat yields for growers who were able to seed their crops in a timely manner. The Loma small plots were seeded into land recently taken out of CRP. The spring wheat was disease ridden and stunted, and with timely precipitation lacking, the yields were very poor. The Chester area went into the fall and started out early spring dryer than normal, however, spring rains were frequent. Timely precipitation encouraged growth for good yield potential, however, stripe rust was prevalent in the cereal trials, limiting yield and quality of the spring wheat and durum.

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, the spring wheat trial yields at Turner averaged just over 35 bu/ac (Table 1). 'Egan', a Montana State University release to help combat the orange wheat blossom midge, was the highest yielding entry at nearly 50 bu/ac. No other named or experimental lines produced yields statistically equal to that of Egan. Test weight of all entries averaged just over 56 lb/bu. Sawfly cutting was nonexistent for the second consecutive year in the spring wheat trial at Turner, this following a severe hailstorm in 2014. Stand percent, plant height, yield, test weight, moisture, protein, falling number and sawfly cutting data for the 2016 Turner dryland spring 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. Nine-year comparable averages (2007-2016) for spring wheat seed yield and test weight at Turner are summarized in Table 2, while nine-year comparable averages for sawfly cutting are summarized in Table 3.

Loring spring wheat yields averaged just under 43 bu/ac with 'Alum', a spring wheat with aluminum tolerance released by Washington State University, producing the highest yield at over 51 bu/ac (Table 4). 'Vida', MSU experimental line 'MT 1316' and two experimental lines submitted by Winfield Solutions, 'HRS 3100' and 'HRS 3504', produced seed yields between 46 and 50 bu/ac, statistically equal to that of Alum. For the second time in the past ten years, sawfly cutting was nonexistent in the trial at the Loring site. Stand percent, plant height, yield, test weight, moisture, protein, falling number and sawfly cutting data for the 2016 Loring dryland spring wheat trial are summarized in Table 4. Ten-year comparable averages for spring wheat seed yield and test weight at Loring are summarized in Table 5, while ten-year comparable averages for sawfly cutting are summarized in Table 6.

In 2013, off-station spring wheat trials were re-established near Loma. The lack of timely rain showers coupled with extreme disease pressure, limited spring wheat yields, which averaged a dismal 11 bu/ac (Table 7). 'Duclair' was the highest yielding entry at just under 17 bu/ac and experimental line 'MT 1401' was the only entry to yield statistically equal to Duclair. Sawfly damage in the small plot situation was low again this year, averaging only 7.9 percent cutting. Stand percent, plant height, yield, test weight, moisture, protein, falling number and sawfly cutting data for the 2016 Loma dryland spring wheat trial are summarized in Table 7. Four-year comparable averages for spring wheat seed yield and test weight at Loma are summarized in Table 8, while four-year comparable averages for sawfly cutting are summarized in Table 9.

In 2014, off-station spring wheat trials were established near Chester. Extreme disease pressure, mainly stripe rust, had an adverse effect on spring wheat yields which averaged just over 23 bu/ac, while test weights averaged under 50

lb/bu (Table 10). Duclair was again the highest yielding entry at over 34 bu/ac, with Egan producing the only yield statistically equal to that of Duclair. Sawfly cutting in the small plot scenario was less than ten percent in 2016. Stand percent, plant height, yield, test weight, moisture, protein, falling number and sawfly cutting data for the 2016 Chester dryland spring wheat trial are summarized in Table 10. Three-year comparable averages for spring wheat seed yield and test weight at Chester are summarized in Table 11, while three-year comparable averages for sawfly cutting are summarized in Table 12.

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 Loring location is entering its twenty-first year, and the cooperators and area producer interest and support has been outstanding. The Turner location is only 32 miles from the Loring site, but growing conditions are quite different. Cooperator and producer support in the Big Flat area have been outstanding through the years with 2016 marking 33 years at the present Turner site. Various winter and spring cereal trials have been conducted with great producer support at the Chouteau County location, between Big Sandy and Loma, since 1998. The Chester location was reestablished in 2014 following a prolonged absence of uniform off-station spring cereal testing in Liberty County.

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 Spring Wheat Cultivar Evaluation Nursery Grown Off-Station at the Leon Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 2016. (Exp# 16-9951-SW)

ID	CULTIVAR or SELECTION	STAND %	PLNT HT Inches	1/ YIELD Bu/Ac	TEST WT Lbs/Bu	MOISTURE %	2/ PROTEIN %	3/ FN seconds	4/ SAWFLY %
WSCIA	ALUM	91.7	28.4	41.4	58.7	10.8	14.6	281	0.0
AGRIPR10	BRENNAN	94.0	25.4	40.3	60.2	10.2	14.7	322	0.0
PI633974	CHOTEAU	93.8	27.7	31.7	56.1	10.3	15.1	312	0.0
BZ996434	CORBIN	97.1	26.4	43.0	57.9	10.3	14.4	309	0.0
PI660981	DUCLAIR	93.9	26.9	39.9	55.8	10.1	14.9	307	0.0
EGAN	EGAN	94.9	27.7	49.7	57.6	10.2	16.2	339	0.0
CI 13596	FORTUNA	96.6	31.6	33.2	58.3	10.3	14.6	311	0.0
PI574642	MCNEAL	88.2	28.8	35.9	54.8	10.3	14.7	317	0.0
NDSW0449	MOTT	88.5	29.3	29.5	57.1	10.5	15.6	294	0.0
BZ999592	ONEAL	98.7	29.8	31.6	54.5	10.2	15.6	305	0.0
ND 695	REEDER	92.6	28.0	40.4	57.4	10.5	14.6	308	0.0
AGRIPR14	SY SOREN	93.2	27.6	30.4	55.2	10.2	15.6	308	0.0
AGRIPR12	SY TYRA	78.0	26.1	25.0	53.8	10.3	15.2	281	0.0
PI642366	VIDA	97.4	28.9	38.3	55.8	10.4	15.1	300	0.0
BZ92413R	WB GUNNISON	92.1	27.8	35.2	58.3	10.5	14.2	308	0.0
WB9879CLP	WB9879CLP	88.7	27.2	35.4	57.6	10.3	15.2	322	0.0
Wnfield-5	HRS 3100	91.6	26.3	31.9	54.0	10.1	14.4	308	0.0
Wnfield-4	HRS 3361	87.1	25.9	28.5	54.2	10.2	14.5	307	0.0
Wnfield-1	HRS 3504	90.4	26.7	39.7	55.3	10.2	14.1	321	0.0
Wnfield-2	HRS 3530	88.4	30.4	27.5	54.0	10.3	15.5	292	0.0
Wnfield-3	HRS 3616	92.5	27.9	33.1	56.9	10.4	15.3	305	0.0
MT 1173	MT0245/IMI8209-1//MT0245	93.2	30.0	27.9	52.8	10.4	15.1	276	0.0
MT 1316	GLENN/MT0747	98.3	29.2	43.5	56.9	10.3	15.0	307	0.0
MT 1348	MT0852/MT0858	90.7	26.5	34.6	56.3	10.3	14.8	304	0.0
MT 1401	VIDA/MT0827	94.4	28.5	38.7	59.2	10.3	14.0	310	0.0
EXPERIMENTAL MEANS		92.2	28.0	35.5	56.3	10.3	14.9	306.1	0.0
LSD (0.05)		13.2	2.4	3.1	1.6	0.2	0.5	9.8	-
C.V.%		8.7	5.1	5.4	1.8	1.0	1.9	2.0	-
P-VALUE (Varieties)		0.6091	0.0001	<.0001	<.0001	<.0001	<.0001	<.0001	-

1/ Volumetric yields are based on plot weights adjusted to uniform 13 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 (16-9951-SW)

Seeding Date: May 8, 2016
 Harvest Date: August 22, 2016
 Fertility: 125-20-10-10 side banded
 System: no till
 Herbicide: none
 Insecticide: none
 Previous Crop: Chemical Fallow - Spring Wheat
 Precipitation: 8.60" seeding to harvest maturity

TABLE 2. Nine-Year Yield and Test Weight Summary on Selected Entries from Dryland Fallow Spring Wheat Variety Nurseries Grown Off-Station at the Leon Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 2007-2016. (Exp# 9951-SW)

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/	9-YR COMP. AVE. YIELD 6/	2012	2013	3/ 2014	2015	2016	AVE. for YEARS TESTED 4/	% of CHECK TEST WT 5/	9-YR COMP. AVE. TEST WT 6/
MT0245 VIDA (+)	9	23.4	66.8	43.5	38.3	36.3	123.5	36.3	60.7	61.3	62.2	55.8	58.6	99.0	58.6		
BZ999592 ONEAL (P+)	8	23.4	61.7	41.1	31.6	36.7	121.5	35.8	60.8	63.2	62.7	54.5	60.1	100.5	59.6		
MT0832 DUCLAIR (+)(saw fly tol)	6	24.0	55.7	39.4	39.9	37.8	120.6	35.5	58.9	60.8	60.6	55.8	58.5	97.3	57.6		
BZ996434 CORBIN (P+)	9	22.6	54.1	38.3	43.0	34.0	115.5	34.0	60.4	62.2	62.3	57.9	59.3	100.0	59.3		
ND695 REEDER (+)	9	22.8	59.0	39.0	40.4	33.9	115.1	33.9	60.5	62.8	62.9	57.4	59.4	100.2	59.4		
IMICHT-79 WB9879CLP (P+)	5	23.1	54.7	38.7	35.4	37.4	114.2	33.6	59.7	61.8	61.8	57.6	60.5	99.4	58.9		
PI574642 McNEAL	9	19.6	50.4	38.1	35.9	32.1	109.1	32.1	59.5	62.2	61.7	54.8	58.1	98.1	58.1		
MT9929 CHOTEAU (+)(saw fly tol)	9	22.5	52.5	35.3	31.7	32.0	108.6	32.0	59.0	61.3	61.2	56.1	57.9	97.8	57.9		
BZ902413 WB GUNNISON (P+)(saw fly tol)	5	21.5	50.3	37.2	35.2	35.5	108.3	31.9	61.0	62.8	62.3	58.3	61.3	100.8	59.7		
04S0515-2-2 SY TYRA (P+)	8	19.6	54.6	42.0	25.0	32.4	107.5	31.7	61.6	63.8	64.2	53.8	60.0	100.5	59.5		
NDSW0449 MOTT (+)(saw fly tol)	6	19.6	56.2	34.7	29.5	33.7	107.3	31.6	60.3	62.6	62.4	57.1	59.9	99.6	59.0		
CI13596 FORTUNA (saw fly tol)	9	18.6	48.4	34.2	33.2	29.4	100.0	29.4	60.7	61.6	62.0	58.3	59.2	100.0	59.2		
MEANS (For Entries Listed)		21.7	55.4	38.5	34.9			33.2	60.3	62.2	62.2	56.5			58.9		
7/ Growing Season Precipitation (in.)		7.5	n/a	16.4	n/a	8.6	8.8										
Soil PAW (in.) to SD @ Planting		8.9	7.8	8.9	6.3	6.1	7.7										
Total Plant Available Water (in.)		16.4	n/a	25.2	n/a	14.7	16.6										
Soil NO3 (lbs.) to SD at Planting		15	11	65	49	85	68										
SD (Sampling Depth in Inches)		48	48	48	48	48	48										
Fertilizer Applied	(# N)	70	100	100	100	125	85										
	(# P ₂ O ₅)	40	20	20	20	20	32										
	(# K ₂ O)	25	10	10	10	10	19										
	(# S)	-	-	-	-	10	10										

Long term check variety is Fortuna.

1/ See MCES Bulletin 1093 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.

3/ No harvest in 2014 due to hail.

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

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

6/ 9-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 Fortuna for the same years, and z = 9-Yr average yield or test weight for the check variety Fortuna.

7/ Seeding to 14 days prior to harvest maturity.

TABLE 3. Nine-Year Sawfly Summary on Selected Entries from Dryland Fallow Spring Wheat Variety Nurseries Grown Off-Station at the Leon Cederberg Farm, Turner. Northern Agricultural Research Center. Havre, Montana. 2007-2016. (Exp# 9951-SW)

2/ VARIETY or SELECTION	No. of YEARS TESTED	1/ SAWFLY RATING (% of cut and lodged stems)										AVE. for YEARS TESTED	% of CHECK SAWFLY 4/	9-YR COMP. AVE. SAWFLY 5/
		2007	2008	2009	2010	2011	2012	2013	3/ 2014	2015	2016			
NDSW0449 MOTT (+)(saw fly tol)	6				3.7	5.0	1.0	0.0		0.0	0.0	1.6	16.0	1.5
BZ902413 WB GUNNISON (P+)(sawfly tol)	5					6.7	2.3	0.3		0.0	0.0	1.9	17.9	1.7
BZ996434 CORBIN (P+)	9	5.0	11.7	3.7	10.3	21.7	18.3	2.0		0.0	0.0	8.1	84.2	8.1
CI 13596 FORTUNA (saw fly tol)	9	16.7	8.3	1.0	8.3	28.3	20.0	3.7		0.0	0.0	9.6	100.0	9.6
IMICHT-79 WB9879CLP (P+)	5					40.0	16.7	2.0		0.0	0.0	11.7	112.8	10.8
MT9929 CHOTEAU (+)(saw fly tol)	9	6.7	13.3	3.7	13.3	36.7	28.3	6.7		0.0	0.0	12.1	125.9	12.1
MT0832 DUCLAIR (+)(saw fly tol)	6				13.7	33.3	30.0	4.0		0.0	0.0	13.5	134.3	12.9
BZ999592 ONEAL (P+)	8		21.7	7.0	2.3	40.0	35.0	5.0		0.0	0.0	13.9	159.4	15.3
MT0245 VIDA (+)	9	38.3	20.0	2.3	18.3	26.7	33.3	3.3		0.0	0.0	15.8	164.9	15.8
04S0515-2-2 SY TYRA (P+)	8		30.0	3.7	15.0	46.7	23.3	3.7		0.0	0.0	15.3	175.6	16.8
ND 695 REEDER (+)	9	35.0	18.3	6.7	16.7	53.3	33.3	5.3		0.0	0.0	18.7	195.4	18.7
PI574642 McNEAL	9	56.7	46.7	18.3	25.0	80.0	61.7	21.7		0.0	0.0	34.4	359.1	34.4
MEANS (For Entries Listed)		26.4	21.3	5.8	12.7	34.9	25.3	4.8		0.0	0.0			13.2
6/ Growing Season Precipitation (in.)		7.0	6.6	6.0	10.3	8.3	7.5	n/a	16.4	n/a	8.6	8.8		
Soil PAW (in.) to SD @ Planting		5.8	8.1	7.8	9.0	7.9	8.9	7.8	8.9	6.3	6.1	7.7		
Total Plant Available Water (in.)		12.8	14.6	13.8	19.2	16.2	16.4	n/a	25.2	n/a	14.7	16.6		
Soil NO3 (lbs.) to SD at Planting		81	n/a	94	162	51	15	11	65	49	85	68		
SD (Sampling Depth in Inches)		48	48	48	48	48	48	48	48	48	48	48		
Fertilizer Applied	(# N)	70	70	70	70	70	70	100	100	100	125	85		
	(# 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		
	(# S)	-	-	-	-	-	-	-	-	-	10	10		

Long-term check variety is Fortuna.

1/ See MCES Bulletin 1093 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.

3/ No harvest in 2014 due to hail.

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

5/ 9-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 Fortuna for the same years, and z = 9-Yr average saw fly rating for the check variety Fortuna.

6/ Seeding to 14 days prior to harvest maturity.

TABLE 4. Dryland Fallow Spring Wheat Cultivar Evaluation Nursery Grown Off-Station at the Flansaas-Lumsden Farm, Loring. Northern Agricultural Research Center. Havre, Montana. 2016. (Exp# 16-9955-SW)

ID	CULTIVAR or SELECTION	STAND %	PLNT HT Inches	1/ YIELD Bu/Ac	TEST WT Lbs/Bu	MOISTURE %	2/ PROTEIN %	3/ FN seconds	4/ SAWFLY %
WSCIA	ALUM	98.0	27.6	51.2	62.4	11.5	14.5	305	0.0
AGRIPR10	BRENNAN	93.3	24.8	39.4	61.7	11.6	15.9	327	0.0
PI633974	CHOTEAU	96.3	25.6	44.9	59.9	11.7	14.8	321	0.0
BZ996434	CORBIN	97.7	25.2	43.3	61.5	11.5	14.7	313	0.0
PI660981	DUCLAIR	92.4	26.1	41.5	60.1	11.6	14.9	309	0.0
EGAN	EGAN	98.7	27.2	44.3	59.6	11.4	17.3	344	0.0
CI 13596	FORTUNA	99.0	31.8	40.3	61.0	11.6	14.8	313	0.0
PI574642	MCNEAL	94.6	27.1	36.4	59.7	11.5	14.5	335	0.0
NDSW0449	MOTT	95.6	27.6	35.3	59.6	11.5	15.1	303	0.0
BZ999592	ONEAL	98.0	26.7	39.5	59.4	11.4	14.3	320	0.0
ND 695	REEDER	91.0	26.7	45.4	61.5	11.8	15.0	319	0.0
AGRIPR14	SY SOREN	95.7	26.2	42.2	61.1	11.4	15.8	324	0.0
AGRIPR12	SY TYRA	94.7	25.8	42.4	60.2	11.3	14.4	313	0.0
PI642366	VIDA	97.7	27.0	49.3	60.3	11.5	14.3	300	0.0
BZ92413R	WB GUNNISON	95.7	28.1	43.2	61.5	11.6	14.3	322	0.0
WB9879CLP	WB9879CLP	98.0	26.2	43.0	59.8	11.7	15.4	330	0.0
Wnfield-5	HRS 3100	98.0	25.3	46.1	60.3	11.7	14.4	324	0.0
Wnfield-4	HRS 3361	96.4	26.3	40.0	59.4	11.6	14.6	316	0.0
Wnfield-1	HRS 3504	97.3	24.8	46.3	60.8	11.7	14.3	324	0.0
Wnfield-2	HRS 3530	95.4	28.1	38.8	58.4	11.6	13.8	306	0.0
Wnfield-3	HRS 3616	94.1	27.2	41.5	60.1	11.4	16.2	315	0.0
MT 1173	MT0245/IMI8209-1//MT0245	94.4	28.9	41.3	58.0	11.8	14.3	296	0.0
MT 1316	GLENN/MT0747	98.4	26.6	50.1	60.7	11.6	15.1	313	0.0
MT 1348	MT0852/MT0858	96.0	25.7	41.7	60.9	11.3	15.0	307	0.0
MT 1401	VIDA/MT0827	95.7	26.1	40.3	61.9	11.8	15.1	313	0.0
EXPERIMENTAL MEANS		96.1	26.8	42.7	60.4	11.6	14.9	316.0	0.0
LSD (0.05)		6.3	1.9	5.5	0.7	0.4	0.4	8.0	-
C.V.%		4.0	4.2	7.9	0.7	1.9	1.8	1.5	-
P-VALUE (Varieties)		0.6353	<.0001	<.0001	<.0001	0.2802	<.0001	<.0001	-

1/ Volumetric yields are based on plot weights adjusted to uniform 13 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 (16-9955-SW)

Seeding Date: May 7, 2016
 Harvest Date: August 24, 2016
 Fertility: 125-20-10-10 side banded
 System: no till
 Herbicide: pending
 Insecticide: pending
 Previous Crop: Chemical Fallow - Spring Wheat
 Precipitation: 7.23" seeding to harvest maturity

TABLE 5. Ten-Year Yield and Test Weight Summary on Selected Entries from Dryland Fallow Spring Wheat Variety Nurseries Grown Off-Station at the Flansaas/Lumsden Farm, Loring. Northern Agricultural Research Center. Havre, Montana. 2007-2016. (Exp# 9955-SW)

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/
MT0245 VIDA (++)	10	29.7	71.4	54.3	52.0	49.3	43.5	127.4	43.5	60.8	60.5	56.9	59.8	60.3	59.0	100.3	59.0
ND 695 REEDER (+)	10	26.6	70.3	47.7	48.4	45.4	40.6	118.9	40.6	60.2	61.8	57.1	60.5	61.5	59.4	101.0	59.4
BZ999592 ONEAL (P+)	9	28.7	61.4	45.3	52.3	39.5	41.5	118.8	40.5	60.4	62.0	57.0	61.0	59.4	60.3	101.9	60.0
04S0515-2-2 SY TYRA (+)	8	26.8	59.3	47.5	46.3	42.4	41.2	114.3	39.0	57.9	61.3	56.7	62.1	60.2	59.4	100.3	59.0
CAP400-1 EGAN (+)	3			41.5	51.4	44.3	45.7	112.8	38.5			54.7	60.6	59.6	58.3	98.5	57.9
BZ996434 CORBIN (P+)	10	29.3	58.8	41.4	45.4	43.3	38.2	111.9	38.2	60.9	60.8	56.4	60.3	61.5	59.2	100.5	59.2
BZ9M1044 JEDD (P+)	7	27.6	50.8	38.0			36.5	110.6	37.7	60.5	60.9	56.7			60.1	102.4	60.3
MT0832 DUCLAIR (+)(saw fly tol)	7	26.1	56.4	47.2	47.0	41.5	40.9	110.4	37.7	60.3	59.3	55.3	57.2	60.1	58.1	97.8	57.6
IMICHT-79 WB9879CLP (P+)	6	27.0	59.2	43.7	44.7	43.0	42.8	110.1	37.6	60.4	59.6	55.5	59.6	59.8	59.3	99.4	58.5
ACS53610 VOLT (P+)	7	21.5	57.8	45.8			35.9	108.6	37.1	60.6	62.4	58.1			60.2	102.7	60.4
BZ902413 WB GUNNISON (P+)(saw fly tol)	6	23.1	55.4	45.9	47.2	43.2	41.6	107.2	36.6	59.4	61.7	57.5	61.1	61.5	60.5	101.0	59.4
MT9929 CHOTEAU (+)(saw fly tol)	10	25.1	55.7	42.5	42.5	44.9	36.5	107.0	36.5	59.7	59.6	55.5	58.7	59.9	57.8	98.3	57.8
PI574642 McNEAL	10	22.9	55.0	40.7	44.5	36.4	35.5	104.2	35.5	60.1	61.3	56.1	59.4	59.7	58.4	99.2	58.4
NDSW0449 MOTT (+)(saw fly tol)	7	23.3	57.1	41.9	41.9	35.3	38.5	104.0	35.5	60.4	60.6	55.3	60.1	59.6	59.0	99.4	58.5
0150042-10 BRENNAN (P+)	3			47.3	39.3	39.4	42.0	103.6	35.3			57.4	61.3	61.7	60.1	101.6	59.8
CI 13596 FORTUNA (saw fly tol)	10	22.7	54.4	38.3	43.0	40.3	34.1	100.0	34.1	59.8	60.9	56.3	60.4	61.0	58.8	100.0	58.8
MEANS (For Entries Listed)		25.7	58.8	44.3	46.1	42.0			37.7	60.1	60.9	56.4	60.2	60.4			59.0
6/ Growing Season Precipitation (in.)		n/a	9.5	5.6	8.9	7.2	8.1										
Soil PAW (in.) to SD @ Planting		8.8	8.8	8.9	8.2	3.7	8.0										
Total Plant Available Water (in.)		n/a	18.3	14.5	17.2	10.9	16.1										
Soil NO3 (lbs.) to SD at Planting		34	34	64	41	25	53										
SD (Sampling Depth in Inches)		48	48	48	48	24	46										
Fertilizer Applied	(# N)	70	100	100	100	125	85										
	(# P ₂ O ₅)	40	20	20	20	20	32										
	(# K ₂ O)	25	10	10	10	10	19										
	(# S)	-	-	-	-	10	10										

Long-term check variety is Fortuna.

1/ See MCES Bulletin 1093 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.

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

4/ Percent of Fortuna 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 Fortuna for the same years, and z = 10-Yr average yield or test weight for the check variety Fortuna.

6/ Seeding to 14 days prior to harvest maturity.

TABLE 6. Ten-Year Sawfly Summary on Selected Entries from Dryland Fallow Spring Wheat Variety Nurseries Grown Off-Station at the Flansaas/Lumsden Farm, Loring. Northern Agricultural Research Center. Havre, Montana. 2007-2016. (Exp# 9955-SW)

2/ VARIETY or SELECTION	No. of YEARS TESTED	1/ SAWFLY RATING (% Cut and Lodged)										AVE. for YEARS TESTED	% of CHECK SAWFLY 3/	10-YR COMP. AVE SAWFLY 4/
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016			
0150042-10 BRENNAN (P+)	3								0.0	0.0	0.0	0.0	0.0	0.0
NDSW0449 MOTT (+)(saw fly tol)	7				1.0	5.0	1.0	0.0	0.7	0.0	0.0	1.1	28.7	1.1
BZ902413 WB GUNNISON (P+)(sawfly tol)	6					5.0	1.0	1.0	0.0	0.0	0.0	1.2	30.3	1.2
CAP400-1 EGAN (+)	3								0.3	0.0	0.0	0.1	33.4	1.3
BZ996434 CORBIN (P+)	10	2.3	2.3	2.3	5.3	10.0	3.7	0.7	0.3	0.0	0.0	2.7	68.1	2.7
IMICHT-79 WB9879CLP (P+)	6					13.3	2.3	0.3	0.0	0.0	0.0	2.7	69.2	2.7
BZ9M1044 JEDD (P+)	7		1.0	2.3	2.3	10.0	11.7	0.0	0.7			4.0	77.7	3.1
BZ999592 ONEAL (P+)	9		1.0	3.7	2.3	16.7	8.3	0.0	0.0	0.0	0.0	3.6	88.7	3.5
CI 13596 FORTUNA (saw fly tol)	10	3.7	4.0	5.3	11.7	6.7	6.7	0.7	1.0	0.0	0.0	4.0	100.0	4.0
MT9929 CHOTEAU (+)(saw fly tol)	10	2.3	2.3	3.7	8.3	16.7	6.7	0.7	1.0	0.0	0.0	4.2	105.0	4.2
04S0512-2-2 SY TYRA (P+)	8		2.3		5.0	15.0	11.7	0.0	0.7	0.0	0.0	4.3	112.9	4.5
MT0832 DUCLAIR (+)(saw fly tol)	7				10.0	15.0	6.7	0.0	0.3	0.0	0.0	4.6	119.8	4.8
MT0245 VIDA (+)	10	3.7	6.7	8.3	10.0	18.3	10.0	0.3	0.3	0.0	0.0	5.8	145.2	5.8
ND 695 REEDER (+)	10	10.0	3.7	3.7	10.3	18.3	15.0	0.7	2.3	0.0	0.0	6.4	161.3	6.4
PI574642 McNEAL	10	16.7	6.7	21.7	20.0	20.0	25.0	1.0	7.0	0.0	0.0	11.8	297.3	11.8
ACS53610 VOLT (P+)	7		23.3	26.7	15.0	23.3	26.7	6.7	2.0			17.7	343.3	13.6
MEANS (For Entries Listed)		6.4	5.3	8.6	8.4	13.8	9.7	0.9	1.0	0.0	0.0			4.4
5/ Growing Season Precipitation (in.)		7.4	8.9	5.3	11.6	n/a	n/a	9.5	5.6	8.9	7.2	8.1		
Soil PAW (in.) to SD @ Planting		8.3	8.2	10.5	7.7	7.1	8.8	8.8	8.9	8.2	3.7	8.0		
Total Plant Available Water (in.)		15.7	17.2	15.7	19.3	n/a	n/a	18.3	14.5	17.2	10.9	16.1		
Soil NO3 (lbs.) to SD at Planting		89	n/a	42	94	50	34	34	64	41	25	53		
SD (Sampling Depth in Inches)		48	48	48	48	48	48	48	48	48	24	46		
Fertilizer Applied	(# N)	70	70	70	70	70	70	100	100	100	125	85		
	(# 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		
	(# S)	-	-	-	-	-	-	-	-	-	10	10		

Long-term check variety is Fortuna.

1/ See MCES Bulletin 1093 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.

3/ Percent of Fortuna 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 Fortuna for the same years, and z = 10-Yr average saw fly rating for the check variety Fortuna.

5/ Seeding to 14 days prior to harvest maturity.

TABLE 7. Dryland Fallow Spring Wheat Cultivar Evaluation Nursery Grown Off-Station at McKeever Farm & Seed, Inc., Loma. Northern Agricultural Research Center. Havre, Montana. 2016. (Exp# 16-9957-SW)

ID	CULTIVAR or SELECTION	STAND %	PLNT HT Inches	1/	TEST WT Lbs/Bu	MOISTURE %	2/	3/	4/
				YIELD Bu/Ac			PROTEIN %	FN seconds	SAWFLY %
WSCIA	ALUM	98.7	22.4	11.3	52.9	9.1	17.1	300	5.0
AGRIPR10	BRENNAN	97.4	18.8	6.9	54.9	9.1	18.8	336	8.3
PI633974	CHOTEAU	98.4	21.2	10.9	52.7	9.1	17.7	316	1.0
BZ996434	CORBIN	96.8	21.0	12.9	53.3	9.2	17.8	311	0.3
PI660981	DUCLAIR	99.4	23.3	16.9	54.8	9.1	17.6	328	3.7
EGAN	EGAN	98.7	20.2	11.7	51.4	9.1	19.9	338	15.0
CI 13596	FORTUNA	98.1	21.8	13.9	53.8	9.2	17.8	334	3.7
PI574642	MCNEAL	96.8	20.6	10.5	50.2	9.2	19.0	346	11.7
NDSW0449	MOTT	98.7	19.5	9.8	50.6	9.1	17.9	294	0.0
BZ999592	ONEAL	97.1	20.1	9.9	51.9	9.2	18.1	334	3.7
ND 695	REEDER	98.4	20.4	10.5	54.5	9.2	17.2	306	18.3
AGRIPR14	SY SOREN	98.7	18.8	8.5	53.1	9.0	19.5	327	20.0
AGRIPR12	SY TYRA	99.0	19.5	7.9	53.1	9.2	17.6	305	1.0
PI642366	VIDA	97.4	20.8	14.8	54.1	9.2	17.8	308	5.0
BZ92413R	WB GUNNISON	97.1	21.2	13.5	54.1	9.2	16.6	341	0.0
WB9879CLP	WB9879CLP	96.8	20.0	12.4	51.8	9.0	17.7	313	0.3
Wnfield-5	HRS 3100	98.7	19.1	10.4	52.3	9.0	17.5	326	5.0
Wnfield-4	HRS 3361	98.1	19.4	7.7	50.8	9.0	18.5	331	2.3
Wnfield-1	HRS 3504	97.8	18.0	10.4	51.8	9.1	17.1	315	13.3
Wnfield-2	HRS 3530	99.7	22.5	7.2	51.5	9.3	18.8	309	18.3
Wnfield-3	HRS 3616	95.5	22.2	5.4	50.3	8.9	18.4	309	20.0
MT 1173	MT0245/IMI8209-1//MT0245	96.2	20.2	11.0	51.4	9.3	18.0	320	2.3
MT 1316	GLENN/MT0747	98.1	20.3	12.2	51.4	9.1	18.5	305	21.7
MT 1348	MT0852/MT0858	97.4	21.9	12.5	55.1	9.2	17.9	308	8.3
MT 1401	VIDA/MT0827	96.8	21.1	15.9	54.8	9.2	17.4	319	10.0
EXPERIMENTAL MEANS		97.8	20.6	11.0	52.7	9.1	18.0	319.3	7.9
LSD (0.05)		4.6	1.9	1.7	0.7	0.1	0.4	7.6	5.1
C.V.%		2.9	5.6	9.3	0.8	0.7	1.3	1.4	39.4
P-VALUE (Varieties)		0.9887	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

1/ Volumetric yields are based on plot weights adjusted to uniform 13 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 (16-9957-SW)

Seeding Date: May 5, 2016
 Harvest Date: August 17, 2016
 Fertility: 125-20-10-10 side banded
 System: no till
 Herbicide: Bromac, 27 oz/ac
 Insecticide: none
 Previous Crop: Mechanical Fallow - Spring Wheat
 Precipitation: 6.04" seeding to harvest maturity

TABLE 8. Four-Year Yield and Test Weight Summary on Selected Entries from Dryland Fallow Spring Wheat Variety Nurseries Grown Off-Station at McKeever Farm & Seed, Inc., Loma. Northern Agricultural Research Center. Havre, Montana. 2013-2016. (Exp# 9957-SW)

2/ VARIETY or SELECTION	No. of YEARS TESTED	1/ YIELD (Bushels Per Acre)					TEST WEIGHT (Pounds Per Bushel)								
		2013	2014	2015	2016	2017	AVE. for YEARS TESTED	% of CHECK YIELD 3/	4-YR COMP. AVE. YIELD 4/	2013	2014	2015	2016	2017	AVE. for YEARS TESTED
MT0245 VIDA (+)	4	70.8	42.8	32.0	14.8	40.1	136.4	40.1	60.0	55.2	53.7	54.1	55.8	98.2	55.8
BZ996434 CORBIN (P+)	4	60.0	37.0	31.8	12.9	35.4	120.4	35.4	60.3	56.5	53.5	53.3	55.9	98.4	55.9
BZ999592 ONEAL (P+)	4	58.6	37.3	32.8	9.9	34.7	117.9	34.7	61.0	55.6	56.1	51.9	56.2	98.9	56.2
MT0832 DUCLAIR (+)(saw fly tol)	4	56.3	35.4	29.7	16.9	34.6	117.6	34.6	58.0	56.1	52.1	54.8	55.2	97.3	55.2
BZ92413R WB GUNNISON (P+)(sawfly tol)	4	58.6	35.8	30.4	13.5	34.6	117.6	34.6	62.0	57.3	54.7	54.1	57.0	100.4	57.0
P1574642 McNEAL	4	53.6	40.5	33.2	10.5	34.5	117.2	34.5	60.1	54.9	54.0	50.2	54.8	96.5	54.8
ND 695 REEDER (+)	4	60.8	35.7	30.3	10.5	34.3	116.7	34.3	60.6	55.7	54.7	54.5	56.4	99.3	56.4
IMICHT-79 WB9879CLP (P+)	4	59.2	37.3	27.8	12.4	34.2	116.2	34.2	60.7	56.0	53.5	51.8	55.5	97.7	55.5
CAP400-1 EGAN (+)	3		37.4	32.4	11.7	27.2	111.8	32.9		54.7	52.9	51.4	53.0	95.4	54.2
NDSW0449 MOTT (+)(saw fly tol)	4	61.2	32.3	26.8	9.8	32.5	110.6	32.5	60.8	57.0	53.8	50.6	55.6	97.8	55.6
MT9929 CHOTEAU (+)(saw fly tol)	4	54.7	35.0	29.0	10.9	32.4	110.1	32.4	58.9	56.1	53.4	52.7	55.3	97.3	55.3
04S0515-2-2 SY TYRA (P+)	4	57.1	33.4	27.7	7.9	31.5	107.2	31.5	61.9	56.4	54.6	53.1	56.5	99.5	56.5
0150042-10 BRENNAN (P+)	3		35.4	32.6	6.9	24.9	102.6	30.2		59.3	56.1	54.9	56.8	102.2	58.0
CI 13596 FORTUNA (saw fly tol)	4	44.7	34.3	24.7	13.9	29.4	100.0	29.4	60.4	57.7	55.2	53.8	56.8	100.0	56.8
MEANS (For Entries Listed)		58.0	36.4	30.1				33.6	60.4	56.3	54.2				55.9
5/ Growing Season Precipitation (in.)		9.0	5.1	n/a	6.0	6.7									
Soil PAW (in.) to SD @ Planting		9.1	10.4	8.8	8.7	9.3									
Total Plant Available Water (in.)		18.1	15.5	n/a	14.8	16.1									
Soil NO3 (lbs.) to SD at Planting		51	85	126	194	114									
SD (Sampling Depth in Inches)		48	48	48	48	48									
Fertilizer Applied	(# N)	100	100	100	125	106									
	(# P ₂ O ₅)	20	20	20	20	20									
	(# K ₂ O)	10	10	10	10	10									
	(# S)	-	-	-	10	10									

Long-term check variety is Fortuna.

1/ See MCES Bulletin 1093 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.

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

4/ 4-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 Fortuna for the same years, and z = 4-Yr average yield or test weight for the check variety Fortuna.

5/ Seeding to 14 days prior to harvest maturity.

TABLE 9. Four-Year Sawfly Summary on Selected Entries from Dryland Fallow Spring Wheat Variety Nurseries Grown Off-Station at McKeever Farm & Seed, Inc., Loma. Northern Agricultural Research Center. Havre, Montana. 2013-2016. (Exp# 9957-SW)

2/ VARIETY or SELECTION	No. of YEARS TESTED	1/ SAWFLY RATING (% of cut and lodged stems)						AVE. for YEARS TESTED	% of CHECK SAWFLY 3/	4-YR COMP. AVE SAWFLY 4/
		2013	2014	2015	2016	2017	2018			
BZ92413R	WB GUNNISON (P+)(sawfly tol)	4	1.0	0.0	1.0	0.0	0.5	16.7	0.5	
NDSW0449	MOTT (+)(saw fly tol)	4	1.0	0.3	1.0	0.0	0.6	19.4	0.6	
IMICHT-79	WB9879CLP (P+)	4	3.7	0.3	1.0	0.3	1.3	44.4	1.3	
BZ996434	CORBIN (P+)	4	3.7	0.0	2.3	0.3	1.6	52.7	1.6	
MT9929	CHOTEAU (+)(saw fly tol)	4	5.7	0.0	2.3	1.0	2.3	75.0	2.3	
04S0515-2-2	SY TYRA (P+)	4	7.0	0.0	4.0	1.0	3.0	100.0	3.0	
CI 13596	FORTUNA (saw fly tol)	4	5.0	1.0	2.3	3.7	3.0	100.0	3.0	
MT0832	DUCLAIR (+)(saw fly tol)	4	7.0	0.0	3.7	3.7	3.6	119.4	3.6	
MT0245	VIDA (+)	4	6.7	0.3	5.0	5.0	4.3	141.6	4.3	
BZ999592	ONEAL (P+)	4	6.7	0.7	6.7	3.7	4.4	147.2	4.4	
0150042-10	BRENNAN (P+)	3		0.3	2.3	8.3	3.7	157.1	4.7	
CAP400-1	EGAN (+)	3		0.7	3.7	15.0	6.4	276.1	8.3	
PI574642	McNEAL	4	20.0	0.7	10.0	11.7	10.6	352.7	10.6	
ND 695	REEDER (+)	4	15.0	0.7	10.0	18.3	11.0	366.5	11.0	

MEANS (For Entries Listed) 6.9 0.4 4.0 5.1 4.2

5/ Growing Season Precipitation (in.)	9.0	5.1	n/a	6.0	6.7
Soil PAW (in.) to SD @ Planting	9.1	10.4	8.8	8.7	9.3
Total Plant Available Water (in.)	18.1	15.5	n/a	14.8	16.1
Soil NO3 (lbs.) to SD at Planting	51	85	126	194	114
SD (Sampling Depth in Inches)	48	48	48	48	48
Fertilizer Applied (# N)	100	100	100	125	106
(# P ₂ O ₅)	20	20	20	20	20
(# K ₂ O)	10	10	10	10	10

Long-term check variety is Fortuna.

1/ See MCES Bulletin 1093 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.

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

4/ 4-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 Fortuna for the same years, and z = 4-Yr average saw fly rating for the check variety Fortuna.

5/ Seeding to 14 days prior to harvest maturity.

TABLE 10. Dryland Fallow Spring Wheat Cultivar Evaluation Nursery Grown Off-Station at the Kammerzell Farm, Chester. Northern Agricultural Research Center. Havre, Montana. 2016. (Exp# 16-9953-SW)

ID	CULTIVAR or SELECTION	STAND %	PLNT HT Inches	1/ YIELD Bu/Ac	TEST WT Lbs/Bu	MOISTURE %	2/ PROTEIN %	3/ FN seconds	4/ SAWFLY %
WSCIA	ALUM	94.0	29.6	22.4	51.4	9.9	17.4	267	11.7
AGRIPR10	BRENNAN	94.3	26.7	31.3	53.1	9.9	16.9	323	3.7
PI633974	CHOTEAU	98.7	27.1	24.8	49.6	9.8	17.1	311	5.3
BZ996434	CORBIN	98.0	28.9	26.8	50.6	9.9	17.1	285	13.3
PI660981	DUCLAIR	98.0	28.3	34.2	50.5	9.7	17.0	305	6.7
EGAN	EGAN	96.7	27.9	32.4	49.8	9.9	18.8	327	5.0
CI 13596	FORTUNA	97.7	33.9	24.6	53.2	10.0	17.3	319	11.7
PI574642	MCNEAL	95.3	29.0	20.3	48.3	9.9	17.4	318	16.7
NDSW0449	MOTT	94.9	30.1	19.8	49.5	9.9	17.7	295	2.0
BZ999592	ONEAL	96.7	28.4	15.3	50.1	10.0	17.2	301	15.0
ND 695	REEDER	93.3	27.5	23.1	50.2	9.9	17.6	308	16.7
AGRIPR14	SY SOREN	96.0	25.7	25.9	49.0	9.8	18.2	313	6.7
AGRIPR12	SY TYRA	95.6	25.5	20.9	47.7	9.9	17.2	290	3.7
PI642366	VIDA	97.4	26.1	23.0	48.5	10.0	17.6	301	5.3
BZ92413R	WB GUNNISON	94.4	24.9	18.3	51.8	9.8	16.4	305	4.0
WB9879CLP	WB9879CLP	96.4	27.1	21.4	48.9	9.9	16.9	296	10.3
Wnfield-5	HRS 3100	96.1	26.5	21.0	47.0	9.8	17.0	308	0.7
Wnfield-4	HRS 3361	95.3	27.1	21.8	46.1	9.8	17.1	304	1.0
Wnfield-1	HRS 3504	95.7	25.6	19.6	45.7	9.8	17.3	314	4.0
Wnfield-2	HRS 3530	96.0	29.8	21.4	49.5	10.0	17.6	302	13.3
Wnfield-3	HRS 3616	95.4	28.0	24.7	48.3	9.9	17.9	312	10.0
MT 1173	MT0245/IMI8209-1/MT0245	94.1	28.3	12.0	46.1	9.9	17.8	289	18.3
MT 1316	GLENN/MT0747	97.0	25.4	23.8	47.4	9.9	17.7	304	18.3
MT 1348	MT0852/MT0858	96.0	29.8	27.8	51.4	9.9	17.3	303	16.7
MT 1401	VIDA/MT0827	97.7	28.4	29.8	53.0	10.0	16.6	314	13.7
EXPERIMENTAL MEANS		96.0	27.8	23.5	49.5	9.9	17.4	304.6	9.4
LSD (0.05)		4.4	2.9	2.1	0.8	0.1	0.3	6.8	7.2
C.V.%		2.8	6.4	5.6	1.0	0.7	1.1	1.4	47.1
P-VALUE (Varieties)		0.6777	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001

1/ Volumetric yields are based on plot weights adjusted to uniform 13 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 (16-9953-SW)

Seeding Date: May 5, 2016
 Harvest Date: August 23, 2016
 Fertility: 125-20-10-10 side banded
 System: no till
 Herbicide: none
 Insecticide: none
 Previous Crop: Chemical Fallow - Spring Wheat
 Precipitation: 8.28" seeding to harvest maturity

TABLE 11. Three-Year Yield and Test Weight Summary on Selected Entries from Dryland Fallow Spring Wheat Variety Nurseries Grown Off-Station at the Kammerzell Farm, Chester. Northern Agricultural Research Center. Havre, Montana. 2014-2016. (Exp# 9953-SW)

2/ VARIETY or SELECTION	No. of YEARS TESTED	1/ YIELD (Bushels Per Acre)						TEST WEIGHT (Pounds Per Bushel)									
		2014	2015	2016	2017	2018	AVE. for YEARS TESTED	% of CHECK YIELD 3/	3-YR COMP. AVE YIELD 4/	2014	2015	2016	2017	2018	AVE. for YEARS TESTED	% of CHECK TEST WT 3/	3-YR COMP. AVE TEST WT 4/
0150042-10 BRENNAN (P+)	3	43.0	24.3	31.3			32.8	129.1	32.8	56.5	58.2	53.1			56.0	101.1	56.0
MT0832 DUCLAIR (+)(saw fly tol)	3	40.3	16.1	34.2			30.2	118.7	30.2	52.6	53.6	50.5			52.2	94.4	52.2
CAP400-1 EGAN (+)	3	33.9	22.6	32.4			29.6	116.4	29.6	53.3	55.5	49.8			52.9	95.5	52.9
BZ996434 CORBIN (P+)	3	36.4	21.3	26.8			28.2	110.7	28.2	54.3	55.5	50.6			53.4	96.5	53.4
MT0245 VIDA (+)	3	37.0	22.8	23.0			27.6	108.5	27.6	52.8	56.7	48.5			52.7	95.2	52.7
BZ92413R WB GUNNISON (P+)(sawfly tol)	3	38.3	23.1	18.3			26.6	104.4	26.6	54.5	56.8	51.8			54.4	98.2	54.4
ND 695 REEDER (+)	3	34.4	22.0	23.1			26.5	104.1	26.5	54.0	56.6	50.2			53.6	96.8	53.6
PI574642 McNEAL	3	34.6	22.3	20.3			25.7	101.2	25.7	53.7	56.1	48.3			52.7	95.2	52.7
04S0515-2-2 SY TYRA (P+)	3	34.7	21.5	20.9			25.7	101.0	25.7	53.7	57.1	47.7			52.8	95.4	52.8
CI 13596 FORTUNA (saw fly tol)	3	33.4	18.3	24.6			25.4	100.0	25.4	55.2	57.7	53.2			55.3	100.0	55.3
NDSW0449 MOTT (+)(saw fly tol)	3	36.4	18.3	19.8			24.8	97.6	24.8	53.9	58.7	49.5			54.0	97.7	54.0
MT9929 CHOTEAU (+)(saw fly tol)	3	29.9	18.3	24.8			24.3	95.7	24.3	53.3	55.7	49.6			52.9	95.6	52.9
IMICHT-79 WB9879CLP (P+)	3	33.1	18.1	21.4			24.2	95.1	24.2	54.1	56.6	48.9			53.2	96.1	53.2
BZ999592 ONEAL (P+)	3	33.6	19.8	15.3			22.9	90.0	22.9	55.8	58.4	50.1			54.8	99.0	54.8
MEANS (For Entries Listed)		35.6	20.6	24.0					26.8	54.1	56.7	50.1					53.6
5/ Growing Season Precipitation (in.)		n/a	5.0	8.3			6.6										
Soil PAW (in.) to SD @ Planting		13.7	9.8	n/a			11.7										
Total Plant Available Water (in.)		n/a	14.8	n/a			14.8										
Soil NO3 (lbs.) to SD at Planting		257	251	n/a			254										
SD (Sampling Depth in Inches)		48	48	48			48										
Fertilizer Applied	(# N)	100	100	125			108										
	(# P ₂ O ₅)	20	20	20			20										
	(# K ₂ O)	10	10	10			10										
	(# S)	-	-	10			10										

Long-term check variety is Fortuna.

1/ See MCES Bulletin 1093 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.

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

4/ 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 Fortuna for the same years, and z = 3-Yr average yield or test weight for the check variety Fortuna.

5/ Seeding to 14 days prior to harvest maturity.

TABLE 12. Three-Year Sawfly Summary on Selected Entries from Dryland Fallow Spring Wheat Variety Nurseries Grown Off-Station at Kammerzell Farm, Chester. Northern Agricultural Research Center. Havre, Montana. 2014-2016. (Exp# 9953-SW)

2/ VARIETY or SELECTION	No. of YEARS TESTED	1/ SAWFLY RATING (% of cut and lodged stems)						
		2014	2015	2016	2017	AVE. for YEARS TESTED	% of CHECK SAWFLY 3/	3-YR COMP. AVE. SAWFLY 4/
NDSW0449 MOTT (+)(saw fly tol)	3	15.0	0.0	4.0		2.6	41.8	2.6
CAP400-1 EGAN (+)	3	6.7	0.0	3.7		2.9	47.3	2.9
IMICHT-79 WB9879CLP (P+)	3	3.7	0.0	5.3		3.7	60.0	3.7
BZ92413R WB GUNNISON (P+)(sawfly tol)	3	3.7	0.0	6.7		3.9	63.6	3.9
0150042-10 BRENNAN (P+)	3	5.0	0.0	5.0		3.9	63.8	3.9
MT0245 VIDA (+)	3	18.3	0.0	10.3		4.7	76.3	4.7
BZ999592 ONEAL (P+)	3	3.7	0.0	13.3		4.8	78.2	4.8
MT9929 CHOTEAU (+)(saw fly tol)	3	5.7	0.0	2.0		5.7	92.7	5.7
PI574642 McNEAL	3	7.0	0.0	3.7		5.7	92.7	5.7
BZ996434 CORBIN (P+)	3	1.0	0.0	11.7		6.1	100.0	6.1
CI 13596 FORTUNA (saw fly tol)	3	6.7	0.0	15.0		6.2	101.8	6.2
ND 695 REEDER (+)	3	6.7	0.0	16.7		7.8	127.3	7.8
04S0515-2-2 SY TYRA (P+)	3	13.3	0.0	5.3		7.9	129.1	7.9
MT0832 DUCLAIR (+)(saw fly tol)	3	5.0	0.0	16.7		7.9	129.1	7.9
MEANS (For Entries Listed)		7.2	0.0	8.5				5.3
5/ Growing Season Precipitation (in.)		n/a	5.0	8.3		6.6		
Soil PAW (in.) to SD @ Planting		13.7	9.8	n/a		11.7		
Total Plant Available Water (in.)		n/a	14.8	n/a		14.8		
Soil NO3 (lbs.) to SD at Planting		257	251	n/a		254		
SD (Sampling Depth in Inches)		48	48	48		48		
Fertilizer Applied	(# N)	100	100	125		108		
	(# P ₂ O ₅)	20	20	20		20		
	(# K ₂ O)	10	10	10		10		
	(# S)	-	-	10		10		

Long-term check variety is Fortuna.

1/ See MCES Bulletin 1093 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.

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

4/ 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 Fortuna for the same years, and z = 3-Yr average saw fly rating for the check variety Fortuna.

5/ Seeding to 14 days prior to harvest maturity.